

XJ Tip - Wire Tie Valve Tool

Adjusting the valves on Yamaha XJ motorcycles from the Early 1980s requires changing out valve shims. The valve cover is removed by loosening a series of allen bolts on the cover and then the gap between the short dimension of the cam and the valve is measured with a feeler gage.

Instead of the cam pressing directly on the valve lifter/bucket, there is a shim, approximately 2-3 mm thick which lies in a depression on the lifter/bucket. By measuring the relief between the cam and the shim, and then removing the shim to determine its thickness, a replacement shim can be obtained so that the valve clearance is within tolerances.

The valve shims are marked on the surface which does not come into contact with the rotating cam, with a number between Y200 and Y300 in increments of 5s. This is code for the thickness. For example a 2.70 mm shim is marked as Y270.

In order to remove the shim, it is necessary to hold the lifter/bucket away from the cam, so that the shim can be worked out of its retaining ring in the top of the lifter/bucket. The book solution for this is to install a special Yamaha tool while the lifter/bucket is depressed by the cam and then rotating the cam out of the way.

In reading some ideas about maintaining my 1982 XJ550 Maxim, I read a few hints about using several thickness of a plastic wire tie instead of the special Yamaha tool. However I found no detailed instructions on the use of such a tool. After experimenting on my own, I have used such a tool to change out two of the shims on my bike. I took pictures during the process, and offer them as further ideas on how such a tool can be used.

Proceed at your own risk. This tool seems to have worked very well for my purpose, but I do not know if there will be any long term effects from using such a tool.

The theory of the tool is that if a piece of soft plastic can be wedged between the valve and its seat inside the cylinder, this will keep the valve from seating and there will be extra space between the cam and the lifter. This space can be used to advantage in removing a shim.

The following series of pictures all involve removing the exhaust valve shim in cylinder #4, the rightmost cylinder, on an 82 XJ550.



Right Side of XJ550 Engine
Front is to the right

In the center of the picture above, is the spark plug wire for the 4th Cylinder. Before proceeding with this adjustment, it is necessary to:

- Remove the gas tank
- Remove the horn from above the valve cover
- Take the spark plug boots off the plugs and move the ignition wires so they do not block removal upward of the valve cover.

- Move the electronic package which hangs directly above the valve cover
- Loosen the 8 allen head bolts along the outer edges of the valve cover (They remain in the valve cover but need to be loose enough that they no longer are connected to the engine)
- Remove the 4 allen head bolts in the valve cover near the central "fin" of the valve cover. This fin covers the cam chain.
- Remove the valve cover by lifting up and then to the right. Take care not to break the two plastic tabs on the end of the valve cover.
- Remove the four screws from the left side round (YCIS labeled) ignition cover
- Remove the four spark plugs

A wrench can now be used to turn the engine with the square bolt in the center of the ignition plate. It turns more easily counter clockwise. Assuming the exhaust valve shim of #4 cylinder needs to be examined, the next step is to turn the engine until the cam lobe over the valve depresses the lifter to its maximum extent.

Note: The exhaust valve lifters/buckets are toward the front of the bike. The intake valve lifters/buckets are toward the back of the bike. If one has any confusion about this, there is a stamped marking on the cam clamp stamped E and I for the appropriate set of valve lifters/buckets.



Spark plug removed from Cylinder #4
The front of the bike is to the right
A plastic wire tie has been folded in half and then
the final half inch has been partially folded to make an angle.

The way I made the wire tie tool was to fold a long wire tie so that a portion several inches long is folded over and crimped with a pair of pliers. Then the last half inch is bent again. This is because it will be necessary to insert the wire tie into the spark plug hole and slide it along the roof of the cylinder.



Inside the spark plug hole, the edge of the valve is visible with a bright light.

With the cam holding the lifter/bucket down, the valve is open in the cylinder. With a bright light, the edge of the valve can be clearly seen inside the spark plug hole. The next step is to feed the bent wire tie at a 45 degree angle from the vertical, directly toward the valve. I can feel the plastic tie enter the valve opening when I have inserted it 1/2 to 3/4 inch. It is stable in this position.



Wire tie has been inserted under the valve and slipped by feel into the space outside the cylinder.

Once the tie is in position, the motor is then rotated so that the cam is no longer holding the lifter/bucket down. There is now a very large space between the lifter/bucket and the cam.



The cam is rotated away from the lifter/bucket which is just visible as a circle to the left and below the cam.

From this position, it is possible to remove the shim. I rotate the lifter until the small slot is easy to access - to the left in this example. It then takes some worrying of the shim disk and its lifter to remove the shim from its seat. (I found that when I pried the disk out of the lifter/bucket with the jeweler's screwdriver, it would jam about half way out. I press down on the lifter/bucket with the pointy end of a hemostat and rock it back and forth. Then I press it back into the lifter/bucket. Then I try prying it up again. After doing this a half dozen times, the shim pops out.) When the shim comes out of its socket, I lift it out of the space between the cam and the lifter using the hemostat.

The shim can be examined to determine its markings. The markings should be on the back side, away from the cam. After the same shim or a different shim is replaced into the depression in the lifter/bucket, the cam is carefully rotated to seat the shim. While the lifter is depressed by the cam, the wire tie can be easily removed from under the valve.

Now, doesn't that sound easier than installing a tool to hold the lifter/bucket down? Also, there is no risk of cracking the head by rotating the cam the wrong way and jamming the tool with the cam.

Shim Pool

It is worth knowing that there are presently (2006) two "shim pools" available on the XJ Owner's mailing list. In these pools, the owner forwards a payment to the shim pool and receives the needed shims. The owner then forwards shims back to the shim pool coordinator who returns the payment for the shims.

Shims are one of the great reusable resources in motorcycle maintenance.

Rick
82 Yamaha XJ550 Maxim
82 Suzuki CS450

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