

SERVICE INFORMATION

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KODIAK RESEARCH LTD. NASSAU, BAHAMAS

Installation of 912 / 914 Rotary Water Pump Seal

4 KUL 97- Rev. 1
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(A) INTRODUCTION

THIS INFORMATION IS INTENDED TO ASSIST THE AIRCRAFT DESIGNER, MANUFACTURER AND BUILDER/OPERATOR TO ACHIEVE CORRECT OPERATING CONDITIONS AND ASSEMBLY FOR THE ENGINE AND CONSEQUENTLY OPTIMUM PERFORMANCE AND RELIABILITY.

(B) TECHNICAL DATA AND GENERAL INFORMATION

IN ADDITION TO THIS INFORMATION PLEASE REFER TO:

- OPERATORS MANUAL
- ENGINE DATA SHEET
- POWER, TORQUE AND FUEL CONSUMPTION CURVES
- SPARE PARTS LIST
- ENGINE INSTALLATION MANUAL
- MAINTENANCE MANUAL 912 F
- MAINTENANCE MANUAL 914 F
- SERVICE INFORMATION 2 KUL 97

IMPORTANT INFORMATION

SUBJECT

In field replacement installation of rotary seal (P/N 850 940) as used on the 912 / 914 water pump.

REASON

Service experience has shown that improper installation procedures can result in damaged rotary seals and water pump leaks.

COMPLIANCE

All owners and operators of Rotax 912 UL, 912 A, 912 F, 914 UL and 914 F series engines.

PRINCIPALS OF OPERATION

Rotary seal (P/N 850 940) provides a mechanical seal using two ceramic sealing rings, one fixed, one rotating, pressed together by a small spring (see Fig. 1). The lubrication provided by the coolant solution allows the sealing rings to operate in contact with each other without creating excessive wear. A flexible diaphragm installed around the fixed ceramic sealing ring and the small spring prevents fluid from escaping the "wet" side of the seal (see Fig. 1). The seal is press fitted over the water pump shaft, and the close tolerances of the fit prevent fluid leakage down the length of the shaft. The seal also relies on the tight press fit between the outer portion of the seal and the engine ignition housing to prevent fluid from escaping around the outer portion of the seal.

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RECOMMENDATIONS

The rotary seal must be installed as per the instructions found in Section 13.3.7 of the Maintenance Manual For Rotax Engine Type 912 F, or Section 13.3.6 of the Maintenance Manual For Rotax Engine Type 914 F. The correct rotary seal installation jig must be used. Very careful handling and installation of the rotary seal is vital in preventing leaking around the rotary seal.

As the seal relies on the tight press fit between the pump shaft and the rotary seal to prevent fluid seepage along the shaft, any damage to the press fit during the assembly of the shaft to the seal can create fluid leakage. It is very important that the shaft be held perfectly parallel to the seal bore during assembly. If the shaft is at even a slight angle to the bore when the shaft is installed into the insertion jig, the shoulder of the shaft can dimple the soft material of the seal bore, reducing the sealing effectiveness of the press fit. To increase the effectiveness of the press fit between the pump shaft and the seal, small amounts of Loctite® 620 adhesive can be applied around the shaft / seal mating surfaces.

During removal of the old rotary seal, the aluminum ignition housing may be slightly damaged, reducing the sealing effectiveness of the press fit when the new rotary seal is installed. For this reason it is also recommended that Loctite® 620 adhesive be applied between the ignition housing and the outer part of the rotary seal to enhance the sealing effectiveness of the press fit between the ignition housing and the rotary seal.

The ceramic sealing rings and the flexible diaphragm are also very susceptible to installation damage. If the seal spring is over-compressed during seal installation, the corner of the fixed sealing ring (see Fig. 1) can be forced into the flexible diaphragm, rupturing the diaphragm, causing the seal to leak. Over-compressing the seal spring can also damage the ceramic sealing rings again causing the seal to fail during operation. Compressing of the seal spring during installation is possible if the seal is not carefully installed with the proper installation tools. **The proper Rotax seal insertion jig (P/N 877 250) must be used to install the rotary seal. Installation of the rotary seal without the use of the insertion jig will result in seal damage.** Seal damage can also result if the installation instructions found in the appropriate maintenance manual are not strictly adhered to. Do not attempt to use a punch to move the pump shaft in a manner that will cause the seal spring to be compressed. Using a punch to move the shaft can also damage the press fit between the shaft and the rotary seal. **If Distance A as shown in Fig. 1 is less than 6.0 mm, the seal spring has been over-compressed and the seal must be replaced.**

The quality of the engine coolant solution must be sufficient to provide adequate seal lubrication. Particulate formation in the engine coolant solution can cause excessive wear on the ceramic sealing rings resulting in premature seal failure. Please refer to Service Information 2 KUL 97 for more information on engine coolant mixtures for the 912 and 914 series engines.

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Distance "A" must be no less than 6.0 mm

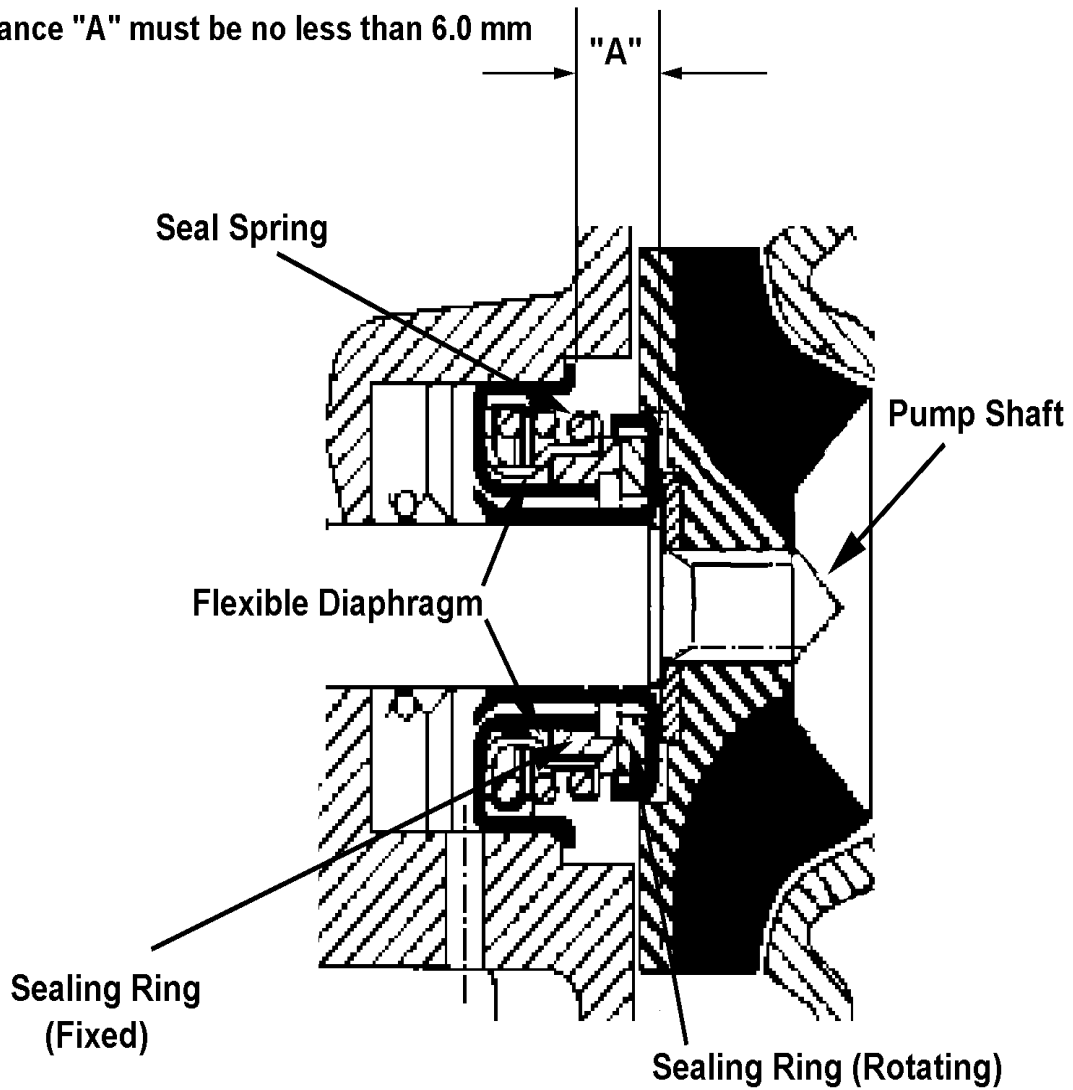


Figure 1. Cross Section of Rotary Seal & Pump Shaft Assembly.

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Summary

- Incorrect installation procedures can result in damage to the rotary seal used on the Rotax 912 / 914 water pump.
- Incorrect seal installation can result in seal leakage and or premature seal failure.
- The rotary seal must be installed as per the instructions found in the appropriate engine repair manual.
- The correct Rotax seal insertion jig must be used to install the rotary seal. Failure to use the correct insertion jig will result in seal damage.
- Use of a punch to move the pump shaft in the seal bore may damage the seal.
- Loctite® 620 adhesive may be used during seal installation to enhance the press fit of the seal.
- Correct coolant (anti-freeze) solution mixtures are important in providing long seal life and the prevention of gelling in the anti-freeze solution. Please refer to Service Information 2 KUL 97 for more detailed information.