Airbus SAceo

ATA 36

LIEBHERR

Liebherr-Aerospace

Agenda

1 **Introduction and presentation**

2 SAceo - Fleet Performance

3 SAceo - ATA36 - Available solutions and mitigations

4 SA - ATA21 - AIR PACK REGUL FAULT

5 SA ATA21 - FCV 1806D0000-02 design improvement status

Presenters

Name	Position	Location
Elisabeth Dahan	Technical Support Manager	Liebherr Aerospace Toulouse - France
Francisco Morales	Product Support Manager	Liebherr Aerospace Toulouse - France

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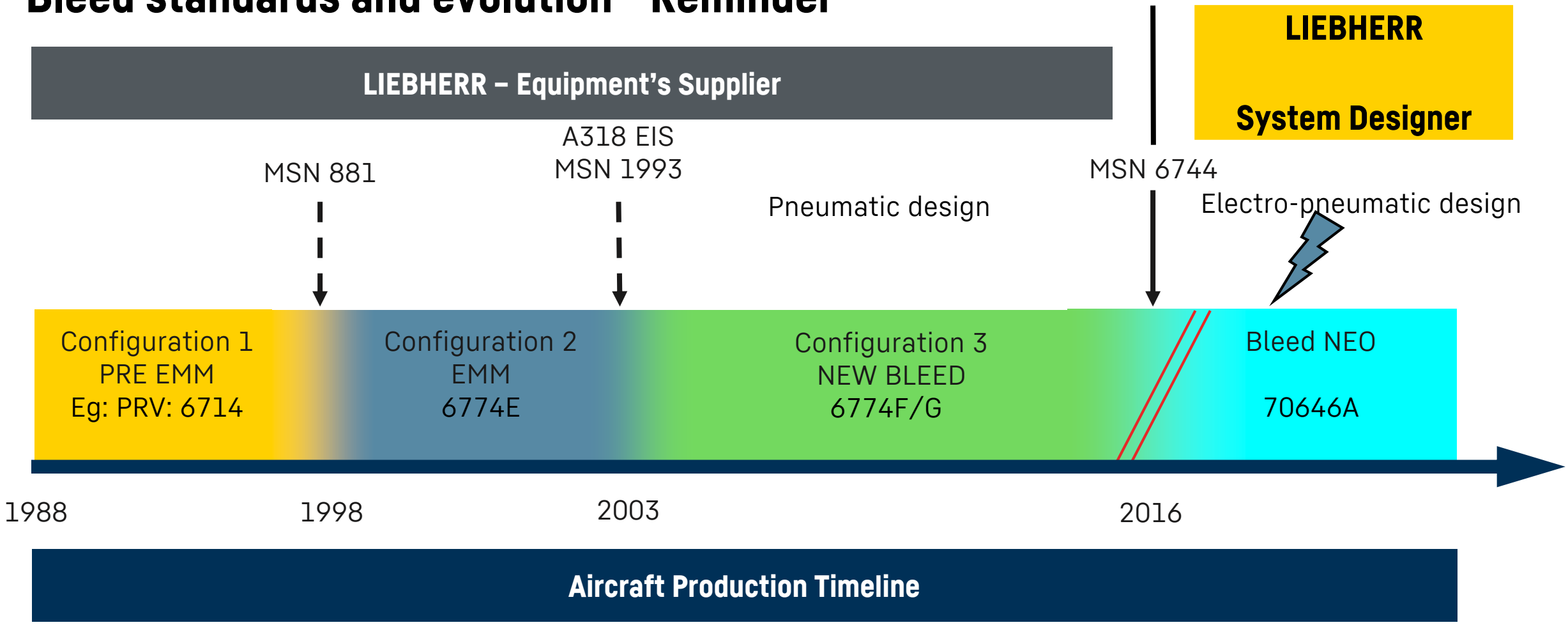
Bleed standards and evolution - Reminder

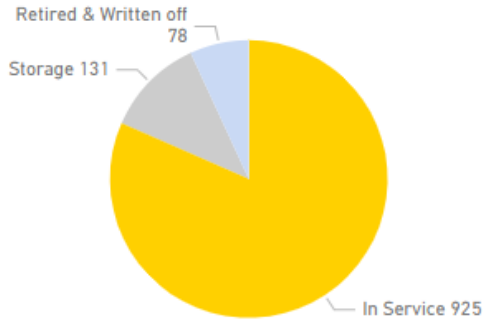


Airbus A320ceo Fleet Status – APAC Region

Operator: Region > Count...	Operator Name	Manufacturer > Family > Type	Engine Type	Status
Asia	Tout	Plusieurs sélections	Tout	Tout

1 134	1 056	11,4
Total Nb MSN	In Service + Stored *(88 % In service)*	Average Age

Nb aircraft (MSNs) per Status



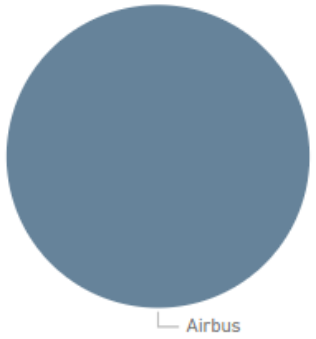
Nb aircraft (MSNs) per Operator Region

Total nb of MSNs with Delivery date this Year

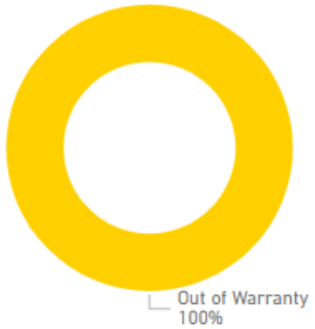
Année	Total
AER Region	
Total	

Focus "In Service" aircraft 925

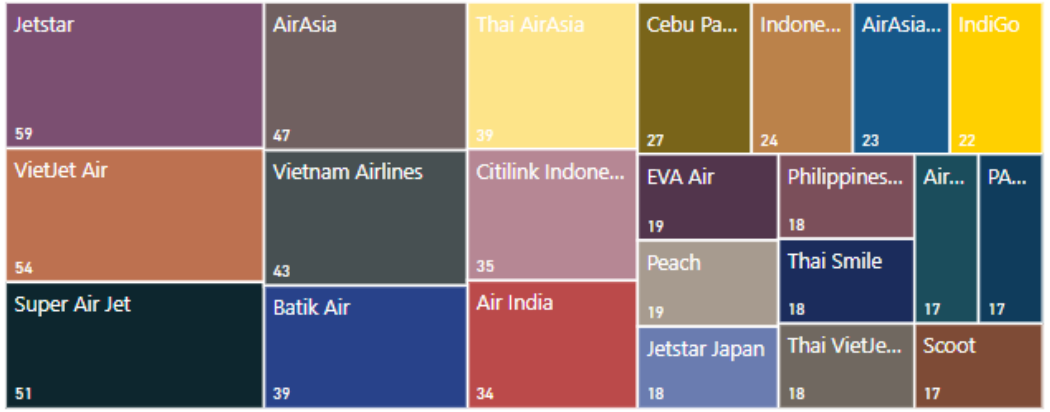
Number of aircraft in service per Manufacturer



Nb aircraft (MSNs) per Warranty status



Number of aircraft in service per Operator (Top 20)



Targeted solutions to optimize aircraft operation – Airbus ISI 36.00.00021

		AIR ENG HP VALVE FAULT	AIR ENG BLEED NOT CLSD - PRV	TLT Misbehaviour - 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 [INTERNAL	AIR ENG BLEED ABNORM PR - OTHERS [INTERNAL]
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 heath 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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Our preventive maintenance approach

Our philosophy: identify maintenance actions on the valve bringing reliability benefits while remaining cost-effective

Our solution: preventive maintenance kits

➔LTS identified MAINTENANCE SUPPORT PACKAGE, a list of parts to be replaced in repair shop:

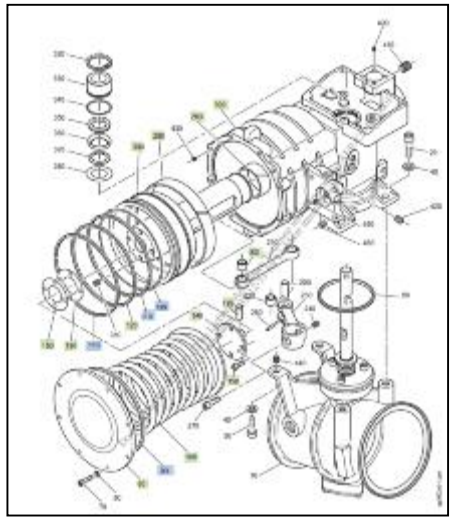
- It is based on root cause analysis results, shop major findings, shop repair experience and engineering feedback.
- It does not require a heavy disassembly of the valve (overhaul) that would be costly in term of labor
- Instead, it **targets the most sensitive parts**

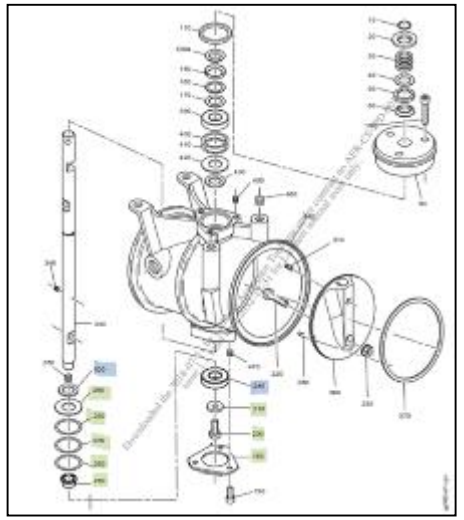
➔A thorough CLEANING of the subassemblies is also recommended to help reduce mechanical blockages.

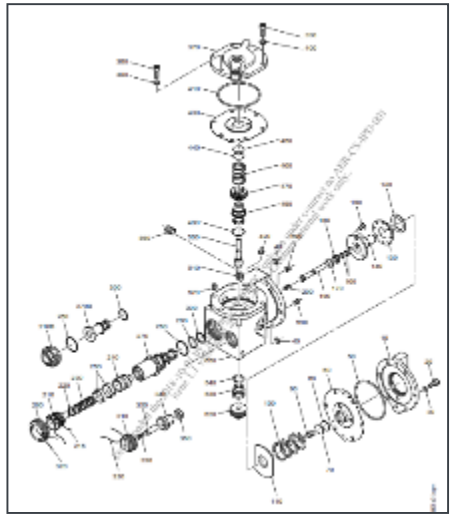
“CLASSIC” REPAIR :
When valve comes back at the shop, only faulty subassembly is repaired (cleaning + parts replacement)

VS

WITH THE SUPPORT PACKAGE :
When valve comes back at the shop, all the sub assemblies are cleaned + defined parts replaced.







Specific parts replacement in Liebherr shop

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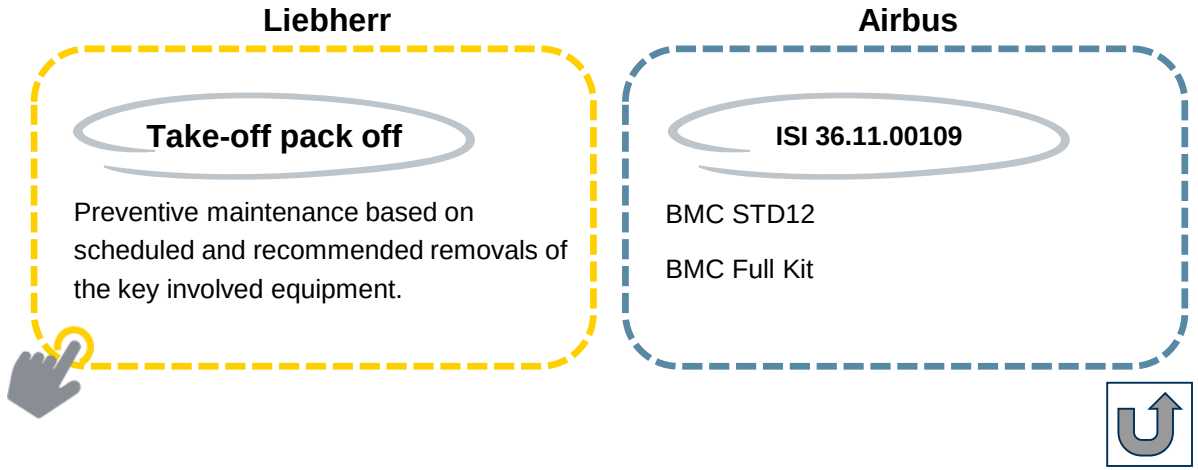
Take-Off / Packs OFF - Solution and Mitigations

Take-Off / Packs OFF System

Overview



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

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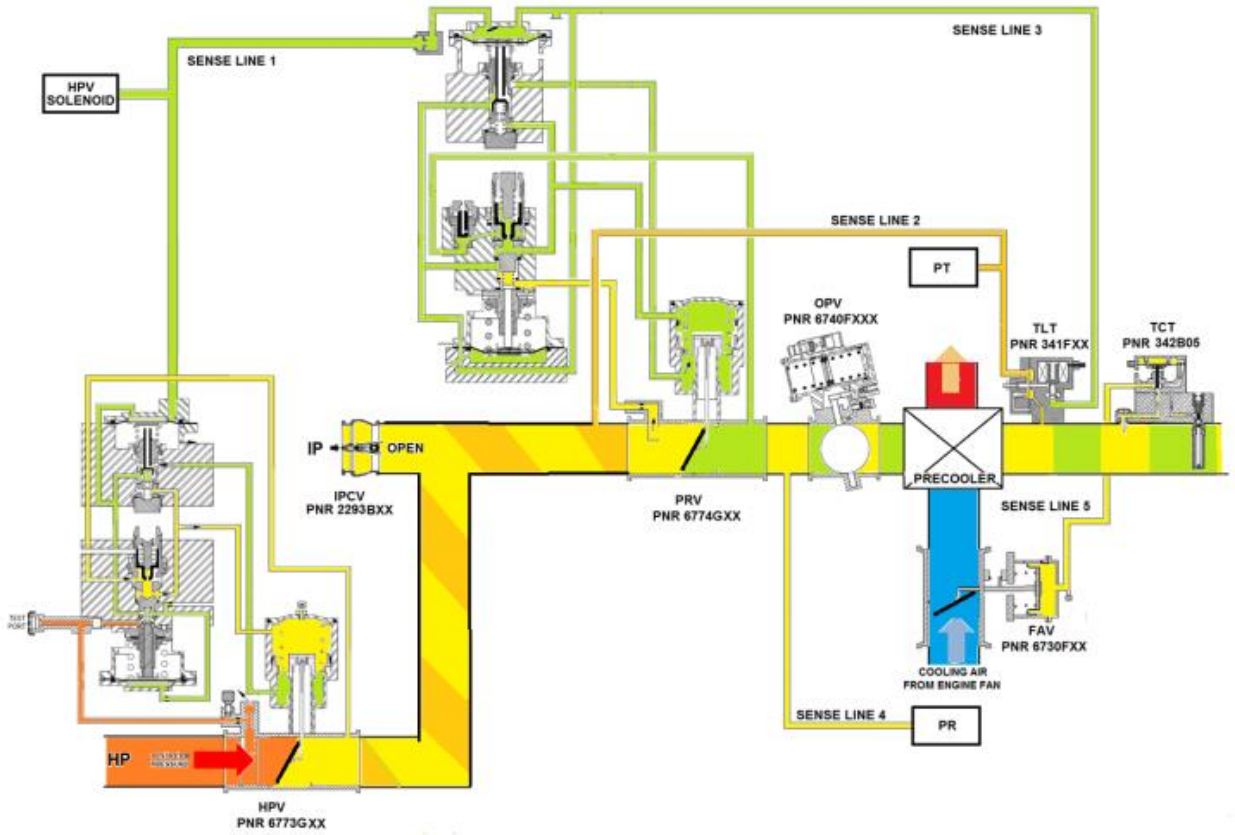
Engine Bleed Abnormal Press – Support Solutions & Maintenance



Liebherr

System performance

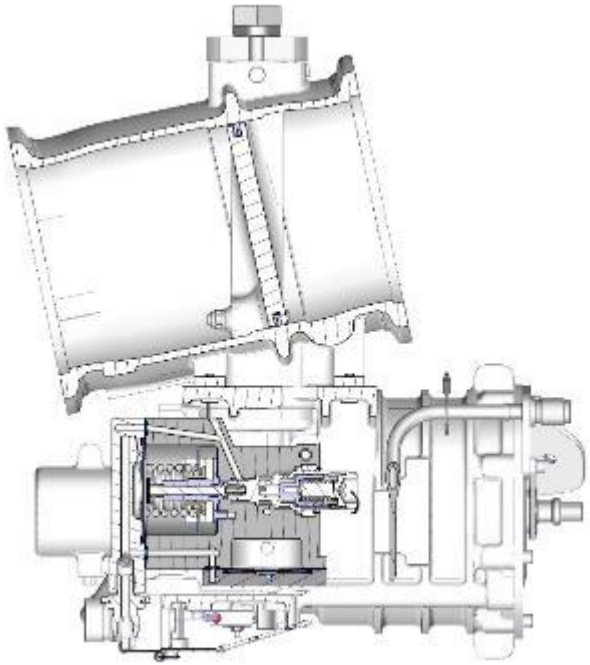
Addressing the key system performance drivers to prevent and avoid the in-service occurrences due to Abnormal press.

Abnorm_Press

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

Engine Bleed Abnormal Press – PRV functional test

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

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 valu e shown on the LCD (5).	On the test set: - The pressure is more or equal to 5.8 psi (0.40 bar).

Scenario 1: no leak in HPV/PRV sense-line

Scenario 2: leak in HPV/PRV sense-line

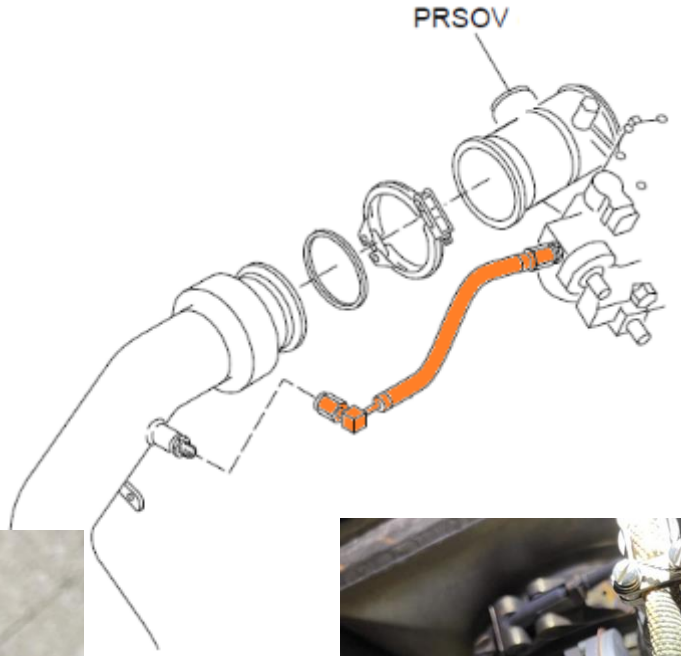
Sense-Line Tester kit SBE2213 applicable with Liebherr and Airbus Bleed Test Set

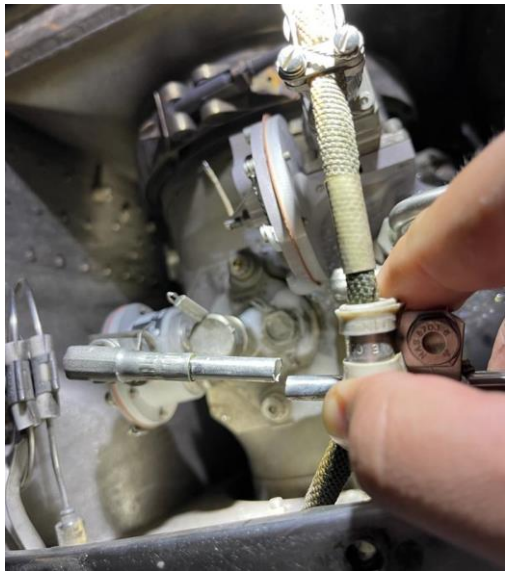
Sense-lines checks

Sense Lines check:

Sense lines connection to the Bleed Valves (HPV; PRV; FAV) and associated Thermostats (TLT; TCT) must be in good condition. It is important to look for following parameters during scheduled checks and troubleshooting:

- Disconnection
- Leak
- Pinch
- Union conditions





Liebherr Bleed Test Set

A new SIL **LS99127-36-03** was released in May 2023 to raise awareness on the importance of maintaining the GSE pertaining to Liebherr Bleed Test kits.

It is often noticed, at the opportunity of Liebherr visit that some tools are damaged but continue to be used “as-is” for Bleed functional tests.

LS99127-36-03 released in May 2023

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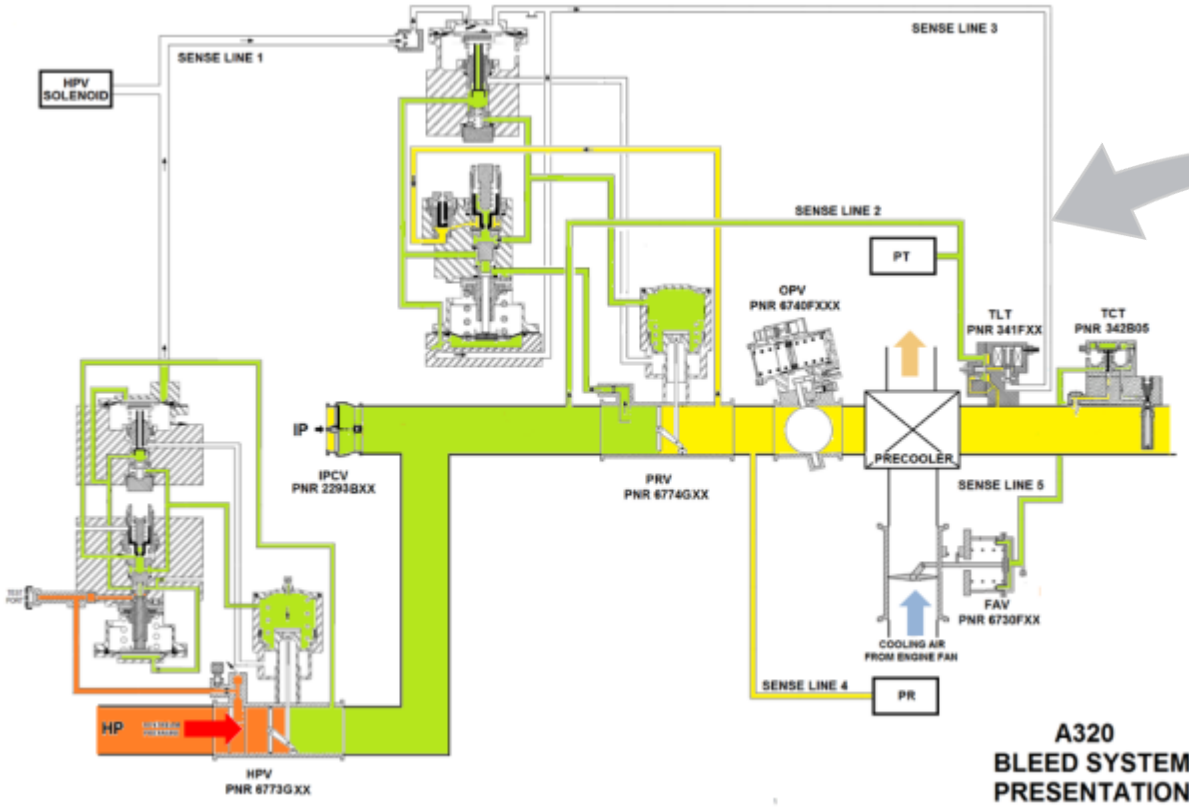
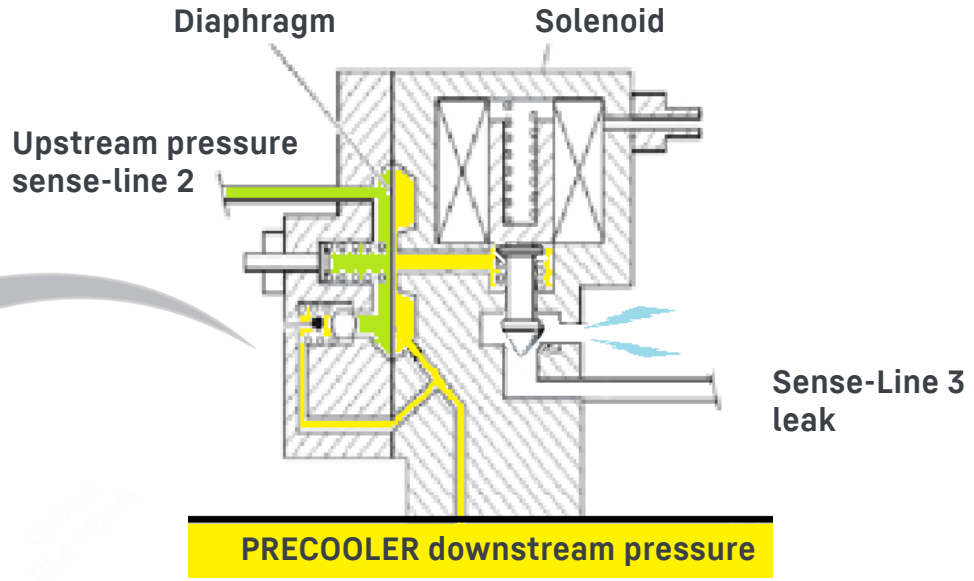
Engine Reverse Flow at start sequence – TLT function

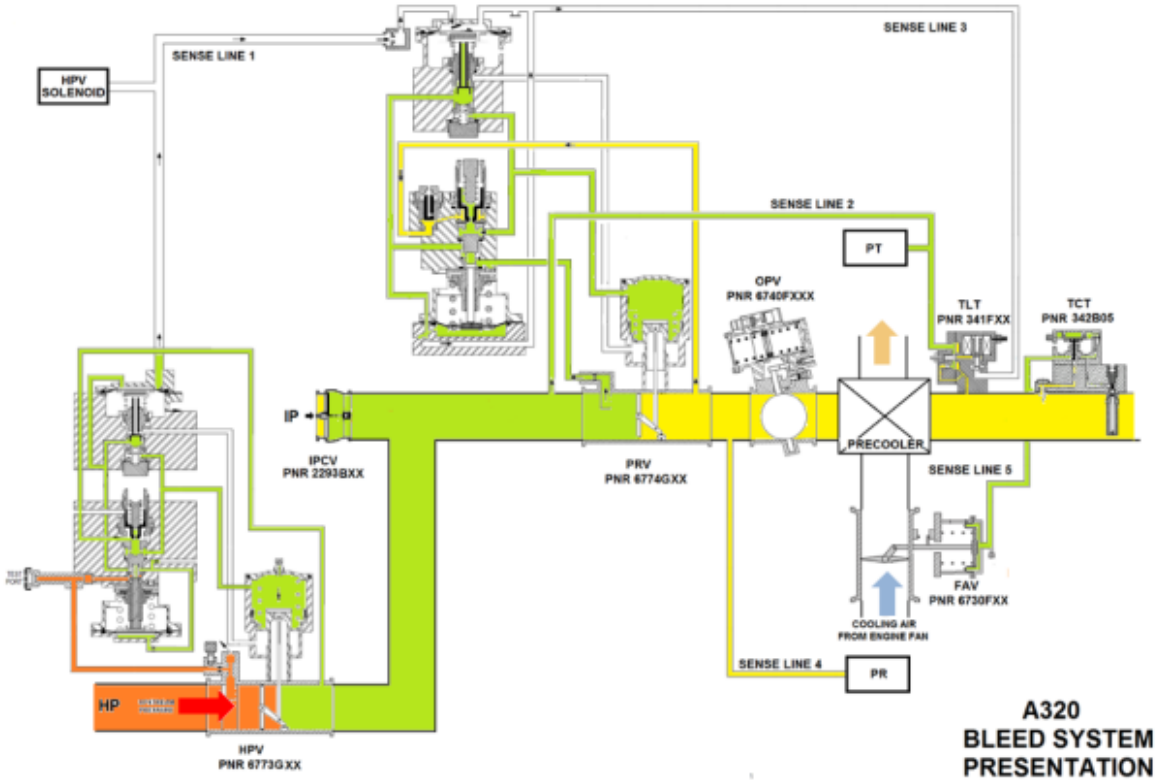




/// Behaviour of the TLT Non-Return function

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.

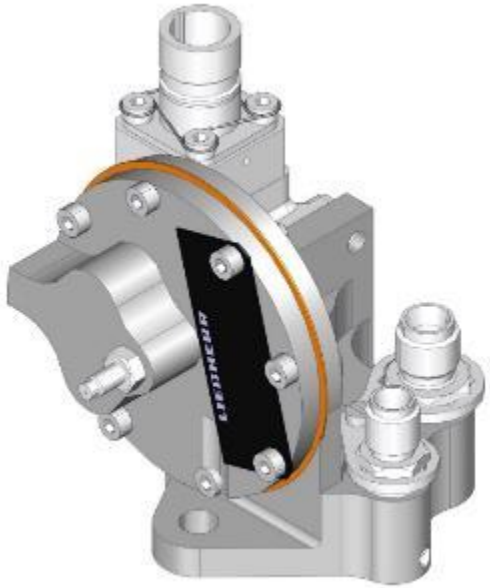


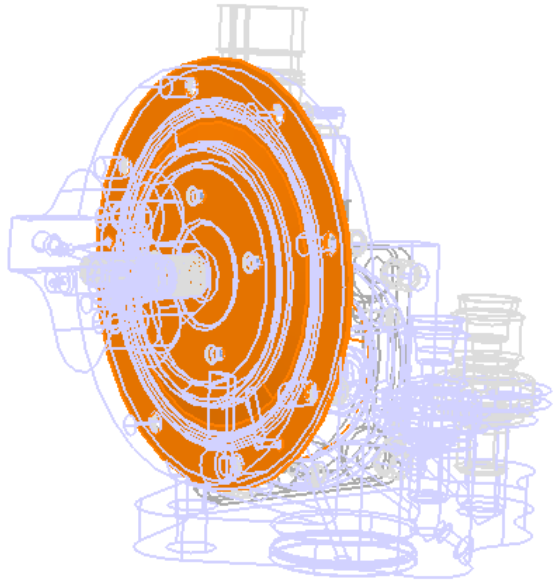
/// Complete failure of TLT reverse flow function just after the engine start sequence with APU Bleed (10s) may lead to engine stall.

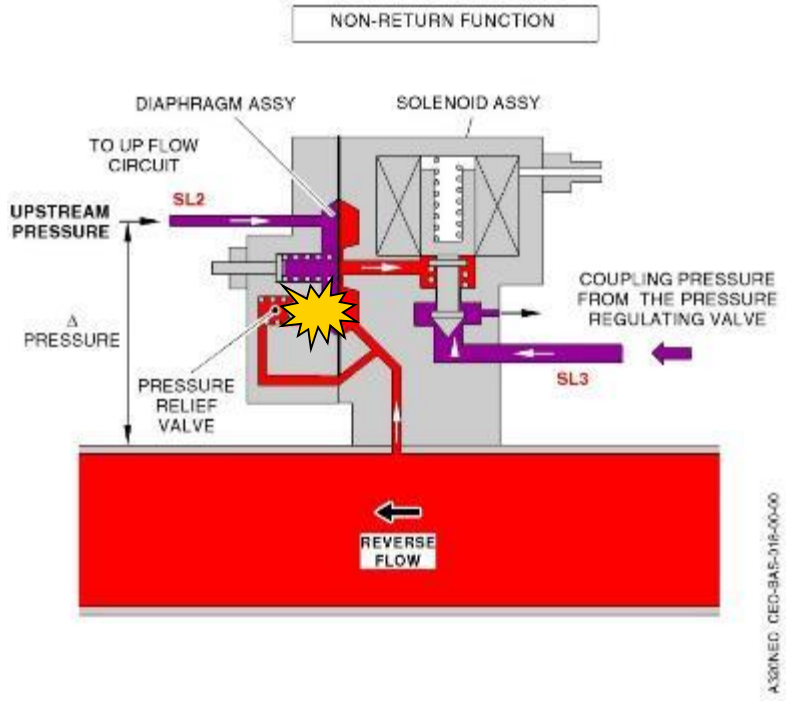
Engine Reverse Flow - TLT 341F010000 manufacturing evolution

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

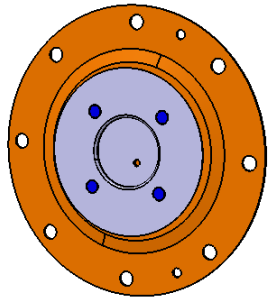






Engine Reverse Flow - TLT 341F01 manufacturing evolution

The modification will consists 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.

Year 2021	Available
New design Qualification validation completion	New P/N **341F020000**

VSB 341F-36-01 available since July 2022

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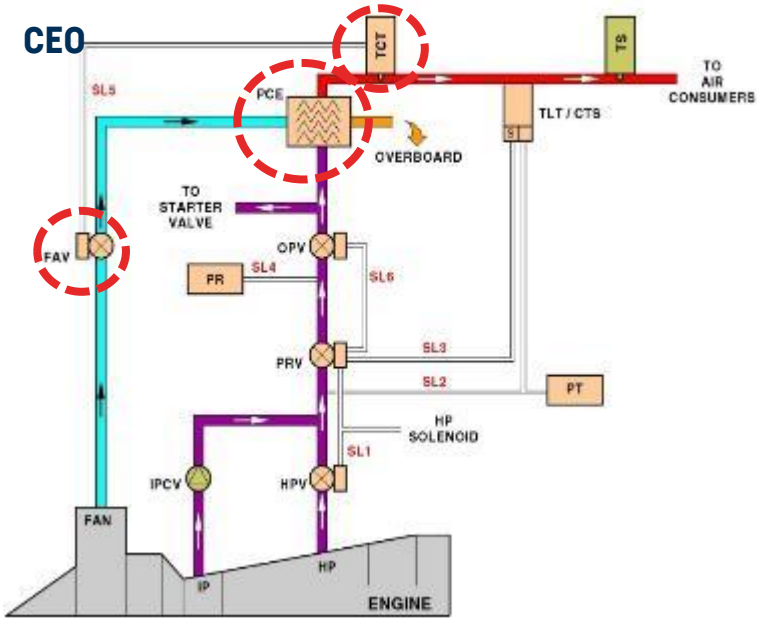
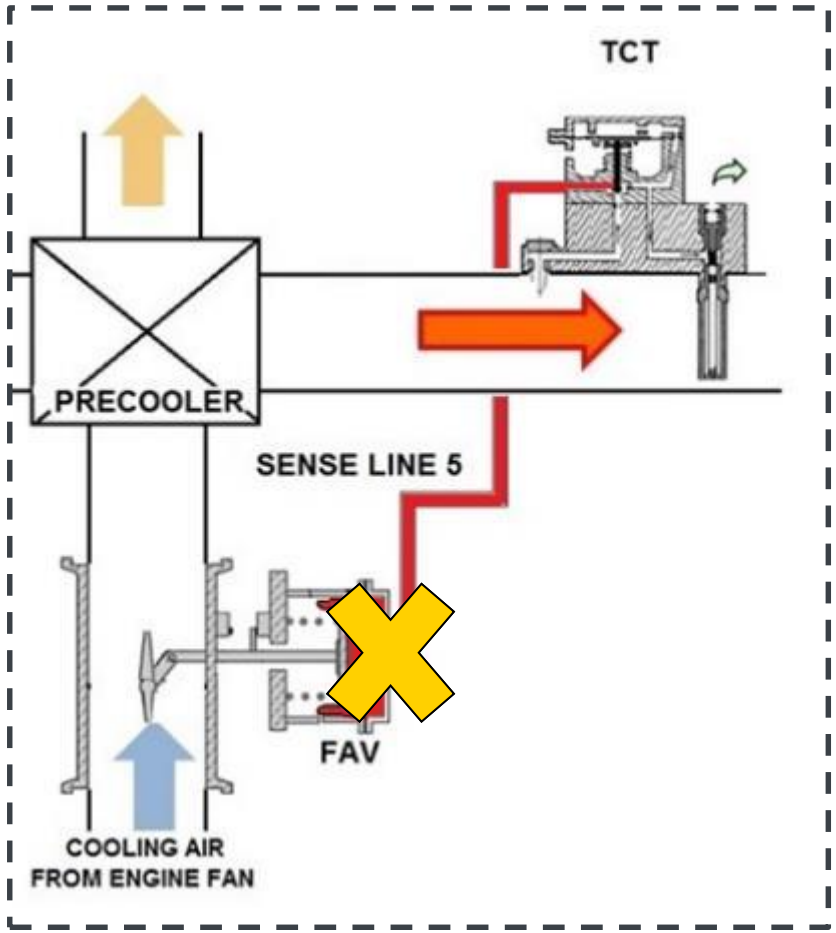
Engine Bleed Low Temp





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.

Temp_Regul