

To all BW350 owners,

I guess sooner or later there had to be a maintenance bulletin, so here it is for the BW350 gear boxes.

One BW350 owner last year had the input shaft seal pop out after approximately 20 hours of ground time and 16 hours of flight time. This resulted in enough lubricant loss that the output shaft bearings failed and the shaft broke near the rear bearing. His only warnings were a mysterious leak of just a few drops that started a few hours prior, and then the distinct smell of burnt lubricant just a few seconds before the failure. Small amounts of lubricant leaking from this seal will be slung around so much that it would be hard to trace it to the source, but now you will know what to look for.

Luckily he was able to make a safe emergency landing on a small grass field, not far from his home airport, and then get his airplane home to start repairs. He has also been very gracious in sharing details of this problem with me so I could come up with a fix to offer other owners, and make changes on future gear boxes to prevent it from happening again.

The oil seal for the input shaft in the back of the case needs to be checked that it is fully seated and is not working itself out. There should be between 0.22 and 0.27 inches between the top of the seal case and the top of the gear box boss. The only way to check this without a fiber optic tool is to remove the gear box from the engine. This should not impact the installation of the flywheel and clutch assembly. There are two pictures of the seal properly seated in the installation manual on page 8. If you zoom in on the bottom left picture you will get the best view of it. The seal on the propeller shaft could also be affected but because it is larger it will be harder to push out, and it is much easier to check. It should be flush with the end of the housing cone. There is a good picture of it on page 3 of the installation manual.

On existing BW350's a one-way pressed in retainer ring will assure that the seal cannot back out. Future gear boxes will have a groove for a snap ring. The correct size rings are not easy to find and are not sold individually, so I have bought a minimum lot of 50 and will sell one to you if you want to install one in your BW350. If your seal has started to back out and shows signs of leaking it should also be replaced. If you don't feel like hunting down a new seal let me know and I will add one to your order for the retaining ring.

I suspect that the gear case under certain conditions is building up pressure that can push the seal out, and could push the seal behind the propeller flange out too if the lower seal is retained. The air expanding, or condensation turning to steam, as the gear box warms up without adequate ventilation is the primary condition that can cause this. So I also recommend that the oil/separator/breather be inspected and cleaned on a regular bases of 15 to 20 hours, or less. Another improvement is to move the breather higher on the case to get it above the lubricant fill hole, which I am doing of all future gear boxes. The existing breather should be removed from the lubricant fill hole and replaced with a plug. The cover plate on the top of the gear box should be removed and drilled for a new smaller breather, and can be taped so old one can be reinstalled there with its elbow fitting. This is easier to accomplish on your own, and less expense if overseas shipping is required, but I can also provide these parts as well.

Prices for the parts, at my cost, are;

Input shaft seal retaining ring (pictured below) – \$1.53

New input shaft seal (if needed) – \$3.99

Plug for lubricant fill hole (pictured below) – \$3.35

New top cover plate with mounting provisions for old or new breather (specify which) – \$19.54

New crank case breather (pictured below) and hardware – \$27.83

Plus shipping costs.

Email me at stuart@autopsrus.com with the combination of parts you want and I will get to you with the total price (plus sales tax for Texas residents only) and the cost of shipping options.

Due to the restrictions of being a guest speaker at a Sun N Fun Work Shop I cannot sell anything at Sun N Fun or show any pricing, so don't ask for any parts. I can only hand out informational materials, talk about parts, and show samples.

Thank you,
Stuart Davis

Retainer ring for input shaft seal



New plug for fill hole.



New breather for top of case



2.5" Dia x 2.5" High

FOLLOW UP ANNOUNCEMENT.

All,

John Goodman was able to inspect the seal on his RV-10 installation with a fiber optical camera and noted that his seal appears to be less than 0.22 inches from the edge of the boss. He also has posted an enlarged picture from the installation manual with an arrow pointing to the seal showing what one looked like when it was new for everyone.

Due to the lack of history and documentation in the details of manufacturing and assembly of past BW350 gear boxes I cannot guarantee that the 0.22 to 0.27 inch dimensions are absolutely correct for everyone to go by. These are based on the nominal dimensions and tolerances for the current case design, an old casting case and a new CNC case, and the seals that I have in stock. Your case and the seal combination may be different, but most likely it is the same. If your seal is less than 0.20 inches from the edge of the boss then the probability of this issue developing in your case in my opinion is high.

The only way to absolutely know is to remove the gear box and check if your seal can be seated any deeper into the boss when you inspect it. If the seal moves then installing a retaining ring is without question the safest thing you can do.

If you can't do this inspection before flying again then the first thing to do is to clean the breather to be absolutely sure that you are not getting any pressure developing inside the gear box to push the seal out any further. Also adding a temporary filtered breather to the top cover plate (an automotive valve cover breather filter will do) until you can do a complete inspection will add a good measure of safety. If you see evidence of moisture in the lubricant while doing any of this you need to check the seal as soon as possible.

I don't have ready access to in service flying BW350 installations so any feedback on what you find inside your breather, any moisture getting into the lubricant, how much movement there was in checking if your seal was seated, and how many hours you have on your engine will be helpful. Also any environmental impacts like, dirt, temperature and humidity ranges, etc., that you have noticed would be very helpful and appreciated.

Thanks,
Stuart Davis