

Primary gasket leak (1996)

My '96 developed a leaky primary cover at only 12,000 miles.

I have had to replace the primary cover gasket on my 1996 twice. The last gasket I bought from the Harley dealer seems much stronger so buy one there.

OK, so this is an Iron Sportster site, but I ran this Evo Sportster when I had a long commute. I gave the bike to my pal Doug when I left California, so I am 100% Iron Head in Florida.



My 1996 Sportster keeps wearing through the primary cover gasket. Vibration and the footpegs being mounted to it must be the cause.



At about 12,000 miles a leak developed at the primary cover gasket. I had degreased and hosed the bike down the week before and driven it just a couple of miles before pulling over to look for the leak source. This is what it looked like after a weeks driving.



A 3/4 inch wrench takes care of the drain plug at the bottom of the motor. You might want to stand the bike upright after it has mostly drained out to get the oil that is sloshed into the primary cover. Harley never bothered to make the drain plug at the lowest point when the bike is on the side stand.



If you want professional results act like a professional. Bring the tools to the bike or vice versa. Why do you think they call it a "roll around" anyway? You should make every effort to "work out of the box" which means you replace tools right after using them.

That way you'll know where to find it as opposed to sitting in a little pile of tools scattered all around you like 5 year old in a sandbox. Leaving a 60 dollar Snap-On wrench in the cowl area of a customer's car cured me of leaving tools laying around. I would watch the big dollar Porsche mechanics on the other side of the shop. They put every tool back immediately after they used it. I said "But your going to use it two seconds later". Tim said "Yep, and I know right where it will be."



First remove the gear shift lever pinch bolt with an English size allen wrench. When I was an engineer with General Motors they had a firm target date of 1976 to convert over to completely metric. They should have asked the machine shops what they thought. Like GM cars today, Harleys are a mixture of English and Metric fasteners. Most of the big stuff is still English.



I was too stupid to remove the footpeg first, I could not get a good grip on the lever. When it was half way out I switched to this position to get it the rest of the way. Maybe a cheap Taiwan puller would work better for you.



This bike was wrecked once and the gear shift shaft got bashed up a little. The lever won't slide off anymore. I use this totally cool little puller made for battery terminals. Please do not try to pry the lever off with a tire iron.



Use a tray to hold all the parts. The tray keeps all the parts in one place, it allows you to carry the parts to the wash bench and it can then be used for the clean parts. Carry it over to the polishing station and you will never lose a part. When all the individual parts are cleaned, polished, inspected for wear or damage and then repaired or replaced you have a tray full of parts ready to assemble.



The foot peg is held on with two large English Allen bolts. I tend to agree with Vance, my racer pal who will not even use an impact tool to take his bikes apart, much less assemble them. I try to use the simplest tool for the job.



Now we can start on the primary cover bolts themselves. You might want to jump ahead to where I realized that late model Sportsters need to have the clutch mechanism disassembled before you can remove the primary. For now just grin as I do the wrong thing.



Cool off the cadmium fumes. Don't just set it down You will forget and pick it up guaranteed and burn the living daylights out of your hand. Cool it off right away and that's one less time bomb you have ticking around your work area.



See, I can show off too. I do have a set of 3/8 drive Allen wrenches. It's a little handier but not a tremendous speed advantage over a plain wrench. I definitely use the wrench to assemble because it's shorter and bends a little to help judge the torque. It's no fun to strip these out.



In 1976 Harley had a lot of AMF (American Machine and Foundry) money to spend. Most of it was wasted. Some geek figured we really needed to be able to adjust the primary chain with the cover on so they added a kludge-fest arrangement with pivoting tensioners and springs and an external bolt and locknut. I have never seen a primary chain stretch or wear out in 30 years.

The nylon tension blocks do wear out and the older design breaks off and jams in between the chain and the case and stuff but the chain itself never seems to go bad. All this whizzy external adjustment has three primary (pun intended) implications: 1) more places for oil to leak. 2) greater misery in removing the primary cover. 3) no way to view the tensioned chain operate with the cover off. After the leveraged buyout from AMF Harley had even more money so they perfected the bad design so it's designed on CAD workstations and made with the latest technology and assembled with SPC precision by Union guys who are actually sober. It is still a bad design however. I'll keep my '62, thanks.



That goofy chain tensioner got me so worked up I took another picture of it. A good design principle: Covers suck. When absolutely needed for oil retention or safety or noise reduction they make sense. It never makes sense to put machinery in a cover. Then it is not a cover, it's some hybrid monster.

The Panhead was great design-- the valve mechanism all bolted down solid with a tin cover to keep the oil and noise in and the dirt out. Then the Sportsters and the Shovelhead with the rocker box being both a cover and a mechanism. The valve geometry goes all over the place with different gasket thickness and the gaskets wear out from the forces applied to them. It also makes things noisier. The Evo rocker kludge-fest is a joke. The 2-cam still has a whole heap a pieces, but at least the rockers don't run in them. (This was done for noise reduction) The 1996 Sportster's primary cover is really a combined chain tensioner and clutch release that is incidentally a cover too. At least it's not a starter bearing support like in the 70s and 80s. Where's my '62?



The chain tensioner won't thread out any further. It is not like the 1977 to 1983 adjuster. Look further down and you can see the bolt is captive to the tensioner block. Just run the bolt out until you feel the resistance of it bottoming out.



Unlike the 1970 to 1983 Iron Sportsters, the clutch mechanism has to come out of the evo Sportster to get the primary off. Note I just gave a couple taps with a soft mallet. I did not wedge a screwdriver in between the cover and the case which will cause an oil leak.



It's time for the manual.



OK, much to my amazement the manual says the clutch mechanism must come out so off comes the derby cover. (A cover mounted on a cover-- you know something's wrong.) I thought this at least was a simple cover but just wait, it's really a clutch adjustment lock mechanism retainer that is just posing as a cover for those trendy LA wannabes that put 200 mile a year on their bikes. Read on.



Oh yeah, I almost forgot, you do have a set of Torx wrenches don't you?



This is called a quad ring by the factory. It's kind of like an O-ring only it's square in cross section. I assume this will prevent us from using standard O-rings instead of official factory authorized original genuine big-dollar quad rings. Accept it and throw it in the tray with the rest of the parts.



Here's the funky lock nut/spring assembly. The derby "cover" pushes on the spring and holds the nut in place. This is proof positive that given enough money and time even a moron can design something that sort of works (kind of). Pull it out and throw it in the tray.



Screw the center bolt in clockwise to back out the incredibly beautiful release mechanism. Powdered metal I think. Must be great to have all that T-shirt money to over-design parts with. Forgive me, I still have a soft spot for the old stamped steel jobs used from 1970 to 1983. Now that was great design. Virtually frictionless and cheap as all get-out to produce. They probably early-retired that guy.



We're really jamming now as Frank Zappa would say. Remember that the problem is a leaky primary cover gasket? So here we are disassembling the clutch mechanism. Turn the center bolt enough and this little fancy hex-threaded gizmo pops out of the assembly. Thread it all the way off and toss it in the parts tray.



Pivot it back like this to get it off the cable. If you haven't dropped any of the small parts in the oil pan below the bike you mind as well toss the little hook thingy in there now and get it over with.



Out plops the breathtakingly gorgeous clutch release mechanism ball ramp sub-assembly. Stunning.



Here is the little hook thingy that wants to drop into the oil pan so bad. If you were not intending to pull the primary it would fall off inside the primary and make you pull the cover just to spite you. Toss it in the parts bucket.



Only the finest binding glue is used in the official genuine authorized Harley Davidson Manual. I sure hope I make it to Wham's funeral on time.....



See how the gasket traps a bunch of oil so that when you pull the cover it drips all over? It's been like that for almost 50 years. Some things never change. That's tradition, that's legacy.



Here is the leak. It looks like the cover was over tightened. The Loctite on the bolts indicated that the cover had never been removed so this may be on the factory. On the other hand I bought the bike wrecked with 4700 miles on it and we know how those crank freaks like to tighten 1/4-20 Allen's with a half inch drive breaker bar with a cheater on it to boot.



I have no idea what this part is or why I'm holding it. It's kind of like the rubber ring around the gear shift shaft so if you don't see me take it off later then this is it and take it off now. At least I had a parts tray with nothing left over in it.



This is where all the oil trapped in the primary leaked out. My Honda-riding pals can come over and make fun of all the oil stains.



Everything having to do with Harleys involves groveling. Get on your belly to loosen the chain tensioner. Get on your belly to pick up all the little pieces. Get on your knees wiping up all the oil. I finally get wise and plop the cover back on momentarily so I can remove the clutch cable and take the whole damn cover into the shop to work on.



Another fine place for a leak. Make sure the little O-ring (what? No quad ring?) is in good shape and clean all this meticulously. Wham's funeral is only a couple hours away. Hope I make it on time.



Behold the Sportster primary drive. Between the electric start setup and the demon-inspired alternator-behind-the-engine-sprocket, I'd say the chain runs a good 2 or 3 inches outboard of my '62. Notice how the starter bolts in above the clutch-- yup, you have to remove the primary cover to change the starter. Good thing Harley doesn't make cars. You'd have to unbolt the steering wheel when you change tires.



Clean the gasket surface perfectly. Do not scrape or nick or pry on it ever. If it is an old old bike that has been abused you can knock down any high spots with a fine file and build up any gouges with a polyamide epoxy like JB Weld. Under no circumstances should you use silicone or Permatex on the gasket. You should not have to glue your bike together. The silicone will get into the tranny and blow it (and you) up.



Don't miss these little hollow dowel pins at the front and back.. They should pop out without force. Older bikes make have a press fit. If so, leave them in.



Yes, there's one in the back too. Into the part's tray they both go.



Back to that professionalism thing again. Wipe off the tools and put them away. I was not working out of the box since I was on my belly but if you do have any tools left out this is the time to wipe them down and put them away. If any are missing you have a better chance of finding them now.



I've got a little Taiwan solvent tank I fill with degreaser (I think it's kerosene mixed with soap). You see me suffering with the chain tensioner still in until I get wise and



Go get the tool to remove the tensioner. A 7/8 wrench if I remember right.



When you back off the big jam nut it goes over the grungy threads that were exposed to the elements and puts enough force on the center bolt to tighten it too tight to come off by hand. Go get the Allen wrench and break it free.



Notice how the chain runs diagonally to the tensioner. Be absolutely sure you put it in the same way it came out. As you can see from the picture above, the open side with the little hollow in the middle is facing out. The other side of the tensioner does not have this hollow.



Wash the primary off with a lot of clean water. Blow it off with clean dry oil free air. Towels are bad because they leave lint but at least lint will be ground up in the bearings unlike silicone which will destroy any roller bearing. (Can you tell I like silicone?)



It's just as important to wash out the tray as the parts it carries. Everything must be meticulously clean. Your bike is on the operating table and this is the tray that will carry in it's new heart (or liver maybe). You'd want it clean if it was your internal organs. Your Harley wants it clean too.



Get the crud off the threads. I just touched the wire wheel as lightly. As I use anti-seize on the threads as opposed to glue I don't think corrosion will be a problem. **Please wear eye protection** and hearing protection. The wires break off and can punch a hole in your eye.



Here is our tray all washed out and cleaned and with all the parts stripped of oil, washed clean, blown dry and inspected for damage and wear.



While I've got the stuff completely off the bike I take a few minutes to hit the buffing wheel.



Mind as well do the primary cover too. Wham's funeral is only an hour away at this point but he would understand me wanting to have my bike look good as well as not leaking oil all over the church parking lot. I use the "Stainless" compound which is made for -- surprise-- stainless steel. It cuts fast and leaves a decent polish. Not as shiny as rouge or finer compounds but still pretty good.



Back in goes the tensioner. Note the hollow part is out like when we took it apart. If yours is in the other way put it back together the other way. It's nice working on clean dry stuff. No oil to trap dirt and get your hands messy.



The tensioner lock nut has to go on now because it interferes with the kickstand. Make sure the nylon surface is clean and free of all grit. Same goes for the area on the case where it mates.



Of course the nylon makes the nut act like those evil prevailing torque nuts I hate so much. It won't free run in the bolt because the nylon needs to thread on the bolt for a (supposedly) leak free seal. Two tools. What joy.



Clean the gearshift shaft. A lot of dirt can collect in the splines and it might be pushed into the primary when you slide the cover on. Cleanliness is the sign of a competent mechanic. I try to be so clean I don't even swear when I put em together (although it's hard not to swear sometimes).



Back in go the hollow dowel pins, front and back.



The gasket won't stay on the dowel pins. Brush on some assembly grease like I did and the gasket will stay in place even though it is pointed a little down.



Put a little assembly lube on the gearshift shaft.



Put a little assembly lube in the primary cover where the shift shaft goes too. The factory says to replace the shaft seal. If I had a seal handy I would have put it in. The splines are a little bunged up and could easily cut the seal up during removal.



You have to reach up and push the chain out of the way so it can go over the tensioner instead of slam into the side. Do not force anything. I hope Wham understands. I'll never make it to San Jose to get Lorrie and then get back to Sunnyvale in time for the funeral service.



Note there are big bolts for the footpeg, long and short bolts for the cover, really short bolts for the derby cover and an oddball medium bolt for the shifter clamp. Don't be a wino and force the long bolts into the short holes.



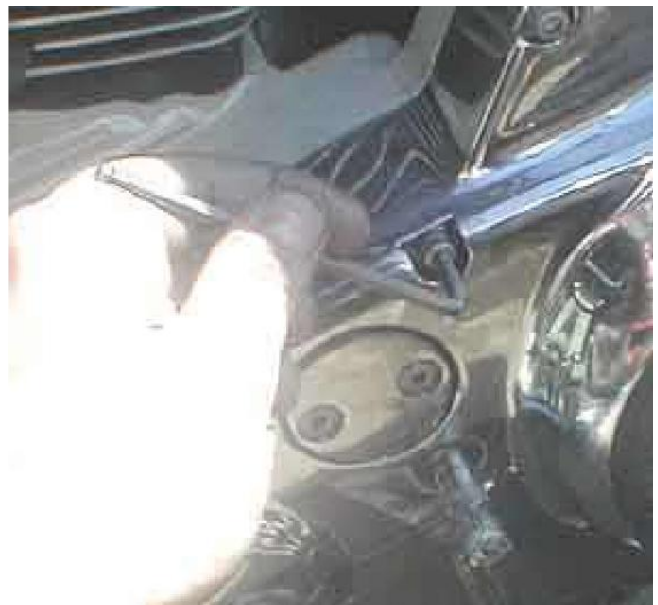
Anti-seize, not Loctite. If the bolts back out then put lock washers under them. Do not glue your bike together.



With all the old grungy Loctite removed and the nice slippery anti-seize on, the bolts spin right in. Better yet, they'll spin right out when you work on them the next time. Now they free-run. You could use your fingers if you wanted and just snug up the last quarter turn. Same way coming apart-- crack em loose and they free-run the rest of the way.



Get all the screws started and, unlike me, who will be suffering a few pictures later, start the big footpeg screws right now also. I didn't and the gasket partially blocked the holes. I was so late and I was so rushed I did not loosen the cover-- I just leaned on the wrench and forced the screws to cut into the paper gasket-- shame.



Use the wrench the long way to tighten the screws. Tighten a little at a time working from side to side and top to bottom until they are all snug.



Major danger here. This cable is so easy to cross-thread it isn't funny, especially when you are running late. It's too stiff to turn by hand so you have to wrench it in. Careful. Everything has been cleaned up and the O-ring is in good shape.



Of course when you handle the cable it pulls apart. If I wasn't in a blind panic I would have put some oil on it. As it was I stuffed it back in under the rubber which made the cable part poke out in the primary cover....



Be oh-so-careful using the wrench to start the cable. Get down on your belly and make absolutely sure the cable is going in straight before you begin turning. I got lucky this time and did not cross-thread and strip it out despite my being in a panic trying to get to my bro's funeral on time.



Where I can put the little hook thingy on the now exposed cable. Do not drop it into the tranny or you will become a suicide risk.



Slip on the magnificent ball ramp assembly. Notice the ridge where the hook mates so it only goes on one way. This has always been important according to the manual but I fail to see why the hook can't go on either way in a design sense. Only Harley knows for sure.



Where you can use a small screwdriver to spin the center bolt while the threaded hex nut assembly screws into the hex pocket on the ball ramp assembly. This is where you do the clutch adjustment. The factory says to tighten the center screw (by turning it counter-clockwise like you are unscrewing it) until you feel resistance.



Swing the ball ramp assembly into the pocket....

Then back off a 1/4 of a turn. Problem is the resistance is progressive for about a half turn so you never know whether to stop just as you fell any resistance whatsoever or to go the half turn more where the resistance really gets stiff. I put it on the loose side so that when I backed off 1/4 there was almost no resistance at all. One nice thing is that once you are close you can reach up and try the clutch to see how it feels.



Pop on the goofy spring with lock disk assembly. If it keeps falling out just slather on a pound of grease and stick the dang thing there.



The spring thingy keeps falling on the ground and the quad ring won't stay put either. Sometimes the quad ring stretches and pops off one section, other times it compresses and pops off another.



Assembly lube to the rescue. Glom it all over the place and everything should stay put just long enough to...



Pop on the derby cover and screw in the hated torx screws with a screwdriver. They won't strip this way. Leave the breaker bar in the house. (Notice how shiny the cover is. I hope Wham appreciates me dolling up my ride for his funeral.)



This is where panic turned to rage, The gasket did not line up for the footpegs even though all the cover bolts were in OK. I just leaned on the wrench to get the bolt to cut through the paper gasket. Horrible, this wipes off all the anti-seize. I'm sure I will be punished for this one day.



Pop off the chain inspection plate with an English size Allen wrench.



Feel the slack in the chain while tightening the adjuster bolt on the bottom of the primary cover. You should hit the starter momentarily to check at various places. My sprockets weren't out round and the slack was the same. I wasn't brave enough to leave my finger in the hole while I cranked the bike. Don't blame me if your friends call you "Stumpy" when you loose a finger.



Start laughing out loud as I pour in the big-dollar synthetic oil. (15W-50.) You haven't seen the picture of me putting in the drain plug yet.



In the background we see 7 dollars worth of virgin oil draining into the pan with the old oil. Since there is no fill level plug on the late model primary cover I have to let the whole quart drain through. I have cleaned off the magnetic plug and blown off all the metal particles with air.

Choke up on that 3/4 inch wrench when you install it-- it's easy to strip. Make sure the seating area is clean and free of grit and grime. This is what happens when you hurry-- you screw up. I wouldn't have been so frantic if I was just making myself late but I was also holding up Lorrie who was counting on me to get her to the funeral service while her car was getting the timing belt replaced. I did put another quart in after the drain plug was installed.



Slip on the rubber grommet over the shifter shaft.



Button up the inspection cover.



Tighten the shift lever clam bolt with a English size Allen wrench. Done. Now you get to ride again. Enjoy.

If your still laughing about me wasting the quart of oil you should have seen me back the bike up and forget to take the oil pan out from underneath it. The front tire flipped it on edge and both quarts ended up on the pavement (and my tire). Never rush-- your life is at stake and you brothers (and sisters) will understand. Lorrie and I got to Wham's funeral service a little late but we saw most of it including when his older brother read a letter Wham sent from Vietnam during the war. I'll miss Wham. He was a good man.