



AIRCRAFT ENGINES

# SERVICE INSTRUCTION

## LUBRICATION SYSTEM FOR ALL ROTAX® ENGINE TYPE 912 (SERIES) AND 914 (SERIES)

SI-912-005

SI-914-007

### 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.

■ **ATTENTION:** 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 Serial / pre production
- 914 Serial / pre production

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

- |            |   |
|------------|---|
| SB-912-005 | Special inspection to increase the TBO for engine, current issue                                |
| SI-912-002 | Verification of the lubrication system and replacment of the oil pressure spring, current issue |
| SI-914-004 | Verification of the lubrication system and replacment of the oil pressure spring, current issue |
| SI-912-003 | Oil line connections with UNF-threads, current issue  |
| SI-914-005 | Oil line connections with UNF-threads, current issue  |
| SI-18-1997 | Selection of motor oil and general operating tips, current issue                                |
| SI-04-1997 | Venting of lubrication system, current issue  |
| SI-27-1994 | Special inspection to increase the TBO for engine type 912 UL, current issue                    |
| SI-20-1994 | Lubrication system for all ROTAX® 912, current issue  |

#### 1.3) Reason

Increasingly, improper installation of the lubrication system on engines of the type 912 and 914 has been reported responsible for engine damage. For this reason all the people involved in the design and building of aircraft as well as owners and users of aircraft powered by a ROTAX® engine 912 or 914 are requested to observe all the instructions in the Operator's Manual, especially the Service Information regarding the lubrication system.

#### 1.4) Subject

Lubrication system for all ROTAX® engines of the type 912 and 914.

#### 1.5) Compliance

NONE - For Information Only

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

#### 1.6) References

In addition to this technical information refer to

- current issue of the Operator's Manual (OM)
- current issue of the Illustrated Parts Catalog (IPC)
- Installation Manual (IM) and Check List
- Maintenance Manual (MM)
- all relevant Service Bulletins (SB)
- all relevant Service Instructions (SI)

## 2) Material Information

- none

## 3) Accomplishment / Instructions

### Accomplishment

▲ **WARNING:** Proceed with this work only in a non-smoking area and not near open flames. Switch off ignition and secure engine against unintentional operation.

- Disconnect negative terminal of aircraft battery for installation of test equipment.

▲ **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) Engine damage possibly caused by insufficient lubrication

- Usage of unsuitable motor oil (refer to the relevant Operator's Manual and Service Instruction SI-18-1997).

◆ **NOTE:** For guide lines of installation and further information regarding the following points, refer to the section Lubrication System in the relevant Installation Manual.

- Incorrect installation of the oil supply line (oil suction line from the oil tank to the engine oil pump via the oil cooler).

- Incorrect installation of the oil return line (from engine back to oil tank).

- Oil lines of too small inside dia. (depending on hose length, see Installation Manual).

- Too long oil lines.

- Too sharp bends at routing of the oil lines.

- Material of the oil hoses too soft.

- Incorrect or unsuitable fittings (not as specified and not supplied by ROTAX<sup>®</sup>) which causes to high flow resistance.

◆ **NOTE:** New type of fittings with UNF-thread for oil hose connections are offered by ROTAX<sup>®</sup> (see SI-912-003, SI-914-005).

- Incorrect installation of the oil cooler.

- Use of an unsuitable oil cooler (not as specified and not supplied by ROTAX<sup>®</sup>). The ROTAX<sup>®</sup> oil cooler must be used appropriate to installation and must not drain empty at engine stop.

- Use of an unsuitable oil tank (not as specified and not supplied by ROTAX<sup>®</sup>).

- Incorrect installation of the oil tank (e.g. oil inlet and oil outlet mixed up).

- Venting of the oil tank (e.g. vent line blocked).

- Non-observance of installation instruction and of limits of operation in accordance with the relevant Operator's Manual.

◆ **NOTE:** To warrant safe operation of the ROTAX<sup>®</sup> engines 912 and 914 install the oil cooler on the oil line suction side (line from oil tank to oil pump of engine) as shown in the relevant Installation Manual.

▲ **WARNING:** Any of the above stated short comings can cause insufficient lubrication. At suspicion of insufficient lubrication the engine has to be thoroughly inspected for damage by an authorized ROTAX<sup>®</sup> distributor or Service Center.

Therefore ROTAX<sup>®</sup> requests all people involved in the design and building of aircraft as well as all owners and users of aircraft using a ROTAX<sup>®</sup> engine 912 or 914 to check the engine installation and especially the lubrication system, according to the relevant ROTAX<sup>®</sup> documentation.

### 3.2) Oil pressure control

To control the proper function of the lubrication system the following readings have to be taken on the running engine.

- ◆ **NOTE:** The following directives are remarks and supplementations to the requirements of the lubrication system (consult also the relevant Installation Manual).  
The required pressure gauges and connection parts are not included in the ROTAX<sup>®</sup> engine delivery.

#### 3.2.1) Measuring of the vacuum

Measuring of depression in the oil suction line (1) (line from oil tank to oil pump via oil cooler) at a max. distance of 100 mm (4 in) from pump inlet (2).

At take-off performance the indicated vacuum (3) must not be more than 0,3 bar (4,35 psi or 8,86 in Hg) otherwise the oil hose (1) could crimp and thus blocking the oil supply to the engine (fig 1).

- ▲ **WARNING:** The vacuum (3) must be verified over the total range of engine operation. By law of physics increase of oil temperature increases oil flow velocity and consequently the flow resistance increases.

#### 3.2.2) Measuring of the pressure in the crankcase

Measure of the mean crankcase pressure at full load (blow-by gas pressure) responsible for proper oil return from crankcase to oil tank. A pressure indicator (4) (pressure gauge with incorporated viscous damper) may be fitted instead of the magnetic plug (5) (see fig. 2).

- ◆ **NOTE:** The connecting thread is metric, M12x1,5!

The pressure in the crankcase at full load must not exceed the prevailing ambient pressure by more than 0,3 bar (4,35 psi or 8,86 in Hg).

If both pressure readings are within the specified limits, under all operating conditions, the lubrication circuit should be working sufficiently.

- ▲ **WARNING:** If the readings exceed the pressure limits then the flow resistance in the lubrication system of the engine installation is too high. This condition is unsafe and must be rectified without delay.

- ▲ **WARNING:** If you do not understand a section of this information or if you are not able to carry out the requested checks or repair, please contact your nearest authorized ROTAX<sup>®</sup> aircraft engine distributor.

- Vent the lubrication system according to the relevant Installation Manual and the Service Instruction SI-04-1997.
- Re-connect the minus pole of the aircraft battery.

### 3.3) Test run

Start engine. Conduct test run including ignition check and leakage test in accordance with the current Maintenance Manual of the respective engine type and as per instructions in Section 3.2.

After completion of the test run, and verification of test data, disconnect the minus pole of the aircraft battery, remove test equipment, reconnect oil lines as required.

- ◆ **NOTE:** Any deficiencies found must be corrected and verified with retest as stated in Section 3.2.

Re-connect the minus pole of the aircraft battery and conduct final test run checking for leaks.

### 3.4) Summary

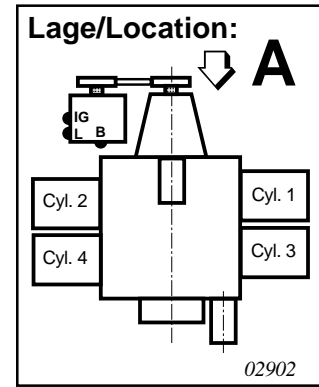
- ▲ **WARNING:** Non-compliance with these recommendations could result in engine damage, personal injury or death!

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.

#### 4) Appendix

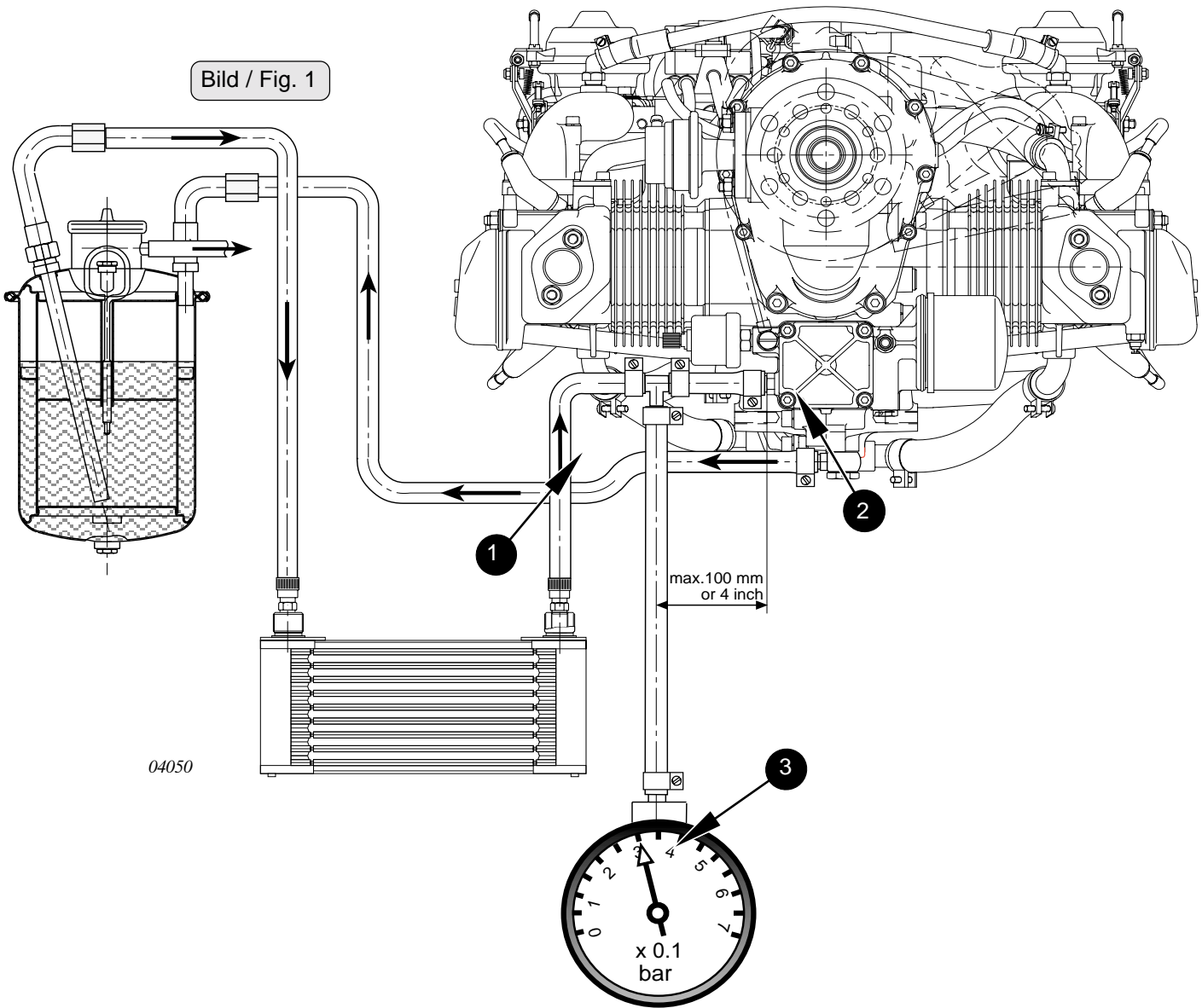
The following drawings should convey additional information:

##### 4.1) Measuring of the depression in the oil suction line



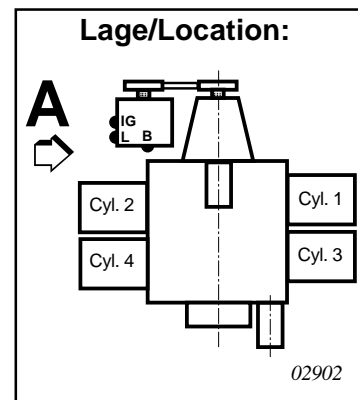
**A**

Bild / Fig. 1



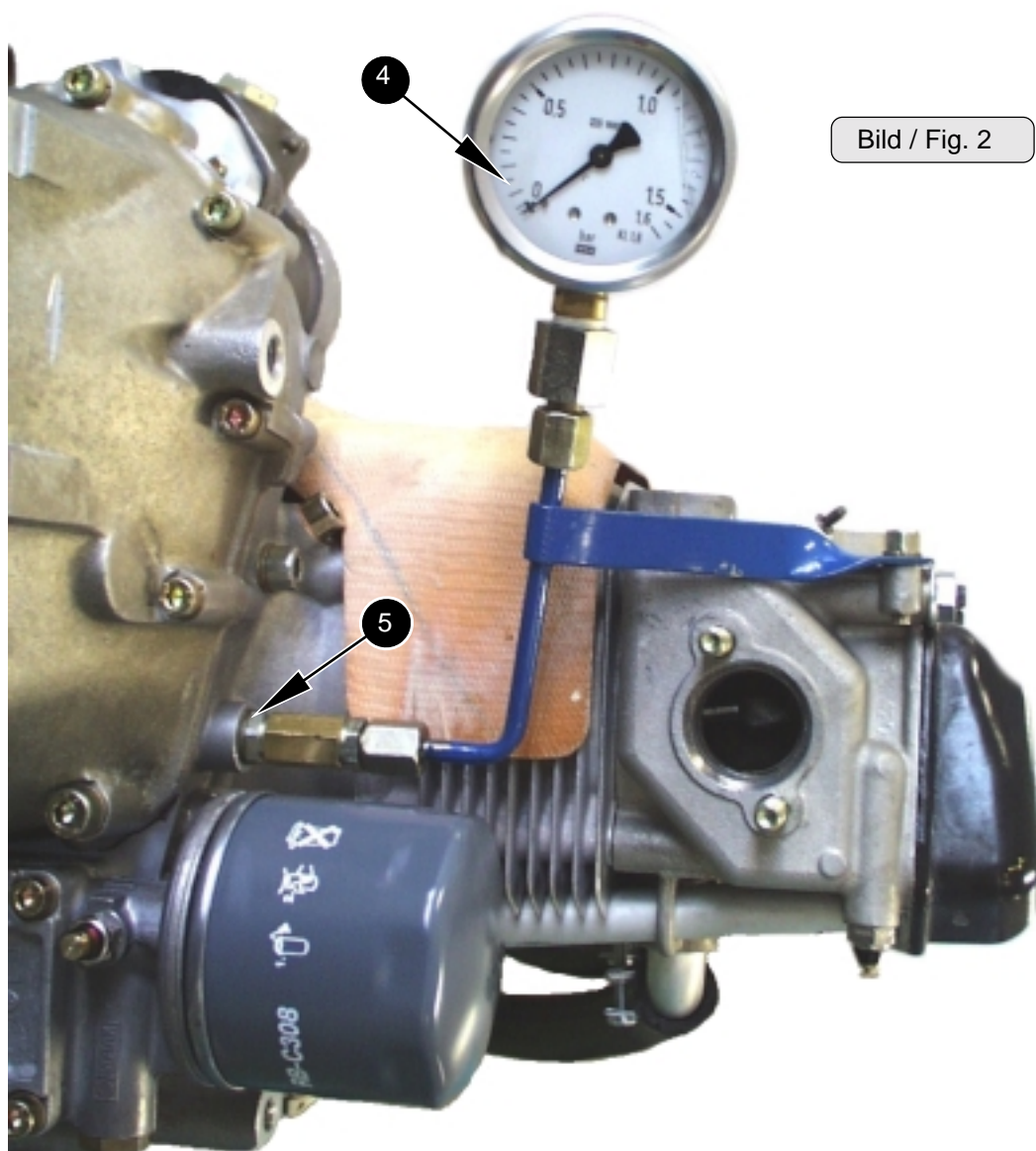
max. 0,3 bar Unterdruck  
max. 0,3 bar below atmospheric pressure

## 4.2) Measuring of the blow-by gas pressure



**A**

max. 0,3 bar Überdruck  
max. 0,3 bar above atmospheric pressure



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