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

INSTALLATION GUIDE

TCP COLVF-07

Front Coil-Over Conversion

Description: Upper and lower coil-over shock mounts with mounting hardware

Applications: Comet ‘60-63, Falcon ‘60-63, Ranchero ‘60-63
Note: Must upgrade to V8 spindle.

IMPORTANT: The outer shock tower reinforcement plate and suspension bump stop must be reinstalled prior to operating the vehicle. Worn or damaged suspension bump stops must be replaced. Failure to provide a proper compression-travel suspension stop will cause unwarrantable damage to the shock absorber and possible structural damage to the chassis.

PARTS LIST

Qty	Part Number	Description
2	7909-032	Shock Tower Backup Plate
1	7909-044	Upper Shock Mount Assembly 2-5/8” Driver Side
1	7909-045	Upper Shock Mount Assembly 2-5/8” Passenger Side
2	7909-052	Lower Shock Mount Mark II #1

7918-043 - Hardware Bag

Qty	Part Number	Description
2	3100-050F2.75Y	Bolt 1/2-20 x 2-3/4” Hex Head Cap Screw Grade 8 Yellow Zinc
2	3100-050F3.00Y	Bolt 1/2-20 x 3” Hex Head Cap Screw Grade 8 Yellow Zinc
6	3101-038-16C	Locknut 3/8-16 Nylon Insert Clear Zinc
4	3101-050-20C	Locknut 1/2-20 Nylon Insert Clear Zinc
6	3104-038C1.75C	Button Head 3/8-16 x 1-3/4” Cap Screw Clear Zinc
4	3108-044L-C	Lock Washer 7/16” Regular Clear Zinc
12	3120-038S-Y	Washer 3/8” Hardened Flat SAE Yellow Zinc
8	3120-050S-Y	Washer 1/2” Hardened Flat SAE Yellow Zinc

INSTRUCTIONS

NOTE: A 1965 Mustang was used for the following images and may show slight differences from your vehicle. The installation procedure is identical.

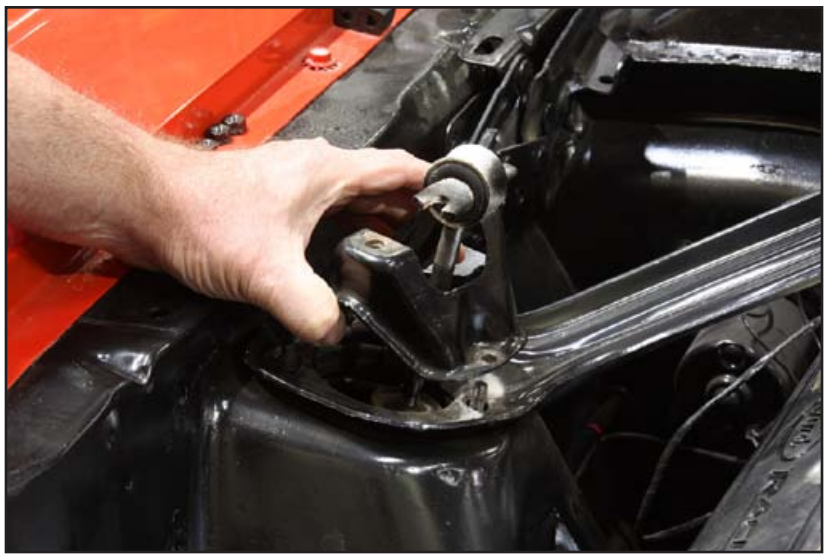
Installation of the upper control arms, lower control arms, and strut rods should be complete before proceeding. The lower arms and strut rods must be attached to the chassis, but not bolted to each other. Specific procedures are described in their individual installation guides. Illustrations show driver’s side suspension. All steps must be repeated for passenger side installation. *Do not install springs onto coil-over shocks until after the suspension has been checked for adequate travel clearance.*

Chassis Inspection

With the factory components out of the way, this is a good time to inspect sheet metal for signs of fatigue. Clean the area to remove any grease or dirt, so that metal and welds are clearly visible. Look for cracks along welds or tearing of mounts in any way. If there is any damage present, repairs must be made before proceeding.

Remove Factory Shocks and Mounts

1. Raise front end of car and secure with jack stands. Wheels must not be in contact with ground.
2. Remove wheels, making note of which side of the vehicle they were removed from.
3. Unbolt the factory shock mount from the shock tower.
4. Unbolt the upper shock crossbar from factory shock mount and remove the stamped shock mount from the vehicle.

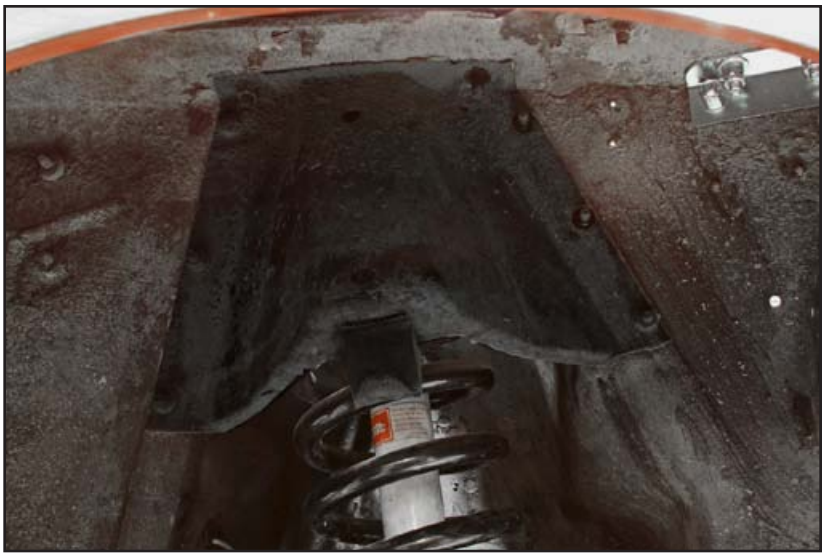


5. Once the upper shock mounts are out of the way, unbolt the factory tower brace at the firewall and lift it out of the way. It can be reinstalled after the coil-over kit has been installed or replaced with our replacement tower brace kit (TCP TWRB-01 or TCP TWRB-04).

6. Remove the outer shock tower reinforcement plate and set it aside. This component will be reinstalled later.

At this point the coil spring must be removed from the vehicle as explained in the upper control arm instructions.

7. Remove the OEM coil-spring isolator, positioned on the upper spring seat of the shock tower.



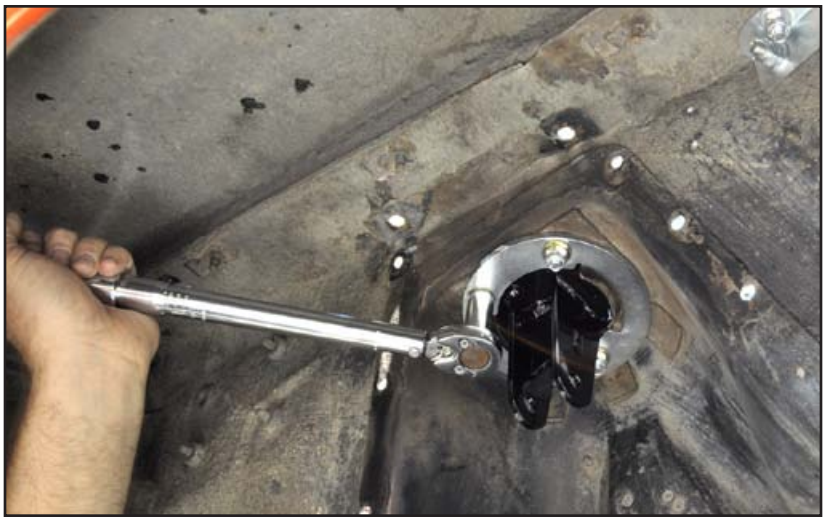
8. Place the new passenger-side upper shock mount on the shock tower and use it as a guide to enlarge the three factory holes in the shock tower.

   NOTE: Some applications will require two new holes to be drilled. Line up the centered holes and use the mount as a drill jig to drill the new holes.

9. Insert the 3/8-16 x 1-3/4” button head bolts and flats washer through the shock mount plate. The radiused edge of the top plate faces the centerline of the vehicle.

10. Slide the shock tower backup plate onto the three bolts and around the factory spring seat.

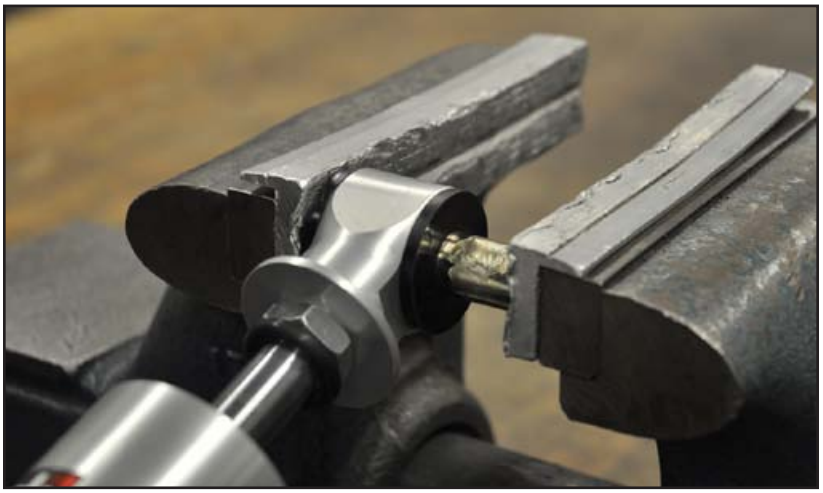
11. Install the 3/8 flat washers and locknuts. Tighten to 30 lb-ft.



12. Press one bushing into each side of the bushing eyes.

13. Apply a small amount of poly lube to the inside bore of the busings.

14. Press the steel sleeve into the bushings, using a vise or press.



15. Position the billet mount over the holes in the strut rod/lower control arm and secure with the 7/16-14 x 1-1/2” socket head cap screws , flat washers (included with the strut rod kit), and lock washers.

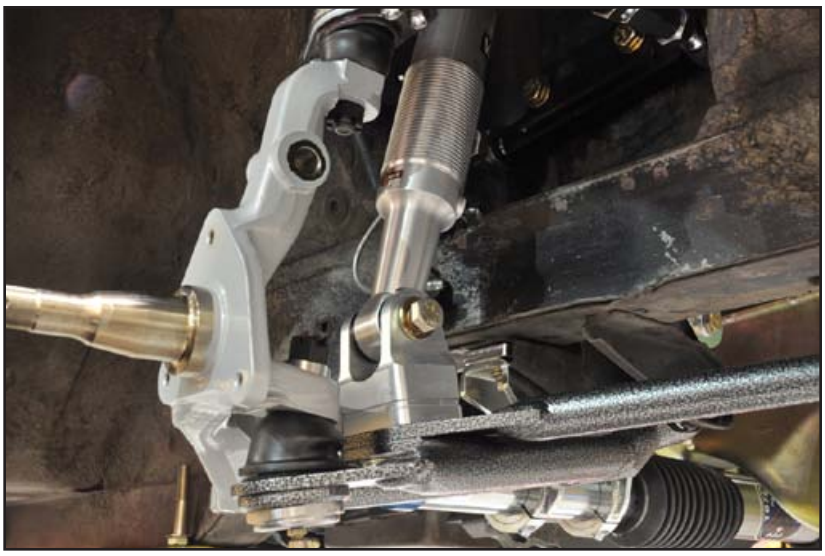
    The arrow on the bottom of the billet shock mount faces toward the front of the car when installed.

16. Tighten the socket heads to 50 lb-ft.

    IMPORTANT: The 7/16” bolts must be loose when adjusting length of the strut rod during front end alignment to prevent binding.

17. Apply poly lube to the flat surface of the bushings where they will contact the shock mounts.
18. Next, the shocks are temporarily installed to verify clearances and set the alignment.
19. Bolt the upper end of the shock into its mount, using a 1/2-20 x 2-3/4” bolt, two flat washers, and a locknut. Thread the nuts on by hand so that the bolts do not slip out during the following steps.

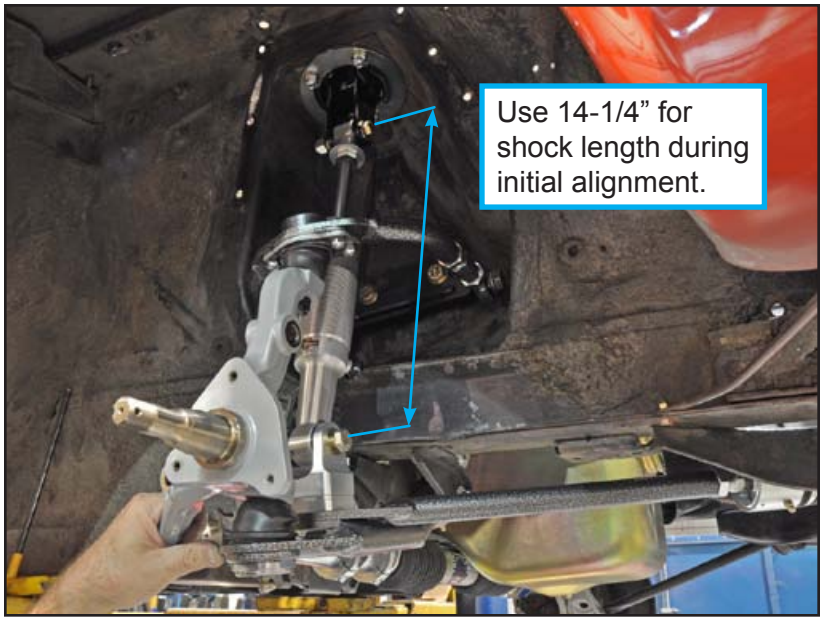
20. To make the shock easier to work with, adjust the shocks to their softest setting by rotating the knobs counter-clockwise.
21. Slide the shock eye into the billet lower mount. Secure the shock with a 1/2-20 x 3” hex bolt, two flat washers and a locknut. Thread the nuts on by hand so that the bolts do not slip out during the following steps.



22. Using a jack placed under the lower control arm, raise the suspension to its ride-height position.

    Ride Height = 14-1/4” eye-to-eye

23. With the suspension at correct ride height, the alignment can be set using a digital protractor placed against flat or ‘square’ features of the spindle.



24. Once adjusted, cycle the suspension through its full range of travel to check for possible clearance issues. You will need to estimate the area taken up by the spring; 3/4” around the shock body.

25. Check to make sure the strut rod does not contact the frame rail when the suspension is fully compressed. The lip of the frame rail can be ground or bent for clearance, if needed.

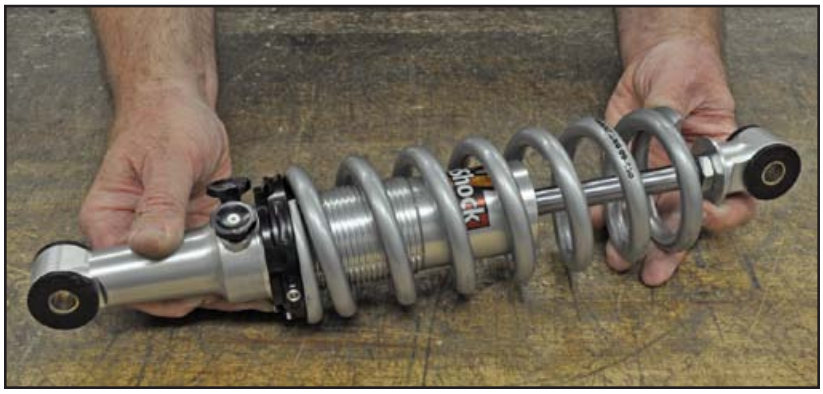
26. Once clearance has been verified, remove the shocks to install the spring seats and coil spring.

27. Thread the lower spring seat onto the shock body as far as possible to allow the spring to be installed. The notches for the spanner wrench must face toward the adjustment knobs.

28. Apply a thread lubricant, such as Anti-Seize™ onto shock-body threads just above the lower spring seat.

29. Extend the shock and slide the rubber O-ring bumper down the shaft a couple of inches.

30. Place the spring over the top mounting eye and onto the lower spring seat.

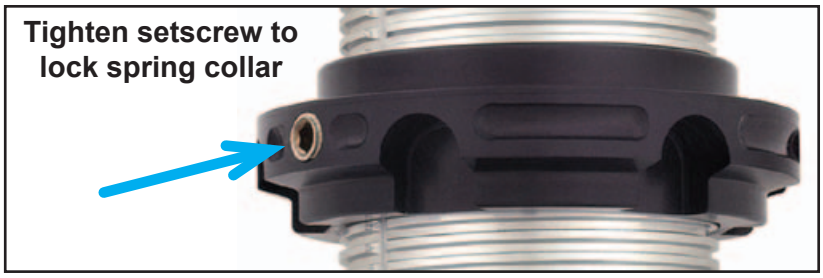


31. Slip the upper spring collar around the piston and seat it between the spring and upper shock eye. You may have to compress the spring slightly.

32. Thread lower spring seat upward until it holds the spring and upper spring seat in place without any free play and is resting at one of the half-turn detents. Make sure the upper collar is correctly seated onto base of upper mounting eye.

33. Tighten the lower spring collar an additional one-half turn.

34. Tighten the lower-seat ball-locks into their grooves.



35. Install the shocks onto the vehicle. Generally there is clearance for the knobs with the shock facing in either direction. Depending upon wheel backspacing it may be easier to face the shock toward the vehicle. Install the shock facing the direction which is most comfortable for you to access for later adjustment.

36. Tighten the shock mounting hardware to 55 lb- ft.

37. Verify all mounting hardware is correctly installed and correctly torqued.

38. Reinstall the outer shock tower reinforcement plate.

39. Replace worn or damaged upper-control-arm bump stops.

40. Install wheels to their original location and torque lug nuts.

41. Lower vehicle.

42. Adjust the shock's lower spring collars to achieve the correct ride-height shock length with weight of vehicle carried by the suspension. Vehicle must be raised and safely supported when adjusting spring collars.

Torque Specifications

Fastener Description	Location	Torque Value
Button Head 3/8-16 x 1-3/4"	Upper Shock Mount to Shock Tower	30 lb. ft.
Socket Head 7/16-14 x 1-1/4"	Lower Shock Mount to Lower Arm Assembly	50 lb. ft.
Hex Head 1/2-20 x 2-3/4" and 3"	Shock Mounting Eyes	60 lb. ft.

Alignment

The vehicle must be professionally inspected and aligned prior to regular use.
If a trailer is not available, your alignment will need to be somewhat close to final specs in order to safely drive your vehicle to the alignment shop. Visually determine if the front wheels look straight. They should not appear to "toe" (left to right) -in or -out. The outside of the wheels should be very close to vertical. A few degrees of negative camber (leaning in) is acceptable.

	Street Performance		Road Course		Drag Strip	
	Manual	Power	Manual	Power	Manual	Power
Caster	2-1/2° to 3° pos.	3-1/2° to 4° pos.	2-1/2° to 3° pos	3-1/2° to 4° pos	4° to 6° pos	4° to 6° pos
Camber	0° to 1/2° neg	0° to 1/2° neg	1-1/2° to 2° neg	1-1/2° to 2° neg	0°	0°
Toe (total)	1/16" to 1/8" in	1/16" to 1/8" in	1/16" out to 1/16" in	1/16" out to 1/16" in	1/16" to 1/8" in	1/16" to 1/8" in

Our recommended alignment specs serve as a starting point for your particular application. Installed components, driver preference, and specific application will have a great affect on the correct settings for your vehicle.

VERIFY RIDE HEIGHT

After all suspension clearances have been checked and the shocks installed onto the vehicle with the springs, you must verify that the shocks rest at ride height within their allowable range of operation.

- The suspension must carry the full weight of the complete vehicle, including interior and passenger weight, with the wheels on the ground during measurement.
- Measure the length of the shock and compare to Shock Specifications chart to ensure you are within the Ride Height range. Spring preload will need to be adjusted at the lower spring seat until both shocks measure equal to each other and are at the correct length.
- SUSPENSION MUST BE AT FULL EXTENSION AND THE VEHICLE SAFELY SUPPORTED WHILE ADJUSTING THE LOWER SPRING SEAT.
- With the vehicle weight carried by the suspension, it is easier to get an accurate measurement from the bottom of the upper spring seat to the center of the lower mounting bolt.
- DO NOT THREAD THE LOWER SPRING SEAT UPWARD MORE THAN 1/2” FROM IT’S LOWEST POSITION.
- If more than 1/2” of preload is needed to raise the vehicle into the correct ride height range, you must step up to a heavier spring rate. Failure to increase the spring rate will allow the spring to abruptly coil-bind before full shock compression, limit suspension travel, and damage the shock and related chassis and suspension components.

Shock Ride-Height Specifications

Part Number	Mounting		Total Travel	Compressed Length*	Extended Length*	Ride Height*		Spring Length
	Upper	Lower				Min.	Max.	
TCP COPQ2-16.30	Poly Eye	Poly Eye	4.25”	10.47”	14.72”	12-1/8”	13”	9”

* Shock length is measured from the top of the coil spring to the center of the lower mounting-eye bolt. It is easiest to measure between these two points once the shock has been mounted to the vehicle.

Spring Selection Guidelines

A good spring rate baseline for vehicles equipped with an iron small block would be 450 lb./in.

Differences that alter desired spring rate:

Weight Reduction -50 lbs (fiberglass hood)
Aluminum Heads -50 lbs
Big Block +100 lbs
Road Race +50 lbs (better handling)
Drag Race -50 lbs (more stored energy)

Spring rate effects ride quality, ride height and roll rate characteristics. Differences in vehicles such as aluminum engine components, fiberglass body parts and chassis stiffening should be taken into consideration. Additional springs can be purchased for tuning purposes.

9” VariSprings

Rate (lb/in)	Part Number
450	VAS 21-09450
500	VAS 21-09500
550	VAS 21-09550
600	VAS 21-09600
675	VAS 21-09675
750	VAS 21-09750
850	VAS 21-09850

Determining Your Baseline Spring Rate

Determining the correct spring rate and correctly adjusting your suspension is very important to achieving the best possible and most reliable performance from your components. In fact, the vast majority of problems people experience with coil-over shocks can be attributed to using the wrong spring rate or incorrect adjustment of the shocks many settings.

What is the Baseline Spring Rate?

“Baseline spring rate” is defined as the pound-per-inch rate (lb/in) at which the spring supports the corner weight of the vehicle with the coil-over shock at the correct installed height without the need to preload the spring. Once the baseline spring rate has been established, the vehicles performance goals and further testing will reveal the correct final spring rate for each installation. Differences such as how the spring is mounted (installation motion ratio), vehicle weight reduction, chassis stiffening, specific performance application, and driver preference and skill level all have a bearing upon the correct final spring rate.

Where to Begin? (Initial Spring Rate)

Based on our experience with vehicles and performance applications similar to your own, Chassisworks can recommended an “initial spring rate” to install on your vehicle, from which the correct baseline spring rate can be derived. In many cases our recommended initial spring rate will be the correct baseline spring rate. However, due to the sheer number of variables, it is impossible for our technical staff to predict the precise baseline spring rate for each and every installation scenario. To assist you in obtaining the correct spring rate, a second set of springs can be purchased at a discount.

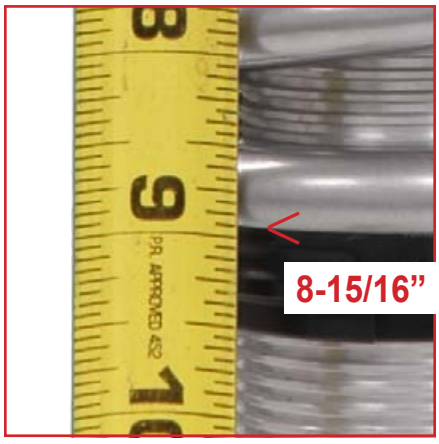
Taking Measurements

Chassisworks has developed a simple method to determine the correct baseline spring rate. This method requires installation of our initially recommended spring, followed by a couple quick measurements and some simple calculations. Before getting started, the vehicle must be 100% complete. This includes interior, glass, fluids, weight ballasts, and sand bags or free weights to substitute as the weight of the driver. At this point, the springs should already be installed on the shocks with NO PRELOAD and ready to go onto the vehicle. *Lower spring seats should be just tight enough to remove free play from the spring.*

1. Record the initial spring rate as value “R” in the calculation table that follows. Most VariSprings will have the rate printed directly on them.
2. With the shock fully extended, measure the installed free-length of the spring. At the upper-spring-seat slot, hook the end of the tape measure against the spring and measure, with one sixteenth-of-an-inch accuracy, the distance to the ground bottom edge of the spring. Record this dimension as value “F” in the calculation table that follows.

   NOTE: The measured length may differ slightly from the nominal spring length. In our example the 9” VariSpring actually measures 8-15/16” when correctly installed.
3. Install all shocks and springs onto the vehicle and lower it to the ground.

Hook the tape measure against the spring at the upper spring seat slot.



Measure the bottom end of the spring.

1. Verify that the springs are supporting the full weight of the vehicle. Any chassis or shock bump stops that are in contact must be temporarily removed. Make sure to replace bump stops when finished.
2. Measure the springs again at their newly collapsed installed height to within one sixteenth-of-an-inch accuracy from the same spring reference points used previously. Record this dimension as value “L” in the calculation table that follows.

Installed Height by Performance

When a shock is at installed length (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 bump (shock compressing) and rebound (shock extending). Use the Reserved Shock Travel Percentage Guidelines and appropriate chart to determine the amount of bump travel required to collapse the shock to the correct installed length for your performance application. Record this dimension as value “T” in our calculations.

NOTE: In our example calculation, a handling performance application with a 4.25”-travel coil-over shock lists a “T” value of 2.13.

Perform the Calculations

Calculation Table

The leftmost column in the calculation table gives you a place to record your values. Use a pencil in case you make a mistake.

Record Values	Variable	Description
___ ___.___ ___	**F**	measured initial Free length of installed unloaded spring
___ ___.___ ___	**L**	measured Loaded spring compressed length
F - L	Answer 1	Subtract L from F
___ ___ ___ lb/in	**R**	initial spring Rate in pounds per inch
Answer 1 x R	Answer 2	Multiply Answer 1 by R
___ ___.___ ___	**T**	spring Travel to achieve desired ride height (from chart on pg. 13)
Answer 2 ÷ T	BASELINE SPRING RATE	Divide Answer 2 by T

Example:

Measured free length (F) 8-15/16” or 8.94

Minus measured loaded length (L) 6-1/2” or 6.50

8.94F - 6.50L = 2.44

Multiply that answer by the current spring rate 500 lb/in

2.44 x 500R = 1220

Divide that answer by the correct (T) value in chart

1220 ÷ 2.13T = 572.77B

Round the final answer up or down to a suitable spring rate.

$$\frac{(F - L)\,R}{T} = \textbf{Baseline Spring Rate}$$

Reserved Shock Travel Percentage Guidelines

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.

Optionally, it is acceptable to adjust the shock's installed height to any length between the minimum and maximum spring-length value shown in the chart. This range allows you to adjust the vehicle ride height a small amount by using the threaded lower spring seat.

VariShock Coil-Over Shocks

Coil-Over Shock Travel	Street 60/40	Handling 50/50	Drag 40/60	Spring Free Length	Street Max.	Handling Center	Drag Min.
	(T) Spring Travel Used At Ride Height				*Installed Spring Length At Ride Height*		
4.25	1.70	2.13	2.55	9	7.30	6.88	6.45

Ride Heights Outside of Designed Range

If you wish to set vehicle ride height beyond the designed 7/8" range, the following options are available.

Higher:

- Taller tire
- Relocate upper mount to underside of shock tower ('67-73 only)
- Purchase/install taller upper shock mount
- purchase/install 1" extended top shock eye (PN: VAS 400-202).

One-inch taller shock mounts and 1" extended top shock eyes each increase ride height by roughly 1-1/4".

Lower:

- Lower profile tire
- Dropped spindle
- Add spacer between top surface of shock tower and upper shock mount
- Purchase/install shorter upper shock mount.

Modification to shock mount configuration or mounts themselves requires the entire steering and suspension system be checked for binding and/or clearance issues. (Ball-joint and tie-rod misalignment angles, frame clearance of lower arm and strut rod, brake caliper clearance, sufficient fastener length, etc.)

Ride heights outside of our designed range have NOT been tested by our engineering department for correct clearances, geometry, performance, or reliability. Modifications are made at your own risk and must be throughly researched and executed in a professional manner for obvious safety reasons.

Refer to coil-over shock installation guide for specific instructions regarding adjusting spring preload and valve adjustment.

Shock Extended Eye

To raise ride height above the standard TCP coil-over-system configuration, one-inch extended top shock eyes are available for separate purchase. The mounts simply screw onto the top of the shock's piston rod and are secured by a jam nut. Installation increases ride height approximately 1-3/8", measured from the ground to the fender opening. From center of shock travel, ride height can also be increased or decreased approximately 1/2" by adjusting the lower spring seat. Proper suspension travel and clearance must be verified prior to operating the vehicle.

VAS 515-2-2

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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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