

KP Racing Valve Train Installation Directions



Thank you for purchasing the fine tuned racing valve train kit! This kit was designed for the daily driver and most importantly, racing!. These springs deliver the optimal seat pressure and full valve lift this cylinder head needs. Kawasaki valves are well known for dropping, almost always from inadequate spring pressure. Stock springs can over rev and float as early as 7000 RPM! This is when the spring cannot close the valve quick enough before the cycle starts all over again. These new high pressure springs you have in your hand, do exactly what they need to. The additional pressure keeps these valves synchronized precisely to the beat of the engine at any given RPM up to 9,000 RPM (Although we recommend not going near that). We are extremely pleased with this kit, and we know you will be also! Please keep in mind, as with any mechanical or engine component, parts do wear out and need adjustment or replacement. Since these are high performance machines, please check shimming every 50-100 hours, and when valves are cut, please check springs for correct seat pressure. Average spring life is upwards of 300 hours.

Installation

(NOTE: Please clean all new and used parts thoroughly before installation)

Quick Installation:

1. Install valve seals
2. Install supplied 0.060 copper colored shims on intake side. Flat side facing the head. (For all models)
3. For 250 and 260 models the Black base washers are the same. Install these with the flat facing down. For 300 and 310 models the thicker base washers go on the intake. The thinner base washers go on the exhaust side. **THIS IS EXTREMELY IMPORTANT!**
4. Install springs. Please make sure to check that the smaller inner spring is in the correct orientation. The tightly bound coil side always faces down.
5. Install valves with assembly grease.
6. Install Titanium retainers and keepers.
7. Set valve lash.

Detailed Installation:

1. Check for the proper spring installed height using the data below.

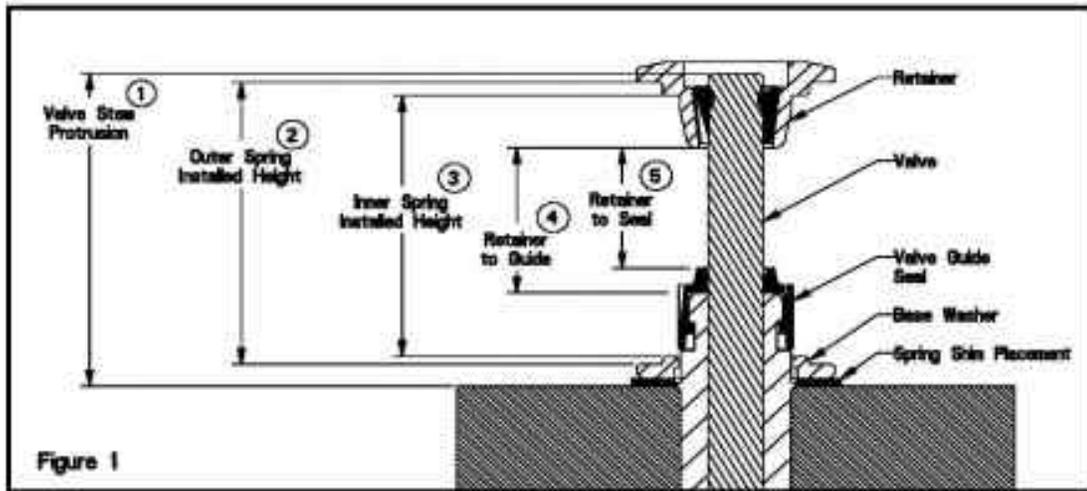


Figure 1

Valve Train Terminology

1. Stem Protrusion is measured from the tip of the valve stem to the cylinder head. See Figure 1.
2. Outer spring installed height is measured where the outer spring contacts the retainer and lower component when assembled. See Figure 1.
3. Inner spring installed height is measured where the inner spring contacts the retainer and lower component when assembled. See Figure 1.
4. Retainer to guide clearance is the distance between the valve guide (w/o the seal) and the bottom of the retainer, with the valve in the closed position. See Figure 1 and Notes 3 & 4.
5. Retainer to seal clearance is the distance between the valve stem seal and the bottom of the retainer, with the valve in the closed position. See Figure 1 and Notes 3 & 4.

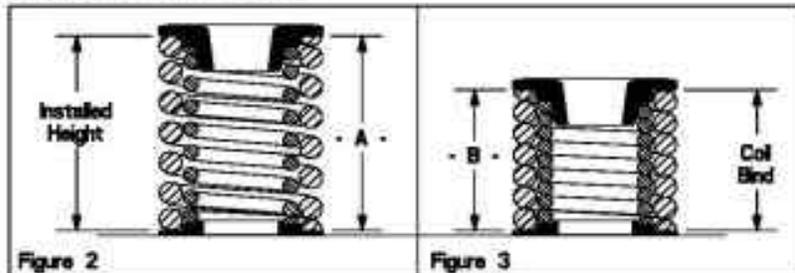


Figure 2

Figure 3

Installed Height

1. In Figure 2 the installed height is measured from where the outer spring contacts the retainer and the basewasher. This measurement is taken when the valve, basewasher, retainer, and keepers are assembled in the cylinder head.

Coil Bind / Solid Height:

1. In Figure 3 the coil bind height is determined by compressing the spring or springs with the retainer and basewasher in place, a vice can be used for this operation, once springs are compressed measure the distance between the retainer and basewasher where the outer spring contacts them.

Notes:

1. The difference between the installed height and the coil bind height is considered "Free-Travel"
2. Free-travel should always be gross valve lift +.060" for safe operation.
3. Retainer to seal and retainer to guide clearance should also be gross valve lift +.060" for safe operation.
4. Failure to check valve train clearances can result in serious damage to an engine.

- Installed Height (Outer Spring or large spring) 1.405-1.415.
Spring height for stock applications can be used 0.010" below the minimum safely, but can strain the spring. We recommend staying on

the higher side if possible. 1.425 is better, especially for race engines with higher lift. Please do not exceed this value.

- Seat Pressure 56 Pounds
- Open pressure at 0.383" Lift is 171 Pounds
- Max valve lift is 0.385"

For daily riding using vernier calipers is ok for checking the height. For racing engines a valve stem height gauge is required for accuracy. When checking for valve stem height, make sure the seats are cut, valves are new or reground. Apply assembly lube to the stem, and push the valve into the cylinder head. Make sure to apply enough pressure on the valve so that it does not move. There should be no base washer or valve seal for this step. Please review the image below.

Make sure everything is sitting as flat as possible and record your value. Please check more than one intake valve and exhaust valve to confirm result.



Now that you have your valve stem height value, we can calculate the installed spring height. Please follow the steps below:

1. Take one intake valve and one exhaust, 4 keepers and two titanium retainers. Install the keepers and titanium retainers on each of the valves. Make sure to twist and pull tightly in order to seat the keepers properly.
2. Measure the distance from the valve stem tip to the outer most point of the titanium retainer. For most valves, this should be 0.060".

3. Measure the thickness of the base washer. 250 and 260 spring kits both have the same base washer which measures 0.077". For 300 and 310 the Exhaust base washers are 0.047". PLEASE MAKE SURE THAT SHIMS ONLY GO ON THE INTAKE SIDE UNDER THE BASE WASHER FOR ALL MACHINES!
4. Measure the distance from the surface the outer spring sits on the titanium retainer, to the top of the retainer. (Side where the shim sits) This value should be 0.105".
5. To calculate the distance from the valve tip to larger or outer spring surface, we need to do a little math. We need to subtract the 0.105" from the 0.06", which gives 0.045". This is the height from the valve stem tip to the large spring surface. Your result should be identical or close if you have tipped valves.
6. Now subtract the valve stem height you measured earlier from the 0.045" and the base washer thickness, 0.085". This result will give you your installed spring height. The intake installed height should be below the required value, which will need shimming. Shims always go under the base washer and with the curved surface facing up. If using the smaller shim in conjunction, please place under the larger shim.
7. Please note the installed spring direction matters! The outer springs are not directional, but the inner springs are! The part with the closer coils always faces towards the cylinder head! This is very important, or the valves may float at high rpm.
8. Shimming is the same as stock. Please see below for specs:

250/260

Intake: 0.006-0.0095"
Exhaust: 0.0126-0.0160"

300/310

Intake: 0.006-0.0095"
Exhaust: 0.0185-0.0220"

If you have any questions at all, please contact us!

Thank You!

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