

How to Rebuild Showa GD 041 Forks

Copyright 2005 © Andrew Sexton

Introduction

Although the Ducati OEM and/or Haynes manuals do have sections on rebuilding the Showa forks found on the Ducati 888, various Ducati 900 SS's and various Monsters, I found the instructions to be a little lacking in helpful and clarifying information at several key points. I was left a little apprehensive about diving into the guts of the units. So, I thought it might be helpful for others contemplating a home shop-based rebuild or upgrade to have the following captured as I rebuilt mine. I decided to rebuild my forks to replace a leaking oil seal and to install upgraded parts from Race Tech.

Some Preliminary Notes:

Skill Level: I found the work to be less demanding than installing a 944 kit in my bike and about on par for technical complexity with adjusting the valve clearances on a 2V engine. If you have good, general mechanical skills and some patience, it is a relatively easy job.

Special Tools Required:

Some method of elevating the front end of the motorcycle such that the front wheel is off the ground and the front forks are suspended. There are several nice front end stands that use a lift point under the lower

tripple clamp. I decided to build a simple jack stand out of some 2x4 lumber and some simple hardware that can be found at any decent hardware store. You can see what I built for myself in Fig's 1 through 4.



Figure 1



Figure 2



Figure 3

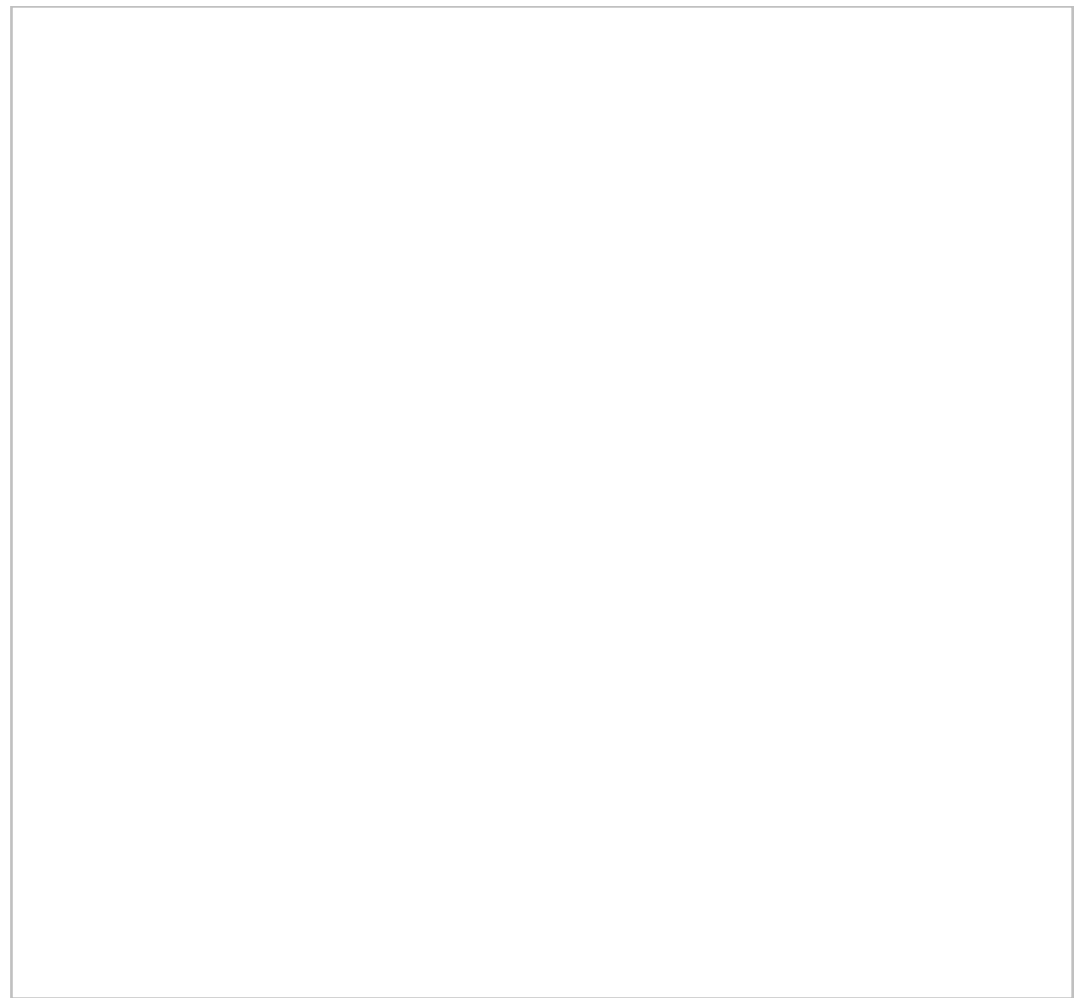


Figure 4

Note that the 3/4 inch round bar that goes through an open space just behind the steering head tube is covered with large diameter plastic tubing to protect the paint. Also, each side of the stand is equipped with an eye bolt/nut/washer that can be used to level everything as well provide a small amount of vertical adjustment. I first use my front fork stand (the kind that lifts using the pins under the front forks) to lift the bike up and then insert the homemade unit. It's turned out to be very steady.

You'll need something to help remove the upper preload/rebound valve from the damper rod. The Haynes

manual shows a way to use a cut washer to allow the damper rod to be held against the spring preload. I was looking over the Race Tech website and found a [nice compression tool](#) (about US \$130) that gave me the idea to create a homemade version out of 2x4 lumber scraps plus some simple hardware (Figures 5 and 6). The lower part of the fork leg sits at the left and the spring tube is captured by two 1/4 bolts on the right.



Figure 5



Figure 6

You'll need a special tool, Figure 7, for installing the oil seal inside the outer fork slider tube. You *might* be able to use a suitable drift to drive it home. But, you'll need to be very careful to avoid damaging the fork slider tube. My suggestion is to either buy the tool (see Chris Kelly's [website](#)) or have something made that does the same thing.

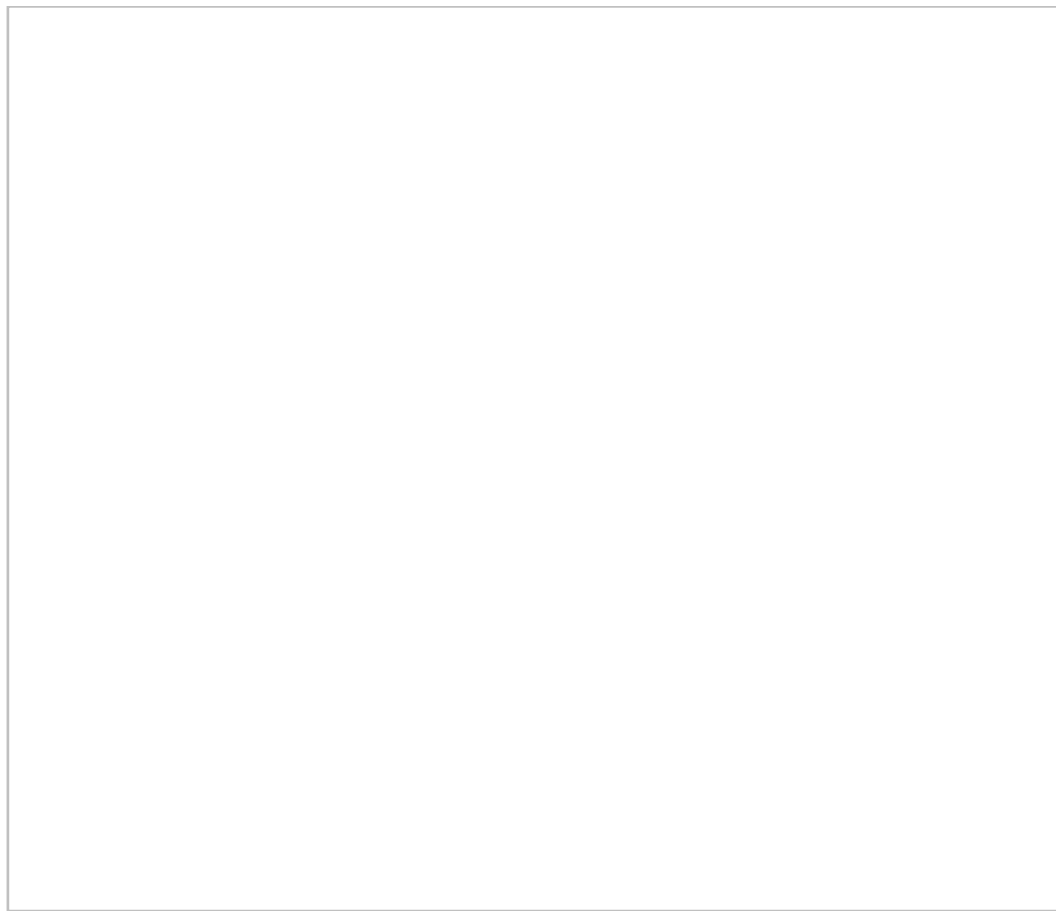


Figure 7

Other Notes:

If you're not especially good at remembering how things came apart and hence should go back together, grab some paper and pencil to take notes or grab a camera and take images.

The first set of tasks involve [1] removing the two fairing halves [if present], [2] removing the front wheel and other wise removing anything that is attached to the fork stanchion tube. You want to end up with the front of the bike suspended and the fork units hanging free and clear as shown in Figure 1.

Before removing the fork units, slightly loosen the cap at the top of the tube (Fig 8) and the allen head bolt that attaches the damper rod assembly to fork tube lower end (Fig 9, this bolt is accessed from the

bottom of the fork assembly). Once the fork assembly is removed from the tripple clamps, this is a little harder to do.



Figure 8

□
Figure 9

The next task is to remove the fork assemblies from the tripple clamps. Before doing that, measure the distance from the upper surface of the tripple clamp and the top of the fork slider tube. Write this down somewhere (I put it on a piece of masking tape and stuck that to the tripple clamp). Next, loosen the single, large bolt in the upper tripple clamp (Fig 10). Then, loosen *ONE* of the two pinch bolts in the lower tripple clamp (Fig 11). Lastly, grasp the fork assembly with one hand and then loosen the remaining lower tripple clamp pinch bolt. Most of the time there is sufficient clamping force to keep the fork assembly from dropping, but that's only most of the time.



Figure 10



Figure 11

You should now have both of the fork assemblies separate from the tripple clamps/bike (Figure 12). Next, you'll want to remove as much of the damping oil as possible. Grab an oil drain pan or something equivalent. Carefully unscrew the spring preload cap from the fork slider tube. This will allow you to push the slider tube down onto the tube. Do this slowly and tip the assembly upside down over the drain pan. Cycle the spring preload cap back and forth to pump the damping fluid out of the fork. You will be able to pour some oil out of the tube as well. It may get a bit messy, so have some towels on hand to wipe up the loose oil.

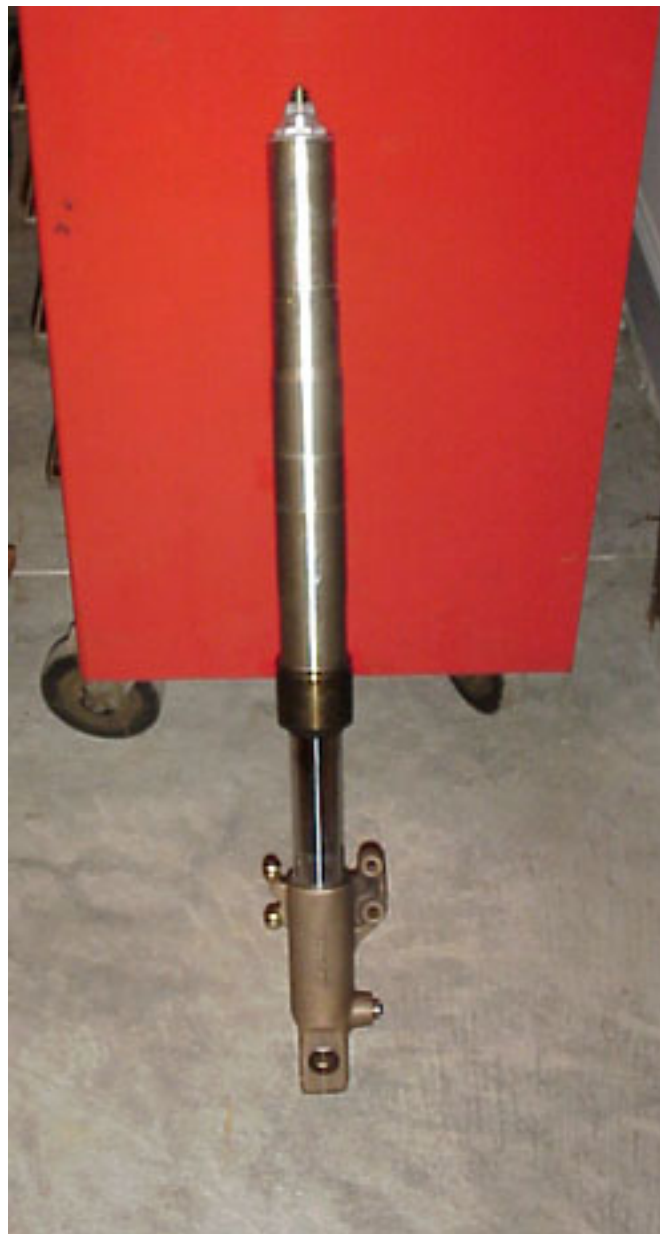


Figure 12

Next comes removal of the spring preload cap from the fork slider tube. You'll need some way to hold the spring tube spacer so as to remove tension on the damper rod nut. Either use a tool like that shown on Fig 5 or use the cut washer as shown in the Haynes manual. I'll show how it's done with my homemade jig.

A fork assembly is shown in the spring compressing jig in Fig 5 and 6 above. The 1/4 inch bolts are threaded into the two holes in the spring spacer tube. You can now slacken the jam nut on the damper rod. The spring preload cap can be removed. Depending on the spring rate of your springs, there will be some amount spring preload to control as you remove the fork assembly from the jig.

Now remove the bolt that attaches the damper to the bottom of the fork stanchion tube. Note that there is a copper sealing washer that will need to be replaced or lapped (I've found that copper washers can be re-used with good sealing properties if you take a piece of 600 grit wet/dry emery paper on some plate glass and then lap the washer using solvent so that both sides are smooth; but the new washers are cheap too).

You can now remove the damper assembly from the other end of the fork assembly. Next, carefully pry the dust seal from the slider tube; a small dull screwdriver works well here. Next, lever out the retaining clip that keeps a washer, inner oil seal and bushing in place. To remove the fork tube from the slider tube, you'll make use of the fact that the upper bushing OD is slightly larger than the lower bushing ID. Grasp the fork tube and give it a couple of good raps against the stanchion tube by withdrawing it quickly. It's easier than it may sound.

Be sure to note the relative positions of the various parts (shown below in Figures 13 and 14 for reference).



Figure 13



Figure 14

At this point, you're ready to start cleaning the parts. Mineral spirits works fine. It's a good idea to clean everything once with a given batch of the solvent and then flush it with fresh mineral spirits. I also found it to be good idea to take some paper towels and run them through the tubes much as one might clean a gun barrel.

Next comes inspection of all the parts. Carefully look over the stanchion tube for any nicks or corrosion. If present, this will need to be corrected or else the new seals will most likely fail. Small nicks can be dressed with 600 grit emery paper. Anything more will likely require something like re-chroming or TiN coating by someone like RaceTech. Look at the upper bushing for signs of odd wear (one shiny spot for example). This could be an indication that the slider tube is bent or has some type of deformation. Check everything

else for signs of anything worn or damaged.

I purchased a Gold Valve from RaceTech so it was necessary to remove the compression valve assembly from the cartridge tube (silver tube in lower right corner of Fig 14). The Gold Valves are shown in Figure 15.

□
Figure 15

Re-assembly is pretty much the reverse of the preceding, as you might expect. Cleanliness is really important. The basic steps of putting it all back together are as follows:

- Wrap some plastic or tape over the section of the stanchion tube where the upper bushing is fitted. (I simply stuck a sandwich bag over the end) This prevents the oil seal from hanging up on the sharp edges of the stanchion tube.
- Place the wiper seal, spring clip, oil seal and large washer onto the stanchion tube (in this order). The oil seal part numbers should be facing away from the slider tube.
- Install the lower bushing onto the stanchion tube (it will be loose at this point).
- Install the upper bushing onto the stanchion tube.
- Insert the stanchion tube into the slider tube.
- Slide the lower bushing and the large washer into the slider tube and use the seal driver to seat the bushing. It won't take too much force to accomplish this.
- Put a small amount of oil on the exterior surface of the oil seal to aid in installing it.
- Slide the oil seal and the washer to where they are just entering the slider tube. Use the Seal tool to drive the seal and washer into the slider tube. It's in far enough when you can see the groove for the

spring clip. Install the spring clip and outer wiper seal as shown in Figure 16.



Figure 16

- Install the fork spring and its related washers.
- Install the cartridge valve and screw in the bolt from the bottom of the stanchion tube. Tighten bolt.
- Install the compression adjuster on the exterior of the stanchion tube. Lube the o-ring to ensure it seats home OK.
- Tip the fork assembly upright and pour about 300 cc of 5W oil into it.
- Grasp the damper rod and cycle it up and down. You'll hear the oil gurgle and as you extend the rod, oil will flow out the top port. Do it slowly and it will just dribble back down into the tube. Do it fast and you'll be

wiping the ceiling - don't ask how I know this!

- You'll need to measure how far the oil is from the top of slider tube. If you're sticking to stock valving, use whatever the manual says (~150 mm). If you have a GoldValve, it will be around 130 mm. The oil level most affects rebound dampening according to RaceTech. Add/subtract oil as needed to hit the correct level.
- You can use one of the commercial kits for sucking the oil out to the right level, or simply use a tape measure and a flashlight.
- The next part is a little tricky. You need to keep the fork assembly vertical while doing it to keep the oil inside. Install the spring tube with the large plastic slider going in first.
- You'll need to compress the spring tube using whatever method you used to compress it the first time. Now put the white plastic slider on the spring tube followed by the metal washer (refer back to Figure 6).

Note: I chose to install some new higher rate springs from RaceTech and found they had a manufacturing problem. When the springs were cut to length using some type of cut off saw, part of the end of the spring collapsed slightly, reducing the effective ID. This reduction of ID caused it to hang up on the white plastic part that is attached to the center of the cartridge damper. I had to grind the inside diameter ends of the springs to make sure the ID was large enough.

- Draw out the damper rod and thread the spring preload cap onto it. Be sure the rebound valve adjuster is set for 14 clicks "in" from fully backed off. Snup the jam nut up against the spring preload cap. Also be sure to put the black rubber bottoming spacer on the cap.
- Now back off the rebound adjuster valve two clicks. This is done so that when you tighten the jam nut, you don't damage the rebound valve (see Figure 17 for illustration of what the valve looks like). Tighten the jam nut. Some folks say you should use loctite here, but I haven't seen evidence of loctite from the factory. If you use it, use the blue stuff and make sure all of the oil is removed from the threads.

□
Figure 17

- Double check that you have 14 clicks for rebound adjustment. If you don't repeat the last two steps until you do. You may need to play with backing the preload cap off a little to compensate for tightening the jam nut.
- Remove whatever you've used to compress the spring tube to give access to the damper jam nut.
- Screw the spring preload cap onto the stanchion tube (being sure to install and lube the o ring that seals this item).
- This is a good time to check if everything is working properly. Back off both the compression and rebound valve adjusters, as well as the spring preload adjuster. Place the lower end of the fork assembly on the floor and cycle the fork up and down. Try adjusting the compression and rebound valve adjusters to see if they have effect.

Note: I found that with the new RaceTech GoldValves installed, the OEM compression adjusters had relative little effect. Concerned that I had screwed something up, I called RaceTech and asked about it. They confirmed that the GoldValve design ends up reducing the OEM external compression adjuster effectiveness and it would not be effective beyond the first few clicks (from fully seated in).

Assuming everything seems to be working well, it's time to put the fork assemblies back on the bike. After getting the forks installed, be sure to step back and carefully assess if you've tightened and torqued all the fasteners that you removed/loosened in the removal phase. It's not a bad idea to simply put a wrench on everything as a final check. After installing the front wheel and axle, be sure to cycle the front end several times before clamping the pinch bolts on the right-hand stanchion tube leg.

last updated 10/14/05