



Rotax Service Interval Guide

Not new news, but a very informative summary

With growing numbers of 912 & 914 series engines in service these days Rotax have gathered a great deal of field experience and have been continually updating the maintenance procedures. Operators of 912 & 914 series engines can obtain current maintenance manuals free of charge, (yep I did say FREE) from the Rotax aircraft engines web site www.rotax-aircraft-engines.com – just click on the documentation tab & fill in the relevant search boxes to obtain the documents you require. You will find parts lists, line & heavy maintenance manuals, service bulletins, operator’s manuals, installation manuals, and a whole host of information you may not have known about. The system is not perfect, for example parts lists for early engines are not available, but it is pretty good & full of useful documentation.

We do find that some Rotax owners find the documentation difficult to interpret and occasionally miss things - agreed it can be difficult to see the wood through the trees, especially after translation. As the maintenance & overhaul information has changed over the last couple of years it’s probably a good time to have a recap on how things are now.

So before the flying season gets too busy why not take the opportunity to make sure your engine is ready for the new flying season – I’m assured its going to be a good one this year!

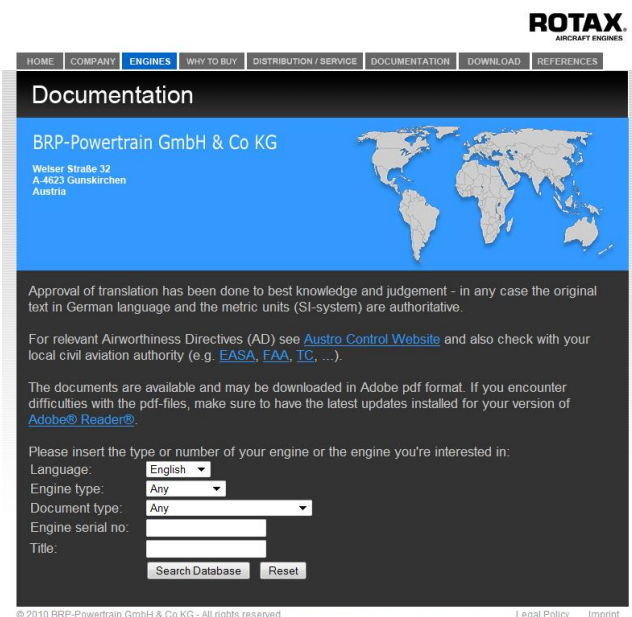


Figure 1: Documentation page of the Rotax Aircraft Engines website (www.rotax-aircraft-engines.com)

MAINTENANCE SCHEDULES

The alterations to the maintenance schedules over the years have mainly been to reduce the work required and the parts replaced, so should you want to save a few pennies in these difficult times you better read on. Now is the time to make sure that you are doing all the necessary checks and have the up to date information. If you are doing your own maintenance it is worthwhile printing out the section in the line maintenance manual detailing each procedure and using it as your worksheet. The gist of that section is summarised below but it will vary, especially if you are using Avgas, or have certain components fitted, so make sure you follow it carefully. For those wishing to have a go at maintaining their own engine, a handy guide can be found on the downloads page our website at www.conairsports.co.uk. Please bear in mind that anyone working on aircraft

engines should only do so if they have undergone type specific training and have the work signed off where necessary.

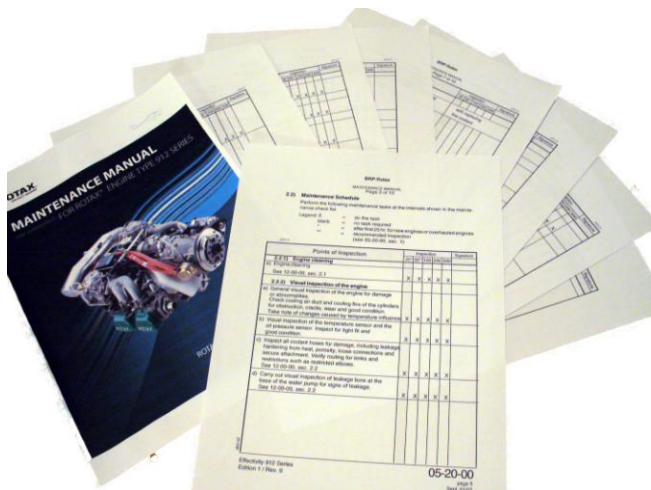


Figure 2: Rotax 912 maintenance schedules



LOOKING AFTER YOUR
ROTAX 912 SERIES ENGINE



Most of the things you wanted to know about
servicing a Rotax 912/914 series aircraft engine
by Conrad Beale

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Figure 3: ConAir guide to servicing 912 engines

SUMMARY OF MAINTENANCE TO BE CARRIED OUT AT EACH SERVICE INTERVAL

25Hrs (first 25hrs). General visual inspection, check magnetic plug, check air filter, check mounting system, pneumatically balance (synchronise) carbs, carb float bowl inspection, check spark plugs, inspect wastegate cable, lubricate wastegate shaft, check fuel filter, measure friction torque, oil change, oil filter change, cut oil filter open and inspected for contamination, alternator belt tension check, ground run, check for compliance with all Rotax Service Bulletins and Service Instructions (again these can be downloaded from the documentation section at www.rotax-aircraft-engines.com the search helps identify the necessary bulletins, but there are still a few bugs in the system giving more info than necessary).

100hrs (first & every 100hrs or annually). Same as 25hr service above.

200hrs (every 200Hrs or every 2 years) 100hr service plus: differential (leak down) compression test, check carburettor rubber sockets (please note that some carburettor rubber sockets are subject to a 50hr inspection - further information can be found in the Rotax Bulletins), strip and inspect carburettors, check spark plug caps and replace spark plugs.

600hrs (every 600Hrs) 200hr service plus: complete tear down of all gearboxes that don't have slipper clutches. Inspect slipper (overload) clutch if using Avgas. Note that some older engines were delivered with a 600 hours TBO & they will either need overhauling or some modifications carrying out to upgrade their TBO, see section on Overhaul later on.

1000hrs (Every 1000Hrs) 200hr service plus: 914 (115hp) & 912ULS/S (100hp) owners will need to have a complete tear down of the gearbox (slipper clutch version). 914 operators will also need to replace the main electric fuel pump.



Figure 4: Slipper clutch components showing lead deposits from oil system

1200hrs Overhaul required on some older engines, see later section on Overhaul.

1500hrs Overhaul required on the majority of engines supplied before 2008, see later section on Overhaul.

2000hrs Current maximum TBO for a 912 or 914 series engine, see later section regarding Overhaul.

Some of you may have noticed that there is no mention of a gearbox service for the 912 80hp engine if it has a slipper clutch. That is because there are no service requirements other than checking the friction torque* up to 2000hrs (with the exception of engines that run on Avgas that require the slipper clutch to be stripped every 600hrs to remove unwanted contamination). At 2000hrs the engine is due for an overhaul, so for those intending to continue on condition it would be worthwhile considering a gearbox teardown at that point.

*(In the unlikely event the friction torque is out of limits the gearbox will need remedial work)

If you use Avgas for more than 30% of the time then Rotax suggest that the oil, oil filter, spark plugs & gearbox will need a bit more maintenance than if using Unleaded fuels. Rotax reduce the oil change intervals to 50Hrs (if you can, 25hrs wont harm) replace the spark plugs every 100hrs & have the slipper clutch inspected every 600hrs. So using Avgas will see you having to do a bit more maintenance.

Of course don't forget those calendar replacement items such as coolant & rubber components:

- Generally there are three different coolants used. The blue stuff usually needs replacing every 2 years, but the pink stuff is normally lifed at 5 years. The waterless coolant (Evans NPG+) does not need replacing until TBO, but you will need to check with the coolant manufacturer for whatever you are using, & of course make sure when you refill the cooling system that you use the type & ratio specified by the aircraft manufacturer.
- Rubber parts should be replaced every 5 years, a list of the rubber parts to replace can be found in the line maintenance manual.



Figure 5: ConAir on site service



Figure 6: Logo of technicians trained under the Rotax Independent Rotax Maintenance Technician training scheme

If you are not sure, get someone out to service it professionally. The numbers of service engineers who have undergone training on the Rotax engines are growing in an effort to keep you flying safely.

OVERHAUL

In recent years Rotax have been actively looking at service history and following their positive findings they have been able to extend the Time Between Overhauls (TBO) for the 912, 912S & 914 engines.

Whilst the news of TBO increases are welcome the engine has had to undergo some modifications to make it possible. The current range of 912 & 914 series engines are being shipped with a 2000hr or 15 year TBO. Owners of earlier engines can have their engines upgraded to the current TBO however in some circumstances it may not be worthwhile as some major components will need replacing.

Bulletins on the Rotax web site can be downloaded which provide information regarding the TBO extensions. This however does not stop you having the engine overhauled and resetting the clock, although be aware that you will still have some original items, most notably the expensive electrical items such as SMD electronic ignition modules. To find out the TBO of your engine simply look at the line maintenance manual under the section titled time limits.



Figure 7: Rotax @ 2000hr TBO

Engine Type description	engine affected engine S/N	TBO Time Between Overhaul
912 A	up to and incl. 4,076.191	600 hr. or 10 years, whichever comes first ⁽¹⁾
912 A	from 4,076.192 up to and incl. 4,410.065	1000 hr. or 10 years, whichever comes first ⁽¹⁾
912 A	from 4,410.066 up to and incl. 4,410.471	1200 hr. or 10 years, whichever comes first ⁽¹⁾
912 A	from 4,410.472 up to and incl. 4,410.856	1500 hr. or 12 years, whichever comes first ⁽¹⁾
912 A	from 4,410.857	2000 hr. or 15 years, whichever comes first ⁽¹⁾
912 F	up to and incl. 4,412.585	1000 hr. or 10 years, whichever comes first ⁽¹⁾
912 F	from 4,412.586 up to and incl. 4,412.816	1200 hr. or 10 years, whichever comes first ⁽¹⁾
912 F	from 4,412.817 up to and incl. 4,412.974	1500 hr. or 12 years, whichever comes first ⁽¹⁾
912 F	from 4,412.975	2000 hr. or 15 years, whichever comes first ⁽¹⁾
912 S	up to and incl. 4,922.776	1200 hr. or 10 years, whichever comes first ⁽¹⁾
912 S	from 4,922.777 up to and incl. 4,923.889	1500 hr. or 12 years, whichever comes first
912 S	from 4,923.890	2000 hr. or 15 years, whichever comes first ⁽¹⁾
912 UL	up to and incl. 4,152.666	600 hr. or 10 years, whichever comes first ⁽¹⁾
912 UL	from 4,152.667 up to and incl. 4,404.717	1200 hr. or 15 years, whichever comes first ⁽¹⁾
912 UL	from 4,404.718 up to and incl. 4,409.715	1500 hr. or 15 years, whichever comes first ⁽¹⁾
912 UL	from 4,409.716	2000 hr. or 15 years, whichever comes first ⁽¹⁾
912 ULS	up to and incl. 4,427.532	1200 hr. or 10 years, whichever comes first ⁽¹⁾
912 ULS	from 4,427.533 up to and incl. 6,775.789	1500 hr. or 12 years, whichever comes first

Figure 8: Table of TBO's of Rotax 912 series engines

We are aware that the Bulletins can sometimes be difficult to interpret and the TBO upgrade is not that clear. Some engines can take advantage of a TBO increase to 2000hrs with as little as £30 of parts & about 15 minutes work. The table on the following page should make it easier to identify which engines can easily be upgraded, and which engines were shipped with the 2000hr TBO.

Engines before those listed in the table will probably require some major parts in order to upgrade the TBO.

Engine type	Easily upgraded with minor parts	Engines already with 2000Hr TBO
912UL	From serial number 4407860	From serial number 4409716
912A	From serial number 4410690	From serial number 4410857
912F	From serial number 4412915	From serial number 4412975
912ULS	From serial number 5646660	From serial number 6775790
912ULSFR	From serial number 4430311	From serial number 6775790
912S	From serial number 4423309	From serial number 4923890
914UL	From serial number 4419316	From serial number 6773779
914F	From serial number 4420607	From serial number 4420909

Figure 9: Table of upgrade information for 912 & 914 series engines

OIL LEVEL CHECK

There seems to be a little bit of confusion regarding the oil level check. An oil level check can only be carried out when all the oil is in the oil tank. Now depending on the location of the tank it is possible for some of the oil to syphon into the crankcase, in fact in some installations the oil tank is so high ALL the oil can syphon into the engine and ends up in the crankcase when the engine is sat unused. Therefore, you **MUST** “gurgle” the engine prior to carrying out an oil level check.

It might help if I briefly explain the oil system. Oil is supplied to the engine from a remote oil tank. A pump on the engine actually sucks the oil from the tank and then pressure feeds it to the bearings in the engine. After the oil has circulated around the bearings in the engine it drops into the bottom of the crankcase. During every compression cycle a small amount of air escapes past the piston rings into the crankcase. This pressurises the crankcase very slightly. The pressure in the crankcase pushes the oil in the bottom of the crankcase back to the oil tank. When the last bit



Figure 10: Checking the oil

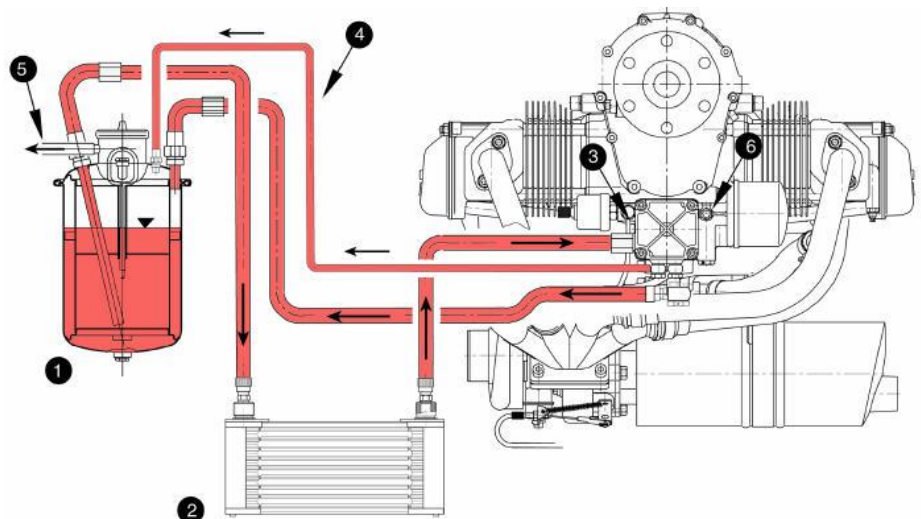


Figure 11: The oil system

of oil is pushed out of the crankcase air follows it out which makes the distinctive Rotax “Burp” (bit like getting to the end of a drink when using a straw), this is known as “gurgling” the engine. The gurgle noise can only be heard with the oil tank cap removed.

Helpful hint - when trying to gurgle your 912 or 914 series engine try turning the prop very slowly (and if possible pause at each compression point). By pausing, you will allow the air you have compressed in the cylinder to leak past the piston rings into the crankcase and in turn this will

push the oil out. By turning the prop slowly & pausing you should achieve the gurgle with much less effort.

Don't forget, get your free guide on servicing your 912 from our website at www.conairsports.co.uk



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