



TECH

SETTING VALVE SPRINGS USING THE ASSEMBLED HEIGHT METHOD.

This is an explanation of the “assembled Height” method of setting up valve springs in a cylinder head.

Back in the day of rocker arm auto engines, automotive engine builders developed what came to be known as “Installed Height”. This was a measurement of the distance the outer valve spring occupied when the spring and retainer assembly was installed in the head. This was measured by installing the assembly in the head using a checking spring, and measuring the distance from the top of the spring base to the bottom of the retainer. This method is still used by some automotive , and Harley engine builders.

Fast forward to the modern era of OHC engines that use buckets or tappets. It is no longer possible to get that measurement accurately.

Beginning with the Z1 Kawasaki in the 70s, APE has perfected what we call the “Assembled Height” method. This method, besides being very simple to do, is also much more accurate than the old method.

To illustrate this, lets use the Hayabusa cylinder head. When setting up the heads after machining the seats, the valve stem tips must be set to a certain dimension to insure that the valves will be in the shim range. On the Hayabusa, we use 1.530” from the tip of the valve to the bottom of the bucket bore. (Note, APE sells gauges to measure this). Fig. 1

To determine Assembled Height, Fit the retainer to the valve with the keepers and pull up tight. Then measure from the top of the retainer to the tip of the valve. Fig. 2 Lets say you get .070”. Add that to the 1.530” valve height dimension for a total of 1.600”. That is the assembled height. Meaning when the valve is installed in the head, the top of the retainer will be 1.600” from the bottom of the bucket bore.

Next, we set our valve spring tester to 1.600”, zero out the dial indicator. Fig. 4 install the spring base, valve spring and retainer. Pull it down to our zero reading and know exactly what our seat pressure will be. Fig. 5.

We then can also pull it clear down to coil bind, back it up .050”, and know exactly how big of a lift we can run. We can also see what your pressures will be an any lift. Fig. 6.



Fig1
Finding valve stem height (APE gauge shown)



Fig 2
Measure retainer to valve tip



Fig 3
Retainer, spring and base go in the tester.

If we feel it needs more seat pressure, we can add shims under the spring base and get totally accurate readings as to the increase.

With the Assembled Height method, you can be assured that what you see in the spring tester, will be exactly what it is when installed in the cylinder head.

Note, that this method isn't only for bucket type motors. We use the same method on rocker arm Suzukis, etc. On some non shim adjusting arrangements, when the retainer is installed on the valve, it may sit below the top of the valve. In this case you would measure from the tip of the valve, down to the top of the retainer, and DEDUCT that amount from the valve stem height to get Assembled Height.

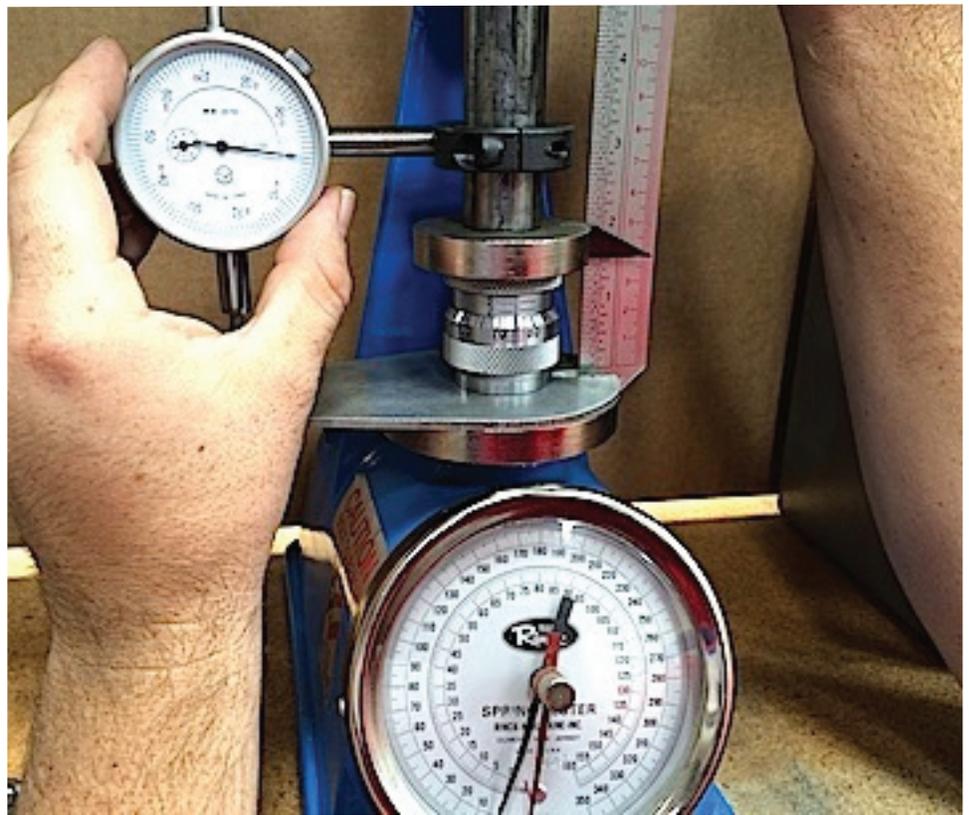


Fig 4
Zeroing out the spring tester to assembled height. APE uses special inside mic for this part.

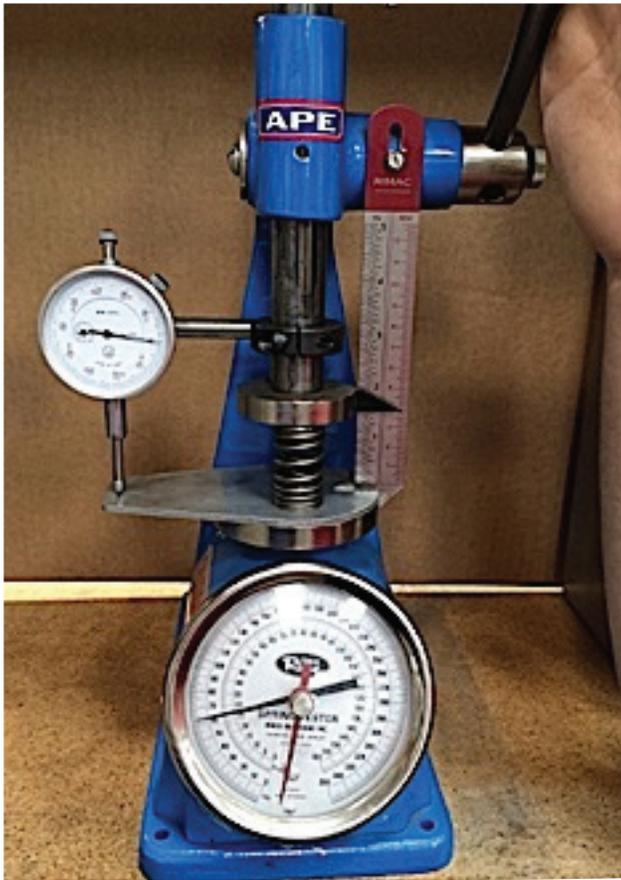


Fig 5
Retainer, spring and base go in the tester. Pull it down to your assembled height zero point and you have exact spring pressure. If you need more pressure, you can insert shims under the base and see exactly what you will get.

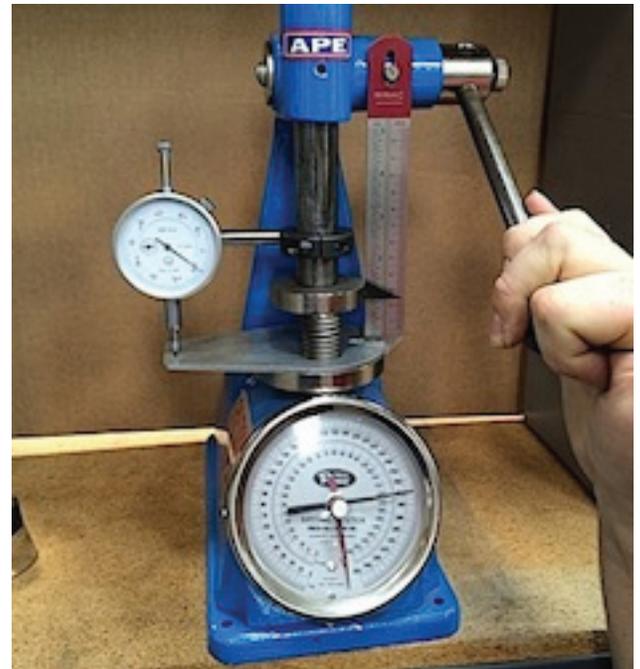


Fig 6
Pull it on down until the spring stacks solid and you can see exactly how much travel you have until coil bind.