Document ID: 3393993

Front and Rear Suspension Modification Kit Installation

Installation Instructions Part Number

23123399

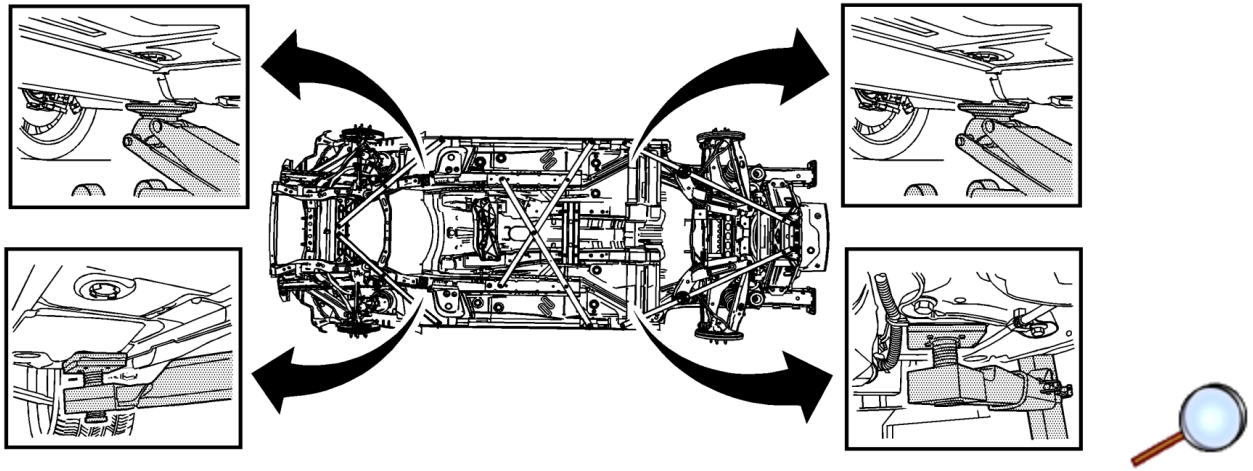
Caution

In order to reduce the chance of personal injury and/or property damage carefully observe the instructions that follow:

- Attempting repairs or service without the appropriate training, tools, and equipment could cause injury to you or others. This could also damage the vehicle, or cause the vehicle to operate improperly. If you are unsure of your abilities to install this kit please have work performed by a qualified technician.
- Proper vehicle service and repair are important to the safety of the service technician and to the safe, reliable operation of all motor vehicles. If you need to replace a part, use the same part number or an equivalent part. Do not use a replacement part of a lesser quality.
- The service procedures we recommend and describe in this service manual are effective methods of performing service and repair. Some of the procedures require the use of tools that are designed for specific purposes.
- Accordingly, any person who intends to use a replacement part, a service procedure, or a tool that is not recommended by General Motors, must first establish that there is no jeopardy to personal safety or the safe operation of the vehicle.
- This installation instruction contains various “Cautions and Notices” that you must observe carefully in order to reduce the risk of personal injury during service or repair. Improper service or repair may damage the vehicle or render the vehicle unsafe. These “Cautions and Notices” are not exhaustive. General Motors cannot possibly warn of all the potentially hazardous consequences of your failure to follow these instructions.

Caution: Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that application. Fasteners requiring replacement or fasteners requiring the use of thread locking compound or sealant are identified in the service procedure. Do not use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener. Use the correct tightening sequence and specifications when installing fasteners in order to avoid damage to parts and systems.

Lifting and Jacking the Vehicle



Danger: To avoid any vehicle damage, serious personal injury or death:

- When major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.
- When performing work in the engine compartment or under the vehicle, ensure that the hood is fully open, or opened to its secondary latch. When the hood is opened to the secondary latch, the vehicle will disable the remote start features from the key fob and OnStar mobile app. Failure to open the hood, or open the hood to the secondary latch while doing a repair in the engine compartment or under the vehicle can result in inadvertent vehicle starting which could result in personal injury or damage to a vehicle.

Danger: To avoid any vehicle damage, serious personal injury or death, always use the jackstands to support the vehicle when lifting the vehicle with a jack.

Caution: Perform the following steps before beginning any vehicle lifting or jacking procedure:

- Remove or secure all of the vehicle contents in order to avoid any shifting or any movement that may occur during the vehicle lifting or jacking procedure.
- The lifting equipment or the jacking equipment weight rating must meet or exceed the weight of the vehicle and any vehicle contents.
- The lifting equipment or the jacking equipment must meet the operational standards of the lifting equipment or jacking equipment manufacturer.
- Perform the vehicle lifting or jacking procedure on a clean, hard, dry, level surface.
- Perform the vehicle lifting or jacking procedure only at the identified lift points. DO NOT allow the lifting equipment or jacking equipment to contact any other vehicle components.

Failure to perform the previous steps could result in damage to the lifting equipment or the jacking equipment, the vehicle, and/or the vehicle contents.

Vehicle Lifting – Frame Contact Lift

Front Lift Pads

When lifting the vehicle with a frame-contact lift, place the front lift pads on the front lower brackets, inboard of the rocker pinch weld flange and outboard of the front frame rail, at the torque box location, as shown.

Rear Lift Pads

When lifting the vehicle with a frame-contact lift, place the rear lift pads on the rear frame rail, at the torque box location, as shown.

Vehicle Jacking

Caution: When you are jacking the vehicle at the front locations, be certain that the jack or the jack lift pad does not contact the front fascia, front fascia air dam, or the front fenders. If such contact occurs, vehicle damage may result. When jacking at selected front locations additional clearance may be required for the jacking points.

Note: When you are lifting a vehicle with a service jack, block the wheels at the opposite end from which you are lifting. Use jack stands to provide additional support.

Front of Vehicle

When using a service jack under the front of the vehicle use one of the following locations:

- Place the service jack pad in the same location as shown for the front lift pads.
- Under the front frame crossmember, as shown.

Rear of Vehicle

Note: Place jackstands ONLY under strong and stable vehicle structures.

When using a service jack under the rear of the vehicle place the jack pad on the rocker panel flange, at the torque box location, as shown.

Special Tools Required

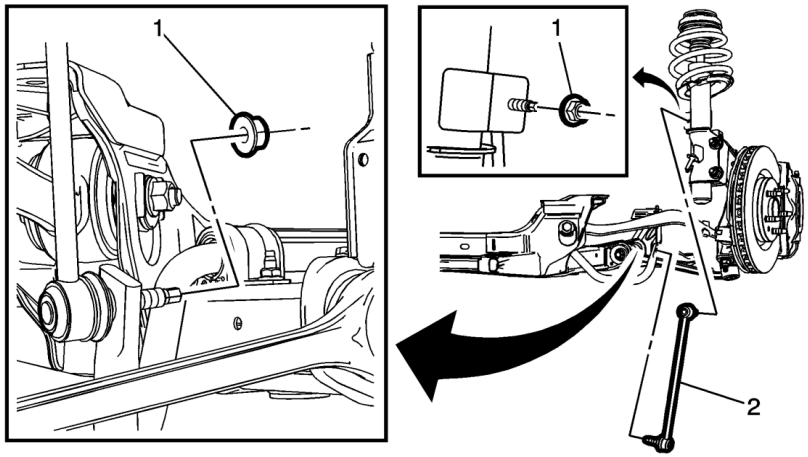
J35669 Wrench , *J42188* Ball Joint Separator

Suspension Disassembly – Front

1. Raise and support the vehicle per the lifting and jacking notes.
2. Remove the tire and wheel assemblies.
    - Remove the wheel center cap, if equipped.

- Remove the wheel center cap nuts, if equipped.
- Remove the wheel nuts.
- Remove the tire and wheel assembly.

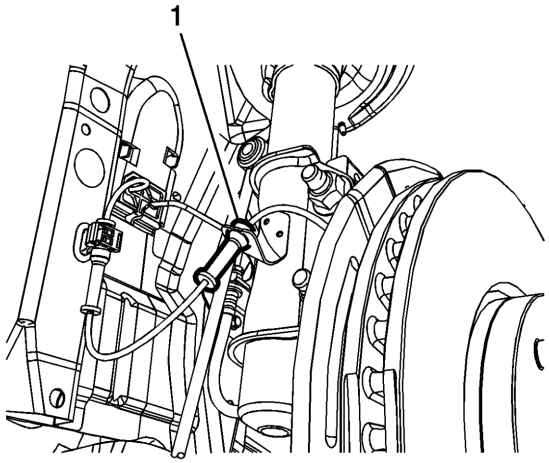
Caution: Never use heat to loosen a tight wheel bolt or nut. This can shorten the life of the wheel and damage the wheel bearings.



3. Remove the stabilizer shaft link (2) from the strut and stabilizer shaft.

Note:

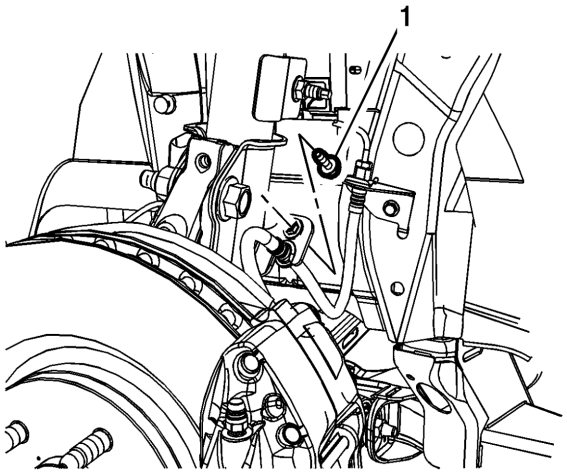
- Use the appropriate size socket or wrench to hold the ball stud while removing the stabilizer shaft nut (1).
- After the nut has been removed, discard and replace with new.



Note: Perform this procedure with the suspension in the neutral position, with the vehicle on a level surface.

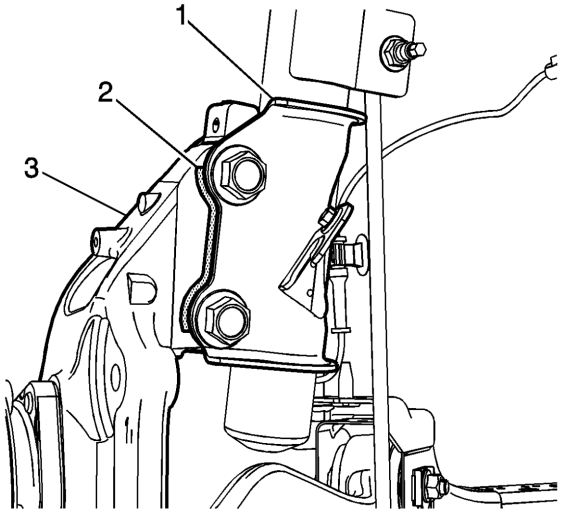
Note: It is not necessary to completely remove the wheel speed sensor from the vehicle. Relocate the wheel speed sensor to the side and secure it.

4. Remove the wheel speed sensor from the strut and steering knuckle.
   Release the wheel speed sensor wire harness form the front suspension strut (1).

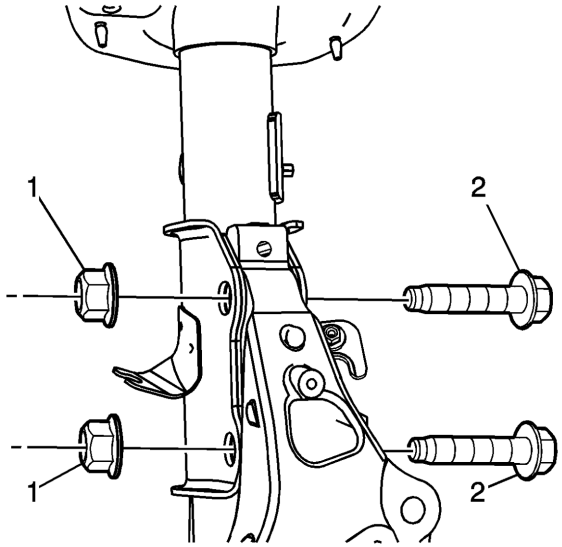


5. Remove the front disc brake hose from the strut.

Remove the brake hose bracket bolt (1) from the front suspension strut.



6. Paint a reference mark (2) of the strut (1) to the steering knuckle (3).

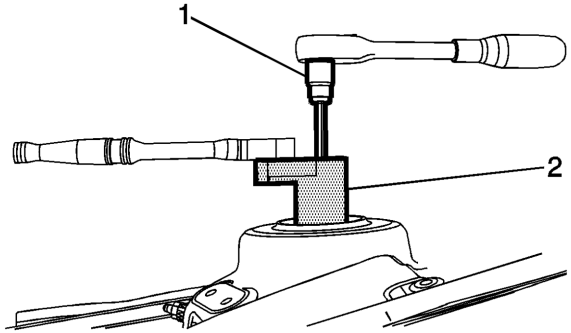


7. Remove the front strut nuts (1) and the bolts (2).

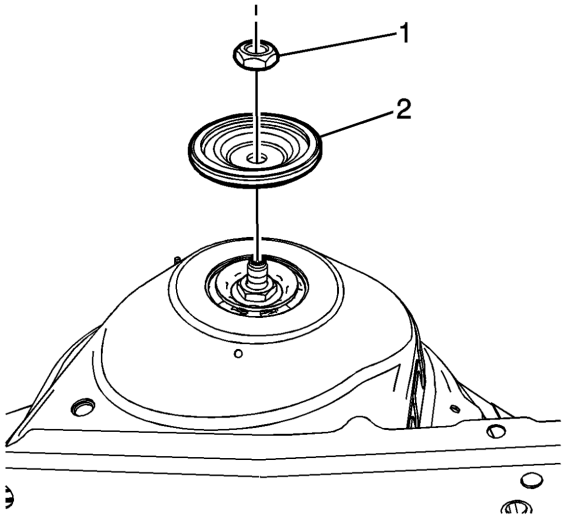
Note: Use the hydraulic floor jack so that the front strut has a small amount of pressure on it.

8. Using a hydraulic floor jack, support the steering knuckle.

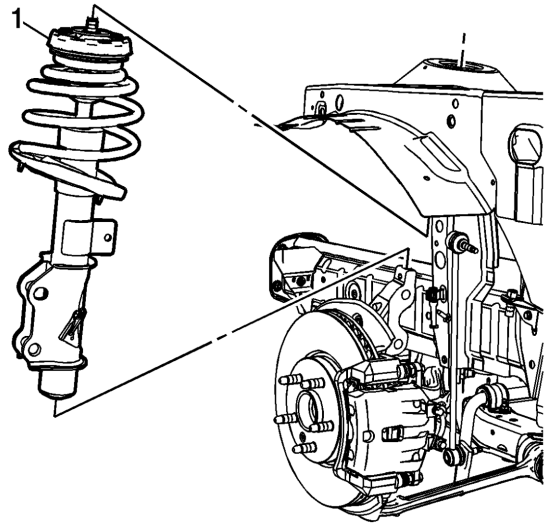
9. Remove the dust cover from the top of the strut, if equipped.



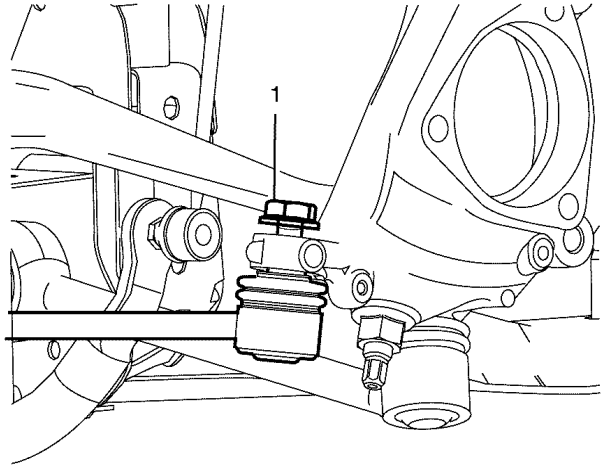
10. Using the J-35669 wrench (2) and a Torx® bit (1), loosen the front strut nut.



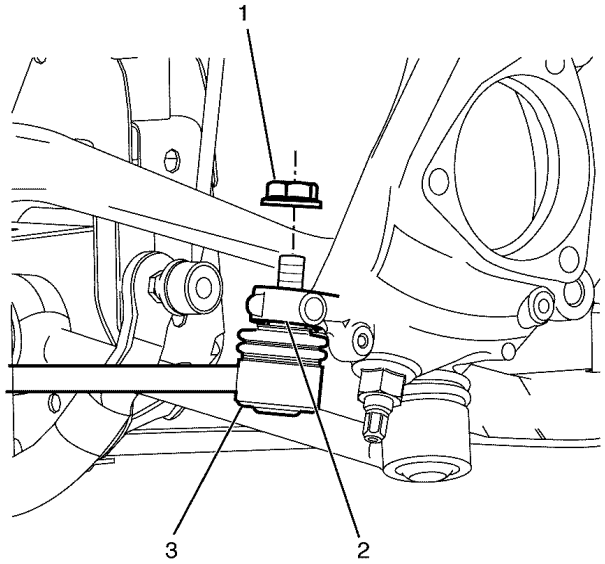
11. Remove the front suspension nut (1) and front suspension mount (2).



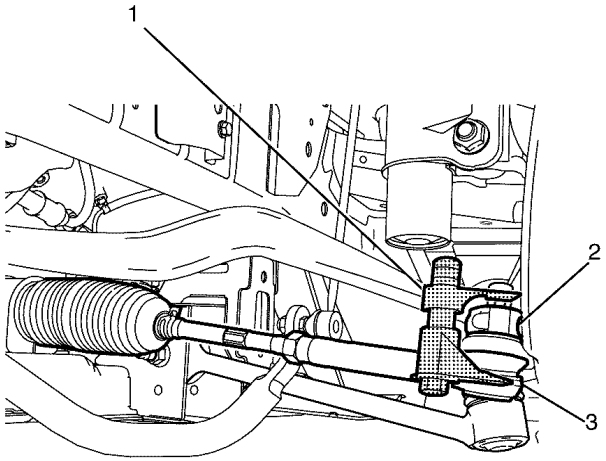
12. Remove the front suspension strut (1) from the vehicle.



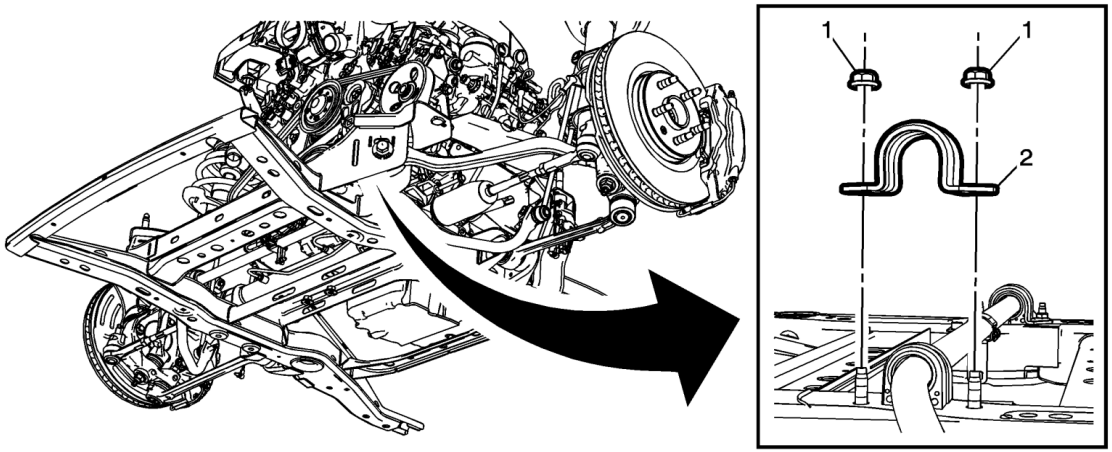
13. Remove the outer tie rod from the steering knuckle.
    Loosen the outer tie rod nut (1) to the top of the stud.



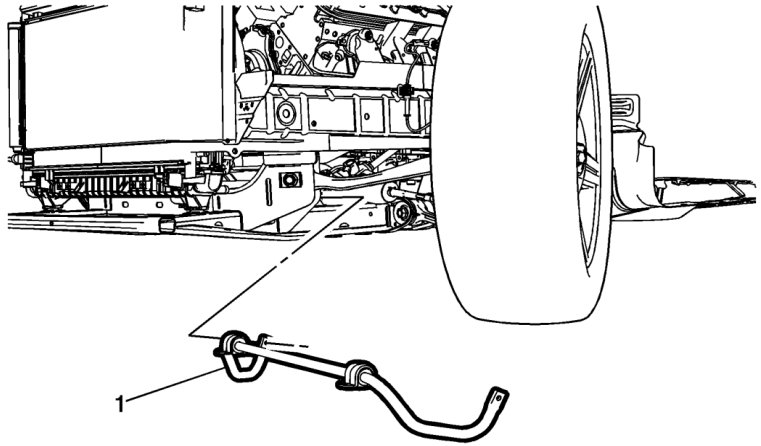
14. Remove and discard the outer tie rod nut (1) and separate the outer tie rod (3) from the steering knuckle (2).



15. Use the J-42188-B Ball Joint Separator (1) in order to disengage the outer tie rod (3) from the steering knuckle (2).



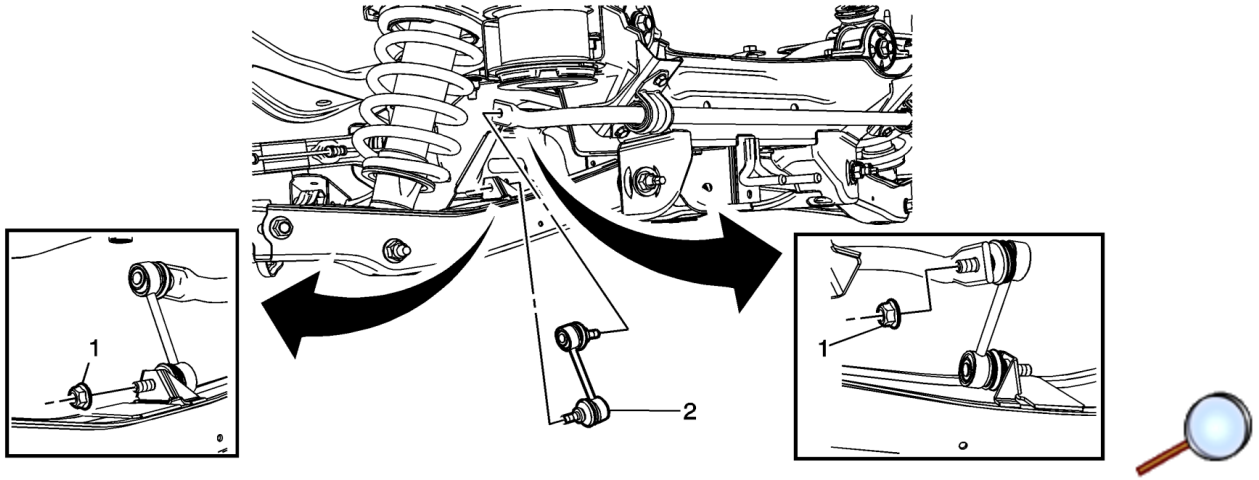
16. Remove the stabilizer clamp nuts (1). Remove the stabilizer clamp (2).



17. Remove the stabilizer bar shaft (1).

Suspension Disassembly – Rear

1. Support the rear knuckle with a suitable hydraulic jack.

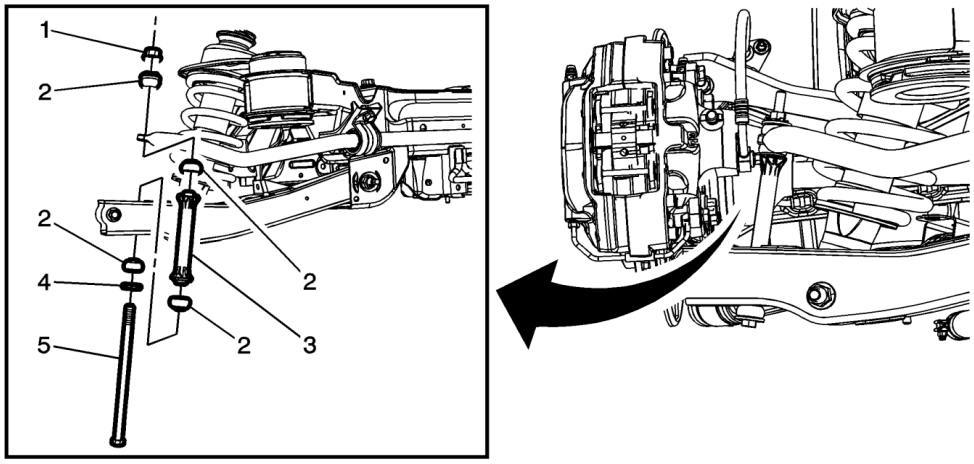


Note: Step 2 applies to MY 2010–2011 vehicles only.

2. Remove the stabilizer shaft link from the lower control arm.

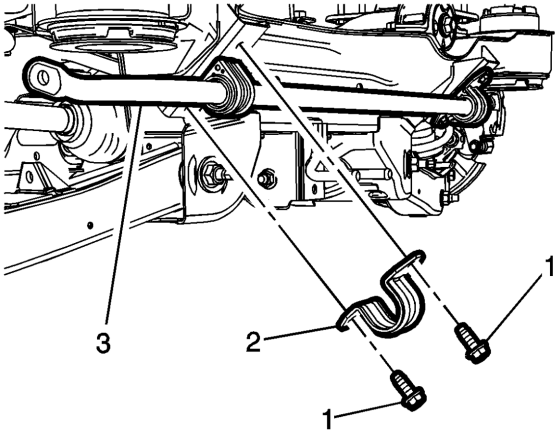
   Tip: Use the appropriate size allen/TORX® bit wrench to keep the ball stud from rotating when removing the stabilizer shaft link nut.

   Remove the stabilizer link nut (1) and remove the stabilizer link (2) from the vehicle.

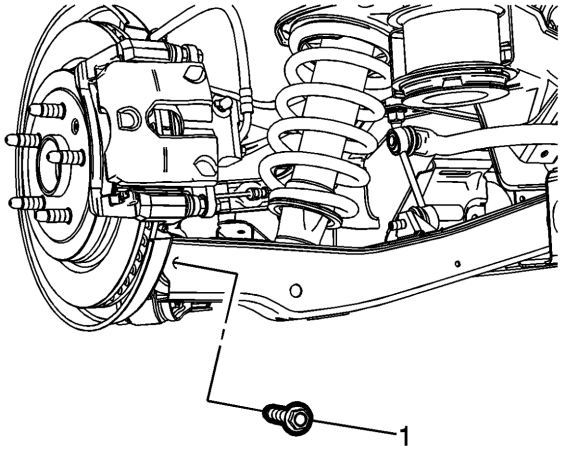


Note: Step 3 applies to MY 2012 and newer vehicles only.

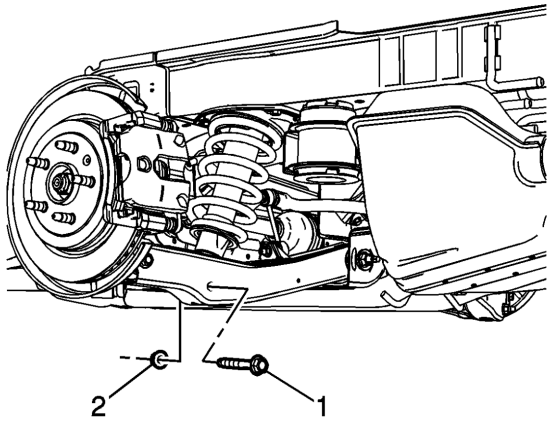
3. Remove the stabilizer shaft nut (1), stabilizer shaft link bolt (5), stabilizer shaft bushing washer (4), stabilizer shaft bushings (2) and stabilizer shaft sleeve (3).



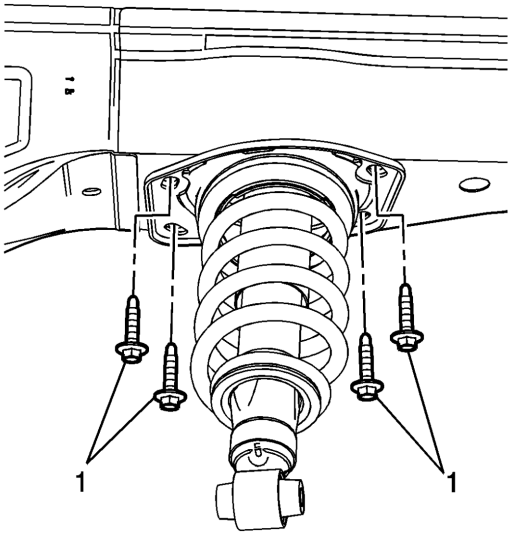
4. Remove the stabilizer clamp bolts (1). Remove the stabilizer clamp (2) and remove the stabilizer shaft (3).



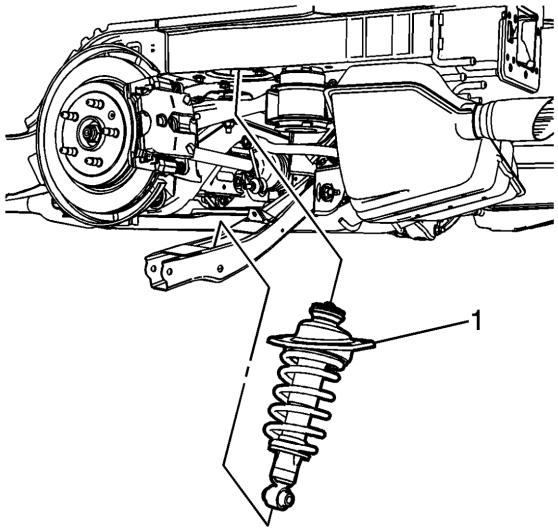
5. Remove the lower control arm bolt (1) from the knuckle.



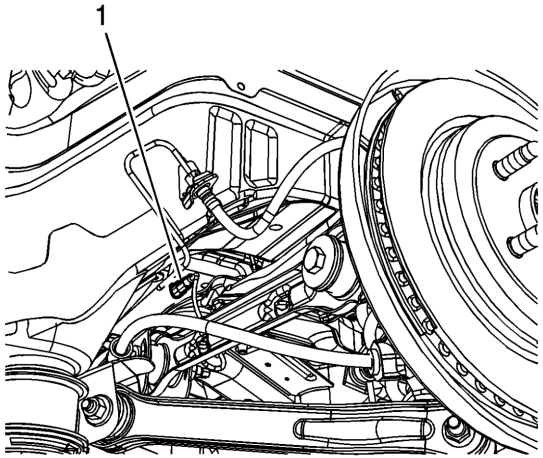
6. Remove the lower rear shock absorber nut (2) and bolt (1).



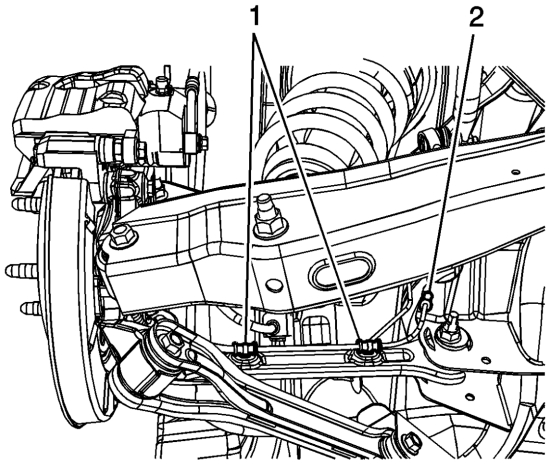
7. Remove the upper shock absorber bolts (1).



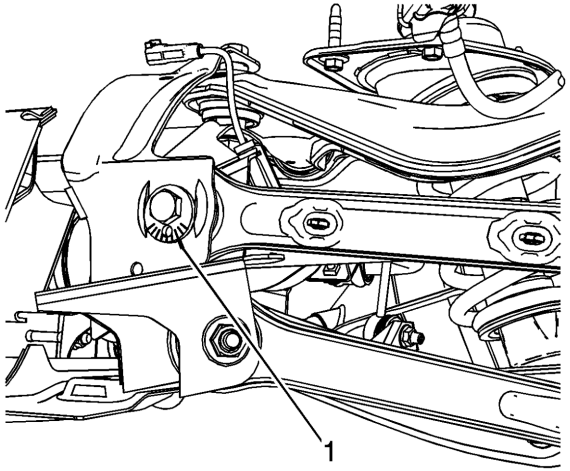
8. Remove the rear shock absorber assembly (1) from the vehicle.



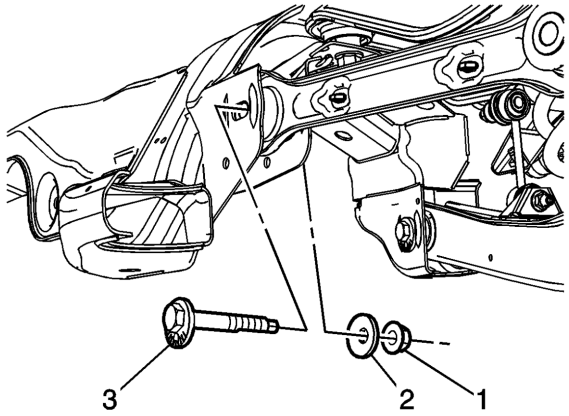
9. Disconnect the rear wheel sensor electrical connector (1).



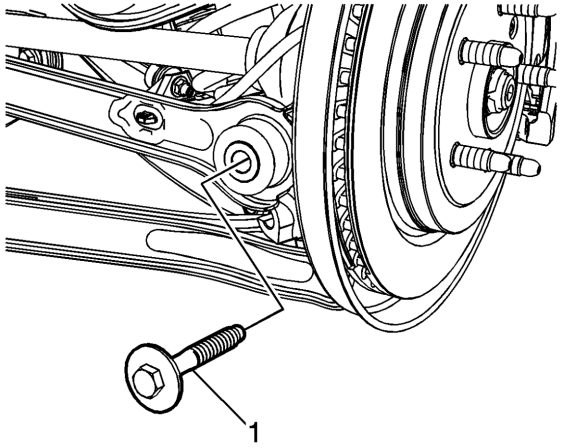
10. Release the wheel speed sensor wire harness retainers (1) from the rear suspension tie bar and release the wheel speed sensor wire harness from the vehicle underbody (2).



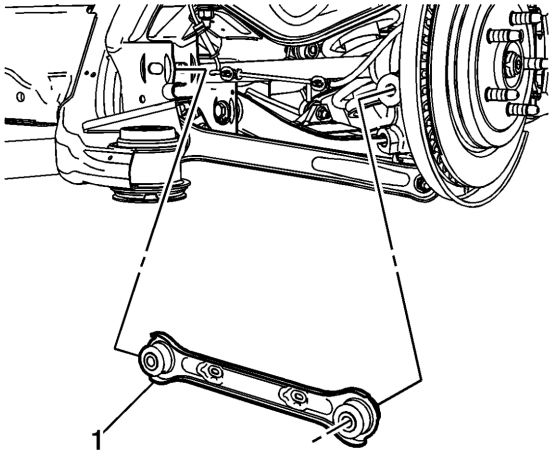
11. Mark the relationship of the rear suspension adjust link to the frame (1).



12. Remove the rear suspension adjust link bolt (3), nut (1) and the washer (2).

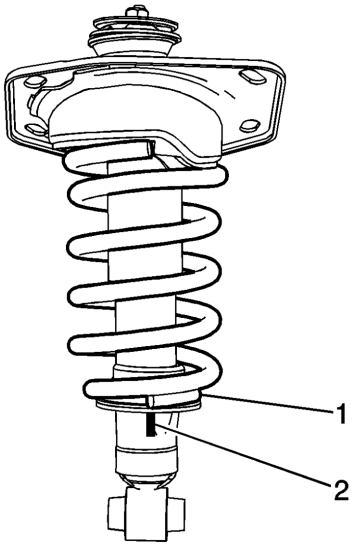


13. Remove the rear suspension adjust link bolt (1) at the rear suspension knuckle.



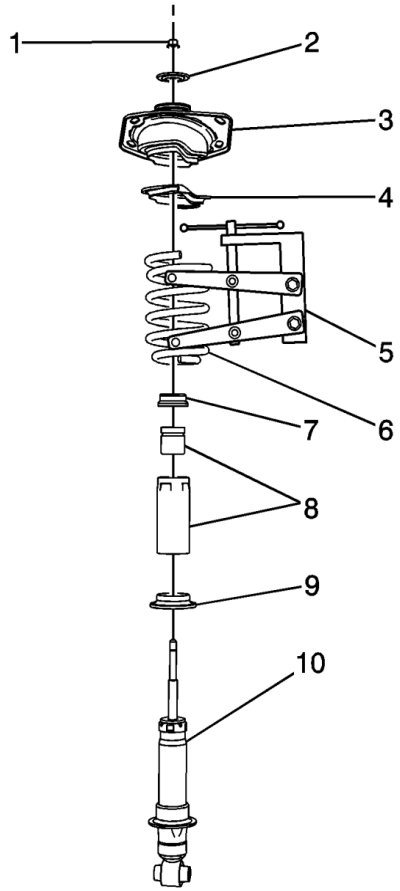
14. Remove the rear suspension adjust link (1).

Rear Shock Absorber Replacement



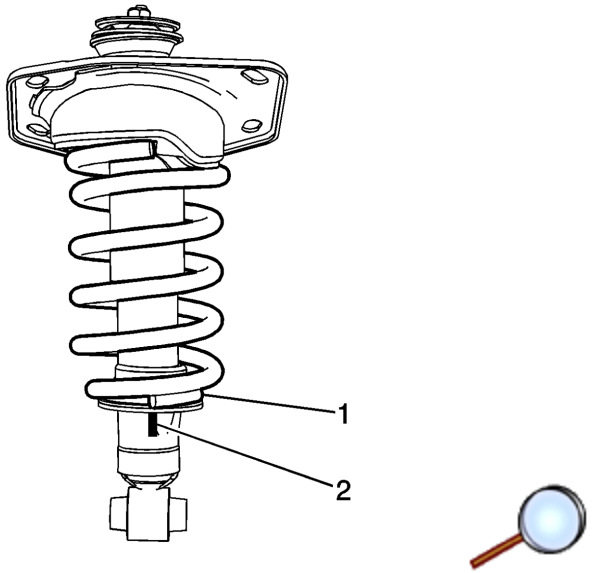
Note: Note the relationship of the end of the spring to the shock absorber. This will aid in the proper alignment of the spring to the shock absorber.

1. Mark the rear spring (1) to the shock absorber (2).



2. Using the CH-48845 Compressor (5), remove the nut (1), retainer (2), rear shock absorber upper plate (3), rear spring upper insulator (4), spring (6), rear shock absorber bumper seat (7), rear shock absorber and shield (8), lower insulator (9), and the rear shock absorber (10).
3. When replacing the rear shock absorber (10), replace the rear spring upper insulator (4) at the same time.

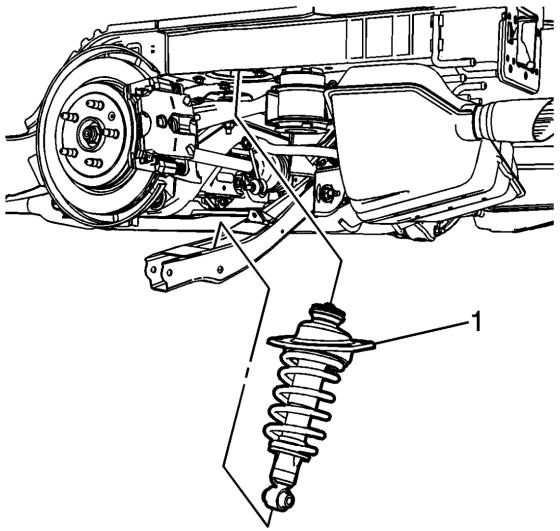
   Note:
   - The rear spring upper insulator must be replaced every time rear shock absorber is replaced.
   - DO NOT tighten the nut for the rear shock absorber until the spring is properly aligned with the reference mark.
4. Using the CH-48845 Compressor (5), install the rear shock absorber (10) – **Kit Part Number 23115372,** lower insulator (9), shield, rear shock absorber bumper (8), rear shock absorber bumper seat (7), spring (6), rear spring upper insulator (4), rear shock absorber upper plate – **Kit Part Numbers 22922445 & 22922446** (3), retainter (2), and the nut (1).



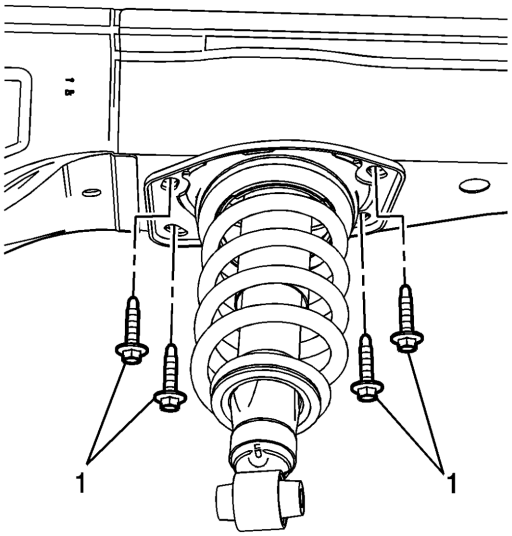
5. Align the spring (1) to the reference mark on the shock absorber (2).

Caution: Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that application. Fasteners requiring replacement or fasteners requiring the use of thread locking compound or sealant are identified in the service procedure. Do not use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener. Use the correct tightening sequence and specifications when installing fasteners in order to avoid damage to parts and systems.

6. Using the appropriate tool to hold the shock absorber shaft, tighten the rear shock absorber nut to **45 N.m (33 lb ft).**

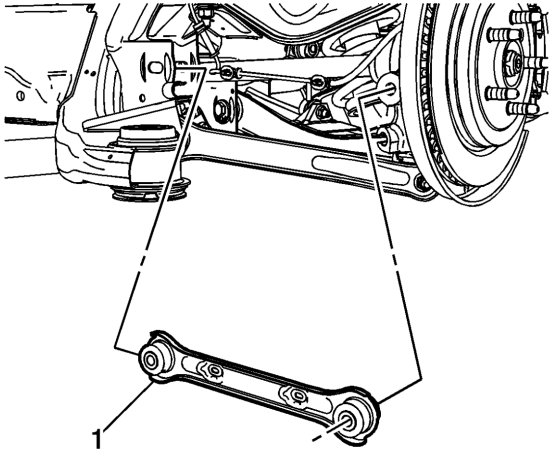


7. Position the rear shock absorber assembly (1) in the vehicle.

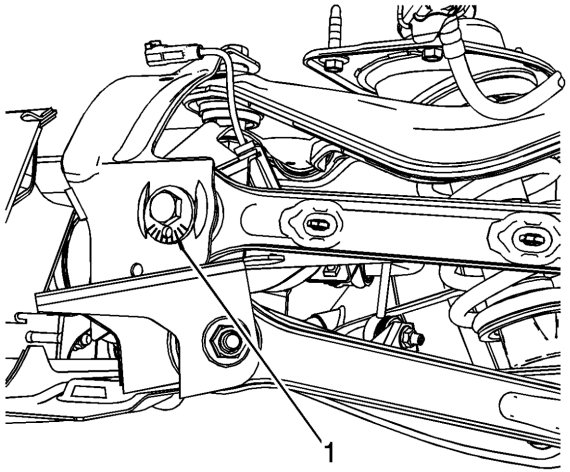


8. Install the upper shock absorber bolts (1) and tighten the bolts to **58 N.m (43 lb ft).**

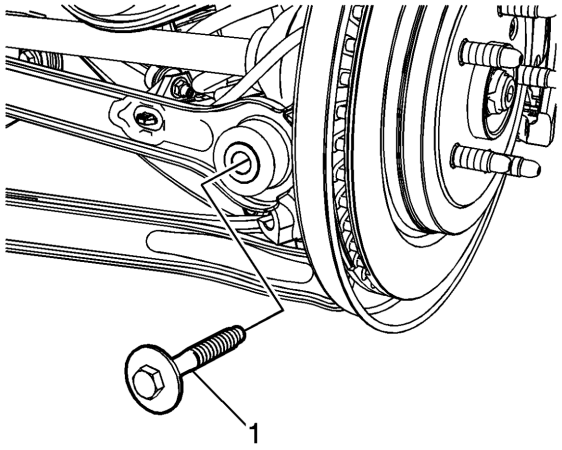
Suspension Installation – Rear



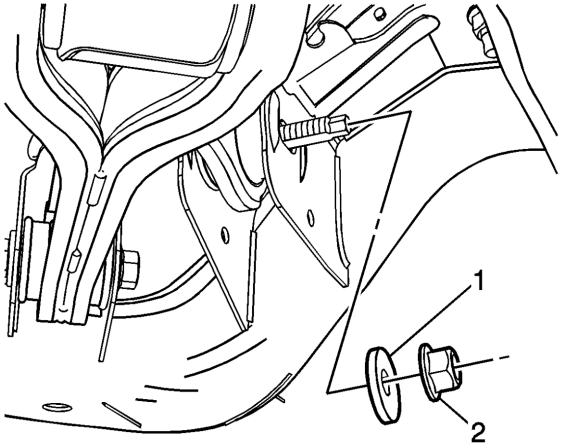
1. Position the new rear toe link (1) – **Kit Part Number 22845487** into the rear subframe.



2. Install the rear suspension adjust link bolt and align the reference marks (1).



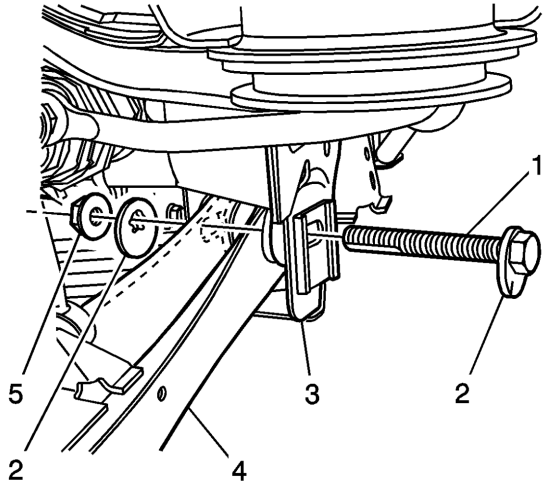
3. Install the rear suspension adjust link bolt (1) in the rear suspension knuckle and tighten to **140 N.m (103 lb ft).**



4. Install the rear suspension adjust link washer (1) and the nut (2) and tighten to **175 N.m (129 lb ft).**

Note: Ensure that the alignment marks DO NOT move when tightening the rear suspension adjust link nut to specifications.

Note: The eccentric washers (1) must be fitted correctly in terms of their orientation and alignment marks.

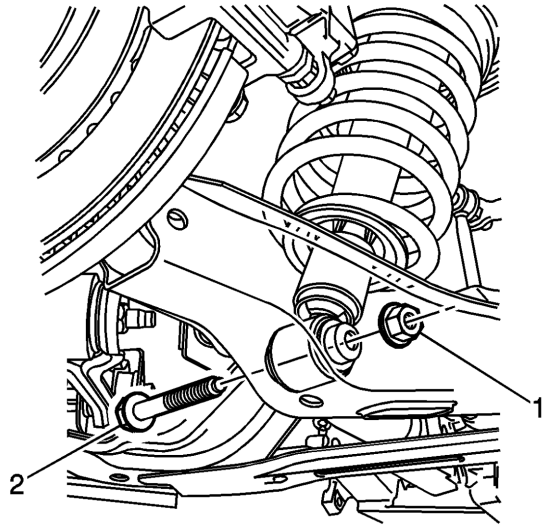


Note: 2010 and 2011 perform steps 5-8, 2012 & newer proceed to step 9

5. Replace the rear lower control arms if required: Install the lower control arm (4) into the rear subframe (3).

   Note:
   - The eccentric washers (2) must be fitted correctly in terms of their orientation and alignment marks.
   - Do not fully tighten the lower control arm to rear subframe retaining bolt (1) and nut (5) at this stage.

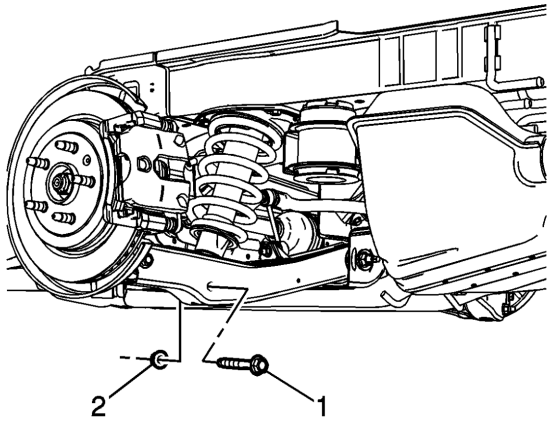
6. Install the lower control arm to rear subframe retaining bolt (1).
7. Install the eccentric washer (2) and the NEW nut (5). Do not fully tighten at this stage.



8. Connect the rear strut assembly (4) to the lower control arm (3).

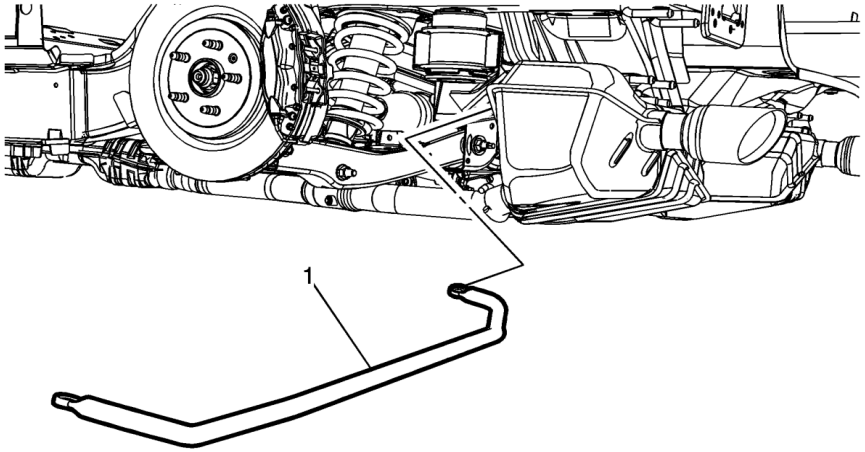
Note: Do not fully tighten the lower control arm to strut assembly retaining bolt (2) and nut (1) at this stage.

9. Install the lower control arm to strut assembly retaining bolt (2) and NEW nut (1). Do not fully tighten at this stage.

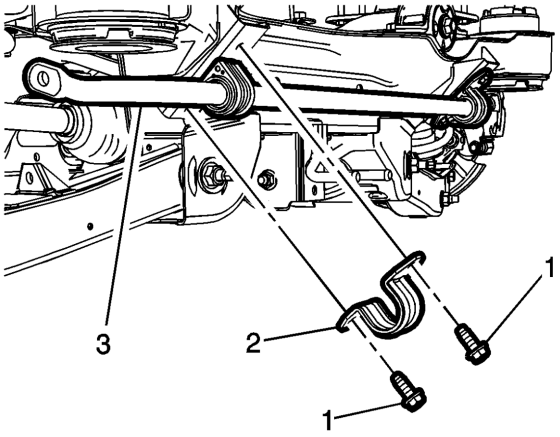


10. Install the rear lower control arm bolt (1).
11. Install the rear lower control arm nut (2) and tighten to:

- First Pass: **40 N.m (30 lb ft)**
- Final Pass: **plus 120 degrees**

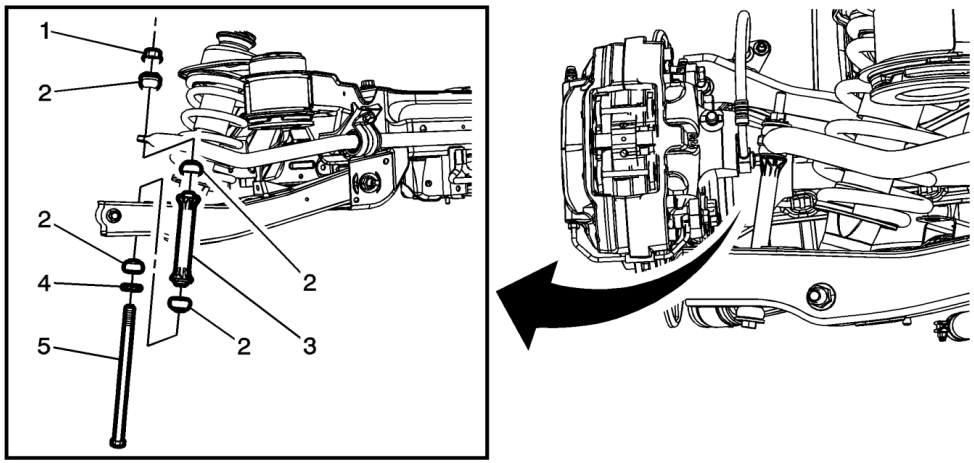


12. Install the rear stabilizer shaft (1) – **Kit Part Number 22786260.**

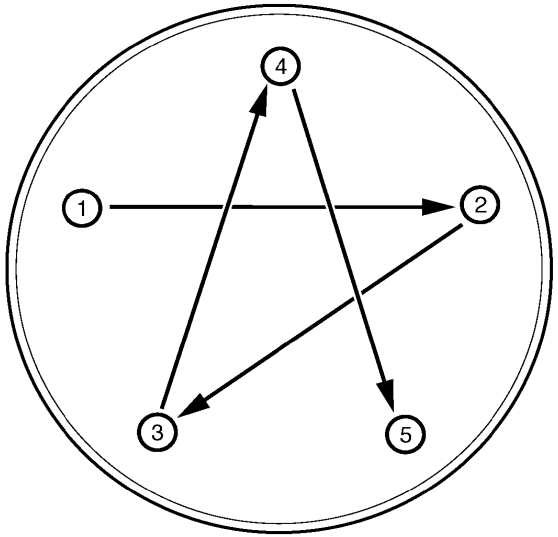


Note: The stabilizer shaft must be at Trim Height before tightening the Rear Stabilizer Shaft Clamp Bolts.

13. Install the stabilizer shaft clamp (2) and bolts (1) to the stabilizer shaft (3). Tighten the clamp bolts to **58 N.m (43 lb ft).**



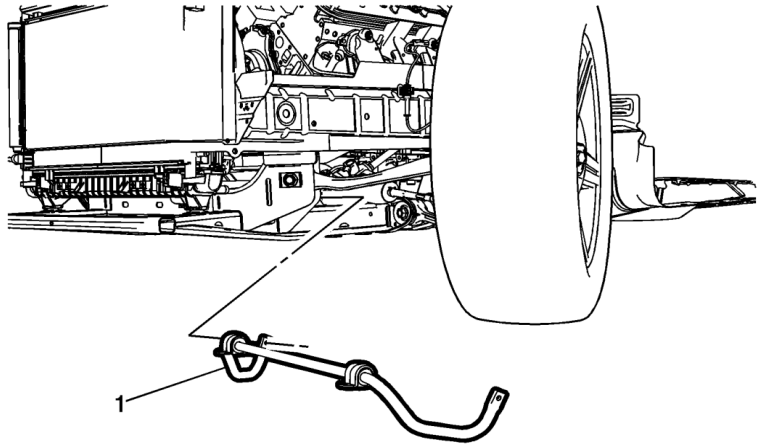
14. Install the stabilizer shaft link (1-5). **Kit Part Number 22761221.**
    Tighten the Stabilizer Shaft Link Nut (1) to **26 N.m (19 lb ft).**
15. Install the rear tire and wheel assemblies.
    Hand start the wheel nuts.



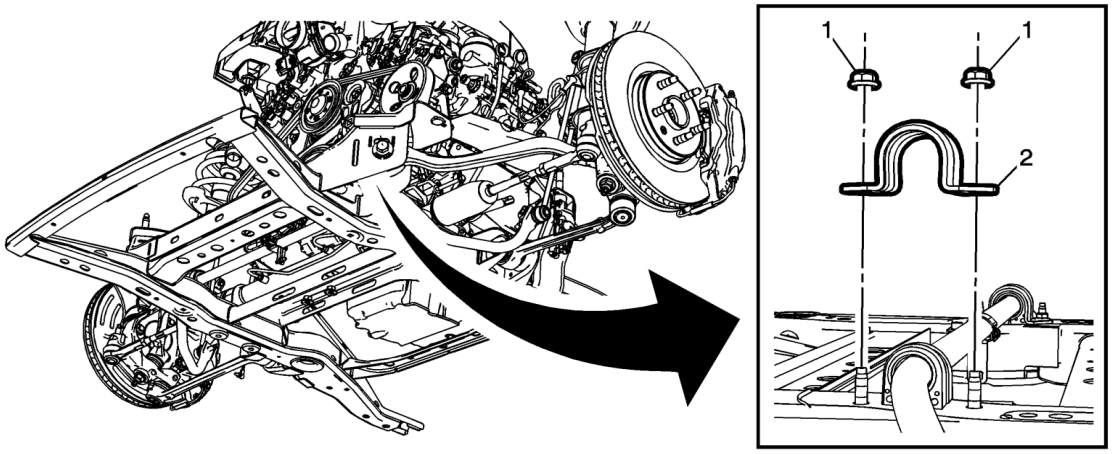
Caution: Improperly tightened wheel bolts or nuts can lead to brake pulsation and rotor damage. In order to avoid expensive brake repairs, evenly tighten the wheel bolts or nuts to the proper torque specification.

16. Using the proper size socket and torque wrench in the proper sequence, tighten the wheel nuts to **165 N.m (122 lb ft).**

Suspension Installation – Front

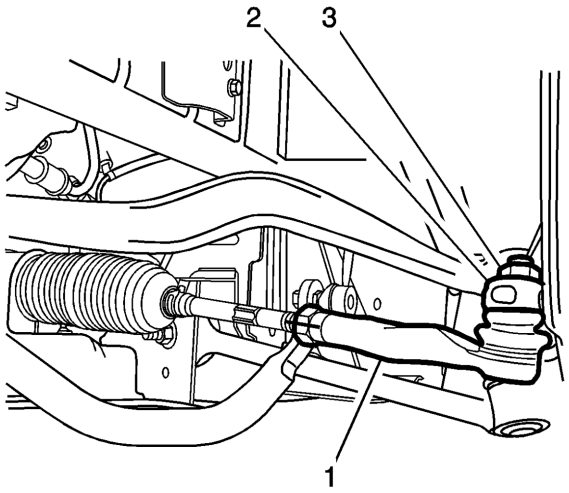


1. Install the stabilizer bar assembly (1), **Kit Part Number 22812942.**



2. Install the insulator clamp (2).

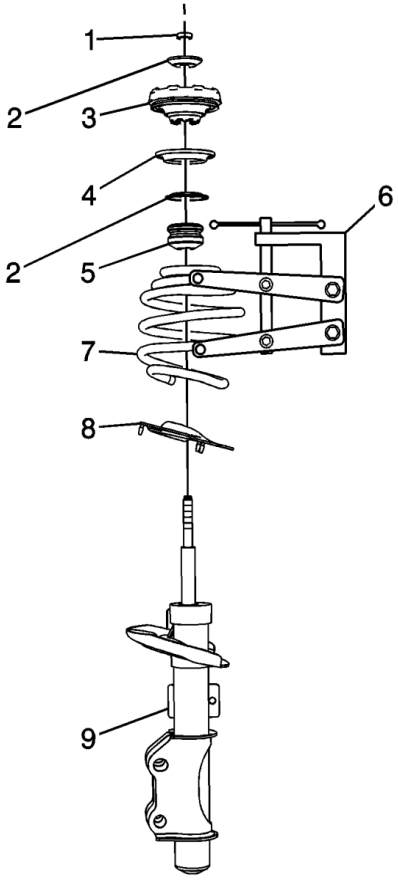
   Note: Tighten the insulator clamp nuts from the top of the vehicle.



3. Connect the outer tie rod (1) to the steering knuckle (2).

Caution: Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that application. Fasteners requiring replacement or fasteners requiring the use of thread locking compound or sealant are identified in the service procedure. Do not use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener. Use the correct tightening sequence and specifications when installing fasteners in order to avoid damage to parts and systems.

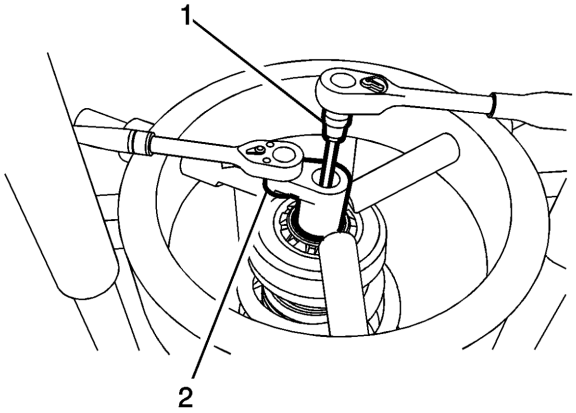
4. Install NEW outer tie rod nut (3) and tighten to **30 N.m (22 lb ft).**
5. Tighten the outer tie rod nut an additional 120 degrees.



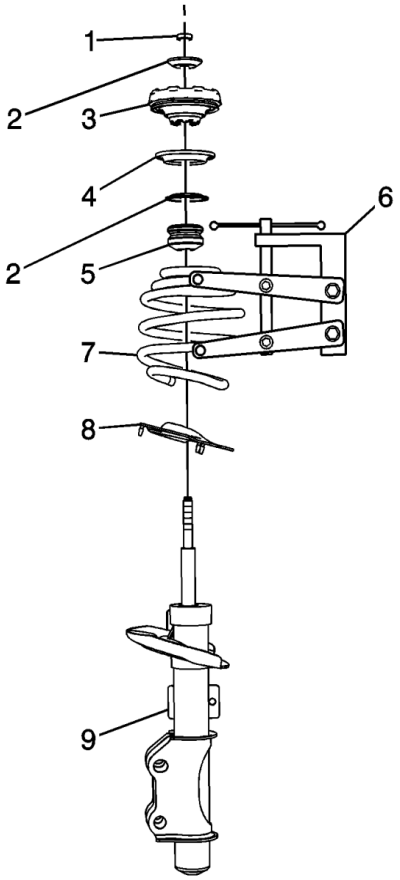
Note: Ensure that the front suspension strut assembly is properly seated in the *CH-48845* Spring Compressor

6. Position the front suspension strut assembly in the CH-48845 spring compressor (6).

Note: Use only hand tools when using the *CH-48845* Spring Compressor



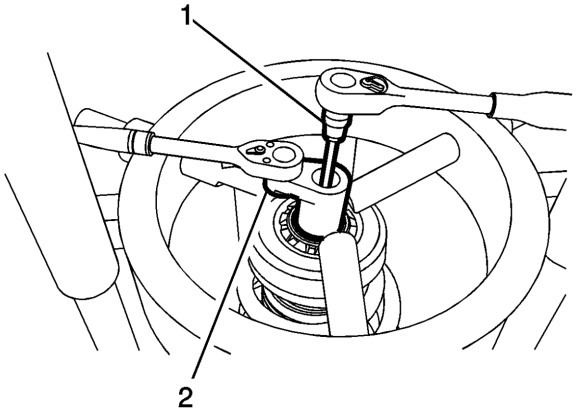
7. Using the *J-35669* Wrench (2) and a TORX® bit (1), hand tools , compress the front spring until the front suspension strut moves freely.



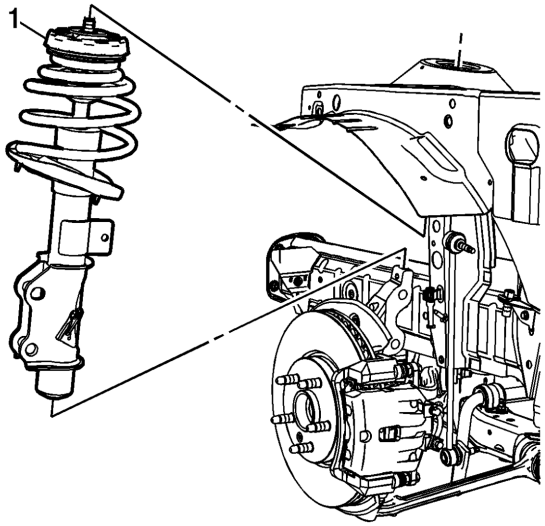
8. Remove the front suspension strut nut (1), front suspension strut mount retainer (2), front suspension strut mount (3), front suspension strut insulator (4), front suspension strut mount retainer (2), front suspension strut bumper (5), front spring (7), front spring insulator (8), and the front suspension strut (9).
9. Replace any of the front suspension strut components that are found to be excessively worn or that are damaged.

   Note: For V8 applications, replace the original strut with **Kit Part Numbers 22812985 & 22812984.**

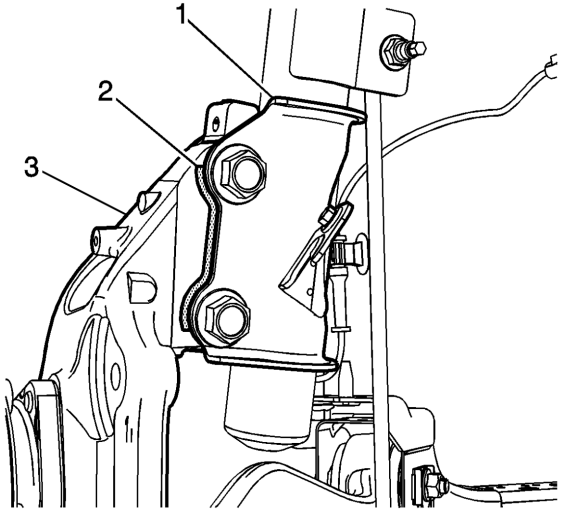
   Note: Have an assistant hold the front suspension strut while installing the other front suspension strut components.
10. Position the front suspension strut (9) in the *CH-48845* Spring Compressor (6).
11. Install the front spring insulator (8), front spring (7), front suspension strut bumper (5), front suspension strut insulator (4), front suspension strut mount retainer (2), front suspension strut mount (3), front suspension strut mount retainer (2), and the front suspension strut nut (1).
12. Using hand tools, slowly release the *CH-48845* Spring Compressor (6). until the front spring contacts the upper front suspension strut insulator (4), and the lower front spring insulator (8).



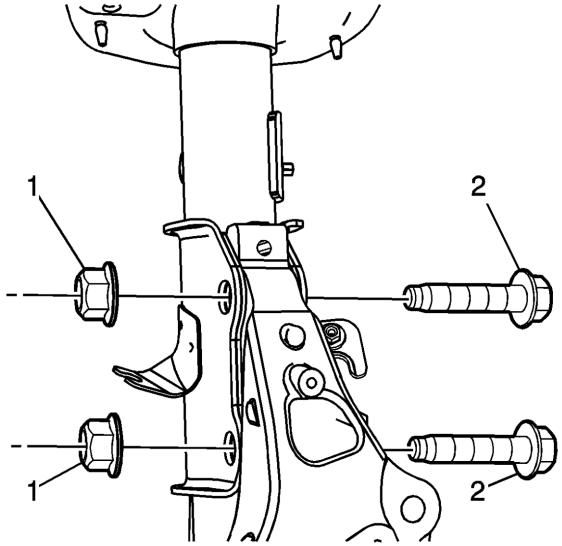
13. Using the *J-35669* Wrench (2) and a TORX® bit (1), tighten the front suspension strut nut to **70 N.m (52 lb ft).**



14. Position the front strut assembly, **Kit part Numbers 22812982 & 22812983,** (1) in the vehicle.

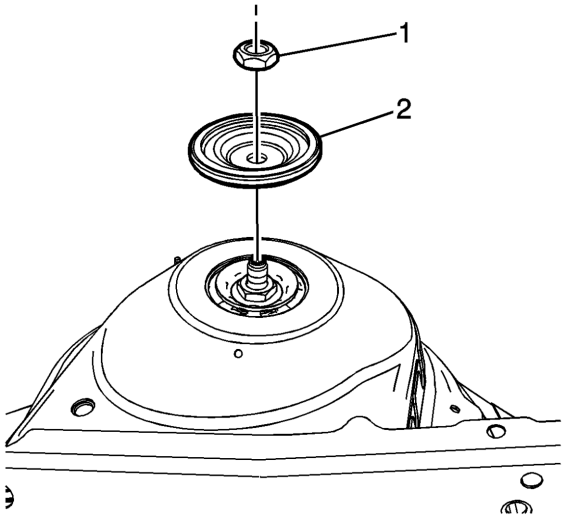


15. Align the front strut (1) with the alignment mark (2) on the steering knuckle (3).

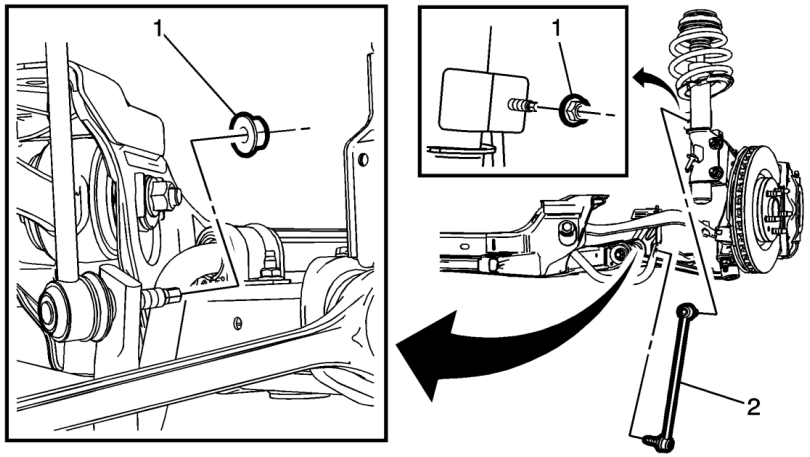


16. Install the front strut bolts (2).
17. Install the nuts (1) and tighten to:
    - First Pass: **80 N.m (59 lb ft)**

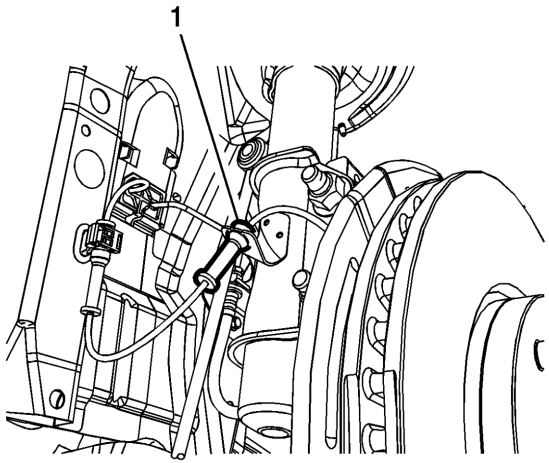
- Final Pass: **plus 180 degrees**



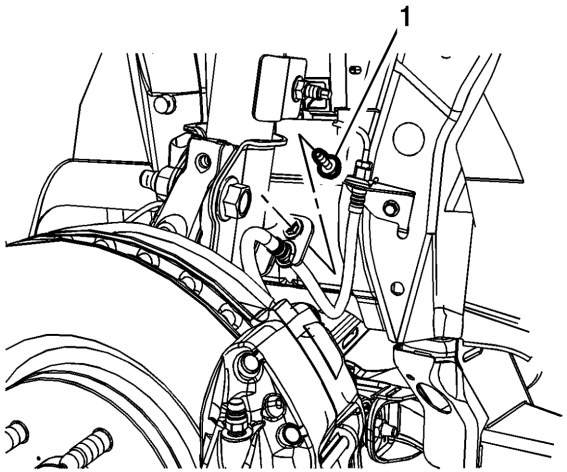
18. Install the front suspension strut mounting plate (2) and nut (1).
19. Remove the hydraulic floor jack.



20. Install the stabilizer shaft link (2) and nuts (1) and tighten:
    - Nut at stabilizer shaft – **50 N.m (36 lb ft)**
    - Nut at strut – **70 N.m (52 lb ft)**

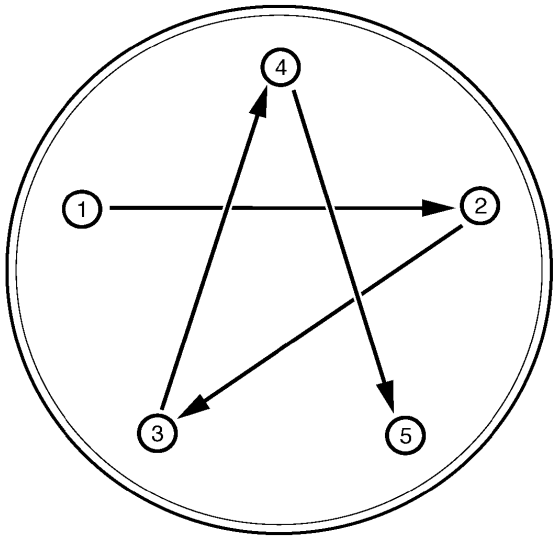


21. Install the wheel speed sensor.
    Secure the wheel speed sensor wire harness to the front suspension strut (1).



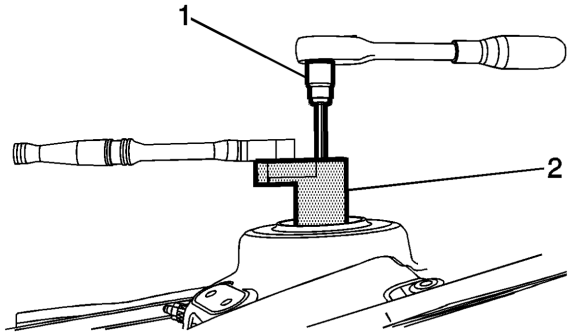
22. Install the front brake hose.
    Install the brake hose bracket bolt (1) to the front suspension strut and tighten to **9 N.m (80 lb in).**
23. Install the wheel and tire assembly.

Hand start the wheel nuts.

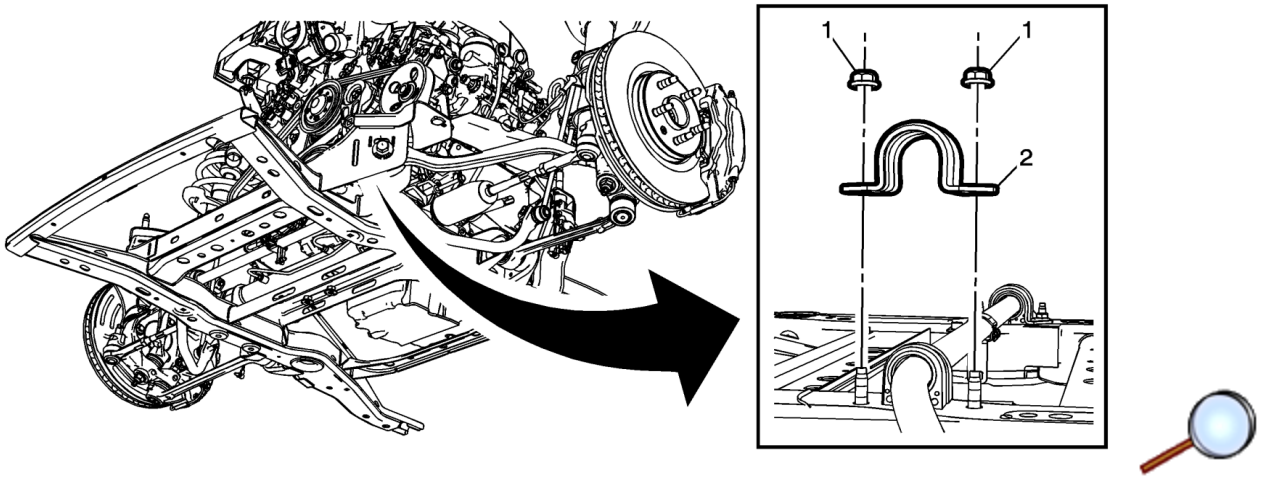


Caution: Improperly tightened wheel bolts or nuts can lead to brake pulsation and rotor damage. In order to avoid expensive brake repairs, evenly tighten the wheel bolts or nuts to the proper torque specification.

24. Using the proper size socket and torque wrench in the proper sequence, tighten the wheel nuts to **165 N.m (122 lb ft).**
25. Remove the support and lower the vehicle.



26. Using the J-35669 wrench (2) and a TORX® bit (1), tighten the front suspension strut nut and tighten to **70 N.m (52 lb ft).**
27. Install the strut dust cover, if equipped.
28. If the rear lower control arms were replaced, tighten the lower control arm to cradle nut to **115 N.m (85 lb ft).**
29. Tighten the rear shock to lower control arm fastener:
    - First Pass: **80 N.m (59 lb ft)**
    - Final Pass: **plus 120 degrees**
30. Tighten the rear stabilizer bar clamps to **58 N.m (43 lb ft).**
31. Bounce the vehicle several times to settle the suspension.



32. Tighten the front stabilizer clamp (2) and nuts (1) to **43 N.m (32 lb ft).**
33. Check and adjust the front wheel alignment, if needed.
34. Check and adjust the rear wheel alignment, if needed.