

Oil leaking out the generator

Rebuild a generator to fix an oil leak.

When the old 1962 Sportster sat for a month the motor sumped. This means the oil in the oil tank leaked down into the motor. When I started the engine all the oil was forced into the gearcase.

A bunch of oil blew out the gearcase breather tube but the pressure got high enough to push this oil seal out of the generator. Oil leaked out the generator every time I ran the bike since.



The Harley 12-volt generator has a seal in the housing that bolts to the engine case. This seal has popped out due to pressure inside the gearcase from a sumped engine.



It's scary putting channel locks on a gear but that's the only way I have been able to do it all these years. Nut is conventional right-hand thread.



If you want professional results act like a professional. Have a tray or a pie tin or a mayonnaise jar but at least put all the parts in one place so you have some chance of reassembling the generator.



A cheap Taiwan puller is all you need to get the gear off.



This particular generator has a Frank's voltage regulator mounted on it. A 3/8 inch wrench or nut driver will remove the field and armature wires. Jot down the colors if you aren't sure of how they go. There is an "A" and an "F" stamped in the generator next to the terminals to identify them.



I'm showing off using a socket for the cover-- all you really need is a 7/16 wrench. I did need the socket to get the regulator off. Please drop a few bucks and buy a set of Phillips screwdrivers and use the right sized one for the bolt.



Gently tap end bell off by lightly tapping under the cutouts with a small rubber mallet. Alternate tapping on both sides to insure nothing gets bent.



To get the armature out of the frame you can gently tap on the armature with a small rubber mallet.



When the old '62 sat for a month the motor sumped. This means the oil in the oil tank leaked down into the motor. When I started it all the oil was forced into the gearcase. A bunch of oil blew out the gearcase breather tube but the pressure got high enough to push this oil seal out of the generator. Oil leaked out the generator every time I ran the bike since.



Gently tap armature out off the end bell with a small rubber mallet. I really mean rubber-- if you use a regular hammer you will mash the threads on the end and life will be difficult. If you must be a wino at least thread the nut back on the armature and pound on the nut.



The seal was still in good condition. It just popped back in with finger pressure. You could use a tiny tiny tiny bit of Loctite or Permatex on the outside of the seal but be extremely careful. The tiniest bit of sealant can get into a roller bearing and start jamming a ball, making it skate instead of roll. Silicone and gasket sealant cause horrible damage in a roller bearing engine.



Tap the armature in with a small rubber mallet. The vise is opened up and gently tightened on the protruding rings of the end bell. You aren't supposed to use sandpaper to shine up the copper commutator because the grit gets stuck in the soft copper and then grinds up the brushes prematurely.



It's usually easier to put the brush plate on after the frame is installed. This plate was too snug to pop out so the handle of the mallet was used to gently tap it free. You can leave the wire attached but don't get too rude with it. I also was using paper towels to dry off any oil on the parts.



Look carefully at the little paper spacer under the square head of the field terminal. If the terminal was torqued too hard this thin paper gets cut and the field gets shorted to the armature and the generator has no output. There are some plastic spacers around. Anything including the plastic from a milk bottle is better than nothing. If you tighten the terminal up carefully you can insure the corner of the square head is not cutting through the spacer.



Note the little pin in the frame and the little slot in the brush plate. It has to go together one way only.



Note the little pin in the frame and the hole in the gear side end bell. It can only go together one way.



The frame didn't want to slip on so I pulled it from the vise and after cleaning the pin and hole, I gently tapped the end bell on with a small rubber mallet.



The brush plate should have enough wire to slip on after the frame and end-bell are assembled. Otherwise you may have to remove the wire or assemble the frame to the end-bell with the brush plate in place. See next step for getting the brushes over the armature. Remember the little slot in the plate and the pin in the frame have to line up.



I dried off the brushes and slipped them back in the holders. You can use two hands because you aren't taking a picture at the same time.



One wire is rubbing against the commutator and the other will get pinched by the end-bell. Bend them back out of the way or loosen and re-tighten the terminal to keep them out of harm's way.



Note that same little pin in the frame picks up a slot in the end bell. It can only go together one way.

Since the voltage regulator uses the generator bolts, loose assemble the brush cover. I used to run without the cover to let



cool air into the generator. It worked great in the rain, everywhere for 5 years. Until I blew a front fork seal and the fork oil splashed on the commutator. It glazed it over and ruined the voltage regulator.



Because of the regulator I needed a deep well socket. Otherwise a 7/16 wrench will work. Always replace the lockwashers--even if you tightened it and then had to take it back off for some reason. Then you will not have to glue your bike together with Loctite. I replace the nylon prevailing-torque nuts the factory uses with regular nuts and lockwashers.



Now you can tighten the brush cover. This one is eye-balled so it points down when the generator is installed. This area was where the oil was coming out.



For this setup that uses a Franks Electric regulator you can hook the field and armature wires up now. Check your notes and you do have the original instructions on file don't you? Don't trust the color on these wires. Different regulators have different colors. Note the little internal tooth star lockwashers that insure good electrical contact. The hardware store is your friend. Spend time with your friends.



Even non meth-amphetamine addicts can strip these 10-32 brass nuts. I turn the wrench like this or use a nut-driver.



Make sure everything is spotlessly clean and especially this bearing cover. Dirt and grime in a precision ball bearing is not good.



The gear will only start on the shaft as it is a light press fit. Some gears do just slide on. The Factory uses a nylon prevailing torque nut. I substitute regular 5/16-24 nut and a pair of the trick Disk-Lock lockwashers. A real touch here as you need to feel the subtle difference of the gear pulling on and, once it all the way on, the increase in torque as the nut tightens. These 5/16-24 threads strip easy.



See why professionals use the trays? The only things left over are the 3 lockwashers that were replaced with new ones. One for the armature nut, two others for the end bell studs.