

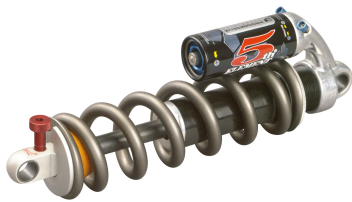
AVALANCHE

SUSPENSION



*Progressive Suspension
5TH Element Upgrade*

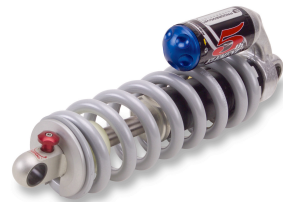
Models effected



5-way



3-way



2-way



ADVANTAGE

PROGRAM

Making suspension better for everyone.

Why the 5th needs to be upgraded?

Position sensitive damping has one major drawback, the deeper the damper is in the stroke the higher the damping force, this is good for preventing bottoming of the shock but in the real world the terrain has many square edged bumps, rocks and trees. If the shock is deep in the stroke and experiences a square edged hit the compression damping needs to be relieved or blow-off to prevent harsh feel or what is call hydraulic lock. This is prevented from happening with the 5th's damping system. All modern shocks today do this with speed sensitive damping, what we call SSD Technology. This is accomplished by replacing the SPV piston with a series of valving shims that react to the speed of the shock shaft not the pressure created by the stroke position of the shaft.

What's been done.

The SPV piston has been replaced with speed sensitive valving shims according to the linkage progression, rider ability and type of terrain.



The shaft seal, bushing and dust scraper have been upgraded to reduce stiction for silky smooth action.



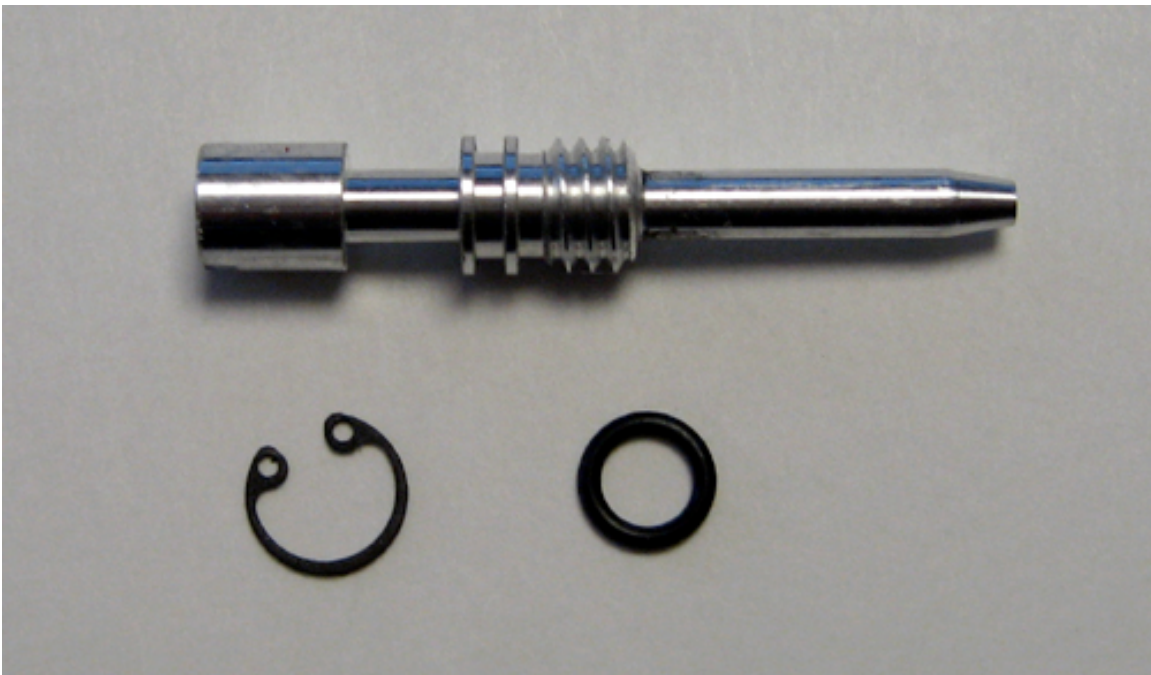
An improved shape factor anti-bottoming mx-style urethane bumper has been installed. This compresses inward constrained by the spring inside diameter making the bumper feel progressive while maximizing travel.



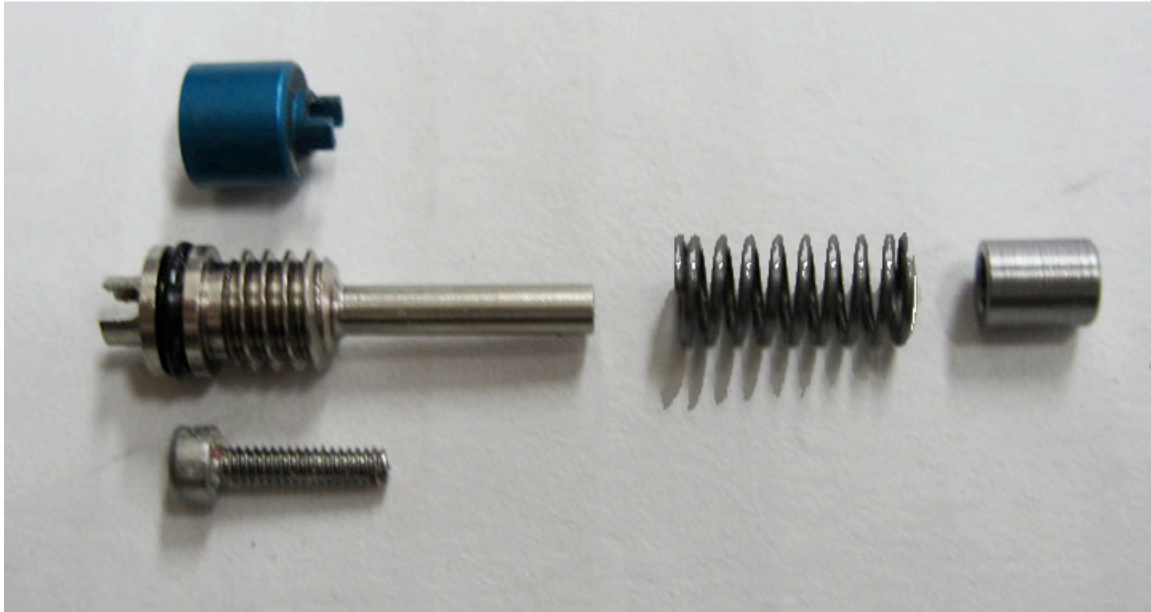
The rebound valving has a modified piston bolt to accept a progressive shim valving stack which produces controlled damping throughout the entire stroke of the spring. This allows the rebound damping to be more responsive deep in the stroke for more pop over the jumps, and preventing packing up in the top of the stroke. In other words easily to bunny hop and no kicking over braking bumps and jumps. Improved common bleed rebound circuit for more lively feel, increased lift over jumps and more sensitive small bump feel.



The beginning stroke adjuster has been replaced with a full range low speed compression adjuster.



The end of stroke adjuster is replaced with a speed sensitive high speed compression adjuster, adjusts spring preload affecting the high speed damping blow-off threshold.



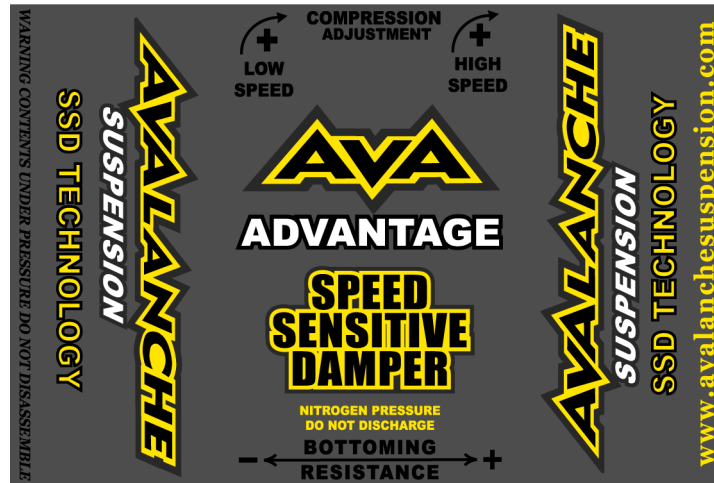
The reservoir shaft valving shims are altered as necessary to ensure a smooth transition from low to high speed compression damping action.

The reservoir piston height is set to maximize the nitrogen charged reservoir. The nitrogen chamber volume adjuster on the 5-way can add an additional spring force to the damper at the end of stroke to improve bottoming resistance. The nitrogen charge is set to a fixed pressure based on the compression valving, this is no longer an adjustment feature on the 5th Element damper, decreasing the pressure will not soften or alter the damping in anyway, if released it will damage the set-up of the shock and cause air bubbles to form in the oil during use, cavitation occurs when the nitrogen pressure is not sufficient enough to prevent reducing the oil pressure below the vapor pressure of the oil during extreme damping conditions.

How it works now.

Speed sensitive damper technology means that at any shaft speed the damper will adjust flow of oil in the damper to adjust for the shaft speed. As the damper shaft speed increases the damper will produce more damping forces unless it is relieved by some means. The point at which the damper relieves itself can be controlled by the valving shims or blow-off valves. The art of tuning these valving shims and blow-off systems is called revalving. A properly revalved damper will provide the necessary damping for absorbing bumps and jumps while relieving the damping as needed during square edge hits to prevent harshness. Knowing your weight, ability, riding conditions and type of linkage progression a suspension tuner can revalve and set-up your shock to meet these conditions. The compression and rebound adjusters provide the rider with a means to fine tune your suspension to your desired needs.

How to set-up your Avalanche advantage upgraded 5th Element.



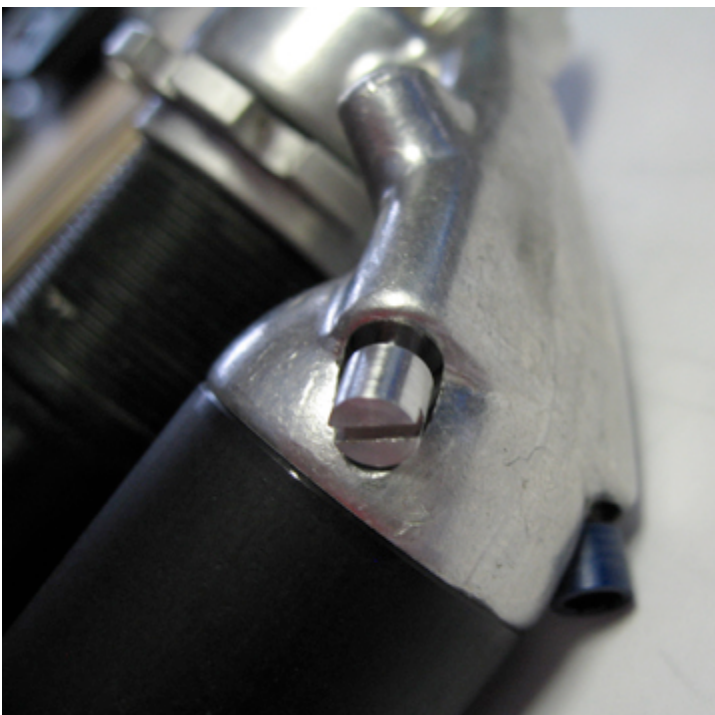
Choosing the proper spring to support your weight is the most essential first step. Your suspension tuner will help you determine this rate. The spring should compress approximately 30% the travel (stroke) of your shock. I.E. for a 3 inch stroke shock the sag will be $30\% \times 3.0 \text{ inches} = .9 \text{ inch}$ of sag. This is called the proper sag. Sag can be adjusted by adjusting the preload on the spring. Tighten the spring preload collar to decrease sag and loosen the preload on the spring to increase sag. The maximum preload is 3 to 4 turns on the preload adjuster after it first contacts the spring; the minimum preload is 1-1/2 turns. If you have too many turns of preload on your spring your low speed rebound damping will be over stressed, too little and the shock will not fully extend for the next bump and cause packing. Too many turns means you will need a slightly stiffer spring and not enough turns you will need a softer spring.



Once your sag is set properly the rebound adjuster can be set for the ride conditions, standard position is about 1.75 turns counterclockwise out from full hard. Turn out 1/8 turn to speed up rebound, this will make it absorb small close together bumps easier. Turn in 1/8 turn to slow up rebound when absorbing big bumps to prevent kicking up. Repeat 1/8 turn at a time until desired results are achieved. Faster rebound is more desirable when trying to achieve plusher settings.



The low speed compression (LSC) adjuster is used to set the overall firmness of the damper, 1 turn in clockwise from full soft is the standard setting. Turn the adjuster screw in 1/4 turn clockwise to increase LSP damping, i.e., for large rolling bumps. Turn the adjuster screw out 1/4 turn to decrease LSC damping, i.e. for small roots and rocky conditions. Repeat 1/4 turn at a time until desired results are achieved. Too little damping will cause the suspension to ride to deep in the stroke, using up most of your stroke causing a harsh ride.



The high speed compression (HSC) adjuster is used to set the overall firmness of the damper, 1 turn in clockwise from full soft is the standard setting. Turn the adjuster screw in 1/4 turn clockwise to increase HSC, i.e., for large drops or g-outs. Turn the adjuster screw out 1/4 turn to decrease HSC damping, i.e. for square edge conditions. Repeat 1/4 turn at a time until desired results are achieved. The best ride is achieved when the HSC is to the firmest position while still able to blow-off on the med to larger high speed square hits.



The nitrogen chamber volume adjuster on the 5-way can add an additional spring force to the damper at the end of stroke to improve bottoming resistance. We do however recommend that compression and proper spring rates are tried first, decreasing the chamber volume will cause a harsh midstroke as the shock heats up, the larger volume adjust will have the least affect on the reservoir pressure.



Service and maintenance.

We recommend you have your shock serviced by an experienced shock technician yearly or every 100 hours of riding for optimum performance. The oil heats up and absorbs wear particles causing its damping action to decrease over time. The nitrogen charge will also need to be recharged every year regardless of the number of hours used as it will slowly leak down or be absorbed by the oil and o-rings. Do not check the nitrogen pressure with a gage, as the gage will absorb most of the pressure in the reservoir during the test. Do not release the nitrogen charge rapidly during recharging, as it will cause bubbles to form in the oil. The state of the nitrogen charge can be tested by removing the spring from the damper and pressing the shaft against a bathroom scale, readings should fall between 35-40 lbs.

Frequently asked questions and terms.

The 5th Element has a very coarse rebound adjuster and to reduce the overall cost of the upgrade this feature remains the same, i.e. the adjuster is very sensitive to small changes so be careful when adjusting the rebound, make small 1/8 turn changes and observe the results.

Why do I have to use nitrogen pressure for the reservoir charge...Nitrogen is a dry inert gas that helps resist pressure changes from heat build-up in the reservoir.

Why is the air pressure adjustment feature no longer used... The speed sensitive valving technology uses a minimum pressure to prevent cavitation, reducing this pressure will damage the oil and not make the damping feel softer.

Eye to Eye: Is the length of shock between the two mounting hole centers.

Sag: Is the amount of shock (& rear wheel) compression caused by the rider's weight while sitting on the bike in a normal riding position.

Spike: Is the harsh feeling that occurs when riding over hi-speed bumps if the shock cannot compress fast enough to absorb the size or sharpness of initial bump contact.

Bobbing: Is the up and down (power loss) movement of your suspension that occurs from weight shifts of the rider during pedaling.

Blow-Off: Is the shock's ability to relieve the pressure caused by high speed pressure build-up in a damper valve.

Disclaimer

Avalanche Suspension Inc. is not responsible for any damages to you or others from riding, transporting or other use of your Avalanche Advantage 5th Element Shock or mountain bike. User fully understands that mountain bike riding and/or racing is dangerous and hard on equipment. In the event your Avalanche Advantage 5th Element shock breaks or malfunctions, Avalanche Suspension Inc. will assume no liability or obligation beyond the repair or replacement of your shock.