

**READ ALL INSTRUCTIONS COMPLETELY AND THOROUGHLY UNDERSTAND THEM BEFORE DOING ANYTHING.  
CALL VARISHOCK TECH SUPPORT (916) 388-0288 IF YOU NEED ASSISTANCE.**



## VariShock SensiSet Bolt-In Shock Installation and Tuning Guide

### Valving

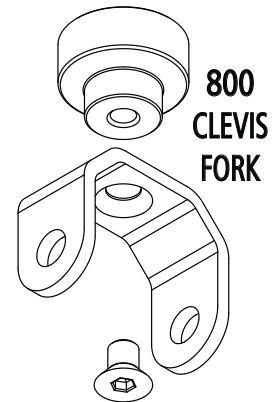
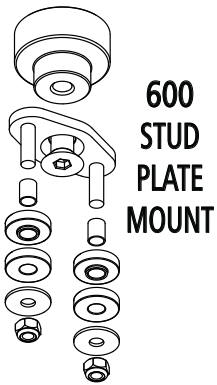
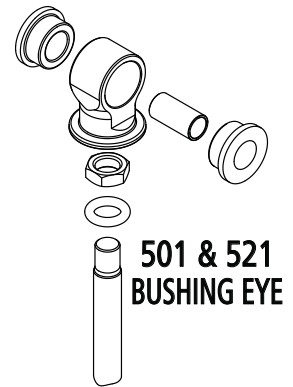
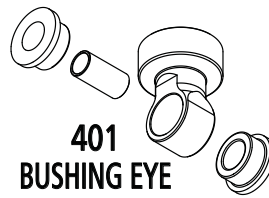
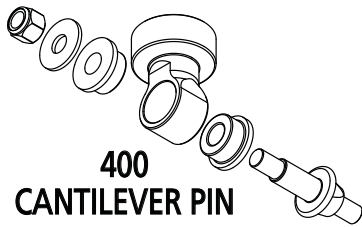
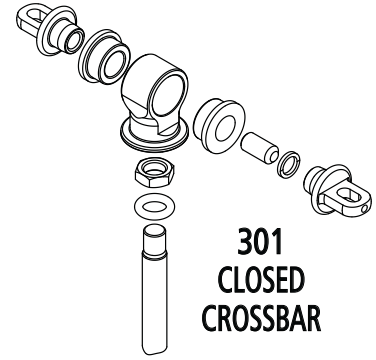
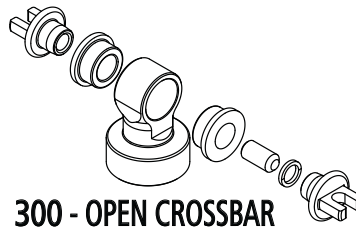
**SensiSet (non-adjustable)** - Features factory set valving range appropriate for most common installation requirements. Custom valved shocks are also available.

Part Number	Qty	Description
VAS 140XX-XXX	2	VariShock SensiSet Bolt-In Shock
899-061-XXX	1	Top Mount Hardware Bag (set)
899-061-XXX	1	Lower Mount Hardware Bag (set)
Note: Some shocks ship with unassembled mount hardware.		

### Shock Specifications

Part Number	Total Travel	Compressed Length	Extended Length	Minimum Ride Height	Maximum Ride Height	Upper Mount (Code - Description)	Lower Mount (Code - Description)
VAS 14022-615	6.15	11.94	18.09	14.40	15.63	501 - Eye, 7/16 to 1/2	501 - Eye, 7/16 to 1/2
VAS 14028-425	4.25	10.04	14.29	11.74	12.59	501 - Eye, 7/16 to 1/2	521 - Eye, 7/16 to 11/16
VAS 14044-715	7.15	10.83	17.98	13.69	15.12	201 - 3/8 Stem x .70 Nipple	700 - Stem, 3/8
VAS 14045-425	4.25	8.30	12.55	10.00	10.85	201 - 3/8 Stem x .70 Nipple	300 - Crossbar, Open
VAS 14045-515	5.15	9.20	14.35	11.26	12.29	201 - 3/8 Stem x .70 Nipple	300 - Crossbar, Open
VAS 14045-615	6.15	10.20	16.35	12.66	13.89	201 - 3/8 Stem x .70 Nipple	300 - Crossbar, Open
VAS 14046-515	5.15	9.20	14.35	11.26	12.29	202 - 3/8 Stem x .85 Nipple	301 - Crossbar, Closed
VAS 14046-615	6.15	10.20	16.35	12.66	13.89	202 - 3/8 Stem x .85 Nipple	301 - Crossbar, Closed
VAS 14047-425	4.25	7.84	12.09	9.54	10.39	201 - 3/8 Stem x .70 Nipple	600 - Stud Plate
VAS 14047-515	5.15	8.74	13.89	10.80	11.83	201 - 3/8 Stem x .70 Nipple	600 - Stud Plate
VAS 14047-615	6.15	9.74	15.89	12.20	13.43	201 - 3/8 Stem x .70 Nipple	600 - Stud Plate
VAS 14049-715	7.15	11.20	18.35	14.06	15.49	201 - 3/8 Stem x .70 Nipple	400/401 - Pin/Eye
VAS 14049-825	8.25	12.30	20.55	15.60	17.25	201 - 3/8 Stem x .70 Nipple	400/401 - Pin/Eye
VAS 1404C-515	5.15	10.49	15.64	12.55	13.58	202 - 3/8 Stem x .85 Nipple	800 - Base Clevis Fork
VAS 14064-715	7.15	12.57	19.72	15.43	16.86	301 - Crossbar, Closed	700 - Stem, 3/8
VAS 14067-425	4.25	9.58	13.83	11.28	12.13	301 - Crossbar, Closed	600 - Stud Plate
VAS 14069-715	7.15	12.94	20.09	15.80	17.23	301 - Crossbar, Closed	400 - Canteliver Pin
VAS 14088-425	4.25	10.04	14.29	11.74	12.59	521 - Eye, 7/16 to 11/16	521 - Eye, 7/16 to 11/16
VAS 14088-715	7.15	12.94	20.09	15.80	17.23	521 - Eye, 7/16 to 11/16	521 - Eye, 7/16 to 11/16
VAS 14088-825	8.25	14.04	22.29	17.34	18.99	521 - Eye, 7/16 to 11/16	521 - Eye, 7/16 to 11/16
VAS BIH20-F0	5.15	9.20	14.35	11.26	12.29	201 - 3/8 Stem x .70 Nipple	Crosspin-B
VAS BIH20-R0	7.15	12.95	20.10	15.81	17.24	Crosspin-B	1-1/4 Wide Poly

# UNASSEMBLED MOUNT DIAGRAMS



## Mount Codes & Descriptions

201/202	Upper 3/8" thread stem x 2-1/8 long
300	Open crossbars for 2-1/8 to 2-1/2 bolt centers 7/16 bolt x 1-1/4, 1-3/8, 3-3/8 sleeve width 12mm bolt x 1-1/4, 1-1/2, 1-5/8 sleeve width 1/2 bolt x 1-1/4, 1-3/8, 1-5/8 sleeve width
301	Closed crossbars for 2-3/8 to 3" bolt centers 5/8 bolt x 1-1/4 sleeve width
400/401	Cantilever pin 1/2 thread with 1-5/16 offset 7/16 bolt x 1-1/4, 1-3/8, 3-3/8 sleeve width 12mm bolt x 1-1/4, 1-1/2, 1-5/8 sleeve width 1/2 bolt x 1-1/4, 1-3/8, 1-5/8 sleeve width

501	Urethane bushing eye 7/16 bolt x 1-1/4, 1-3/8, 3-3/8 sleeve width 12mm bolt x 1-1/4, 1-1/2, 1-5/8 sleeve width 1/2 bolt x 1-1/4, 1-3/8, 1-5/8 sleeve width
521	Urethane bushing eye 12mm bolt x 1-1/4, 1-1/2, 1-5/8 sleeve width 1/2 bolt x 1-1/4, 1-3/8, 1-5/8 sleeve width 9/16 bolt with 1-5/8 sleeve width 5/8 bolt with 1-5/16 sleeve width 11/16 bolt with 1-9/16 sleeve width
600	5/16 stud plates on 2-1/8 centers
700	Lower 3/8 thread stem x 2-1/8 long
800	Clevis fork with 5/8 bore x 2-3/4 wide

## ASSEMBLED MOUNT IMAGES



Upper Crosspin-B



Lower Crosspin-B



Lower Crosspin-A



Spool Bushing  
1-1/4"-wide, various bores

## INSTALLATION

Read the complete installation and tuning guide before beginning.

### Verify Correct Dimensions

It is the purchaser's responsibility to physically verify that the VariShock chosen for your vehicle will fit correctly. Verify that the shock received has the correct mount types, and meets the length and travel requirements for your application. If the vehicle's ride height has been altered, either raised or lowered from stock, a shock of different length than stock will be required. The required travel measurements can be taken from your existing shock or directly from the chassis mounts. Measure your existing shock or chassis mounts at full-compression, full-extension, and at ride height. If measuring from the chassis mounts, the springs must be removed from the vehicle to allow free movement. These dimensions can be directly compared to the information contained in the Shock Specifications chart on page one. If dimensions are acceptable, proceed with trial fit and installation.

### Checking for Binding and Clearance Overview

It is extremely important to check for binding and adequate clearance before installing the suspension springs. This will allow you to more easily move the suspension throughout its entire range of travel. Place the vehicle on four jack stands so that the suspension hangs freely. With the shocks installed and springs removed, position a floor jack under the A-arms or rear end housing to raise and lower the suspension. Check for binding at every suspension joint, including shock mounts, balljoints, tie rods, and anti-roll bar end links. Front end suspension travel will need to be checked with the steering straight, and also with the steering at full left- and right-lock. VariShocks are larger in diameter than OEM shocks, so clearance around the shock body and mounts will be different from factory clearances. Verify that there is at least 1/2" clearance around the entire shock assembly. Modifications to the chassis or its components may be necessary. Failure to ensure proper shock clearance and bind-free movement at all possible travel positions will result in damage to the shock and/or chassis.

### Shock Assembly

Assemble the hardware that attaches to the shock stems and eyes. Refer to the exploded diagrams for assembly.

### Crossbar Mount Pre-assembly

We recommend pre-assembling the crossbar halves before installing them onto the shock eye. Put one crossbar half into a vise; clamping onto the mounting tab. Screw the set screw into this half. Place crush washer over set screw and then screw the other crossbar half onto the set screw until it bottoms against the crush washer. Use a large crescent wrench to tighten the assembly until the two tabs are flat in relation to each other. Do not tighten the assembly more than 1/2 turn to prevent damaging the crush washer.

### Shock Installation

We recommend replacing factory mounting hardware with new fasteners of equal or better grade. Follow standard torque specifications for fasteners used at solid mounts such as crossbar tabs. Urethane-bushed mounts, such as stems, should be tightened to slightly preload the bushings without over tightening.

## Crossbar Shock Installation

In some installations the lower control arm will have to be modified to install the VariShock. Generally, the aluminum body and adjustment knobs are larger than the OEM component they are replacing and requires the opening at the center of the lower arms spring pocket to be widened or notched for installation clearance. The VariShock crossbar mounts in the same location as an OEM-style shock.

1. Insert the shock into the lower A-arm with the knobs facing away from the pocket that seats the end of the spring coil. The shock will be rotated 180-degrees during installation.
2. Trace the knobs onto the arm to define the cut line. We chose to draw a straight line between the knob ends to make one large notch instead of two smaller notches.



3. Use a small saw or cutoff wheel to make the modification. Be sure to deburr the cutout before installing the shock.



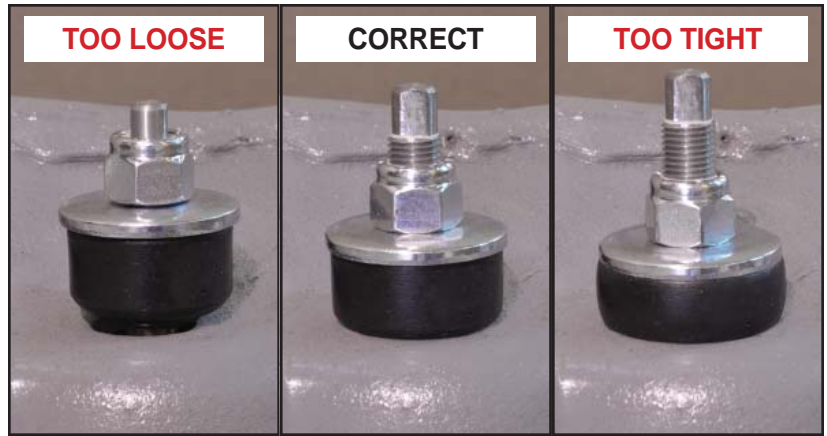
4. Bolt the crossbar to the A-arm with the hardware include in the kit. The OEM hardware is not long enough to securely mount the thicker VariShock crossbars and should not be used.





### Stem Mount Installation

The urethane bushings at the stem mount must be preloaded to eliminate unnecessary freeplay, while still allowing the shock stem to pivot within a necessary range.



### Rear Crossbar and Cantilever Pin Shock

This is an example of a upper crossbar mount and a lower 1-1/4" wide poly-bushing eye mounted on a factory cantilever pin.



# VariShock Adjustment and Tuning Guide - SensiSet

This guide covers adjustment features and tuning procedures for VariShock SensiSet, non-adjustable, shock absorbers. The information contained has been greatly simplified and is only intended to get you started in the right direction. Suspension tuning involves multiple variables such as: spring rates, antiroll bar rates, vehicle weight distribution, tire sizes, tire pressures, suspension geometry, and track conditions. We highly recommend thoroughly researching suspension tuning and vehicle dynamics, or consulting an experienced professional.

## SensiSet Valve Features

VariShocks have very little bypass or internal bleed. Due to our minimal-bleed design, shocks will feel extremely stiff 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.

## Travel Limiters

Shocks are not to be used as travel limiters. An extension travel limiter, such as a strap or cable, should be used to prevent topping out and damaging the shocks. The installed compression bumper protects the shock if bottomed out during normal use. If the bumper shows signs of wear or damage it must be replaced immediately. Never operate a vehicle with a missing or damaged bumper. Vehicles that consistently bottom out shocks or land harshly from wheel stands should use a higher rate spring along with some form of suspension stop to limit compression travel without directly impacting the shock body. Any shock will be damaged if the car is dropped from a wheel stand.

## 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.

## **Spring Preload**

The threaded lower spring seat is used to adjust spring preload. Compressing the coil spring to any length shorter than its 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.

## **Tuning Front Suspension with Spring Rate (Drag Race)**

A drag race car should run the lightest front spring rate possible, without letting the shocks bottom out when making a pass. As a general guideline, lighter springs allow the car to easily transfer weight, and settle faster down track. Changing spring rate affects ride height and the rate at which weight is transferred to the rear tires. A softer rate makes the front easier to raise during acceleration. A stiffer rate makes the front harder to raise during acceleration. If you are having trouble getting the front end to rise, you can soften shock valving or change to a softer spring. When using lighter rate springs preload must be added by screwing the lower spring seat upward, compressing the spring to achieve proper ride height. In general terms, the worse a car hooks the more shock extension travel it will need. If you need more extension travel, preload can be removed to lower ride height. Using this method will cause the car to have less ground clearance and reduce the amount of compression travel. If you are going to operate the shock at a ride height shorter than recommended, the upper chassis mounts must be relocated to correct any major vehicle ride height issues. It may take some work with spring rates and upper mount relocation to get the correct combination of vehicle ride height and front suspension travel for your application.

**WARRANTY NOTICE:**

There are NO WARRANTIES, either expressed or implied. Neither the seller nor manufacturer will be liable for any loss, damage or injury, direct or indirect, arising from the use or inability to determine the appropriate use of any products. Before any attempt at installation, all drawings and/or instruction sheets should be completely reviewed to determine the suitability of the product for its intended use. In this connection, the user assumes all responsibility and risk. We reserve the right to change specification without notice. Further, Chris Alston's Chassisworks, Inc., makes **NO GUARANTEE** in reference to any specific class legality of any component. **ALL PRODUCTS ARE INTENDED FOR RACING AND OFF-ROAD USE AND MAY NOT BE LEGALLY USED ON THE HIGHWAY.** The products offered for sale are true race-car components and, in all cases, require some fabrication skill. **NO PRODUCT OR SERVICE IS DESIGNED OR INTENDED TO PREVENT INJURY OR DEATH.**

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