



Installation Instructions for KPMI Part No: **82-82400**

Polaris • Various 900/1000's • 2013-'23

Lightweight Racing Valve Spring Kit

RZR™ 900 2013-2023 / RZR™ XP1000 2014 / Ranger™ 900 XP 2013-2019 / Ranger™ 1000 (&XP) 2017-2023

Being at the forefront of valvetrain development in the side by side market, KPMI® takes pride in being able to development spring kits for the top engine builders around the world. Because of this fact, KPMI® processes valued feedback when offering new designs or modifying existing. Pay close attention to the pressures and retainer material offered. KPMI® recommends heat-treated-steel-retainers for all endurance applications and leaves it up to the most experience engine builder to select titanium retainers when mass reduction is imperative and normal maintenance teardowns are routine after each race. As an additional note, our race customers are using less open pressure for the Turbo's and only using the Beehive and higher open pressure with experience and knowledge of the treatment of mating parts, clearances and oils. Matching a spring design to given valvetrain mass and cam dynamics is a science and when in doubt you must confer with an experienced builder.

A) 82-82400 Kit Includes

<u>Qty</u>	<u>Application</u>	<u>Description</u>
8 - Pcs	Intake / Exhaust	Titanium Retainers
8 - Prs	Intake / Exhaust	Chrome Silicon Springs
8 - Pcs	Intake / Exhaust	H.T. Steel Basewashers*
8 - Pcs	Intake / Exhaust	Viton Seals*

*Notes:

1) When installing the 82-82400 kit, the supplied basewashers and seals must be used instead of the OEM "tophat" seals.

2) A 9mm socket may be needed to ensure the 82-82407 seal is fully installed on the OEM guide. When properly installed the top of this seal should be 0.155" above the top of the OEM guide.

B) Recommended Installed Height - Intake/Exhaust

1.	Installed Height	1.370" - 1.380"
2.	Seat Pressure	57 #
3.	Open Pressure at 0.360" Lift	131 #
4.	Open Pressure at 0.450" Lift	150 #
5.	Max Valve Lift	0.450"

*Note: KPMI Guides must be installed when using cams with greater than 0.415" valve lift.

C) Notes

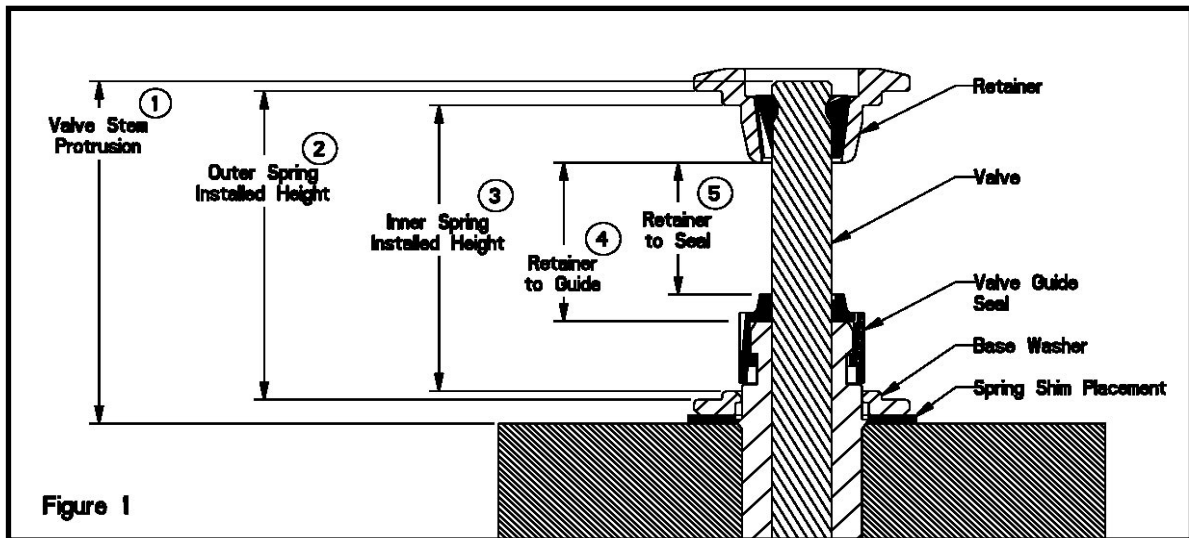
1. The difference between the installed height and the coil bind height is considered "Free-Travel"

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.

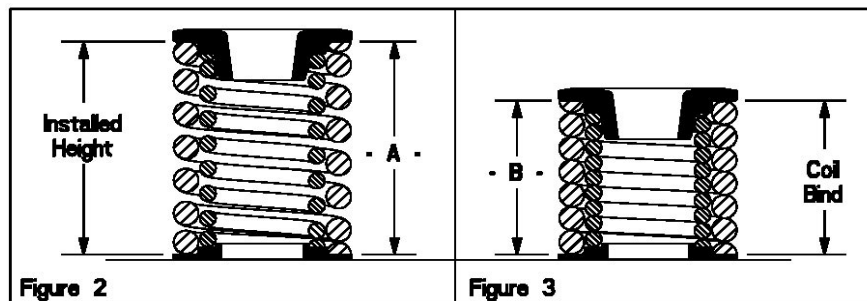
2. Free-travel should always be gross valve lift +.060" for safe operation.
3. Retainer to seal and retainer to guide clearance should also be gross valve lift +.060" for safe operation.
4. Failure to check valve train clearances can result in serious damage to an engine

Packaged By: _____

Date: _____

TECH TIPS**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.