ROTAX
AIRCRAFT ENGINES

# SERVICE BULLETIN

## INSPECTION FOR CORRECT VENTING OF THE OIL SYSTEM FOR ROTAX® ENGINE TYPE 912 AND 914 (SERIES)
## SB-912-036 R1
## SB-914-022 R1

**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 all serial numbers
- 912 F all serial numbers
- 912 S all serial numbers
- 914 F all serial numbers

#### 1.2) Concurrent ASB/SB/SI and SL

Further to this service bulletin the following additional service instructions must be observed and complied with:

- SI-04-1997, "Venting of lubrication system" current issue
- SI-912-010, "Oil change" current issue
- SI-914-011, "Oil change" current issue

#### 1.3) Reason

It has been established, that damage of the engine valve train is possible due to incorrect venting of lubrication system.

#### 1.4) Subject

Inspection for correct venting of the oil system for ROTAX® engine type 912 and 914 (series).

#### 1.5) Compliance

a) Before next engine operation perform venting and inspection for correct venting of the hydraulic valve tappets according to the instructions in section 3.1.1 up to 3.1.3 on following engines:

- new engines, prior to their 1st start;
- overhauled engines, prior to their 1st start;
- engines that have had an opened and drained oil system allowing air to be injested into the valve train (e.g. oil pump, oil cooler or suction line were removed and oil drained from the oil galleries);
- engines which have had oil changes not in compliance with instructions in section 1.2;
- engines which have had the prop spun for more than 1 turn in reverse direction allowing air to be injested into the valve train.

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b) Within next 5 hours of operation, inspection of the engine valve train must be performed according to the instructions in section 3.1.5 up to 3.1.7) on following engines:

All engines, which have been operated for not more than 50 hours

- since the oil system has been opened and drained allowing air to be injested into the valve train (e.g. oil pump, oil cooler or suction line were removed and oil drained from the oil galleries);
- since an oil change has been performed not in compliance with instructions in section 1.2;
- since the prop has been spun for more than 1 turn in reverse direction allowing air to be injested into the valve train.

**1.6) Approval**

The technical content of this Service Bulletin has been approved by ACG.

**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

- all relevant Service Instructions (SI)
- Maintenance Manual (MM)

**1.12) Other publications affected**

none

**1.13) Interchangeability of parts**

not affected

## 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**

- The damages and costs incurred, namely with respect to shipping cost, down time, loss of income, telephone costs or costs of conversion to other engine versions or additional work, including simultaneous engine overhaul, are not covered in the scope and will not be borne or reimbursed by ROTAX® .

**2.3) Material requirement per engine**

Parts requirement:

Inspection for correct venting of hydraulic valve tappets and for inspection of the engine valve train, following material requirement is necessary:

| Fig.no. | New p/n | Qty/engine | Description | Old p/n | Application |
|---|---|---|---|---|---|
| | 881920 | 1 | O-ring set | | |
| consisting of: | | | | | |
| | - | 4 | O-ring 105x2,5 | 250285 | valve cover |
| | - | 4 | O-ring 6,4x1,8 | 430205 | valve cover |

◆ NOTE: Additional new parts are only necessary if wear was found in the engine valve train. Order only the current need in accordance with Illustrated Parts Catalog (IPC), current issue.

**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:

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

Parts requirement:

| Fig.no. | New p/n | Qty/engine | Description | Old p/n | Application |
|---|---|---|---|---|---|
| 5 | 877387* | 1 | valve spring loading jig assy | | valve spring |
| | 297433 | NB | slide paste MOLYKOTE G-N | | rocker arm bearing |
| 7 | 276855* | 1 | screw nipple | | spark plug tapping |

* or equivalent

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

## 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: Carry out work on a cold engine only.

▲ WARNING: Should a locking device be removed (namely lock tabs, self-locking fasteners) when undergoing disassembly/assembly, always replace with a new one.

◆ NOTE: All work has to be performed in accordance with the relevant Maintenance Manual.

**3.1) Instructions**

**3.1.1) Venting of oil system**

- Perform the venting of the engine´s oil system according to section 3.1.1 of the Service Instruction SI-04-1997, “Venting of lubrication system” current issue.

**3.1.2) Warming up period**

- Restore aircraft to original operating configuration.
- Connect negative terminal of aircraft battery.
- Perform a warming up period of engine according to section 3.1.2 of the Service Instruction SI-04-1997, “Venting of lubrication system” current issue.
- Disconnect negative terminal of aircraft battery.

**3.1.3) Inspection for correct venting of hydraulic valve tappets**

- Inspect correct venting of hydraulic valve tappets according to section 3.1.3 of the Service Instruction SI-04-1997, “Venting of lubrication system” current issue.

**3.1.4) Replacement of components**

- If the inspection for correct venting of the hydraulic valve tappets shows malfunction of a hydraulic valve tappet, replace hydraulic valve tappet and inspect valve train components according to section 3.1.4 of the Service Instruction SI-04-1997, “Venting of lubrication system” current issue.

### 3.1.5) Removal of the engine valvetrain

See fig. 1, 2, 3, 4 and 5

- For engines according to compliance (section 1.5) the following working steps are to be executed.

◆ NOTE: On standard applications the replacement of the engine valve train can be carried out with engine installed in aircraft.

- Remove the spark plug connector and the 4 top spark plugs (18).

■ CAUTION: Prevent entering of foreign matter through spark plug hole.

- Remove Allen screw (8) M6x30 with washer (9) from valve cover (10).
- Remove large and small O-ring (1) and (2).
- Tap valve spring retainers slightly with a soft mallet to loosen valve spring retainers from the valve cotters.
- Turn crankshaft so that the respective piston is exactly on ignition top dead centre (compression stroke).
- Remove the external cap nut (11) (exhaust side of cylinder).

■ CAUTION: Do not remove the other cylinder head nuts. During removal of the cylinder head nut, the head stud may come loose requiring re-installation as per current Maintenance Manual. Tightening torque of the stud 3 Nm (26 in.lb.)

- Attach the support plate (14) for the valve spring loading jig (5) with 2 hex. screws (13) M6x16 at the attachment points (19) on the cylinders.
- Put adapters (6) on the valve spring loading jig.
- Attach the valve spring loading jig on cylinder head and support plate with 2 Allen screws (12) M6x70.
- Fit the screw nipple (7) into the spark plug hole.

■ CAUTION: At fitting of the screw nipple take care not to damage the spark plug threads.

- Securly hold crankshaft in top dead centre position for respective cylinder by utilizing a socket wrench on magneto side.
- Admit approximately 2 bar (30 psi) air pressure into cylinder.

▲ WARNING: Risk of injury due to rotating socket wrench. Failure to adequatly secure the crankshaft in a fully stable position could lead to un-intentional rotation of the crankshaft resulting in serious injury. Remove socket wrench after positioning.

- Depress the 2 valve spring evenly by the valve spring loading jig (5) until the valve cotters are easily accessible. Simultaneously both hydraulic tappets will be relieved.
- Remove rocker arm shaft (15).

■ CAUTION: At removal take care not to damage the rocker arm shaft bearings in the cylinder head.

◆ NOTE: Any stuck rocker arm shaft (15) not moving easily has to be removed as per the current Service Bulletin SB-912-015.

- Remove both rocker arms (16) and (17).
- Remove the valve cotters (4).

◆ NOTE: To facilitate the removal of valve cotters use grease or magnet.

- Remove the valve spring loading jig (5).
- Remove the valve spring retainer (3).
- Remove the valve spring(s) (20).
- Remove the valve spring support (21).

### 3.1.6) Inspect of the engine valve train

- Inspect valve spring support (21). Measure the wear refering to the reference surface (inner area of valve spring support) in radial direction to outer side with a dial gauge. Value t = max. 0,04 mm (0,0016 in.). See fig. 5. An exceeding of max. 0,04 mm (0,0016 in.) is not acceptable. Any exceeding of this limit requires a complete replacement of valve spring support, valve spring retainer, valve cotters and hydraulic valve tappets or any other damaged components on the affected valve train.

◆ NOTE: The valve spring support indicates a possible malfunction of valve train caused by incorrectly or insufficiently vented hydraulic valve tappets. At standard conditions no wear is visible even after a longer time of operation. If the visual inspection shows some wear on the valve spring support surface, measure the actual wear with a dial gauge.

- Visually inspect all other disassembled parts of the engine valve train (valve push-rod, rocker arm, ...) for damages or wear.
- If no damage or wear can be found, the parts are servicable again.

▲ WARNING: Should damage or traces of wear be discovered on the valve train components, replace the affected parts immediately.

**3.1.7) Re-assembly of the engine valve train**

- Install the components of the engine valve train in accordance with the Maintenance Manual, current issue.
- Repeat this procedure on all other 3 cylinders in accordance with section from the 3.1.5 to the 3.1.7.
- Vent lubrication system in accordance with Service Instruction SI-04-1997, Venting of lubrication system, current issue section 3.1.1.
- Restore aircraft to original operating configuration.
- Warm up the engine in accordance with Service Instruction SI-04-1997, Venting of lubrication system, current issue section 3.1.2
- Inspect hydraulic valve tappets for correct venting in accordance with Service Instruction SI-04-1997, Venting of hydraulic valve tappets, current issue section 3.1.3.

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

**3.2) Test run**

Conduct test run including ignition check and leakage test.

**3.3) Summary**

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

◆ NOTE: The executed works are to be certified in the engine log book.

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.

## 4) Appendix

the following drawings / wiring diagrams / tables * should convey additional information:

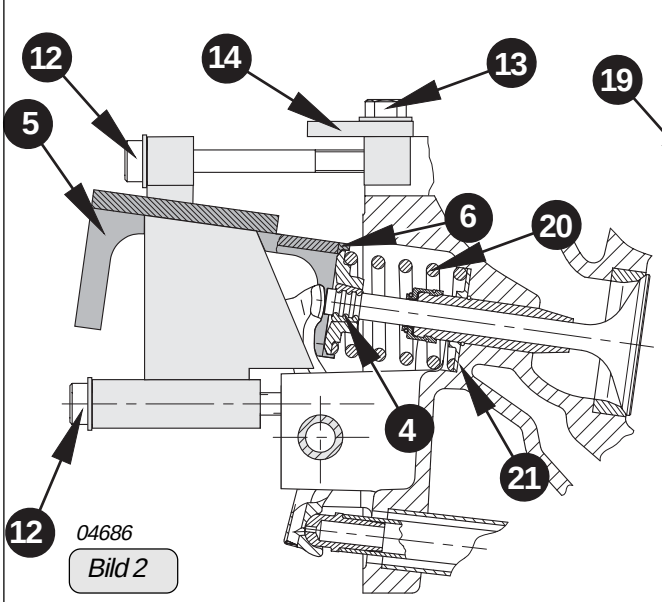


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Bild 2

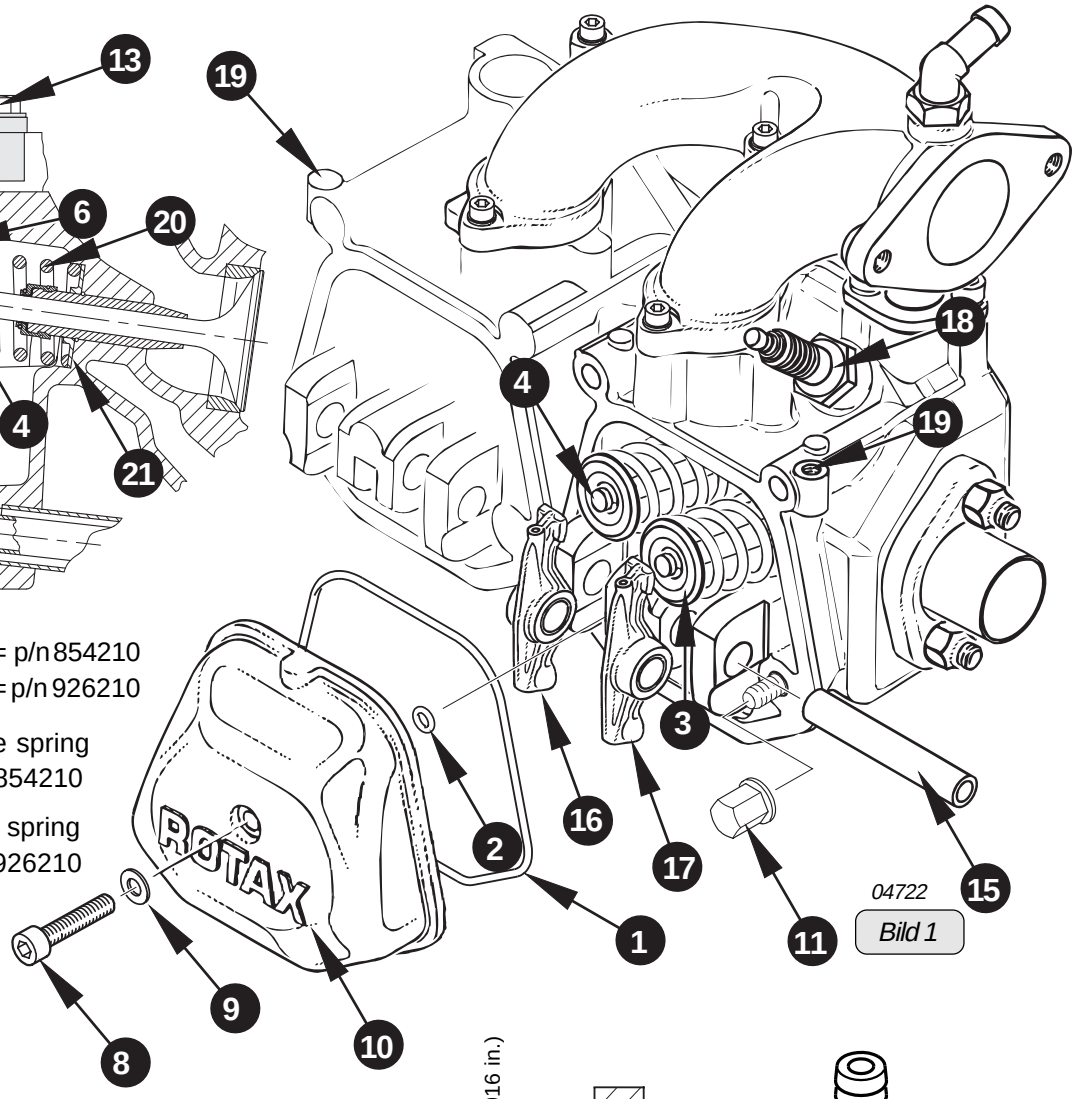


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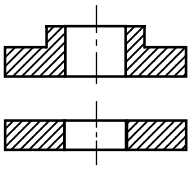
Bild 1

"Support" double valve spring = p/n 854210

"Shim" single valve spring = p/n 926210



double valve spring
version p/n 854210

single valve spring
version p/n 926210

"Exaggerated diagram"

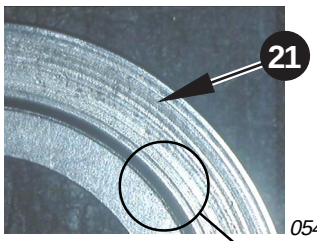



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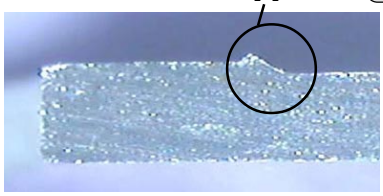
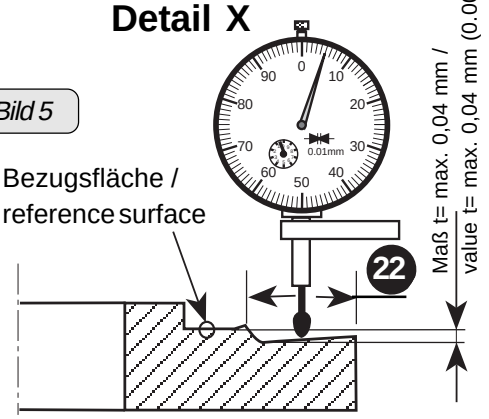
Bild 5



"Exaggerated diagram" 05451

**Detail X**




double valve spring 05449
version p/n 854210

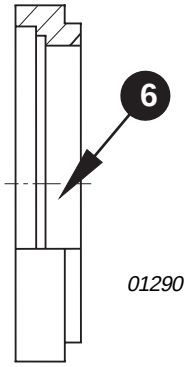



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Bild 3

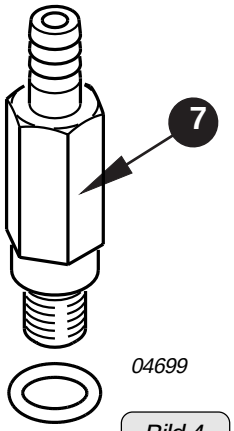


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Bild 4

◆ 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.