DATA SUMMARY

LOCATION

Date and time	**Friday, 14 July 2006; 13:15 h local time**[1]
Site	**Borjas Blancas (Lleida)**

AIRCRAFT

Registration	**EC-JCQ**
Type and model	**TECNAM P2002-JF**
Operator	**Private**

Engines

Type and model	**ROTAX 912S2**
Number	**1**

CREW

Pilot in command

Age	**40 years**
Licence	**Private pilot aeroplane**
Total flight hours	**6,500 h**
Flight hours on the type	**2,200 h**

INJURIES

	Fatal	Serious	Minor/None
Crew			**1**
Passengers			**1**
Third persons			

DAMAGE

Aircraft	**Minor**
Third parties	**None**

FLIGHT DATA

Operation	**General aviation – Ferry/positioning**
Phase of flight	**En route**

REPORT

Date of approval	**24 October 2007**

[1] The time reference used in this report is local time.

1. FACTUAL INFORMATION

1.1. History of the flight

On Friday, 14 July 2006, aircraft EC-JCQ took off at 10:30, with pilot and a second person aboard, from Sabadell airport en route to Madrid-Cuatro Vientos following the installation of a new ROTAX 912S2 engine.

A few minutes after takeoff, an increase in the oil temperature and slight vibrations, forced the pilot to return to Sabadell. The aircraft was inspected by the maintenance center that had performed the engine installation and took off again at 12:45 after a pipe in the fuel system was changed and all engine parameters were verified to be within specifications on ground.

Thirty minutes after takeoff, while on level flight, the aircraft once again experienced an increase in the oil temperature to 120°. After a brief period, during which the pilot descended the aircraft at 100 fpm in an attempt to lower the temperature, the engine revolutions dropped to 1,300 rpm, intermittent power losses took place and a metallic sound appeared.

After declaring an emergency to ACC Barcelona, the pilot made an emergency landing. Both occupants were uninjured, though the aircraft's nose gear was slightly damaged.

1.2. Aircraft information

The aircraft, a Tecnam P2002 JF, registration EC-JCQ, was being used for training purposes. It had been manufactured in 2004 and registered on 29-11-2004 in Spain. Its MTOW was 580 kg and it was equipped with a fixed-pitch two-blade propeller and a certified Rotax 912S2 four-cylinder engine.

Due to problems with a loss of oil within the previous engine's warranty period, the Rotax 912S engine, S/N 4923307, with which the aircraft was outfitted in the incident, had just been installed. It had been in operation a total of 45 minutes since its installation.

The engine's sales invoice showed that it had been delivered by Rotax two days before the incident and that it was new.

1.3. Personnel information

The pilot, 40 years of age, had a private pilot's license with a total of 6,500 flight hours, 2,200 of them on the type. The previous three months he had flown 49 h, 35 of them in the last month. The day before the accident he had flown 1 hour.

1.4. Investigation

1.4.1. *Engine inspection*

During the investigation, it was performed a visual inspection and a disassembly of the engine. The engine was in good overall condition and no external impacts, warping or visible liquid leaks were detected. Oil, water and fuel levels were adequate. Disassembly of the engine revealed the following deficiencies:

- The propeller did not rotate freely.
- Upon removing the gearbox, the magnetic plug was found to contain a large quantity of metallic particles.
- The oil pump's upper casing showed evidence of circular abrasion marks.
- The combustion chambers showed clear signs of oxidation. Metallic particles and abrasion marks were also found.
- The crankshaft did not rotate and showed abrasion marks on the crankpins.
- The hydraulic tappet on the exhaust valve of cylinder number 1 was jammed. Extracting it revealed that the contact area between the tappet and the cam was perforated (figure 1).
- The camshaft showed signs of wear, as did the cam associated with the exhaust valve number one cylinder, whose tappet was perforated (figure 1).
- The camshaft bearing in the crankcase showed abrasion marks.

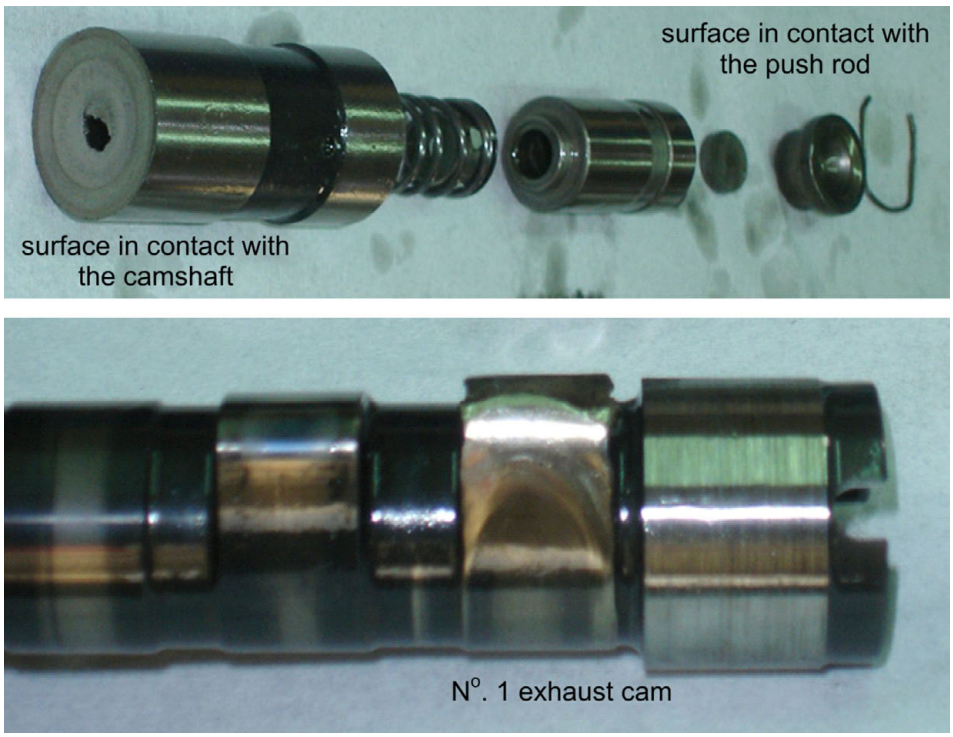

Figure 1. Hydraulic tappet and exhaust cam for the n° 1 cylinder

1.4.2. *Inspection by the manufacturer*

The tappets, camshaft, crankshaft, cylinders, both crankcase halves and the oil pressure sensor for the engine on aircraft EC-JCQ were sent to the manufacturer, Rotax, to be inspected under the supervision of Austria's Accident Investigation Board.

Mechanical and metallographic analysis revealed that the hydraulic tappets met design hardness specifications, except the perforated tappet with an HRC value of 53-54 below the minimum required of 55 HRC. According to the manufacturer, that value is not conclusive due to the fact that the hardness of the perforated hydraulic tappet could not be measured at the required point (1.54 mm off the center) given the perforation on the surface.

A hardness analysis of the camshaft material showed that the cam (showing massive wear too) associated with the exhaust valve number 1 cylinder met design specifications, with a hardness of 724 HV10 with respect to the minimum value of 680 HV10.

According to the manufacturer, the damages and marks found on the other engine components were produced by metallic particles. The oil pressure sensor was functioning properly.

1.4.3. *Measures taken by the manufacturer Rotax and EASA*

According to information provided by Austria's Accident Investigation Board, the manufacturer was aware of similar incidents in which, on some occasions, the engine had stopped completely due to tappet problems. Said problems seemed to occur the first 50 operating hours on new or overhauled engines.

According to the information provided by the manufacturer, the wear and massive loss of material are consequences of the heat and friction between both elements, caused by a combination of the excessive roughness of the hydraulic tappet contact surface, and the engine oil. Consequences of that scenario, according to Rotax, are a loss of power and/or unusual engine behaviour, such that the pilot is able to react in an adequate manner.

The internal measures taken by Rotax consisted of:

- Polishing the surface that came in contact with the cams on the hydraulic tappets in order to reduce the friction between the two pieces.
- The improvement of the engine oil used on the serial test bench.
- The inclusion, in the quality control process for the pieces, of a tappet size control step and of a visual inspection of the roughness of the area in contact with the hydraulic tappet cam.

- A check of the tappet spring tension and visual inspection of the accurate assembly and the right colour of the spring.
- The installation in new engines of the new polished hydraulic tappets so as to prevent excessive friction.

The external measures taken by the manufacturer consisted of issuing a mandatory alert service bulletin ASB-912-051/ASB-914-034 on 13 October 2006 (annex I), to be implemented prior to the initial installation or start-up of the engine, within the next five hours of operation or, at the latest, before 1-03-2007, and periodically with each oil change. The bulletin explained that the camshaft and hydraulic valve tappets were subject to increased wear and required a check of the magnetic plug. The accumulation of large quantities of metallic particles at the magnetic plug required the engine to be stopped and an authorized distributor to be consulted. ASB-912-051/ASB-914-034 was applicable to specific serial numbers of certain certified engines (912 A, 912 F, 912 S and 914 F) and all engines whose camshafts or hydraulic tappets had been replaced since 01-01-2006.

For certain serial numbers of non-certified four-stroke engines (912 UL, 912 ULS, 912 ULSFR and 914 UL), the manufacturer issued ASB-912-051 UL/ASB-014-034 UL (annex II) on the same day which proposed the same measures as for the certified engines.

On 16 October 2006, and going into effect the next day, EASA issued airworthiness directive AD 2006-0316-E (annex III), which referenced the measures taken in the Rotax bulletin.

1.5. Additional information

On 13 April 2007, aircraft ULM Tecnam P-92-ECHO, registration EC-IZC, had to perform an emergency landing on final approach due to power and vibration problems. The pilot decided to turn off the engine due to the proximity of the runway. The aircraft was equipped with a non-certified Rotax 912 UL engine, S/N 4407941, which had been supplied and installed by Rotax's authorized representative in Spain on 18-09-2006. The aircraft had operated a total of 152 h from the time of installation until the incident.

The inspection of the engine revealed a large quantity of metallic particles in the magnetic plug, the propeller did not turn freely and a stuck-open exhaust valve on the number 4 cylinder as a result of the associated hydraulic tappet being stuck in its housing in the crankcase. After disassembly, it was verified that the tappet surface in contact with the camshaft was no longer flat, and that a dimple had been created as a result of wear. In the associated camshaft cam, wear was also observed (figure 2).

The engine's serial number was affected by service bulletin ASB-912-051 UL/ASB-912-034 UL issued by Rotax on 13 October 2006. Moreover, the engine had been inspected 5 hours before by Rotax's authorized representative in Spain which, among another actions, had changed the oil without detecting metallic particles in the magnetic plug.

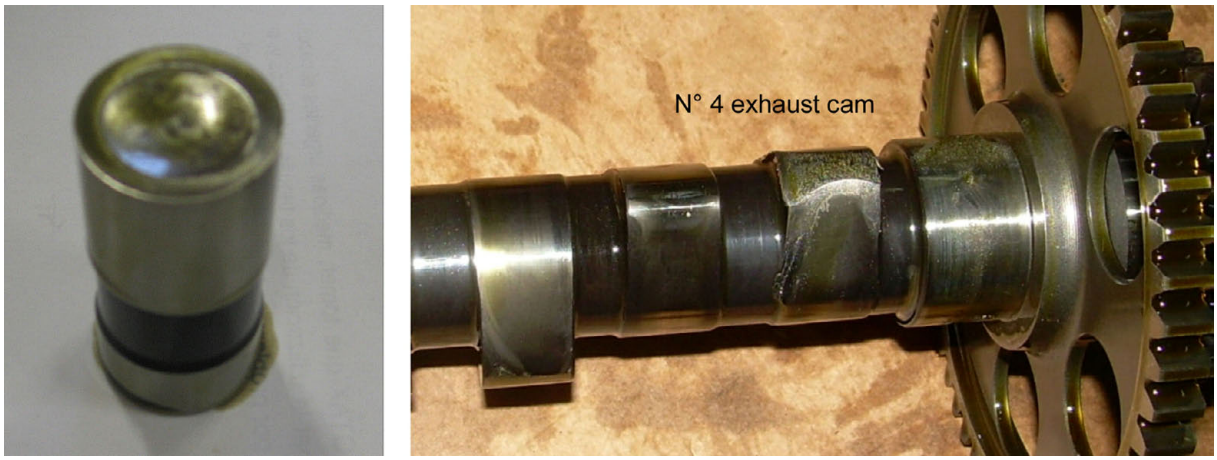

Figure 2. Hydraulic tappet and camshaft cam from exhaust valve cylinder n° 4 on aircraft EC-IZC

Despite similar wear on tappets and camshafts of aircraft EC-JCQ and EC-JCQ, the manufacturer considers that the EC-IZC problem is different from that of the EC-JCQ and does not share the same cause.

2. ANALYSIS

After a total of 45 minutes of operation since being installed on aircraft EC-JCQ, the new certified Rotax 912S2 engine began to exhibit a loss of power, increased temperature, vibrations and a metallic sound. The inspection of the engine revealed that the hydraulic tappet from exhaust valve cylinder number 1 was perforated, did not meet design hardness specifications, and that the associated camshaft cam showed a massive loss of material.

The purpose of the tappet is to convert the rotational movement of the camshaft to the rectilinear motion of the push rods, which in turn open and close the combustion chambers' intake and exhaust valves. The improper operation of the tappets affects the valves and leads to problems with airtightness, mixture admission and the evacuation of exhaust gases from the combustion chamber, thereby affecting the power developed by the engine. Wear and perforations found in the camshaft-hydraulic tappet assembly led to problems in the opening and closing of the associated valve, which resulted in a loss of power of the aircraft EC-JCQ. As a result of the wear both on the cams and on the hydraulic tappets, particles were ejected which, once distributed throughout the engine, led to the abrasion marks and particules found.

According to the manufacturer, the cause of the perforation is an excessive roughness of the hydraulic tappet contact surface in combination with the engine oil used for lubrication. These conditions led to excessive friction and heat, which caused the loss of material and perforation of the tappet and camshaft cam. In this regard, the

manufacturer has polished the surface of the hydraulic tappet and has changed the engine oil used on the bench test. Because of the consideration by the manufacturer that wear on both pieces (camshaft cam and hydraulic tappet) stemmed from the tappets, actions regarding the camshaft have not been considered, and the manufacturer considers its actions sufficient to avoid any unsafe conditions.

That scenario explains problems which ocurred on new engines or engines with new tappets installed. However, it does not explain problems which appeared on engines with more operating hours, like the EC-IZC aircraft, in which at just 152 hours of total operation, the engine showed similar wear and loss of material on tappets and the camshaft cam. Nevertheless, the manufacturer considers that the EC-IZC ocurrence is a different case and does not share the same cause.

The improvements implemented by the manufacturer would prevent failures on new engines or engines with new polished hydraulic tappets. As for those engines already installed or built, with hydraulic tappets manufactured before the improvements, Rotax has not taken any preventive actions, save for that listed in bulletin ASB-912-051/ASB-914-034 to inspect the magnetic plug. This measure relies on the accumulation of shavings at the magnetic plug from a fault in the tappet-camshaft assembly to detect a problem in that part of the engine. Yet, as happened with aircraft EC-JCQ and EC-IZC, the tappet failed completely after a short in-service period which did not allow the problem to be detected. This measure, therefore, in addition to being reactive, is considered to endanger the safe operation of the engine and is thus addressed in a safety recommendation.

3. CONCLUSIONS

3.1. Findings

- The engine installed in the aircraft had been manufactured and distributed by Rotax and had operated 45 minutes since new.
- The exhaust valve number 1 cylinder hydraulic tappet, after the incident, had hardness caracteristics below the minimun design specifications and a perforation.
- The manufacturer considers that the perforations and loss of material from tappets and camshafts are caused by friction and heat due to lubrication and the excessive roughness of the tappet contact surface with the cam.
- The measures taken by the manufacturer and EASA for already built engines call for a check of the magnetic plug as symptom of a problem in the tappet-camshaft assembly.
- Despite the similarity of the wear and loss of material from tappets and camshafts found on aircraft EC-IZC after 152 h of operation, the manufacturer considers that both incidents do not share the same cause.

3.2. Causes

The loss of power which led to the incident with aircraft EC-JCQ is considered to be the result of a fault in the exhaust valve n° 1 cylinder due to the improper transmission of motion from the camshaft to the push rod and to the valve through the hydraulic tappet. According to the manufacturer, the excessive roughness of the tappet and lubrication resulted in excessive friction between the tappets and camshafts.

4. SAFETY RECOMMENDATIONS

The investigation into the incident involving aircraft EC-JCQ has revealed problems in the hydraulic tappet-camshaft assembly. In both cases, these problems resulted in the faulty operation of an exhaust valve with the ensuing loss of power and the performance of emergency landings.

Both the tappet and the camshaft suffered significant wear. In one case, the tappet was actually perforated. The manufacturer has acknowledged the existence of problems with the roughness of the tappets and lubrication, which has resulted in certain improvements to the manufacturing processes and in the issue of two service bulletins and an airworthiness directive.

The measures taken in October 2006 in regards to the Airworthiness Directive, do not allow from the outset for prevention of the failure of the tappet-camshaft assembly. The fault in question could be catastrophic and immediate (occurring over just one flight) resulting in a loss of power, and force to the pilot to perform an emergency landing without any additional flight time. These measures are reactive and it is considered that the continued airworthiness of those engines with tappets manufactured prior to the improvements is not ensured.

REC 42/07. It is recommended that EASA and ROTAX take measures intended to guarantee the continued airworthiness of ROTAX 912/914 engines in service which use hydraulic tappets manufactured prior to the implementation of the improvements.

ANNEX I
ASB-912-051/ASB-914-034

ROTAX
AIRCRAFT ENGINES

ALERT SERVICE BULLETIN

CHECKING OF MAGNETIC PLUG ON ROTAX® ENGINE TYPE 912/914 (SERIES)

ASB-912-051
ASB-914-034

MANDATORY

Repeating symbols:

Please, pay attention to the following symbols throughout this document emphasizing particular information.

▲ WARNING: Identifies an instruction, which if not followed, may cause serious injury or even death.

■ CAUTION: Denotes an instruction which if not followed, may severely damage the engine or could lead to suspension of warranty.

◆ NOTE: Information useful for better handling.

1) Planning information

1.1) Engines affected

All versions of the engine type:

- 912 A from S/N 4,410.681
- 912 F from S/N 4,412.912
- 912 S from S/N 4,923.263
- 914 F from S/N 4,420.595

Also affected are all engines on which the camshaft/hydraulic valve tappets have been exchanged at engine repair/general overhaul after January 1, 2006.

That certain engines

- 912 A from S/N 4,410.709
- 912 F from S/N 4,412.920
- 912 S from S/N 4,923.381
- 914 F from S/N 4,420.633

have already had the magnetic plug inspected to comply with section 1.5 (a) "before first installation or first start up".

1.2) Concurrent ASB/SB/SI and SL

none

1.3) Reason

In limited cases increased wear of camshaft/hydraulic valve tappet can occur.

1.4) Subject

Checking of magnetic plug on ROTAX® engine type 912/914 (Series).

1.5) Compliance

(a) before the first installation or first engine start up

(b) within the next 5 hours of operation (one-time), but at the latest by March 1, 2007

(c) at every specified oil change

▲ WARNING: Non-compliance with these instructions could result in engine damage, personal injury or death!

1.6) Approval

The technical content is approved under the authority of DOA Nr. EASA.21J.048.

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1.7) Manpower

Estimated man-hours:
engine installed in the aircraft - - - manpower time will depend on installation and therefore no estimate is available from the engine manufacturer.

1.8) Mass data

change of weight - - - none
moment of inertia - - - unaffected

1.9) Electrical load data

no change

1.10) Software accomplishment summary

no change

1.11) References

In addition to this technical information refer to current issue of
- Illustrated Parts Catalog (IPC)
- Maintenance Manual (MM)

◆ NOTE: The status of Manuals can be determined by checking the table of amendments of the Manual. The 1st column of this table is the revision status. Compare this number to that listed on the ROTAX WebSite: www.rotax-aircraft-engines.com. Updates and current revisions can be downloaded for free.

1.12) Other publications affected

none

1.13) Interchangeability of parts

All used parts which cannot be used must be returned F.O.B. to a ROTAX® Authorized Distributor or Service Center.

2) Material Information

2.1) Material - cost and availability

Price and availability will be supplied on request by ROTAX® Authorized Distributors or their Service Center.

2.2) Company support information

none

2.3) Material requirement per engine

Should removal of a locking device (e.g. lock tabs, self-locking fasteners, etc.) be required when undergoing disassembly/assembly, always replace with a new one.

2.4) Material requirement per spare part

none

2.5) Rework of parts

none

2.6) Special tooling/lubricant-/adhesives-/sealing compound - Price and availability

Price and availability will be supplied on request by ROTAX® Authorized Distributors or their Service Centers.
parts requirement:

Fig.no.	p/n	Qty/engine	Description	Old p/n	Application
	877890	1	Torx-Bit T40	-	magnetic drain plug

■ CAUTION: In using these special tools observe the manufacturer´s specifications.

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3) Accomplishment / Instructions

Accomplishment

All the measures must be taken and confirmed by the following persons or facilities:

- ROTAX® -Airworthiness representative
- ROTAX® -Distributors or their Service Centers
- Persons approved by the respective Aviation Authority

▲ WARNING: Proceed with this work only in a non-smoking area and not close to sparks or open flames. Switch off ignition and secure engine against unintentional operation. Secure aircraft against unauthorized operation. Disconnect negative terminal of aircraft battery.

▲ WARNING: Risk of scalds and burns! Allow engine to cool sufficiently and use appropriate safety gear while performing work.

▲ WARNING: Should removal of a locking device (e.g. lock tabs, self-locking fasteners, etc.) be required when undergoing disassembly/assembly, always replace with a new one.

3.1) Instructions

■ CAUTION: All work has to be performed in accordance with the relevant Maintenance Manual.

3.1.1) Checking of magnetic plug

See fig. 1 and fig. 2

- Remove the magnetic plug according to relevant Maintenance Manual.
- Inspect magnetic plug in accordance with procedure in relevant Maintenance Manual.

■ CAUTION: If a greater quantity of metal particles (more than 3 mm (1/8“)) is detected, consultation of an authorized distributor regarding further action is necessary. The engine must not be taken into operation until the cause has been identified and eliminated.

- Restore aircraft to original operating configuration.
- Connect negative terminal of aircraft battery.

3.2) Test run

Conduct test run including ignition check and inspect for fluid leaks in accordance with the current Maintenance Manual of the respective engine type.

3.3) Summary

These instructions (section 3) have to be conducted in accordance with compliance in section 1.5.

The execution of the mandatory Alert Service Bulletin must be confirmed in the logbook.

Approval of translation to best knowledge and judgement - in any case the original text in German language and the metric units (SI-system) are authoritative.

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4) Appendix

the following drawings should convey additional information:

acceptable

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fig. 1

not acceptable

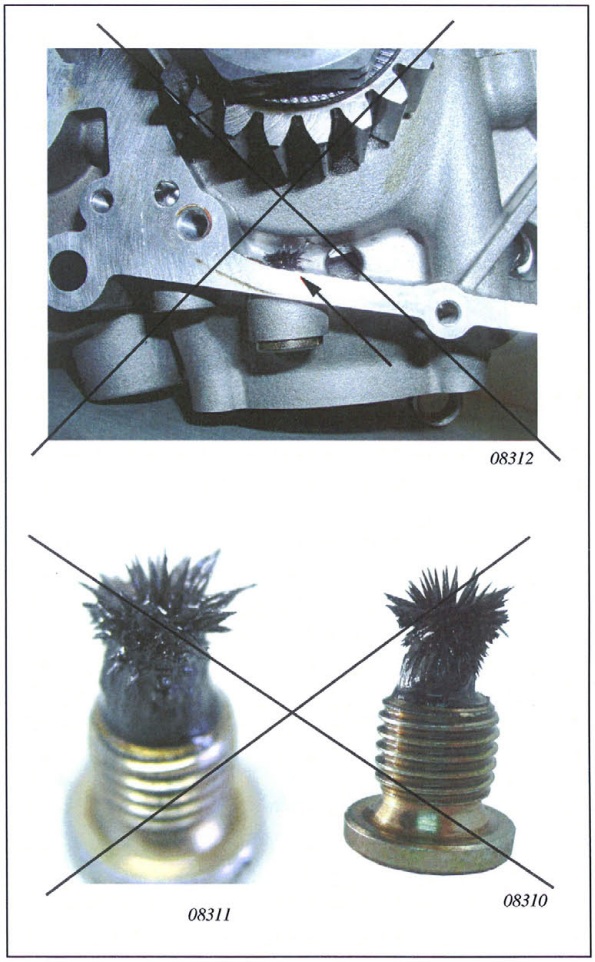

fig. 2

◆ NOTE: The illustrations in this document show the typical construction. They may not represent full detail or the exact shape of the parts which have the same or similar function.
Exploded views are **no technical** drawings and are for reference only. For specific detail, refer to the current documents of the respective engine type.

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ANNEX II
ASB-912-051 UL/ASB-914-034 UL

ROTAX
AIRCRAFT ENGINES

ALERT SERVICE BULLETIN

CHECKING OF MAGNETIC PLUG ON ROTAX® ENGINE TYPE 912/914 (SERIES)
ASB-912-051UL
ASB-914-034UL

MANDATORY

Repeating symbols:

Please, pay attention to the following symbols throughout this document emphasizing particular information.

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■ CAUTION: Denotes an instruction which if not followed, may severely damage the engine or could lead to suspension of warranty.

◆ NOTE: Information useful for better handling.

1) Planning information

1.1) Engines affected

All versions of the engine type:

- 912 UL from S/N 4,407.606
- 912 ULS from S/N 5,645.990
- 912 ULSFR from S/N 4,430.267
- 914 UL from S/N 4,419.210

Also affected are all engines on which the camshaft/hydraulic valve tappets have been exchanged at engine repair/general overhaul after January 1, 2006.

That certain engines

- 912 UL from S/N 4,408.102
- 912 ULS from S/N 5,647.146
- 912 ULSFR from S/N 4,430.414
- 914 UL from S/N 4,419.436

have already had the magnetic plug inspected to comply with section 1.5 (a) "before first installation or first start up".

For complete instructions and compliance to this Alert Service Bulletin refer to Alert Service Bulletin ASB-912-051/ASB-914-034, latest edition section 1.2 onward.

◆ NOTE: Section 1.6) Approval: Is not required for engines of the type UL (series).
Section 3) Accomplishment: In addition:persons with adequate type-specific training.

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ROTAX
AIRCRAFT ENGINES

ALERT SERVICE BULLETIN

CHECKING OF MAGNETIC PLUG ON ROTAX® ENGINE TYPE 912/914 (SERIES)

ASB-912-051
ASB-914-034

MANDATORY

Repeating symbols:

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1) Planning information

1.1) Engines affected

All versions of the engine type:

- 912 A from S/N 4,410.681
- 912 F from S/N 4,412.912
- 912 S from S/N 4,923.263
- 914 F from S/N 4,420.595

Also affected are all engines on which the camshaft/hydraulic valve tappets have been exchanged at engine repair/general overhaul after January 1, 2006.

That certain engines

- 912 A from S/N 4,410.709
- 912 F from S/N 4,412.920
- 912 S from S/N 4,923.381
- 914 F from S/N 4,420.633

have already had the magnetic plug inspected to comply with section 1.5 (a) "before first installation or first start up".

1.2) Concurrent ASB/SB/SI and SL

none

1.3) Reason

In limited cases increased wear of camshaft/hydraulic valve tappet can occur.

1.4) Subject

Checking of magnetic plug on ROTAX® engine type 912/914 (Series).

1.5) Compliance

(a) before the first installation or first engine start up

(b) within the next 5 hours of operation (one-time), but at the latest by March 1, 2007

(c) at every specified oil change

▲ WARNING: Non-compliance with these instructions could result in engine damage, personal injury or death!

1.6) Approval

The technical content is approved under the authority of DOA Nr. EASA.21J.048.

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1.7) Manpower

Estimated man-hours:
engine installed in the aircraft - - - manpower time will depend on installation and therefore no estimate is available from the engine manufacturer.

1.8) Mass data

change of weight - - - none
moment of inertia - - - unaffected

1.9) Electrical load data

no change

1.10) Software accomplishment summary

no change

1.11) References

In addition to this technical information refer to current issue of
- Illustrated Parts Catalog (IPC)
- Maintenance Manual (MM)

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1.12) Other publications affected

none

1.13) Interchangeability of parts

All used parts which cannot be used must be returned F.O.B. to a ROTAX® Authorized Distributor or Service Center.

2) Material Information

2.1) Material - cost and availability

Price and availability will be supplied on request by ROTAX® Authorized Distributors or their Service Center.

2.2) Company support information

none

2.3) Material requirement per engine

Should removal of a locking device (e.g. lock tabs, self-locking fasteners, etc.) be required when undergoing disassembly/assembly, always replace with a new one.

2.4) Material requirement per spare part

none

2.5) Rework of parts

none

2.6) Special tooling/lubricant-/adhesives-/sealing compound - Price and availability

Price and availability will be supplied on request by ROTAX® Authorized Distributors or their Service Centers.
parts requirement:

Fig.no.	p/n	Qty/engine	Description	Old p/n	Application
	877890	1	Torx-Bit T40	-	magnetic drain plug

■ CAUTION: In using these special tools observe the manufacturer´s specifications.

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3) Accomplishment / Instructions

Accomplishment

All the measures must be taken and confirmed by the following persons or facilities:

- ROTAX® -Airworthiness representative
- ROTAX® -Distributors or their Service Centers
- Persons approved by the respective Aviation Authority

▲ WARNING: Proceed with this work only in a non-smoking area and not close to sparks or open flames. Switch off ignition and secure engine against unintentional operation. Secure aircraft against unauthorized operation. Disconnect negative terminal of aircraft battery.

▲ WARNING: Risk of scalds and burns! Allow engine to cool sufficiently and use appropriate safety gear while performing work.

▲ WARNING: Should removal of a locking device (e.g. lock tabs, self-locking fasteners, etc.) be required when undergoing disassembly/assembly, always replace with a new one.

3.1) Instructions

■ CAUTION: All work has to be performed in accordance with the relevant Maintenance Manual.

3.1.1) Checking of magnetic plug

See fig. 1 and fig. 2

- Remove the magnetic plug according to relevant Maintenance Manual.
- Inspect magnetic plug in accordance with procedure in relevant Maintenance Manual.

■ CAUTION: If a greater quantity of metal particles (more than 3 mm (1/8“)) is detected, consultation of an authorized distributor regarding further action is necessary. The engine must not be taken into operation until the cause has been identified and eliminated.

- Restore aircraft to original operating configuration.
- Connect negative terminal of aircraft battery.

3.2) Test run

Conduct test run including ignition check and inspect for fluid leaks in accordance with the current Maintenance Manual of the respective engine type.

3.3) Summary

These instructions (section 3) have to be conducted in accordance with compliance in section 1.5.

The execution of the mandatory Alert Service Bulletin must be confirmed in the logbook.

Approval of translation to best knowledge and judgement - in any case the original text in German language and the metric units (SI-system) are authoritative.

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4) Appendix

the following drawings should convey additional information:

acceptable

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fig. 1

not acceptable

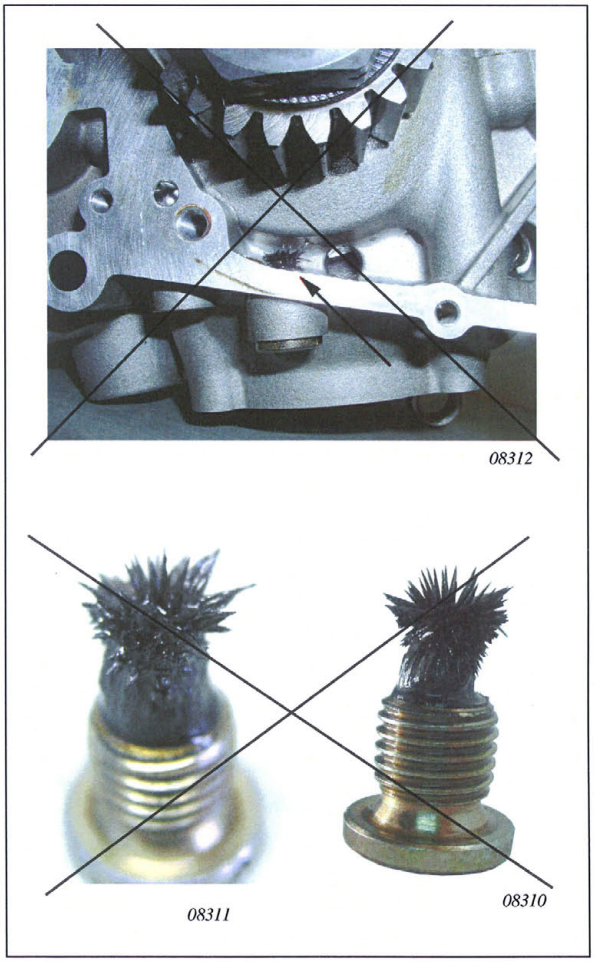

fig. 2

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Exploded views are **no technical** drawings and are for reference only. For specific detail, refer to the current documents of the respective engine type.

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ANNEX III
AD 2006-0316-E

EASA	EMERGENCY AIRWORTHINESS DIRECTIVE
	AD No : 2006-0316-E **Date: 16 October 2006**

No person may operate an aircraft to which an Airworthiness Directive applies, except in accordance with the requirements of that Airworthiness Directive unless otherwise agreed with the Authority of the State of Registry.

Type Approval Holder's Name :	**Type/Model designation(s) :**
BRP-Rotax GmbH & Co. KG	Rotax 912 A series; Rotax 912 F series; Rotax 912 S series; and Rotax 914 F series

TCDS Number : Austria TW8/89, TW9-ACG, TW10-ACG

Foreign AD : Not applicable

Supersedure : Not applicable

ATA 72	**Engine – Magnetic Plug – Inspections**
Manufacturer(s):	BRP-Rotax GmbH & Co. KG; Bombardier-Rotax GmbH & Co. KG; Bombardier-Rotax GmbH;
Applicability:	Rotax 912 A series engines from serial number (s/n) 4,410.681 onwards; Rotax 912 F series engines from s/n 4,412.912 onwards; Rotax 912 S series engines from s/n 4,923.263 onwards; Rotax 914 F series engines from s/n 4,420.595 onwards; and any s/n engine on which the camshaft and/or the hydraulic valve tappets have been replaced (e.g. during engine repair or general overhaul) after January 1, 2006. These engines are known to be installed on, but not limited to, the following aircraft types: **3-i** Sky Arrow 650 TC, 650 TCN, 650 TCNS and 710 RG; **Aeromot** AMT-200 Super Ximango and AMT-300 Turbo Super Ximango; **Aircraft Philipp** (formerly Alpla-Werke; Nitsche) AVO 68 series Samburo; **Aquila** AT01; **Cessna** 150 and A150 series; **Diamond** (formerly HOAC) H 36 Dimona, HK 36 series Super Dimona, DV 20 Katana and DA20-A1 Katana; **Evektor-Aerotechnik** EV-97 VLA; **Grob** G 109; **Issoire** APM-20 Lionceau; **Reims Aviation** F150 and FA150 series; **Scheibe** SF 36R and SF 25C;

	Stemme S10-VT; **Tecnam** P 92-J, P 92-JS and P2002-JF; **W.D. Aircraft** D4 Fascination. **Note:** The installation of these engines was either done by the respective **aircraft manufacturer** or through modification of the aircraft by Supplemental Type Certificate. The following s/n engines have already been inspected before first installation or first engine start up according section 1.5 Compliance (a) of BRP-Rotax ASB-912-051 and ASB-914-034 respectively: Rotax 912 A series from s/n 4,410.709 onwards. Rotax 912 F series from s/n 4,412.920 onwards. Rotax 912 S series from s/n 4,923.381 onwards. Rotax 914 F series from s/n 4,420.633 onwards.
Reason:	In limited cases increased wear of camshaft/hydraulic valve tappet can occur. This may lead to improper engine operation, power loss or in-flight engine failure. BRP-Rotax Gmbh & Co. KG has issued Alert Service Bulletin ASB-912-051 and ASB-914-034 respectively which describes a special inspection for the affected engines to address this problem. This Emergency Airworthiness Directive requires the inspection, as described in the referenced ASB's, to be carried out as indicated.
Effective Date:	17 October 2006
Compliance:	(1) Before the next engine start up from the effective date of this directive, inspect the magnetic plug in accordance with the instructions of BRP-Rotax ASB-912-051 or ASB-914-034, as applicable; (2) Within 5 hours of operation after the effective date of this directive, but not later than 01 March 2007 and thereafter at every specified oil change, repeat the inspection as required by paragraph (1) of this directive. (3) If, during any of the inspections as required by this directive, a greater quantity of metal parts than 3 mm is detected, the engine must not be taken into operation until the cause has been identified and eliminated; (4) After the effective date of this directive, no person may install one of the affected engines on any aircraft unless the magnetic plug has been inspected in accordance with the requirements of this directive.
Ref. Publications:	BRP-Rotax Alert Service Bulletin, ASB-912-051 and ASB-914-034 or later approved revisions.
Remarks :	1. If requested and appropriately substantiated the responsible EASA manager for the related product has the authority to accept Alternative Method of Compliance (AMOCs) for this AD. 2. The safety assessment has requested not to implement the full consultation process and an immediate publication and notification. 3. Enquiries regarding this AD should be addressed to the AD Focal Point, Certification Directorate, EASA; E-mail: ADs@easa.europa.eu. 4. For any question concerning the technical content of the requirements in this AD, please contact BRP-Rotax GmbH & Co.KG Ph.: +43 7246 601 0; Fax: +43 7246 601 760