

Tune it Yourself

From the ST1100 Newsletter



By W. Grant Norman

I recently decided to have valves once again adjusted by one of our local Honda motorcycle dealers, not! No, this time I'd do it myself - after all, I had the shop manual, a reasonable amount of intelligence, and figured it couldn't take more than a couple hours. Actually, "weeks" would have been better than hours.

In the end, it was a highly educational, and quite enjoyable task, and I did relish the thrill of pushing the starter button after I was done and wondering if my ST1100 would go super-nova. Alas, it worked. In fact, it worked quite well, and it should have since I did the entire operation twice.

First, a brief explanation of why I chose *not* to have a local Honda dealer do the job: I have never felt entirely comfortable with any of the dealers in the Houston area working on my motorcycles. I do believe they attempt to do a decent job, but for some reason, I've never felt they could accomplish it.

When I started to remove the cams on the ST engine, I found the reasons for my long-time suspicion. Three of the bolts through the cam holder had stripped their threads in the aluminum head. A fourth bolt was also stripped and was coated with an 1/8" layer of lock tight! My suspicions were correct! Gorillas had been under the valve cover: and I'd been whining this motor out to red line and up to speeds of 120 mph, all with loose and stripped cam bolts!

So much for depending on the dealer. Had I only used one dealer for valve adjustments, believe me, I would have gone down there and immediately demanded new heads for the bike but alas, then I would have had to let *them* install them, and *that* would have been too frightening to think of!

Myself, I am NOT a mechanic. I have done quite a few different minor mechanical tasks on my bikes and cars, but usually nothing more than change the oil, filters, and plugs. My brother was always the family mechanic (over 20 years professionally). Also, I can do brake pads, but my brother had to bail me out when I tried to rebuild the brake cylinders on my Suzuki GS850. But for the most part, I can get the job done, and usually better than most of the local Honda *experts*.

Some things I learned to do *before* tearing down ST and removing the cams:

1. Make certain you have a reliable torque wrench. The cam holder bolts can not take over tightening. They must be tightened only to 9-foot pounds on re-assembly.

2. Buy some molybdenum grease for reassembly of cams.

3. If a previous valve adjuster was a gorilla and stripped the threads on any of your cam holder bolts, use a Size M6 X 1, Part No. 5546-6 Helicoil kit to insert new threads. You will need to make about a half inch long tube from a pen to fit inside the counter sunk hole on the outer cam holder bolt-holes to guide the coil to where the threads would start. Also, before drilling or tapping new holes, measure the hole depth with a screw driver and put tape around your drill bit and/or tap to prevent going too deep.



4. Locate various size shims at a Honda dealer. I found a dealer up near Dallas had every single size in stock, while the ones in Houston only had a few of the different sizes. The manual says the shims are available in 65 different sizes from 120–280 (1.2mm – 2.8mm). I found the range I needed was from 195–210. They sold from a range of \$4.25 – \$6.25 each. I found one dealer that would trade me shims when I asked the service manager.

5. The calculations for figuring the new shim thicknesses are relatively simple, but since it involves 16 different valves and shims, I didn't trust myself to calculate properly each time. Therefore, I wrote a simple computer program to calculate the proper thickness for me.

6. Make yourself a chart **before** you remove the cams, lifters, and shims. Then you can place the proper parts on the chart for easy reassembly. **When you are through with the adjustment, copy down the shim sizes. Installed in each valve, you can then next time you adjust them, you can buy all the shims in advance before taking off the cam and looking at the shim size stamped on it.**

7. The STI 100 Honda service manual is accurate and gives good step by step instructions for this procedure, however, it does not show you that the **two bolts on the inner side of the longer cam holders are about 1/2 inch shorter than the other bolts.**

This is where some mechanic had stripped the threads of my cylinder head by putting these bolts in the outer 2 holes of the longer cam holders. The small end cam holders have the longer bolts in both the inner and the outer holes.

When you do your valve measurements, make sure you have a good feeler gauge and that the engine is cold. I feel it needs to sit at least 3- 4 hours, if not overnight. Remove the spark plugs to make the engine easy to turn by hand.

Sighting up accurately on the timing marks (located under a cover under the radiator) is not really easy. You must try and get your head down at an angle where the front tire is. I found it better to use those T1 and T4 marks for a good approximation but used a long screwdriver in the spark plug hole and get a mechanical top–dead–center by watching the screwdriver come to its highest point then stop. After which, I would check the cam index lines, located on the center of the gear end of the cams to check their alignment with the

edge of the head case. Also, I only removed one cam at a time. Even though the cams are well marked, this was a precaution I took that made it easy to reassemble.

Lastly, MAKE SURE you USE A TORQUE WRENCH TO TIGHTEN THE CAM HOLDER BOLTS! I cannot stress this enough because I spent at least 4 hours tracking down tools and repairing stripped threads. If the mechanics had been a little more careful on this procedure, it would have saved me a lot of time.

Observations

Measure, and measure again. I measured all clearances once, wrote them down, then measured them again, wrote them down on a separate piece of paper, then compared the two measurements. Where they were different, I measured a third, sometimes a fourth time. (I found that the intake valve measurements were always easy, but the exhaust valves, the pressure of the gauge could push down the lifter some, giving a false reading if using too thick of a gauge)

It is easy (at least it was for me) to sometimes get the exhaust valves and the intake valves measurement mixed up. They have different valve lash specifications so make certain you are on the right valve. The first reading I took on cylinder #1 1 put down as okay, only later to find out that yes, the exhaust valves were in spec for intake valve specifications and vice versa.

If you must repair the threads from a gorilla (even if you were the gorilla - yes, I was on one bolt) use a rag stuffed around the hole to catch any aluminum shavings that might want to get in the engine. Also, I have a little shop vac with a crevice tool and I stopped and vacuumed the hole frequently as I drilled and ran the vacuum continuously on the hole while backing out the tap. No aluminum scrap in the motor.

I hope you find this information useful. Much of it is true for any valve adjustment. I do hope that any of you real super mechanical types that read this will immediately comment if there is anything I've said in error, after all, I am not a mechanic, just a concerned rider who wanted to make sure my ST1100 was tuned properly.