

A330/340 FAM - Preventing External Hydraulic Leaks

Reference: 29.00.00158

Issue date: 05-FEB-2019

Last check date: 14-MAY-2024

Status: Open

A/C type/serie: A330, A340

ATA: 27-00, 29-00, 32-00, ...

Engine manufacturer:

Supplier:

Purpose / Reason for revision: .

 **Engineering Support**

Status: Open

1. PURPOSE:

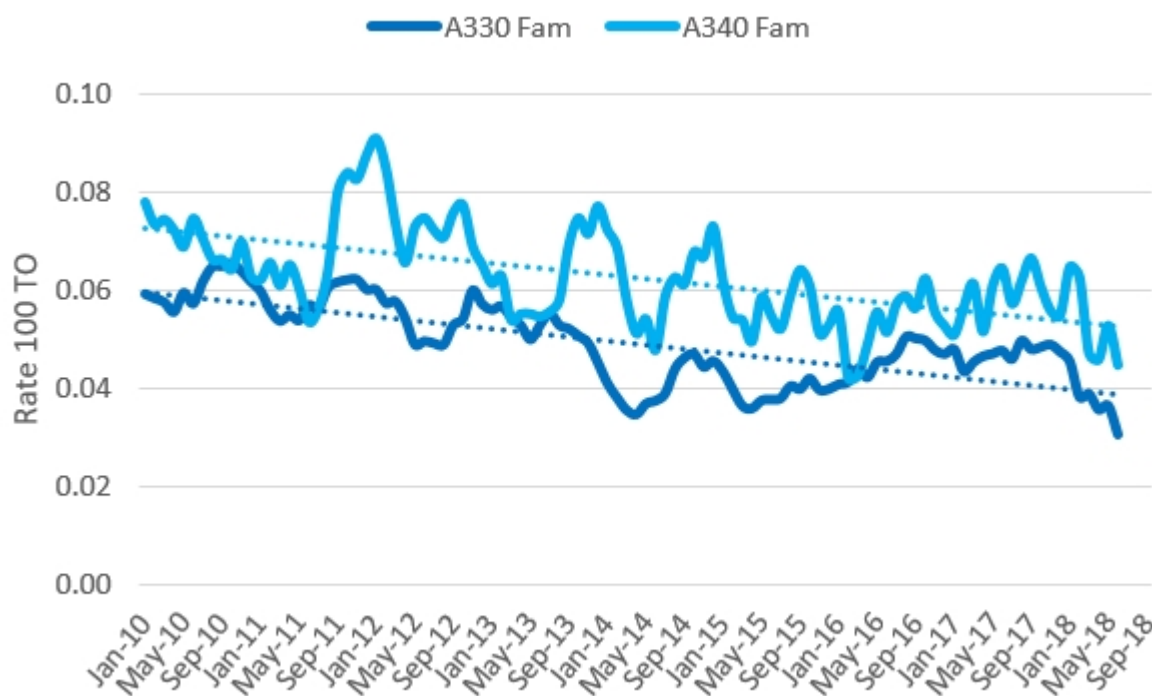
This article gives a summary of the latest information and available modifications addressing hydraulic leaks on A330 and A340 aircraft.

It is aimed at providing operators with necessary technical background in order to launch whenever necessary hydraulic leak prevention program and consequently allows to further the operational reliability of the Long Range family aircraft.

This is kept updated on a regular basis. For issues under investigation, it may happen that information contained in this ISI are not up to date and we recommend to refer of the dedicated TFU/ISI.

2. BACKGROUND:

Due to their impact on aircraft dispatch reliability, hydraulic leaks are a concern for operators. The following charts have been produced based on the leak events reported by the operators. It presents the fleet wide operational interruption rate per 100 Take Offs (T/O) due to hydraulic leaks in ATA chapters 27, 29, 32, 52 and 78 for the A330, A340 basic and for A3456 aircraft.



Airbus A330/340 – Hydraulic Operating Interruption

3. DESCRIPTION:

Airbus continuously monitors the reported hydraulic leak events (Technical event reports and delays/cancellations) by means of a dedicated computer database.

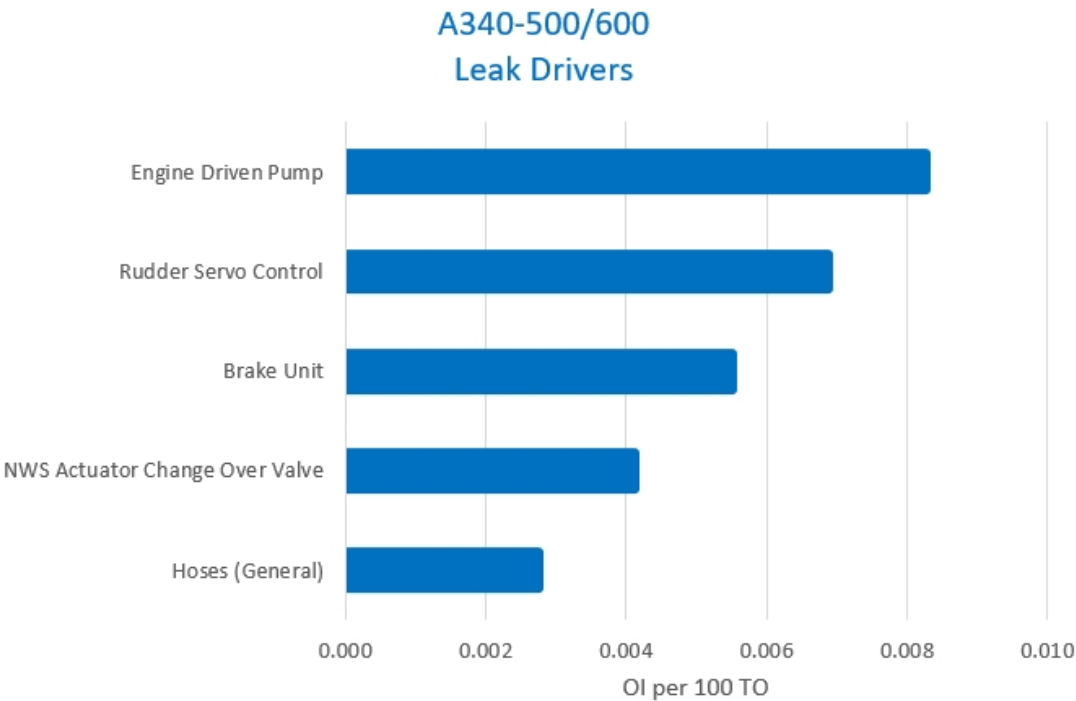
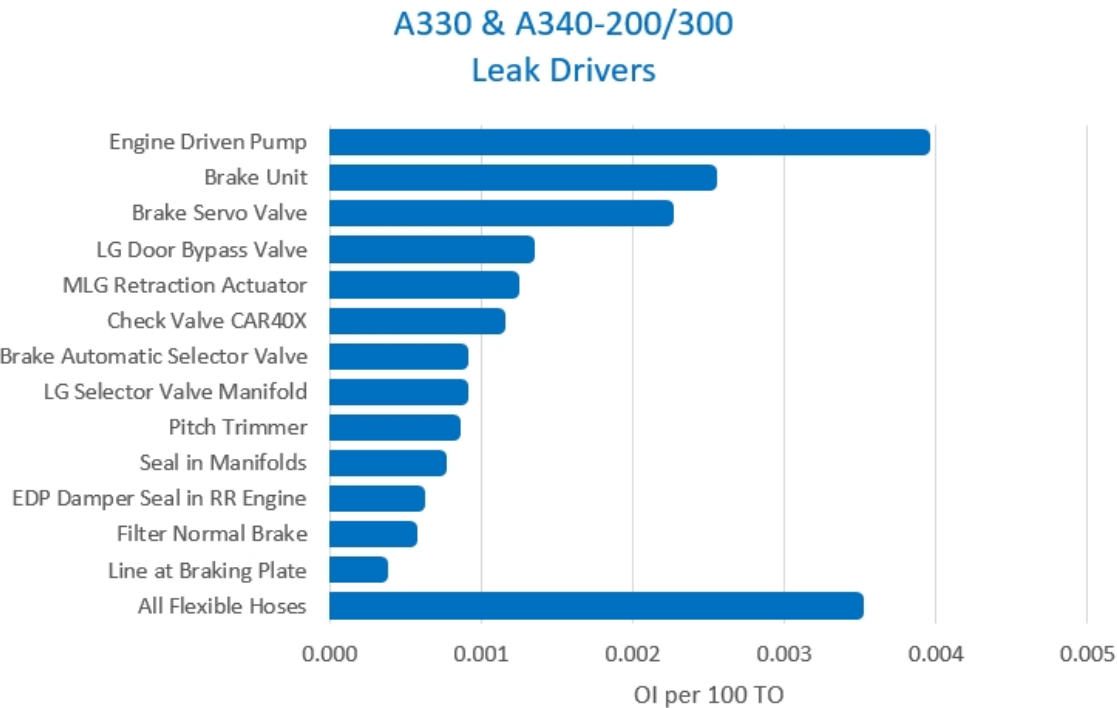
This monitoring is based on feedback reports from operators and contributes to:

- Identify leaks drivers and required actions.
- Monitor the efficiency of corrective actions.

The article incorporates an overview of hydraulic leak main drivers that have been identified for the in-service fleet and reflects detailed information on available modifications.

Further recommendations regarding preventive maintenance program are provided.

The following figures on hydraulic leak main drivers have been produced based on operational interruptions resulting from the leak events reported in 2015-2018.



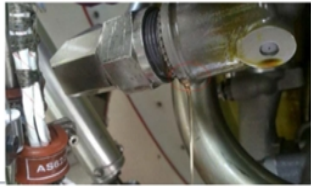
4. AIRBUS ACTION:

Based on the analysis of hydraulic leaks reports, Airbus have launched a number of actions to further improve the hydraulic system reliability with respect to external hydraulic leaks on in- service aircraft.

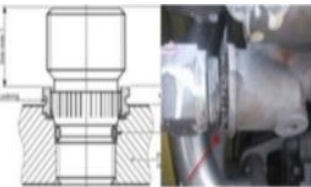
Based on their impact on the operational reliability, information within this paragraph has been gathered addressing hydraulic leak situation that most likely result in long delays or in the loss of a hydraulic system in flight.

4.1 COMPONENTS:

ATA 29 EDP – ROSAN FITTING SEEPAGE

<input checked="" type="checkbox"/> A330CEO	<input checked="" type="checkbox"/> A330NEO	<input type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> Technical Follow-up	<input type="checkbox"/> In-Service Information	<input checked="" type="checkbox"/> Service Bulletins
	29.11.00.016		A330-29-3136 3022053-001-29-01
	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input checked="" type="checkbox"/> Monitoring
<p>Several cases of hydraulic seepages at EDP outlet port (Rosan fitting type) at Valve Block and fitting's interface have been reported to Eaton and Airbus. These findings are mainly detected during walk-around checks or during scheduled visual zoning inspection. The Rosan fitting represents 20% of the findings in the EDP leakage.</p> <p>The in-service feedback we got indicate that despite remote events are reported on A330 PW, A330 GE Engine types, A330 Rolls-Royce Engine type and Green EDPs are the most affected Engine type and EDP locations. Embodiment in production at MSN 01862 for A330ceo and MSN 01915 for A330neo.</p>			

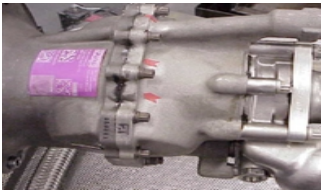
ATA 29 EDP – ENGINE DRIVEN PUMP – EATON - UNION LEAKS

<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input type="checkbox"/> Technical Follow-up	<input type="checkbox"/> In-Service Information	<input checked="" type="checkbox"/> Service Bulletins
	29.10.00.029		A330-29-3106
	29.10.00.030		A340-29-4082
	29.10.00.033		
<input checked="" type="checkbox"/> Improvement available <input type="checkbox"/> Investigation <input type="checkbox"/> Monitoring			


EDP models PV3-300-13K (P/N 974976), PV3-300-13L (P/N 974800) and PV3-300-EA2 (P/N 3022053-000) have been affected by various leak issues that have been addressed through different modifications and Service Bulletins. From October 2007, the EDP model PV3-300-EA2A (P/N 3022053-001) was introduced on production aircraft through mod 56723 and through desirable SB's for in service aircraft. This model features several major improvements namely: Parting lines; ROSAN fittings (assembly process change at Eaton) and Transfer tubes

Note: all above Eaton EDP models are fully interchangeable.

ATA 29 ENGINE DRIVEN PUMP – PARKER – PARTING LINES LEAKAGES

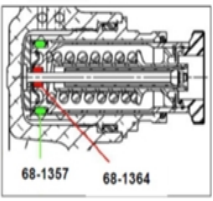

<input type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input type="checkbox"/> A340-200/300	<input checked="" type="checkbox"/> A340-500/600
	<input type="checkbox"/> Technical Follow-up <input type="checkbox"/> In-Service Information <input type="checkbox"/> Service Bulletins		
	<input checked="" type="checkbox"/> Improvement available <input type="checkbox"/> Investigation <input type="checkbox"/> Monitoring		
	<p>Some external leakages have been suspected at the EDPs (P/N 66198-01/-02) parting lines. After in depth investigation by Parker, it is in fact O-ring assembly lube that has worked its way out of the split line and attracted FOD while in-service. This condition is not an indication of an external hydraulic leak.</p> <p>For more details, please refer Parker SIL 29-215 (initial issue January 2009).</p>		

ATA 29 ENGINE DRIVEN PUMP – EATON – PARTING LINES LEAKAGES

<input checked="" type="checkbox"/> A330CEO	<input checked="" type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input type="checkbox"/> Technical Follow-up <input type="checkbox"/> In-Service Information <input type="checkbox"/> Service Bulletins		
	<input checked="" type="checkbox"/> Improvement available <input type="checkbox"/> Investigation <input type="checkbox"/> Monitoring		
	<p>A high number of pumps are removed following a routine visual inspection or during maintenance operations for reported external leakage or staining. In many cases following removal the pumps are inspected, tested and classified as No Fault Found. EATON has issued a SIL 3022053-001-29-01 to provide instructions for prevent removals of serviceable pumps from aircraft for incorrect diagnosis of external leakage.</p>		

ATA 32 BRAKE UNITS PACKINGS

<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
---	----------------------------------	---------------------------------------	---------------------------------------

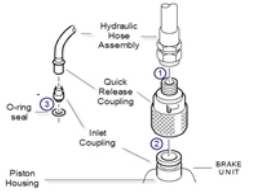
 	<input checked="" type="checkbox"/> <u>Technical Follow-up</u>	<input type="checkbox"/> <u>In-Service Information</u>	<input checked="" type="checkbox"/> <u>Service Bulletins</u>
	32.40.00.035		2-1577-32-13 2-1578-32-9 2-1542-32-15 2-1545-32 -12 2-1577-32-11 2-1578-32-7
	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input type="checkbox"/> Monitoring

Since 2009, in-service brake unit's leakages were reported by several operators. It has been identified some batches of preformed packings from Brake units P/Ns 68-1357 and 68-1364 may cause leakage leading to removal of brake assembly before the heat sink is fully worn.

Most of in-service brakes are not affected by this leakage issue. However, brake assembly P/Ns 2-1577 series with S/N 07821 to 09668 and brake assembly P/Ns 2-1578 series with S/N 07831 to 09580 are possibly affected by defective preformed packings.

For more information, refer to Goodrich-Messier SIL F6137-32-3341.

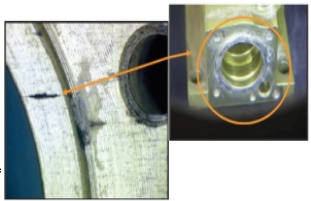
ATA 32 BRAKE QUICK DISCONNECT COUPLING (QDC)

<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> <u>Technical Follow-up</u>	<input checked="" type="checkbox"/> <u>In-Service Information</u>	<input type="checkbox"/> <u>Service Bulletins</u>
	32.42.00.044	32.42.00118	
	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input type="checkbox"/> Monitoring

Hydraulic leaks at brake hydraulic coupling level have already been reported to Airbus. Three different leakage locations have been identified on the brake hydraulic coupling.

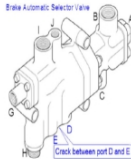
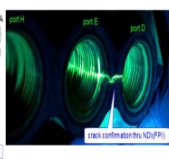
In order to prevent leak on **location 1**, apply AMM 32-42-27-960-804-A. For leakage on **location 2**, make sure that the locking-collar of the QDC is fully engaged. Turn it clockwise until the coupling engages the mechanical stop. For leakage located on **location 3**, remove and replace the inlet coupling as per AMM 32-42-27-960-801-A. A new AMM task is available since April 2014 revision to replace the quick-release coupling only.

ATA 32 BSV - BRAKE SERVO VALVE BODY CORROSION

<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input checked="" type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> <u>Technical Follow-up</u>	<input type="checkbox"/> <u>In-Service Information</u>	<input checked="" type="checkbox"/> <u>Service Bulletins</u>
	32.42.00.041		C20374-32-3350


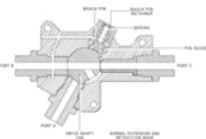
	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input type="checkbox"/> Monitoring
<p>Some operator reported cases of external leakage from the brake servovalve PN C20374000-1/2 at the blanking plate level. Servovalve leakage is caused by crack at the interface between the servovalve body and the blanking plate. Metallurgical inspections revealed that cracks are initiated by corrosion due to contaminants stagnation and they propagated under fatigue mode.</p> <p>In order to prevent corrosion initiation, Vendor SB C20374-32-3350 introduces a Loctite 518 layer between each blanking plate edge and the servovalve body, to act as a sealant preventing contaminants ingress. Loctite 518 is specifically designed to fill gaps between 2 rigid metallic faces.</p> <p>The PN of the servovalve changes has follows : C20374000-2 to C20374000-2 Amdt A.</p>			

ATA 32 BSV - BRAKE SERVO VALVE BODY CORROSION

<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input checked="" type="checkbox"/> A340-500/600
 			
<input checked="" type="checkbox"/> Technical Follow-up <input type="checkbox"/> In-Service Information <input type="checkbox"/> Service Bulletins			
32.42.00.054			
<input checked="" type="checkbox"/> Improvement available <input type="checkbox"/> Investigation <input type="checkbox"/> Monitoring			
<p>On A330 / A340-200/300, some operators have reported some leakages on Auto Brake Selector Valve Seal P/N NAS1612-8. Currently, Airbus advises the operator to follow recommendations for seal procurement given in MBD SIL F6137-32-865 issued in November 2009.</p> <p>Additional, 3 cases of cracked automatic selector (FIN 5202GG) have been reported in 2013 (+1 which happened in the 2011). In case of an external crack, either the green hydraulic system or the blue hydraulic system (+ brake accumulators) is lost depending on the location of the crack. Inspections recommended by SLS can be performed on-wing using NDT (ultrasonic) techniques.</p>			

ATA 32 LG DOOR BYPASS VALVE – HYDRAULIC LEAKAGE

FAIR 10.0060

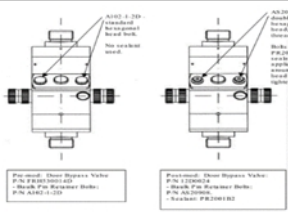
<input checked="" type="checkbox"/> A330CEO	<input checked="" type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
 			
<input checked="" type="checkbox"/> Technical Follow-up <input type="checkbox"/> In-Service Information <input type="checkbox"/> Service Bulletins			
32.31.00.036			
<input type="checkbox"/> Improvement available <input checked="" type="checkbox"/> Investigation <input type="checkbox"/> Monitoring			

External leakage of the Landing Gear Door Bypass Valve has been reported by several operators in service. This can result in unscheduled maintenance and AOG situations whilst replacement is sourced and fitted.


No On-Wing seal replacement permitted but on case by case basis, pending AMM improvement:

- In case of leakage, Technical Adaptation can be provided with conditions to allow 3 additional flights after which the seal must be replaced.
- Final solution to be confirmed by completion of the design analysis and qualification testing for increase of tightening torque and/or new seal design


ATA 32 LG DOOR BYPASS VALVE – HYDRAULIC LEAKAGE

<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input checked="" type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> Technical Follow-up		
	<input type="checkbox"/> In-Service Information		
	<input checked="" type="checkbox"/> Service Bulletins		
32.00.00.009		FRH530014D-32-1	
32.31.01.004			
<input checked="" type="checkbox"/> Improvement available			
<input type="checkbox"/> Investigation			
<input type="checkbox"/> Monitoring			
<p>The door bypass valve (PN HTE960023) was affected by leaks on A330 and A340 aircraft. A new design of the door bypass valve PN FRH530014D was introduced by FR-HITEMP.</p> <p>Several operators have reported failures of the baulk pin retaining plate bolts on PN FRH530014D for which Eaton (ex Fr-Hitemp) have carried out several fatigue / endurance tests. All tests have been passed without a bolt failure, which led Eaton to conclude that over torqueing in-service is the likely reason behind the failures.</p> <p>Eaton has dispatched a VSB ref FRH530014D-32-1 to propose new bolts (providing a higher margin to potential over torqueing) and tamper device.</p>			


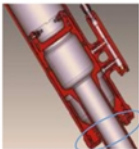
ATA 32 ENHANCED MLG RETRACTION ACTUATOR LEAKAGE

<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input checked="" type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> Technical Follow-up	<input type="checkbox"/> In-Service Information	<input checked="" type="checkbox"/> Service Bulletins
	32.31.46.010		A330-32-3243 A340-32-4284 VSB A33/34-32-289
	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input type="checkbox"/> Monitoring
Leaks on enhanced retraction actuators after a relatively low number of flight cycles. Leakages occurred from the seal between the piston rod and gland have been experienced. MOD 200837 introduces a seal elastomeric element modification and re-design of the seal housing.			

ATA 29 CHECK VALE PART NUMBER CAR40X LEAKS

<input checked="" type="checkbox"/> A330CEO	<input checked="" type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> <u>Technical Follow-up</u> 29.10.00.034	<input checked="" type="checkbox"/> <u>In-Service Information</u> 29.10.00150 29.00.00183	<input checked="" type="checkbox"/> <u>Service Bulletins</u> A330-29-3111 A340-29-4086 A330-29-3119 A340-29-4091 A330-29-3125
	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input checked="" type="checkbox"/> Monitoring
	<p>Several modifications have been developed to address this subject (as the introduction of CAR401; increase the torque value; etc), with no success and leading to repetitive mandated inspections. In June 2014, CAR402 has been introduced improving significantly the reliability. Some cases of leakage were experienced on aircraft modified in the field due to incorrect installation (storage seal).</p> <p>Airbus recommends a preventive visual inspection as per detailed in the ISI 29.00.00183.</p>		

ATA 32 NLG RETRACTION ACTUATOR LEAKAGE

<input checked="" type="checkbox"/> A330CEO <input type="checkbox"/> A330NEO <input checked="" type="checkbox"/> A340-200/300 <input type="checkbox"/> A340-500/600	
 	<input checked="" type="checkbox"/> <u>Technical Follow-up</u> <input checked="" type="checkbox"/> <u>In-Service Information</u> <input checked="" type="checkbox"/> <u>Service Bulletins</u>
	<div>32.31.22.002</div> <div>29.00.00007</div> <div>D23581-32-071</div>
<input checked="" type="checkbox"/> Improvement available <input type="checkbox"/> Investigation <input type="checkbox"/> Monitoring	
<p>External leakages were reported on A330 / A340 at low Flight Cycle (before 1500 FC). Dynamic seal and scraper seal were found damaged due to high friction forces.</p> <p>Airbus has proposed a mitigation solution by application of a film of hydraulic fluid on a weekly basis to improve cleanliness and lubrication of the piston rod and reduce friction between seal and rod.</p> <p>The final solution is a new dynamic & scraper seal through VSB.</p>	

ATA 32 PARKING BRAKE OPERATED VALVE

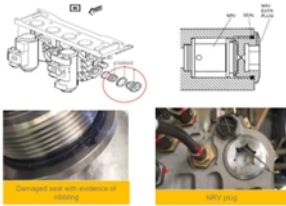
[illegible]

A batch of defective parking brake operated valves has been identified. The Airbus Alert Inspection SBs were issued in September 2001 in order to prevent seepage and heavy leakage of the PBOV and the potential consequences on braking system operation.

In 2012 and 2013, some isolated cases of deviation during production were reported leading to hydraulic seepage. The vendor SIL A25315-32-3395 has been issued in 2013 to inform the operators of hydraulic seepage potentially affecting a limited batch of PBOV.

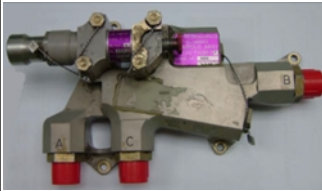
ATA 32

LG SELECTOR VALVE MANIFOLD – HYDRAULIC LEAKAGE FAIR 15.0212

<input checked="" type="checkbox"/> A330CEO		<input checked="" type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> Technical Follow-up			
	<input type="checkbox"/> In-Service Information			
	<input checked="" type="checkbox"/> Service Bulletins			
32.31.00.037		A330-32-3152		
		A330-32-4190		
<input type="checkbox"/> Improvement available		<input checked="" type="checkbox"/> Investigation		<input checked="" type="checkbox"/> Monitoring
<p>External hydraulic leakage of the Landing Gear Selector Valve Manifold (SVM) (FIN 5280GA) (P/N: D31AB4411, D31AB4412, D31AB4413, D31AB4414, D31AB4415) has been reported by several operators in service. The reported failure events mainly concerned leakage at NRV Extractor Plug (NRV EP) (FIN 5286GA) (P/N: 554A01, D31AB4412-021) whilst some were attributed to the other plug of hydraulic unions connections.</p> <p>Note: dedicate GSE tool is required for on-wing replacement of NRV plug seal.</p>				


ATA 32

MLG PITCH TRIMMER MANIFOLD LEAKAGE FAIR 16.0265

747R 10.0203			
<input checked="" type="checkbox"/> A330CEO	<input checked="" type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> Technical Follow-up <input type="checkbox"/> In-Service Information <input type="checkbox"/> Service Bulletins		
	32.11.00.033		
	<input type="checkbox"/> Improvement available <input checked="" type="checkbox"/> Investigation <input checked="" type="checkbox"/> Monitoring		
<p>The Main Landing Gear Pitch Trimmer Manifold (FIN 5014GM & 5015GM) controls the hydraulic flow going to the Pitch Trimmer during operations. There are two manifold per Aircraft (one per MLG).</p> <p>External hydraulic leakage of the manifold body has been reported by several operators in service. In most cases reported to Airbus, the valve body has been found cracked, leading to hydraulic leakage and subsequent loss of the Green hydraulic system.</p> <p>As mitigation, the replacement of the valve body is recommended at 7000FC, in order to reduce the risk of in-service failure.</p>			

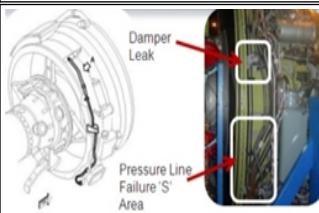
ATA 29**HYDRAULIC LEAKS ON HP MANIFOLDS BLANKING CAP**

FAIR 15.0269

<input checked="" type="checkbox"/> A330CEO	<input checked="" type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> Technical Follow-up	<input checked="" type="checkbox"/> In-Service Information	<input checked="" type="checkbox"/> Service Bulletins
	29.10.00.052	29.00.00150 29.00.00183	A330-29-3135
	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input type="checkbox"/> Monitoring
<p>Hydraulic leaks have been experienced by airlines on blanking cap unions fitted on HP manifolds. These leaks were identified either on the Blue or Yellow system. However, in service experience shows that caps fitted on Yellow system HP manifolds are more affected. Modification 207172 has been developed to replace plug-in unions and caps fitted on Blue and Yellow HP manifolds by plug and bleeder AS5169J10.</p> <p>This solution has been implemented on MSN 1802 and for aircraft in service the SB has been released.</p>			

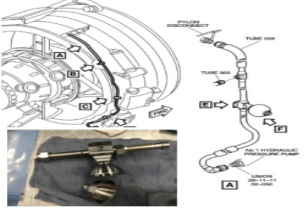
ATA 29**EDP DAMPER SEAL ON R&R ENGINE INSTALLATION**

FAIR 09.0215

<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input checked="" type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> Technical Follow-up	<input type="checkbox"/> In-Service Information	<input checked="" type="checkbox"/> Service Bulletins
	29.11.00.009		RRSB-73-H619 RRSB-73-AJ366 RB211-29-F577 RB211-29-F727 RB211-29-E364
	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input type="checkbox"/> Monitoring
<p>Hydraulic leaks from the pulsation damper due to loosening at the damper/hydraulic line interface, in some cases leading to hydraulic green system loss have been reported.</p> <p>Rolls Royce recommends repetitive inspection of screwed (pre 29-E593 and post 29-EG062) pulsation damper/hydraulic pressure line union tightness (check of witness torque stripe), hex head damage and support installation every A-Check. A new design validated through flight test retains the damper, improve the robustness of the mounting arrangement and include longer length of HP line flexible hose. For T-500 engines, a repetitive inspection is requested every A check.</p>			


ATA 29**EDP DAMPER SEAL POST SB73-AJ366 – LIFE LIMITATION**

<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> Technical Follow-up	<input type="checkbox"/> In-Service Information	<input checked="" type="checkbox"/> Service Bulletins

	73.11.00.059	RRSB-73-AJ942
		RRSB-29-AJ472
		RRSB-29-AJ696
<input checked="" type="checkbox"/> Improvement available <input type="checkbox"/> Investigation <input checked="" type="checkbox"/> Monitoring		
<p>Ripple damper failed at proof pressure test revealing risk of low life leakage due to inadequate welding design at sphere joint. In-service events were experienced on damper that had cumulated from 0FC to 704FC. Consequence is loss of green hydraulic system.</p> <p>Before 10-August-2017 replacement of single weld by double weld damper and until final fix embodiment, perform a damper repetitive replacement every 800FC.</p> <p>New damper proposed by SB RRSB-73-AJ942 to be installed by July 2020.</p>		

ATA 29 HYDRAULIC RESERVOIR PRESSURE RELIEF VALVE

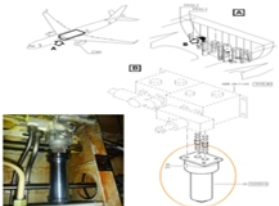
FAIR 15.0340

<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> Technical Follow-up	<input type="checkbox"/> In-Service Information	<input checked="" type="checkbox"/> Service Bulletins
	29.14.00.010		A330-29-3131/3132
			A330-29-3133
			A340-29-4100/4101
			A340-29-4099
		A340-29-5026	
	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input type="checkbox"/> Monitoring

Some operators have reported cases of in-service PRV (Pressure Relief Valve) air leakage. This defect leads to an Air leakage in the Hydraulic Reservoir with triggering "HYD G (B) (Y) RSVR LO AIR PR" ECAM warnings and loss of the associated system. New PRVs PN 42F0029 have been defined to optimize seal groove tolerances. The AD 2016-0107 have been released in 2016, requiring hydraulic reservoir level inspection every 1600 FH and each time one hydraulic reservoir is serviced. The EASA issued Airworthiness Directive (AD) No EASA AD 2018-0064 on 23 Mar 2018 to mandate replacement of suspect PRV's.

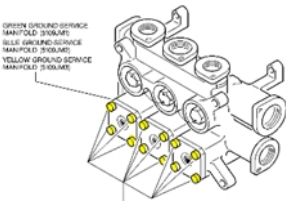
Note: This item has been added to this ISI considering that hydraulic fluid can be extracted at PRV in case of over servicing.

ATA 29 HP AND FILTER BRAKE MANIFOLD FILTERS

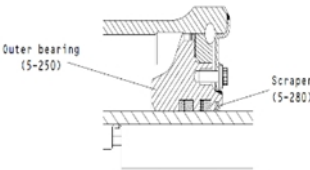
<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input checked="" type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> Technical Follow-up	<input type="checkbox"/> In-Service Information	<input checked="" type="checkbox"/> Service Bulletins
	32.42.00.045		FA04804A-29-001

	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input type="checkbox"/> Monitoring
<p>Some operators have reported leaks on the HP filter manifolds P/N FA00512A. Airbus introduced in production P/N FA04804A by MOD 200493 in July 2010 with enhanced fatigue properties. The modification consists of three changes: New filter head design; New raw material (Aluminium material of filter head has been replaced by new more resistant aluminium); Manual deburring process replaced by electro deburring process.</p> <p>The P/N FA04804A is 2-way interchangeable with the P/N FA00512A.</p> <p><u>Note:</u> same filter P/N is used on normal brake system. Brake filters were more affected by leaks because they are submitted to a higher number of pressure cycles.</p>			

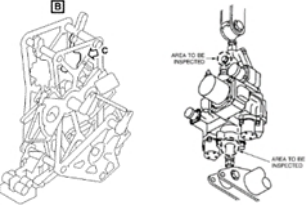
ATA 29 GROUND SERVICE MANIFOLD – SCREW RUPTURE

<input checked="" type="checkbox"/> A330CEO		<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600		
	<input checked="" type="checkbox"/> Technical Follow-up			<input type="checkbox"/> In-Service Information	<input checked="" type="checkbox"/> Service Bulletins	
	29.19.00.002			A330-29-3104 A340-29-4080		
	<input checked="" type="checkbox"/> Improvement available					<input type="checkbox"/> Investigation
<p>Some hydraulic leaks from Ground Service Manifold body with more than 10000 FC have been reported to Airbus. In these events, some screws ruptured leading to a "pop-out" of one of the manual valves. A new manifold featuring screws with enhanced mechanical properties is proposed by MOD 56660. For Aircraft in-service refer to the SB's. Screw replacements can be done either in-shop or directly on wing.</p>						


ATA 27 RUDDER SERVO CONTROL SEAL PROTRUSION

<input type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input type="checkbox"/> A340-200/300	<input checked="" type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> Technical Follow-up <input type="checkbox"/> In-Service Information <input checked="" type="checkbox"/> Service Bulletins		
	27.24.00.011 31115-27-03		
	<input checked="" type="checkbox"/> Improvement available <input type="checkbox"/> Investigation <input type="checkbox"/> Monitoring		
<p>The scraper seal (CMM 27-21-20 IPL Fig.5 item 280) of the rudder servo controls PN 31115-060/-070 was found extruded. These servo controls (PN31115-0X0) are installed on A340-500/600 and A330-200 post-mod 49144 (electrical rudder). As long as the leakage rate is within AMM 29-00-00-790-801 limits, according to Goodrich SIL 31115-27-0A, the rudder servo controls that are affected by a piston rod scraper seal extrusion are still serviceable and do not need to be replaced.</p>			


ATA 27 YAW DAMPER ACTUATOR EXTERNAL LEAKAGE

<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> <u>Technical Follow-up</u>	<input type="checkbox"/> <u>In-Service Information</u>	<input checked="" type="checkbox"/> <u>Service Bulletins</u>
	27.26.00.011		A330-27-3125 A330-27-3124 A330-27-4125 A340-27-4126
	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input type="checkbox"/> Monitoring
<p>Some cases of hydraulic leakage from the yaw damper actuator PN SC4710 installed in the active position (19CS1). Affected actuators had accumulated more than 10000FH. Tightness of the yaw damper is improved by SB A330-27-3125 and A340-27-4126 which introduce:</p> <ul style="list-style-type: none"> • A new tungsten carbide plated piston rod; • New PTFE dynamic seals. <p>For more details please refer to TFU 27.26.00.011 (Closed in Nov 2004).</p>			

ATA 32 NWS STEERING CHANGEOVER VALVE

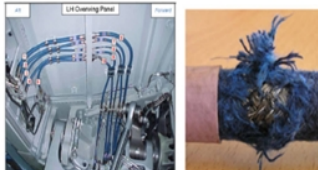
<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input checked="" type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> <u>Technical Follow-up</u>	<input checked="" type="checkbox"/> <u>In-Service Information</u>	<input checked="" type="checkbox"/> <u>Service Bulletins</u>
	32.51.17.002 32.51.17.003 32.51.17.004	32.51.00001	A330-32-3188 A340-32-4235 A340-32-5038
	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input type="checkbox"/> Monitoring
<p>Numerous cases of NLG steering actuator Changeover valve (FIN 5108GC and/or 5109GC) leakages have been reported in service by operators. Moreover, at overhaul COV have also been scrapped after having failed the CMM acceptance test.</p> <p>Following the A340-500/600 NWS actuator COV experience, modification process was launched to introduce the same type of design improvement on A330/A340 aircraft.</p>			

ATA 32 ENHANCED MLG PITCH TRIMMER ACTUATOR ROD CRUSHING

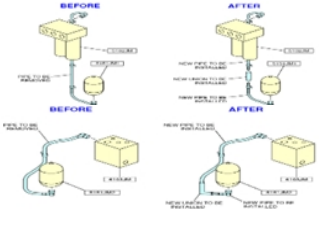
<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input checked="" type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> Technical Follow-up <input type="checkbox"/> In-Service Information <input checked="" type="checkbox"/> Service Bulletins		
	32.11.00.018 32.11.13.026 32.11.00.027		
	<input checked="" type="checkbox"/> Improvement available <input type="checkbox"/> Investigation <input type="checkbox"/> Monitoring		
A number of Pitch Trimmer Actuators failures (Crushed Rod) have been reported on MLG Pitch Trimmer Actuators of the Enhanced standard (PN 10-212701 series)			
<ul style="list-style-type: none">Consequence of the failure is loss of green hydraulic system			
A new Mod (207138) has been raised to reduce the risk of a crushed rod occurrence. It includes a new rod end, new piston rod, new elbow fitting and flow control device. It includes as well the corrosion resistant solutions as well (ref. TFU 32.11.00.027). Concurrent requirement is the Bogie Pivot Pin modification (ref. TFU 32.11.13.026).			

4.2 LINES:

ATA 29 HYDRAULIC FLEXIBLE HOSES IN OVERWING PANEL AREA FAIR 14.0017

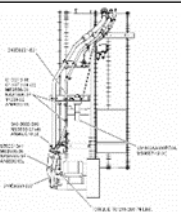
<input checked="" type="checkbox"/> A330CEO		<input checked="" type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600	
<div><div><div>Left</div><div>Left Cleaning Panel</div><div>Right</div></div></div>	<input checked="" type="checkbox"/> Technical Follow-up			<input checked="" type="checkbox"/> In-Service Information	<input type="checkbox"/> Service Bulletins
	29.00.00.082		29.00.00160		
			32.00.00157		
<input checked="" type="checkbox"/> Improvement available		<input type="checkbox"/> Investigation		<input checked="" type="checkbox"/> Monitoring	
<p>Several A330/A340 Operators are experiencing failures of flexible hoses that usually lead to Hydraulic System loss. Investigations has been demonstrated fatigue fractures initiated / aggravated by corrosion in an important number of instances. This allowed defining some recommendations for preventive replacements. These recommendations have been validated by the FAIR Screening Committee.</p> <p>Note that this replacement period should be adapted upon airline experience and operating environment.</p>					

ATA 29 LINE HYDRAULIC SYSTEM ACCUMULATOR FAIR 17.0308

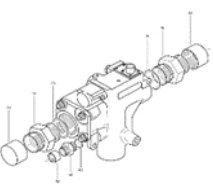
<input type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> Technical Follow-up <input checked="" type="checkbox"/> In-Service Information <input checked="" type="checkbox"/> Service Bulletins		
	29.10.00.031 29.10.00047		
	A330-29-3107 A340-29-4083 A330-29-3120 A340-29-4092		

	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input type="checkbox"/> Monitoring
<p>Leakages have been reported on green and blue accumulator lines due to pipe installation under constraint. In August 2007 Airbus issued one time Inspection Service Bulletins A330-29-3107 & A340-29-4083. In parallel modification 58489 has been issued. It replaces Green and Blue accumulator lines by 2 pipes swaged together on wing for better stress free installation. This solution has been implemented on aircraft in production since end 2008.</p> <p>Later on, some customers have decided to implement this modification and have requested specific procedure to be defined. Therefore AMM has been updated and SB's are available for the modification.</p>			

ATA 29 A340 CFM56-5C EDP CASE DRAIN LINE

<input type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> Technical Follow-up	<input type="checkbox"/> In-Service Information	<input checked="" type="checkbox"/> Service Bulletins
	29.10.00.021		RA34029-6
	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input type="checkbox"/> Monitoring
<p>Several operators have reported chafing and sometimes hydraulic leaks involving EDP lower case drain line PN AE708820-1 (Goodrich Rohr PN 340D8661-501).</p> <p>Engineering and flight test led to define a new flexible line with a new routing, available through Goodrich SB RA34029-6.</p>			

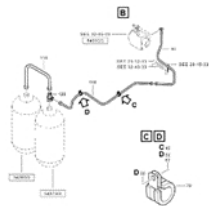
ATA 29 LG SAFETY VALVE RETURN LINE

<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input checked="" type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> Technical Follow-up	<input type="checkbox"/> In-Service Information	<input checked="" type="checkbox"/> Service Bulletins
	29.00.00.035		A340-32-5086 A330-32-3219 A340-32-4263 D31AB443-32-03
	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input type="checkbox"/> Monitoring
<p>On A340-500/600 several cases of leaks have been reported by operators at return line from the safety valve to the return manifold. A SB released in 2007 introduces a new safety valve P/N D31AB4433 with an integrated restrictor reducing the flow and preventing pipe rupture. Parts/equipment modifications are free of charge.</p>			

On A330 and A340-200/300 operators also reported cracks and loose connections on a similar hydraulic line (IPC 29-11-03-43 item 70). Associated clamp blocks were also found damaged. To reduce the stress on the hydraulic return line, a new Safety Valve PN D31AB4433 (FA3T1) equipped with a non-return valve end cap and a restrictor on the return port is available.

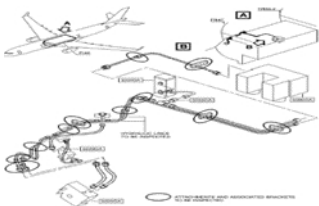
ATA 32 LINE AT BRAKING PLATE

FAIR 07.0173

<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> Technical Follow-up	<input type="checkbox"/> In-Service Information	<input checked="" type="checkbox"/> Service Bulletins
	32.43.00.004		A330-29-3113 A330-32-3280 A340-29-4088 A340-32-4309
	<input checked="" type="checkbox"/> Improvement available <input type="checkbox"/> Investigation <input type="checkbox"/> Monitoring		

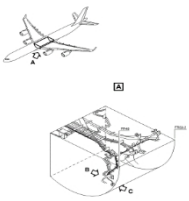
Hydraulic connection loosening has been reported at the Braking Plate to many Brake Systems component. To solve this issue, on A330/A340-200/300 MSN0728 and subsequent, quality actions were initiated to make sure unions are effectively lubricated during installation. Moreover, on A330/A340 MSN0665 and subsequent (MOD 56013), tightening torque has been increased on 6 hydraulic pipes (12 connections). AMM has been updated, and these changes are reflected in component R/I procedures. Upgrading the BSCU to S9D first will ensure that the braking pipes do not experience pressure peaks that could potentially affect the tightening of the connections before performing the torque check.

ATA 29 LEAK AT RH MLG DOOR UPLOCK LINES

<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> <u>Technical Follow-up</u> <input type="checkbox"/> <u>In-Service Information</u> <input checked="" type="checkbox"/> <u>Service Bulletins</u>		
	29.00.00.034 <div> A330-32-3223 A340-32-4266 A330-29-3102 A340-29-4079 </div>		
	<input checked="" type="checkbox"/> Improvement available <input type="checkbox"/> Investigation <input type="checkbox"/> Monitoring		

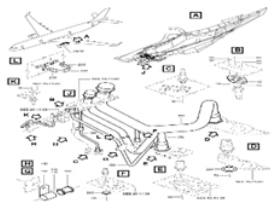
Several of Green System leakage due to chafing of pipe IPC 32-31-03-29 item 200, item 40, item 120 and item 170 have been reported. Associated pipe attachment devices have also been found damaged, due to air trapped in the hydraulic lines. As final solution, Airbus issued SBs A330-32-3223 and A340-32-4266 that introduced one automatic bleeder on the RH MLG door uplock line. This automatic bleeder is similar to the ones used on A340- 500/600, which demonstrated a good efficiency. However, even if embodiment of these SBs cancels the previous ISBs A330-29-3102 and A340-29-4079, we recommend to check clamps and pipes to ensure that there are no premature failure signs of the uplock lines.

ATA 29 LEAK AT RH MLG DOOR UPLOCK LINES

<input type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input type="checkbox"/> A340-200/300	<input checked="" type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> <u>Technical Follow-up</u>	<input type="checkbox"/> <u>In-Service Information</u>	<input checked="" type="checkbox"/> <u>Service Bulletins</u>
	29.00.00.032		A340-29-5006 A340-29-5009 A340-29-5052 A340-32-5042 A340-32-5059
	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input type="checkbox"/> Monitoring

Several cases of Green System leakage due to failure of pipe IPC 32-31-03-27B item 190 have been reported in-service. Each time the pipe failed near the swaging of its connection to the L/G door selector valve manifold 5400GA port F. A solution introducing an automatic and permanent bleeding of two hydraulic lines connected to the 5400GA is available from aircraft MSN 706. For in-service aircraft SB A340-32-5052 and SB A340-32-5059 are available. When both modifications are embodied on aircraft, the periodic inspection ISB A340-29-5006 requirements are cancelled. SB A340-29-5009 (Mod 54585) introduces a new pipe version which is considered as an additional improvement - part of "Fleet Improvement" program. LH MLG door uplock line automatic bleeder must be installed prior to A340-29-5009 embodiment.

ATA 54 HYDRAULIC PIPE LEAK IN GE/P&W ENGINES PYLONS


<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input type="checkbox"/> <u>Technical Follow-up</u>	<input type="checkbox"/> <u>In-Service Information</u>	<input checked="" type="checkbox"/> <u>Service Bulletins</u>
			A330-54-3033
	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input type="checkbox"/> Monitoring

Some hydraulic leaks have been reported on A330 GE Blue Case Drain pipe PN F2903000800000 located in Engine Pylon 1. Similar pipe is fitted on P&W and GE Engines Pylons 1 & 2 (Blue & Yellow systems). Pipe failed due fatigue crack under swaged straight union NSA855011-6.

The root cause of the failure has been identified as vibration loads caused by A/C engine and/or by hydraulic pulsations originating from the EDP.

The final solution consists in replacing current common bracket by two separated ones. It is proposed for in-service aircraft through SB A330-54-3033.

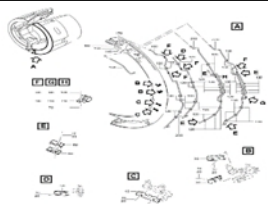
ATA 29 TEE IN SPOILER 5 AREA

<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input type="checkbox"/> A340-200/300	<input checked="" type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> Technical Follow-up <input type="checkbox"/> In-Service Information <input checked="" type="checkbox"/> Service Bulletins		
	29.11.05.001		
	A330-29-3100 A340-29-5007		
<input checked="" type="checkbox"/> Improvement available <input type="checkbox"/> Investigation <input type="checkbox"/> Monitoring			

Several operators have reported loosening of the NSA855113 tee connections in the Spoiler N°5 area. The events occurred on both RH and LH wing and on both LP and HP lines. The consequence is a leakage at the loose connection, which could lead to a system loss.

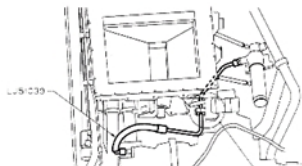
As final solution, MOD 53814 introducing swaged connections at the T fittings was issued. This modification is embodied from MSN0702 onwards and is covered by SBA340-29-5007 for A340-500/-600 in service aircraft, and by SB A330-29-3100 for A330-300 increased MTOW (ST8), A330-200 (ST7) aircraft.

ATA 78 THRUST REVERSER LINES – CFM ENGINE


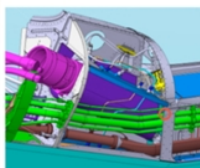
<input type="checkbox"/> A330CEO		<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600	
	<input checked="" type="checkbox"/> Technical Follow-up			<input type="checkbox"/> In-Service Information	<input checked="" type="checkbox"/> Service Bulletins
	78.31.00.082			RA34078-61	
	<input checked="" type="checkbox"/> Improvement available			<input type="checkbox"/> Investigation	<input type="checkbox"/> Monitoring
The thrust reverser hydraulic supply lines have been the cause of operational interruptions due to external hydraulic leaks since December 1998 for A340 aircraft. The root cause has been fatigue failure of the lines PNs 4252035-1 and 4252047-1 (left and right hand thrust reverser pivoting door actuator stow lines). These fatigue failures have been attributed to installation pre-loads and vibration. Revised procedures cautions have been introduced in production and AMM 78-31-49 has been revised to allow A/C dispatch with a failed					

line fitted provided the T/R is deactivated and the leakage stops. An additional clamp has been introduced in the aim to alter the natural frequency of the line and reduce vibration level.

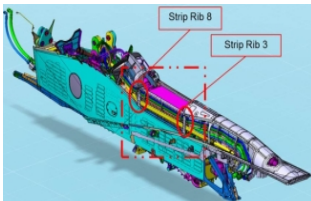
ATA 78 CASE DRAIN FILTER PIPE – R&R

<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input checked="" type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input type="checkbox"/> Technical Follow-up <input type="checkbox"/> In-Service Information <input checked="" type="checkbox"/> Service Bulletins		
	A330-29-3077 211-29-C885		
	<input checked="" type="checkbox"/> Improvement available <input type="checkbox"/> Investigation <input type="checkbox"/> Monitoring		
In-line and EDP integrated dampers have not proved to be the solution to the pressure pulsations causing the leaks. Therefore, in order to address this issue, Airbus and Rolls Royce have developed a new case drain line, which replaces the existing rigid pipe with a flexible hose. This new case drain line has been introduced through RR service bulletin RB211-29-C885, covered by Airbus SB A330-29-3077 (production embodiment rank MSN 382).			

ATA 54 PYLON FORWARD – CHAFING BETWEEN HYDRAULIC PIPE AND SCREW

<input checked="" type="checkbox"/> A330CEO		<input type="checkbox"/> A330NEO	<input type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
 	<input checked="" type="checkbox"/> Technical Follow-up <input type="checkbox"/> In-Service Information <input checked="" type="checkbox"/> Service Bulletins			
	54.52.00.007 A330-54-3043			
	<input checked="" type="checkbox"/> Improvement available <input type="checkbox"/> Investigation <input checked="" type="checkbox"/> Monitoring			
<p>Some operators of A330 aircraft PRE-MOD 205813 (MSN < 1742) equipped with RR engines have faced a chafing issue between Pipe PNR F2903062300000 and Screw NAS1102E3-10 located at the RIB8A (Pylon Forward Fairing Area).</p> <p>Service Bulletin No. A330-54-3043 is expected for April 2019, in order to retrofit all KARMAN panels with shorter screws DAN169E3-9 and therefore avoiding any contact.</p>				

ATA 54 CHAFING BETWEEN HYDRAULIC PIPE AND PYLON STRIP

<input checked="" type="checkbox"/> A330CEO	<input type="checkbox"/> A330NEO	<input type="checkbox"/> A340-200/300	<input type="checkbox"/> A340-500/600
	<input checked="" type="checkbox"/> <u>Technical Follow-up</u>	<input type="checkbox"/> <u>In-Service Information</u>	<input checked="" type="checkbox"/> <u>Service Bulletins</u>
	54.52.00.006		A330-54-3038
	<input checked="" type="checkbox"/> Improvement available	<input type="checkbox"/> Investigation	<input type="checkbox"/> Monitoring
<p>Chafing damage was reported on A330 hydraulic pipe, blue system suction pipe in pylon forward fairing area by several operators. This chafing is caused by the contact with the flanged edge of a pylon strip.</p> <p>The root cause is the height of the flanged edge being too high. A recommended ISB 54-3038 has been issued for a one-time detailed inspection of the pylon pipes and strips for chafing damage.</p> <p>In case of finding, instructions are provided in order to restore correct interfaces between pylon strip and hydraulic pipes. Mod 204885 has been introduced in production to ensure correct height of the flange edge of the strip.</p>			

4.3 HYDRAULIC PIPES:

Hydraulic tubing damage can be categorized into 2 families, chafing and cracking. This damage is usually induced by:

- A wrong line installation (lack of clearance, stress installation, pipe ovality due to incorrect bending, etc.).
- Clamping damage (breaking, loosening), spacers' migration.

With time, the hydraulic tubing leaks may increase mainly because of tube chafing. In order to anticipate this potential time-related phenomenon, Airbus recommends inspecting lines for chafing at the opportunity of major maintenance layover.

This consists in checking:

- Clamp integrity
- Good positioning of clamps
- Pipes are correctly held by clamp. In case of play between clamp and tube, the clamp should be removed and the pipe inspected,
- Potential pipe to pipe or pipe to structure chafing areas and correcting them by installing additional clamping as necessary (refer to AMM 20-23-14). ISI article 29.00.00018 gives general recommendations regarding additional p-clamps to replace migrated and/or loosen spacer.
- Pipes are in good visual shape. Criteria for rejection are given in AMM 20-23-11.

When installing hydraulic lines, special care has to be taken to ensure a minimum clearance installation and prevent lines chafing. Also as a reference, AMM chapter 20-23-14-201, "Line Tying – Maintenance Practices", lists all available protection techniques to prevent vibration and chafing of hydraulic pipes.

4.4 FLEXIBLE HOSES:

Flexible hoses are installed in the hydraulic distribution system where some level of movement is required, imposing a high level of stress on the tube caused by pressure fluctuation and pulsation in the system.

If not replaced, damage to a hose or to the wire braid of a hose that is assessed as minor during inspection could lead to the loss of the hydraulic system during the next flights.

A regular inspection of the hoses should be performed to identify chafing marks located on the hose surface, cuts or kinking or any kind of damage.

Please refer to AMM task 20-23-11-200-802-A for permitted damage criterias for flexible hoses

During hose installation make sure to apply counter-torque to avoid twisting or unintended repositioning of the hose leading to a change of its' routing.

4.5 SEALS:

It is normal behaviour that a seal in contact with hydraulic fluid will swell. Swell or increase in volume is almost always accompanied by a decrease in hardness. Excessive swell, usually induced by seal of bad manufacturing quality, will result in marked softening of the rubber which will lead to reduced abrasion and tear resistance, and then they permit extrusion of the seal under high pressure. Consequently, whenever a component or manifold is removed, the interface seals must systematically be replaced to avoid further seal leak. If not systematically done, the naturally swelled and softened seal would most probably be damaged during its reinstallation and then lead to early leakage.

For further information regarding Hydraulic system seal and supplier recommendation, please refer to ISI article 29.00.00150.

Airbus do not recommend a large fleet campaign of hydraulic seal replacement. An A330 operator carried out a fleet seal replacement campaign and the results were not satisfactory. The fact is that a fleet replacement campaign on seals is a major disturbance on the hydraulic system, and could therefore introduce more issues rather than providing a real improvement. As general good practice, it is advised to pay particular attention at manifolds and ground service panels for seepage at the opportunity of the scheduled General Visual Inspections as per MPD tasks performed in the landing gear bay. Seepage and traces of black deposit on a manifold is usually a clear indication of a seal pre-damage calling for preventive rectification. Please refer to the "Preventive Maintenance Recommendation" in particular ISI 29.00.00183 for support such inspection.

To prevent seals and backup ring deterioration during their installation on bobbins, the general installation procedure has been clarified in the AMM 20-23-21. Appropriate tool ref. TEM 20-00-00 PN 97A29102090000 should be used when installing a new seal on the bobbin. This tool prevents damage on the manifold and component ports and then subsequent leakage.

AMM 20-29-00, "O-ring installation" provides detailed recommendation regarding O-ring seal installation in order to prevent damage (specific tooling required).

To end up with O-ring seals, do not use MCS352 grease for plug in lubrication of the (pipe to manifold) union seals. MCS352 grease could push the seal out of the plug-in union during the tightening and the seal could get extruded. For plug-in unions, only hydraulic fluid should be used as a lubricant, as stated in AMM20-29-00.

4.6 UNIONS:

Sliding Unions

Extensive investigation of returned sliding unions revealed that most of the leaks were due to stress introduced by lateral forces coming from pipe installation tolerance build up. In-service experience shows that most of the leaks were fixed by reinstallation of the sliding union and adjacent pipes.

MOD 45820 (embodied from A340 A/C MSN 235) introduced adjustable clamps in production to reduce lateral and longitudinal forces through a better control of the pipe installation tolerance build-up. Due to the extent of this modification, it was considered not retrofittable.

New sliding unions HTE620196/197 with an enhanced internal sealing arrangement and new bearing were designed for A340-500/600 A/C in order to address the sensitivity to stress induced by side loads and therefore the hydraulic leakage issue, experienced on PNs HTE620071-1/72-1. After having been tested during A340-500/-600 flight test, sliding unions PN HTE620196 and PN HTE620197 have replaced the sliding unions PN HTE620071-1 and PN HTE620072-1 on A330/ A340 basic aircraft too. For more detail, please refer to VSB HTE620071-1-29-1.

Side loads on the sliding union will appear if the sliding union is not correctly installed following the requirement of AMM 29-11-47 or if the counter wrench is not used to tighten lines equipped with sliding unions. This will generate torsion loads on the lines that will induce side loads on the sliding unions.

The dynamic seal of the sliding union is more efficient under high pressure. This is why a leakage test with low pressure (7.3 psi) is more critical than a check under nominal system pressure regarding deformation of O-rings in the grooves. Consequently, the external leak limit for sliding unions is defined as follows:

- Hydraulic system pressurized: Slight seepage without formation of a drop.
- Hydraulic system unpressurized: 1 drop / 10 minutes.

This has to be taken into account to avoid unnecessary sliding union removal due to seepage with the hydraulic system in the unpressurized condition.

➤ **Loose connections**

Leaks at loose connections are often due to an incorrect torque applied. In order to highlight the usual maintenance practices, including the different torque values, a "Hydraulic System Working Practices" booklet, as well as a "Hydraulic System Maintenance Practices" CD-ROM has been issued.

The hydraulic connections of the LR A/C are identified with a red painted line as per AMM 20-23-22. This eases the identification of:

- Connections tightened to the nominal torque value.
- Possible loosening of the union at the opportunity of a visual inspection.

The best opportunity to detect the beginning of loosening of connections is zonal inspections as per MPD tasks. If the mark is not aligned or if seepage is found, it is recommended to correct the tightening torque value as per AMM 20-23-11 :

- Refer to AMM 20-23-11 for torque value definition
- Set the torque wrench to the given value.
- Erase the red mark if any.
- Loosen connection.
- Replace O-ring seal if any.
- Lubricate the thread using hydraulic fluid.
- Tighten the union using the torque wrench and counter torque wrench.
- Apply red marking.

If one or more parts you assemble are new, the double torque procedure shall be applied. This double torque procedure can be found in AMM 20-23-11 and is applied on the production line since mid-1997 giving good results. The double torque procedure is applicable to metal-metal connections and must not be used if a seal is present.

➤ **Cracked unions and sleeves on Titanium pipes**

Several sleeves ASNA3759 and few unions ASNA3760 swaged on high-pressure hydraulic pipes have been reported by some operators cracked with no leakage. Further investigations have demonstrated that the cracks were induced by stress corrosion. Several tests have been performed showing that cracked sleeves are more robust than cracked unions which could lead to a leakage. Therefore, Inspection Service Bulletin has been issued in order to recommend repetitive visual inspection of all unions ASNA3760 located in non-pressurized areas. Moreover, to enhance corrosion prevention, it is recommended after the inspection to apply corrosion preventive compound on the inspected non-cracked unions ASNA3760. In case of cracked union finding, the affected pipe must be repaired as per AMM 20-23-11 or replaced.

The final solution consists in changing the heat treatment of the fittings (sleeve: ASNA3759 and union: ASNA3760) from H900/H925 to H1075 in order to avoid stress corrosion cracking.

The new unions (New PN: ASNA3760VAXx) are now available and new pipes are being manufactured for installation on production line aircraft. Due to lead-time for pipe manufacturing, before MSN 1020, aircraft will have mixed pre & post union configurations.

The full embodiment i.e. with new unions and new pipes only, as per Mod 58346, will be effective from MSN 1020 onwards, with new pipe identification. The new sleeves are also available but due to the confirmed low impact, they will be incorporated without identification change. For more details, please refer to TFU29.00.00.036 (closed in September 2008) and SB29-3105/4081/5012.

4.7 PREVENTIVE MAINTENANCE RECOMMENDATIONS:

Airbus considers the Preventive Maintenance as an indispensable task to prevent a Hydraulic Operational Interruption. Therefore, as far as hydraulic system is concerned, we recommend to take benefit of planned inspections (including zonal inspections) to pay a specific attention at the hydraulic components.

As a general rule:

- Do a local check in the work area where you do the maintenance operations to see if the preventive maintenance actions are possible.
- When you do a maintenance action on one (some) component(s) in the same area, clean the adjacent area. Then, do a careful check.
- You must do a careful final check when the operations are completed and before the doors or access panels are closed.
- Specific precautions need to be taken when working on several hydraulic systems. Please refer to the AMM task 29-00-00-910-804-A – General Rules for Removal and Installation.

The following ISI's provides additional information's for preventive maintenance:

- 29.00.00150 - Hydraulic system seals

- 29.00.00152 – Hydraulic System bleeding on A330/A340 Fam
- 29.00.00160 - Preventive replacement of flexible hose installed in overwing panel area
- 29.00.00179 - A330/A340 Hydraulic system maintenance practices
- 29.00.00180 - A330 A340-200/300 Visual inspection guide
- 29.00.00181 - A340-500/600 Visual inspection guide
- 29.00.00183 - Identification of hydraulic seal degradation – Black deposit
- 29.00.00195 – Hydraulic repetitive maintenance tasks recommended
- 32.00.00157 – Preventive replacement of flexible Hoses on Landing Gear

Recommendation for Preventive Maintenance Inspection:

- **Manifolds:** Perform a detailed visual inspections of the components interfaces and the adjacent area. Make sure that there are no signs of black deposit around the connections. **Check for red marking alignment, attachment, damages and leaks.**
- **Tubes and Clamps:** Perform a detailed visual inspection. Clean and dry the tubes with a **clean** lint-free cloth. Use a light source for inspection. Examine the hydraulic tubes for **correct attachment, damages and leaks.** Make sure **correct clearance** between pipe to pipe / pipe to structure. Look for **chafing at clamp** location.
- **Flexible hoses:** Perform visual inspections and make sure identification sleeves are correctly installed, the hydraulic hoses are correctly installed and **free of damaged, twisted and signs of wear.** Make sure **correct clearance** between hose to pipe / hose to structure.
- **Check for Air:** During the replacement of hydraulic component and after each hydraulic system opening, air can be introduced in the hydraulic system. To avoid any detrimental consequences due to excessive air presence, we recommend to first check the air quantity in the hydraulic system as per **AMM Task 29-00-00-210-801** and if necessary to bleed the hydraulic system.

ISI article 29.00.00152 provides additional information on the hydraulic system bleeding.

Caution: Specific to the green hydraulic system on A330/A340 basic Aircraft:

As per AMM procedures, further to green reservoir low level event, it is requested after Green reservoir refilling (Reservoir low level condition cancelled) to reset the C/B FIN 5JR to unlatch the HSMU logic.

For more details, refer OIT SE 999.0134/06 and TFU 29.31.00.004.

[Survey for the Engineering Support section](#)

General Information

Potential impact:	Maintenance, Operational Reliability				
Key information:					
Solution benefit:					
First issue date:	17-JUL-2014	Issue date:	05-FEB-2019	Last check date:	14-MAY-2024

Technical parameters

ATA:	27-00, 29-00, 32-00, 52-00, 78-00
A/C type/serie:	A330, A340
Engine:	
Engine manufacturer:	
Fault code/ECAM warning:	
FIN:	
Part Number:	
Supplier:	

Attachments

N/A

Links

Other articles (ISI/TFU):

- 27.24.00.011, 27.26.00.011, 29.00.00.027, 29.00.00.032, 29.00.00.034, 29.00.00.034, 29.00.00.035, 29.00.00.150, 29.00.00.152, 29.00.00.152, 29.00.00.156, 29.00.00.160, 29.00.00.179, 29.00.00.179, 29.00.00.180, 29.00.00.180, 29.00.00.181, 29.00.00.181, 29.00.00.181, 29.00.00.183, 29.00.00.195, 29.10.00.034, 29.10.00.047, 29.11.00.009, 29.11.00.009, 29.11.05.001, 29.19.00.002, 29.31.00.004, 32.00.00.009, 32.00.00.157, 32.00.00.157, 32.31.01.004, 32.31.22.002, 32.31.46.010, 32.43.00.004, 32.45.14.001, 32.51.17.003, 32.51.17.004

© Airbus SAS, 2024. All rights reserved. Confidential and proprietary document. The technical information provided in this article is for convenience and information purposes only. It shall in no case replace the official Airbus technical or Flight Operations data which shall remain the sole basis for aircraft maintenance and operation. These recommendations and information do not constitute a contractual commitment, warranty or guarantee whatsoever. They shall not supersede the Airbus technical nor operational documentation; should any deviation appear between this article and the Airbus or airline's official manuals, the operator must ensure to cover it with the appropriate document such as TA, FCD, RDAS. Access to WISE is supplied by Airbus under the express condition that Airbus hereby disclaims any and all liability for the use made by the user of the information contained in WISE. It shall be used for the user's own purposes only and shall not be reproduced or disclosed to any third party without the prior consent of Airbus.