

# SERVICE BULLETIN

## NEW MAINTENANCE SCHEDULE, CHECKLIST AND ENGINE PRESERVATION FOR ROTAX® ENGINE TYPE 275, 501, 505, 535 SB-505-010 R1 SB-535-009 R1

### **MANDATORY**

#### Repeating symbols:

Please, pay attention to the following symbols throughout the Service Bulletin 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 certified 2-stroke aircraft engines from start of serial production:

275  
501  
505 (Series)  
535 (Series)

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

In addition to this Service Bulletin the following additional Service Bulletin/Service Instruction must be observed and complied with:

- Service Bulletin SB-505-005, "Piston pin bearing, conversion to reinforced design" current issue.
- Service Instruction SI-11-1996, "Engine preservation for 2-stroke UL-engines" current issue.

##### 1.3) Reason

Based on long testing experience of these certified ROTAX® 2-stroke engines the maintenance schedule became updated.

##### 1.4) Subject

New maintenance schedule, checklist and engine preservation for ROTAX® engines type 275, 501, 505, 535.

##### 1.5) Compliance

Incorporation into the respective documentation of the aircraft manufacturer, at the latest December 31, 2006.

##### 1.6) Approval

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

#### 2) Material Information

The measuring instrument listed in reference 3 section 3.3.1 or in section 4 is not available from BRP-Rotax. Price and availability will be supplied on request by ROTAX Authorized Distributor under [www.skydrive.co.uk](http://www.skydrive.co.uk) and can be ordered on demand.

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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
- Persons with type-specific training

▲ **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 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.

▲ **WARNING:** Following instructions require the replacement of the piston pin bearing from the old version with cage to the cageless version. This procedure is absolutely mandatory to guarantee a safe operation and to get a correct reading when carrying out the conrod bearing clearance tester (see section 3.3.2).

#### 3.1) Pre-flight checks

▲ **WARNING:** Repair as necessary all discrepancies and shortcoming before flight.

- Verify ignition "OFF"
- Check fuel content.
- Inspect for coolant leaks.
- Verify spark plug connectors for security.
- Inspect engine for oil leaks.
- Inspect engine for loose or missing nuts, bolts and screws.
- Inspect propeller for splits and chips. If any damage, consult propeller manufacturer for a repair scheme.
- Verify security of propeller mounting.
- Check throttle and choke actuation for free and full movement.
- Inspect exhaust for cracks, security of mounting, springs and hooks for breakage and wear.
- Start engine after assuring that area is clear of bystanders.
- Single ignition engines check operation of ignition switch (flick ignition off and on again at idle).
- Dual ignition engines check operation of both ignition circuits (according OM).
- Check operation of all engine instruments during warm up.
- If possible, visually check engine and exhaust for excessive vibration and unusual noise during warm up.
- Verify that engine reaches full power rpm during take off roll.

#### 3.2) Daily checks

▲ **WARNING:** Repair as necessary all discrepancies and shortcomings before flight.

- Verify ignition "OFF"
- Drain water from fuel tank sump and/or water trap (if fitted).
- Inspect carburetor rubber socket or flange for cracks and verify secure attachment.
- Verify security and condition of intake silencer and air filter.
- Verify security of radiator mounting. Inspect radiators for damage and leaks.
- Verify coolant level in overflow bottle and security of cap.
- Verify coolant hoses for security, inspect for leaks and chafing.
- Inspect engine for coolant leaks (cylinder head, cylinder base and water pump).
- Verify oil content for rotary valve gear lubrication and security of oil cap.
- Verify oil hoses for security, inspect for leaks and chafing (rotary valve gear lubrication system)
- Verify ignition coils/electronic boxes for secure mounting. Check ignition leads and all electrical wiring for secure connections and chafing.
- Verify electric starter for secure mounting.
- Verify engine to airframe mounting for security and inspect for cracks.

- Verify fuel pump mounting for security. Inspect all fuel hose connections, filters, primer bulbs and taps for security, leakage, chafing and kinks.
- Verify fuel pump impulse hose for secure connections, inspect for chafing and kinks.
- Rotate engine by hand and listen for unusual noises (first double verify that ignition is OFF).
- Check propeller shaft bearing for clearance by rocking propeller.
- Inspect throttle and choke cables for damage (end fittings, outer casing and kinks and free movement).
- Inspect reduction drive for condition and belt tension.

### 3.3) maintenance schedule

The subsequent maintenance schedule replaces the time schedules in the relevant maintenance and overhaul manuals of the affected engine types:

#### 3.3.1) Checks & work/ schedule

Checks & work 1)	First		Every						
	2 hr	10 hr	5 hr or 1 yr	12.5 hr or 1 yr	25 hr or 1 yr	50 hr or 2 yr	100 hr or 3 yr	150 hr or 5 yr	300hr or 6 yr
1) Ground run	X	X		X					
2) Re-torque cylinder head nuts 2)		X				X			
3) Carry out CCBCT check on cold engine and record readings in log book. Check to see history of readings and ensure they are within limits and there has not been any sudden increase			X						
4) Re-torque exhaust manifold screws 2)		X				X			
5) visual check of engine condition 3)						X			
6) Check rewind starter rope		X		X					
7) Check electric starter gear		X				X			
8) Inspect spark plugs (according OM)				X					
9) Replace spark plugs (according MM)					X				
10) Check ignition system						X			
11) Check & clean inside spark plug caps+ fixation				X					
12) Lubricate ball joints of exhaust					X				
13) Replace exhaust muffler springs 11)								X	
14) Lubricate control cables 5)						X			
15) Check propeller balance and tracking 4,5)						X			
16) Inspect propeller mounting bolts 5)						X			
17) Clean and oil air filter					X				
18) Check fuel filter				X					
19) Replace fuel filter					X				
20) Check carburettor(s) and re-adjust (idle speed, cable tension, throttle valve position,....)		X				X			
21) Clean carburettor(s) and check for wear						X			
22) Check fuel pump (measure fuel pressure)						X			
23) replace fuel pump									X
24) Check gearbox oil level 8)					X				
25) Replace gearbox oil 8)						X			
26) Check and adjust gearbox, preload of springs (type B gearbox) 8)							X		
27) Replace coolant							X		
28) Replace coolant hoses								X	
29) Check points & condensers		X				X			
30) check the resistance of the charging coil and replace if necessary (280- 330 Ohm)							X		
31) Check ignition timing (points versions)		X			X				
32) Replace points and condensers								X	
33) Replace rotary valve lubrication oil 7)							X		
34) Inspect cylinder head and piston crown							X		
35) Inspect piston rings for free movement							X		
36) Check piston diameter 6)							X		
37) Piston ring: check gap 6)							X		
38) Piston ring: check axial clearance (rectang-ring)							X		
39) Check cylinder diameter 6)							X		
40) Cylinder: check for roundness 6)							X		
41) Replace cylinder head, cylinder base and exhaust gaskets							X		
42) Check decompressor 12)						X			
43) Compression check						X			
44) Inspect piston pin and bearing							X		
45) Replace piston pin and small end bearing 9)								X	
46) Replace outer seals and main bearings if necessary								X	
47) Replace fuel hose								X	
48) Replace carb membrane								X	
49) Check compliance with service bulletins					X				
50) check pistons & piston rings 10)									X
51) inspect crankshaft runout (PTO & MAG)						X			

- 1) at every scheduled maintenance a pre-flight and daily inspection should be carried out
- 2) and after every replacement of gasket(s)
- 3) check of rust on outside surface, visual check of cylinder, cylinder head fins and piston condition by removing the exhaust manifold
- 4) also after any damage
- 5) according to instructions of manufacturer
- 6) wear limit see Repair Manual
- 7) use only oil with good inhibiting properties
- 8) engine type 275 only
- 9) if needle cage is installed
- 10) and use oversize pistons if necessary
- 11) and whenever necessary
- 12) only on engines equipped with decompressor

### 3.3.2) Conrod Bearing Clearance Tester (see Fig. 1)

The conrod bearing clearance tester (CBCT) is designed for use on all Rotax 2-stroke engines. The bearing clearance tester is intended to check big end and small end bearing clearances without disassembly of the engine. The conrod bearing clearance tester consists of a dial gauge, plug adaptor with dial gauge fixing screw and pipe connector, dial gauge extension, suction hose and vacuum pump (syringe).

The tester can also be used as an indicator for checking ignition timing on all Rotax 2-stroke engines.

The maximum reading of the dial gauge must not exceed **0,07mm (0,002756 in.)**.

◆ NOTE: The measurement is only significant with cageless piston pin bearing.

### 3.4) Engine preservation

If the engine is not going to be used for an extended period of time, certain measures must be taken to protect engine against heat, direct sun light, dampness, corrosion and formation of residues.

In particular the water bonded by the alcohol in the fuel causes increased corrosion problems at engine stops or storage. Especially affected are essential engine components such as crankshaft bearings and conrod bearings as well as crank pins and piston pins.

For further instructions refer to SI-11-1996.

#### 3.4.1) After each flight

Activate choke for a moment before stopping engine

#### 3.4.2) If Engine is Likely to be Stored for more than 8 weeks (or 4 weeks on seaside conditions)

- Proceed with preservation prior to engine stop and on the engine at operating temperature
- let the engine run at increased idle speed
- remove air filters and inject approx. 6 cm<sup>3</sup> of preservation oil or equivalent oil into the air intake of each carburetor stop engine
- remove spark plugs and inject approx. 20 cm<sup>3</sup> preservation oil into each cylinder and slowly turn crankshaft 2 to 3 turns by hand to lubricate top end parts. Refit spark plugs.
- drain gasoline from carbs, fuel tank, fuel lines and pump.
- drain coolant on liquid cooled engines, to prevent any damage by freezing
- ▲ WARNING: Generally comply with standard rules for handling of chemicals. Dispose of chemicals as per local environmental regulations.
- Lubricate all carburetor linkages.
- Close all openings of the engine like exhaust end pipe, venting tube and air intake to prevent entry of dirt and humidity.
- spray all external steel parts with engine oil.
- ensure the engine is turned at least one turn of the propeller at least once in every 8 weeks (or 4 weeks on seaside conditions).

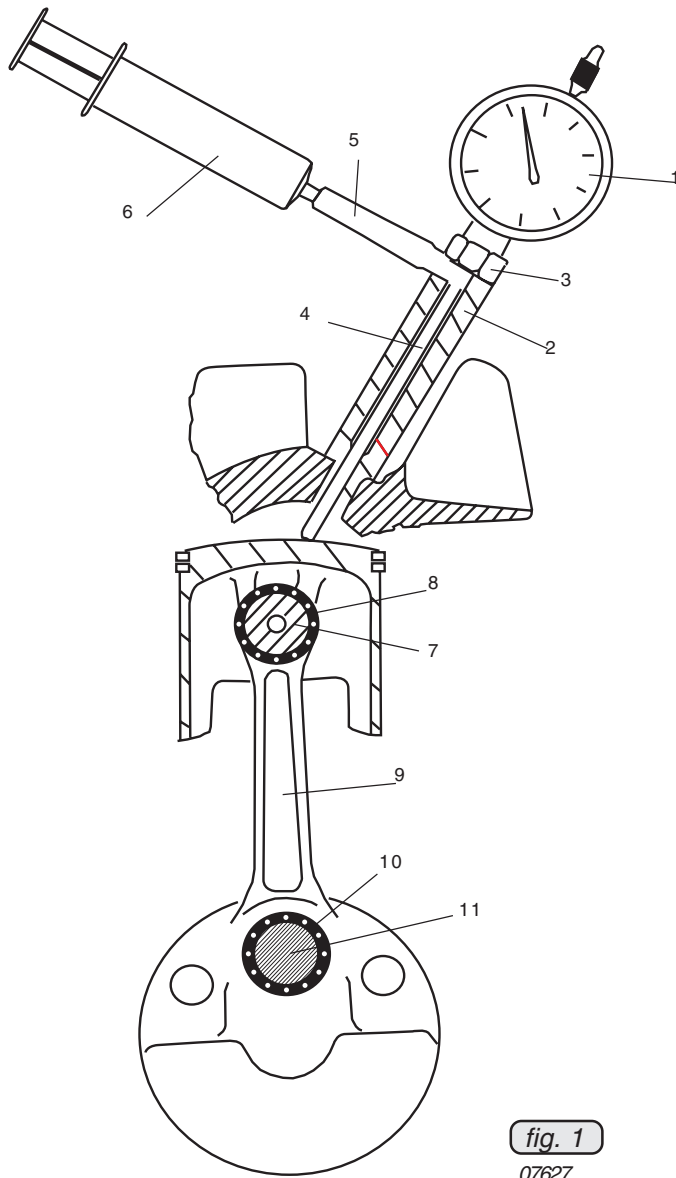
#### 3.4.3) If Engine has been Stored for more than 1 year

- Carry out complete strip and inspection

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

#### 4) Appendix

The following drawings should convey additional information:



◆ 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.