# Atomic Fabrication and Performance

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# Torsion Bars to Coilover Background Info and Installation Guide for 1999-2007 GMT800 2WD/4WD Trucks and SUVs

V3.2

Chevy/GMC Silverado/Sierra/Tahoe/Suburban/Yukon 1500 4WD/2WD vehicles with factory torsion bars using the factory lower and upper control arms.
*will not fit 2500 or 3500 series vehicles

This kit is meant to remove the torsion bar setup on 99-07 GM Fullsize Trucks and SUVs and install coilovers as the front suspension utilizing the stock control arms. This is primarily intended as a performance and ride comfort upgrade. This will not make your truck a prerunner capable of jumping! Typical offroad and racing uses are fine.

Please contact me at atomicFandP@gmail.com or see my website at www.atomicfabandperformance.com if you have any questions!

I take no responsibility for any harm or damage as a result of your decision to do this modification. If you aren't comfortable doing this swap, don't do it!

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## Why Do I Want Coilovers?

There are several advantages to coilovers from torsion bars. The biggest one is coilovers ride much, much better, and depending on what shocks and springs you use, can have many different ride settings for many different conditions. Torsion bars, on the other hand, leave you pretty much stuck and only able to adjust shock dampening rates (through aftermarket shocks) and not the spring rate itself. Many 4wd guys crank or de-crank the bars to adjust ride height (yes this applies both to lifted and lowered guys), and this changes the ride comfort drastically. With coilovers you can choose spring rates specific to your application; higher spring rates for more aggressive driving, and softer for more daily driver type duty, as well as having an adjustable or double adjustable shock for compression and rebound settings.

The torsion bar setups are basically meant to ride on the bump stops or slightly above them, this is how the suspension is designed and needs those bumpers as part of it. On lifted setups when you crank the bars the ride is usually the biggest complaint since the bump stop is so far away its not used. On lowered setups it's basically the same just the opposite direction and you are constantly riding on the bump stops too much even after trimming them. In both cases the suspension is operating out of its intended range, and so the ride quality suffers. The spring force of the torsion bar changes proportional to the amount of preload put on it by the index key (which is how the height changes). A torsion bar is essentially a coil spring that is straightened out and acts by twisting instead of compressing.

Second advantage is going to be the huge selection of shocks and springs available in the aftermarket for coilovers. I primarily use (and sell) Viking coilovers with my kits, however, King, Fox, QA1, FOA, and whoever else makes coilovers can be used as long as they have the correct size bearing to work with my brackets. Springs are universal as long as the diameter and length are appropriate for the shock selected. Viking has a wide variety of springs as well as Eibach, PAC, and Hyperco. For lowered street setups spring rates are typically in the 1200-900lb range, with lifted setups in the 650-750lb range depending on use and the specific vehicle. I discuss how to select springs and shocks for your particular application further down.

The third advantage is weight. All of the stock torsion bar stuff including keys, crossmember, bars, shocks, and bolts weighs 71lbs. My shocks with my brackets (upper and lowers) weigh about 15lb per side. So total weight savings is around 41lbs with a much better riding and handling front end. Taking out the crossmember also makes it a lot easier to drop the transfer case.

The only real disadvantage I can think of for coilovers is it costs money and you might have to modify your frame (drilling). Both of which are par for the course in this hobby. If you have an extremely heavy setup or intend to drive in severe conditions, then coilovers in conjunction with the torsion bars may be a better setup. Torsion bars are big, dumb, and heavy, but they are very tough. If you plan on doing steel bumpers with a heavy plow and heavy engine setup then this may be something to consider (but is not typical).

## Driving Impressions

I have had this conversion done to my truck since 2011 (I am updating this docunment in February of 2021), and I have not had a single issue from this conversion. I have hundreds of customers with tens of thousands of miles with my kit by this point all the way from low 9 second quarter mile trucks to 8” lifted offroad trucks without any major issues.

Driving wise the truck is very precise with this conversion. The steering feels very planted and in control without being harsh. Obviously you can fine tune your ride however you want it with spring and shock combinations, but I like it slightly firm. I am very happy with this conversion and feel like it handles a ton better. I use the truck for drag racing and keep going faster and faster now that the front end is under control. I have been 1.3x 60ft with these on radials and slicks at 5000lb.

## Testimonials

A more complete (but not exhaustive) list of guys who have done this swap is near the end of this document. As is typical in 2021, if you ask in any truck facebook groups you will find people that have done this conversion for first hand feedback, but I have never had someone do this swap and regret it once everything is installed and set up.

## Setup Overview

There are 3 basic pieces to the kit:

1. **Lower brackets.** These are needed regardless of what you do with the top. See Figures 1 and 2.
2. **Upper Brackets**
    a. **Normal Upper brackets**. I call these normal because they are the original design that uses a stud-style shock See Figures 1 and 2. You would use these for stock height and lowered applications. 1" over stock is doable, but any higher than that and you will want the Lifted brackets. See Figure 4.
    b. **Lifted Upper brackets**. These are for guys going above stock height or with lift kits that drop the LCA and/or use a lift spindle. They can be used in non-lifted applications however they are more difficult to install than the normal upper brackets because both ends are bolted, so for those I recommend the normal style. These are mandatory what you need over 1" of lift from stock height, this includes leveling kits. See Figure 2 and 3.
3. **Stud Bushings**. I make these washers and bushings so stud top shocks can be used with the normal style upper brackets. This decreases the amount of room the mounting hardware takes up which allows for a longer shock to be used or for more drop in very low applications. See Figure 5.

There are several different combinations of stuff that will work depending on what you want to do. The bare minimum to do this swap only requires the lower brackets, however you will need to use a larger washer or steel plate to better distribute the load on the frame to the bushing. The most popular combination is the lower brackets and the normal upper brackets (this constitutes a Full Normal kit). The lifted uppers are required for lift-kit applications (along with the lowers).

Figure 1 below is the complete assembly with the normal style upper mount, lower mount, and the stud top. This is on my truck. This is a Viking shock with an Eibach spring.

**Figure 1: Full Normal Coilover Assembly**

The lifted upper style has an integrated mount to attach the shock directly. The purpose of this is to create clearance with the factory Upper Control Arm (UCA) which is the point of least clearance when doing this swap on a lift-kit setup, by moving the mount forward away from the arm. The shock UCA is fine and aftermarket control arms are not needed. The UCA moves away from the spring when loaded, so if the clearance is tight at full droop that is ok as it will never be that close during normal operation.

These brackets can be used on non-lifted setups, but I recommend using the normal style as the lifted style is more difficult to install. The top hole is not typically used, it is there as a visual aid for alignment. The installed picture is from a customer that was kind enough to take pictures for me on what looks to be a 6-7" lift. The cognito UCA is not required, but does look cool. **It is important for the included spacers to be installed to make sure the shock doesn't bind during compression. The spacer should be installed as to push the shock towards the front of the truck and the top spacer installed as to push the shock towards the back. The shock should be mounted as vertically as possible.** The shock can be mounted with the control knobs at the top or bottom with this mounting style, either way is fine.

**Figure 2: Lifted Brackets (Passenger side bracket on left, Driver side bracket on right)**

**Figure 3: Lifted Brackets Installed (Driver side)**

Most coilovers with come with either a bearing style top, or more stock appearing stud stlye. The advantage to using the stud top is it takes much less room to mount the shock so a longer shock can be used that has more travel. The stud top needs to be used with my stud bushing kit to better support and distribute the load over a wider area. The upper bracket is highly recommended when using the stud top.

Pictured below is the stud on the driver side normal upper bracket and the bushing kit I make which includes the washers and a poly piece. Most shocks will include a large rubber bushing with the shocks, this piece is typically not used with my kit. On top of the frame will be the large silver washer and shock stud nut. Do not overtighten this during assembly or you can crush the poly bushing. Snug with some loctite is fine.

**Figure 4: Stud Bushing on the Driver Side Bracket**

## Lower Mount Bracket

These are designed in Solidworks and laser cut from 3/8" steel and powdercoated black. They are doweled by design which makes them very strong. It is the male end of the dowel into the sides supporting the weight, not the weld itself, so there is no need for a lot of welding. In addition, the bolts holding these to the frame (the lower shock bolt hole) and new coilover bolt hold them together. These are not going anywhere. The need for these is because the lower mount on the 1500 4wd LCA is a male- style mount. All aftermarket coilovers that I have found also have a male style mount, so the issue is trying to hook up two male style mounts together. These brackets sit on top of the shock mount and prevent the coilover lower mount from rotating on the LCA. **These are designed for factory OEM LCAs, not aftermarket replacements.** I have seen examples of the shock mount being slightly off for aftermarket replacement LCAs (autozone house brand, Detroit, etc) that would require modification to fit (I don't recommend this).

The included hardware is all grade 8 stuff. Either bolt makes a good mounting location for limiting straps if you plan on going that route, but I have not seen that to be necessary. There is plenty of clearance for the CV shaft and everything else. This is literally a slide-over and bolts in place of the shock deal. Installation of this particular part takes 30 seconds.

The inside width is roughly 1 3/8". The Viking shocks I sell have a lower mount thickness with the bearing of approximately 1". To prevent it from sliding around I used a pair of spacers that are included with my full kit.

## Upper Reinforcement Bracket

Similar to the lower mounts, these are laser cut 3/8" steel that have been MIG welded and powdercoated. These are highly recommended for the stock height to lowered swap and mandatory for lifted guys and do require some drilling (or welding if you prefer).

These are side dependent and work by sitting up inside the factory upper shock mount and use two 1/2" grade 8 bolts through the frame to secure it. I call this a reinforcement mount because it is reinforcing the mount that is there, not just carrying the full weight by itself. When you drill the holes for these, I recommend bolting them through the top (or just clamping) to ensure they fit tight to the frame before you start drilling. Remember when drilling, use lots of oil and go slow with moderate pressure. Cobalt drill bits are great for drilling steel. These are not designed to fit with any pre-existing brackets or holes on the frame, new holes need to be drilled.

The passenger side is relatively easy to get to, but because of the differences in the frame, the driver side is harder and needs to be reached by using a wrench under the truck. This is a pain in the ass since there is not a lot of room (unless you want to drop the front diff), but can be done without removing the axle. I used the trick of using a piece of tape to hold the nut and washer to the wrench as I put it up there. The upper mount works well as an anchoring point for limiting straps, although this is more difficult on the driver side because of where the holes are in relation to the spring. The other option than drilling through the frame is to simply weld them in place and not use the bolts. The coating will need to be stripped on both the mounts and the frame to make sure you get a good weld. I bolted mine on, but if you have a good welder or know a guy, go for it. A note on bolting them in, **do not overtighten these bolts**. The frame bends rather easily, you just want to take up the slack in the bolt. You can easily overtighten and bend the

frame, so be mindful. Snug works fine, these are a locking nut so they will not back off. No need to go ham. If you ever decide to convert back to torsion bars, you can leave the top normal mount in place (lifted one would need to be removed or ground down), and the factory shock will still fit fine. So if you want to weld to the frame, this is not something that is completely irreversible.

The lifted style upper mounts mount the exact same way as the normal style but the bolt holes are located in different positions on the brace. This is not an issue with installation, but it is not recommended to switch from the normal upper mount to the lifted styles because of all of the holes that would need to be drilled.

## Frame Modifications

The only cutting modification that may need to be done is trimming the corner of the frame on bump stop mount. This is most easily done with a sawzall and this is simply to create clearance for the spring. Mine fit without trimming but I wanted to trim anyway to make sure there would be enough room at full extension when the spring is drawn inward slightly. The bump stop upper cup should also be cut off and an aftermarket bumpstop installed (included with my full kit package).

This is where the frame will need be trimmed:

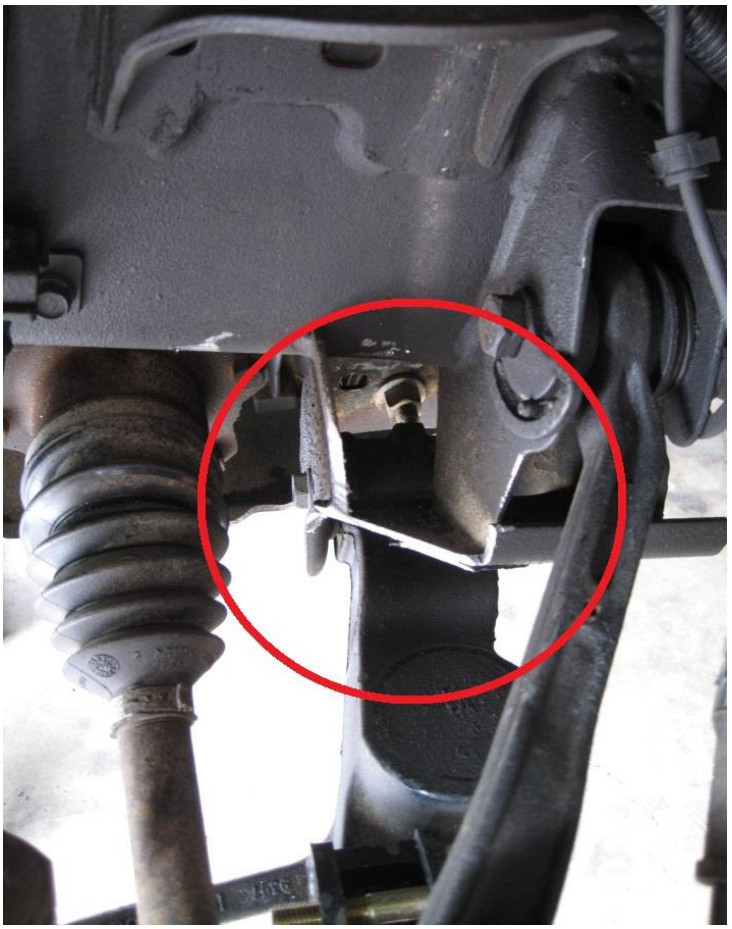

**Figure 5: Frame Trimming Required (Driver Side)**

Two ½" holes will need to be drilled in the frame for the upper reinforcement bracket, and a single 3/8" hole will need to be drilled in the LCA bumpstop area for the aftermarket bumpstop.

## Bearings, Bushings, and Bumpstops

I initially used nylon bearings that come by default with some shocks (QA1 DS301, 303, etc.), but they were destroyed in very short order. After talking to the QA1 tech he said they were only designed for around a 600lb spring, and since I'm running twice that he wasn't surprised that they failed. The good news is there is a drop in steel replacement bearing for most all shocks, and these are rated for a 30,000lb static load. The Viking shocks I sell with my kits already come with steel bearings, but I thought this was worth pointing out if you plan on using something else.

I highly recommended bumpstops to prevent bottoming out and damaging the shock so I include some energy suspension bump stops in my stock height and lowered kits. They are mounted to the LCA by drilling a hole in the factory bump stop location and mounting them upside down.

## Limiting Straps

Limiting straps are used to prevent the shocks from topping out and damaging them and are most common on very high lifted setups in offroad situations. I don't feel they are needed with the adjustability of coilovers with a performance build on a lowered truck, but they are easily added to my kit if you want. Usually they use a clevis bolt for adjustability, but I would mount some between the bolts of the upper and lower brackets. I would completely install your coilovers first, and then measure from whatever mounting points you choose with the truck jacked up and hanging in the air. Now subtract 1" from this and you want that size strap. The reason for subtracting an inch is you never really want the shock to top out, but you want to use the full travel.

I do not currently use straps because I did not need them and they are a bit cumbersome to install on stock or lowered setups. My front end lift is very well controlled with just the shock alone and I do not recommend straps in addition to coilovers on anything but lifted setups and even then, only setups that actually offroad and would see a situation with the tire hanging in the air unloaded.

## What These Brackets Will Not Work On

The lower brackets will not work on 2WD (I have a separate kit for them) or Chevy/ CMC 2500/3500 trucks. The frame on the 2500s goes inward (toward the engine) a few inches down whereas on the 1500s it's a straight section. This will also not work on lifted trucks that moved the UCA out of the factory position. This is mainly on bigger lifts (9"+). This swap requires the factory OEM LCA on 1500 trucks. This is also only for 99+ trucks and 2000+ SUVs. Again, **No 2500HDs** (I get asked this a lot) and not for pre-99 trucks.

## Selecting Springs and Shocks

To find out what shocks and springs you need you will need to measure the “ride height” of the shock. In terms of the shock, this is the distance from the lower mount to the upper mount. This is the most important measurement of this swap. The easiest way to measure this is with the factory shock removed and a floor jack handy, although it can be done without much difficulty just by turning the wheels one way or the other to make some room.

You need to measure from the lower shock bolt on the LCA to the top of the shock hoop in a straight line. If you want to gain lift from this swap, use the jack to raise the front end to the height you want then measure between the same points. **I will help you select the proper shock and spring and make sure you get the right stuff the first time, but everything is based on this measurement so I will definitely need it as you currently (or hope to) sit.**

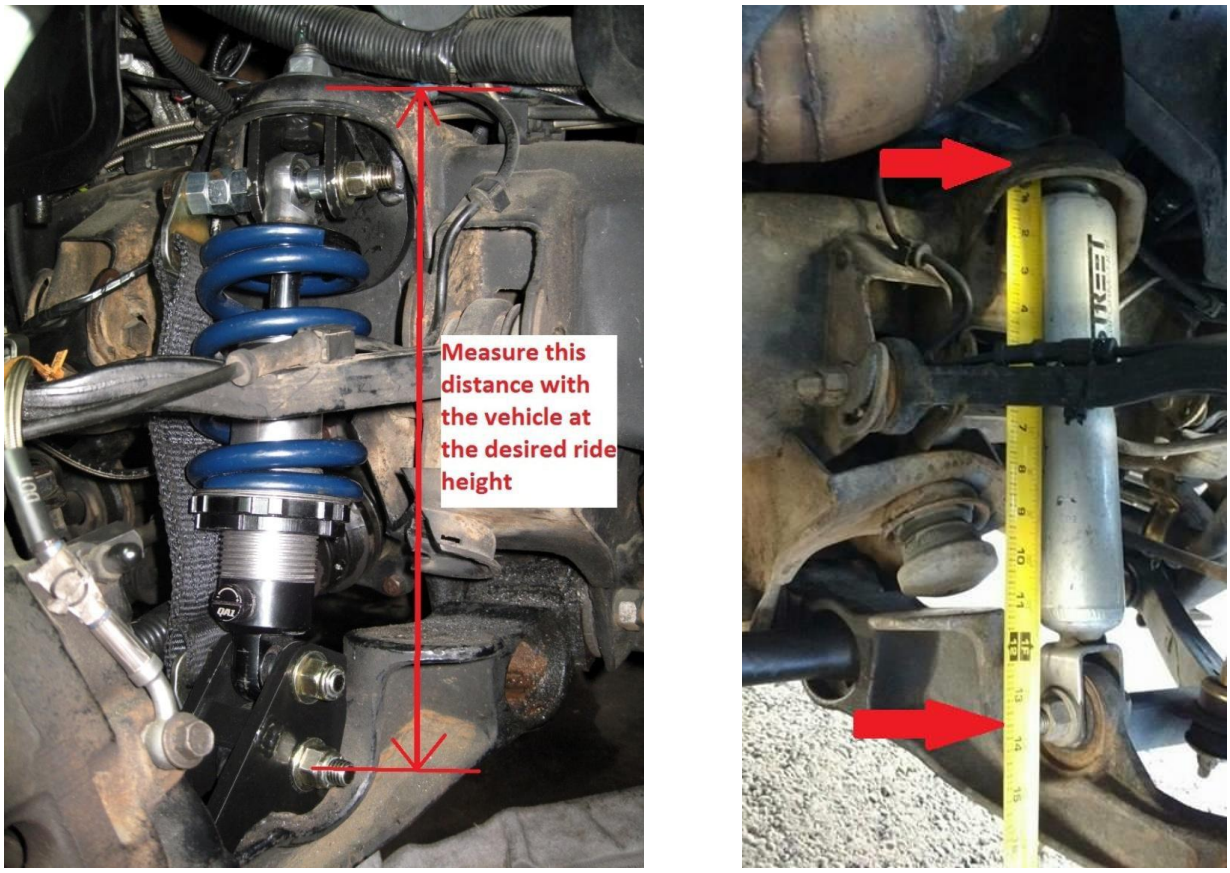


**Figure 6: Ride Height Measurement**

I supply the most typical spring rates I have found work best over the years for my full kit packages, so most of the following information is for background only unless you are supplying your own coilovers.

If you only want my brackets and you want to supply your own coilovers, my brackets take up approximately 3” of whatever you measure, so youll need to subtract this from your ride height calculation.

Now you want to find a shock that has this as its ride height, or median measurement between fully collapsed and fully extended. Most shock makers post this sort of thing in a table, along with a recommended spring length.

You generally want 60% of the travel to be for compression and 40% for uptravel, but no more out of range than this. So if the shock has 4” of travel, you want 2.4” from the fully collapsed and 1.6” from fully open so it has more room to compress. Shock manufacturers generally list a ride height range with their shocks. You want to be in this range. Dividing the travel by 2 would leave 50% for downtravel and 50% for uptravel.

Once you found your shock you need to pick your spring. These need to be 2.5" ID springs to clear the UCA. 1500 trucks have roughly 1600lb of sprung weight per corner. Do not be scared by seemingly small shock travels. Travel at the wheel is roughly twice what travel at the shock is, so if a shock has 4” of travel that is roughly 8” at the wheel, which is very significant on IFS. My shocks only have 3.5” of travel and my truck rides great. The shock you select will also tell you the spring length you need.

Now you need to compress the spring to half of the travel to be at the center of shock travel. If your shock has 3.25” of travel (fully extended – fully collapsed) and we use 1350lb as the corner weight, you will need a spring that will support that weight with half the amount of travel you have. That is accounting for the static load of the vehicle.

3.25”/2 = 1.625” of travel on either side
1450lb/1.625” = 892lb/in spring

If you want it to be at 60% compression and 40% uptravel, you need 3.25"*(1-.6)=1.3” of movement from just supporting the weight, and 1450/1.3=1115lb/in spring. So I like to say you need a spring between 900lb and 1150lb depending on how smooth or stiff you want the ride. The stiffer (more precise) the ride you desire, the stiffer spring you need. You may also be limited by what spring rates are actually produced in the length you need. I prefer to go more on the stiffer side. The spring rate will also affect the amount of preload you need on the spring when you install it. The risk with too soft of a spring is with bottoming out the shock, and you really want to avoid this as it could damage the shock.

So as you can see choosing a shock/spring combination needs to be done after you decide on your ride height. Keep in mind the spring is only part of the equation is more directly affects oscillation frequency. It must be tuned with the shock dampening to tune the ride.

## Purchasing Information

See here for latest pricing and contact info: www.atomicfabandperformance.com

Or email me at atomicFandP@gmail.com with any questions or comments.

## Final Word

I feel it is important to say that if you are not comfortable modifying your truck’s suspension please do not

attempt this modification. This swap, even with it being a bolt-on mod, will still require refinement and tweaking on your part. This comes with the territory any time you modify a vehicle and is really the spirit of hot-rodding. I can lend my advice and experience, but due diligence must be paid before hand by reading this and doing the proper research and proper measuring to make sure of the correct parts for your particular application.

**Realistic expectations are important.** This will not make your truck a desert trophy truck or be able to compete with trucks that have $100k invested in their suspension. This kit offers an easy to install worthwhile upgrade in performance and ride comfort over the stock torsion bar setup for the vast majority of people in their daily driver or weekend warrior type of truck.

Coilovers do have an adjustment range to fine tune ride height, but this is more “fine tuning” than big changes. I generally say an inch up or down is fine from where they are specd, but any more than that and you need a longer/shorter shock to keep it happy during use. Doing a setup now and adding preload to raise it 3” in the future is not a good plan. That would require a different shock and spring entirely.

# Coilover Brackets Installation Guide

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## Installation Overview

The installation is not difficult, and can be done with a basic knowledge of working on vehicles and tools in general. These instructions assume you have a decent level of wrenching experience. If you can change your own brakes you can do this swap no problem. I did this by myself with no help, but if you have a friend that wants to help that will speed it up. Access to a shop lift is not necessarily useful because you will need to adjust the ride height when installing the coilovers. I recommend using a floor jack and jack stands with a cooler full of beer to sit on. Installation should be about 2 hours for lowers only, and 4 hours for uppers and lowers if working alone.

## Tools Needed:

-Floor jack
-Sockets and wrenches
-Torsion bar unloading tool (can be rented from autozone or equivalent I believe) (please use this and not a giant C clamp, its free to rent)
-Drill and 1/2" bit (for the upper bracket bolts) and 3/8” bit for bumpstop
-Sawzall with metal cutting blade (or die grinder with cutting disc)

## Abbreviated Instructions

This is the short version of the installation for those that don't want to read the whole thing.

1. Jack the front end up in the air, take off the front tires for more room, and remove all the torsion bar stuff including shocks.
2. Trim the corner of the frame above the bumpstop (see picture) and on lowered vehicles cut off the bumpstop as well.
3. Install the upper reinforcement brackets (if applicable, otherwise skip this step).
4. Install the new bumpstop or confirm the factory one is acceptable.
5. Assemble the shocks and springs with thrust washer kit and bearings (if needed) on the bench (be sure to use antiseize or grease on the shock body threads)
6. Install the shock assembly into the truck and connect to both upper and lower brackets. Make sure included spacers are towards the rear as to push the shock to the front of the truck in the brackets on the bottom, and on the front side for the top end of the shock in the upper bracket.
7. Adjust the spring preload so the shock sits at half travel and trim bumpstop if needed.
8. Take a test drive and get an alignment if your ride height changed.
9. Enjoy!

## Step 1: Prepare The Truck

Jack the front end off the ground so the suspension is fully extended and the tires are roughly 3-4" off the ground. Support the frame with jack stands and sit the truck down on them. Take off the front wheels to gain access to where we will be working. Take off the factory shocks.
I recommend using the official GM torsion bar unloading tool when dealing with the torsion keys. I have used a 2 jaw puller before and trust me when I say it was sketchy as hell, the real tool is much easier and far safer. With that said you can go ahead and unload the torsion bars and remove the bars, keys, and crossmember and throw it next to the factory shocks you just took off. All of the torsion bar stuff should be removed at this point.

## Step 2: Trim the Frame and Cut Off the Bumpstop Cup

It is easier to remove the bumpstop first. Use your cutting instrument of choice (I used a sawzall) and cut off the bumpstop cup as evenly with the frame as you can. Lifted trucks may not need to do this depending how much clearance you currently have and what shock you go with. The idea is to make sure the bumpstop prevents the shock from bottoming out and damaging it. Next use your cutting instrument of choice and cut off the corner of the frame that was closets to the shock from about middle of the bumpstop cup pointing to the front axle. The corner above that section may need trimming as well. See the Figure 2 below. This cut will not affect the truck integrity in any way. You will be installing an aftermarket bumpstop to replace the factory one, except it will be pointed up, which is why you want the area where you cut off the factory cup to be smooth, however, you can leave it if you center the new bumpstop. I recommend just removing the old one though to make it easy.

If you have the lifted style brackets, you may need to trim the edge of the shock pocket to ease installation of the bolt that holds the shock. Do not cut excessively here. A 1 inch section cut out is plenty.

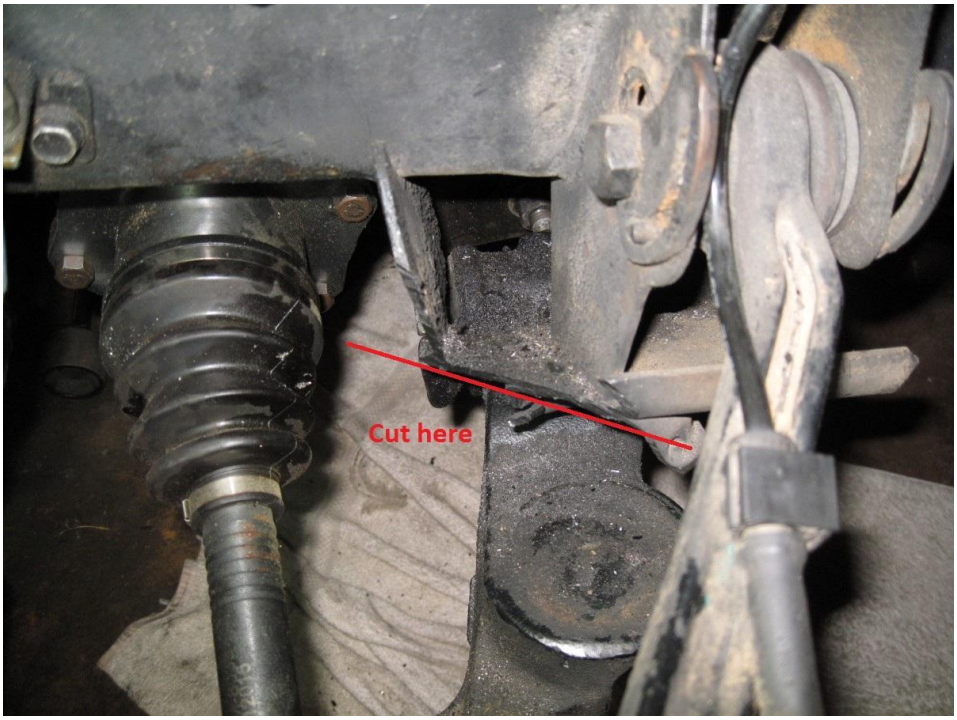


**Figure 9: Frame Trimming**

Repeat this cut for both sides. This is the only cutting that will be needed during this installation.

## Step 3: Installing the Upper Reinforcement Brackets

This is the hardest part of the installation because space is limited, especially on the driver side. Do the passenger side first because it is easier. You want to put the bracket up against the vertical frame and top of the shock hoop as tight as you can. The top bolt hole is slightly oversize and should line up fairly well, but it doesn't need to be exact because the hole is much larger than the stud top shaft. You want it to be flat against the frame and touching the shock hoop, basically as snuggly in the corner as possible. I recommend using a bolt or welding clamp to hold it tight to the frame while you drill.

The installation of the lifted style upper is similar. It doesn't have to be a large bolt or clamp on the top, you just need enough force to make the bracket stay and not shift during the drilling process. The hole in the top of the lifted bracket is not used, but is merely there for reference. It may be helpful for bolting/clamping while the side bolt holes are drilled, but it does not need to be bolted which is why no hardware is included for it.

When you drill go straight into the frame and take your time while using plenty of lubricant. Use the bracket as a guide to where the holes should be drilled. Cobalt drill bits are very good for this purpose. Use a slow speed with lots of pressure. Overheating will destroy drill bits quickly so don't just send it all with the drill. Once you are through both sides of the frame, insert the included bolt and tighten just enough to take up the slack. The frame can be crushed if you overtighten, so be gentle. Make sure both bolts are tight before calling it done. The bolt should have at least 1-2 threads showing past the nut. The nuts are locking nuts and should not need to retightened or back out, so snug is fine and you can use Loctite if you want but shouldn't be needed.

The procedure is nearly identical with the driver side in terms of securing the bracket to the frame and hoop before you drill. You will notice they are more on top of each other and access to the top one is difficult. I found it easiest to put the nut on a box wrench and secure with a piece of masking top on the outside to hold it in there while turning the bolt when with a socket wrench. The front axle is right in the way, but I managed to do it with it installed. Install the lower bolt after the top one. Keep in mind again not to overtighten these because the frame can be crushed. Make sure both are tight before moving on.

Depending on your year truck there may be another frame on the frame with holes that look like they should line up, they don't, and this is by design. Just install the upper bracket as snuggly up in the shock pocket as possible and drill where needed. Once you finish this step the hard part is done and the rest goes much faster!

## Step 4: Install Aftermarket Bumpstop

The aftermarket bumpstop I used was a generic one with a 3/8" stud and nut on the bottom side and the same as the ones I include in my kits. I drilled a 3/8" hole in the round flat spot of the LCA where the factory bumpstop contacted. I installed the new one so it faces up (upside down of the factory one). I positioned it so it fully contacted the frame above it and fully sat on the LCA. I used a standard drill and

3/8" bit. The LCA drills surprisingly  easily. See Figure 2 below for bumpstop location.

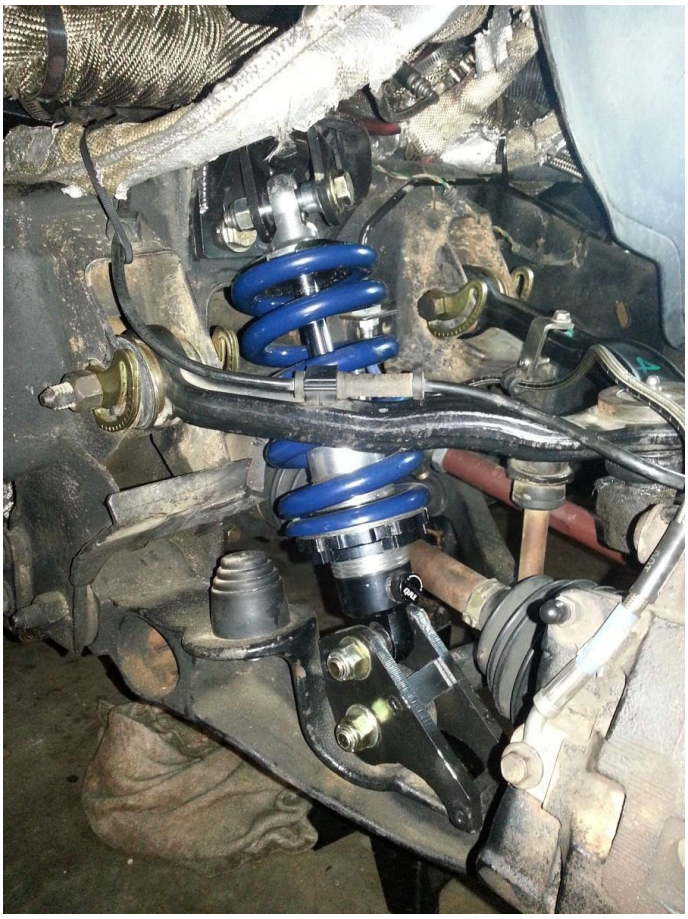

**Figure 10: Complete Passenger Side**

Repeat this for both sides.

The bumpstop can/will be trimmed when we have the coilover established in the truck. We want the bumpstop to engage just before the shock bottoms out preventing damage to the shock while still using all of the shocks available travel. This is easiest at this point before the spring is installed. Take the shock and loosely mount it in the lower bracket and install in the upper mount. You may need to use a floor jack under the LCA to raise it up so you can tighten the top nut holding the top.

What we are doing is finding how much we need to trim the bumpstop so it engages before the shock bottoms out. The bumpstops are to protect the shock from bottoming out should you hit a really large bump in the road or something the coilover is not overly compressed and damaged.

You want the bumpstop to engage slightly before the shock bottoms out. With the truck sitting at ride height, measure from the top of the bump stop to the spot on the frame where it would contact should the suspension cycle all the way down. You want this distance to be slightly less than your available

downtravel (1/2” to ¾”). So if your shock has 4" of travel, then the shock should be sitting at roughly 2” (middle of travel). You want to use most of the shock travel before the bumpstop engages. If your shock has more then an inch or so of travel when it contacts the bumpstop you may need to trim it down some. If it is farther away, you may need to shim your bumpstop or buy a longer one. I had to cut the first land off my bumpstops to get the right distance.

Slowly raise the LCA using the floor jack so the bumpstop is almost engaging the frame above it. It should contact before the shock bottoms out otherwise you will need a longer bumpstop (they come in many different sizes and are very cheap). Trim the bumpstop using a sawzall or other cutting tool to the height at which this happens.

Once the bumpstop height is set, lower the LCA and remove the shock for assembly.

## Step 5: Assemble The Coilovers

This installation will go a lot easier if you set out all the stuff and make sure everything is present before you start turning wrenches. Hopefully you followed my instructions on how to select the proper springs and shocks, or just sent me the measurements so I can make sure you get the right stuff, so this should be fairly painless.

If you bought shocks separately you will want to make sure they include **steel** bearings. If not, you will want to replace the current (probably nylon) ones with steel ones. Viking shocks already come with upgraded steel bearings.

Now is good time to make a mark on the shaft at exactly half travel. Measure from the shock from eye to eye fully extended and fully collapsed. Now subtract these two numbers and divide by 2. Now add this number to the collapsed measurement and extend the shock to this measurement. Make a mark right at the bottom of the shaft near the body with a felt tip sharpie marker. This is where you want the shock to be sitting when you install it in the truck and it has the full weight on it. You will use this mark to adjust the preload of the spring. Or you can just eyeball it half way on the shaft, which is probably easier. Making this line for reference is important to do and makes setting preload much easier. Do this for both shocks.

If you also bought the thrust bearing kit (included with my kits) go ahead and put on the lower jam nut all the way to the bottom on the shock, then the adjustment nut spring seat, then the washer, then the bearing, then the top washer. Make sure to put adequate anti-seize or heavy grease on the bearing before installation, it will make adjustment much easier when the spring is under load. You should not need a spring compressor to install the spring and the top spring puck.

Put the spring over the shock and insert the top puck. If you had to loosen or remove the top of the shock to install the spring tighten it back now. Go ahead and turn the spring adjustment nut under the thrust washers on the shock as far as you can hand tight, then get the adjustment spanner wrench and

turn it about half an inch up on the shock. This is just an initial preload guess and we will fine adjust it once we get it installed. **You never want the spring to be loose so always make sure you have enough preload to keep the spring properly seated when fully extended.**

Once you finish this part the shock should have the spring installed and slightly preloaded, and the metal bearings installed. I recommend going ahead and setting the shocks to the recommended settings per the vehicle use on the sheet that came with them from Viking. If you lost it or don't have any idea, start in the middle of adjustments and go from there. Typically, I have the compression 2-4 clicks higher than the rebound for street driving. Once you have done this set the shocks aside for the moment. It should look like this

**Figure 11: Assembled Shock**

## Step 6: Install Shock Assembly

You may find it easier to go ahead and install lower bracket on the shock before putting it in the truck (see Figure 1 on page 6).

**IMPORTANT: Use the 3/8" spacer on the lower bracket to move the shock towards the front of the truck when installed. On the lifted kits, use the other spacer on the top bracket as to push the top of the shock towards the rear. This is to keep the shock as vertical as possible. These are critical to keep the shock from binding in its movement. For the lifted brackets there are spacers on both the top and the bottom. If improperly installed there is a risk of the shock breaking under high compression from being misaligned.**

The shock mounting bolts do not need to be super tight since they use nylon locking nuts, just snug, perhaps 30ftlb. Now you are ready to put it in the truck. The following process is the same for both sides.

**For the normal stud top:** I found it easiest to come up under the UCA and insert the stud into the shock hoop then slide the bottom bracket over the LCA. If you can't get it in there push the spindle down which should be easy since the torsion bars are out.
**For the lifted upper brackets:** It is basically the same as the stud top, but youll want to install the top of the shock to the frame/top mount first, then swing the lower mount down and over the LCA while pushing down on the spindle. If you have a particularly “cranked” setup you may need to disconnect the UCA first so you can let the LCA droop more. Use a jack to support the spindle when you do this, attach the lower bracket, then use the jack to compress the spring and raise it back up so you can reattach the UCA balljoint.
**You need to use the 3/8" spacer on the lower bolt so it should push the shock towards the front of the truck**. **The top spacer should be installed as to push the shock rearwards to keep the shock as vertical as possible.** The bolt direction shouldn’t matter, but I put it facing the back giving the CV shaft more clearance. Same torque spec for the top bolt, probably 30ftlb or so. Go ahead and snug up the lower bolt that goes through the LCA as well.

You want to slide the coilover away from the UCA as far as possible. Mine has roughly 1" clearance between the OD of the spring and the UCA with everything installed. Clearance will change as the suspension cycles, this is normal. Once this is done make sure nothing is contacting the shock or spring with the truck on the ground (not sitting on the droop stop) and tighten all bolts and reinstall the wheels.

## Step 7: Adjust Spring Preload and Bumpstop

You will want to pay attention to that mark you made on the shock shaft when you first started. You want the truck to sit right at that level with the full weight on the coilovers. Remove the jackstands and slowly lower the truck down on to the wheels to see where it is. The following process will probably take

several iterations to get the right preload on the spring. **Only adjust the preload with the truck jacked up with the springs unloaded or you will void the shock warranty. Make sure the shock body threads are greased as well.**

If its too low (shock compresses past the half way mark), jack the truck back up and use the spanner wrench to turn up the adjustment/spring seat nut a few turns then set it back down and try again. Repeat this as needed (Look at mark, verify correct, if too low jack up truck and add preload, set down and look again). You will want to raise the truck back up while adjusting to make turning the wrench easier. Once the shock sits where you made the mark on the shaft you are almost done! Once you have the main nut set, tighten the jam nut with the spanner wrench to make sure it doesn't move.

## Step 8: Take A Test Drive and Get an Alignment

On the first test drive go very slow making sure there are no abnormal sounds or feels. Clanking or banging is bad, and if it's over a bump probably indicates the shock is bottoming out in which case you need to adjust your bumpstop, use a higher spring rate, increase shock dampening, or a combination of all of these.

Because you changed the front end height (most likely), you will need to get a front end alignment. You will probably get some funny looks from the tech but the camber adjustment range should still be in check unless you are super low. I had to install the belltech offset UCA bushings in mine because it is rather low, but others have not needed to. The alignment adjusters operate the same as factory.

## Step 9: Enjoy!

I am very happy with this mod and think it is a great upgrade for these trucks. Please let me know if you have any questions or comments by emailing me at atomicfandp@gmail.com or sending me a message on Facebook (www.facebook.com/atomicfp).

## Coilover Shock Settings Adjustment

The shock settings can be adjusted to your personal taste. I generally prefer it very stiff for track duty (13-15) and somewhat soft for common driving (9-10). The knobs make it very easy to adjust the shock dampening. There is no "best" setting I can give, every setup and personal taste will be different.

Ride height can be adjusted in the same fashion that we used to initially set the preload. The springs may need readjustment after the first week or so. I have not touched mine since I first installed them. Whenever ride height changes it is recommend to have your front end aligned. Do not move the shocks far out of their mid range of travel. If you find yourself having to adjust them more than an inch away from the line on the mid-shaft either up or down then the solution is to get a new shock that is longer or shorter, or to adjust your ride height some other way. Think of the adjustments with coilovers as fine tuning the ride height, not huge changes. Once you get the height set it is not recommended to change it frequently.