

Table of Contents

EVO: Engine Mechanicals - Sub-04L	1
Stabilizing Noisy Rocker Arm Shafts	1
<i>Rocker Lockers</i>	3
Using the Teflon Installation Tool	3
Installing the 86-06 Kit	4
<i>ROCKOUT Rocker Shaft Inserts</i>	6

[Go To Technical Menu](#)

EVO: Engine Mechanicals - Sub-04L

Stabilizing Noisy Rocker Arm Shafts

This is to address the ticking / tapping noise in the rocker box area due to back and forth movement of the rocker arm shafts.

Some people rather like the noise and others don't.

This condition can make one think that the lifters are having problems instead but it causes no harm other than the ticking sound.

You can inspect the shafts during operation to see if this is happening to your shafts.

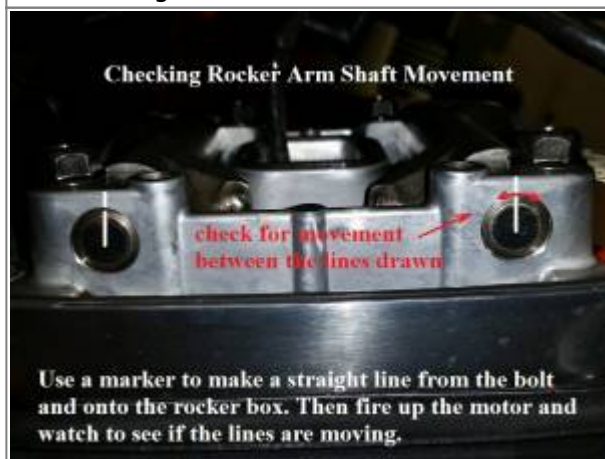
Remove the top (and middle if applicable) rocker box cover. Clean the area around the shaft ends and lower rocker box on one side of the cylinder.

Draw a straight line with a marker across the shaft end and onto the rocker box.

Start the engine and watch the area of the line between the shaft and rocker box.

If the shaft is turning, you'll see back and forth movement of the straight line on the shaft.

Checking rocker arm shaft movement ¹⁾



At this [LINK](#) there are two videos.

The first one has a before and after, beginning at about the 2 minute mark.

The second one has a before right at the beginning of the video.

The shafts have a notch in them that the bolt is supposed to butt up against which locks the rocker arm shafts in place.

However, the bolt hole is too large which leaves a gap there.

This gap allows the shaft to slightly rotate and hit the bolt which causes an annoying ticking / tapping noise.

Rocker box mounting hole going through shaft hole. ²⁾Aligning rocker arm shaft. ³⁾

Aftermarket rocker bolt spacers are made to close the gap between the bolts and the shafts.

It's important to note that no engine needs these. ⁴⁾

There is nothing detrimental to the engine when it is ticking because of the rocker shafts banging into the bolts.

The only reason they would be “needed” is if the ticking bothers the owner of the bike.

Two bushings, or spacers, are used for each rocker box.

They are installed into the rocker box to head mounting holes on the pushrod side next to the rocker arms.

There are no provisions from the MoCo for this gap to be used for oiling or to control heat.

It's a closed gap inside the lower rocker arm bore.

Oiling and heat control is handled through the clearance between the shaft and the arm bushings.

And also through a hole in the (exhaust only) rocker arm shaft on the exhaust side behind the shaft bushing.

The issue of the noise could be easily fixed at the factory with shoulder bolts. ⁵⁾

In fact, each of us could fix it with shoulder bolts. But those are more costly than the bolt spacers.

Experiments were done with bolts that had larger (precisely machined) shoulders.

These kept the rocker shafts from clanking back and forth against the bolts.

However, there were two issues:

1. The precision shouldered bolts are more expensive to machine than the bolt spacers.
2. In very much of what HD does, they use very loose tolerances.

Not because they are needed, simply because it is easier and less expensive.

This is not just in the engine, but on the frame also.

Most of the time when using the machined bolts (instead of rocker bolt spacers) everything worked fine.

⁶⁾

However, a small percentage of the time, when there was not any play between the diameter of the bolt and the diameter of the bolt hole,

We were unable to get the rocker box sitting exactly where it should.

The rocker bolt spacers take into account the cascading effect of loose HD tolerances.

Rocker Lockers

Rocker Lockers eliminate the gap between the rocker mounting bolt and the slot in the rocker arm shaft. They are available at [DKCustoms](#). This locks the shaft from turning and striking the bolt and eliminates the ticking noise.

They also center the rocker plate so that it is always located in the same position.

This helps to eliminate different wear patterns on the rocker arm/valve and a better alignment of the pushrod in the holes.

The Rocker Lockers are tapered so that they lock themselves in and wedge the bolt/shaft in place.

Note:

Rocker Lockers will not quiet noisy lifters, noisy chains, gears, tensioners or bearings.

If you ever need to remove the lockers, just use a punch and tap them out, they are usually reusable.

- The 86-06 Sportster kit includes: ⁷⁾
 - (4) Brass tapered bushings
 - (1) Bolt, Washer & Nut for installation
 - (1) Teflon centering tool
 - Step-by-step installation instructions



- The 07 and Up Sportster kit includes: ⁹⁾
 - (4) Brass tapered bushings
 - (1) Washer & Nut for installation
 - (1) Teflon centering tool
 - Step-by-step installation instructions

Using the Teflon Installation Tool

- Use the Teflon tool supplied with the kit to vertically center and align the slot in the shaft.
 - The tool will straighten it on the way out the bottom.
 - The shaft would need to be able to spin by itself inside the bore while pushing the tool in so the tool could align the slot.



Installing the 86-06 Kit

- The tapered end of each bushing goes in first.
- The tapered side is fairly easy to find.
 - The wider end will not go into the hole.
 - And the tapered end easily slips into the hole with a light pressure applied.
- The non-tapered end won't go in the hole. ¹⁰⁾



- Then the bolt is installed in the top with the washer and nut on the bottom.
- Tighten the nut / bolt until the bushing pulls in flush at the top.
- It should pull in with minimum force applied. then remove the installation bolt.
- If you turn the nut and hold the bolt end still, this will pull the bushing in instead of turning it into the hole. ¹¹⁾



- Check fitment of the regular rocker box mounting bolt to ensure it goes into the bushing and rotates freely.
- Then repeat for the other side.
- Inspect and make sure you can't see the shaft through the hole.
- Insert the Teflon tool for verification of shaft alignment. ¹²⁾



- Then pull the bushing in with the installation bolt.
- Now you have both Rocker Lockers installed and ready to bolt back to the heads. ¹³⁾



ROCKOUT Rocker Shaft Inserts

ROCKOUTs also eliminate the gap between the rocker mounting bolt and the slot in the rocker arm shaft. They are available on Amazon, Ebay, and directly from [Rockout.biz](https://www.rockout.biz). Installation instructions are also online at [Rockout.biz](https://www.rockout.biz).

The rocking / sliding action of the loose shafts hit the bolts so hard it can leave dents in the shafts. ¹⁴⁾

Go To Technical Menu

1)

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2) 3) 8)

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4) 5) 6)

DK Custom of the XLFORUM

<https://www.xlforum.net/forum/vendors/dk-custom-products/180112-rocker-lockers-quiet-down-annoying-top-end-ticking/page5?t=1935736&page=5>

7)

<http://www.dkcustomproducts.com/86-06-sportster-rocker-lockers-reduce-top-end-ticking-noise-dk-rl-spt-8606.htm>

9)

<http://www.dkcustomproducts.com/sportster-rocker-lockers-reduce-top-end-ticking-noise-dk-rl-spt.htm>

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<https://www.rockout.biz/>

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