

## K1100 ABS II K Bike Spline Lube Notes

Version 1.1 - 1/10/14

**Disclaimer:** I make no claim that anything in this document is the correct "BMW" way to do this, that it's in the correct order or that it's complete and I take no responsibility for it's contents. It's merely some pictures and notes I took when I recently spline lubed my 1994 K1100RS and I'm publishing them in the hope that others might find this information useful. If you choose to undertake this task then you do so AT YOUR OWN RISK and I take no responsibility for anything that breaks or malfunctions or if you crash your bike because you didn't put everything back together properly. Assume that this document is worth exactly what you paid for it – nothing.

Disclaimer aside, lubing the splines really isn't that difficult of a task. However, it takes a lot of time since you have to take the whole rear end of the bike apart in order to get the transmission off – and then put it all back together.

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

1. A 12mm Allen wrench (for the left final drive pivot)
2. A torque wrench capable of being set to 7.3 N-m (65 in-lbs, 5.4 ft-lbs) for the "floating" final drive and swing arm pivots (Note that you can probably "get by" without having a torque wrench. There's a note about this topic at the very end of this write-up.)
3. A 27mm box wrench or a crescent wrench that will adjust to 27mm for the lock nuts on the floating pivots
4. Drain pan for draining the final drive and transmission
5. Sawhorse to hold up the rear of the bike when the center stand is removed
6. And beer, lots and lots of beer...

**FLUIDS/LUBRICANTS:** Lubing the splines is a lot less messy if you drain the gear oil from the final drive and transmission prior to removing them. I also empty the coolant out of the coolant reservoir.

**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 molybdenum disulfide (a.k.a. "moly") to gear oil reduces friction (and thus wear) as well as improving shifting. I use Guard Dog brand moly gear oil additive. (About 3.4 oz. in the transmission and about 1.1 oz. in the final drive.)

**Spline Lubricants:** BMW recommends using their #10 grease – part number 95009000190:



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However, most BMW aficionados swear by Honda Moly 60 which can be found on The Internet or at your local Honda powersports dealer:



In order to get the moly to stick around longer you can also do a 50/50 mix of the Honda stuff with Wurth SIG 3000 which is VERY sticky stuff:



That's what I use.

Another good option that has 30% moly and is very sticky is Guard Dog GD525. And you don't need to mix it like you do with the Honda/Wurth mix:



**General grease:** You'll also 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 found a tube of water resistant grease for boat trailer bearings that I use on those.

**Coolant:** To keep it from dripping and making a mess during the spline lube task, I just empty out the coolant reservoir into a bucket. If you don't have any coolant around or don't want to bother with mixing it then you can just refill the coolant reservoir later with **distilled** water from the grocery store. (You want to use distilled water because it doesn't have impurities in it that lead to corrosion in the cooling system.)

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### All right, here we go...

Put the bike up on the center stand.

Remove the side covers.

Remove the seat: <http://www.motobrick.com/index.php/topic,530.0.html>



Remove the lower left side "Z" rack bolts(5mm) and the left peg plate bolts.(8mm)



Put the bike into 5<sup>th</sup> gear. (This makes it easier to spin the input splines and line them up by turning the output shaft when you're putting the transmission back on later.)



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Stick a scrap of 1x4 lumber between the exhaust and the clutch arm, pry up the clutch arm and release the end of the clutch cable from the clutch arm:



Then pull the rubber boot up through the hole in the transmission casing.

Remove the shift lever:



Unscrew the exhaust O2 sensor connector. (Not required on bikes in countries where they're not equipped with a catalytic converter.) Also snip the small zip tie that secures the O2 sensor wiring to the rear of the ABS control unit bracket.



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Unscrew the exhaust rear hanger bolt. (8mm)



In my case the bike has 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 might need a deep well 12mm socket for this.



Use a 4mm Allen wrench to pull the hub cap off of the rear wheel:



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Undo the 5 lug bolts that hold the rear wheel on:



Remove the drain plug from the final drive and drain the gear oil:



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





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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 decided to remove the tail cowl and support the bike from the rear.

How to remove the tail cowl: <http://www.motobrick.com/index.php/topic,386.0.html>

Remove the rear half of the rear fender. This is accomplished by removing the two 10mm hex head screws inside the fender under the tail light assembly.



Undo the two 10mm nuts for the bracket that holds the front half of the rear fender:



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Note that the coolant reservoir tabs go ABOVE the metal tabs on the frame and the black plastic spacers go BELOW them:



Empty the coolant reservoir:



Remove the right "Z" rack bolts (5mm) and the right peg plate bolts. (8mm)





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



In my case my cruise control servo unit rests under the seat so I needed to disconnect the wiring harness and vacuum hose for it:



Disconnect the Motronic control unit wiring harness connector by pushing the metal tab at the rear of it back and lifting up the rear of the connector:



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



You can now pull the Motronic to the rear and remove it:



Remove the two long Phillips machine screws that secure the battery hold down plate:





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This is a bit of a tangent but I use a thick piece of industrial rubber to make sure that the positive battery terminal can't short to the battery hold down plate:



Undo the negative battery terminal first. This avoids the risk of your tool shorting to the frame when you're removing the positive terminal. Then undo the positive battery terminal.



Remove the battery:





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Remove the two bolts (5mm) that secure the front and rear of the ABS control unit bracket:



Remove the Torx bolt from the rear side of the ABS control unit bracket. I didn't have any Torx bits available so I used Vice-Grips to remove it and then replaced with a stainless steel M6x15 buttonhead Allen bolt when I put things back together.

Push the ABS control unit towards the center of the bike and remove the two 10mm nuts that hold the ABS control unit bracket to the rubber bushing on the transmission. Then remove the other two on the right hand side of the bike.



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



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



Remove the two bolts that mount the rear of the starter to the transmission:



Note that 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.  
Also note that the left starter bolt grounds the coils and the right bolt holds two other ground ring terminals.

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Remove the center bolt (5mm) from the right swing arm pivot that secures the plastic retainer for the side stand switch wiring:



Remove the three bolts (5mm) that secure the fixed right swing arm pivot:



Remove the two small bolts that hold the alternator cover on:



Remove the two mounting bolts (8mm) for the rear brake caliper and use some string to tie it off to the frame so it's not hanging by its brake lines.



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Remove the bolt (4mm) that secures the speedometer sensor.



Using a narrow tool to lift the rear of it and your fingers on the front of it where the wire exits 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 a small regular screwdriver to remove the front band from the Final drive rubber boot:



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



Remove the nut that holds the bottom end of the shock to the final drive:



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Remove the nut from the mounting bolt at the top of the shock:



Unplug side stand switch wiring.

Unplug gear position indicator switch wiring.

Replace final drive drain plug.

Remove the nuts from the bolts where the paralever strut mounts to the final drive and transmission.

Break the final drive fixed pivot free. This has Loctite on it's threads 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 messing with the Loctite.





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The RS bikes have a small plastic cap in the 6mm hole for the right side floating final drive pivot. Pick that out.

Use a 27mm box wrench or a crescent wrench to loosen the locknut on the right side floating pivot.

Use a 6mm Allen wrench to break the 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.*

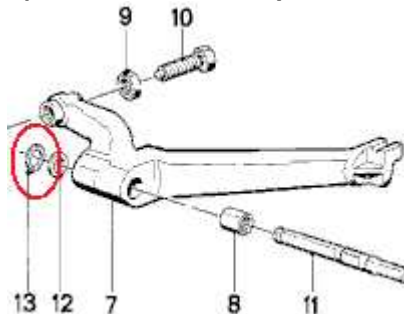
Now I sit down and cradle the final drive in my lap while I finish removing the pivot on each side and the rear paralever strut bolt so that the final drive can be removed.

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.

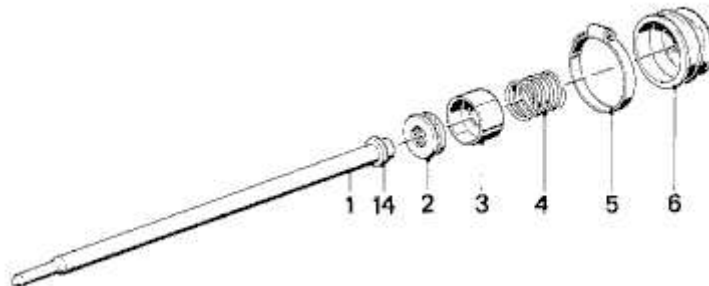
Remove the pivots for the swing arm and remove the swing arm.

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.

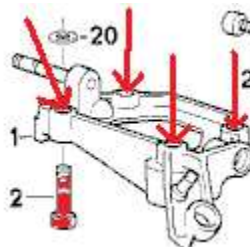
Optional: Remove the clutch arm pivot rod and lube it's needle bearings. Take the clip(13) off of the right side end of it and push the pivot rod out to the left. (Be careful when removing that clip. They like to fly off into oblivion.)



Optional: Remove the rubber boot and clutch pushrod parts. Inspect the boot to make sure it's in good shape and replace it if necessary. Pulling the clutch push rod will make it easier to get the transmission back on later after you've lubed the splines.



Before elevating the bike, since they can be tough, I break(slightly loosen) the four 8mm bolts that hold the canter/side mounting bracket to the underside of the transmission:



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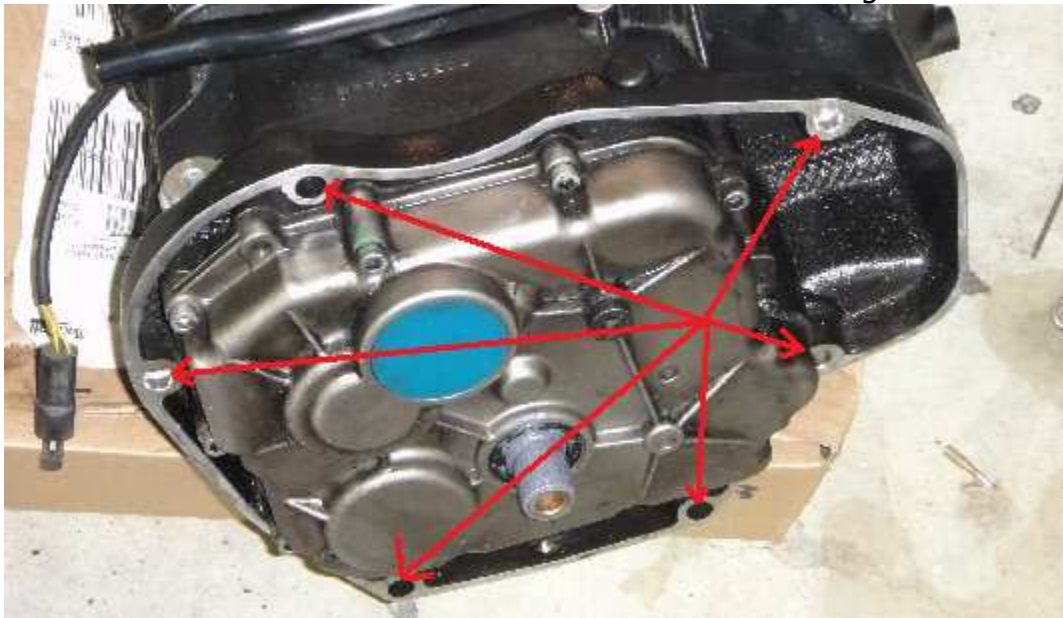
To get the rear of the frame on the sawhorse I lift the rear of the bike and have a helper slide a couple of pieces of wood between the sawhorse and the frame. You want to get at least an inch of clearance between the feet of the center stand and the ground to make it easier to remove the center stand.



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 the six 6mm bolts that hold the transmission to the bellhousing:



Remove the two 8mm bolts (one on each side) that mount the transmission to the frame.

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Now it's finally time to remove the transmission. 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 the splines: I usually use a combination of toothpicks, Q-tips and paper towels. For the clutch plate splines make sure that you clean towards you and be careful not to push any lubricant out the front of those splines as it can spin off onto the clutch friction surface.

Lube the transmission input splines ONLY. Also make sure that the front of the transmission input shaft does not have any lubricant on it as this can also spin off onto the clutch friction surface.



Don't worry about putting too much spline lubricant on. It will be pushed out of the collar on the clutch plate and spin off harmlessly onto the inside of the bellhousing.



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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.

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 5<sup>th</sup> 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.

After that, putting every thing back together is simply the reverse of taking it apart with a few small exceptions:

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.

Drive shaft phasing: <http://www.motobrick.com/index.php/topic,337.0.html>

I don't bother putting any Loctite on any of the pivots when I reassemble. The floating pivots both have locknuts so Loctite really isn't necessary in my opinion. 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.

There's a "bridge" in the swing arm that holds up the rear end of the front half of the drive shaft. You'll need to lift the rear of the front half of the drive shaft and then rotate the swing arm up for the drive shaft to clear and be supported by that bridge.

If you don't have a torque wrench for the left swing arm and right final drive pivot then screw them in until you can feel them pressing on the pivot bearings and then back off about 20 degrees before tightening the locknut.