



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.



## INTRODUCTION

### Porsche 955/957 Cayenne H&R Sport Springs ES#1303247

H&R Sport Springs offer the following features and benefits:

- Front and rear lowering of 1.6 inches
- Made in Germany
- Improved handling characteristics
- Comfortable ride quality
- Easy installation

## **ECS Difficulty Gauge**



Looking to enhance the looks and improve the handling of your Porsche Cayenne, yet retain comfortable ride quality? Installing H&R's Sport Springs is the answer. Due to its moderate difficulty, some experience is recommended for this project, however we'll take you through it step by step so even if you don't have any previous experience, we'll make it easy for you. Overall you can complete this installation in a weekend, but be sure to plan accordingly based on your experience level. Before you begin, read and familiarize yourself with these instructions and make sure you have all the required tools on hand. In addition, don't forget to plan and schedule a four wheel alignment with a gualified repair facility. Thank you for purchasing H&R Sport Springs from ECS Tuning. We appreciate your business!



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Stock Ride Height



Lowered with H&R Sport Springs



# **KIT CONTENTS**



**Two Front Coil Springs** 



Two Rear Coil Springs



## **REQUIRED TOOLS**

Note: The tools required for each step will be listed by the step number throughout these instructions.

We recommend that you have a complete selection of tools and equipment necessary for automotive repair. Below is a list of the tools we used to install the H&R Sport Springs. Additional tools may be required for any issues that arise during installation such as rust, corrosion, or broken and stripped fasteners.

19mm Protecta-Socket (for lug nuts)	Available at ecstuning.com	<u>ES#2221243</u>
• 3/8" Drive Ratchet	Available at ecstuning.com	<u>ES#2765902</u>
• 3/8" Drive Torque Wrench	Available at ecstuning.com	<u>ES#2221245</u>
• 1/2" Drive Torque Wrench	Available at ecstuning.com	<u>ES#2221244</u>
Flat and Blade Screwdriver(s)	Available at ecstuning.com	<u>ES#2225921</u>
• Wheel Hanger	Available at ecstuning.com	<u>ES#2678092</u>
Torx Bit Sockets: T40	Available at ecstuning.com	<u>ES#11418</u>
Strut Nut Sockets: 18mm	-	
• 3/8" Sockets: 13mm	-	
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- 3/8" Extensions
- 1/2" Ratchet, Breaker Bar
- 1/2" Drive Sockets: 18mm, 21mm
- Impact Wrench
- 3/8" Drive Shallow Swivel Sockets: 13mm, 16mm
- 1/2"-3/8" Adapter
- Pry Bar
- Coil Spring Compressor see page 15 for spring compressor requirements
- Open/Boxed End Wrenches: 7mm, 16mm, 17mm, 18mm, 21mm

## SHOP SUPPLIES AND MATERIALS

 Aerosol Brake Cleaner...... Available at your local auto parts store Shop Rags ...... Available at your local auto parts store Aerosol Spray Lubricant/Penetrating Oil..... Available at your local auto parts store

- Ball Peen Hammers
- Hydraulic Jack or similar equipment
- Locking Pliers



## **INSTALLATION NOTES**

- **RH** refers to the *passenger side* of the vehicle. •
- **LH** refers to the *driver side* of the vehicle.
- Always use the proper torgue 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.

## GENERAL PREPARATION AND SAFETY INFORMATION

ECS Tuning cares about your health and safety. Please read the following safety information. This information pertains to automotive service in general, and while it may not pertain to every job you do, please remember and share these important safety tips.

- 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. ٠
- **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.

Step 1:

19mm Protecta-Socket, Wheel Hanger, Impact Wrench

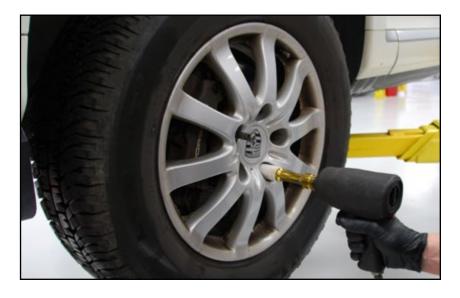
Safely raise and support the vehicle and remove all four wheels. Here we are using a wheel hanger to support the weight of the wheel while we remove the lug bolts.

## ΝΟΤΕ

Don't forget to remove the locking lug bolts first. We recommend loosening them by hand with the wheels on the ground so the teeth on the lug bolts or "key" are not damaged if you are using an impact wrench.

### Step 2: 18mm Wrenches

Disconnect the sway bar links where they attach to the front sway bar. First remove the nuts, then pull down on the sway bar to relieve the tension and slide the bolts out.







21mm Socket, 21mm Wrench, Impact or Breaker Bar Step 3:

Remove the front lower strut base nut on each side.



### Step 4:

Disconnect the brake pad warning sensor harness connector on each side by releasing the locking tab then pulling the connector downward.





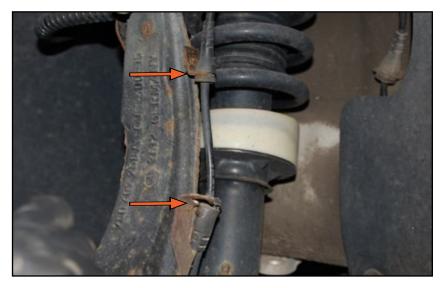
### Step 5:

Rotate the upper half of each connector 90 degrees (either direction will work), then pull it out of its mounting bracket.



### Step 6:

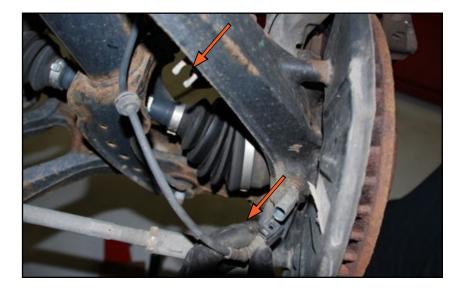
Pull the warning harness out of both of the upper retainers on each steering knuckle.





### Step 7:

Disconnect the ABS harness connector from the sensor on each side and pull the harnesses out of their retainers behind each steering knuckle.



### Step 8:

Pull each front brake hose out of its retainer near the top of the steering knuckle.





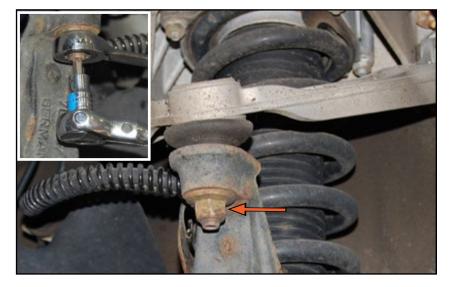
Step 9: Hydraulic Jack or Similar Equipment

Place a hydraulic jack or similar equipment underneath one of the front lower control arms.



#### 18mm Wrench, T40 Torx Bit Socket, Ratchet Step 10:

Remove the upper ball joint nut. If the ball joint stud begins to spin, hold it stationary with a Torx Bit Socket (Inset photo).



## Step 11:Ball Joint Separator or Ball Peen Hammers

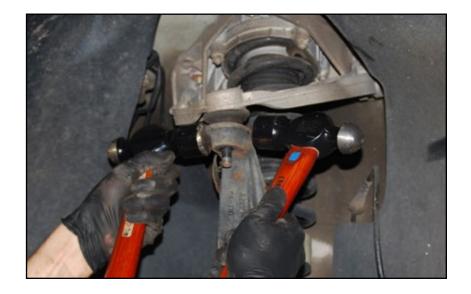
Separate the upper ball joint from the steering knuckle. You can use a ball joint separator for this, but if you do not have one, you can use the method shown here. Use two heavy hammers and hold one firmly against the steering knuckle on one side of the ball joint stud. Strike the other side with moderate force. You may have to strike the steering knuckle five to ten times, but the ball joint will eventually pop out of the steering knuckle.

### CAUTION

Do not use a traditional ball joint fork as this will damage the rubber boot and joint.

### Step 12: 16mm Wrenches

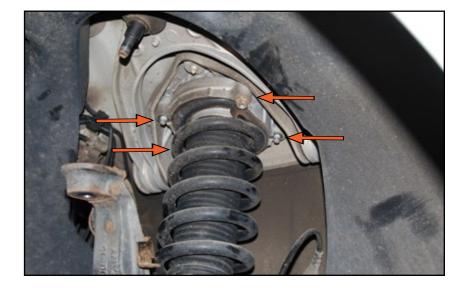
Once the ball joint has popped out of the steering knuckle, loosen the two upper a-arm bolts and push the a-arm up as far as it will go, then snug one of the bolts. This will hold it out of the way for strut removal.





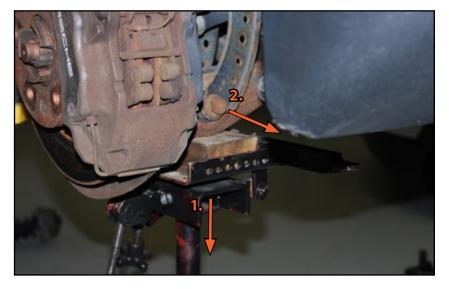
Step 13: 13mm Swivel Socket, 3/8 Ratchet, Extension

Loosen all four nuts holding the strut in place at the top, then remove three of them and leave one loosely installed.



## Step 14:

Lower the jack to relieve tension on the lower strut base bolt, then remove the bolt.





### Step 15:

Firmly hold the strut and remove the last nut holding it in place at the top. Lower the strut down being careful not to rest it on the CV boots.



### Step 16:

Pivot the top of the strut outward until it clears the fender, then carefully guide the strut base around the CV shaft and remove the strut assembly.





**Coil Spring Compressor** Step 1:

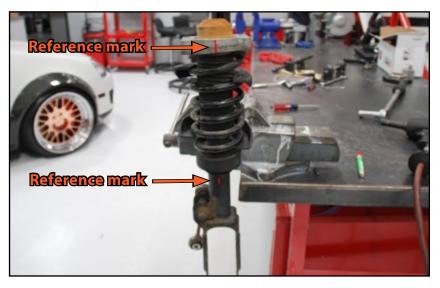
A high quality clamshell or wall mount style of coil spring compressor will be required for this installation. Due to both the size and rating of the original springs as well as the design and coil positioning of the new H&R springs, these professional compressors are necessary for safety and function. We are using a clamshell style of spring compressor here and have begun by clamping it securely in a vise, then selecting and installing the correct size jaws for this application.



### Step 2:

Position the strut into the coil spring compressor, making sure that the jaws are fully engaged onto the spring coils at the top and bottom. Tighten the jaws of the spring compressor just enough to hold the strut in place. There is a lip on each jaw that prevents the coil spring from sliding off and it must be positioned on the inside of the coils.

Using a paint marker, make a reference mark on the strut body and the upper spring seat so you can properly align them during reassembly.

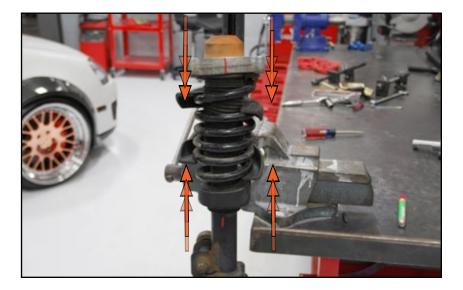


21mm Wrench (for coil spring compressor) Step 3:

Compress the coil spring until the tension is removed from the upper spring seat.



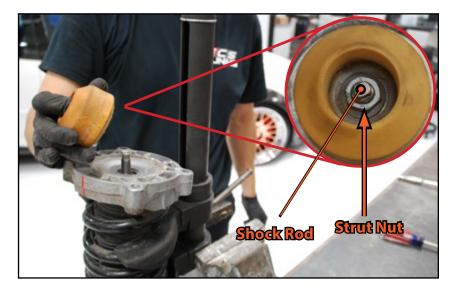
Be conscious of the danger of a compressed coil spring. Read all of these steps first and be prepared to work as efficiently as possible. Always keep a respectful distance from the coil spring in the event of an unforeseen release.



#### 18mm Strut Nut Socket, 7mm Wrench Step 4:

Hold or support the shock and strut base on the bottom, then remove the nut on the top of the strut by using a strut nut socket. A strut nut socket is open on one side which will allow you to hold the shock rod while loosening the nut.

Once you have removed the nut, lift off the upper strut insulator.





### Step 5:

Pull the shock absorber out through the bottom of the coil spring. The lower spring seat and insulator will normally remain in place on the shock plate. If they are stuck on the coil spring, remove them and re install them on the shock.



As a general rule of thumb, release the tension on the spring as soon as possible to minimize the danger related to compressing a coil spring.



### Step 6:

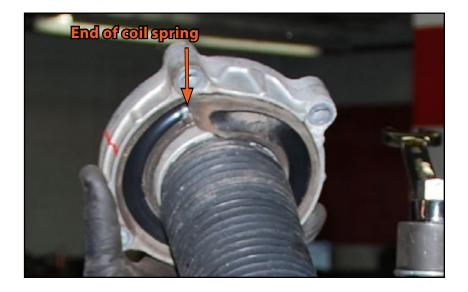
Lift the upper spring seat off of the coil spring. The dust boot is attached to the upper spring seat and should come out along with it.





### Step 7:

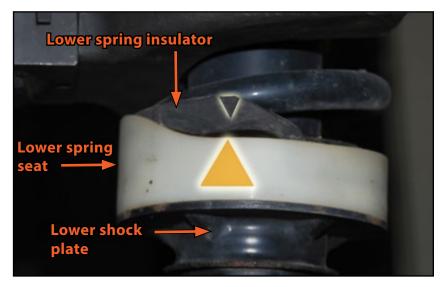
Wipe any dirt or debris from the upper and lower spring insulators and inspect them closely. Note that when assembled, the ends of the coil spring on the top and bottom must be positioned correctly in the insulator. (Upper shown)



### Step 8:

Inspect the lower spring seat and insulator. Note the following details and installation tips:

- The arrows on the lower spring insulator and seat must line up when installed
- The end of the coil spring on the bottom must be positioned correctly in the lower spring insulator (reference step 7)
- The lower spring seat can be rotated on the lower shock plate





### Step 9:

Remove the original coil spring and place one of the new front H&R coil springs into the spring compressor. The larger coils are the top of the spring as shown in the picture.



The front coil springs can be identified by the (F) marking on the spring.



### Step 10:

Compress the coil spring.



### Step 11:

Insert the shock absorber back up through the bottom of the coil spring, then guide the dust boot through the top and position the upper spring seat on the coil spring. Place the strut insulator on top and thread the nut onto the shock rod so all of the threads are engaged, but do not tighten it at this time.

### NOTE

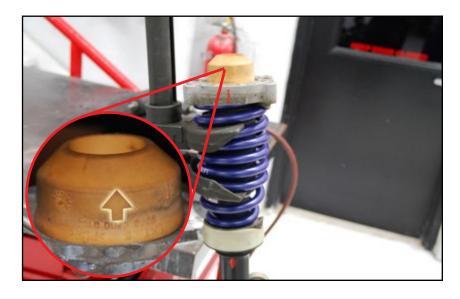
The upper spring insulator has an arrow on it that indicated the "top" or "up". (Inset photo)

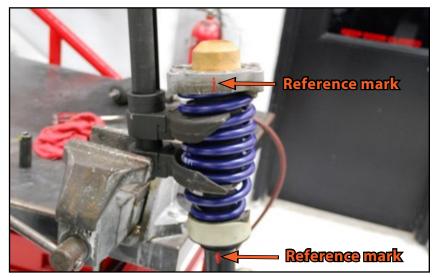
### Step 12:

Check the position, alignment, and assembly of the following items:

- Make sure the reference marks (made in step 2) are aligned
- Make sure the end of the coil spring on the top is positioned correctly in the upper spring insulator
- Make sure the arrows on the lower spring insulator and seat line up
- Make sure the end of the coil spring on the bottom is positioned correctly in the lower spring insulator

Adjust the position of the coil spring and shock absorber, and rotate the lower spring seat as necessary until everything is properly aligned.







### Step 13:

Check to make sure that the dust boot is seated onto the body of the shock absorber as shown.



#### 18mm Strut Nut Socket, 7mm Wrench, Torque Wrench Step 14:

Torque the upper strut nut to 30 Nm (22 Ft-lbs).



## REINSTALLING THE FRONT STRUTS

Reinstalling the front struts is basically the reverse of removal, however for accuracy and ease of installation, we have included this checklist along with important details and tips.

Slide the strut base over the CV shaft and pivot the strut into position.

Slide the strut up onto the four studs on top.

Install the lower strut base bolt but do not tighten it at this time.

### NOTE

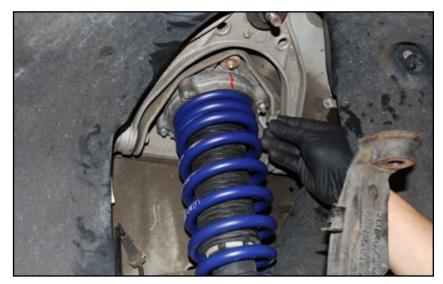
Do not tighten the bolts until recommended. They need to be tightened at ride height in order to prevent premature wear of the suspension bushings.

Jack up the lower control arm until the strut is pushed all the way onto the upper studs.

Install the four upper nuts and torque them to 30 Nm (22 Ft-lbs).

Install the sway bar end link bolt but do not tighten it at this time.





## **REINSTALLING THE FRONT STRUTS**

Loosen the upper A-arm bolts and insert the ball joint into the knuckle.

Install the ball joint nut and torque it to 85 Nm (63 Ft-lbs).

Reconnect the brake hose on the top of the steering knuckle.

Reconnect the brake pad and ABS harnesses.

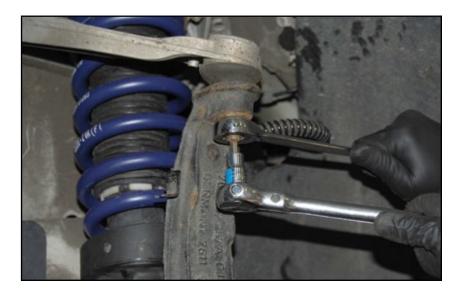
With the Jack under the lower control arm, jack up the suspension just until it begins to lift the vehicle. This indicates that the suspension is at ride height.

Torque the upper A-arm bolts to 50 Nm+90 Degrees (37 Ft-lbs+90 Degrees).

Torque the lower strut base bolt to 150 Nm+90 Degrees (111 Ft-lbs+90 Degrees)

Torque the sway bar bolt to 110 Nm (81 Ft-lbs).

Install the front wheels and torque them to 160 Nm (118 Ft-lbs).







Step 1:

18mm Socket, 18mm Wrench, Breaker Bar

Remove the rear lower shock nut on each side.



### Step 2:

Pull the lower shock bolt out part of the way as shown. This will make it easier to remove the sway bar link in the next step. You may need to grip the bolt with locking pliers in order to pull it out.





Step 3: Pry Bar

Slide the sway bar links off of the end of the shock absorber bolts.





#### Locking Pliers Step 4:

Jack up the shock absorber slightly to relieve tension on the bolt, then slide the lower shock bolt out. You may have to grip the bolt with locking pliers in order to remove it.



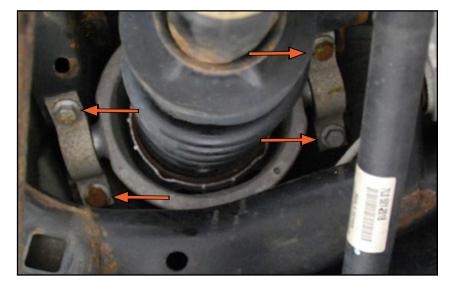
### Step 5:

Lower the jack, then pull the bottom of the shock absorber out from each rear knuckle assembly.



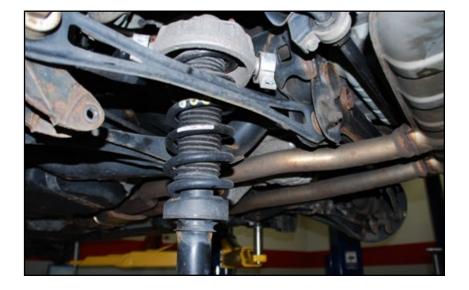
### Step 6:

Locate the four bolts at the top of each rear strut assembly, holding it to the body.



Step 7: 16mm Swivel Socket, Extension, Ratchet

Remove three of the bolts and loosen the fourth. Hold the strut assembly firmly and remove the last bolt. Lower the strut assembly out of the vehicle, turning it slightly to clear the suspension arms.



### Step 8:

Spray the upper mount support nuts with penetrating lubricant to allow it to soak in for a few minutes.



**Coil Spring Compressor** Step 1:

A high quality clamshell or wall mount style of coil spring compressor will be required for this installation. Due to both the size and rating of the original springs as well as the design and coil positioning of the new H&R springs, these professional compressors are necessary for safety and function. We are using a clamshell style of spring compressor here and have begun by clamping it securely in a vise, then selecting and installing the correct size jaws for this application.

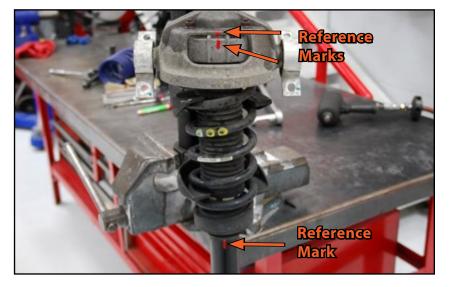


#### Step 2: Paint Marker

Position the strut into the coil spring compressor, making sure that the jaws are fully engaged onto the spring coils at the top and bottom. Tighten the jaws just enough to hold the strut in place.

Make three reference marks as shown in the picture:

- 1. On the upper mount support
- 2. On the upper spring seat
- 3. On the shock body underneath the lower spring seat





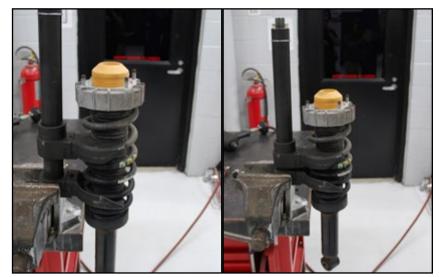
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# INSTALLING THE NEW H&R REAR SPRINGS

13mm Socket, Ratchet Step 3:

Remove the four top nuts and lift off the upper mount support.



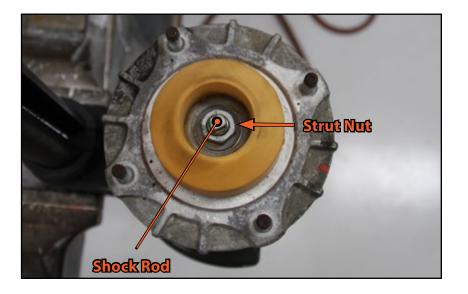


#### 21mm Wrench (for coil spring compressor) Step 4:

Compress the coil spring until the tension is released on the upper spring seat.

Step 5: 18mm Strut Nut Socket, 7mm Wrench

Loosen the nut on the top of the strut by using a strut nut socket. A strut nut socket is open on one side which will allow you to hold the shock rod while loosening the nut. Back the nut off until there are just a few threads remaining. Hold the shock absorber at the bottom, then completely remove the nut and lift off the upper strut insulator.



### Step 6:

Pull the shock absorber out of the bottom of the coil spring. The lower spring seat and insulator will typically stay on the lower shock plate. If they stick on the coil spring, pull them off and reinstall them onto the lower shock plate.





### Step 7:

Lift the upper spring seat off of the coil spring. The dust boot is attached to the upper spring seat and should come out along with it.

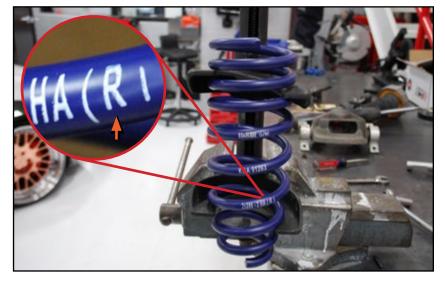


#### 21mm Wrench (for coil spring compressor) Step 8:

Loosen the tension on the original coil spring and remove it from the compressor. Place a new rear coil spring into the jaws and tighten them just enough to hold the spring in place.

### NOTE

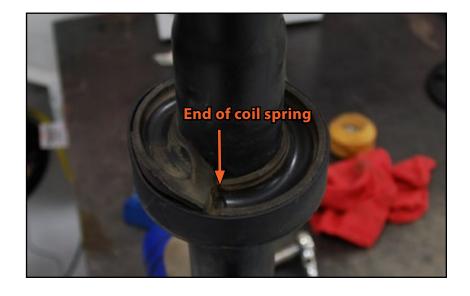
The rear coil springs can be identified by the (R) marking on the spring.





### Step 9:

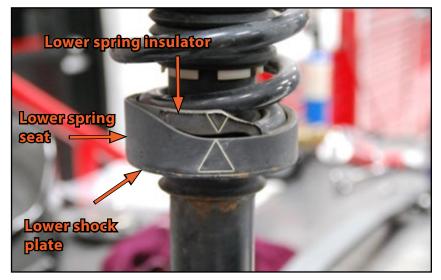
Wipe any dirt or debris from the upper and lower spring insulators and inspect them closely. Note that when assembled, the ends of the coil spring on the top and bottom must be positioned correctly in the insulator. (Lower shown)



### Step 10:

Inspect the lower spring seat and insulator. Note the following details and installation tips:

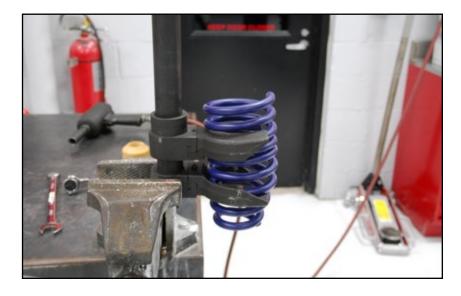
- The arrows on the lower spring insulator and seat must line up when installed
- The end of the coil spring on the bottom must be positioned correctly in the lower spring insulator (reference step 9)
- The lower spring seat can be rotated on the lower shock plate





Step 11: 21mm Wrench (for coil spring compressor)

Compress the coil spring.



### Step 12:

Insert the shock absorber back up through the bottom of the coil spring, then guide the dust boot through the top and position the upper spring seat on the coil spring. Place the strut insulator on top and thread the nut onto the shock rod so all of the threads are engaged, but do not tighten it at this time.

### NOTE

The upper spring insulator has an arrow on it that indicates the "top" or "up". (Inset photo)



### Step 13:

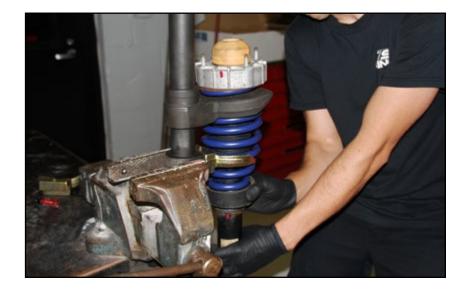
Check the position, alignment, and assembly of the following items:

- Make sure the reference marks (made in step 2) are aligned
- Make sure the end of the coil spring on the top is positioned correctly in the upper spring insulator
- Make sure the arrows on the lower spring insulator and seat line up
- Make sure the end of the coil spring on the bottom is positioned correctly in the lower spring insulator

Adjust the position of the coil spring and shock absorber, and rotate the lower spring seat as necessary until everything is properly aligned.

### Step 14:

Check to make sure that the dust boot is seated onto the body of the shock absorber as shown.





18mm Strut Nut Socket, 7mm Wrench, Torque Wrench Step 15:

Torque the upper strut nut to 30 Nm (22 Ft-lbs).



#### 13mm Socket, Torque Wrench Step 16:

Install the upper mount support, making sure the reference mark lines up with the mark on the upper spring seat and torgue the four nuts to 30 Nm (22 Ft-lbs).



## **REINSTALLING THE REAR STRUTS**

Reinstalling the rear struts is basically the reverse of removal, however for accuracy and ease of installation, we have included this checklist along with important details and tips.

Position the rear struts back into place and install the four top bolts.

Torque the top bolts to 60 Nm (44 Ft-lbs).

Align the bottom of the shocks with the rear knuckle assembly and partially install the bolts.

Align the sway bar end links and push the lower shock bolt fully into place.

Jack up the rear suspension to ride height.

Install the lower shock nuts and torque them to 90 Nm (67 Ft-lbs).

Install the rear wheels and torque them to 160 Nm (118 Ft-lbs).



## **TORQUING TIPS**

## Torque to Yield or "Stretch" Bolts

Many bolts will have a torque specification listed in the format - xx Nm (xx Ft-lbs) + xx degrees. These bolts are torque to yield bolts, commonly referred to as "stretch" bolts. The correct procedure for torguing these bolts is:

Stage One - Torque the bolt(s) to the initial Nm or Ft-lb specification. If there is more than one, be sure to torque them in the correct sequence. Stage Two - Tighten or "stretch" the bolt(s) the additional specified number of degrees. If there is more than one, be sure to follow the correct sequence.

*Note* - Some bolts may have two or more stages of torguing before the final stage of "stretching" the bolts.

When tightening more than one bolt in a specified sequence, be sure to mark each fastener with paint immediately after performing the final stage or "stretching" of the bolts. This will ensure that you keep track of which bolts have already been "stretched".

All Torque to Yield bolts should only be used once and should be replaced each time they are removed. If they are reused, they will not be able to achieve the proper clamping force with the specified torque.

## Lubrication

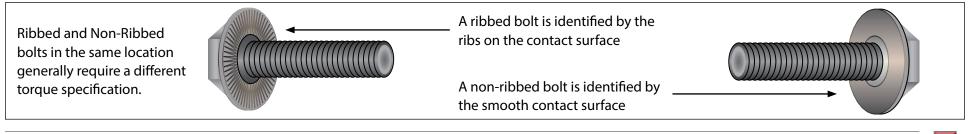
Torque specifications are always listed for a dry fastener (*no* lubrication) unless specified otherwise.

Some fasteners require lubrication on the threads -or- on the contact surface while torguing. These fasteners will be listed with the specific location and type of lubrication required. Always follow manufacturers recommendations exactly.

Lubricating a fastener that is intended to be installed dry and then torguing it to factory specifications will increase the clamping force and stress on the fastener and components, which can result in damage or failure.

Do not lubricate the threads of any fastener unless it is specifically recommended by the manufacturer.

## **Ribbed vs. Non-Ribbed Bolts**





## TORQUE SPECIFICATIONS

Front Lower Strut Base Bolts	
Front Sway Bar Bolt	
Front Upper A-Arm Bolts	50 Nm+90 degrees (37 Ft-Ibs+90 degrees)
Front Upper Ball Joint	
Front Upper Spring Seat to Body Nuts	
Front Upper Strut Nut	
Rear Lower Shock Bolt	90 Nm (67 Ft-lbs)( <u>Page 35</u> )
Rear Strut Top Bolts to Body	60 Nm (44 Ft-lbs)( <u>Page 35</u> )
Rear Upper Mount Support Nuts	
Rear Upper Strut Nut	
Wheels	



## SCHWABEN - BUILD THE ULTIMATE TOOL COLLECTION

At ECS Tuning, we carry a line of high quality Schwaben Tools and Equipment to help you build your ultimate tool collection. Never before has affordability and quality been so closely related. Our entire Schwaben line is subjected to strict in house testing for strength and durability. See what we have to offer and equip your garage without breaking the bank.



## Your Porsche 955/957 Cayenne Sport Spring 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.

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