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## Bolt-In VariStrut with Coil-Over Option – Models for '82-92 Camaro and '79-04 Mustang

OEM-  
Replacement  
VariStrut



Coil-Over-  
Conversion  
VariStrut



### Features and Benefits

- Direct bolt-in installation
- Available as direct replacement strut or coil-over conversion strut
- Versatile top mount hardware allows use with 16mm- or 3/4"-bore caster/camber plates
- Double-adjustable valving with independent 16-position adjustment of compression and rebound
- Two travel lengths/heights available: 7" travel, 1/2" shorter than stock; and 6-1/2" travel, 2" shorter than stock
- Suitable for drag race or street
- Sturdy 4130-chromemoly body with 7/8"-diameter high-strength piston rod

### Coil-Over Features

- Spring rates range from 80 to 450 lb-in.
- On-car adjustment of spring preload
- One-piece locking lower spring seat provides audible clicks at each adjustment step

## Bolt-in OEM-replacement VariStruts

OEM-replacement VariStruts are a bolt-in suspension-tuning solution with models available for 1982-1992 Camaros and 1979-2004 Mustangs. Double-adjustable QuickSet 2 valving lets you quickly adjust the strut's rate of compression and extension independently with easily accessible sixteen-position knobs. VariStruts are available for use with stock or aftermarket coil springs, or as a coil-over-conversion system to further increase tuning options and reduce weight. Spring rates range from 80 to 450 lb-in., and broaden the strut's performance range to cover drag racing, street use, and handling performance. The compact VariShock base-valve mechanism reduces the strut's overall length, yet retains the stock 6-1/2" of travel, making VariStrut an ideal component for vehicles with lower ride heights. Improvements to durability and performance accuracy are a result of billet 4130-steel strut bodies and full 7/8"-diameter piston rods. VariStrut's are compatible with most 16mm- or 3/4"-aftermarket caster/camber plates, but cannot be installed with OEM alignment plates. All strut components and hardware are plated, anodized, or powder coated for a long-lasting quality appearance. Struts and springs are packaged in pairs.

## VariStrut Installation

Bolt-in VariStruts utilize the factory mounting locations to simplify installation and maximize compatibility with aftermarket components. The strut stem mounts using an adaptable thrust stand and safety nut to enable installation with 16mm- or 3/4"-bore caster/camber plates. Lower-mount ears, welded directly to the strut body, mount to OEM-width spindle uprights with included replacement hardware. Mustang VariStruts also include additional spacers to allow use with 1" - or 3/4"-wide spindle uprights.

The non-coil-over VariStrut is for use with vehicles that require coil-springs in the stock locations. VariStrut coil-overs include hardware to mount 2-1/2" coil springs around the strut body, enabling the factory springs to be eliminated and reducing weight. Modification to the anti-roll bar and end links may be necessary for adequate clearance around the lower coil-over spring seat and adjustment knobs.



## VariStrut Construction

VariStruts are built to withstand the heavy demands of drag racing as well as the severity of daily street use. The strut body serves as the foundation for the strut and is constructed from 4130 steel tubing for its substantial strength and rigidity. The lower mounting ears are welded directly to the strut body, increasing clearance around the lower end of the strut. High-load-capacity ACME threads are machined onto the outside of the strut body, creating a durable means of adjusting spring preload and ride height. Strut bodies receive an ultra-seal clear-zinc finish prior to final assembly for enhanced corrosion resistance.

The bottom end of the strut is capped by an O-ring-sealed, screw-on base cap. 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 strut assembly during performance use. A manufacturing process known as "centerless grinding" is used to size the rod material to exactly 7/8" 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.

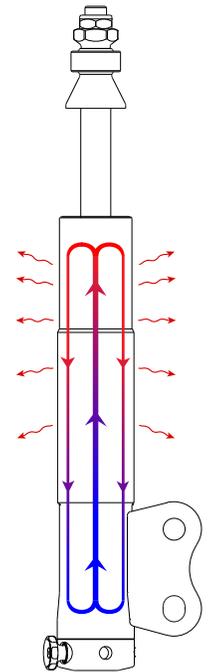


## VariShock Design

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 space is limited. 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 shock's 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 shock's 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 deflative-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.

## 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.



Symbol	Direction	Effect
+	Clockwise	Increase Stiffness
-	Counter-Clockwise	Decrease Stiffness
↓ ↑		Bump (compression) Adjustment
↕		Rebound (extension) Adjustment

## Double-Adjustable QuickSet 2

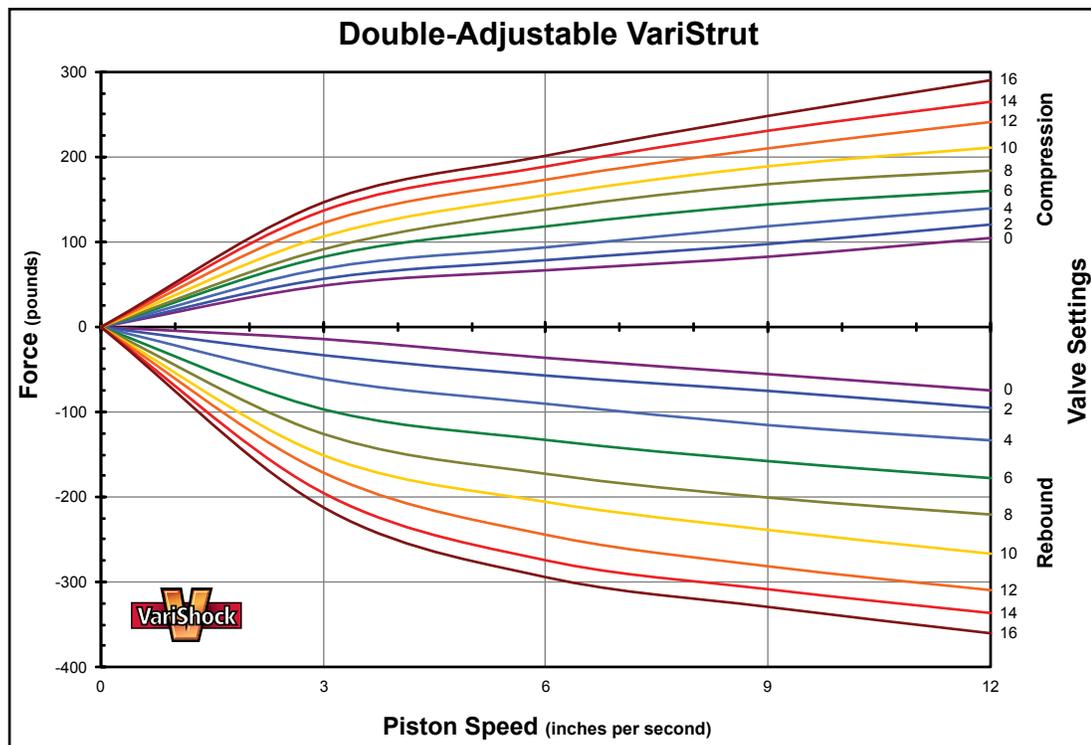
The QuickSet 2 valve system features dual adjustment knobs that independently control bump- and rebound-damping stiffness of the shock. Dual-arrow symbols engraved into the shock body demonstrate the function of each knob. Arrows pointing toward each other designate bump (compression) adjustment; the 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.

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.

### VariStrut Dyno Graph

A shock dyno graph displays how much force is required to compress or extend the strut 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 VariStrut. The strut'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.



### 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.

## 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.



### Billet Spring Seat Hardware

To mount the spring over the shock or strut, 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-strut upper seats require a closed seat to fully support the roller thrust-bearing assembly required for steering system operation.

### 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.



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: OEM-replacement VariStruts use a 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.



## VariStrut 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**

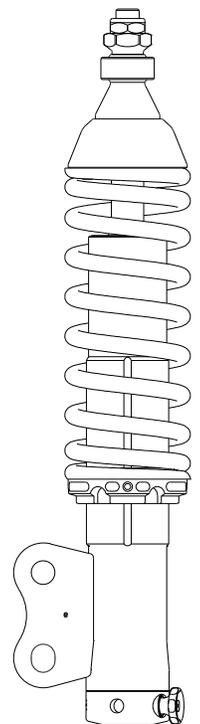
Street vehicles require more available compression (bump) travel for improved ride quality and unexpected road hazards. At baseline ride height, the shock and spring should collapse 40-percent from their installed heights. This results in 40-percent of travel available for extension and 60-percent for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



## 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>

Front Vehicle Weight (lbs)	Rate (lb/in)	Spring Travel (in)	Maximum Preload (in)	Part Number
675-775	80	8.63	2.755	VAS 21-12080
775-900	95	8.28	2.405	VAS 21-12095
900-1025	110	7.91	2.035	VAS 21-12110
1025-1175	130	8.43	2.555	VAS 21-12130
1175-1350	150	7.61	1.735	VAS 21-12150
1350-1500	175	7.60	1.725	VAS 21-12175
1500-1825	200	7.45	1.575	VAS 21-12200
1825-2200	250	7.00	1.125	VAS 21-12250
2200-2600	300	7.07	1.195	VAS 21-12300



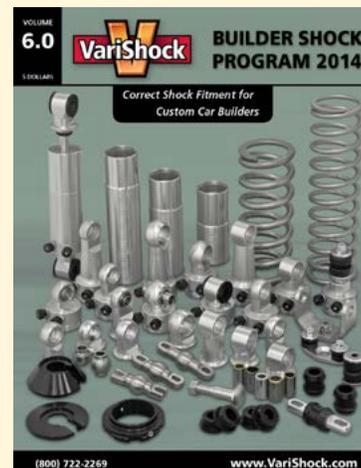
Part Number	Application	Type	Valving	Total Travel	Compressed Length	Extended Length	Minimum Ride Height	Maximum Ride Height
VAS 172DL-156	'79-04 Mustang	Bare Strut	Double	7.0"	15"	22"	17.8"	19.2"
VAS 172DL-952	'79-04 Mustang	Bare Strut	Double	6.5"	13.5"	20"	16.1"	17.4"
VAS 172DP-952	'82-92 Camaro	Bare Strut	Double	6.5"	13.5"	20"	16.1"	17.4"
VAS 872DL-156 <sup>2</sup>	'79-04 Mustang	Coil-Over	Double	7.0"	15"	22"	17.8"	19.2"
VAS 872DL-952 <sup>2</sup>	'79-04 Mustang	Coil-Over	Double	6.5"	13.5"	20"	16.1"	17.4"
VAS 872DP-952 <sup>2</sup>	'82-92 Camaro	Coil-Over	Double	6.5"	13.5"	20"	16.1"	17.4"

**Notes:** 1 - Sold only in pairs, 2 - Coil-over kit includes springs, upper and lower spring-seat hardware, and spanner wrench

## ■ 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](http://www.varishock.com).



A Chris Alston's Chassisworks, Inc. Brand

VariShock  
8661 Younger Creek Drive  
Sacramento, CA 95828

Order: 800-722-2269  
Tech: 916-388-0288  
Fax: 916-388-0295

[varishock@cachassisworks.com](mailto:varishock@cachassisworks.com)  
[www.varishock.com](http://www.varishock.com)