

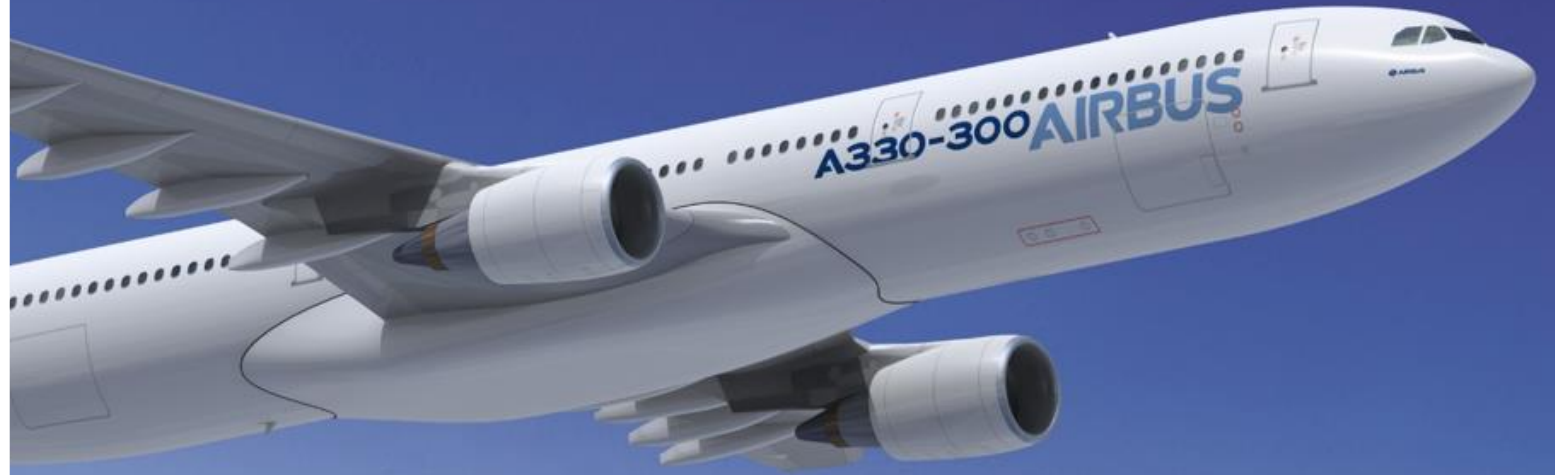
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**RTW 2023**  
**Airbus**  
**A330CEO**  
**ATA 36**

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**LIEBHERR**

Liebherr-Aerospace Toulouse SAS



# Presenters



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Name	Position	Location
Elisabeth <b>DAHAN</b>	<b>Technical Support Engineer</b>	Liebherr Aerospace Toulouse - France
Morgan <b>GUYOMAR</b>	<b>Technical Support Engineer</b>	Liebherr Aerospace Toulouse - France
Jonathan <b>CLARK</b>	<b>Technical Support Engineer</b>	Liebherr Aerospace Toulouse - France



# Summary

- 1 A330 Fleet Status 4
- 2 Brief System Training 6
- 3 Engine Bleed Not Closed - Airbus / Liebherr ISE Status 10
- 4 PRV Lock-up - VSB Release 13
- 5 HPV NOT OPEN 15



# Summary



<b>1 A330 Fleet Status</b>	<b>4</b>
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# Airbus A330ceo Fleet Status - APAC

- ▼ ■ Asia
- ▼ ■ China
- ^ □ Airbus
- ^ □ Long Range
- A330
- A330 NEO
- A340
- A340-500/600

Operator: Region > Count... Operator Name Manufacturer > Family > Type Engine Type Status

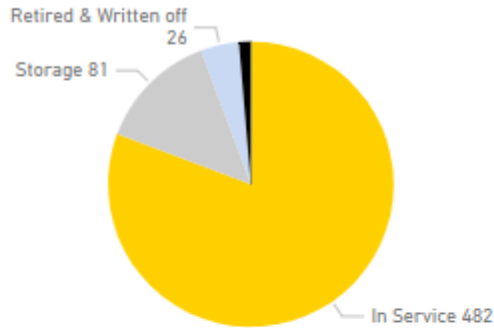
Plusieurs sélections ▼ Tout ▼ Plusieurs sélections ▼ Tout ▼ Tout ▼

**597** Total Nb MSN

**563** In Service + Stored (86 % In service)

**12,1** Average Age

Nb aircraft (MSNs) per Status



Nb aircraft (MSNs) per Operator Region



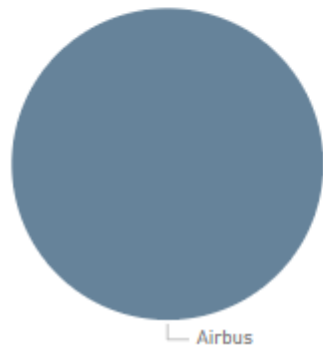
Total nb of MSNs with Delivery date this Year

Année	Total
AER Region	
<b>Total</b>	

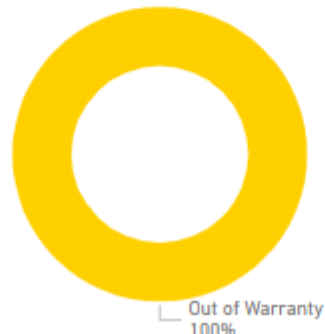
## Focus "In Service" aircraft

482

Number of aircraft in service per Manufacturer



Nb aircraft (MSNs) per Warranty status



Number of aircraft in service per Operator (Top 20)

China Eastern Airlines	China Southern Airlines	Qantas	China Air...	Asiana ...	Sichuan ...
52	35	25	16	15	15
Air China	Cathay Pacific	Korean Air	AirAsia X	SriLank...	Capita...
50	34	24	13	11	10
	Hainan Airlines	Malaysia Airlines	EVA Air	Philippi...	Royal ...
	31	24	12	9	7
			Garuda Ind...	Air Hon...	VietJe...
			11	8	7



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# Brief System Training

## – System functions:

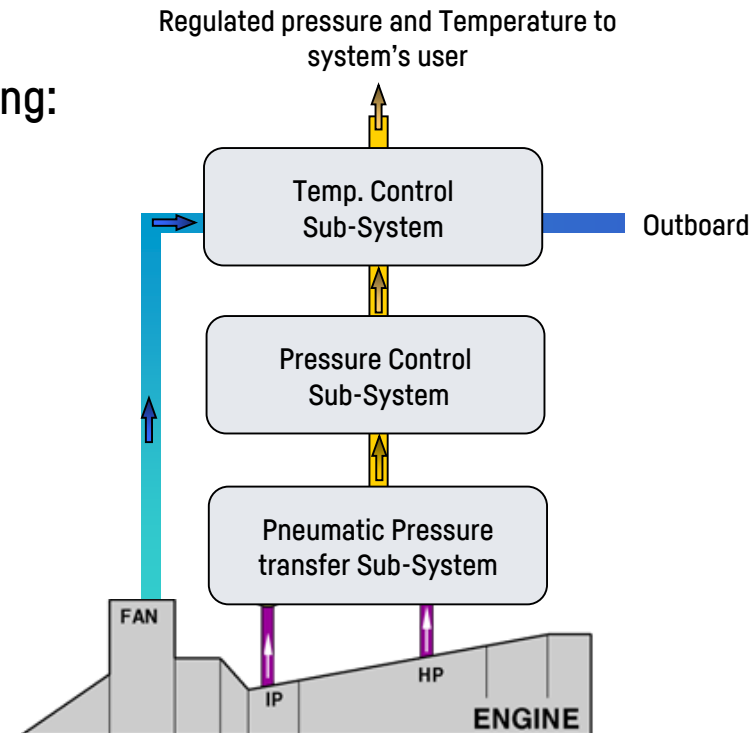
The main functions of the Engine Bleed Air System are the following:

### Three Main Sub-System

- Engine Bleed Port Selection
- Pressure Control
- Temperature Control

### System Functions:

- Protection against reverse flow
- Engine Bleed Air System condition monitoring and control
- Engine Bleed Port Isolation



# Brief System Training

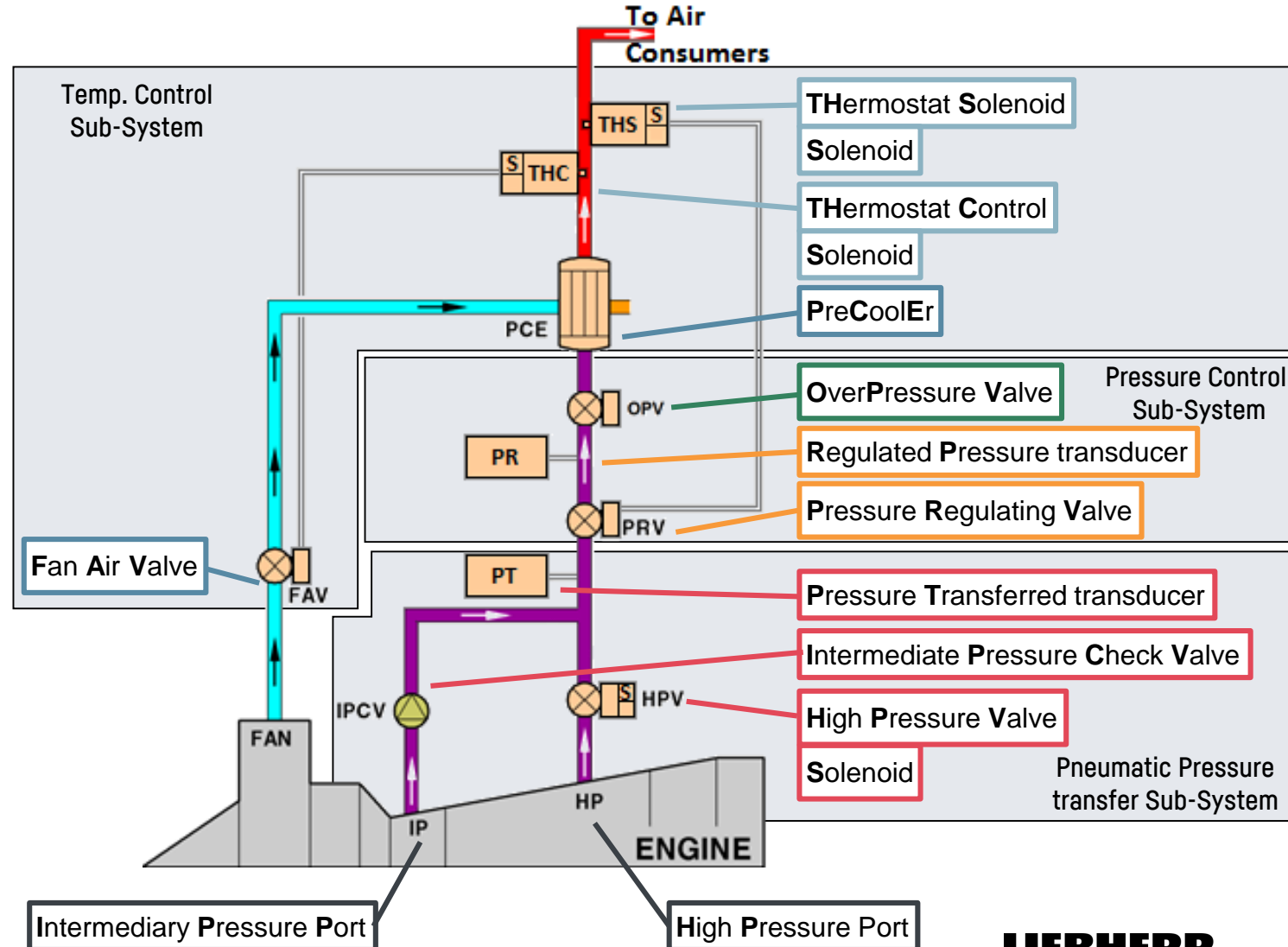
## – ATA36 equipment details

Equipment	Part Number
THC	398
THS	397
PCE	❖ 11-811538
PR	❖
PT	❖
OPV	❖ 6743
FAV	6733
PRV	6764
IPCV	2292
HPV	6763
BMC	❖

❖ Equipment not under Liebherr responsibility

Monitored by

**Bleed Monitoring Computer**





# Brief System Training

## – ATA36 equipment details

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Monitored by

**Bleed Monitoring Computer**

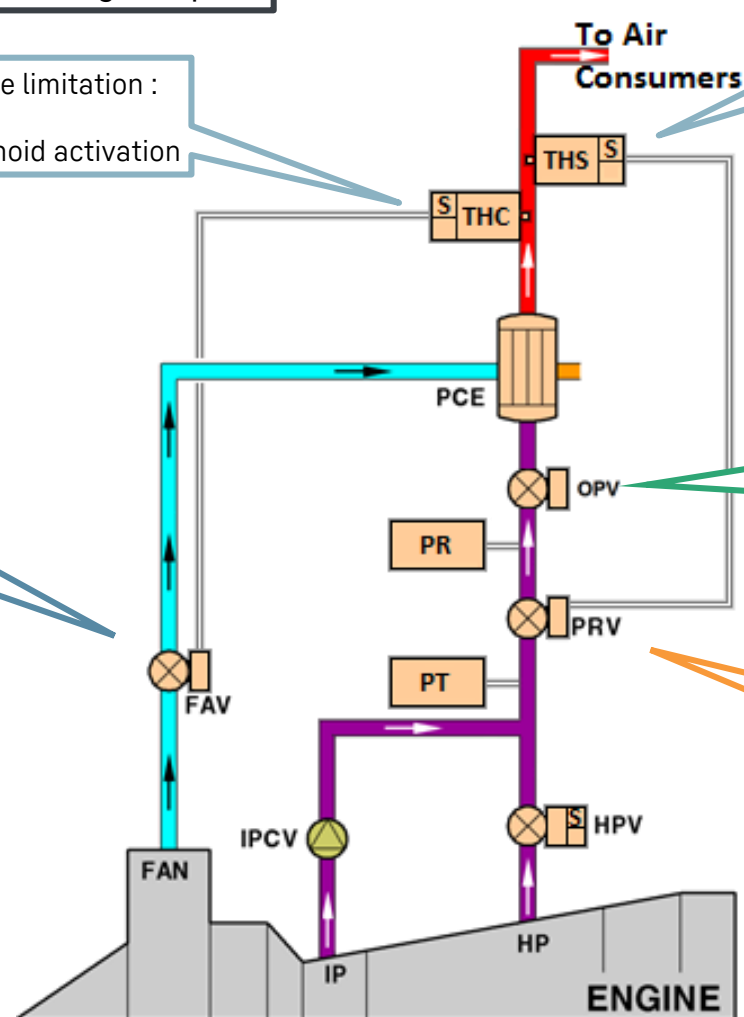
Temperature limitation :  
200°C  
150°C solenoid activation

Solenoid activation → PRV closure

Butterfly valve  
commanded by THC

**OPV closure :**  
5.86 +0 / 0.69 barg  
(85 +0 /-10 psig)  
**OPV reopening :**  
Below 3.58 ± 0.2 barg  
Below 52 ±3 psig

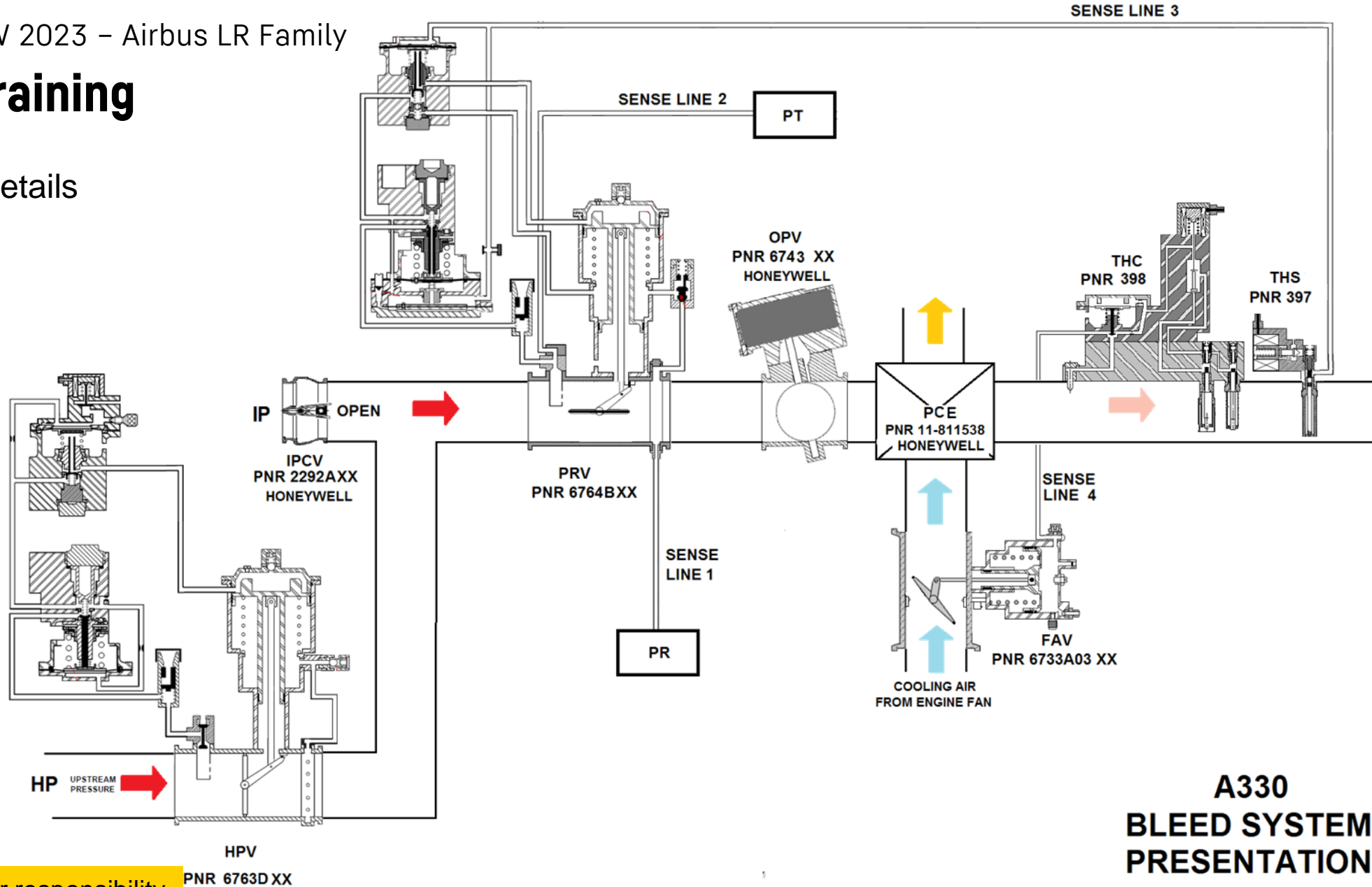
**PRV regulated pressure :**  
3.31 ± 0.28 barg  
(48 ± 4 psig)



# Brief System Training

– ATA36 equipment details

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**A330  
BLEED SYSTEM  
PRESENTATION**

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# Engine Bleed Not Closed – Airbus / Liebherr ISE Status

## Context:

“AIR ENG BLEED NOT CLSD” ECAM warning reported on A330 Fleet

- PRV failed to close.

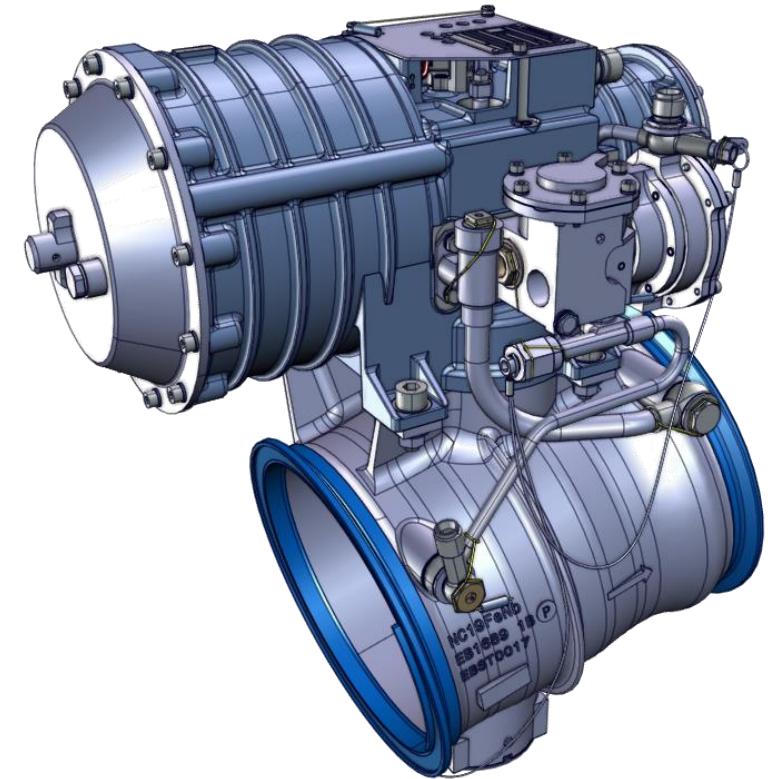
## Investigation :

With current PRV design, Air pressure is needed to ensure that the valve closure in all condition.

- During engine shutdown, not enough pressure to close the valve when APU bleed pressure is not available.

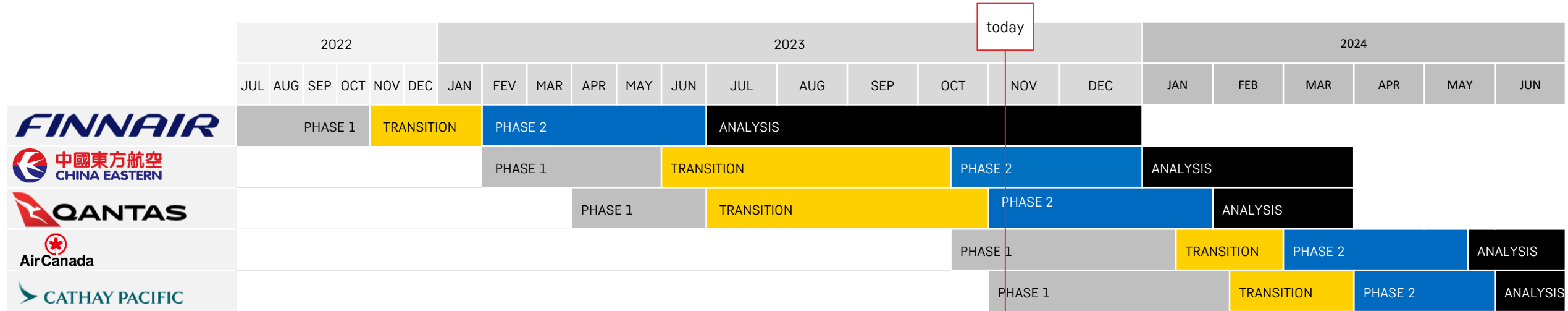
## Mitigation on 3 axis :

- AIB documentation modification (TSM & FCOM),
- Predictive maintenance algorithm,
- Preventive maintenance workscope (ISE).



**PRV 6764B040000 Amdt A &  
6764B060000**

# Engine Bleed Not Closed – Airbus / Liebherr ISE Status



- Shall be reduced as much as possible
- Shall be made “in the flow”

Phase 1 : Data analysis for EBNC characterization & Aircraft candidate selection

Phase 2 : Data analysis

Preventive Maintenance EBNC Workscope description :  
 Inspection of several components (ie ring guide, ring sealing, spring, washer...) for Body actuator S/A, butterfly S/A, regulator S/A for sign of wear or heavy pollution.  
 → Clean or replace if necessary

10 PRVs = 4 with EBNC preventive maintenance + 4 with standard repair + 2 new



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# PRV Lock-up – VSB Release

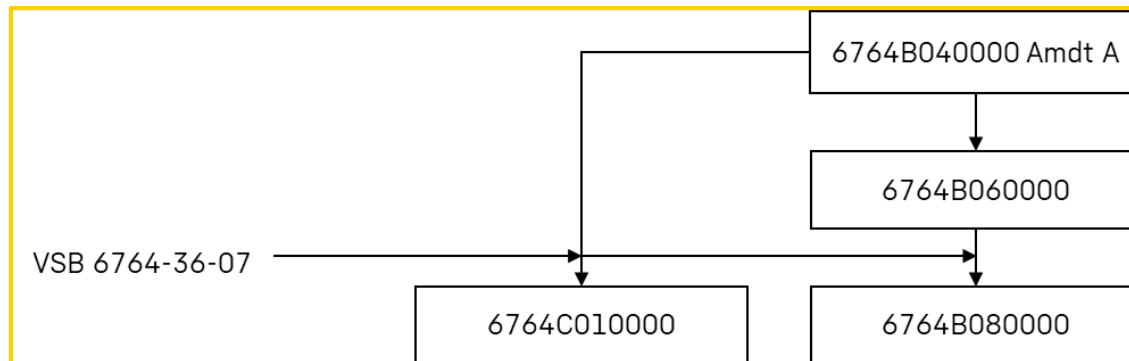
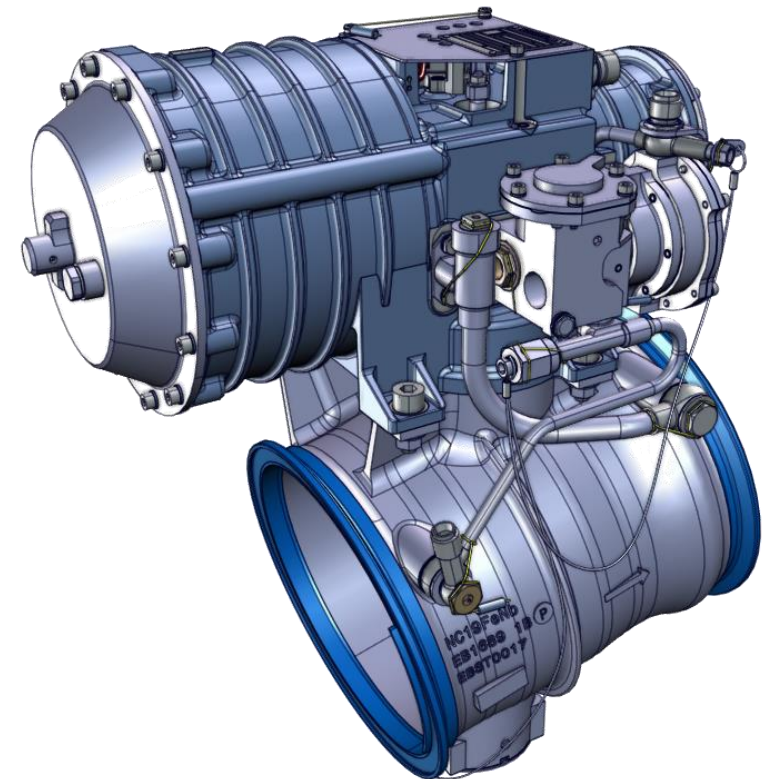
PRV improvement not related to EBNC

## Context:

Airbus request for PRV modification to make the PRV able to re-open at high upstream pressure (for **Take-Off, Bleed OFF & APU Bleed ON** operations for specific airlines).

Design modification of Regulation sub-assy clapper and clapper seat.

Allow re-opening of the PRV in case of upstream pressure up to 27.5 barg.



VSB 6764-36-07 available since March 2023

**PRV 6764B080000 &  
6764C010000**

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# HPV NOT OPEN

## Context:

HPV Not Opening in flight, mainly at Top of Descent (transient phase from Cruise to Descent), the HPV is requested to open based on BMC de-energization command toward the HPV Solenoid thus allowing the HPV to open.

## Root cause:

The Solenoid assy was identified as a contributor to the HPV opening occurrences.

## Maintenance Task:

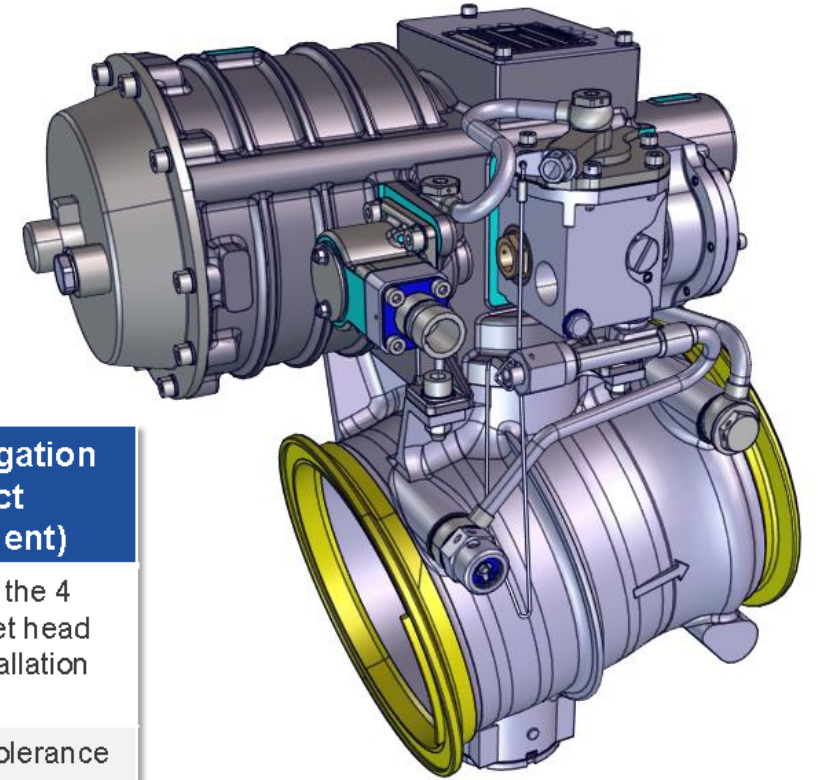
Recommendation to perform Solenoid cleaning task ref TASK-36-11-26RM-100-802-A01 during disassembly of the equipment even if the HPV CMM test results are compliant.

Cleaning procedure SIL 6763-36-04 released in Sept 2018

VSB 6763-36-08 available

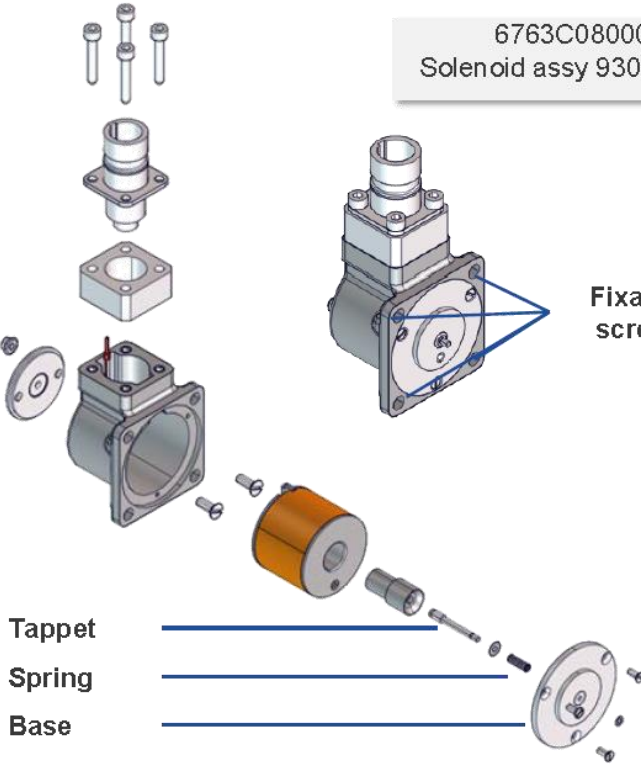
HPV Part Number Tracability → Amdt B

# HPV NOT OPEN



6763C080000  
Solenoid assy 93003-0300

Fixation screws



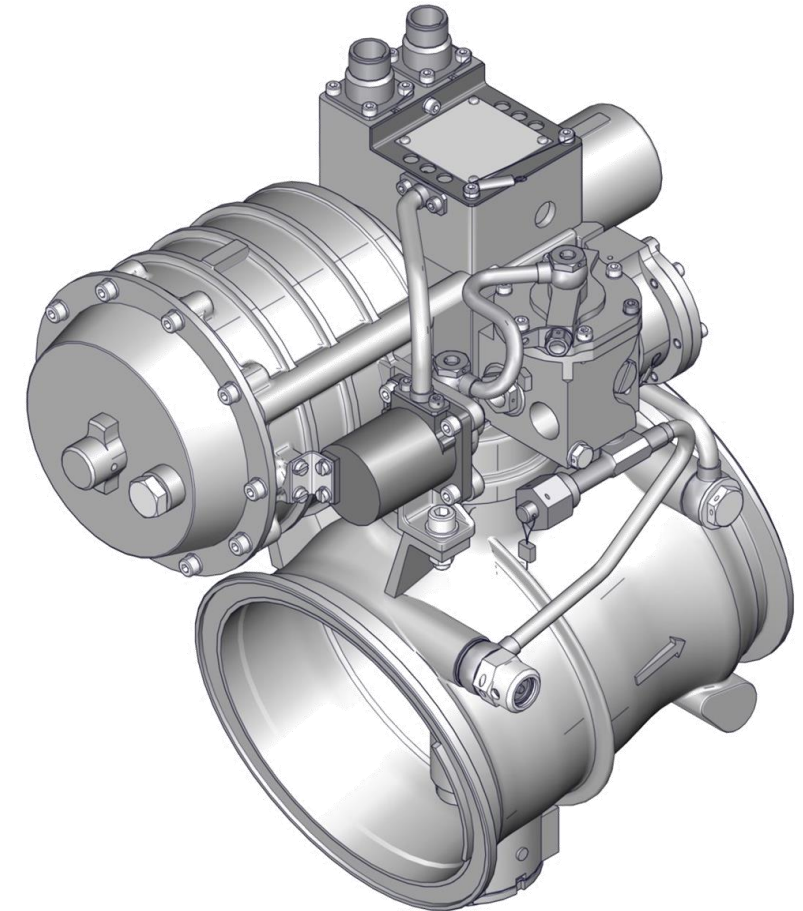
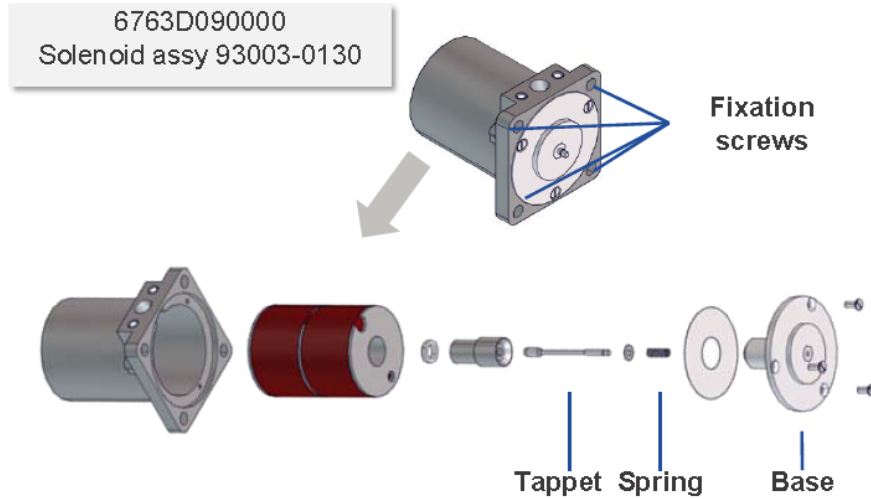
Tappet  
Spring  
Base

Solenoid assy	Maintenance Mitigation	Design Mitigation (Product Improvement)
Fixation screws	After solenoid cleaning and re-assembly on the HPV, ensure screws are correctly torqued	Replacement of the 4 screws by socket head screws and installation with lock-wire
Tappet 93003-42	Cleaning or replacement pending visual inspection	Manufacturing tolerance improvement
Spring S100-687	Replacement	Design unchanged

**PRV 6763C080000**



# HPV NOT OPEN



Solenoid assy	Maintenance Mitigation	Design Mitigation (Product Improvement)
<b>Fixation screws</b>	After solenoid cleaning and re-assembly on the HPV, ensure screws are correctly torqued	Replacement of the 4 screws by socket head screws and installation with lock-wire
<b>Tappet 93003-52</b>	Cleaning or replacement pending visual inspection	Manufacturing tolerance improvement
<b>Spring S100-687</b>	Replacement	Design unchanged

**PRV 6763D090000**

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**Thank  
you**

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