

Landing Gear Motor Maintenance

By Steve Zeller



Serviceable motor commutator



This commutator needs to be turned.

The Bonanza and Baron landing gear system is robust and extremely well designed. Pre-1979 Bonanzas have 14-volt electrical systems, with all of the electrical components wired more or less in series. Later model aircraft introduced relays and 28-volt power. Relays were added to avoid burning up the points in limit switches with high electrical current flow.

The wiring diagrams in the aircraft maintenance manuals are wonderful. My own G35 is 62 years old, and each individual wire is carefully labeled and identified on the schematics in the manual. A really good mechanic will study these diagrams carefully and develop a troubleshooting strategy before he even touches your airplane. If you are working with a new shop, make them show you that they have this documentation.

The actual mechanical parts of the landing gear system are pretty much the same from model to model. If your landing gear appears to be out of rig, 99 percent of the time the airplane is telling you that the gear motor needs maintenance. A properly built or overhauled landing gear motor should last 2000 hours. The best advice I could give anyone is to take

the airplane to an ABS Service Clinic prior to letting a shop touch it. The ABS Technical Advisors have seen it all and done it all and will save you big bucks troubleshooting in the end.

Lots of mechanics will tell you that your weak or tired landing gear motor just needs new brushes. In reality, brush wear is just one of many reasons the motor might be failing. I have looked at many tired motors and found brushes to be well within service limits. Your problem could also be caused by:

1. Poor motor ground. Always ground the motor to the wing spar.
2. Grease contamination. Too much gear grease can work its way back into the motor and foul the brushes and commutator.
3. Motor bearing issues. If a motor bearing seizes, you can't hand crank the gear.
4. Motor winding issues. Winding insulation breaks down with time and heat.
5. Commutator wear (see photos on this page).
6. Brush wear or incorrect brush part numbers.

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New brush (left) and serviceable brush (right)

built. They each started having dynamic braking issues around 1500 hours. If you notice one of your inboard main landing gear doors hanging open 1/2" to 1" (usually the left gear door), this is your clue it is probably time to look at your landing gear motor.



Landing gear motor test stand

My opinion is that it takes so much time and work to jack the airplane, open it up, remove and replace the motor, do all the necessary retraction tests, and put everything back together, that you really want a motor overhauled by a reliable shop. I recently had the opportunity to work with Aircraft Accessories International in Peachtree City, Georgia (www.aai-air.com). Kevin Allen took me through the entire motor inspection and repair procedure. In addition, an FAA licensed repair station like Kevin's shop will put your motor on a drive stand, run in the brushes, and do a load test. They will run the motor under mechanical load in both directions and simulate the dynamic braking limit switches in your aircraft. This was actually a lot of fun for me to watch, as I started my career in the aerospace industry working for a company that built aircraft electrical power generation and conditioning equipment back in the early 1980s.

This was the third landing gear motor I have installed in my own aircraft in nearly 3000 hours. The first two were not very well-



Overhauled landing gear motor

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