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Technical Memo P/N: AS-REG-A

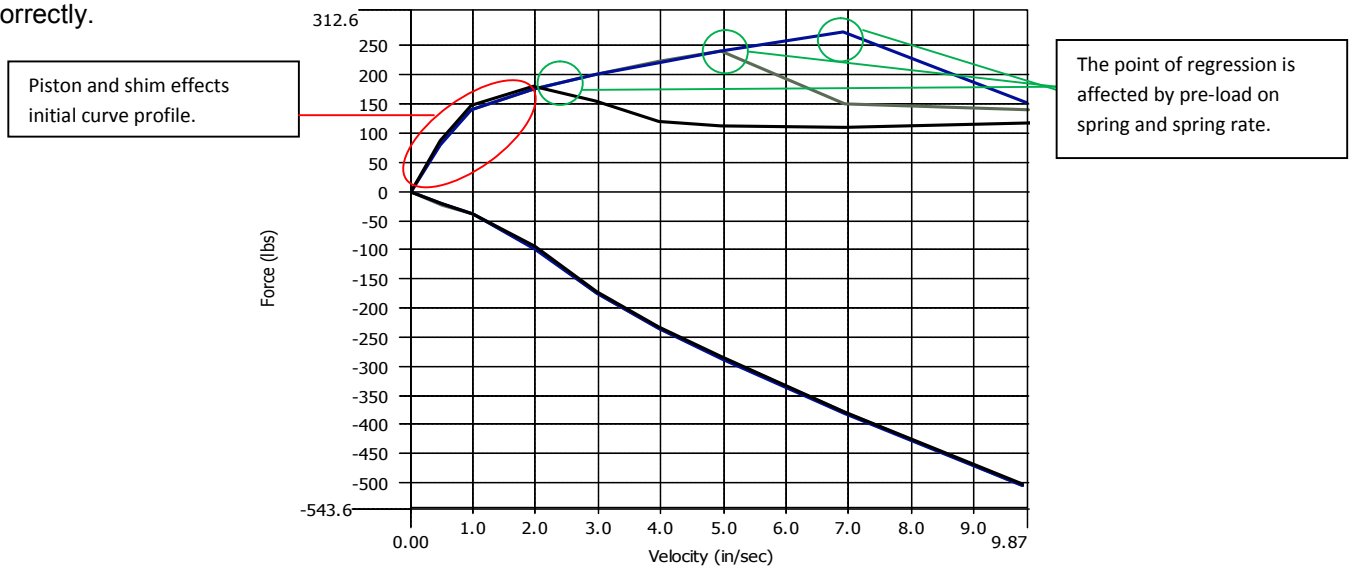
Description: Regressive valve assembly, used to produce either compression or rebound regressive curve.

Synopsis:

The objective of the regressive valve is to produce a compression or rebound damping characteristic that allows increased low or mid-speed damping force for driver feel, while providing more suitable lower levels of high speed damping for bump absorption. Typically you will increase the low speed damping level in the shock, and decrease the spring rate, typically resulting in more mechanical grip.

Tuning Techniques

The main piston type, shim stack, and bleed settings across the main piston will determine the damping curve prior to the blow-off point, and also affect damping levels at much higher damper speeds after the regressive blow-off. It is important to realize that the regressive blow-off point is force and pressure based, and the shape of the damping curve prior to blow-off will determine the velocity at which the valve will actuate. Also, the main piston and shim stacks must at some point be stiffer than the regressive blow-off point in order for the valve to work correctly.



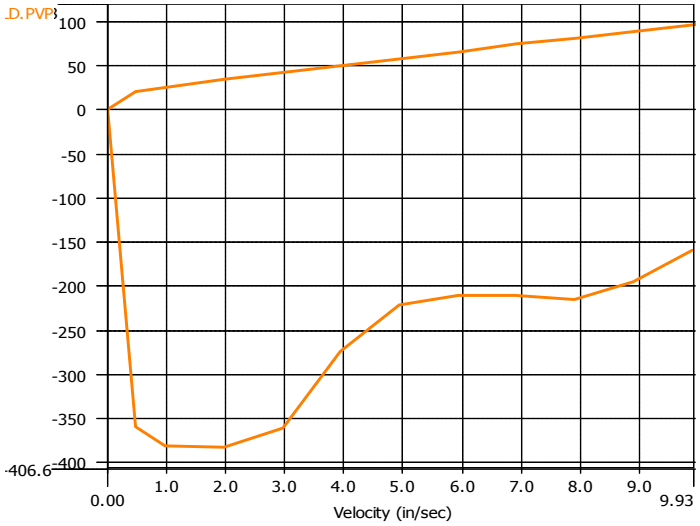
When using a linear main piston and shim stack, the regressive blow-off level can be used to select how much of the linear curve you would like to utilize. Higher velocity forces typically associated with linear pistons can be significantly reduced after the regressive blow-off. In addition, a dished or pre-loaded linear piston can be utilized to provide a smooth low speed nose profile, providing drivers with the great response and feel of a linear piston without the sharp edged blow-off usually associated with a digressive damping curve.

When using a digressive main piston, the digressive blow-off level is typically set higher than the regressive blow-off. This allows bleed settings across the main piston to control the shape of the curve prior to blow-off. Digressive main piston settings that blow-off prior to the regressive valve are not usually recommended because the flat digressive curve will likely cause regressive blow-off repeatability issues.

Track Tuning Recommendations:

The age old racing damper setup dilemma has always been the compromise between low speed compression damping support which inspires driver confidence, and high speed compression damping for chassis control over bumps. Digressive style pistons allow increased low speed support only to the point where the resulting high speed damping levels begin to erode performance and tire wear. The regressive valve is the next logical step in eliminating this performance compromise.

Depending on track layout and vehicle set-up, it is recommended that regressive damping be tried on either compression or rebound. Typically we find compression regressive curves are most beneficial when curbing or large bump spikes are upsetting the car. Rebound regressive damping has shown advantages in help the vehicle recover quicker over bumps which allow the driver to return the throttle quicker.



Summary:

In test after test, the regressive valve has allowed suspension tuners to unlock hidden performance in many different types of racing. By increasing low speed damping support, and dramatically reducing suspension spring rates without loss of driver feel, regressive valve users have boosted driver confidence and increased grip levels. In the same setup, the regressive valve provides independently tuned high speed compression damping to maximize control over bumps and minimize tire wear. In addition, frequency response tuning, and the ability to use specific portions of linear damping curves further add to the performance potential of the regressive.

If you have any questions, please contact one of the Penske Racing Shocks technicians below.

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Thank you!