4g63 Solid Lash Adjuster Theory

Since late 1999 we have been developing, testing, revising, more testing, and manufacturing solid lash adjuster technology for the Mitsubishi 4g62, 4g63, and some of the Mitsubishi V6 applications.This technology with slight modification will also fit the Dodge 420A motor found in the 95-99 2.0l DOHC 2gen Eclipse and Dodge Neon.At this time I don't remember the exact date that we first dropped in some pre release versions of the adjusters but I do remember my distinct first impression was, wow.The car seemed to have noticeable increase in performance.This was even with the factory ground cams. This is building block technology for some of the other parts we are working on.

The Basics:

Factory stock configuration:

In a nutshell, the factory HLA (hydraulic lash adjuster) was designed for dual purpose.It's first and foremost purpose is to provide oil the the pivot ball, rocker assembly and friction surface of the camshaft. It's secondary purpose is to automatically adjust the lash of the rocker arm to the camshaft. This is done by storing oil in a type of a one-way-valve system.For this system to work every thing must work correctly in the system.There has to be the correct amount of oil flow and pressure.There has to be clean oil as not the clog the HLA valve making it imposable to store the needed oil to ensure proper tension of the rocker arm and camshaft. Any extra oil pressure left over from the lubrication process is used to pump up the HLA.

Benefits of the Factory stock configuration:

The factory HLA was designed to be auto adjusting.This means that as parts wear, if the system is working correctly, the factory HLA will change it's height to match what is needed for proper valve lash. Because the factory HLA is auto adjusting it is considered quiet when the system is working correctly.

Limitations of the Factory style HLA.

Factory HLA have no provision for decreasing the amount of lash while the motor is running.This becomes important especially in a race application where stainless steel valves are run in the cylinder head.We know that stainless steel valves thermally grow significantly more than factory valves. This creates a situation where the factory HLA can not compensate for the additional lash needed when the stainless steel valves expand from the temperatures in the combustion process.

We have also seen issues where the factory HLA can not hold profile in high rpm tests.

In looking at factory camshaft wear patterns we noticed that as the cam profile increased, the more the wear differed on the leading side of the lobe vs. the trailing side of the lobe.Basically, all of the stock cams we inspected had a nice wear patter the width of the roller on the leading side, but on the trailing side the wear pattern was very narrow, almost like there was no tension to provide the wear.All of our original development was based on the theory that the factory units would not hold profile under rpm. Since then we have developed a second theory that happens in upper end race motors.

Theories:

Because what we have learned based on the factory designed part, we have formed a two theory scenario.

First Theory:

Horse power is lost by the factory style HLA not being able to hold its lash profile in high rpm's. We have seen this from noticing HLA tick after a high rpm dyno pull and from just the general valve train noise that the 4g63 is noted for. Not holding profile makes the valves see a smaller percentage of the true lift of the camshaft. This theory applies to stock and slightly modified motors

Second Theory:

This theory deals with why horse power falls off in upper RPM when using the factory HLA. Most race heads use stainless steel valve technology. Stainless steel has a much higher thermal expansion rate than traditional valve technology. Most typical race motors will have the balance shafts removed. This provides a lot of extra oil volume and pressure making it so that the factory HLA holds it profile a bit too well providing zero lash. When the stainless steel valves expand from heat, the factory HLA is so pumped up that it can not compensate for the thermal growth of the valve. This makes it so that the valve is actually held open creating less cylinder pressure and ultimately less horse power.

With either theory the solution is to set the valve lash with a static solid setting vs. a dynamic hydraulic setting.

Tools needed for installation:
¼" end wrench
12mm end wrench
13mm end wrench
.002 feeler gauge
.0025 feeler gauge

Inspect all the lash adjusters. Check for shipping damage. Lube the threaded assembles. Inspect all internal passages for debris or any obstruction that might hinder oil flow.

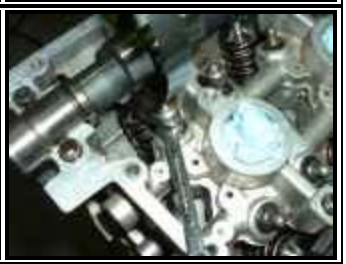
Loosen the locking assembly and install the Solid adjuster into the lifter boar.

Install rocker arms on 1 set of valves (for example both exhaust valves on cylinder number 1)

Carefully set the camshaft in the head ensuring that the lobes are positioned on the “base circle” of the camshaft lobe.Ensure that the S.L.A. is adjusted short enough to not touch the camshaft

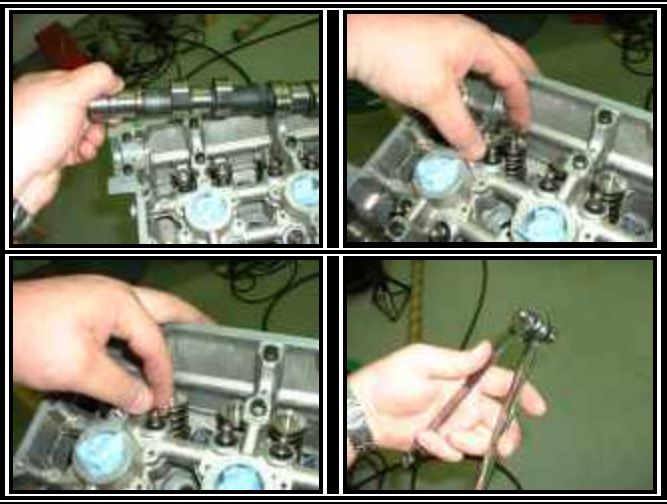
Recommended lash for Intake lobes is .002” at the camshaft.
Recommended lash for Exhaust lobes is .0025” at the camshaft. Different valve materials may require different lash settings. Please use these specs as a base line starting point. We have found that these numbers work well with most common aftermarket stainless steel valves.

Small adjustments to the lash setting can be done with the ¼” end wrench with the feeler gauge installed between the roller and the camshaft.



When you get the adjustment where you want it:
-Lift out the camshaft.
-Carefully remove the rocker arm.
-Carefully remove the S.L.A.
-Lock down the S.L.A.
-Reinstall the S.L.A. into the lifter board
-Reinstall the rocker arm

-Double check lash setting.
-If the setting isn't correct, unlock the two pieces, make a small adjustment, reinstall and check lash setting.



Note: detailed attention to lash setting is critical to the operation of this product.

When the first one is complete, move to the second valve on the same cylinder. Follow the same procedure. When you get it adjusted correctly:
Carefully lift out the camshaft.
Use a black "sharpie" market and lable the rockers indicating their location.

Note: it's important to keep each rocker with the lobe that it was adjusted for. Often manufacturing tolerances in the cylinder head and on the camshaft are different for each lobe.

Now that the first two rockers are adjusted and marked, remove the rocker arms. Install another pair of rocker arms on the next cylinder needing adjustment.

Follow the same procedure as above to adjust the next cylinder. When adjustment is correct, mark both rocker arms with a black “sharpie” marker indicating their appropriate location.

Follow the above procedure until all valves have been adjusted

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Source : C.R.U.S / CRCO