

SERVICE BULLETIN

Subject: Airbus Common Beam Master Cylinder Leakage

Helicopters Affected: EC135 / EC145 aircraft with Common Beam Cargo Hook System

Parts Affected: P/Ns listed in Table 1.

Table 1 – Affected Part Numbers

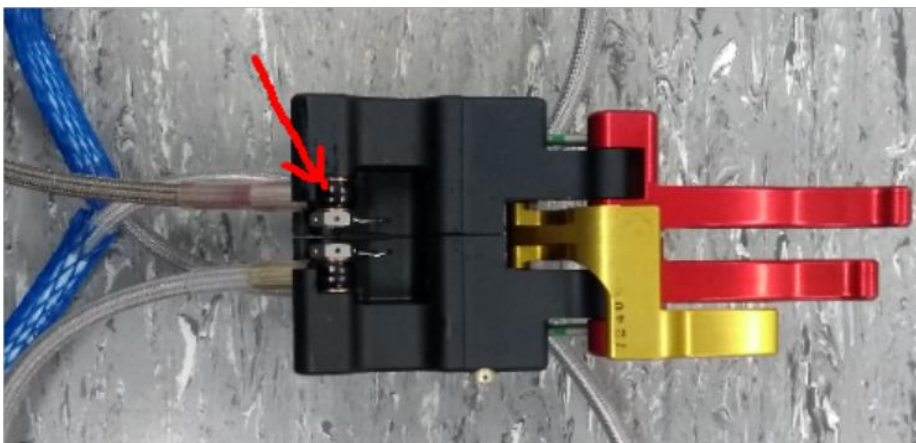
OSI P/N	Description
232-626-00	Master Cylinder with Plumbing – Single – EC135
232-626-01	Master Cylinder with Plumbing – Dual – EC135
232-626-10	Master Cylinder with Plumbing – Single – EC145T2
232-626-11	Master Cylinder with Plumbing – Dual – EC145T2

Compliance: Recommended on condition, within 8 weeks of leakage discovery.

Ownership: Please review this information and determine if the equipment is still in your possession. If the equipment is no longer in your possession, please forward this notice to the current owner, or to your customer, as applicable.

Description of Incident: Onboard Systems has been notified by Airbus Helicopters of multiple instances of hydraulic fluid leakage from 'Common Beam' Master Cylinder assemblies at the connection point between the hydraulic hose and Master Cylinder reservoir. Evidence of hydraulic fluid can be seen as wetness on the Banjo Bolt and pink-colored discoloration under the hydraulic hose protective sleeving.

Figure 1 – Master Cylinder fluid leakage location



Response: Onboard Systems has examined the Quality Notifications and photos provided by Airbus and investigated potential root cause by examination of inventory components and work-in-process.

Findings indicate the primary root cause of the leakage to be a production nonconformance within both Master Cylinders (P/Ns 291-836-00 and 291-837-00). Inventory inspected showed that a thread relief was missing from physical parts: Ø.320 feature highlighted in Figure 2.

This missing feature can cause unintended interference between the Banjo Bolt (P/N 291-665-00) and Master Cylinder—preventing full clamping force of the sealing joint, even after full assembly torque. The cause of this is that the Banjo Bolt potentially bottoms out against a blind thread of limited depth. See Figures 2 & 3.

Figure 2 – Missing thread relief

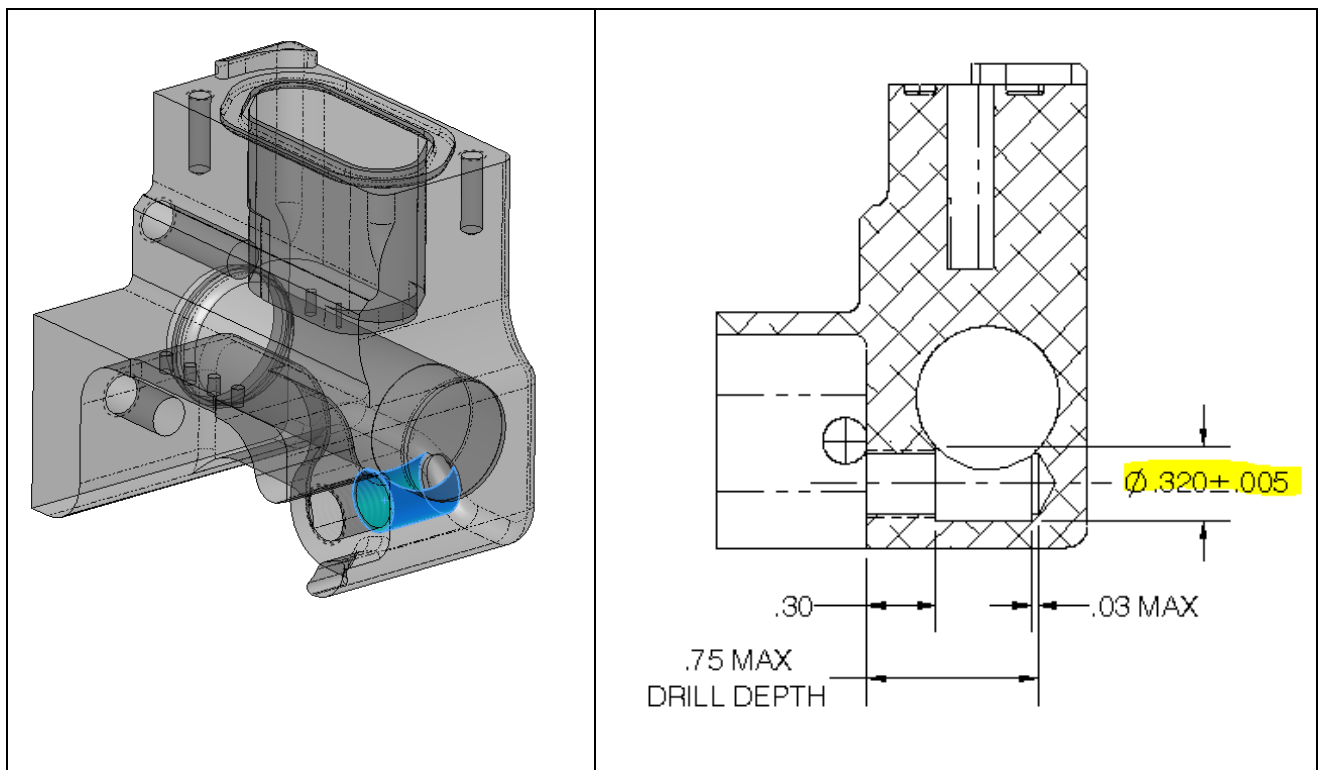
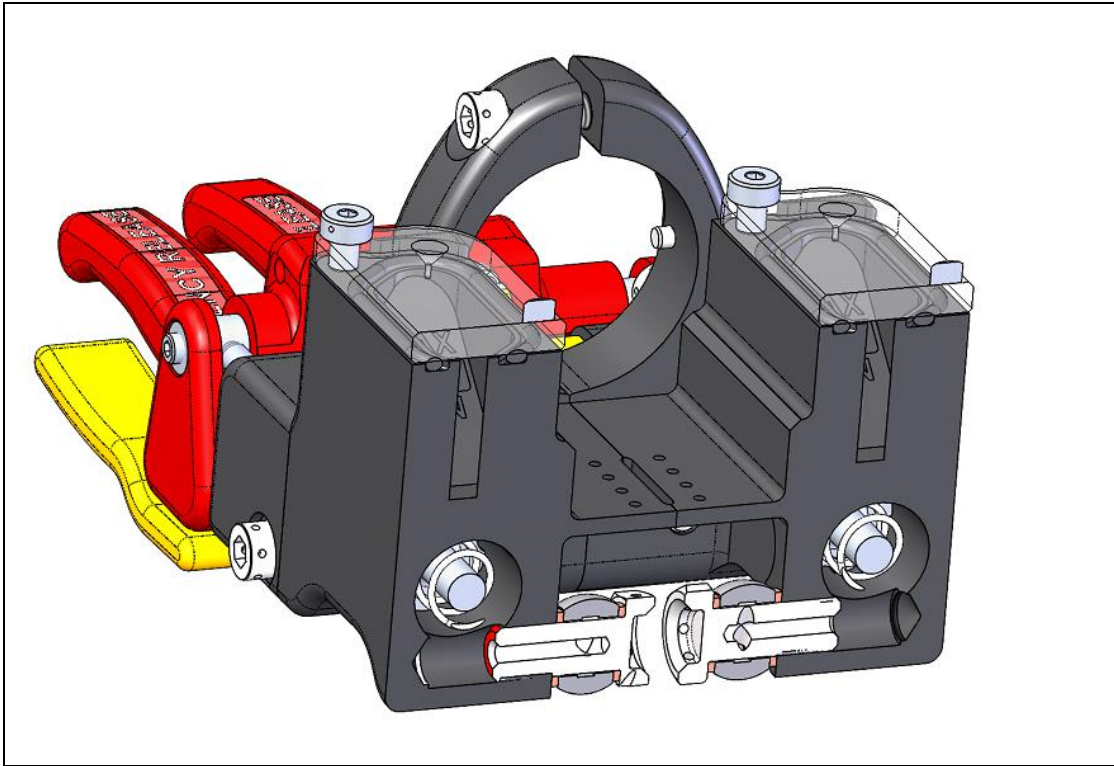


Figure 3 – Missing thread relief, in context of assembly cross-section



A secondary root cause was found to be insufficient assembly torque of the Banjo Bolt. Increasing assembly torque of the Banjo Bolt from the original value of 60 in-lbs [7 Nm] to 10 ft-lbs [14 Nm] was found to be more effective in developing positive sealing surfaces at the Crush Washers.

The volume of fluid leakage is minimal and represents a nuisance; there is no apparent risk to loss of functionality or system safety. A transparent reservoir lid, legible MIN/MAX fluid indicator and daily pre-flight regime further mitigate against any potential loss of functionality due to excessive fluid loss.

As a functional test of the master cylinder, including a leakage test, has always been conducted during the factory build process, it is speculated that the actual leakage is attributable to wicking action of the hydraulic fluid (MIL-PRF-87257), and happens slowly over time.

Future build lots will include a more expanded factory leakage test, including a 24-hour overnight dwell under pressure within the ATP.

Recommended Action: Inspect affected Master Cylinders for leaking condition described above. If no leakage is found, no further action is necessary. If leakage is found, this Service Bulletin outlines two acceptable means to eliminate the leakage:

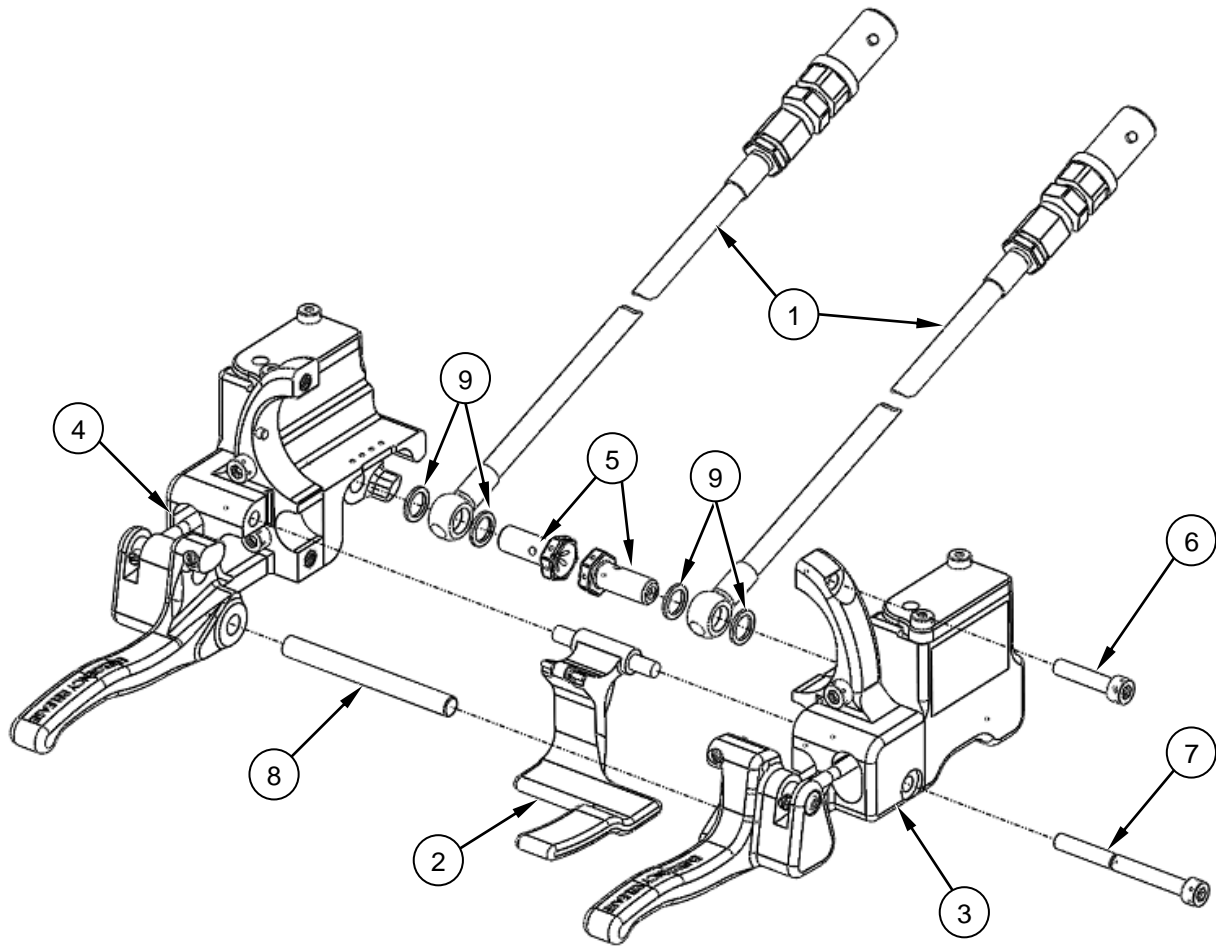
1. **Repair procedure** to be conducted by Airbus on the Final Assembly Line for urgent cases, or by end-user customers in the field. *Articles undergoing this repair will be designated as configuration 'Amdt B' after completion.*
2. **Rework procedure** to bring the configuration into conformance with the intended design (to be conducted at Onboard Systems). *Articles undergoing rework (as well as new production) will be designated as configuration 'Amdt C' after completion.*

Remove the complete Master Cylinder with Plumbing assembly from aircraft, if installed. Remove lid and drain reservoir of hydraulic fluid.

REPAIR PROCEDURE:

In a FOD-controlled environment, carefully disassemble the Master Cylinder Assembly to the level shown in the illustrated parts of Figure 4. Depending on the model, reference also Onboard Systems Owner's Manuals 120-217-00 or 120-220-00 for supporting information.

Figure 4 – Disassemble Master Cylinder (P/N 232-626-11 shown)



ITEM	P/N	DESCRIPTION	QTY
1	232-632-00	MASTER CYLINDER PLUMBING ASSEMBLY	2
2	232-640-00	LOCKOUT LEVER ASSEMBLY	1
3	232-641-10	MASTER CYLINDER SUBASSEMBLY (PORT)	1
4	232-643-10	MASTER CYLINDER SUBASSEMBLY (STBD)	1
5	291-665-00	BANJO BOLT, DRILLED HEAD	2
6	511-080-00	SOCKET HEAD SCREW	1
7	511-081-00	SOCKET HEAD SCREW	1
8	511-086-00	DOWEL PIN	1
9	556-040-00	CRUSH WASHER	4

NOTICE

The master cylinder assembly is sensitive to FOD. Conduct repair in a controlled environment and store components in covered bins to avoid contamination.

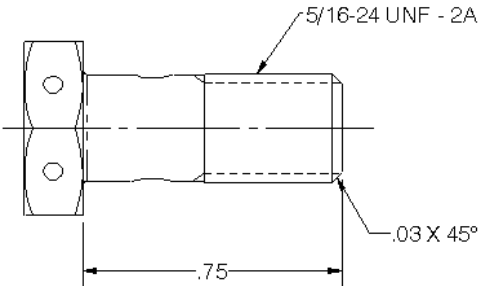
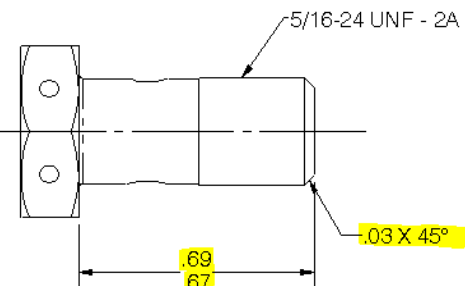
The repair procedure below outlines a modification of the Banjo Bolt. After the modification, the Banjo Bolt part number is identified as 291-665-01.

- By manual machining or grinding, modify the Banjo Bolt(s) P/N 291-665-00. Remove .06 - .08 inches [1.5 – 2.0mm] of bolt length as depicted in Figure 5 below to achieve the new length of .69/.67 inches [17.5/17.0mm].
- Break the external thread sharp edge with a .03 inch [.7mm] x 45° chamfer. See Figure 5.
- Restore any deformed / collapsed threads with a small triangle file, remove any remaining burrs and thoroughly clean / degrease the part.

NOTICE

Ensure that the modified Banjo Bolt threads are free-running after modification & before assembly. Restore any deformed threads. Test the threads using a 5/16-24 plain nut or class -2A thread ring gage.

Figure 5 – Banjo Bolt modification

Before Modification: 291-665-00	After Modification: 291-665-01
	

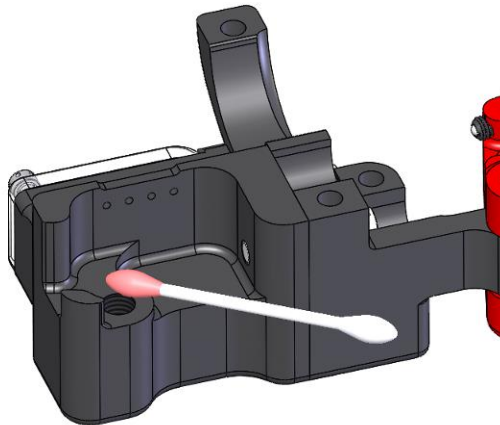
Prepare the plumbing assembly by placing the modified Banjo Bolt, through the banjo fitting. Place a crush washer, P/N 556-040-00, on both sides of the banjo fitting as shown.



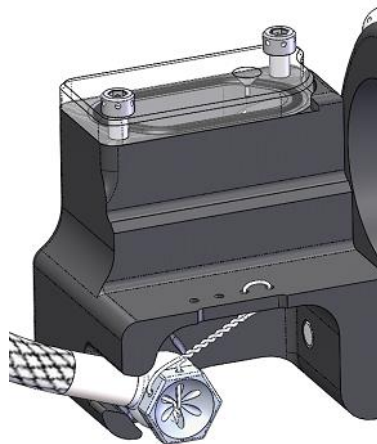
NOTICE

Ensure Crush Washers are flat / smooth. If any indentations are seen, replace them.

Apply a thin coat of hydraulic fluid to the faying surface of the Master Cylinder Sub Assy using a foam swab. Ensure that no FOD is introduced into the cylinder.



Orient the hose's banjo fitting in the slot of the Master Cylinder Sub-Assemblies as shown and secure with Banjo Bolt. **Torque the Banjo Bolt to 10 ft-lbs [14 Nm]**, and secure bolt using MS20995C25 lockwire, or equivalent.



NOTICE

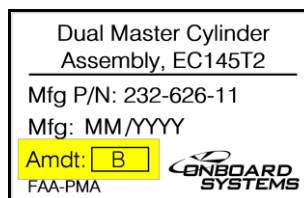
Ensure that the Banjo Bolt clamps up the banjo fitting & crush washers before applying assembly torque.

Fill and bleed the Master Cylinder Assembly using instructions from Owner's Manual 120-217-00. Thoroughly clean the exterior of the master cylinder with acetone or isopropyl alcohol to remove all trace of hydraulic fluid.

NOTICE

Ensure no fluid is found around the Banjo Bolt after an overnight dwell to verify the repair. It is not necessary to pressurize the system to test the seal. It is necessary to bleed and fill the reservoir however.

Apply Amendment 'B' Decal, P/N 215-428-00, on top of existing product label to show amendment 'B'.



REWORK PROCEDURE:

A second option is to return the complete Master Cylinder with Plumbing assembly to Onboard Systems for rework to full conformance to the as-designed configuration.

Onboard Systems will fully disassemble the Master Cylinder, add the missing thread relief depicted in Figure 2, reassemble (increasing the assembly torque of the Banjo Bolt) and re-ATP. As CNC machining is required, this process is not feasible to conduct in the field.

This configuration will be denoted as amendment 'C'.

Dual Master Cylinder
Assembly, EC145T2

Mfg P/N: 232-626-11

Mfg: MM/YYYY

Amdt: **C**



Manpower: Approximately 2 man-hours will be required for repair procedure.

Required Materials: See Table 3. All materials listed are as-required (AR), no new materials are technically required.

Table 3 – Materials

Part No.	Description	Quantity
212-038-00	Bleed kit, Staubli Fitting, MIL-PRF-87257	AR
540-032-00	2oz MIL-PRF-87257	AR
556-040-00	Crush Washer	AR

Publications Affected: The following publications can be downloaded from the company web site by visiting the following link:

<http://www.onboardsystems.com/document>

Owner's Manual: 120-217-00

Owner's Manual: 120-220-00

Contact Information: Technical support question regarding this bulletin can be addressed through the following contact methods:

Phone: 360-546-3072



Service Bulletin

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Revision: 3 Date: 11/17/21

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