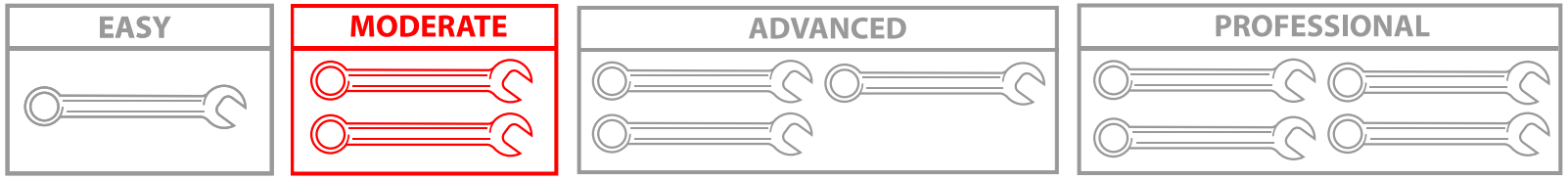
VW MKV/MKVI Coilover Suspension Installation

INTRODUCTION

Volkswagen MKV/MKVI Coilover Suspension Systems

ECS Tuning offers a number of high quality coilover suspension systems with the following features:

- Adjustable ride height
- Superior handling
- Quality lightweight materials and construction
- Impressive warranties
- Race proven technology
- The aggressive looks of a lowered suspension



BASIC SKILLS REQUIRED

SOME EXPERIENCE RECOMMENDED

ADVANCED SKILLS & EXPERIENCE REQUIRED

PROFESSIONAL SKILLS & SPECIALTY TOOLS REQUIRED

Installing a coilover suspension is a rewarding project that can be successfully completed in a weekend. Plan accordingly based on your experience level. These instructions will help you with a smooth, trouble free installation, but they are designed to help with all coilover suspension systems. There are some differences between brands, so be sure to read and familiarize yourself with these instructions before you begin and read any information that comes with your kit as well. Make sure you have all the required tools on hand and in addition, don't forget to plan ahead and schedule a four wheel alignment with a qualified repair facility. Thank you for purchasing a coilover suspension kit from ECS Tuning. We appreciate your business!

TABLE OF CONTENTS

We carry some of the the finest coilover suspension kits from some of the best names in the business. These instructions are intended as a guide to help you install a coilover kit on any MKV or MKVI Volkswagen. We have used a JOM coilover kit in creating these instructions. There may be some minor differences in kits from different manufacturers, but the overall installation procedures will be the same. Before you begin, please refer to the section on manufacturer specific notes (page 36) for any specific information relating to your kit.

H&R

Bilstein

KW

ST Suspensions

FK Automotive

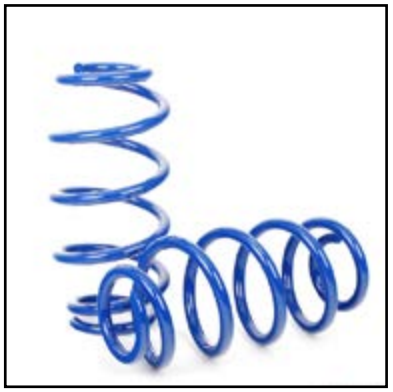
JOM

Koni

COILOVER KIT CONTENTS

Rear Shocks with Bump Stops and Dust Boots

Front Shocks with Bump Stops and Dust Boots



Rear Coil Springs

Front Coil Springs

Adjustment Wrench

Rear Spring Perches

INSTALLATION KITS

For a trouble free installation and to obtain the maximum benefit from your new coilover suspension, we recommend the use of a coilover installation kit. Using an installation kit has the following advantages:

- A spring compressor is not required throughout the procedure.
- The original suspension will not need to be disassembled, allowing you the option of easily switching back to the factory suspension or making other use of it.
- New bushings and strut bearings allow your suspension to operate smoothly and increase reliability.
- Many of the fasteners are torque to yield fasteners that require replacement, and in many cases they will be very rusty and can be damaged during removal. These are included with an installation kit.
- Specialty tools are included with some installation kits.

ES#2570017 includes the following:

- Upper Front Strut Mounts
- Upper Front Strut Bearings
- Front Knuckle Pinch Bolts and Nuts
- Outer Axle Bolts (24mm 12 Point)
- Rear Shock Mounting Bolts
- Rear Upper Shock Mounts
- Schwaben Spindle Housing Spreader
- Schwaben M14 Triple Square Socket

ES#2581787 includes the following:

- Upper Front Strut Mounts
- Upper Front Strut Bearings
- Front Knuckle Pinch Bolts and Nuts
- Outer Axle Bolts (24mm 12 Point)
- Rear Shock Mounting Bolts
- Rear Upper Shock Mounts

REQUIRED TOOLS

NOTE

We recommend that you have a complete selection of tools and the necessary equipment for automotive repair. Below is a list of the specific tools that were required for this coilover installation. Additional tools may be required for different brands of kits, or any issues that arise during installation such as rust, corrosion, or broken and stripped fasteners.

These tools are available at ecstuning.com

- 17mm Protecta-Socket (for lug nuts) ..... ES#2221243
- 3/8" Drive Torque Wrench ..... ES#2221245
- 1/2" Drive Torque Wrench ..... ES#2221244
- 14 x 1.25 Wheel Hanger ..... ES#2678092
- Flat Blade Screwdriver(s) ..... ES#2225921
- Schwaben 19mm Strut Nut Socket ..... ES#2652177
- Schwaben 21mm Strut Nut Socket ..... ES#2652181
- Schwaben 22mm Strut Nut Socket ..... ES#2652183
- Schwaben Spindle Housing Spreader ..... ES#3894
- Floor Jack ..... ES#240941
- Coil Spring Compressor ..... ES#1306817
- Triple Square Sockets: M6, M14 ..... ES#9011
- 1/4" Drive Ratchet
- 1/4" Drive Sockets: 10mm
- 3/8" Drive Sockets: 13mm, 16mm
- 3/8" Drive Ratchet, Extensions
- 1/2" Drive Breaker Bar
- 1/2" Drive Ratchet
- 1/2" Drive Sockets: 16mm, 18mm, 24mm 12 point
- Allen Wrenches: 7mm
- Combination Wrenches: 10mm, 18mm
- Pry Bar
- 1/2" Drive Impact
- Tape Measure

ADDITIONAL RECOMMENDATIONS FOR COILOVER INSTALLATION

Many coilover kits come with only one wrench for adjustment. It is extremely helpful to have two wrenches for adjusting and tightening the spring perches. Our ES#2465 wrench set contains two different sizes compatible with JOM, ECS, and H&R coilover kits.

Front sway bar end links are quite often worn out or get damaged during removal. Some coilover kits come with new ones. If your kit does not, save time and frustration and order replacements before you begin.

SHOP SUPPLIES AND MATERIALS

- Hand Cleaner/Degreaser ..... Available at ecstuning.com ..... ES#2167336
- Nylon Cable Ties ..... Available at ecstuning.com ..... ES#5840
- Shop Rags ..... Available at your local auto parts store
- Aerosol Spray Lubricant/Penetrating Oil ..... Available at your local auto parts store
- Mechanics Wire ..... Available at your local auto parts store

INSTALLATION NOTES

- RH refers to the passenger side of the vehicle.
- LH refers to the driver side of the vehicle.
- Always use the proper torque specifications.
- If applicable to this installation, torque specifications will be listed throughout the document and at the end as well.
- Please read all of these instructions and familiarize yourself with the complete process before you begin.

PREPARATION AND SAFETY

- Park your car in a safe, well lit, level area.
- Shut the engine off and remove the key from the ignition switch.
- Make sure any remote start devices are properly disabled.
- Always wear safety glasses.
- Make sure the parking brake is applied until the vehicle is safely lifted and supported.
- If using an automotive lift, be sure and utilize the factory specified lift points. Lifting a vehicle in an incorrect location can cause damage to the suspension/running gear.
- When lifting a vehicle using a jack, always utilize the factory specified lift points. Lifting a vehicle in an incorrect location can cause damage to the suspension/running gear. Always support the vehicle with jack stands.
- Always read and follow all safety information and warnings for the equipment you are using.

Never get underneath a vehicle that is supported only by a jack. Always make sure that the vehicle is securely supported on jack stands.

With the vehicle parked on level ground, measure the FTG (fender to ground) clearance in both the front and rear by measuring between the ground and the lip of the fender or quarter panel as shown in the picture. This is an important measurement that will give you a reference point for adjusting the ride height of the vehicle. Record the measurements below.

Front	Rear

Safely lift and support the vehicle, then remove all four wheels. We are using a 17mm protecta socket to protect the finish on the wheels and a wheel hanger to support the wheel as we remove the lug bolts.

REMOVING THE ORIGINAL FRONT STRUTS

Step 3:

Disconnect the sway bar end links from each front strut housing. Use an 18mm wrench to loosen and remove the nut while holding the link stud with an M6 triple square socket.

TECH TIP

It is very common for these end link nuts to be extremely difficult to remove. You cannot heat them or the end link will be ruined. The best method is to clean the exposed stud with a wire brush and lubricate it with penetrating oil. Then work the nut back and forth gently until you are able to remove it.

Step 4:

Using a 10mm wrench, remove the bolt securing the brake hose and ABS sensor wire bracket to each front wheel bearing housing.

NOTE

Be careful not to stretch the brake hoses or sensor wires or allow any component to hang on them during this installation.

REMOVING THE ORIGINAL FRONT STRUTS

Step 5:

Using a 24mm socket and an impact wrench, remove each axle bolt. Some replacement axle bolts may require a 17mm allen socket for removal.

TECH TIP

If you do not have an impact wrench, you can loosen the axle bolt by using the following method: Thread in two lug bolts and lever between them with a long pry bar. Then loosen the axle bolt using the socket on the end of a 1/2" breaker bar.

Step 6:

Using a 10mm socket, remove the nut securing the headlight leveling sensor arm bracket (if equipped) to the LH lower front control arm and pull the bracket stud out of the hole.

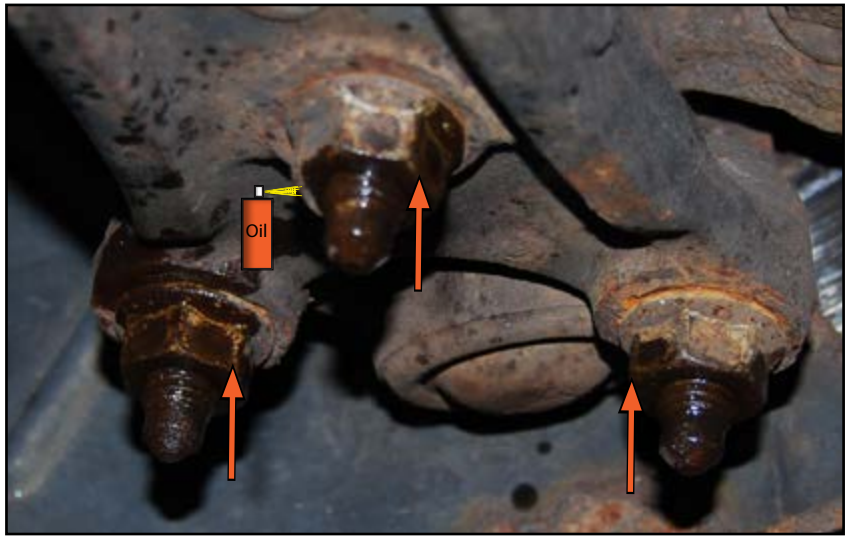
TECH TIP

It is a good idea to use a spray lubricant/penetrating oil on this nut and any of the rusty fasteners you encounter during this installation. It can mean the difference between relatively easy removal or frustration with seized and broken fasteners.

REMOVING THE ORIGINAL FRONT STRUTS

Step 7:

Using a 16mm socket, remove the three lower ball joint nuts (arrows) on each side.



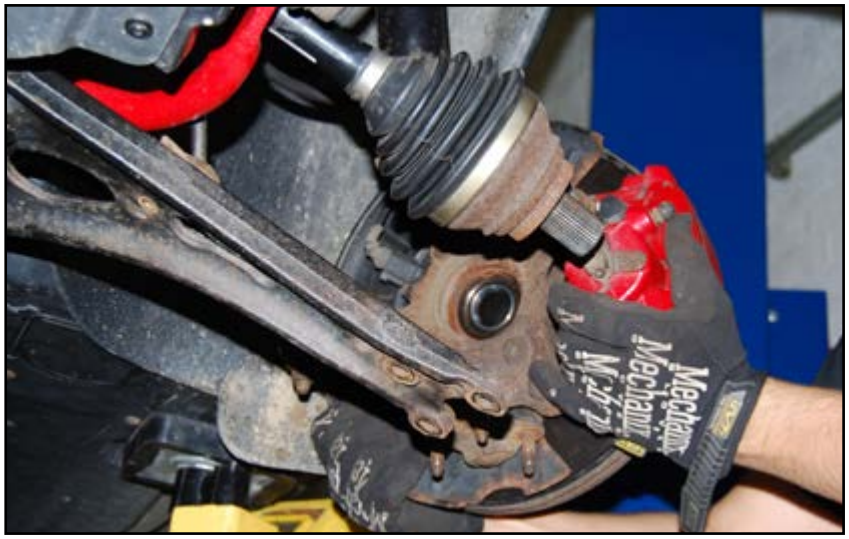
Step 8:

Pull each lower control arm down from the ball joints. These two parts may be stuck together due to rust and corrosion, you may need to use a prybar to separate them as shown in the picture.

REMOVING THE ORIGINAL FRONT STRUTS

Step 9:

Pull each outer CV joint out of it's wheel bearing by pulling the wheel bearing housing outward. Secure the CV shafts up out of the way using mechanic's wire or wire ties.



Step 10:

Reconnect the lower ball joints to each control arm. Thread the nuts on by hand. It is not necessary to tighten or torque the nuts at this time.

REMOVING THE ORIGINAL FRONT STRUTS

Step 11:

Support the front suspension underneath the control arm with a floor jack.

Step 12:

Remove the wheel bearing housing pinch bolts using an M14 triple square socket on one side and an 18mm socket on the other. These bolts may be rusted in place and you may have to drive them out with a hammer. If you are re using these bolts, be careful not to damage the threads. If you have an installation kit, these bolts and nuts are included with the kit.

REMOVING THE ORIGINAL FRONT STRUTS

Step 13:

Put the housing spreader on the end of a 1/2" ratchet, then insert it into the slot in the back of the wheel bearing housing. Pull down on the end of the ratchet to rotate the spreader and increase the gap in the housing.

Step 14:

Pull the wheel bearing housing down off the shock absorber tube. Lower the floor jack as necessary until the shock absorber is completely removed from the housing. Below are three very helpful tips for this step:

TECH TIPS

- If the shock absorber is binding in the housing, you may have to completely unbolt the lower ball joint to gain additional movement of the housing. Have an assistant tap on the housing with a hammer while you support it.
- If it feels like the housing is hitting something and it will not drop any lower, make sure the alignment tab on the shock absorber tube is not hitting the tip of the housing spreader.
- You may have to move and readjust the housing spreader a few times during strut removal.

REMOVING THE ORIGINAL FRONT STRUTS

Step 15:

The upper strut mounting bolts are located underneath the cowl panel. Pull off the cowl panel seal and lift gently at each corner of the panel to access the bolts.

NOTE

Lifting the corners of the cowl panel saves you the time of removing the wiper arms and completely removing the panel. Be careful not to lift or distort the panel too far or cracks and breakage may result.

Step 16:

There are three upper strut mounting bolts on each side. Using a 13mm socket, remove two of them and loosen the third. Then, while holding the strut with one hand, remove the last bolt and carefully lower the strut out of the shock tower.

INSTALLING THE NEW FRONT COILOVERS

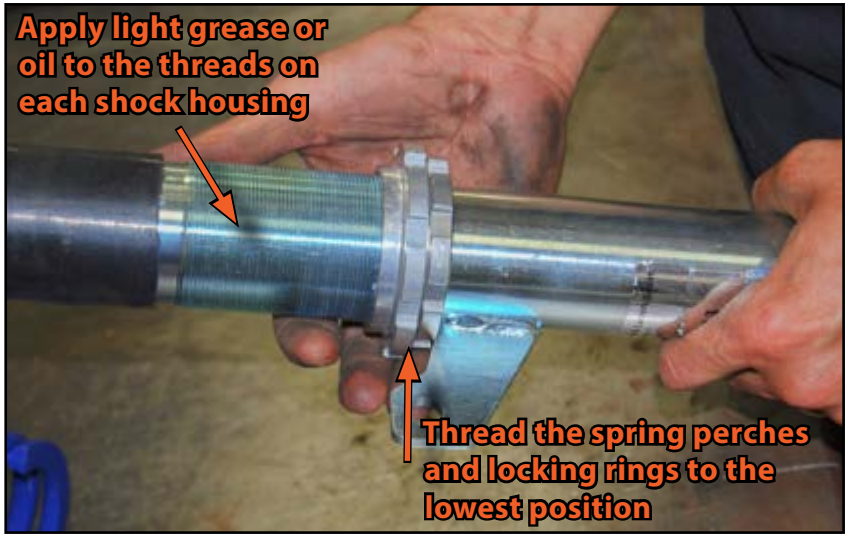
Step 1:

Don't forget to refer to page 36 for any manufacturer specific notes regarding the installation of your new coilover suspension.

For smooth adjustments and to prevent future corrosion, apply light grease or oil to the threads on each shock housing. Then thread the spring perch and locking ring to the lowest position on each front shock.

NOTE

If you are going to use your old strut mounts, see pages 32-34 for instructions on removing the mounts from the original front and rear struts.



Step 2:

Place the coil spring over the shock body until it rests on the lower spring perch. Then slide the upper strut spacer onto the shock rod as shown in the picture.

NOTE

The top and bottom diameter of the front coil springs is different and will match the size of the upper and lower spring seats. There is no left or right, either one can be used on either side.

INSTALLING THE NEW FRONT COILOVERS

Step 3:

If they are not already together, assemble the new front strut bearing onto the front strut mount as shown in the picture. If you are using your old mounts, make sure the bearing is still installed in the mount. Also note the two arrows (highlighted in the inset photo) on top of the strut mount.

Step 4:

Place the strut mount over the shock rod and thread the new shock nut on by hand. Line up the arrows on the strut mount so when the strut is installed they will point towards the front and rear of the car. Use the location of the sway bar link mounting tab to help you reference the installation position of the mount.

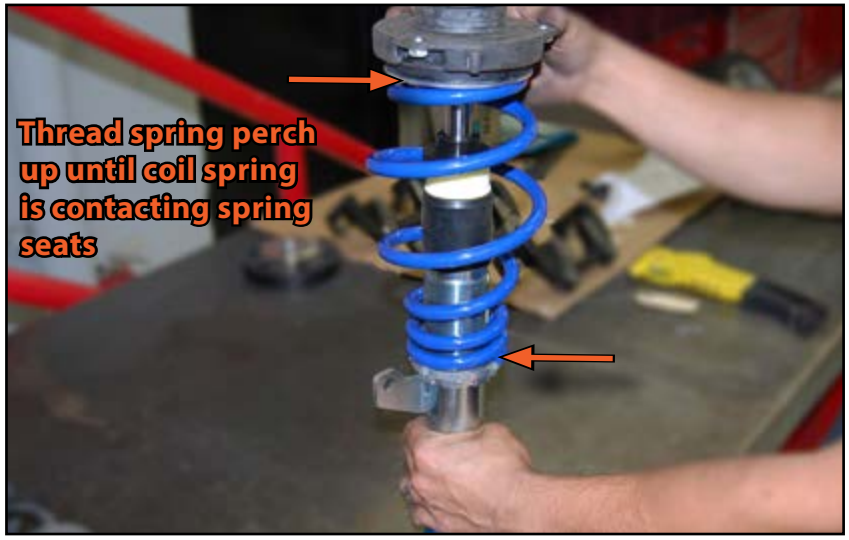
INSTALLING THE NEW FRONT COILOVERS

Step 5:

Hold the shock rod with a 7mm allen wrench and then using a 22mm strut nut socket, tighten the upper shock nut to 60 Nm (44 Ft-lbs). Make sure the arrows on the upper strut mount stay properly positioned as you tighten the shock nut.

Step 6:

Thread the spring perch up until the coil spring is contacting the upper and lower spring seats (arrows).



INSTALLING THE NEW FRONT COILOVERS

Step 7:

Lift the assembled coilover up into the strut tower, making sure the arrows on the mount are properly positioned, and then thread in the three upper strut mounting bolts. Torque the bolts to 15 Nm+90 degrees (11 Ft-lbs+90 degrees).

Step 8:

Using the jack to raise the suspension, guide the bottom of the coilover into the wheel bearing housing. Make sure it is completely seated into the housing then install the pinch bolt. Torque the bolt to 70 Nm+90 degrees (52 Ft-lbs+90 degrees).

The remainder of the re-assembly is the reverse of removal. For convenience and accuracy, we have provided this checklist for you to follow:

- [ ] Unbolt the lower ball joint.
- [ ] Install the CV Joint into the wheel bearing.
- [ ] Install the lower ball joint and torque the nuts to the proper specification depending on the style of control arm on your car. (See page 35)
- [ ] Install the sway bar end link and torque the nut to 65 Nm (48 Ft-lbs).
- [ ] Install the axle bolt and torque to the proper specification depending the style of bolt you have. (See page 35)
- [ ] Install the brake hose and ABS wire bracket.
- [ ] Install the headlight level sensor bracket into the LH lower control arm.
- [ ] Install both front wheels and torque them to 120 Nm (89 Ft-lbs).

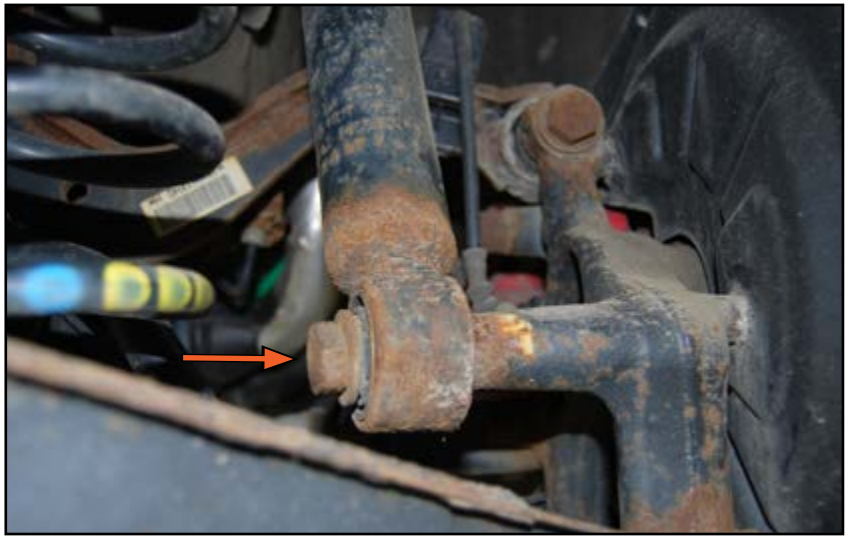
REMOVING THE ORIGINAL REAR SHOCKS AND SPRINGS

Step 1:

Using a 10mm socket, remove the nut (arrow) holding the rear headlight leveling sensor arm to the actuator (if equipped). It is located on the LH side, forward of the lower control arm.

Step 2:

Using a 21 mm wrench, remove both lower shock mounting bolts.



REMOVING THE ORIGINAL REAR SHOCKS AND SPRINGS

Step 3:

Using a 13mm socket and a long extension for ease of access, remove both upper shock mount bolts on each side.

Step 4:

Remove the shock absorbers from the car.

REMOVING THE ORIGINAL REAR SHOCKS AND SPRINGS

Step 5:

Using an 18mm socket and wrench, remove the nut on each lower control arm outer mount. You will be able to remove the nut easily, but the bolt will be under a bind from the pressure of the coil spring.

Step 6:

Lift the rear lower control arms slightly using a floor jack or similar type of lifting equipment. This will release the binding on the bolt. Remove the bolt once it is free.

REMOVING THE ORIGINAL REAR SHOCKS AND SPRINGS

Step 7:

Lower the floor jack and remove the rear coil spring.

NOTE

Make sure the lower spring cushion stays in place in the lower control arm.

INSTALLING THE NEW REAR SHOCKS AND SPRINGS

Step 1:

Place the new rear shock upper mount (or the old mount if you are re using it) over the shock rod.

Step 2:

Install the rear shock upper nut and torque it to 25 Nm (18 Ft-lbs). The new shock may require you to use an allen wrench to hold the shock rod. You can use an offset box wrench for easier tightening of the nut as shown in the picture. You will need a 19mm strut nut socket for the final torque of the nut.

INSTALLING THE NEW REAR SHOCKS AND SPRINGS

Step 3:

Oil or grease the threads on each rear coil spring perch and thread the adjusting collar all the way on.

Step 4:

Insert a rear spring perch into the top of each rear coil spring.

Some rear coilover suspensions are designed with the spring perch and adjusting collar located on the top of the coil spring, such as the JOM kit we are using here. Others are designed with the spring perch and adjusting collar located on the bottom of the spring. Refer to page 37 for notes on installing suspension with a lower mounted spring perch.

NOTE

The top and bottom diameter of the rear coil springs is different and will match the size of the upper and lower spring seats, however there is no left or right, either one can be used on either side.

INSTALLING THE NEW REAR SHOCKS AND SPRINGS

Step 5:

Hold the new rear shock absorber in place, then install and torque both upper mount bolts to 50 Nm+45 degrees (37 Ft-lbs+45 degrees).

Step 6:

Place a rear coil spring into the lower control arm. Position the spring so the end coil is correctly indexed in the lower spring cushion. The spring cushion will have a clearly identifyable locating stop for the end coil.

INSTALLING THE NEW REAR SHOCKS AND SPRINGS

Step 7:

Hold the rear coil spring so the spring perch is aligned with the centering pin on the body, then raise the lower control arm with the floor jack until the spring perch is seated.

Step 8:

Adjust the floor jack as necessary to align the outer control arm bolt. Install the bolt and tighten the nut hand tight. Do not torque the nut at this time.

NOTE

These suspension bushings must be torqued with the suspension at ride height.

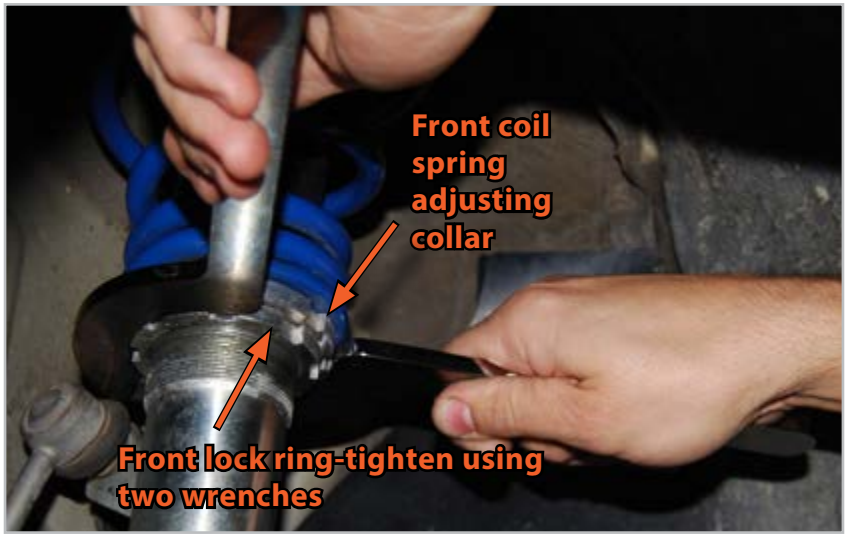
Install the lower rear shock absorber bolt until it is threaded all the way in but do not torque it at this time.

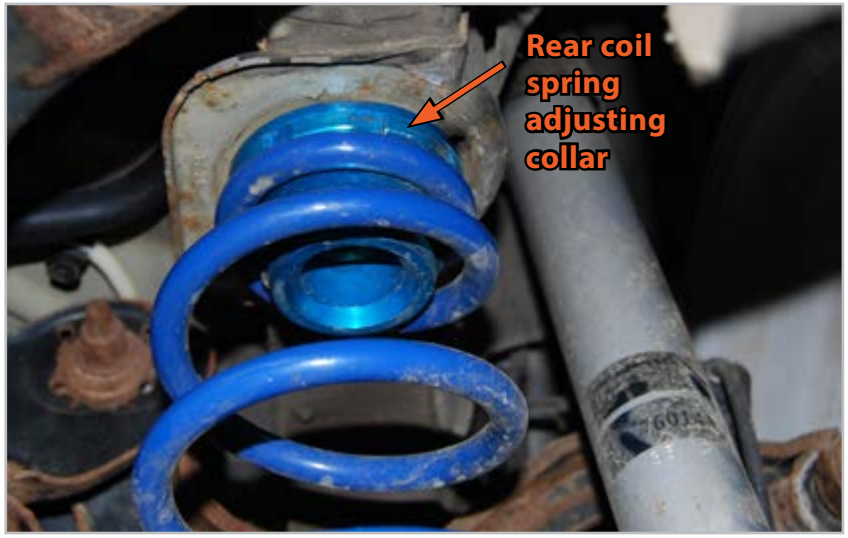
- [ ] Connect the headlight leveling sensor arm (if equipped).
- [ ] Install both rear wheels and torque them to 120 Nm (89 Ft-lbs).
- [ ] Lower the vehicle onto the suspension and perform the ride height adjustment.
- [ ] Torque the rear shock absorber bolt to 180 Nm (133 Ft-lbs) with the vehicle at the final ride height.
- [ ] Torque the rear outer control arm bolt to 90 Nm+90 degrees (66 Ft-lbs+90 degrees) with the vehicle at final ride height.

ADJUSTING THE RIDE HEIGHT

Adjusting the ride height is a simple process of moving the spring perches up or down until the desired height is reached. Keep the following pointers in mind while adjusting your suspension:

- You must lift the vehicle so all weight is off the springs before adjusting the spring perches.
- Use the measurements you took on page nine for reference if you have a specific amount of drop in mind.
- You may have to make a number of adjustments to get everything set exactly right. Be patient and take your time.
- Securely tighten the front locking rings to the perches once ride height is set.
- Once you have the ride height adjusted to your liking, make sure there is no wheel/tire interference while turning the wheels lock to lock.
- After driving for the first time, the suspension may require readjustment.
- If you add any additional components in the future such as a sway bar or polyurethane bushings, the suspension may require minor adjustments.





ORIGINAL FRONT STRUT MOUNT REMOVAL

Step 1:

Secure the front strut in a vise and install a coil spring compressor.

CAUTION

Make sure the coil spring compressor is securely installed and the safety pins are engaged.

Step 2:

Compress the coil spring by turning the screws alternately and evenly until it pulls away from the upper spring seat (arrow).

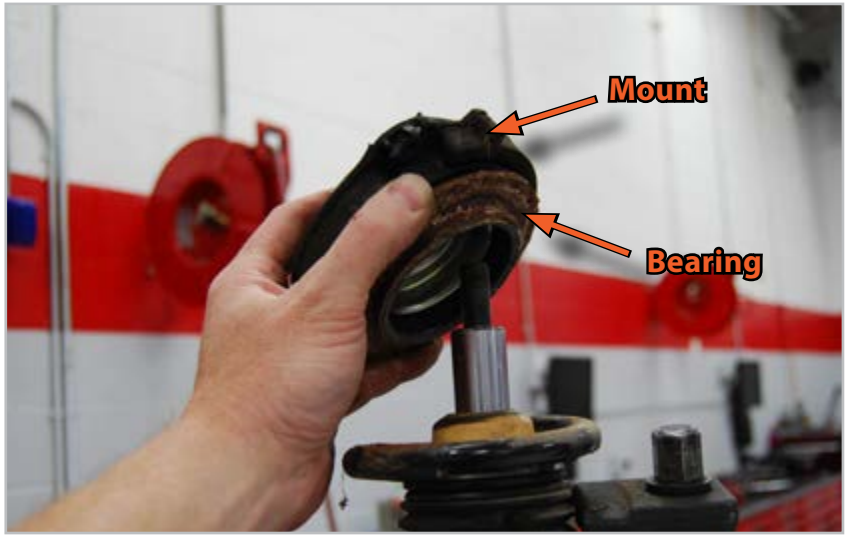
ORIGINAL FRONT STRUT MOUNT REMOVAL

Step 3:

Hold the top of the shock rod with a 7mm allen wrench, then remove the upper strut nut using a 21mm strut nut socket.

Step 4:

Lift off the upper strut mount. Make sure the bearing stays installed on the mount. Slowly release the coil spring compressor and perform the same process on the other front strut.



ORIGINAL REAR SHOCK MOUNT REMOVAL

Step 1:

Secure the rear shock in a vise. Hold the top of the shock rod with a crescent wrench or similar tool and loosen the top nut with a 16mm wrench.

Step 2:

Lift off the upper mount and pull off the bump stop if it sticks to it.

TORQUE SPECIFICATIONS

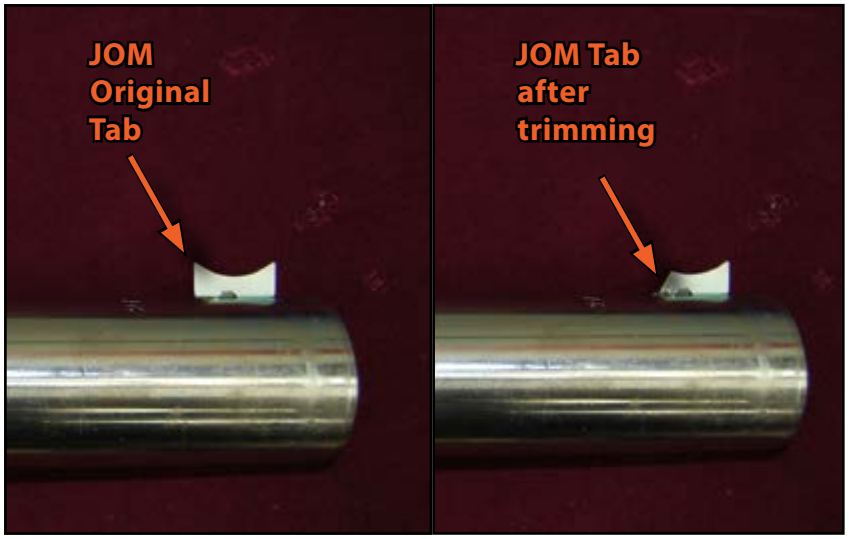
CV Joint to Wheel Hub Hexagon Bolt	200 Nm+180 degrees (147 Ft-lbs+180 degrees)	(Page 21)
CV Joint to Wheel Hub 12 Point Ribbed Bolt	70 Nm+90 degrees (52 Ft-lbs+90 degrees)	(Page 21)
CV Joint to Wheel Hub 12 Point Bolt	200 Nm+180 degrees (147 Ft-lbs+180 degrees)	(Page 21)
Front Upper Shock Nut	60 Nm (44 Ft-lbs)	(Page 19)
Front Upper Strut Mount to Body	15 Nm+90 degrees (11 Ft-lbs+90 degrees)	(Page 20)
Lower Ball Joint to Cast Lower Control Arm	60 Nm (44 Ft-lbs)	(Page 21)
Lower Ball Joint to Aluminum Lower Control Arm	100 Nm (74 Ft-lbs)	(Page 21)
Lower Ball Joint to Stamped Steel Lower Control Arm	100 Nm (74 Ft-lbs)	(Page 21)
Rear Control Arm Outer Bolt	90 Nm+90 degrees (66 Ft-lbs+90 degrees)	(Page 30)
Rear Shock Nut	25 Nm (18 Ft-lbs)	(Page 26)
Rear Shock Lower Mounting Bolt	180 Nm (133 Ft-lbs)	(Page 30)
Rear Shock Upper Mount Bolts	50 Nm+45 degrees (37 Ft-lbs+45 degrees)	(Page 28)
Wheel Bearing Housing to Suspension Strut	70 Nm+90 degrees (52 Ft-lbs+90 degrees)	(Page 20)
Sway Bar Link to Strut	65 Nm (48 Ft-lbs)	(Page 21)
Wheels	120 Nm (89 Ft-lbs)	(Page 21)

• A note about torque to yield or "stretch" bolts: Many bolts will have a torque specification listed in the format - xx Nm+xx degrees (xx Ft-lbs+xx degrees). These bolts are torque to yield bolts, commonly referred to as "stretch" bolts. The correct procedure for torquing these bolts is: *Stage One* - torque them to the Nm or Ft-lb specification. *Stage Two* - tighten each one the additional specified number of degrees. To prevent over torquing it is important to mark each fastener with paint *immediately* after performing the second stage or "stretching" of the bolts.

MANUFACTURER SPECIFIC NOTES

JOM Coilovers

You may have to trim the alignment tab on each front shock. On some applications, this tab will interfere with the pinch bolt in the wheel bearing housing. If necessary, it can be easily trimmed with a hack saw. Hold the coilover in place prior to bolting it in to determine if you need to trim this tab.



JOM Coilovers

Depending on application, the blue sleeves included with the coilover kit will need to be installed onto the bottom of each front shock. Measure the diameter of the original shock and the JOM to determine whether or not the sleeves will be required.

LOWER MOUNTED SPRING PERCH

Independent Rear Suspension Step 1

Some coilover kits have a lower mounted spring perch. On independent rear suspension vehicles, you will have to remove the lower spring cushion by prying out the retainer from the bottom of the control arm.

Independent Rear Suspension Step 2

Lift out the rear spring cushion and retainer.

LOWER MOUNTED SPRING PERCH

Independent Rear Suspension Step 3

Place the lower spring perch/adjustment collar into the lower control arm.

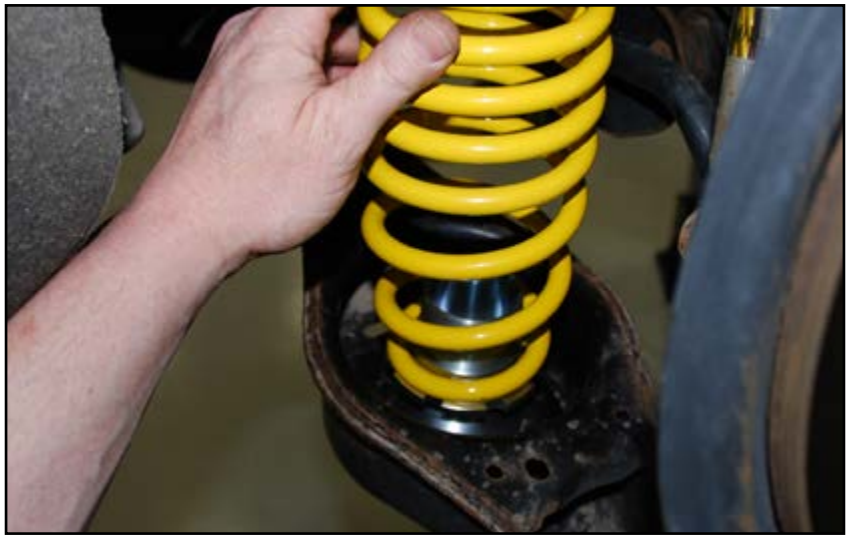
Independent Rear Suspension Step 4

Install and torque the lower spring perch retaining bolt.

LOWER MOUNTED SPRING PERCH

Independent Rear Suspension Step 5

Place the coil spring onto the lower spring perch and be sure to re use the original upper spring cushion.



Your Coilover Suspension Installation is Complete!

These instructions are provided as a courtesy by ECS Tuning.

Proper service and repair procedures are vital to the safe, reliable operation of all motor vehicles as well as the personal safety of those performing the repairs. Standard safety procedures and precautions (including use of safety goggles and proper tools and equipment) should be followed at all times to eliminate the possibility of personal injury or improper service which could damage the vehicle or compromise its safety.