VariShock

A Chris Alston's Chassisworks, Inc. Brand

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Bolt-In Front Coil-Over Conversion for 1993-2002 Camaros

Features and Benefits

- Available with single- or double-adjustable shock valving
- Easily accessible 16-position adjustment knobs
- Factory-welded upper mount provides direct bolt-in installation
- Lower crossbar mounts to OEM or aftermarket A-Arms
- 4.25" of shock travel
- Lightweight billet-aluminum body with 5/8"-diameter high-strength piston rod

Coil-Over Features

- 350 to 650 lb/in spring rates available
- On-car adjustment of spring preload
- One-piece locking lower spring seat provides audible clicks at each adjustment step

Bolt-in Coil-Over Conversion for GM A-Arms

Converting your stock 1993-2002 Camaro front suspension to VariShock coil-over shocks is a simple bolt-on procedure. Our exclusive factory-welded upper-mount assembly bolts to the factory tower, replacing the factory mount. The urethane-bushed lower crossbar mounts directly to the factory or aftermarket lower A-arm. Lightweight billet-aluminum VariShock coil-overs are available in 16-position single-adjustable or 256-combination double-adjustable versions and provide 4.25" of shock travel. Choice of spring rates range from 350 to 650 lb/in, suitable for drag-race use, street-friendly ride quality, or handling performance. A second set of different rate springs can also be selected as an option for tuning purposes. Kits include shocks, springs, mounting hardware, and spanner wrench. All shock components and hardware are plated, anodized, or powder coated for a long-lasting quality appearance. Shocks and springs are packaged in pairs.

Direct-Fit Upper Mount

Our VariShock-exclusive, top-mount assembly attaches the coil-over shock to the chassis at the factory mounting location. The gusseted-sheet-metal design eliminates flex and enables a double-shear bolt configuration. Mounts are factory-welded and clear-zinc for corrosion protection.

Billet Spring Seat Hardware

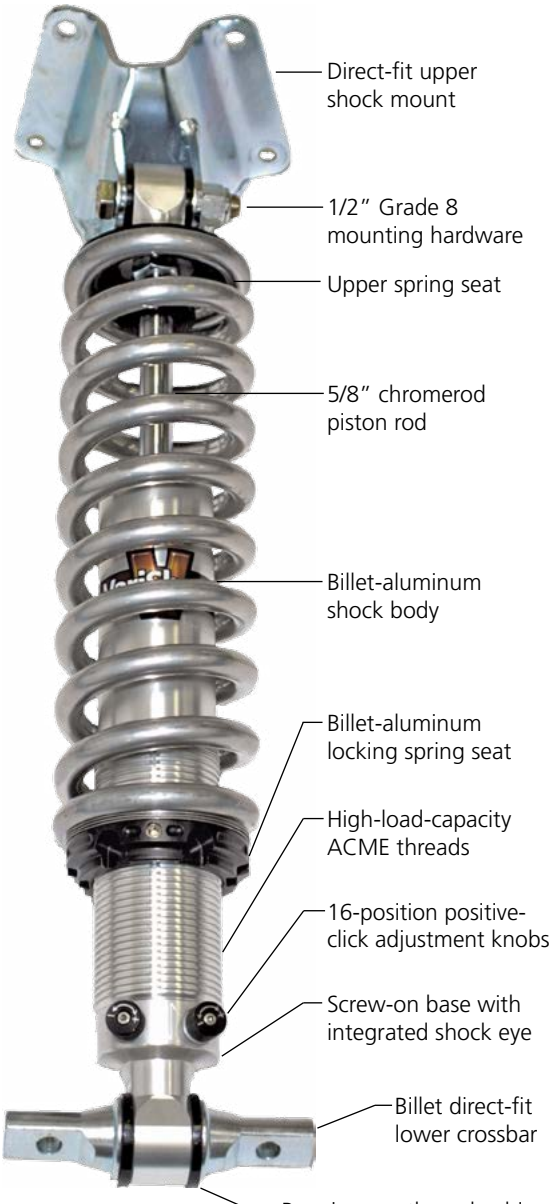
To mount the spring over the shock, VariShock billet aluminum upper and lower spring seats are required. Spring seats utilize inset shoulders and application specific bores to perfectly align the top mount, spring, and shock body.

Upper Spring Seats – Coil-over-shock upper seats feature an open slot that allows the spring to be easily installed or replaced without removing the upper mounting eye.

Lower Spring Seat – The one-piece lower spring seat rides on the shock-body ACME threads and is used to adjust spring preload. Each seat features two spring-loaded, ball-lock mechanisms to securely hold the adjusted setting. When rotated, the ball-locks and shock-body grooves provide positive-click stops to audibly and physically notify you of every half-turn. The lock mechanism is easily operated using a common 5/32" allen wrench to tighten (lock) or loosen (unlock) the spring seat's two set screws. The lower spring seat also features six individual notches that enable the VariShock four-tang spanner wrench to interlock with the spring seat for slip-free adjustment. Upper and lower spring seats are anodized for surface hardening and improved appearance.

Billet Lower Crossbar

The lower crossbar assembly is mounted directly to a factory or aftermarket lower A-arm. A 1/2" stud and crush washer are used to thread the two billet crossbar halves together and apply the proper amount of bushing preload. The lower crossbar bushings have up to 350% more urethane material than common 1/2" shock eyes offered by other brands. To improve spring and shock absorber performance we chose a premium urethane with much higher load capacity and longer service life.



VariShock Construction

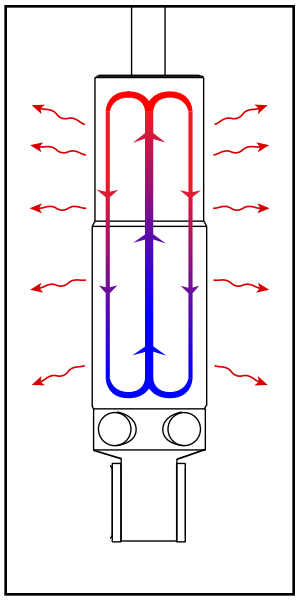
VariShocks are built to withstand the heavy demands of drag racing as well as the severity of daily street use. The shock body serves as the foundation for the shock and is constructed from heat-tempered aluminum tubing for its lightweight strength and rigidity, and rapid heat dissipation. High-load-capacity ACME threads are machined onto the outside of the shock body, creating a durable means of adjusting spring preload and ride height. Shock bodies receive a clear-anodize finish prior to final assembly for enhanced corrosion resistance.

The bottom end of the shock is capped by an O-ring-sealed, screw-on base cap with integrated shock eye. The cap and adjuster components that make up the base-valve mechanism are machined from an aluminum alloy that provides a superior machined surface finish and more consistent flow characteristics. The piston rod is made from high-strength chromerod material to reduce deflection of the shock assembly during performance use. A manufacturing process known as "centerless grinding" is used to size the rod material to exactly 5/8" diameter with perfect roundness and extremely smooth surface. This ensures uniform seal pressure against the piston rod. Each rod then receives a hard chrome surface finish to improve the service life of the seals and further reduce friction. The piston diameter has been increased by 12% over other popular-brand shock absorbers to broaden the overall range of damping adjustment and gain more precise control over piston movement.

VariShock Design

The VariShock product line offers an affordable and versatile, high-end performance improvement over OEM replacements and traditional twin-tube shock absorbers. Our updated design overcomes the major shortcomings of traditional gas shocks and low-end twin-tube shocks, which include poor heat dissipation, limited mounting orientation, cavitation or shock fade, and fixed valving.

Improved Heat Dissipation



Traditional twin-tube shocks provide damping force by moving fluid back and forth between the inner compression tube and the surrounding reservoir. This rapidly heats the fluid that remains trapped inside the compression tube, causing outgassing and shock fade. VariShock's system of internal valves circulates fluid in a single direction through the shock absorber body, utilizing the entire volume of fluid to absorb heat. Thermally conductive materials are used internally to further help equalize fluid temperature. Heat energy is then dissipated through the shock base and body. Coil-over threaded bodies provide additional surface area for more rapid cooling.

Low-Pressure Fluid Environment

For a shock absorber to operate, its volume of fluid must be able to increase and decrease to compensate for the volume displaced as the piston moves into and out of the shock. Traditional design dictates that a pocket of air must reside inside the reservoir. However, this presents the possibility of air mixing with the fluid, inducing shock fade, and also limits the mounting orientation of the shock to a standard upright position.

VariShock utilizes a high-density, inert-gas cell within the outer reservoir to allow proper operation. The gas molecules are too large to pass through the polymer cell membrane and therefore cannot mix with the fluid. This allows VariShocks to be mounted sideways or completely inverted, adding needed flexibility to installation when packaging may be tight. Unlike more costly high-pressure gas shocks, VariShocks do not have the unintended side-effect of progressively increasing the suspension spring rate. VariShock's low-pressure design offers improved linearity of shock damping and more predictable tuning results.

Fluid Control

A shocks purpose is to limit the rate at which the suspension moves, whether induced by road irregularities or by chassis movement. By carefully controlling the rate of fluid flow into the different areas of the shock we can better manage the suspension's ability to keep the tire in contact with the road. VariShocks operate with zero bleed, meaning that absolutely all fluid flow is purposely directed and metered. By contrast, many manufacturers skimp on sealing the shocks internals to lower manufacturing costs. The allowed internal leakage makes valving adjustments less effective and lacking in precision. The VariShock total-seal design gives you improved control over the entire range of damping and enhances adjustment effectiveness at the slower range of piston speeds (0-4 in/sec) that control large chassis movements and vehicle handling.

A combination of fatigue-resistant deflective-disk and adjustable poppet valves focus damping forces at a range useful to the widest variety of vehicle types and performance applications. Damping-force ranges differ depending upon the adjustment features and mounting configuration of the shock. Custom valve sets are also available to alter the adjustment range of compression or rebound independently. VariShocks provide digressive damping to permit finer adjustment at the higher range of piston speeds (6-12 in/sec) that control rapid suspension movement and ride harshness. To give better control of vehicle-handling without rapidly increasing ride harshness, rebound (extension) valving is purposely stiffer with a broader adjustment range.

VariShock Quality

Delivering a finished product that is of excellent quality and value is the primary focus throughout the VariShock product line. Unlike other brands in this price range, VariShocks are engineered, manufactured, and assembled in America using state-of-the-art engineering workstations and computer-numeric-controlled (CNC) manufacturing equipment. Each component, including valves, adjusters, and internal shaft seals is designed and manufactured specifically for use in VariShock products. This level of clean-sheet engineering is the first step to producing longer lasting seals that keep dirt out of the shock absorber and extend service life between rebuilds.

Assembly of the components is equally important to delivering a quality product. To avoid the possibility of manufacturing debris contaminating the shock fluid and seals, the VariShock-assembly clean room is housed in a completely separate facility. After assembly, each shock is thoroughly dyno-tested and calibrated to meet Varishock's strict performance goals. This ensures virtually identical performance from every pair throughout their entire range of travel. By carefully controlling engineering, manufacturing, assembly, and final testing, VariShock can confidently deliver the highest-quality product with the most value for our customers.

The Truth About 16- vs. 24-Clicks

Don't be fooled by shocks offering more adjustment clicks. They are actually 1/2-click adjustments. The manufacturer merely added more detents to the mechanism without increasing the range of adjustment. This practice gives more clicks, but the adjustment is so slight that your vehicle will not respond to the change. A 16-position VariShock actually has a broader range of adjustable force with the added benefit of a more manageable number of adjustments to try.

Adjustable QuickSet Series

The VariShock QuickSet series allows you to easily tune your suspension for improved cornering and acceleration traction, or to quickly adapt to current track conditions. Adjustment takes only a few seconds and is made with the VariShock installed on the vehicle. Readily accessible, 16-position adjustment knobs can be operated by hand or with the aid of a common allen wrench.

QuickSet 1 – Single-Adjustable Valving
The QuickSet 1 valve system features a single adjustment knob that controls overall damping stiffness of the shock. Knobs are clearly etched indicating the correct direction of rotation to decrease (-), or increase (+) damping stiffness. There are a total of 16 specific adjustment positions.

QuickSet 2 – Double-Adjustable Valving
The QuickSet 2 valve system features dual adjustment knobs that independently control bump- and rebound-damping stiffness of the shock. Dual-arrow symbols engraved into the shock body demonstrate the function of each knob. Arrows pointing toward each other designate bump (compression) adjustment; the shock collapsing. Arrows pointing away from each other represent rebound (extension) adjustment; the shock extending. Knobs are clearly etched indicating the correct direction of rotation to decrease (-), or increase (+) damping stiffness. There are 16 specific adjustment positions for each knob, with a total of 256 unique combinations possible.

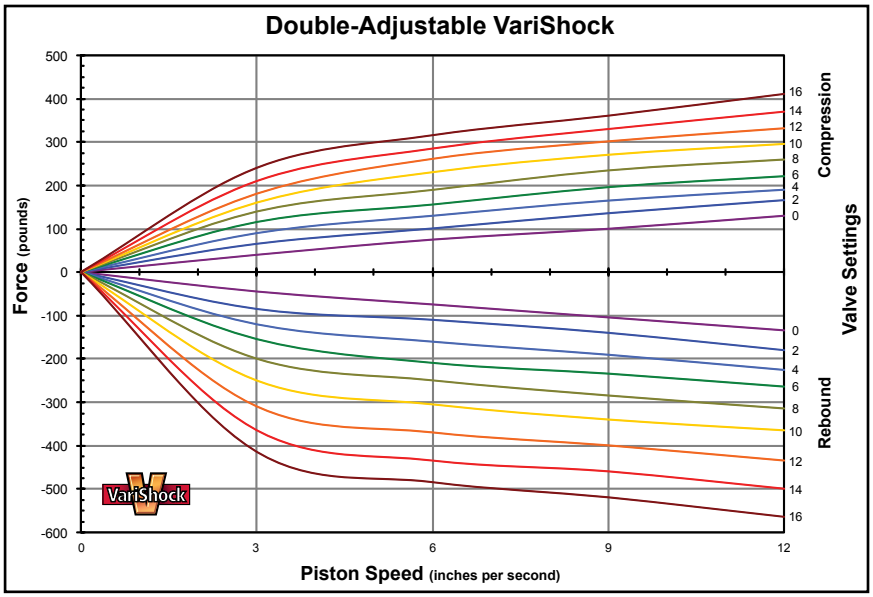
Symbol	Direction	Effect
+	Clockwise	Increase Stiffness
-	Counter-Clockwise	Decrease Stiffness
↓ ↑	Bump (compression) Adjustment	
↕	Rebound (extension) Adjustment	
Note:	QuickSet 1's single knob adjusts overall damping stiffness for Bump and Rebound simultaneously.	

Simple Adjustment
Position 1, the softest setting, is found by turning the knob in the counter-clockwise direction until the positive stop is located. Rotating the knob in the clockwise direction increases damping stiffness. Each of the 16 settings is indicated by a detent that can be felt when turning the knob, and an audible click as the knob gently locks into position. Only very light force is necessary to rotate the knob past each detent. If access to the adjustment knobs is limited, a 5/64 or 7/64 (depending upon model) ball-drive Allen wrench can be used to adjust the knob.

Note: VariShocks have a substantial range of adjustment with very little bypass or internal bleed. Due to our minimal-bleed design, shocks will feel extremely stiff at some settings when operated by hand, whereas other shocks with excessive bleed will move more freely. Manual comparison should not be performed. A person cannot manually operate the shock at a rate anywhere near real life conditions and any results found in this manner will be meaningless. Prior to shipping, every VariShock is dynamometer (dyno) tested and calibrated throughout an accurate range of shaft speeds and cylinder pressures found in real-world operation.

VariShock Dyno Graph

A shock dyno graph displays how much force is required to compress or extend the shock over a range of piston speeds (Force vs. Absolute Velocity). For readability purposes, the following graph only plots response curves for every other adjustment setting of the Bolt-In QuickSet 2 VariShock. The shock's digressive valving curve can be easily identified by the steeper incline in the slowest piston speeds and more level response as piston speed increases. Each setting provides an even increase of stiffness in relatively even increments across the entire range without deviation from the general response curve. This consistency can be found throughout the VariShock product line and makes suspension tuning simple and intuitive.



Coil-Over VariShocks

VariShock coil-over shocks and struts, and VariSpring 2-1/2"-ID coil springs give you the added abilities of adjusting spring preload and easily changing spring rates when tuning the suspension. Increasing or decreasing spring preload is necessary to position the shock at the correct ride-height length, and to maximize available traction by corner balancing the vehicle. Coil-over shock bodies feature high-load-capacity ACME threads with two vertical grooves, used to adjust and lock the ride-height adjustment.

Spring Preload

The threaded lower spring seat is used to adjust spring preload. Compressing the coil spring to any length shorter than it's free height, with the shock fully extended, is considered preloading the spring. If you adjust the spring seat to change the vehicle's ground clearance, be aware that you will be adding or subtracting travel in the shock. Usually when lighter-than-baseline spring rates are used it is necessary to add preload to achieve the correct balance of travel and ride height. If preload has been added make sure there is adequate spring travel remaining to prevent coil bind before the shock is fully collapsed.

Spanner wrench included

High-Travel VariSprings

VariSpring's line of coil springs was designed to complement the VariShock family. A new high-tensile wire is used that is stronger than the chrome-silicon wire used by other manufacturers. The improved material allows VariSprings to compress until the coils touch without damaging the springs or causing them to take a set, which adversely affects handling and randomly changes the spring height. This additional range of usable flex gives VariSprings greater travel than competitors' chrome-silicon springs of the same rate and permits the use of a more aggressive coil angle, reducing material used and overall weight. VariSprings can improve suspension control and available traction by allowing your shock to operate throughout its entire travel range.

VariSprings are available for front and rear applications in four lengths and a broad range of spring rates to suit a variety of shock and performance applications. Lengths range from 7 to 14 inches and rates from 80 to 850 pounds per inch, depending upon spring length. The steps between rates are approximately 15%, sufficiently close to make very fine adjustments.

Note: VariShock bolt-in coil-overs for 1993-2002 Camaros use 12" free-length spring. Refer to the chart on the following page for help in selecting the proper spring rate.

Springs are manufactured to tight tolerances to ensure uniform performance from every set. Inside diameters are 2.5" and can be used with VariShock coil-over shocks as well as shocks from other manufacturers. Ends are closed and ground to within 1.5 degrees. Springs are dyno-tested and must be within 3% of the designed rate to pass our strict quality control. VariSprings are sold in matched pairs. For universal quality appearance and easy identification, springs are completely powder-coated silver with the part number and spring rate silk-screened along the outside of the coil.

Baseline Spring Rate Selection

Spring rate affects ride quality, ride height, stored energy, weight transfer and how effectively the front suspension handles downward movement after drag race launches. Differences in vehicles such as specific performance application, weight reduction and chassis stiffening should be taken into consideration. Additional springs can be purchased for tuning purposes. The recommended spring rates are based on the combination of weight of the car and baseline ride height.

Additional information regarding ride height and spring rate selection is available by downloading the Installation and Tuning Guide from the VariShock product document library. The document library contains application charts, data sheets, instructions, and catalog pages for the entire VariShock product line.

http://www.varishock.com/docs

Baseline Spring Rate

Front Vehicle Weight (lbs)	Rate (lb/in)	Part Number
1400-1550	350	VAS 21-12350
1550-1700	400	VAS 21-12400
1700-1850	450	VAS 21-12450
	500	VAS 21-12500
	550	VAS 21-12550
	600	VAS 21-12600
	650	VAS 21-12650

VariShock Ride Height

When a shock is at ride height a certain amount of travel is available in either direction. Depending upon performance application, shock travel will be reserved in different percentages for compression or extension.

Street Baseline: 60-percent Bump, 40-percent Rebound
Street vehicles require more available compression (bump) travel for improved ride quality and unexpected road hazards. At baseline ride height, the shock and spring should collapse 40-percent from their installed heights. This results in 40-percent of travel available for extension and 60-percent for compression travel.

Handling Baseline: 50-percent Bump, 50-percent Rebound
Handling performance applications are usually limited to smooth prepared road-course- or autocross-tracks, therefore less compression travel is required. Suspension geometry or track conditions may require the travel percentages to be shifted to prevent topping- or bottoming-out the shock.

Drag Race Baseline: 40-percent Bump, 60-percent Rebound
Drag race vehicles generally require more extension (rebound) travel to help weight transfer, and because the drag strip is very flat, less compression travel is needed. The amount of extension travel available in the shock will drastically affect how the car works. At baseline ride height, the shock and spring should collapse 60-percent from their installed heights. This results in 60-percent of travel available for extension and 40-percent of compression travel.

Pricing and Specifications

QuickSet 1	QuickSet 2	Mounting		Total	Collapsed	Extended	Ride Height		Spring
		Top	Bottom	Travel	Length	Length	Min.	Max.	Length
VAS 8612F-834	VAS 8622F-834	Poly-eye	Crossbar	4.25	14.04	18.29	15.74	16.59	12

* Sold in pairs

Related Products

Spring-Seat Thrust Bearings

Thrust bearings are used at the lower spring seat to reduce friction when adjusting ride height. New stainless "cap-style" seats, a VariShock exclusive, enclose the thrust bearing to keep dirt out.

Part Number	Description
VAS 512-100	Spring-seat thrust bearing set (pair)
VAS 200	2-1/2" coil-over spring compressor

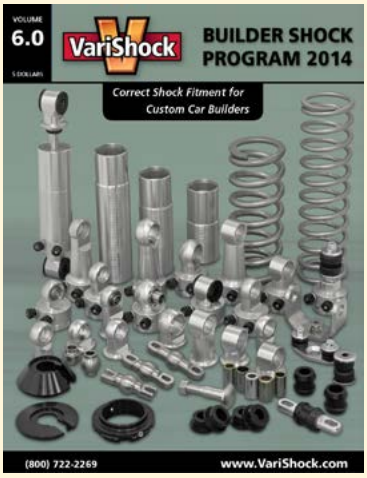
Coil-Over Spring Compressor

For use with all 2-1/2"-ID coil springs. Greatly eases adjustment on high-preload or high-rate applications.

Custom Built Shock Program

Having issues finding just the right shock? VariShock's Builder Shock Program could be the answer. Choose from coil-over, smooth-body, or air-spring shocks, with dozens of mounting styles, and a broad range of travel lengths.

Download the full program guide HERE.



All prices subject to change. Current pricing available at www.varishock.com.

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