

Disclaimer: This is my own method for doing this and I make no claims that it is the right or only way to do this. Therefore, if you use these notes then you do so AT YOUR OWN RISK and I assume no responsibility whatsoever for any physical, property, emotional or other damages you may incur from use of the information contained herein.

TOOLS: Aside from the tools in the factory tool kit you'll need the following:

1. 12mm Allen wrench (for the left final drive pivot)
2. Torque wrench set to 7.3 N-m (65 in-lbs, 5.4 ft-lbs) for the right final drive and left swing arm pivots (Somewhat optional. More on this later.)
3. 27mm box wrench or a crescent wrench adjustable to 27 mm
4. Drain pan for final drive and transmission gear oil
5. Sawhorse

FLUIDS/LUBRICANTS:

Final Drive Gear Oil: 0.3 quarts of 75W-90 gear oil. I use Mobil 1 75/90 and change it every 20,000 miles.

Transmission Gear Oil: 0.8 quarts of 75W-140 gear oil. Alternately you can use 75/90 in the transmission but supposedly the 75/140 makes K bikes shift a bit better. Again I use Mobil one and change it on a 20k interval.

Moly Gear Oil Additive: (optional) Adding moly to gear oil reduces friction/wear and makes shifting smoother. I use Guard Dog moly gear oil additive. (3.4 oz. in the transmission and 1.1 oz. in the final drive)

Spline Lubricants: BMW recommends using their #10 grease – part number 95009000190: However, many BMW owners use either Honda Moly 60 (Honda part 08734-0001) or Guard Dog GD525. The GD525 is stickier and tends to stay around longer so that's what I recommend.

General grease: You'll need some general grease for the final drive and swing arm pivots as well as the needle bearings in the clutch arm pivot. I use Mobil 1 synthetic bearing grease for that stuff but you'd probably be fine using Honda Moly 60 or lithium grease.

Zerk Grease: There are Zerk grease nipples for a grease gun on the center and side stand pivots that should be lubed periodically. I use water resistant grease made for boat trailer bearings.

Coolant: It's less messy if you just empty out the coolant reservoir when doing a spline lube. If you don't have any coolant around then refill the reservoir with distilled water when you're finished.

- Put bike on center stand.
- Remove side covers.
- Remove seat.
- Remove lower left side "Z" rack bolts(5mm) and the left peg plate bolts.(8mm)



- Place piece of 1x4 wood between exhaust and clutch arm, pry up clutch arm and release end of clutch cable from clutch arm:



- Pull rubber boot up through the front of the cable mounting hole in the transmission case.
Put transmission into 5th gear. (Easier to spin input splines to line them up by turning the output shaft when putting transmission back on .)
Remove the shift lever:



- Unscrew exhaust O2 sensor connector. Snip small zip tie that secures O2 sensor wiring to rear of ABS control unit bracket.



- Unscrew exhaust rear hanger bolt. (8mm)



- In my case I have a Remus exhaust so all I needed to do next was undo the exhaust clamp at the collector to remove the exhaust can. For a stock exhaust, since it's all one piece, you'll need to remove the belly pan (K1100RS only) and undo the 8 12mm nuts that attach the header flanges to the cylinder head to get the exhaust off. You may need a deep well 12mm socket for this.
- Use 4mm Allen wrench to pull hub cap off of rear wheel:



- Undo the 5 lug bolts and remove the rear wheel. Put the spacer with the lug bolts so you remember to install it when putting the wheel back on..



- Drain final drive gear oil:



- Undo 2 bolts (8mm hex outside, Phillips machine screw inside) that hold front half of inner rear fender to rear half:



- Remove rear half of fender. There are 2 10mm hex bolts inside the fender under the tail light assembly.



- Unscrew 2 10mm nuts for bracket that holds front half of fender:
Note that coolant reservoir tabs go above metal tabs on frame and black plastic spacers go below them:



- Empty coolant reservoir:
- Remove right "Z" rack bolts (5mm) and right peg plate bolts. (8mm)



- Remove 2 bolts (5mm) that hold rear master cylinder to right peg plate and bolt (4mm) that holds rear brake switch:



- Disconnect Motronic connector by pushing metal tab at the rear of it back and lifting up the rear of the connector:



- Disconnect ground blade terminal at back of Motronic and unscrew bolt(5mm) that holds down the rear of the Motronic:



- Pull Motronic to the rear and remove it:
- Remove the two long Phillips machine screws that secure the battery hold down plate.
Side note: I use a 1/8" thick piece of industrial rubber to ensure that the positive battery terminal won't short to the battery hold down plate.



- Undo negative battery terminal first to avoid risk of your tool shorting to the frame when removing the positive terminal.
- Undo positive battery terminal.
- Remove battery:
- Remove 2 bolts (5mm) that secure front and rear of ABS control unit bracket:



- Remove Torx bolt from rear side of ABS control unit bracket. I didn't have any Torx bits on hand so I used Vise-Grips to remove it and then replaced it with a stainless steel M6x15 buttonhead Allen bolt when I put things back together to simplify future maintenance.
- Push ABS control unit towards center of the bike and remove 2 10mm nuts that hold ABS control unit bracket to rubber bushings on transmission. Then remove the other two on the right side.



- Rotate the ABS/battery tray out of the way around the rear brake line:



- Secure ABS control unit to left frame rail to keep it up and out of the way:



- Remove 2 bolts (5mm) that hold rear of starter motor to transmission: You do not need to remove or disconnect the starter. Just make sure the transmission doesn't hit the starter when you slide the transmission back on.



- Remove center bolt (5mm) from right swing arm pivot that secures the plastic retainer for the side stand switch wiring. Remove 3 bolts (5mm) around the perimeter that secure right swing arm pivot to transmission case:



- Remove 2 small bolts (3mm) for alternator cover:



- Remove 2 mounting bolts (8mm) for rear brake caliper and use some string to tie it off to the frame so it's not hanging by its brake lines.
- Remove bolt (4mm) that secures speedometer sensor.



- Using a narrow tool to lift the rear of it and your fingers on the front of it where the wire exits to rock it back and forth while pulling up to remove it: Note that there is usually some dirt gathered behind the speedometer sensor so be careful not to let any of that fall into the final drive. Once I get the speedometer sensor out I stick a finger in that hole to keep dirt from falling into it while I use the other hand to clean the dirt away:



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- Use small screwdriver to remove front band from final drive rubber boot:



- If you have an aftermarket shock like an Ohlins or Works Performance then uninstall the remote reservoir:



- Remove nut from lower rear shock stud.



- Remove nut from mounting bolt at top of shock: Then remove the bolt and the shock.

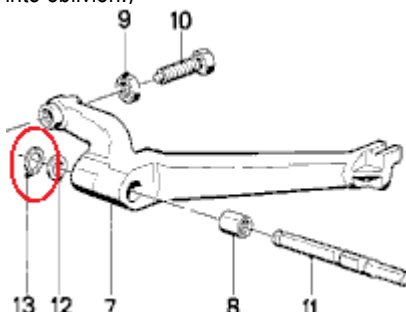


- Disconnect side stand switch connector near rear brake reservoir.
- Disconnect gear position indicator switch connector.
- Install final drive drain plug.
- Remove 2 nuts from bolts that mount paralever strut to bottom of final drive and transmission.

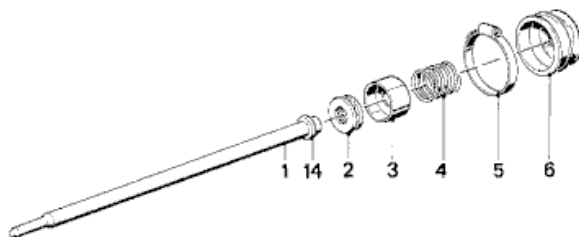
- Break final drive left pivot free. This has Loctite on it so in theory you should heat it up with a torch to burn off the Loctite but I've always just used a 12mm Allen wrench with a piece of pipe on it and that provides sufficient torque to loosen the pivot without doing that.



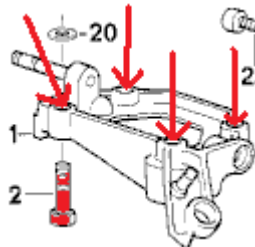
- The RS bikes have a small plastic cap in the 6mm hole in the right side final drive pivot. Pick that out. Use 27mm box wrench or crescent wrench to loosen locknut on the right side pivot. Use 6mm Allen wrench to break right side pivot free. (That's got Loctite on it too.)
Note: At this point I stopped taking pictures because my hands were getting pretty dirty.
- Sit on the floor and cradle final drive in your lap. Remove rear paralever strut bolt and pivots on both sides of final drive.
- The rear half of the drive shaft is held onto the final drive by a circlip in the splines. Use a couple of large screwdrivers in the U-joint to pop it free.
- Remove pivots for swing arm and remove swing arm.
- The front half of the drive shaft is held onto the transmission by a circlip in the splines so it needs to be popped off similar to the rear half. When removing it be careful not to push the bike forward off of the center stand.
- Optional: Remove clutch arm pivot rod and lube its needle bearings. Take the clip (13) off of the right side end of it and push the pivot rod out to the left. (Be careful when removing that clip. They like to fly off into oblivion.)



- Optional: Remove the rubber boot and throwout bearing. Inspect the boot to make sure it's in good shape and replace it if necessary. Pulling the clutch push rod out now will make it easier to get the transmission off and on.



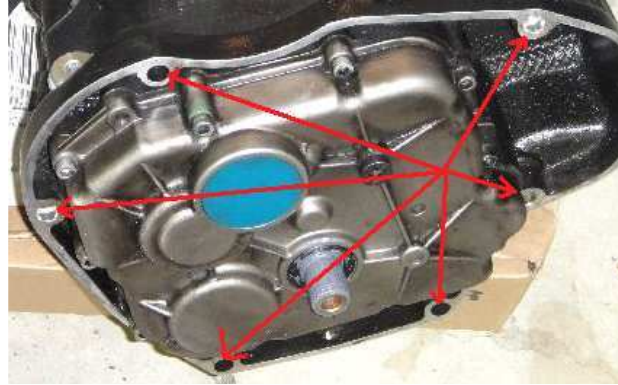
- Before elevating the bike, break (slightly loosen) the 4 8mm bolts that hold canter/side mounting bracket to underside of transmission:



- On the ABS I bikes I usually run a sawhorse through the center of the frame but that would be difficult with the ABS II control unit in the way so I remove the tail cowl and support the bike at the rear of the frame. To get the rear of the frame on the sawhorse lift the rear of the bike and have a helper slide a couple of pieces of wood between the sawhorse and the frame. You want to get at least an inch of clearance between the feet of the center stand and the ground to make it easier to remove/re-install the center/side stand assembly.



- Remove the four 8mm bolts that hold the side/center stand assembly to the bottom of the transmission.
- Remove the drain plug and drain the transmission. I usually wait until I have the center stand off because otherwise you need to use aluminum foil to keep the gear oil from dribbling down the center stand and making a mess on the floor.
- Remove 6 6mm bolts that hold transmission to bellhousing:

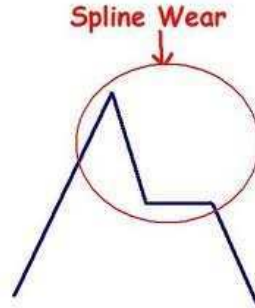


- Remove 2 8mm bolts (one on each side) that mount transmission to frame.
- The transmission weighs about 35 pounds. I usually sit under the bike, support my elbows on my knees and pull it straight back. Sometimes the transmission may be a bit stubborn and not simply pull right off. In this situation I usually use a scrap of 2x4 and a hammer and lightly tap it back on each side at the peg plate mounts:



- Clean both clutch plate and transmission input splines: For the clutch plate splines make sure that you clean towards you and not push any old lubricant out the front of those splines as it can spin off onto the clutch friction surface and cause clutch slippage.

- Inspect clutch plate splines for wear. If these splines show significant wear then consider installing a new clutch plate before putting the bike back together.



- Lube transmission input splines ONLY. Make sure that the front of the transmission input shaft does not have any lubricant on it as this can spin off onto the clutch friction surface. Don't worry about putting too much spline lubricant on. When you install the transmission it will be pushed back by the clutch plate collar and spin off harmlessly onto the inside of the bellhousing.



- Put the transmission back on, making sure that the rear of the starter is out of the way and that the outer casing lines up with the bellhousing. If it doesn't slip right back on then try turning the output shaft. If it's in 5th gear as recommended then turning the output shaft on the rear of the transmission should spin the input splines so they'll line up with the splines in the clutch plate.
 - Install 6mm bolts that hold the transmission to the bellhousing.
 - Install 2 8mm bolts that hold the transmission to the frame on each side.
 - Install the center/side stand assembly.
 - Lift the rear of the bike, have a helper remove the sawhorse and set it down on the center stand.
 - Install the front half of the drive shaft (after lubing the splines) and get it to pop onto the transmission output splines the by placing a block of wood at the rear of it and giving it a light tap with a hammer to get it back on the circlip. Also put some sort of marking on it that will be visible so you can phase the drive shaft halves properly when you put the final drive back on. Explanation of drive shaft phasing: <http://sn.im/dsphase>
- After that, putting every thing back together is simply the reverse of taking it apart with a few small exceptions

The threads of three of the final drive and swing arm pivots will have Loctite on the threads which should be cleaned off prior to reassembly. I just run them back and forth through the threads a few times to clean them off. Since the left swing arm pivot and right final drive pivot have locknuts on them I do not bother with using Loctite on those as it seems redundant to me. I also torque the heck out of the fixed pivot on the final drive so I don't think it will ever be coming loose.

- To install the swing arm pivots:
 1. Push the swing arm on over the front half of the drive shaft, pushing it forward so that its rubber boot seals to the transmission. If you pull back on it a little and then let it go then if the rubber boot is on properly it will pull the swing arm forward slightly.,
 2. Fully install the right fixed swing arm pivot first. Then look through the hole for the left swing arm pivot to line up that side of the swing arm and screw in the left pivot. Then torque it and install its locknut.
- To install the final drive:
 1. Lube the splines at the back of the rear half of the drive shaft and then use a block of wood and a hammer to pop it back onto its circlip on the final drive input splines.
 2. Support the rear of the swing arm so that it is roughly horizontal. There is a "bridge" at the bottom rear inside of the swing arm that should support the back of the front half of the drive shaft in order to simplify mating it with the splines of the rear half of the drive shaft when installing the final drive. Sometimes, with newer drive shafts, the outer part of the front half of the drive shaft is not long enough to reach the bridge. If this is the case then stuff a rag underneath the rear half of the drive shaft in order to hold it up. Then once the splines of the front and rear halves have started to mate pull the rag out.
 3. Once you have the final drive initially mounted, Tighten the left fixed swing arm until it is all of the way in.
 4. Screw the outer final drive pivot in until you feel a little resistance as it "bottoms out" on the bearing slightly.
 5. Fully tighten/torque the left final drive pivot.
 6. Torque the right final drive pivot and install its locknut.

If you don't have a torque wrench for the left swing arm pivot and right final drive pivot then you can probably get away with doing it by feel. Screw it in until it bottoms out against the bearing it is mating with and then get it pretty snug. Then back off about 20 degrees or so that it is not putting lateral pressure n the bearing.