



VariShock SensiSet Coil-Over Installation Guide

Part Number	Qty.	Description
VAS 110XX-XXX	2	Coil-Over Shock with Threaded Body (pair)
899-002-200	2	Lower Coil-Over Spring Seat
899-002-201	2	Upper Coil-Over Spring Seat

Valving

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

Mounting Eyes - Two Styles

- **Spherical Bearing** - *1/2" bore x 1" wide Teflon lined bearing*
This style of mount is primarily used for racing or off-road applications for reduced friction. They are generally mounted between two frame tabs with a 1/2" diameter bolt. The inside width between the tabs should be 1-1/16" to 1-3/16" wide. Replacement bearings are available separately.
- **Polyurethane Bushing** - *5/8" bore bushings with 1/2" bore sleeve x 1-1/4" wide pressed-in sleeve*
Poly eye coil-overs are generally used in street applications for reduced vibration and noise. They are generally mounted between two frame tabs with a 1/2" diameter bolt. The inside tab width should be 1-1/4" to 1-5/16" wide. By removing the 1/2" sleeve, the poly eye coil-overs can also be mounted to VariShock 5/8" pin mounts (optionally available). Replacement bushings are available separately.

Lengths - Six

VariShock coil-overs are available in six different lengths, ranging from 11.35" to 20.10", fully extended. Each provides a specific amount of total travel (see chart) that must match the requirements for your particular application.

Part Number	Total Travel	Compressed Length ¹	Extended Length ¹	Minimum ² Ride Height	Maximum ³ Ride Height	Spring Length	Usage
VAS 110XX-280	2.80	8.55	11.35	9.67	10.23	7	Front
VAS 110XX-350	3.50	9.30	12.80	10.70	11.40	7	Front
VAS 110XX-425	4.25	10.05	14.30	11.75	12.60	9	Both
VAS 110XX-515	5.15	10.95	16.10	13.01	14.04	12	Rear
VAS 110XX-615	6.15	11.95	18.10	14.41	15.64	12	Rear
VAS 110XX-715	7.15	12.95	20.10	15.81	17.24	14	Rear

Footnotes:

1	Length of shock is the measured distance between centers of mounting eyes.
2	Minimum Ride Height: 40% of travel available for compression (bump), 60% of travel available for extension (rebound)
3	Maximum Ride Height: 60% of travel available for compression (bump), 40% of travel available for extension (rebound)

Spring Rate Selection

Springs are a tuning item, therefore VariShock does not accept exchanges. If you are unsure of the correct spring rate, check with your chassis builder or component supplier for a recommendation. Mathematical formulas are also available to find an accurate baseline rate from which to start. All formulas will require individual weights for the front and rear of the vehicle. As an aid to help you select the correct spring rate, VariShock offers a discount on a second set of springs if purchased with the shocks.

Front Baseline Spring Rate

Determining the front spring rate requires knowledge of the installation or motion rate for calculation. If you are unsure of this procedure, check with your chassis builder or component supplier for a recommendation.

Installation

Read these instructions in their entirety before beginning installation.

1. Verify you have the correct length shock, and eye mount style for your application before proceeding. If there is any question regarding correct fit please consult with your chassis builder or component supplier before contacting Chassisworks directly.
2. Trial fit the shock absorber onto the chassis prior to installing the spring. This allows you to easily move the suspension throughout its entire range of travel.
3. Place your vehicle on four jack stands so that the suspension hangs freely and the tires do not touch the ground.
4. Use a floor jack under the A-arms or rear end to raise and lower the suspension. Check for binding in every joint of the suspension, including the coil-over mounting eyes. Check front suspension travel with the tires straight, and then again with them turned to full lock in each direction. If everything checks out, the springs can be installed onto the shocks.
5. Apply anti-seize to threads of lower spring seat and shock body, then screw spring seat onto shock until nearly in contact with adjustment knobs. The spanner wrench notches in spring seat should face toward lower shock eye. Ball-locks may need to be loosened to easily turn spring seat.
6. Install optional spring seat thrust bearing (PN 899-020-217) onto shock at this time. Bearings must be lightly greased before use.
7. Install spring onto shock, then place upper spring seat into position. The threaded lower spring seat will need to be very near its lowest setting. In most cases, the spring must be slightly compressed to slide the top seat into position.
8. Once upper spring seat is in place, thread lower seat upward until spring just starts to compress. Make sure both lower spring seats are screwed on equal amounts to prevent preloading the spring.
9. Install the assembled coil-over on the vehicle. Verify there is no binding and plenty of clearance around the shock and spring. There must be ample clearance around the spring which was not on the shock during your first travel check. Remove the jack stands and place your car on the ground again checking clearances. While remaining at a safe distance from the car and any moving suspension components, have someone bounce the vehicle at each of its four corners to verify there are not spring clearance issues.

Baseline Spring Rate (REAR ONLY)

Rear Vehicle Weight (lbs)	Rate (lb/in)	Part Number
820-925	80	VAS 21-XX080
925-1025	95	VAS 21-XX095
1025-1125	110	VAS 21-XX110
1125-1225	130	VAS 21-XX130
1225-1350	150	VAS 21-XX150
1350-1500	175	VAS 21-XX175
1500-1750	200	VAS 21-XX200
1750-2025	250	VAS 21-XX250
2025-2300	300	VAS 21-XX300
2300-2600	350	VAS 21-XX350
2600-2900	400	VAS 21-XX400
2900-3200	450	VAS 21-XX450



Figure 2-1



Figure 2-2

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 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.

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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