

BILSTEIN® SHOCK ABSORBERS



Front Height Adjustable Leveling Shocks



Before 5100 Series Leveling Shocks Installed



After 5100 Series Leveling Shocks Installed

Simple Facts:

Why Bilstein 5100 Series Leveling Shocks are far superior to coilover spacer kits

Coilover Leveling Kits: more popular than ever...but why?

Leveling kits have become an extremely popular upgrade on many later model 1/2 ton trucks and SUVs. Their popularity is due largely to 3 trends in new OEM designs.

Larger Wheel Wells

Auto manufacturers are building trucks and SUVs with larger wheel wells and more fender clearance. This allows a consumer, upgrading to a leveling kit, to utilize 33" or in some cases 35" tall tires. In years past, during the '80s and '90s, to install a 33" tire required a minimum of a 4-6" lift on most trucks or SUVs.

Coilover Front Suspension

In the late 90's truck and SUV manufacturers began utilizing coilover front suspensions. These types of OEM coilovers are easily modified to level the vehicle.

Following is a list of vehicles using an OEM front coilover suspension design:

- GM: ('07 & up) C/K 1500, Tahoe, Suburban, Avalanche
- Dodge: ('06 & up) Ram 1500 4x4
- Ford: ('04 & up) F150
- Nissan: Titan, ('05 & up) Frontier / X-Terra, Pathfinder
- Toyota: ('95 & up) Tacoma 4WD/Prerunner, ('96 & up) 4 Runner, FJ Cruiser

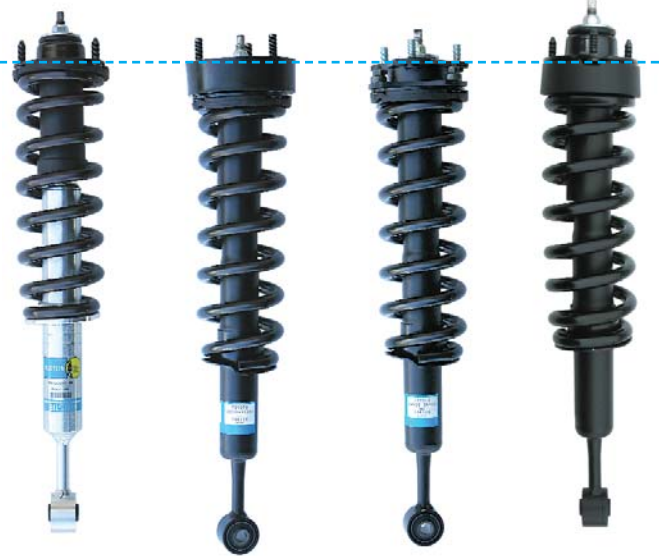
Factory Rake

All later model Trucks and SUVs have a substantial factory rake where the front is much lower than the rear. This look does not appeal to many people and creates the desire to correct the appearance of the vehicle.

Spacer Kits: How they work

At first glance you might think that spacer kits are all the same. In fact, there are 3 different, yet common types of spacer kits: Strut Extension Kits, Spring Preload Kits, or a Combination of both.

Upper Shock Mount Seat



Bilstein 5100 Adjustable Height Shock with Stock Spring

Stock Shock with Strut Extension Kit

Stock Shock with Strut Extension Kit

Stock Shock with Spring Preload Kit



Strut Extension Kits

Spring Preload Kits



Why Bilstein 5100 Series Leveling Shocks are far superior to coilover spacer kits

Strut Extension Kit:

A “strut extension” refers to a spacer that installs between the OEM shock mount and the coilover shock spring perch. This kit spaces the entire coilover assembly down 1” to 2”. This type of spacer kit has significant shortcomings: *reduces* suspension up-travel and commonly *over-extends* suspension down-travel.

Typical competitor strut extension kits shown below



These Kits Limit Up-Travel

There are two different designs of factory suspension compression stops. One features an external bump stop located on the frame or lower control arm. This type is currently found on Toyota and Nissan trucks and SUVs.

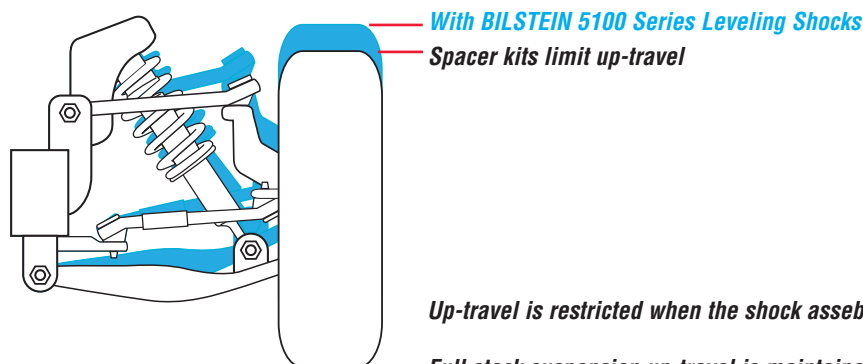
The other uses the shock to limit compression travel with bottom out bump stop located on its shaft. With either design, by adding a spacer kit you increase ride height but actually decrease suspension up-travel. This type is currently found on Ford, Dodge and GM trucks and SUVs.

On an external bump stop suspension, when a strut extension spacer is added to the coilover assembly, the shock and/or spring may bottom out before the lower control arm reaches the factory compression bump stop. This can possibly lead to major structural damage and/or shock failure.

When a strut extension spacer is used on a suspension that utilizes the shock as the compression stop, up-travel will actually be reduced from 1” to 2” **less** than was allowed by the stock suspension, depending on spacer size.

The Bilstein 5100 Series Leveling Shock allows the suspension components to fully travel upward to the factory bump stop as it was originally designed to do.

SUSPENSION UP-TRAVEL



Up-travel is restricted when the shock assembly bottoms out with the Strut Extension spacer installed.

Full stock suspension up-travel is maintained with the Bilstein 5100 Leveling Shock installed.

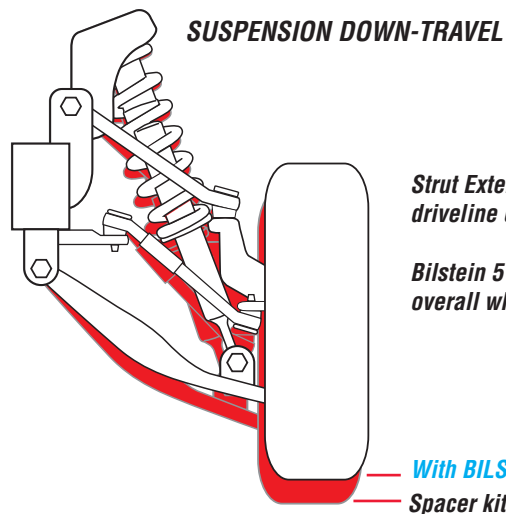
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Strut Extension Kits Can Create Over Extended Down-Travel

Coilover shocks are the factory down travel limiter on the majority of applications. This means that the OEM shock will stop the downward motion of the suspension before component damage occurs. Parts that may be damaged from over-extension include ball joints, CV joints, driveline or swaybar components. Most of these suspension designs allow a little leeway for a longer shock, typically about 1/2" to 3/4". By installing a strut extension spacer, you will be increasing the overall length of the coilover assembly by 1" to 2". This will far exceed the limits of the suspension down-travel and increase the likelihood of component damage.

Bilstein 5100 Series Leveling Shocks are 1/2" to 3/4" longer, depending on application, than the O.E. shocks they replace. Yet, they are designed to prevent over-extension of the suspension travel and possible component damage. All 5100 Leveling Shocks are designed to optimize available suspension travel.

On strut extension kit applications, the most common issue you may notice is a loud "popping" or "banging" noise from the front end as the shock completely tops out. The noise is caused from either the ball joint binding or the upper A-arm contacting the coil spring. This is most noticeable when the vehicle encounters sharp suspension inputs such as a speed bump.



Strut Extension spacers can create over extended down-travel causing possible ball joint, CV joint or driveline component damage.

Bilstein 5100 Leveling Shocks prevent over-extension of the suspension but do provide an increase in overall wheel travel.

*With BILSTEIN 5100 Series Leveling Shocks
Spacer kits can over extend down-travel*

Spring Preload Spacer Kits



A Spring Preload Spacer installs between the upper spring perch and the top of the coil spring. The spacer applies more preload to the spring, raising the static spring rate, which increases the ride height of the vehicle.

This type of spacer kit has two major shortcomings: *loss* of rebound damping control, and *loss* of free down-travel or "droop".

Typical competitor preload spacer kit shown at left

Loss of Rebound Damping Control

The Spring Preload Spacer kit is designed to work with an OEM or aftermarket replacement "stock length" coilover assembly. This causes a major short-coming in the suspension's performance due to the OEM specified rebound damping rates of the stock shocks. When additional preload is applied, the higher static spring rate will over-power the rebound damping capability of the O.E. shocks, creating excessive front end bounce movement. This situation is both uncomfortable and potentially dangerous.

The rebound valving on Bilstein 5100 Leveling Shocks is specifically designed to control the additional static spring rate providing predictable control while delivering a comfortable ride.

Why Bilstein 5100 Series Leveling Shocks are far superior to coilover spacer kits

Loss of Down-Travel or Droop

A Spring Preload kit does not provide for more overall wheel travel. By lifting the vehicle in this manner, all you are doing is increasing the static ride height within the stock limited amount of wheel travel. The result of utilizing a spring preload kit is a loss of down-travel. For example, with the static ride height increased by 2", droop has been decreased by 2" causing the stock shock to top out sooner. Keep in mind, a certain amount of down travel must be maintained in order to maintain a decent ride quality. Vehicles with little or no down-travel deliver extremely poor ride characteristics.

Bilstein 5100 Series Leveling Shocks are longer than the O.E. shocks by 1/2" to 3/4", depending on application. Now when the ride height of the vehicle is increased by 2", the Bilstein 5100 Series Leveling Shocks offer additional droop. By maintaining the factory up-travel, this combines for an increase in overall wheel travel. The result is the lift you're looking for - along with a great ride.

Combination (Strut Extender + Spring Preload Spacer)

This kit uses a small strut extension spacer which will limit droop prior to ball joint bind. This accounts for about 10% of the lift with the other 90% of the lift coming from a spring preload spacer. However, this kit shares the same shortcomings as the other kit designs. Since this kit uses a spring preload spacer, loss of rebound damping control is an issue along with up-travel limitations as found in the strut extension kits.

Bilstein 5100 Series Leveling Shocks still provide a more viable solution. Not only will you have fewer parts to deal with and install, but you'll also be getting a true performance handling upgrade.

BILSTEIN 5100 Series Leveling Shocks



Correctly Engineered to Level Your Vehicle

In designing the 5100 Leveling Shocks, key steps were taken to insure they deliver maximum performance while avoiding the shortcomings found in spacer kits. The end result is the perfect product to get the job done right.

Maximize All Available Wheel Travel

The 5100 Series Leveling Shock will allow for 1-2" more up-travel than a strut extension. As for the droop or down-travel, the extended length of the shock also allows for more overall travel. The goal is to maximize wheel travel without inducing any ball joint or driveline bind.

What we have found in most cases is that the OEM manufacturers have designed a coilover unit using a short travel shock with long shock body. What this means is we can increase the extended length of the shock without effecting the collapsed length. With the 5100 Series Leveling Shock installed, you will gain more wheel travel while maintaining the factory compression stops.

Increased Rebound Control

The lift on the 5100 Series leveling shocks is achieved by increasing the preload on the factory coil. By adding more preload, the shock is designed with more rebound damping as compared to the O.E. or standard aftermarket replacement shock. Considering that Bilstein is the world leader in monotube gas pressure shocks absorbers, we are in the unique position to offer a leveling shock with the perfect damping rates, optimizing your ride and handling characteristics. The result is a much smoother and better controlled ride than the factory coilover set up can deliver.

Install OEM Spec Hardware

Bilstein shock absorbers are widely used on many OEM applications. Manufacturers such as Ford, Toyota, GM, Nissan, and Dodge all use Bilstein as an optional factory upgrade. Bilstein builds the 5100 leveling shocks utilizing OEM hardware, which offers the highest durability available. You can be assured that these heavy duty components will offer many years of trouble free usage.



OEM Ford F150 Low Friction Bushing Shown at Right

Bilstein 5100 Series Leveling Shock with O.E. Spring (Spring & Upper Hardware Not Included with Shock Purchase)

Why Bilstein 5100 Series Leveling Shocks are far superior to coilover spacer kits

Adjustable Ride Height

Bilstein's Multiple Position Spring Seat Locator



Stock Spring Seat



Bilstein 5100 Series Leveling Shocks offer multiple spring seat positions for ride height adjustment ranging from stock height up to 2.75", depending on the application. This allows you to select the right amount of lift needed to achieve the look you desire.

To change the ride height, you simply need to move the external snap ring into the desired position. The spring seat is then indexed over the snap ring, encapsulating it for maximum strength. The spring seat and snap ring assembly on 5100 Leveling Shocks are extremely durable and capable of withstanding significant loads.

Height adjustments on the 5100 Series Leveling Shocks can only be made with the coilover assemblies off the vehicle.

Inexpensive and Easy to Install

The 5100 Series Leveling Shocks are directly derived from Bilstein OEM coilover programs. The components utilized in these shocks are produced to strict OEM standards for use by manufacturers such as GM, Chrysler, Ford, Nissan, and Toyota. Considering the performance advantage of the 5100 Leveling Shocks over a spacer kit, the decision to choose the 5100 Leveling Shocks should be a simple one.

The 5100 Series Leveling Shock installation procedure is the same as changing your factory shock, yet should be performed by a skilled mechanic.

Rear Shocks: The Tuned System

In addition to the front leveling shocks, Bilstein offers a matched set of rear 5100 Series shocks to complete the tuned system. The addition of the rear shocks will offer an excellent balance to your vehicle. You may be able to "get by" with just doing the front leveling shocks but you will need the rears for the ultimate system and maximum performance.

The rear 5100 Series shocks will also accommodate up to a 1.5" lift if an extended shackle, block, add-a-leaf, or a new spring pack has been added on your vehicle. *The rear 5100 Series shocks do not provide a ride height feature.* However, as with the front shocks, the rear shocks are designed to maximize available suspension travel.

This system will outlast the life of the vehicle

Bilstein is world famous for manufacturing some of the most durable, longest lasting shocks available. In fact, the 5100 Series shocks are comprised of components originally designed for off-road motorsports. Bilstein is so confident that these shocks will out last your vehicle that we back the product with a Limited Lifetime Aftermarket Warranty. If a Bilstein shock fails during normal wear and tear, you'll get a new shock absolutely free.

