ROTAX®
AIRCRAFT ENGINES

SERVICE INSTRUCTION

ROTARY VALVE SHAFT SEAL LEAKAGE AT ROTAX® ENGINE TYPE 462 UL / 532 UL / 582 UL AND 618 UL SI-03-1996

1) Repeating symbols

Please, pay attention to the following symbols throughout the service instruction emphasizing particular information.

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

■ ATTENTION: Denotes an instruction which if not followed, may severely damage the engine or other components.

◆ NOTE: Information useful for better handling.

2) Introduction

This information is intended to assist the aircraft designer, manufacturer and builder to achieve correct operating conditions and assembly for the engine and consequently optimum performance and reliability.

3) Technical data and general information

In addition to this technical information refer to:

- Operator´s Manual (OM)
- engine data sheet
- power, torque and fuel consumption curves
- current issue of the Illustrated Parts Catalog (IPS)
- Installation Manual (IM) and Check List
- all relevant Service Instructions (SI)
- Maintenance Manual (MM)
- Repair Manual (RM)

5) Subject

Possible rotary valve shaft seal leakage.

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SERVICE INSTRUCTION

6) Reason

Random field reports have indicated possible contamination of the rotary valve shaft oil by engine coolant and/or excessive rotary valve oil consumption caused by leakage across the rotary valve shaft seals.

■ ATTENTION: Contamination of the rotary valve oil by engine coolant can lead to reduced bearing and gear lubrication and possible failure of the cross shaft.

7) Compliance

All builders, operators and manufacturers using or operating ROTAX® engine type 462 UL 532 UL / 582 UL and 618 UL.

8) Cause

Rotary valve shaft seal leakage can be caused by one or all of the following factors:

- Inadequate or poor cooling system design. (Use of non-ROTAX® cooling system that does not comply with requirements.)
- Improper cooling system installation. (Refer to the current issue of the Operator´s Manual or Installation Manual and Service Instruction SI-09-1991)
- Inadequate cooling system maintenance. (Polluted engine coolant or water cooler)
- Cooling system pressure exceeds recommended values. (Defective or incorrect pressure cap. MAX 0,9 BAR = 13 P.S.I.).
- Engine coolant does not provide adequate seal lubrication. (Insufficient quantity, or improperly mixed).

  ■ ATTENTION: Falling short of the specified antifreeze mixture of 50% water and 50% antifreeze, or use of pure water as engine coolant is not permitted. Not proper coolant (e.g. pure water, not correct mixture of water to antifreeze) can cause corrosion and wear on the rotary valve shaft and seals.

  It is recommended that owners and operators of water-cooled ROTAX® 2-stroke aero-engines select a high quality brand name antifreeze with corrosion inhibiting additives. Coolant solutions should be prepared as necessary to provide adequate protection at temperatures above the max. cooling liquid temperature limit of 80° C (175°F). The cooling solution should also provide protection against freezing and

frost damage given local environmental conditions and the aircraft mission profile. Coolant solutions should be checked with a tensiometer or glycol tester to verify protection level. In all cases, antifreeze to water ratios should not exceed the antifreeze manufacturer´s recommendations.

■ ATTENTION: Exceeding the antifreeze manufacturers recommended ratios can lead to particulate formation in the coolant solution („jelling“). Particulate formation or „jelling“ may be harmful to cooling system components including the cross shaft seals.

- Use of improper rotary valve oil. (Oil used must meet ROTAX® minimum specifications.)

9) Action

- Inspect rotary valve oil for coolant contamination and correct level before every flight.
- Make sure that the oil-inlet and the oil return lines are attached correctly. See relevant Installation or Operators Manual.

  Rotary valve oil in the rotary valve oil reservoir should be inspected directly for discoloration or signs of foreign substances that may indicate rotary valve shaft seal leakage. Increasing oil levels in the rotary valve oil reservoir is an indication that engine coolant is leaking past the cross shaft seals into the rotary valve system. Excessive rotary valve oil consumption (Maximum consumtion:1C.C. per hour) may also indicate rotary valve oil leaking past the cross shaft seals into the engine cooling system.

  ◆ NOTE: ROTAX® engine type 582 UL mod. 99 and type 618 UL are equipped with a witness hole, which is located near the water pump housing.

- ROTAX® engines, which are equipped with a witness hole, inspect this area of the engine prior to every flight for signs of fluid leakage.

10) Remedy

- Insure that cooling system design and installation meets engine specifications. Refer to the respective engine Installation and Operator Manuals.
- Insure that cooling system is properly maintained, and the cooling system provides adequate protection against system overpressure. (Maximum cooling system pressure is 0.9 BAR = 13 PSI.)
- Check out the correct function of the water breather valve, to make sure that the cooling liquid can flow back from the overflow bottle during engine cool down.

- Insure that engine coolant is of good quality and aluminium compatible.
- Change engine coolant as per manufacturer´s recommendations.
- Always mix engine coolant solution as per the antifreeze manufacturers recommended ratios.
- Replace the rotary valve lubrication oil every 100 hours. Refer to the maintenance schedule in the respective engine Maintenance Manual or Operator´s Manual. Use only high quality 2 stroke oil. (ASTM/CEC Standard API-TC)

11) Summary

- Rotary valve oil must be inspected for contamination before every flight.
- On engine types equipped with a cross shaft witness hole (ROTAX® engine type 582 UL mod. 99 and type 618 UL), inspect the area around the witness hole for fluid leakage prior to every flight.

  ◆ NOTE: A low humidity at the witness hole area is normal and must not be interpreted as a cross shaft seal leaking problem.
- The following items are indications of possible cross shaft seal leakage:
  - contamination of the rotary valve oil
  - increasing rotary valve oil levels
  - excessive rotary valve oil consumption
  - signs of excessive fluid leakage from the cross shaft witness hole

  If any of these indications are observed, cease any further engine operation and contact your nearest ROTAX® authorized Distributor or Service-Center.

▲ WARNING: Failure to comply with this recommendation could result in engine damage and personal injury or death!

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.