

# Valve Adjustment Notes



## 1995-1196 Kawasaki GPZ 1100 Valve Adjustment Notes



### Introduction & Disclaimer:

This document is meant as a personal opinion. Your results may vary and you are totally responsible for your own actions. Wow, what a concept! Enough of the legal smeagle. A few of the smaller steps might be left out so that this document isn't 100 pages long. I've got to assume a few things (danger, danger Will Robinson!). (Watch for typos, etc.!)

### Tools, Supplies & Time Needed:

The normal assortment of tools is needed. Box end, crescent, socket wrenches, along with the usual stuff. You will also need feeler gauges for the valve measurement that are metric. Avoid the SAE (inch) variety as you will be constantly calculation the metric conversion and if you lubricate the adjustment process with a few beers, you can easily mislead yourself to the wrong measurement. Never happened to me, you understand. Just hearsay from other fellow GPZ owners.

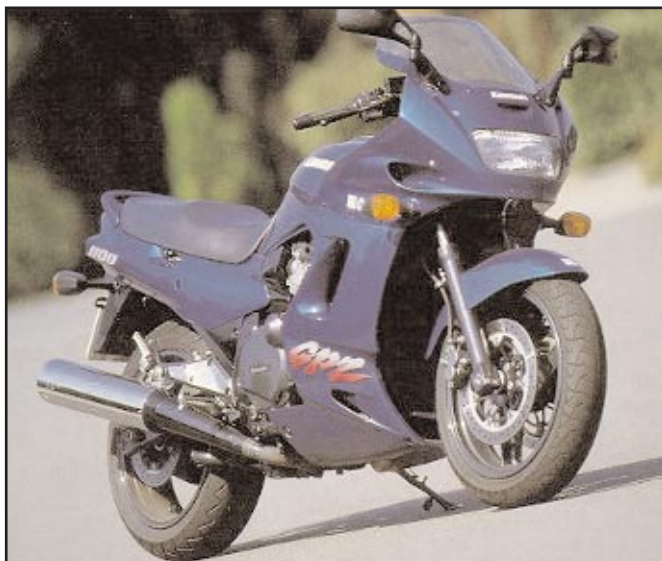
You will also probably need valve shims for changing the valve adjustment. You can get the correct ones at your local or not-so-local Kawa dealer. I'll get into that more later.

Some valve cover gasket sealer is necessary, e.g. the sillycone variety will do. Might as well change the plugs while you're at it, but I must say that every time I did it the plugs looked great. So, unless you haven't changed them in 40,000 miles, this step is probably optional.

One invaluable tool will be a flexible shaft with a magnet on the end for retrieving valve shims that have escaped your grasp. It could save you hours and a lot of gray hairs. A little bit of heavy grease of some kind is handy, nothing special. It's used to hold the shim on your finger tip. More later. A very skinny flat blade screwdriver and a pair of needle nose pliers will make like easier also.

The first brain wave about doing this little job on the GPZ is to not be rushed. If you have done valves before on other bikes, leave yourself a half a day. This will include running to the dealer for shims. If you have never done valves before, leave yourself a full day for messing around, rereading the instructions a few times,





double checking stuff and general confusion. If you are a real whiz you can probably do this in two hours with shims on hand. I get distracted easily, girls going by on bicycles, running out of beer, finding a good radio station, so it usually takes me half a day.

### **Working Smart:**

Do only what's needed and do it well. The shop manual will have you removing the lower fairing, draining the cooling system, and taking off the whole ignition cover on the left side. Those Japanese, such comedians. That stuff not needed. Believe me, you can do this easily without doing any of that. I have witnesses.

Second item on working smart, always use the right tool and never force anything. Even if you have to pound on something, I'll show you how to do it "intelligently and with respect" for the GPZ.

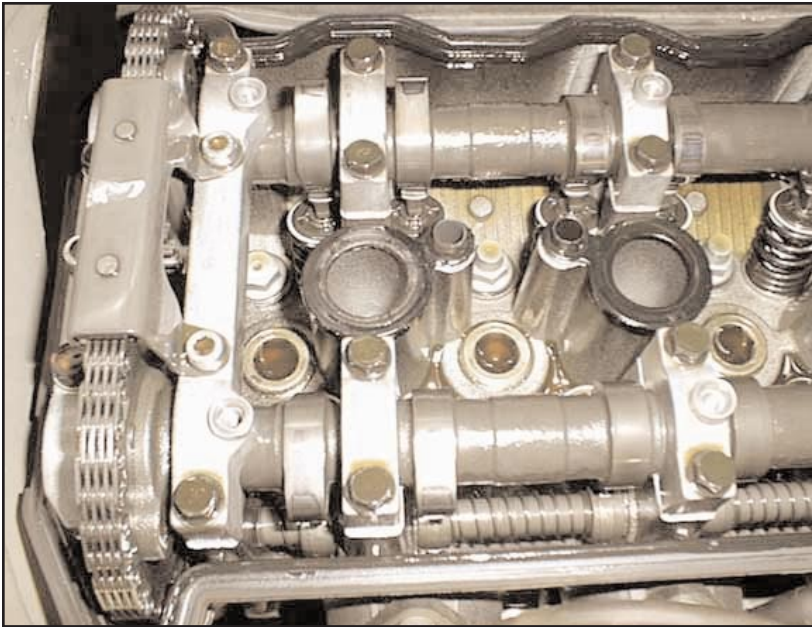
When you get to measuring and writing down the valve clearances, don't let anyone interrupt your focus. Same goes for calculating what new shim size you may need. This is critical and is not the time to stop and take the kids to the soccer practice.

### **Steps to Adjusting Valves:**

1. Remove the tank. Oops, wait, remove the seat first, remove the side cover screws and flex the side covers away from the tank. Make sure the tank petcock is NOT on Prime or you will have a flood. Hopefully you have been smart and have used up most of the gas in the tank before this surgery. A full tank is heavier than my first wife and just as difficult to move across the room. Smells almost as bad too. Tank has hoses at the back end, different number for California and other states. The best thing is to mark their location with masking tape. Sure, you can remember which goes where. Sure you can. Forget it, mark them. Remove the petcock hose. There may be a little dribble, so be prepared. My hose dribbles, doesn't yours? Disconnect the fuel level sensor lead connector from the bottom of the tank.

2. There is a black plastic air damn that butts up against the front of the cylinder block, just touching it at the seam between the valve cover and the cylinder block. Clean the crud off the top of this air damn and then gently, at the valve cover, push the damn downwards until it is below the line of the valve cover gasket  
3. Remove the spark plug wires from the plugs. Loosen all the valve cover bolts and gently tap





### Getting the Right Top Dead Center

*This is how your engine works.*

*The piston is at the top of its stroke. The spark plug fires. Both valves are closed the combustion forces the piston down. As it reaches the bottom of its stroke the exhaust valve opens. The piston comes up to push the gases out the exhaust. This is the "exhaust stroke". As the piston reaches Top Dead Center the exhaust valve may still be open. As the piston starts down the exhaust valve closes and the intake valve opens sucking in new fuel. As the piston reaches the bottom the intake valve closes and the piston rises on the compression stroke. When it reaches the top, it is now Top Dead Center on the Compression Stroke. This TDC is where you set your valves.*

### Short Cuts for TDC and Setting the Valves

*Engines being what they are, when you have the engine in the right position to set one set of valves, other valves are also positioned to set.*

*Position #4 piston on TDC of the compression stroke. Set the intake and exhaust on #4, BUT also the intake of #2 and the exhaust on #3.*

*Position #1 piston on TDC of the compression stroke. Set the intake and exhaust on #1, BUT also the intake of #3 and the exhaust on #2.*

*Exhaust clearances: from 0.18 to 0.23 mm*

*Intake clearances: from 0.13 to 0.18 mm*

### TAKE NOTES!!!

*Take a piece of paper and draw a grid on it that represents all your valves. Remember, two intakes and two exhaust per cylinder. Then when you are measuring the valve clearance, write down each measurement on your grid.*

the cover with a rubber mallet or use the wood end of one hammer against the valve cover and use another hammer for tapping.

4. The valve cover will come loose and you can remove it from the right side. Or is it the left, oh well, one side will look easier than the other. Getting it over the cam chain sprockets are what slow you down a bit. You will have to remove some hoses from the top of the valve cover. Those strange square things that bolt to the top are the air suction valves. Don't worry, you can't hurt them.

5. The key to adjusting the valves is having the engine turned over to the right position. To do this: remove the spark plugs, remove the inspection cover on the left side of the engine so you can see the timing marks. It's the little quarter sized cover that you can remove with....a quarter (if you are very strong). With the bike on the center stand (oops, forgot to tell you that) you can put the engine in second or third gear and then turn over the engine by using your hand to rotate the rear wheel. There's a lot of mass to move so you actually kind of bump the engine around its rotation. Inside the little inspection cover you will see timing marks rotate by. T 1.4 means Top Dead Center for cylinder #1 and #4. T2.3 is the same for the others. Your pistons are numbered with #1 starting on the left side. BUT there are two Top Dead Centers for any cylinder. See the side note.

6. Once you put the engine in the correct position to check the valves, start measuring. The easy way is to use the "go-no go" method with the feeler gauge. The reason for this is not everyone knows how much drag a rocker arm should have on a shim. So try the correct feeler gauge. If it goes in real easy, try the next larger. If it goes in and drags as you pull it out, it's correct. If it won't go in but the smaller gauge seems like it pulls out real easy then your valve is between those two sizes. One will Go and the other size No Go. Write down all your measurements before doing anything else.

7. A couple of words of caution. When removing or installing shims, stuff a rag down the cam chain tunnel. Make sure it is completely sealed off. If you drop a shim....no, I mean, when you drop a shim they gravitate either toward that tunnel or, now listen up, to the front side of the base of the valve spring. An almost impossible position to retrieve it from. This is why you need a magnet on a flexible shaft. Again, I'm only guessing that this could happen. Don't try to turn the cam shafts with the rag stuffed in there and don't forget to pull it out before you put the valve cover on. No, I know you won't forget.





### Swapping Shim Sizes

Once you have mapped out all your clearances and know which ones are out of spec, you need to remove the out of spec shims and see what shim sizes they are. You may find that you can swap some shims between one valve and another and not need to buy any new shims.

Some dealers will allow you to bring in your old shim and swap it for another of the needed size for free. Other dealers are not so gracious and will charge you approximately \$7 per shim.

Being the really anal type, on the first valve adjustment I removed all shims one at a time and recorded what size each was. Knowing this at the second valve adjustment, I was able to swap all kinds of shims around to get the clearances where I wanted them. Also it helps you to track wear to see if a particular valve is wearing unusually fast. Probably not necessary, but heck, gotta have some fun somewhere.

### Shim Sizes

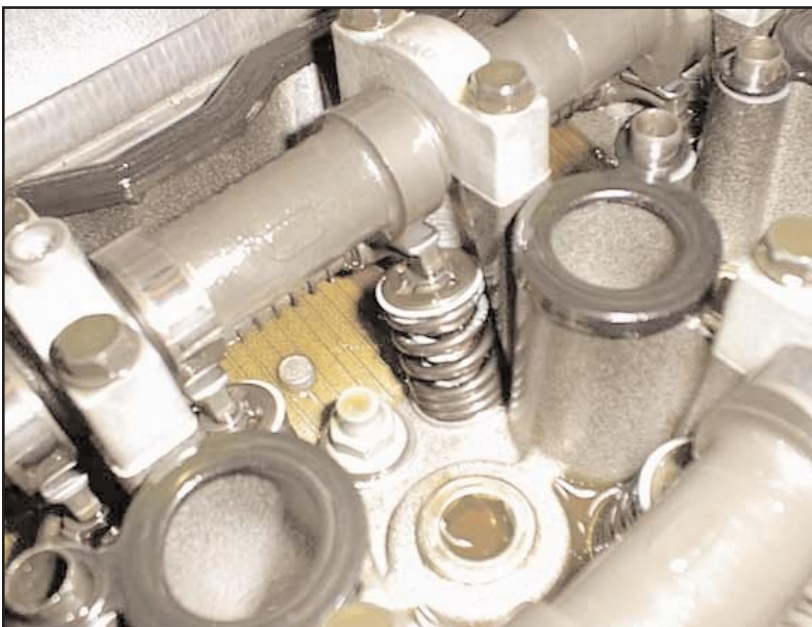
Shims are marked with their size. 65 means the shim is 2.65 mm thick. The shims come in 0.05mm increments. If you have too little clearance then you will need a thinner shim size, perhaps a 60 or 55.

For example:

You measure your exhaust valve and it's tight, let's say 0.16 and the shim is 65. Then if you went to the 60 shim you would add 0.05mm to the gap and get  $0.05 + 0.16 = 0.21$  which would put you in the correct range. If you are on the edge of being inside or outside of the correct range, or towards being inside the range at the loose end, e.g. .23 end of the .18-.23 range. The valves may be slightly noisier at the loose end of the range, especially when the engine is cold but they quiet down when it warms up.

Exhaust clearances: from 0.18 to 0.23 mm

Intake clearances: from 0.13 to 0.18 mm



8. Most shims come out easily but some require the urging of a small narrow flat blade screw driver. You have to pull the rocker arm sideways and hold it there while you pull the shim or hold it there with something. Sometimes you can rest the rocker against the top of the valve spring. Putting the shims back in usually works with a small dab of grease on your finger tip and stick the shim to your finger and then put in place. Some shim insist on going into their little place cock eyed. So make sure they are seated squarely in their place.

9. When getting ready to put the valve cover back on, clean the valve cover gasket surfaces and try to strip off all of the sealer on the valve cover gasket and especially the valve cover which has a sealing groove in the edge of the cover. Apply some new silicone sealer to the gasket. Just a little will do. All the valve cover bolts and air suction bolts torque to 87 inch-lb or about 7.25 foot-lb. It's not much so don't over do it. There's no real force on these components so the torques are not critical.