

Sprockets and Chain Tutorial

By: ThagAnderson81 (www.riderforums.com)

Parts you will need:

- Front sprocket (stock size is 15 teeth, I used a 14).
- Rear sprocket (stock size is 46 teeth, I used a 48).
- 520 Chain (optional, unless you're using non-stock sprocket sizes).

Tools you will need:

- 27mm Wrench.
- 27mm, 1/2" Drive socket.
- 14mm Wrench and/or socket.
- 1/4" Drive ratchet.
- 10mm Socket.
- 8mm Socket.
- 6mm Allen wrench.
- 4mm Allen wrench.
- 1/2" Drive air impact gun.
- Chain riveter/breaker (*very important*).
- Pliers, normal size.
- Flat head screwdriver.
- Hammer or small rubber mallet.

Tools that might make things much easier:

- Bike stand (one that allows removal of the rear wheel)
- Rear axle alignment helper
- Bolt cutters, large
- 1/2" drive torque wrench

Miscellaneous, but not required:

- Rags
- shop gloves

Random thoughts about the project:

I'm going to start out by talking about things not directly related to the installation. First, the new rear sprocket felt much lighter than the stock steel sprocket. I had no way of weighing them, but I could tell just by holding them. The front sprocket felt the same to me. It is most likely somewhat lighter (maybe a few ounces), but, as far as I'm concerned, it is plenty beefy for the job. Once you have done this mod, your speedometer is going to be considerably off. My speedo was 3.5mph fast from the factory, and now, it indicates a speed much faster than actual. So, if you think you're getting passed a lot after you do this, it's because you are going slow. I'll post an update about how this affects riding later, as I haven't ridden it enough with them on yet.

Let's get started.

(Refer to Fig. 1) Take your 8mm socket and remove the two bolts from the front sprocket cover. Set the cover to the side. You can also remove the grey plastic piece to the right of the cover, but it's really not necessary. To remove it, unscrew the 4mm Allen head bolt from the top, pull on the bottom until the clips pop out, then lift up on the whole thing and the top clip will pop allowing removal.



Fig. 1

(Refer to Fig. 2) Take your 10mm socket and remove the two bolts from the speed sensor. Let the sensor hang, but make sure it's out of the way of the sprocket nut.

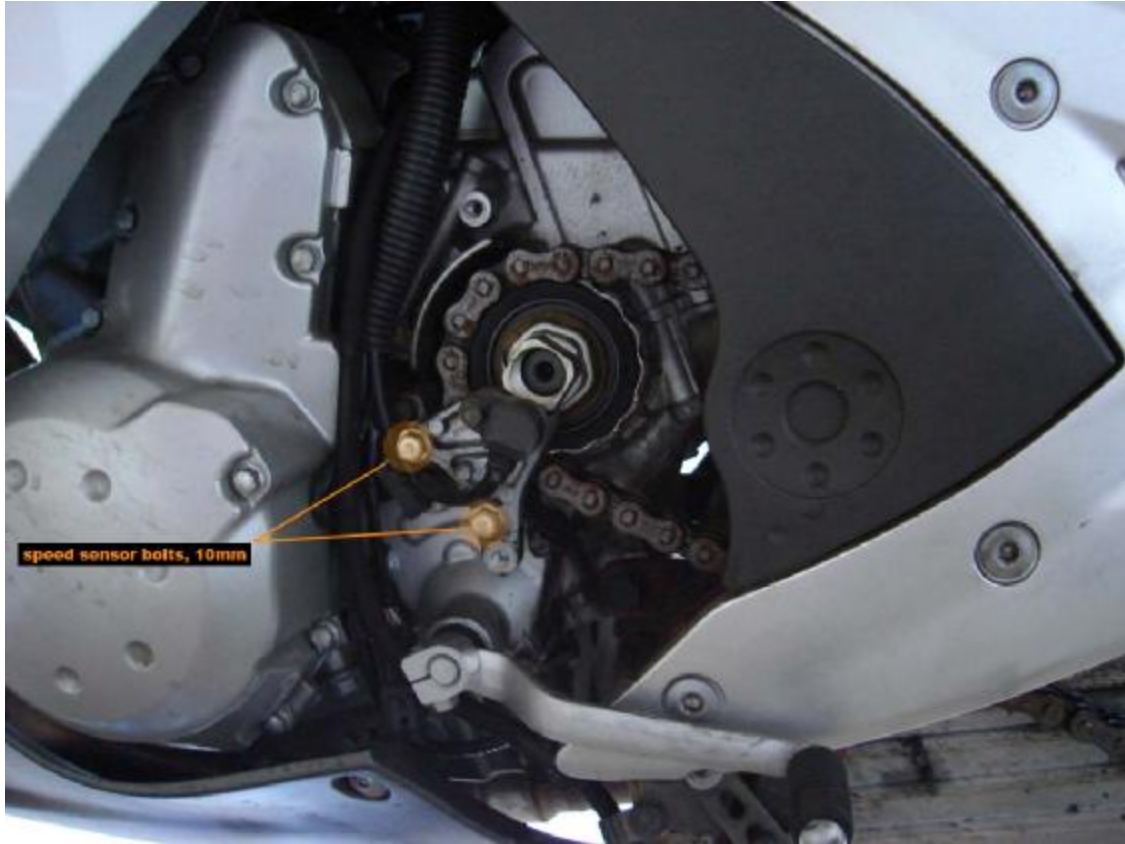


Fig. 2

(Refer to Fig.3) Take your flat head screwdriver and your hammer or mallet and flatten out the retaining ring behind the front sprocket nut. Setup your air impact gun and use your 27mm socket to remove the sprocket nut.

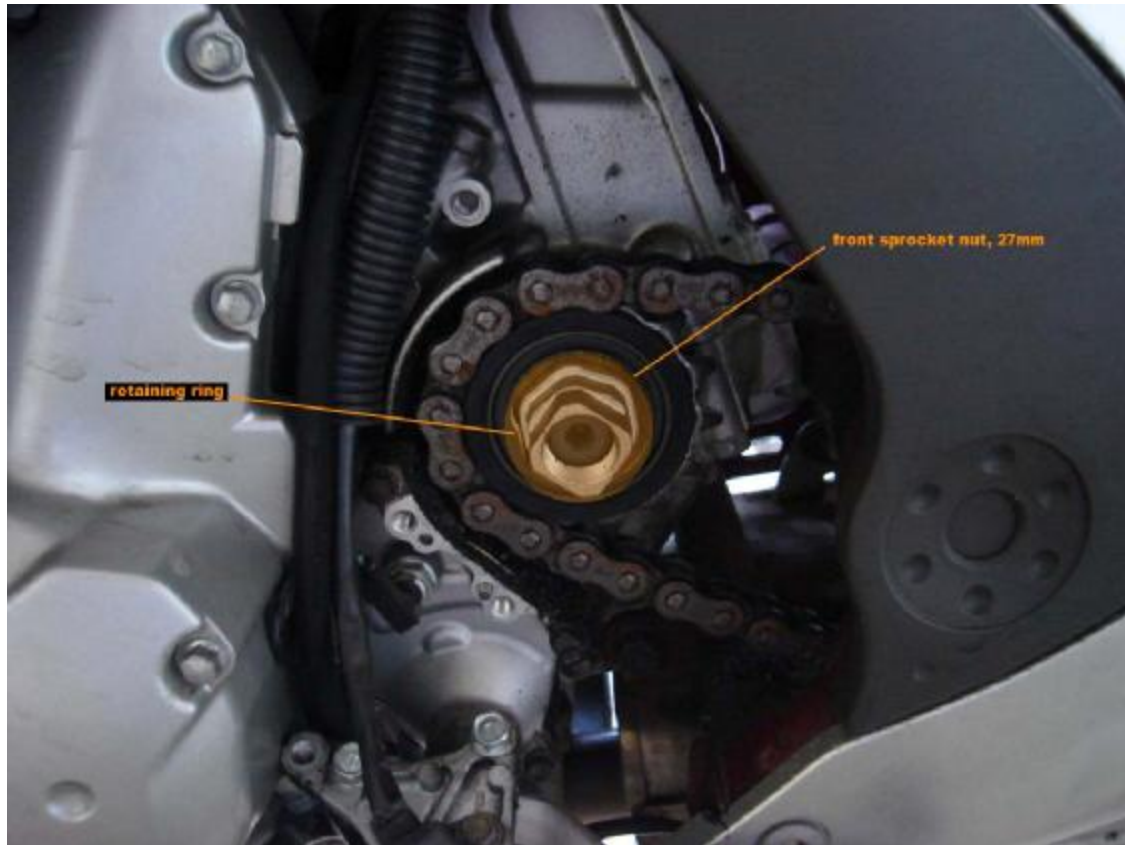


Fig. 3

(Refer to Fig. 4) Take your 4mm Allen wrench and remove the two bolts holding the chain guard to the swingarm. Set the chain guard aside with the sprocket cover you removed earlier. Use your pliers to untwist and remove the rear axle nut pin. Next, take your 27mm wrench and loosen the rear axle nut. With the rear axle loose, loosen the chain tensioners with your 14mm wrench. There's one on both sides of the swingarm. Do *not* screw the tensioners all the way off, just loosen them enough to move the rear tire all the way forward.



Fig. 4

(Refer to Fig. 5) Take your 6mm Allen wrench and remove the two bolts holding the rear brake caliper to the swingarm. Lift up on the caliper and place it on the passenger footrest. **Do not** let the caliper just dangle from the hydraulic line. Also, don't depress the rear brake lever while the caliper is off the brake rotor.

If you are re-using your chain for whatever reason, this is how to remove the sprockets without cutting the chain. If you have a new chain, cut your old one (or use the chain breaker) and go ahead to the next paragraph.

If you haven't already, push the rear tire as far forward as it will go. There should now be lots of slack in your chain so we can remove the sprockets. Pull the front sprocket off the transmission output shaft. The chain may try to keep the sprocket in place, but it *will* come off. With the front sprocket off, pull the chain towards the rear of the bike, then up and off the rear sprocket. **Make sure you take the chain off towards the swingarm and not towards the wheel!** While we're here, you might-as-well clean out any gunk that has accumulated around the front sprocket area, as well as the chain rail on top of the swingarm.

Ok. Your chain is cut and/or your sprockets are free. Put your bike up on a bike stand and remove the rear axle. Here is a picture of the axle off the bike.



Be careful not to get the axle dirty. Remove the rear wheel and set it down, sprocket-side-up. It would be a good idea to set the wheel down on a rag or something, just to keep the hub from getting scuffed on the outside or dirty on the inside. We don't want anything abrasive in the hub! Here's a couple pictures of the rear wheel and the sprockets:









Use your 14mm wrench or socket to remove the six nuts holding the sprocket to the wheel. Take the old sprocket off, put the new sprocket on. Replace and tighten sprocket nuts to 44 ft/lbs, place wheel back under bike, replace axle, replace axle nut, but do not tighten it down.

Note: **DO NOT** force the axle through the hub. When lined up properly, the axle will slide right through the hub with very little friction.

Install your new front sprocket on the transmission output shaft. If you are re-using your old chain, you must put the chain around the sprocket *before* installing it.

Note: The factory sprocket is very clearly marked "outside" so it is hard to install it wrong. However, the aftermarket sprocket I was using was not shaped the same as the factory sprocket, and was also not marked as to orientation. If this is the case for you, look at the spacing between the stock sprocket's teeth and the transmission. Then, compare using both sides of the new sprocket. It will be obvious which way it is supposed to go on.

All right, sprocket is now on the transmission. My new sprocket was wider than the stock one, so the retaining ring could not be pushed onto the splines as it was before. I put it on before the sprocket nut anyway though, just as a washer, if nothing else. Just hand tighten the nut for now, we'll torque it down later.

If you're re-using your old chain, make sure your rear tire is all the way forward, and feed the chain around the bottom of the sprocket, as far up as you can go. Rotate

the tire counter-clockwise until the chain is completely around the sprocket.

Unwrap your new chain, and feed it over the rear sprocket and through the front sprocket, so that the loose ends are underneath the swingarm, just in front of the rear sprocket. Make sure the rear wheel is still pushed all the way forward. If necessary, use your chain breaker to remove any un-needed links. Now, use your chain riveter to install the master link. Make sure you use the rubber bushings on *both* sides of the master link! Also, make sure you read the instructions provided with the new chain as to the installation of the master link. If your master link came with a retaining clip, make sure you install that too. It's easiest with pliers.

Ok. Sprockets, check. Chain, check. You're almost done!

Pull on the rear wheel until there is no more droop in the chain. Tighten the rear axle nut until the axle does not move freely. Do not torque the axle nut yet. Take your 14mm wrench and tighten the chain tensioners so that the red caps on the end of the swingarm are snug again. I am not going to tell you how to align the rear axle, because many people do it many different ways. I used the alignment marks on the swingarm. Once you're satisfied with the alignment of your axle, torque the axle nut down to 80 ft/lbs. You may need another wrench for the right-hand side of the axle if it wants to spin freely. It stayed in place while I was working on it, but it may not for you. The bolt head on the right-hand side is 22mm. While you still have your torque wrench and 27mm socket out, go ahead and torque the front sprocket nut down as well. Torque to 92ft/lbs. After I tightened the front sprocket nut, I also bent the retaining ring back up. Probably not necessary, as the ring is no longer being held in place, but I did it anyway.

Take your 6mm Allen wrench and bolt your rear brake calliper back in place. Torque spec for the calliper mounting bolts is 18 ft/lbs. While you're back there, go ahead and use your 4mm Allen wrench to re-install the chain guard. Moving to the front, we bolt our speed sensor back on, followed by our sprocket cover. If you removed the other plastic piece from earlier, replace it too.

Now, get cleaned up, suit up, and test her out!

Disclaimer

I am **NOT** a professional mechanic, and I do **NOT** guarantee that my tutorial is %100 sound advice. I am merely conveying, to anyone who wants to read it, what I did to my bike. Use this tutorial at your OWN RISK.

With that out of the way, if there is anything you see that could be made better, or anything that needs to be corrected, just tell me, and I'll try to fix/add it. Thank you.

07Dec2006 EDIT

Added torque specs for required components.
Added proper size of rear axle bolt head.

12 Dec 2006 : My thoughts – Sprockets and clutch springs, 500miles

I've been riding/stunting with my new sprockets and clutch springs for about 500 miles now, and I thought I would share my thoughts on the differences between stock and mod.

Starting out, the only reason I performed these mods was to aid low-end torque and clutch grab for the sole purpose of performing wheelies. 14t/48t sprockets are certainly *not* for everyday riders, or for people who do a lot of sustained high speed riding, such as on freeways. However, besides the obvious on-tap wheelie power I now have, I have also noticed powering out of corners in the wrong gear to be much easier. Not a habit to get into, but if you come out of a corner in 3rd when you needed 2nd, you probably won't have to down-shift unless you really want to.

Another thing I've noticed is a marked decrease in fuel economy. This is mainly my fault though, as I tend to let the tacho roam into the high side before shifting, even when just cruising. If I were to shift conservatively, I would assume that fuel economy would remain unchanged.

Another thing you will immediately notice is that your speedometer will be off even more than it was stock. I plan on doing more testing later, but according to my first GPS measurement, at ~65mph indicated, I am now going ~55mph actual. I don't plan on fixing the inaccuracy, but if you wish to, there are modules you can splice into your system to fix inaccurate speedos.

Moving on to the clutch springs, well, there really isn't a lot to say here. They work exactly as expected. Clutch "tension" at the lever is definitely increased, and you will notice your hand getting tired quicker if you drive in a lot of traffic; but you get acclimated quickly, as I don't hardly notice anymore. Dragging the clutch is slightly more difficult, as the Barnett springs cause the clutch plates to grab the friction plates much harder and quicker than the stock springs did. You may find yourself dumping the clutch a few times while getting used to the new springs, but definitely worth it in the long run.

All in all, I am very pleased with my new setup; and at under \$300 for the parts, the benefits really can't be beat. On a side note, after doing the mods, I notice that my bike feels very "unstable", especially when riding two up. I was riding through a parking lot with my girl on the back just like we always do on Thursday night, and I almost fell over taking a turn I've taken at-least 20 times with her on the back. The bike just doesn't want to stay up by itself like it used to. This has happened a couple times now, and I'm thinking that the rear axle might not be aligned properly. I used the marks on the swing arm, just like the shop that built my bike did, and the chain doesn't make any noise at all. Not quite sure what's going on yet, but I'm looking into it.