

## Fork Disassembly Spring/Oil Change & Emulator Install

By: Simon (BRP 650 Forum)

I won't detail everything, as the Kawasaki service manual and other guides ([Lumpia](#) and [GeoffC](#)) covers this, but will add some personal observations. Also see other threads on Race Tech Emulators. Images at the bottom.

Special tools needed:

14 mm hex socket for axle - simple hex key will work, but will lack possibility for proper torquing. (Opposite end of the spark plug tool from the kit is 14 mm as well, but it's rather poor)

Break loose all necessary bolts before raising the front:

Yoke clamp bolts. Fork top plugs.

Calliper bolts. Axle clamp bolt. Front axle.

Remove fender.

Remove callipers. First press both callipers simultaneously toward the brake rotors: You may be able to squeeze the pistons back into the callipers, which will give you more room when it's time to refit callipers around the rotors. Suspend the callipers; don't let them hang by the brake lines.

Loosen axle clamp bolt and remove front wheel.

Now try to remove the fork bottom bolts (beware oil will run out if successful)... This may be tricky as bolts are to be installed using thread lock, and threads into the damper rods, that tends to turn with the bolts. Known suggestions includes: Using an impact wrench. And/or removing the bolt while the fork leg is assembled, and the spring thus pinning the damper rod somewhat. In my case the bike was sitting in the garage at near-freezing temperatures. - Don't have an impact wrench and couldn't break the bottom bolt loose, so I removed both fork legs, emptied out the oil, refit the springs and thoroughly warmed the legs on the living room radiators - then the bolts let go..!

Note: The bottom bolts has washers under them. As they might be somewhat stuck in the recess they are easily missed, so don't lose them...

The manual specifies these washers should be replaced; I didn't but annealed them best I could with a minitorch.

Loosen the remaining yoke clamp bolts - beware fork leg will drop! - and remove leg. - If you have too little ground clearance, remove the handlebar to be able to open and collapse the fork leg while removing; careful not to bend the brake line...

Remove top plugs - beware some preload is present - and empty out oil, spacer tubes, washers, fork springs, damper rods and top out springs; note that order. According to the manual there should be a "cylinder base" at the bottom of the damper rods -- I didn't see any...

Each damper rod has four compression holes at the bottom: Enlarge these to 8 mm (5/16") and add another two for a total of six holes; deburr the edges. - Do not modify the rebound holes at the top. Temporarily assemble the fork legs (don't forget the top out springs) and reinstall the bottom bolts into the damper

rods; use non-permanent thread lock.

Set the desired preload on the emulator springs - from two to four turns from relaxed is the standard recommendations from RaceTech. Remember to tighten the lock nut against the emulator base when preload has been set.

Now is the time to add fork oil and set the oil level. Remove spacer and spring from fork leg again, add fork oil and pump the leg to remove any trapped air. Use a ruler, or syringe+tube to draw off oil to desired level. This is done with the leg in vertical position and compressed, and the emulator in place on top of the damper rod (as the emulator will take up a volume and therefore raise the oil level. Spring and spacer tube must not be installed.) Oil level recommendations are around 130-140 mm below fork tube edge. Higher levels will give a stiffer fork at the end of its travel. 5 cc of oil corresponds to approx. 5 mm of oil level - in case you want to adjust the oil level later on.

Install fork legs and wheel; grease the axle. To get best alignment keep the fork fully compressed by supporting or tying up the wheel. The top edge of the fork inner tube should be flush with the surface of the yoke (some recommendations exists for 10 mm above the yoke surface). Tighten the axle a fair bit, then the four bottom yoke bolts alternately to their specified torque. Upper yoke clamp bolt should only be semi-tightened at first: Then install the fork spring, washer, spacer and top plug (to avoid binding of this). Here's your chance to adjust preload of fork. You may have replaced the springs, cut the spacer tubes shorter or similar; between the spacer tube and the top plug 36-37 mm diameter washers can be added as required to achieve desired sag. (See Sportrider and Wiki)

The manual specifies replacing the plug O-rings; didn't really see the need for that...

Finally fully torque down the top plugs, upper yoke bolts, axle and the clamp bolt.

Measure the distance from the dust seal to the bottom yoke while fork is unloaded and fully extended; this will come in handy later when you want to measure/set the sag; the actual travel of the fork etc.

Reinstall callipers and fender. Pump the front brake until its firm.



Emptying fork legs.



**Marked**

**Drilled**

Damper rods - before and after.



Emulator: - this disc lifts when front wheel takes bigger hits (high speed), at slow speed compression the oil only flows through the small hole in the disc.



Emulator: - on rebound this one-way valve allows oil through.

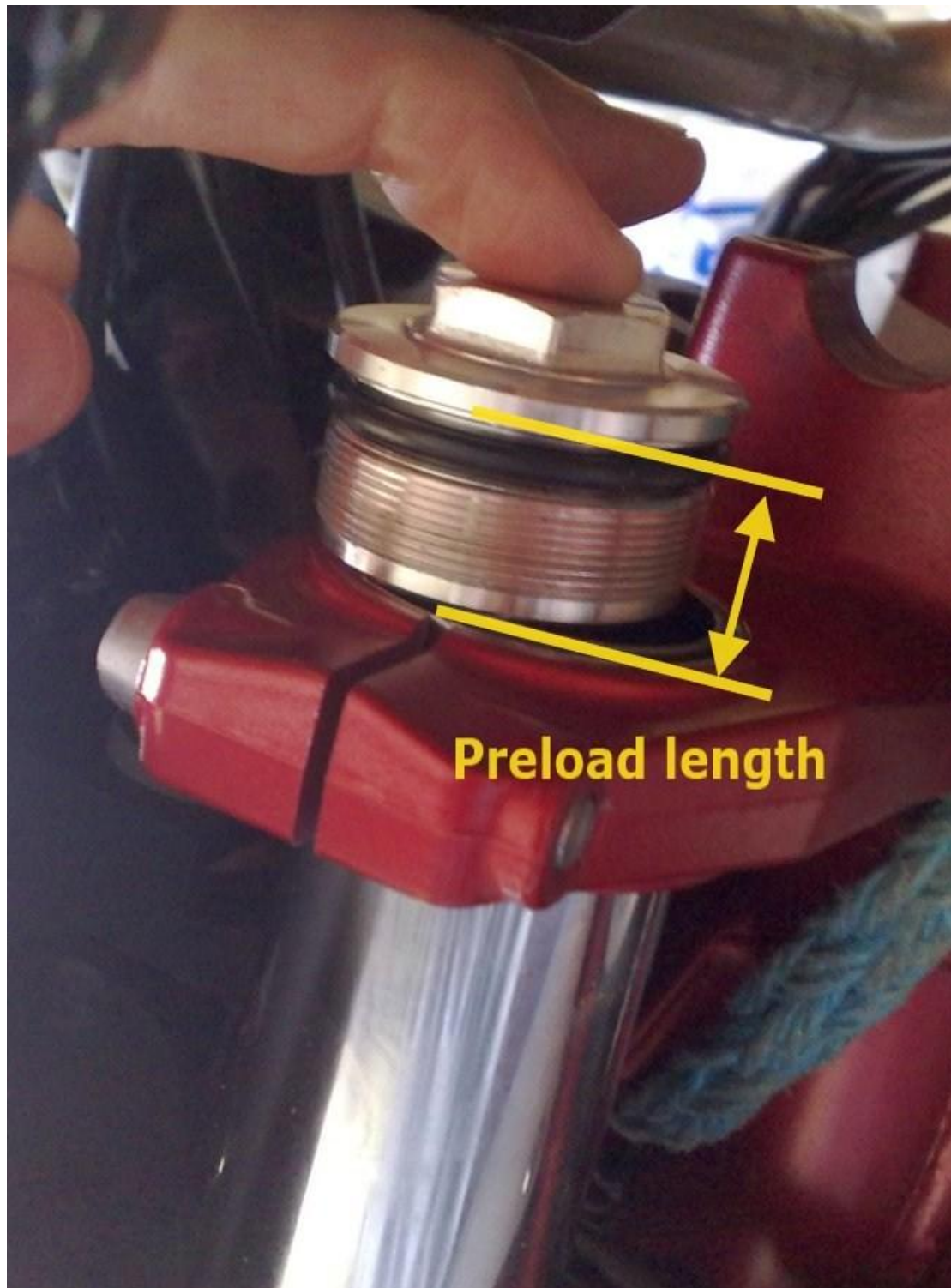


Emulator: - valve sitting on top of the damper rod.

Kawasaki Ninja 650R (ER-6F) & ER-6N Resource



Syringe with a piece of tube can be used to draw off fork oil to the desired level.



Washers can be added between spacer tube and top plug to adjust fork preload.



Most important part of the upgrade.