

2002 SUSPENSION**Rear - Corvette****DESCRIPTION & OPERATION**

NOTE: For trim height specifications, diagnostic information and procedures, see GENERAL DIAGNOSIS article.

The rear suspension uses a single lightweight fiberglass transverse spring mounted to the crossmember and lower control arms. The following lightweight aluminum components are used throughout the rear suspension:

- Rear suspension knuckles
- Upper control arms
- Lower control arms
- Rear suspension toe links
- Crossmember
- Drive shaft support tube

The shock absorbers attach at the upper end to the frame and at the lower end, to the lower control arm. Shock absorbers help keep the wheels in contact with the road surface under most road conditions. Shock absorbers reduce crash-through at full jounce and rebound.

The standard gas shock and the optional Real Time Damping (RTD) shock absorbers are gas charged to reduce aeration (foaming) of the shock fluid. Aeration of the shock fluid results in poor damping control.

ADJUSTMENTS & INSPECTION

NOTE: For adjustments and inspections, see GENERAL DIAGNOSIS article.

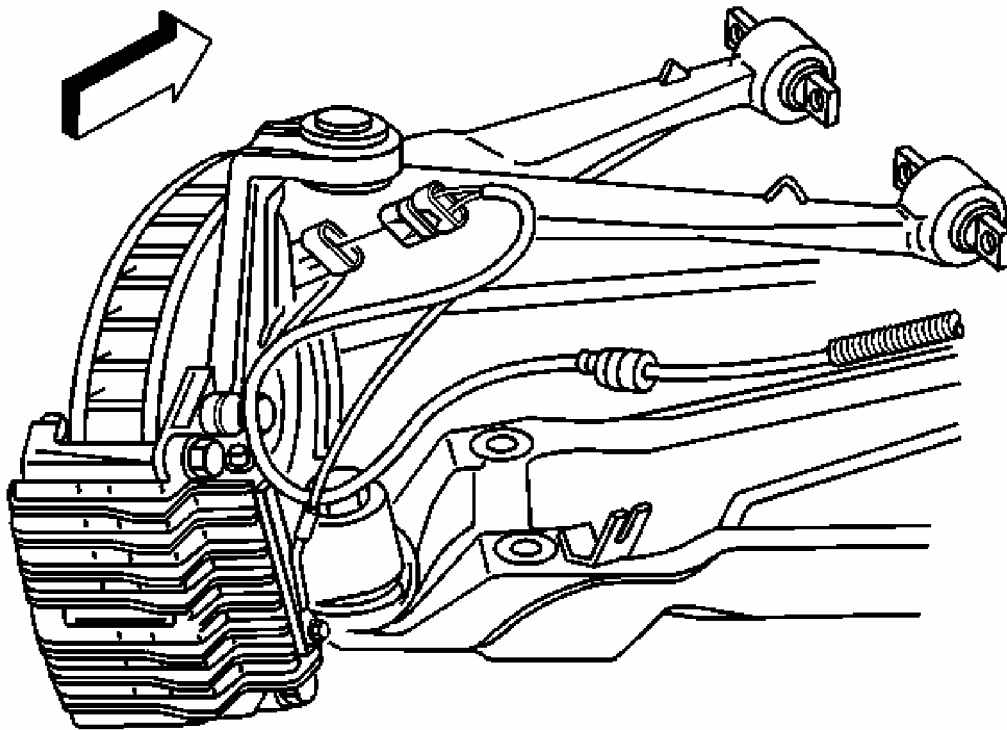
REMOVAL & INSTALLATION**CROSSMEMBER****Removal**

1. Raise and support the vehicle.
2. Remove the tire and wheel assemblies. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
3. Disconnect the electrical connectors from both wheel speed sensors. See **Fig. 1** .

2002 Chevrolet Corvette

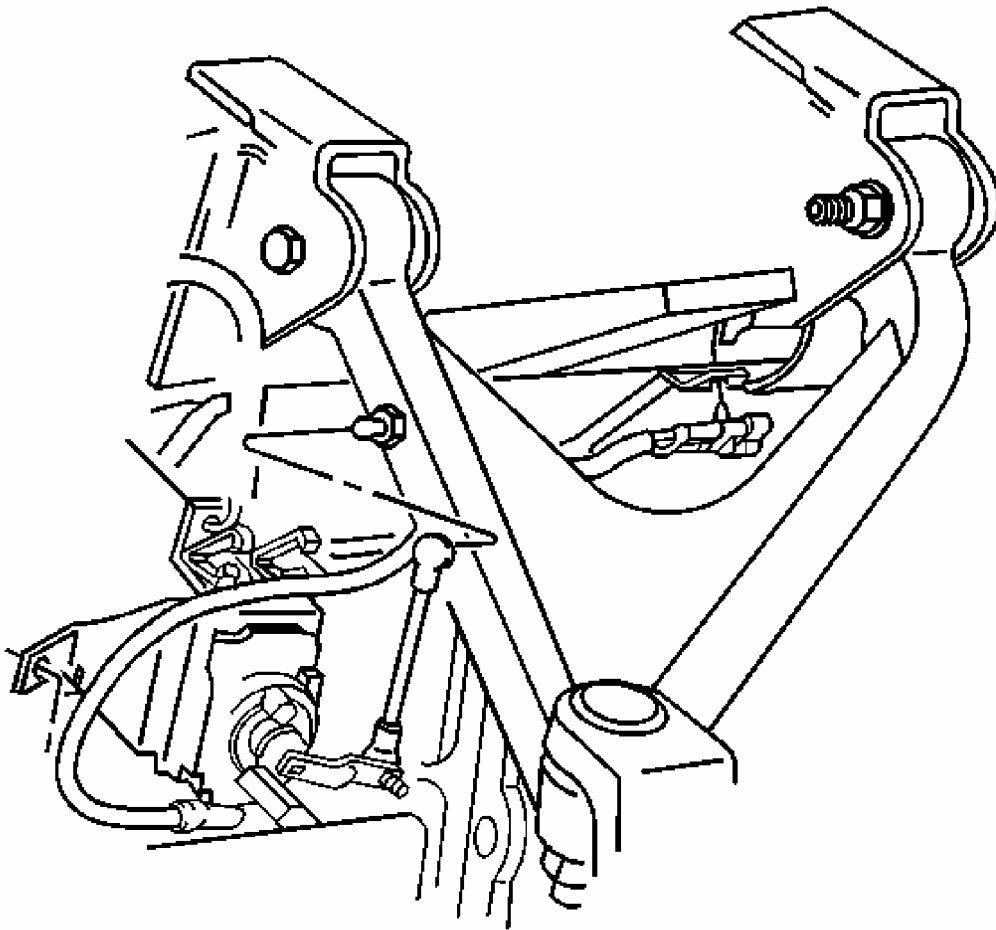
2002 SUSPENSION Rear - Corvette

4. Disconnect the real time damping (RTD) position sensor links, if equipped. See **Fig. 2** .
5. Disconnect the shock absorber solenoid electrical connectors, if equipped. See **Fig. 3** .
6. Remove the transverse spring from the crossmember. Refer to **REAR TRANSVERSE SPRING** .
7. Support the crossmember with a transmission jack.
8. Remove the stabilizer shaft from the vehicle. Refer to **STABILIZER SHAFT** .
9. Disconnect the outer tie rod end studs from the rear suspension knuckles. Refer to **TIE ROD (OUTER END)** and **TIE ROD (SUSPENSION LINK)** .
10. Remove the transaxle mount lower nuts. See **Fig. 4** . Refer to TRANSMISSION MOUNT REPLACEMENT in REAR DRIVE AXLE article.
11. Remove the shock absorber lower mounting bolts from the lower control arms.
12. Remove the upper control arm from the rear axle. Refer to **REAR AXLE UPPER CONTROL ARM** .
13. Loosen the nut on the lower control arm ball joint stud. See **Fig. 5** . Do not remove.
14. Rotate the suspension knuckles backwards until the wheel drive shaft clears the differential. Refer to **AXLE SHAFTS** .
15. Support the wheel drive shafts and the rear suspension knuckles.
16. Disconnect all the electrical connectors from the crossmember.
17. Disconnect the brake pipes from the crossmember.
18. Support the transaxle under the transmission pan with a transmission jack.
19. Remove the rear crossmember mounting nuts.
20. Remove the crossmember from the vehicle.
21. Discard the rear crossmember mounting nuts.



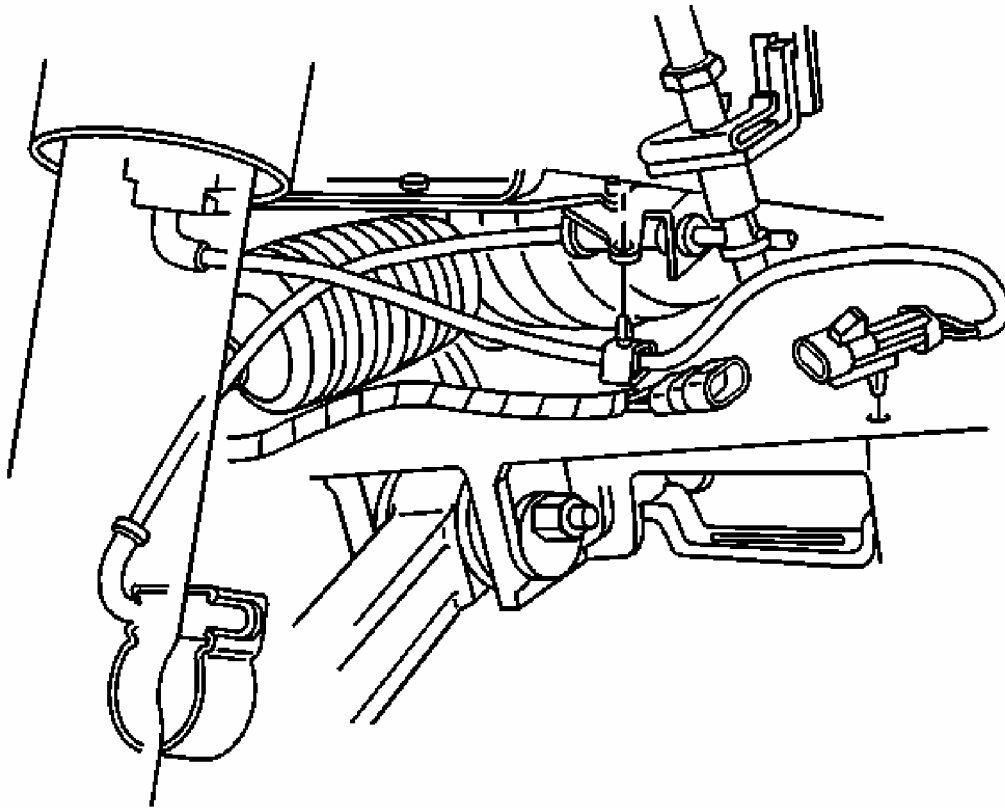
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Fig. 1: Disconnecting Wheel Speed Sensor Harness Connector
Courtesy of GENERAL MOTORS CORP.



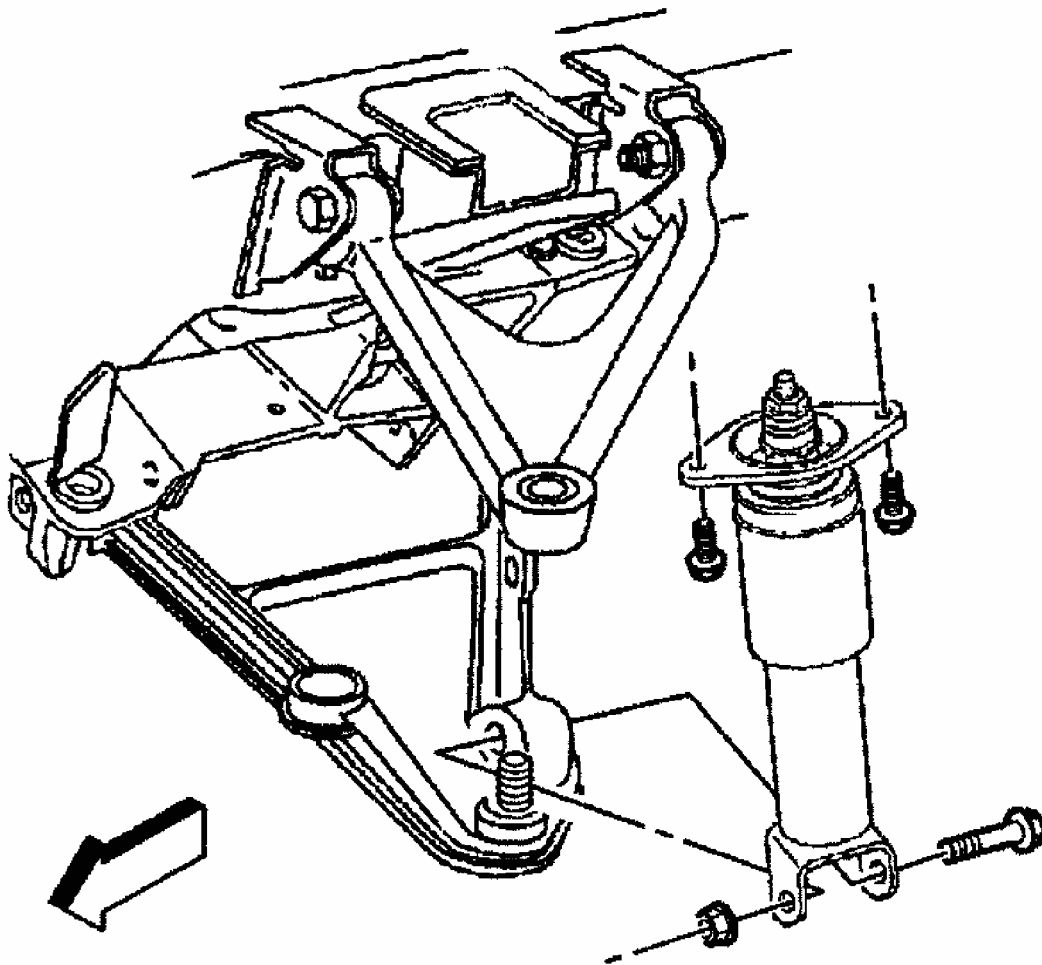
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Fig. 2: Disconnecting RTD Position Sensor Links
Courtesy of GENERAL MOTORS CORP.



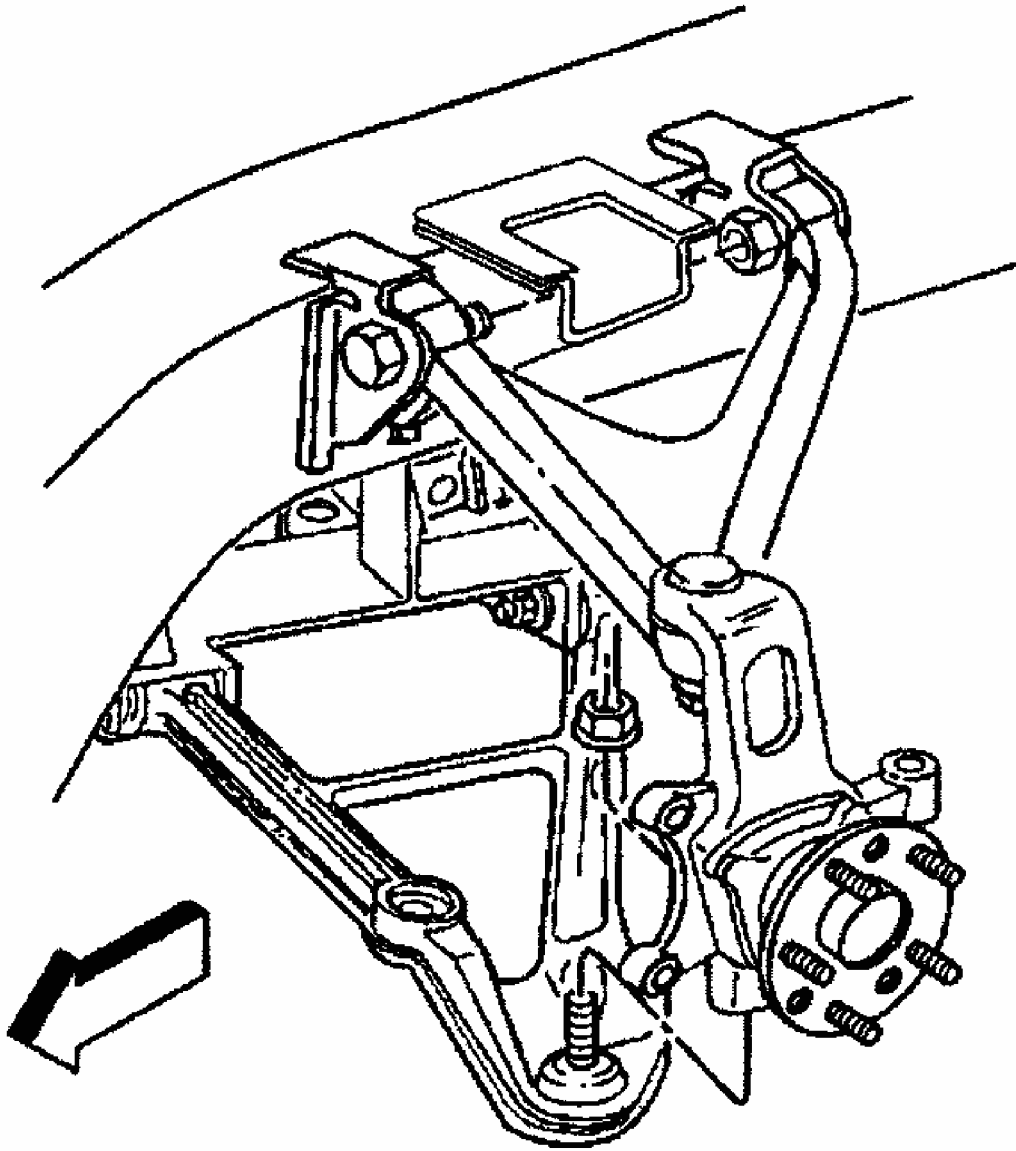
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Fig. 3: Disconnecting Shock Absorber Solenoid Electrical Connector
Courtesy of GENERAL MOTORS CORP.



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Fig. 4: Removing Shock Absorber Lower Mounting Bolts
Courtesy of GENERAL MOTORS CORP.



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Fig. 5: Loosening Lower Control Arm Ball Joint Stud Nut
Courtesy of GENERAL MOTORS CORP.

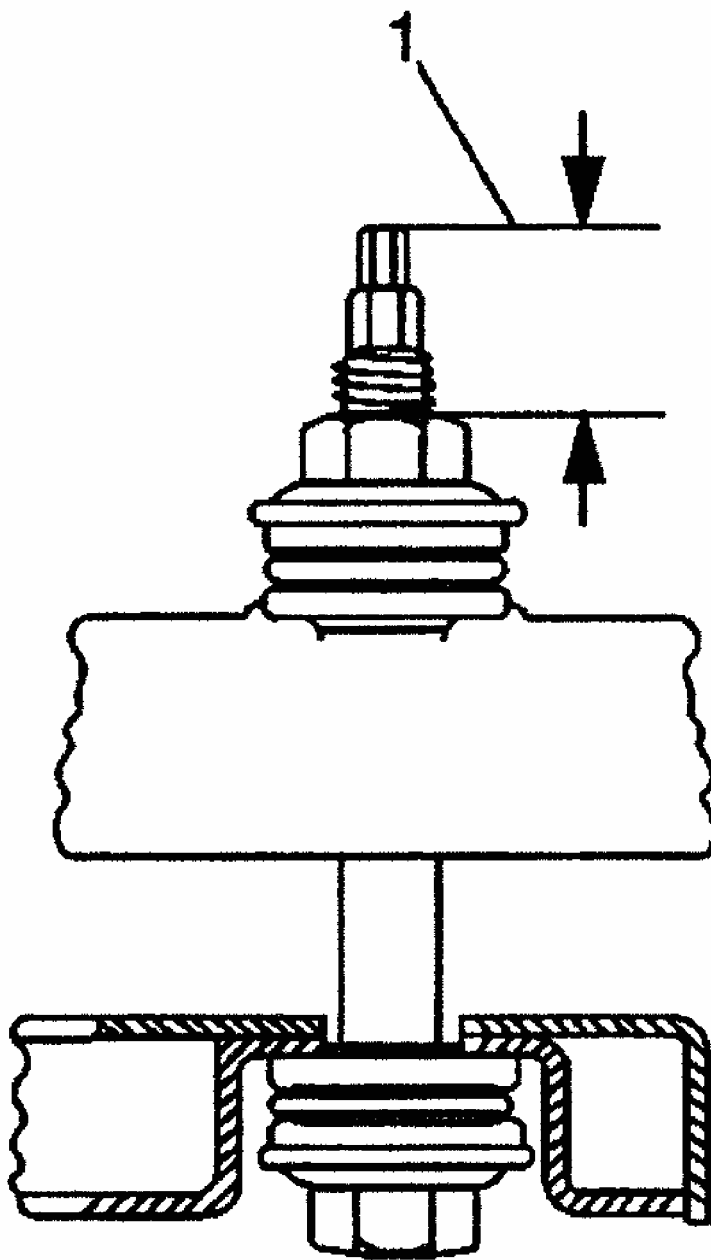
Installation

1. Install the crossmember to the vehicle.
 - Align the crossmember dowel pins to the holes in the frame rails.
 - Align the transaxle mount studs to the crossmember.

NOTE: 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.

2. Install NEW rear suspension crossmember mounting nuts. Tighten the NEW rear crossmember mounting bolts to 110 N.m (81 lb ft).
3. Remove the transmission jack from the transmission pan.
4. Connect all electrical connectors to the crossmember.
5. Connect the brake pipes to the retainers in the crossmember.
6. Install the transaxle mount lower nuts. Refer to TRANSMISSION MOUNT REPLACEMENT in REAR DRIVE AXLE article.
7. Install the inner constant velocity (CV) joints to the differential. Refer to AXLE SHAFTS .
8. Install the rear suspension knuckles to the lower control arms. See Fig. 5 . Refer to KNUCKLE .
9. Install the shock absorbers to the lower control arms. Refer to SHOCK ABSORBER .
10. Install the outer tie rod end studs into the rear suspension knuckles. Refer to TIE ROD (OUTER END) and TIE ROD (SUSPENSION LINK) .
11. Install the stabilizer shaft to the crossmember. Refer to STABILIZER SHAFT .
12. Remove the jack stands from under the lower control arms.
13. Install the transverse spring to the crossmember. Refer to REAR TRANSVERSE SPRING .
14. Connect the electrical connectors to the wheel speed sensors. See Fig. 1 .
15. Connect the shock absorber solenoid connectors, if equipped. See Fig. 3 .
16. Connect the RTD position sensor links, if equipped. See Fig. 2 .
17. Set the spring stud height (1) to the measurement taken before removal. See Fig. 6 .
18. Install the tire and wheel assemblies. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
19. Lower the vehicle.



1. Rear Spring Stud Heights

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Fig. 6: Measuring Rear Spring Stud Height
Courtesy of GENERAL MOTORS CORP.

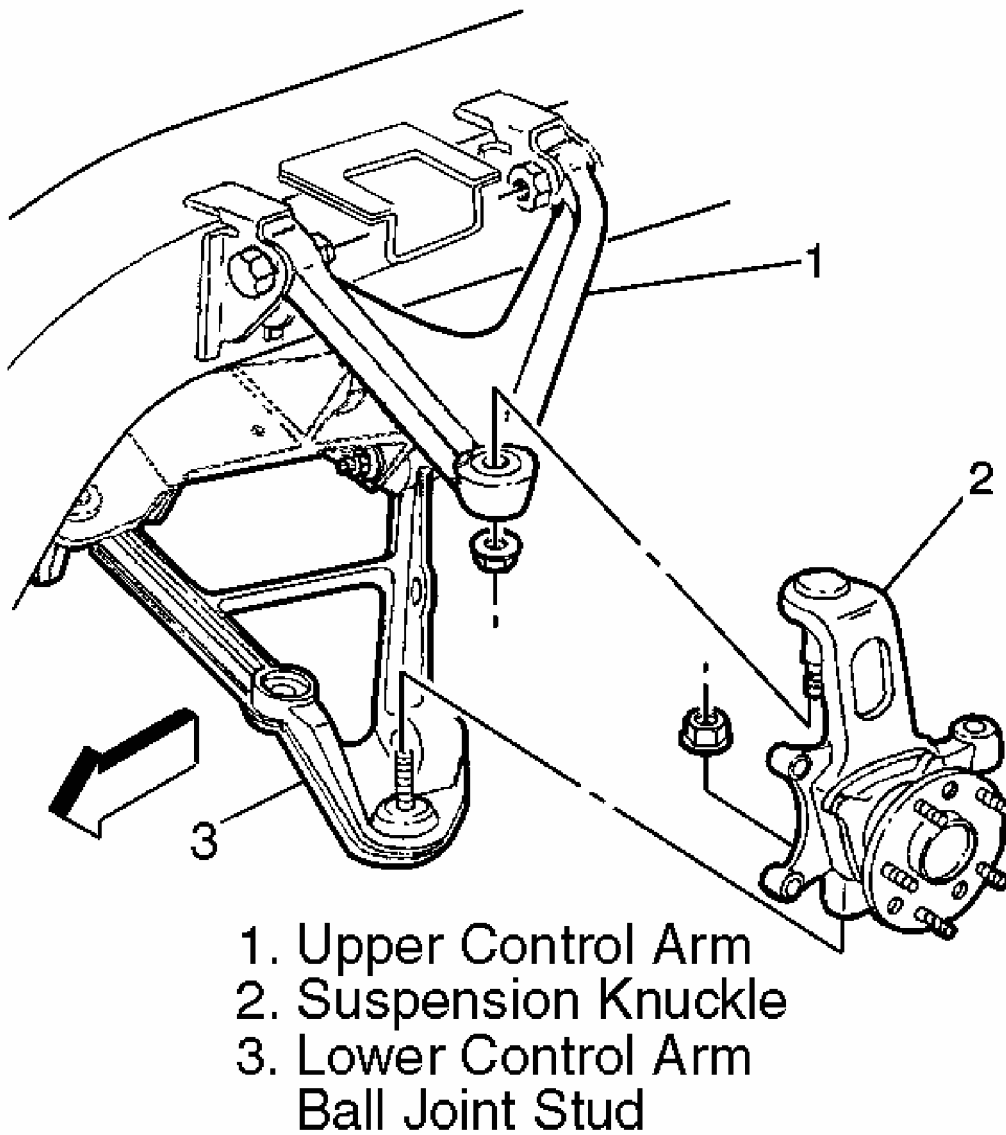
WHEEL BEARING/HUB - REAR

Removal

2002 Chevrolet Corvette

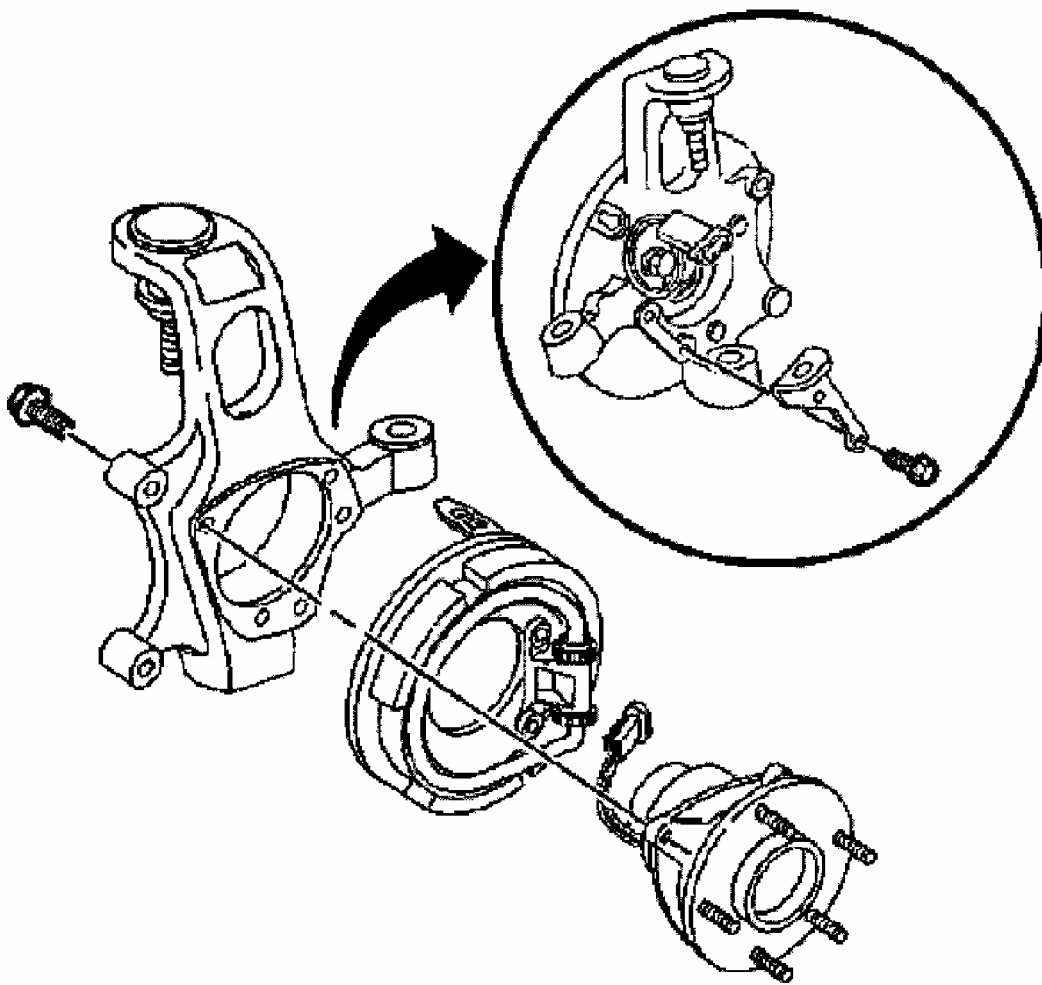
2002 SUSPENSION Rear - Corvette

1. Raise and support the vehicle.
2. Remove the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
3. Disconnect the wheel speed sensor electrical connector. See **Fig. 1** .
4. Disconnect the real time damping (RTD) position sensor link, if equipped. See **Fig. 2** .
5. Remove the brake caliper and rotor. Refer to **REAR BRAKE CALIPER** and **REAR BRAKE ROTOR** .
6. Remove the shock absorber solenoid electrical connector, if equipped. See **Fig. 3** .
7. Separate the outer tie rod end from the suspension knuckle. Refer to **TIE ROD (OUTER END)** and **TIE ROD (SUSPENSION LINK)** .
8. Remove the spindle nut retainer, the spindle nut and the washer. Refer to **AXLE SHAFTS** .
9. Separate the upper control arm (1) from the suspension knuckle. See **Fig. 7** . Refer to **REAR AXLE UPPER CONTROL ARM** .
10. Separate the suspension knuckle from the lower control arm ball joint stud (3). Refer to **REAR AXLE LOWER CONTROL ARM** .
11. Remove the suspension knuckle from the vehicle.
12. Remove the wheel hub mounting bolts. See **Fig. 8** .
13. Remove the hub and bearing assembly from the suspension knuckle.



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Fig. 7: Separating Upper Control Arm & Suspension Knuckle
Courtesy of GENERAL MOTORS CORP.



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Fig. 8: Removing Hub & Bearing Assembly
Courtesy of GENERAL MOTORS CORP.

Installation

CAUTION: The Front and Rear Wheel Hub/Wheel Speed Sensors are not interchangeable. When you are replacing a Wheel Hub/Wheel Speed Sensor be sure to use the correct Wheel Hub/Wheel Speed Sensor part number. Do not mount the Rear Wheel Hub/Wheel Speed Sensor in the front steering knuckle. The Rear Wheel Hub/Wheel Speed Sensor features a splined hole through the center of the bearing which mates to the drive axle. The Rear Wheel Hub/Wheel Speed Sensor requires the support of the drive axle and the drive axle nut clamped joint to properly carry the vehicle loads.

Mounting the Rear Wheel Hub/Wheel Speed Sensor in the front steering knuckle can cause bearing failure and possible damage to the vehicle.

1. Install the wheel hub and bearing assembly to the suspension knuckle. See **Fig. 8** .

NOTE: **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.**

2. Install the wheel hub mounting bolts. Tighten the wheel hub mounting bolts to 130 N.m (96 lb ft).
3. Install the suspension knuckle to the upper control arm (1). See **Fig. 7** . Refer to **REAR AXLE UPPER CONTROL ARM** .
4. Install the suspension knuckle (2) to the lower control arm ball stud (3). Refer to **REAR AXLE LOWER CONTROL ARM** .
5. Install the spindle nut, washer and retainer. Refer to **AXLE SHAFTS** .
6. Install the outer tie rod end stud to the suspension knuckle. Refer to **TIE ROD (OUTER END)** and **TIE ROD (SUSPENSION LINK)** .
7. Install the brake rotor and caliper. Refer to **REAR BRAKE CALIPER** and **REAR BRAKE ROTOR** .
8. Connect the wheel speed sensor electrical connector. See **Fig. 1** .
9. Install the shock absorber solenoid electrical connector, if equipped. See **Fig. 3** .
10. Connect the real time damping position sensor link, if equipped. See **Fig. 2** .
11. Install the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
12. Lower the vehicle.

KNUCKLE

Removal

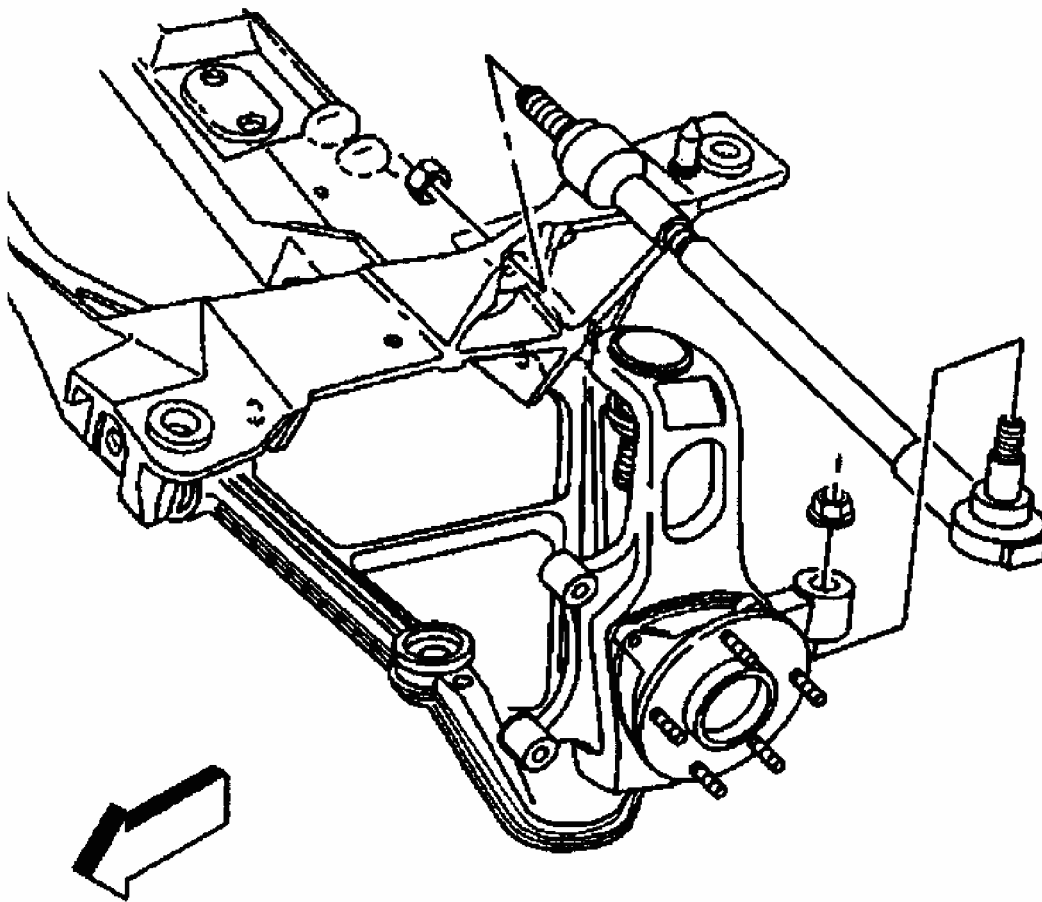
1. Raise and support the vehicle.
2. Remove the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND

INSTALLATION in TIRES AND WHEELS article.

3. Disconnect the wheel speed sensor electrical connector. See **Fig. 1** .
4. Disconnect the real time damping (RTD) position sensor link, if equipped. See **Fig. 2** .
5. Remove the brake rotor. Refer to **REAR BRAKE ROTOR** .
6. Remove the shock absorber solenoid electrical connector, if equipped. See **Fig. 3** .
7. Separate the outer tie rod end from the suspension knuckle. Refer to **TIE ROD (OUTER END)** and **TIE ROD (SUSPENSION LINK)** .
8. Remove the spindle nut retainer, the spindle nut and the washer. Refer to **AXLE SHAFTS** .
9. Separate the suspension knuckle (2) from the upper control arm (1). Refer to **REAR AXLE UPPER CONTROL ARM** .
10. Separate the suspension knuckle (2) from the lower control arm ball joint stud (3). Refer to **REAR AXLE LOWER CONTROL ARM** .
11. Remove the suspension knuckle.

Installation

1. Install the suspension knuckle (2) to the lower control arm (3) ball joint stud. Refer to **REAR AXLE LOWER CONTROL ARM** .
2. Install the suspension knuckle ball joint stud (2) to the upper control arm (1). Refer to **REAR AXLE UPPER CONTROL ARM** .
3. Install the spindle nut, washer and retainer. Refer to **AXLE SHAFTS** .
4. Install the outer tie rod end to the suspension knuckle. See **Fig. 9** . Refer to **TIE ROD (OUTER END)** and **TIE ROD (SUSPENSION LINK)** .
5. Install the brake rotor and caliper. Refer to **REAR BRAKE CALIPER** and **REAR BRAKE ROTOR** .
6. Connect the wheel speed sensor electrical connector. See **Fig. 1** .
7. Install the shock absorber solenoid electrical connector, if equipped. See **Fig. 3** .
8. Connect the real time damping position sensor link, if equipped. See **Fig. 2** .
9. Install the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
10. Lower the vehicle.
11. Perform a rear wheel alignment. Refer to MEASURING WHEEL ALIGNMENT in WHEEL ALIGNMENT article.



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Fig. 9: Installing Outer Tie Rod To Suspension Knuckle
Courtesy of GENERAL MOTORS CORP.

REAR AXLE UPPER CONTROL ARM

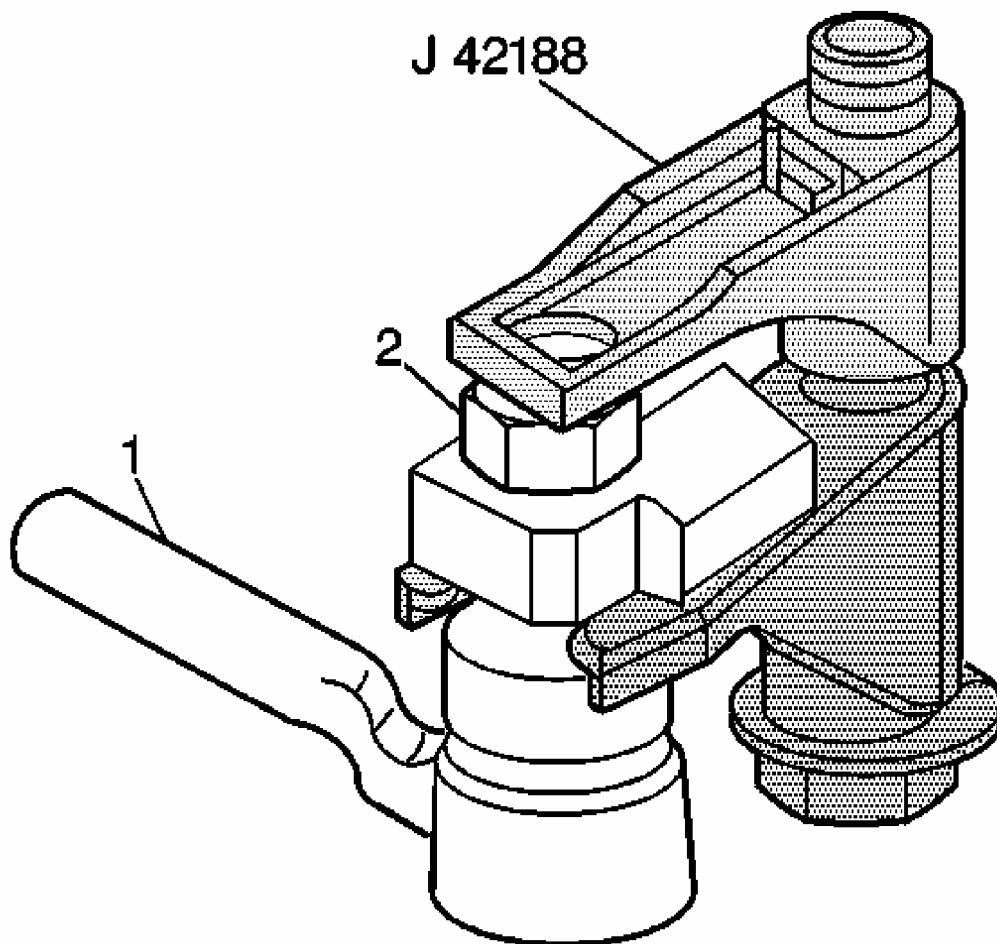
Removal

NOTE: Tools Required

- J 42188 Ball Joint Separator

1. Raise and support the vehicle.
2. Remove the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
3. Disconnect the wheel speed sensor electrical connector. See **Fig. 1**.
4. Disconnect the real time damping (RTD) position sensor link, if equipped. See **Fig. 2**.

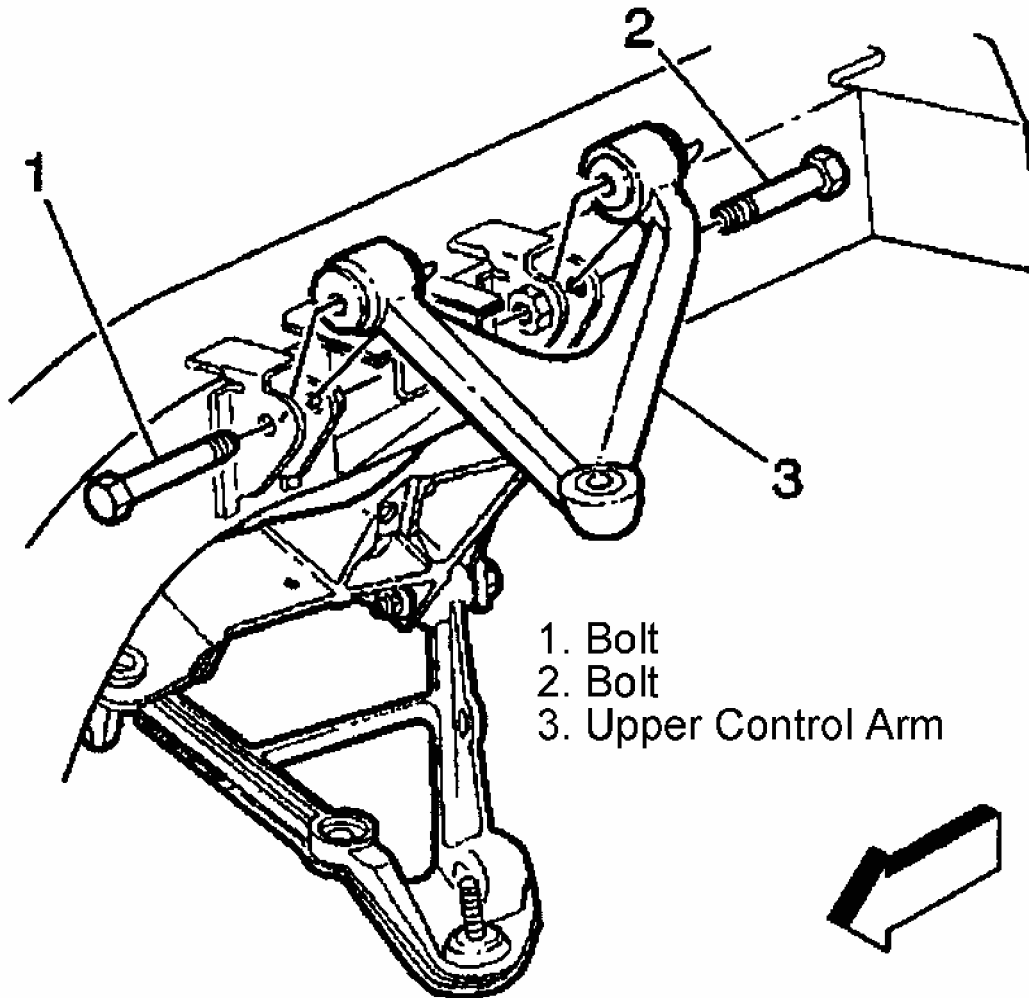
5. Separate the suspension knuckle (1) from the upper control arm using J 42188. See **Fig. 10**.
6. Support the lower control arm with a jack stand.
7. Loosen the upper ball joint stud nut, but do not remove the nut.
8. Remove J 42188 and the ball joint stud nut (2) from the ball joint stud.
9. Remove the bolts (1) and (2) retaining the upper control arm (3) to the frame. See **Fig. 11**.
10. Remove the upper control arm (3) from the vehicle.



1. Suspension Knuckle
2. Ball Joint Stud Nut

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Fig. 10: Separating Suspension Knuckle Using J 42188
 Courtesy of GENERAL MOTORS CORP.



- 1. Bolt
- 2. Bolt
- 3. Upper Control Arm

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Fig. 11: Removing Upper Control Arm Bolts
 Courtesy of GENERAL MOTORS CORP.

Installation

1. Install the upper control arm (3) to the vehicle. See **Fig. 11** .

NOTE: 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.

2. Install the upper control arm mounting bolts (1) and (2) to the frame. Tighten the upper control arm mounting bolts to 110 N.m (81 lb ft).
3. Install the suspension knuckle upper ball joint stud into the upper control arm. See **Fig. 5** . It may be necessary to use an allen wrench to keep the ball joint stud from spinning while tightening the ball joint stud nut.
4. Install the upper ball joint stud nut.
 - A. Tighten the suspension knuckle ball joint stud nut to 20 N.m (15 lb ft) to seat the ball joint stud.
 - B. Turn the ball joint stud nut an additional 250 degrees.
 - C. Check the ball joint nut for a minimum final torque of 55 N.m (41 lb ft).
5. Connect the wheel speed sensor electrical connector. See **Fig. 1** .
6. Install the shock absorber solenoid electrical connector, if equipped. See **Fig. 3** .
7. Connect the real time damping position sensor link, if equipped. See **Fig. 2** .
8. Remove the jack stand from the lower control arm.
9. Install the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
10. Lower the vehicle.
11. Perform a rear wheel alignment. Refer to MEASURING WHEEL ALIGNMENT in WHEEL ALIGNMENT article.

REAR AXLE LOWER CONTROL ARM

Removal

NOTE: Tools Required

- **J 33432-A Transverse Spring Compressor**
- **J 42188 Ball Joint Separator**

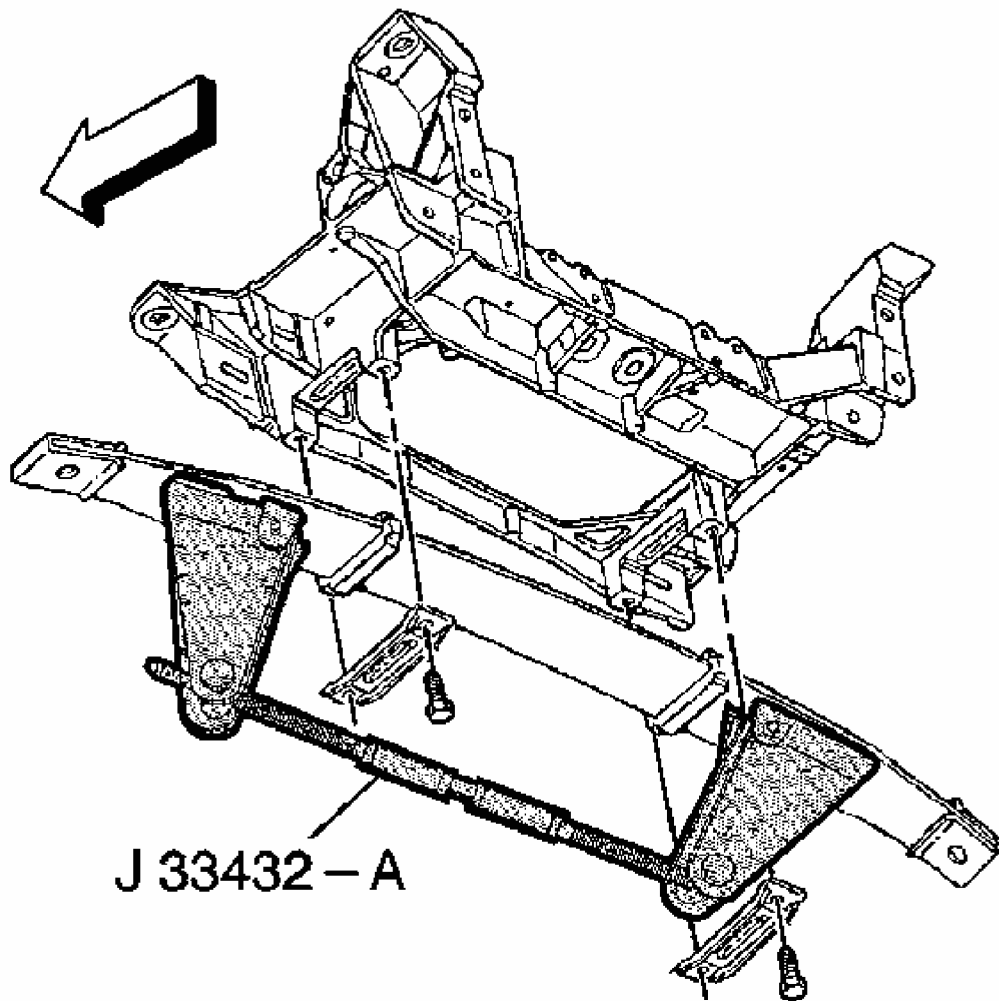
1. Raise and support the vehicle.
2. Remove the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
3. Measure the spring stud height (1) before removing the transverse spring mounting

bolt. See **Fig. 6** .

4. Install J 33432-A to the spring. See **Fig. 12** .
5. Compress the spring.
6. Remove the nuts, bolts (2), and insulators retaining the transverse spring to the lower control arm. See **Fig. 13** .
7. Remove the transverse spring from the control arm.
8. Support the lower control arm with a jack stand.
9. Disconnect the shock absorber from the lower control arm. See **Fig. 4** .

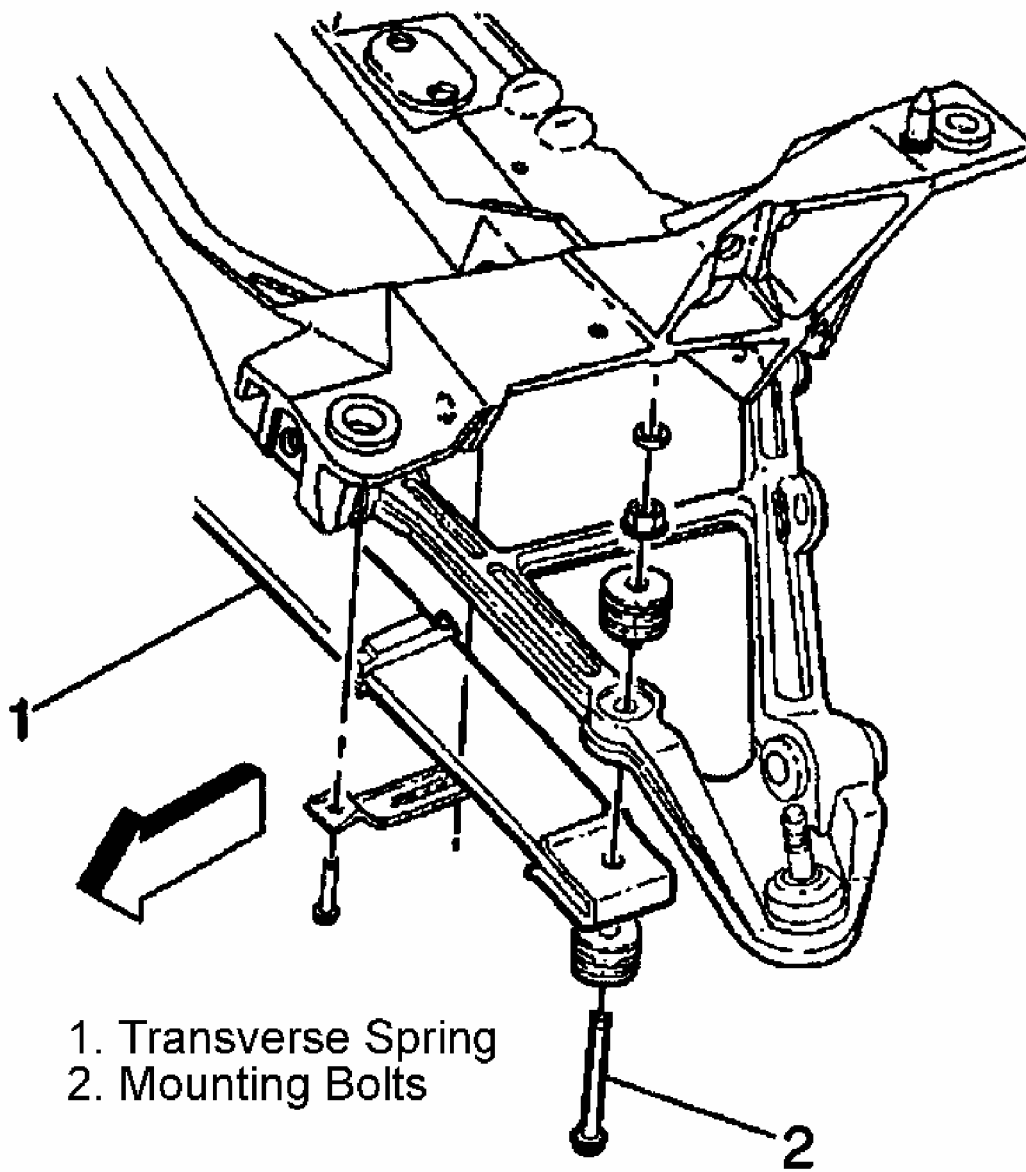
NOTE: **The ball joint must be prevented from rotating. Use a TORX (R) inserted into the top of the ball stud while removing the ball stud nut.**

10. Loosen, but do not remove the upper ball joint stud nut.
11. Use the J 42188 in order to separate the upper ball joint stud from the suspension knuckle.
12. Remove the J 42188 and the upper ball joint stud nut from the suspension knuckle.
13. Remove the nut from the wheel drive shaft on the suspension knuckle.
14. Loosen, but do not remove the lower ball joint stud nut. See **Fig. 5** .
15. Separate the lower ball joint stud from the suspension knuckle using J 42188.
16. Remove J 42188 and the lower ball joint stud nut from the suspension knuckle.
17. Remove the stabilizer shaft link from the lower control arm. See **Fig. 14** .
18. Mark the position of, and then remove the cam bolts, washers, and nuts retaining the control arm to the crossmember. See **Fig. 15** .
19. Remove the jack stand.
20. Remove the lower control arm from the vehicle.



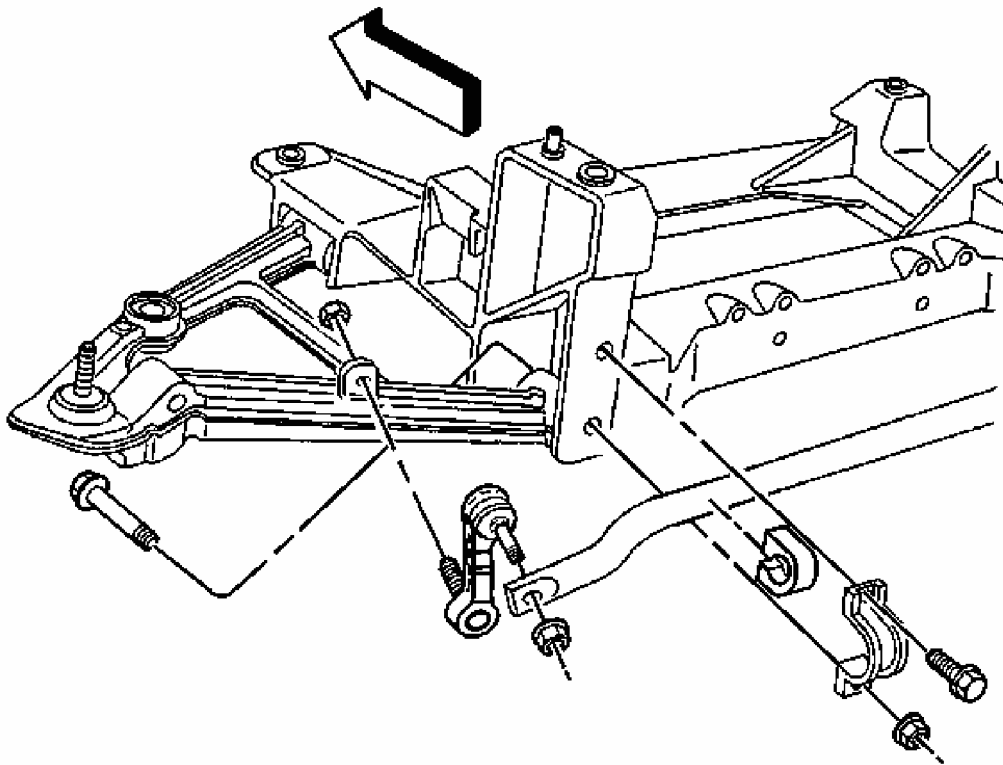
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Fig. 12: Installing J 33432-A To Spring
Courtesy of GENERAL MOTORS CORP.



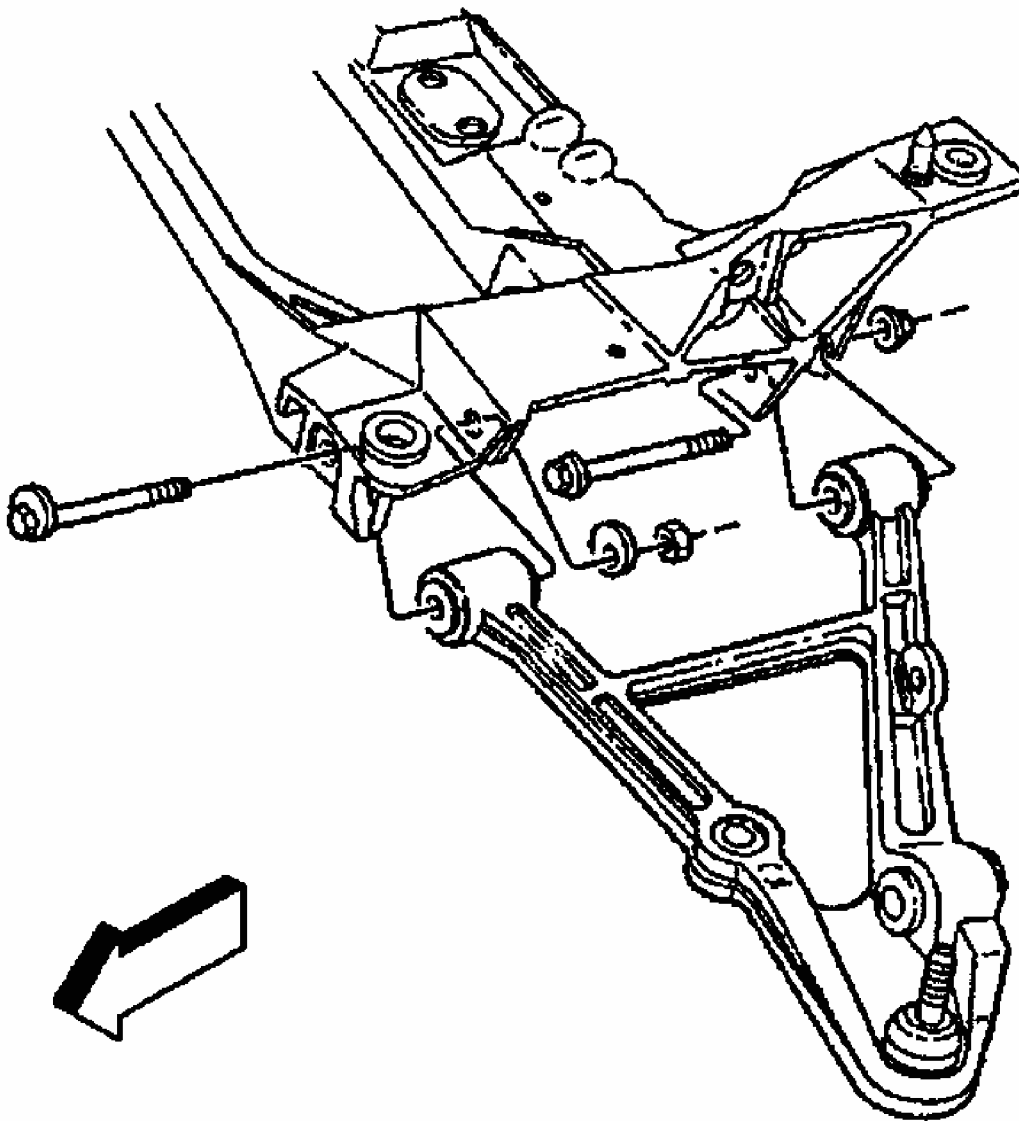
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Fig. 13: Removing Transverse Spring
Courtesy of GENERAL MOTORS CORP.



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Fig. 14: Removing Stabilizer Shaft Link From Lower Control Arm
Courtesy of GENERAL MOTORS CORP.



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Fig. 15: Removing Lower Control Arm
Courtesy of GENERAL MOTORS CORP.

Installation

1. Install the lower control arm to the vehicle.
2. Support the lower control arm with a jack stand.
3. Install the cam bolts, washers, and nuts retaining the lower control arm to crossmember. See **Fig. 15** .
 - A. Place the cam bolts at the position marked during removal.

- B. Due to a required wheel alignment, tighten the cam bolts but do not set them to the final torque specification at this time.

NOTE: 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 the lower control arm ball joint stud into the suspension knuckle. See **Fig. 5** . It may be necessary to use an allen wrench to keep the ball joint stud from spinning while tightening the ball joint stud nut.
 - Tighten the lower control arm ball joint stud nut to 20 N.m (15 lb ft) to seat the ball joint stud.
 - Turn the nut an additional 3 1/2 flats.
 - Check the ball joint stud nut for a minimum final torque of 55 N.m (41 lb ft).
5. Install the stabilizer shaft link to control arm. See **Fig. 14** . Tighten the stabilizer shaft link nuts to 72 N.m (53 lb ft).
6. Install the shock absorber to the lower control arm. See **Fig. 4** . Tighten the shock absorber lower mounting bolt to 220 N.m (162 lb ft).
7. Install the transverse spring (1) to the lower control arm. See **Fig. 13** .
8. Install the transverse spring insulators and mounting bolts (2).
9. Remove the jack stand.
10. Set the transverse spring stud height (1) to the height measured during removal. See **Fig. 6** .
11. Release and remove J 33432-A from the transverse spring.
12. Install the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
13. Perform a rear wheel alignment. Refer to MEASURING WHEEL ALIGNMENT in WHEEL ALIGNMENT article.
 - Tighten the lower control arm (front) cam bolt to 145 N.m (107 lb ft).
 - Tighten the lower control arm (rear) cam bolt to 95 N.m (70 lb ft).

Removal**NOTE: Tools Required**

- **J 33432-A Transverse Spring Compressor**

1. Raise and support the vehicle.
2. Remove the tire and wheel assemblies. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
3. Measure the transverse spring stud height (1). See **Fig. 6** . This measurement will be used in the installation to set-up the vehicle trim height.

NOTE: During this procedure, use care not to scratch the rear transverse spring.

4. Install J 33432-A to the rear transverse spring, and compress the spring. See **Fig. 12** .
5. Remove the retainers, nuts, bolts (2) and insulators retaining the transverse spring (1) to the lower control arms. See **Fig. 13** .
6. Remove the rear transverse spring mounting bolts, spring spacers and insulators from the crossmember.
7. Remove the rear transverse spring from the vehicle.
8. If the transverse spring is to be replaced, release and remove J 33432-A from the transverse spring. See **Fig. 12** .

Installation

1. If the transverse spring is a replacement, install J 33432-A to the transverse spring and compress the spring. See **Fig. 12** .
2. Install the rear transverse spring to the vehicle.

NOTE: 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.

2002 Chevrolet Corvette

2002 SUSPENSION Rear - Corvette

3. Install the rear transverse spring spacers, insulators and mounting brackets to the crossmember. Tighten the rear transverse spring mounting bracket bolts to 62 N.m (46 lb ft).
4. Position the transverse spring (1) to the lower control arms and install the spring bolts (2), insulators and nuts. See **Fig. 13** .
5. Release and remove J 33432-A from the transverse spring.

NOTE: **The rear transverse spring stud bolt must have a minimum of 2 threads showing above the nut.**

6. Set the transverse spring stud height (1) to the height measured during removal. See **Fig. 6** .
7. Install the retainers to the bolts.
8. Install the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
9. Lower the vehicle.

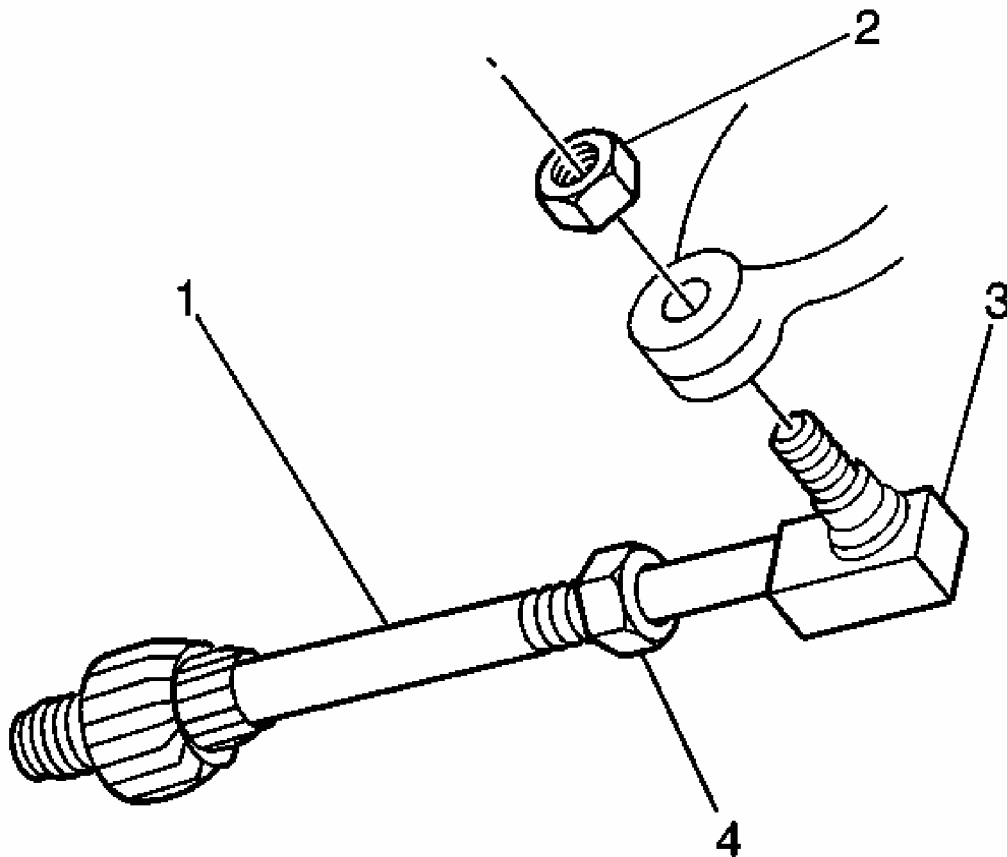
TIE ROD (OUTER END)

Removal

NOTE: **Tools Required**

- **J 42188 Ball Joint Separator**

1. Raise and support the vehicle.
2. Remove the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
3. Loosen, do not remove, the outer tie rod end stud nut (2) from the outer tie rod end ball stud. See **Fig. 10** .
4. Install J 42188 between the steering knuckle and the outer tie rod end stud.
5. Tighten the bolt on J 42188 until the steering knuckle and the outer tie rod end stud separate.
6. Remove J 42188 and the outer tie rod end stud nut.
7. Remove the outer tie rod end stud from the suspension knuckle.
8. Loosen the jam nut (4) on the rear suspension adjustment link. See **Fig. 16** .
9. Remove the outer tie rod end (3) from the rear suspension adjustment link (1).



1. Rear Suspension Adjustment Link
2. Outer Tie Rod End Nut
3. Outer Tie Rod End
4. Jam Nut

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Fig. 16: Removing Outer Tie Rod End
Courtesy of GENERAL MOTORS CORP.

Installation

1. Install the outer tie rod end (3) to the rear suspension adjustment link (1). See **Fig. 16**.
2. Install the outer tie rod end into the suspension knuckle.

NOTE: Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that

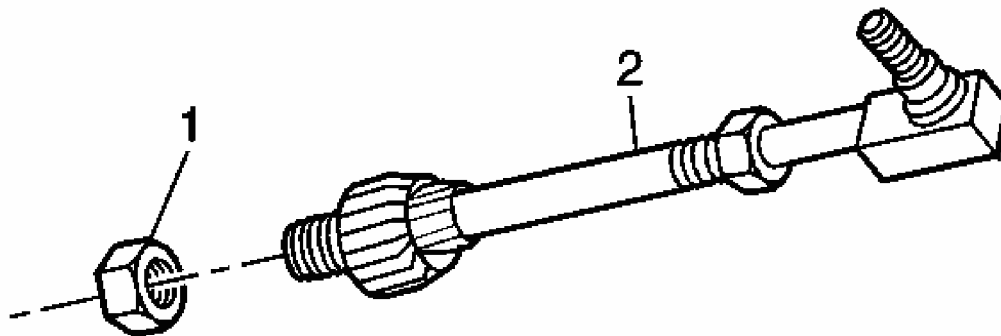
application. Fasteners requiring replacement or fasteners requiring the use of thread locking compound or sealant are identified in the service procedure. Do not use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque 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.

3. Install the outer tie rod end nut (2).
 - Tighten the outer tie rod end nut (2) to 20 N.m (15 lb ft) to seat the outer tie rod stud.
 - Turn the nut an additional 160 degrees.
 - Check the outer tie rod end nut for a minimum torque of 45 N.m (33 lb ft).
4. Install the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
5. Lower the vehicle.
6. Adjust the rear wheel toe as necessary and tighten the rear suspension adjustment link lock nut. Refer to REAR TOE ADJUSTMENT in WHEEL ALIGNMENT article.

TIE ROD (SUSPENSION LINK)

Removal

1. Raise and support the vehicle.
2. Remove the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
3. Disconnect the outer tie rod end from the suspension knuckle. Refer to **TIE ROD (OUTER END)**.
4. Remove the nut (1) retaining the rear suspension adjustment link to the crossmember. See **Fig. 17**.
5. Remove the rear suspension adjustment link (2) from the vehicle.



1. Nut

2. Rear Suspension Adjustment Link

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Fig. 17: Removing Rear Suspension Adjustment Link
Courtesy of GENERAL MOTORS CORP.

Installation

1. Install the rear suspension adjustment link (2) to the vehicle. See **Fig. 17** .

NOTE: 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.

2. Install the rear suspension adjustment link nut (1) to the back side of the crossmember. Tighten the rear suspension adjustment link nut to 60 N.m (44 lb ft).
3. Install the outer tie rod end into the suspension knuckle. Refer to **TIE ROD (OUTER END)** .
4. Install the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.

5. Lower the vehicle.
6. Adjust the rear wheel toe as necessary. Refer to REAR TOE ADJUSTMENT in WHEEL ALIGNMENT article.

STABILIZER SHAFT

Removal

1. Raise and support the vehicle.
2. Remove the tire and wheel assemblies. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
3. Remove the stabilizer shaft link nuts from the stabilizer shaft. See **Fig. 14** .
4. Remove the stabilizer shaft clamps, bolts and nuts retaining the shaft to the crossmember.
5. Remove the stabilizer shaft from the vehicle.

Installation

1. Install the stabilizer shaft to the vehicle. See **Fig. 14** .

NOTE: 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.

2. Install the stabilizer shaft insulator clamps to the stabilizer shaft and the crossmember.
 - Tighten the stabilizer shaft insulator clamp bolts to 65 N.m (49 lb ft).
 - Tighten the stabilizer shaft insulator clamp nuts to 95 N.m (70 lb ft).
3. Install the stabilizer shaft links to the stabilizer shaft. Tighten the stabilizer shaft link nuts to 72 N.m (53 lb ft).
4. Install the tire and wheel assemblies. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
5. Lower the vehicle.

STABILIZER SHAFT INSULATOR

Removal

1. Raise and support the vehicle.
2. Remove the tire and wheel assemblies. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
3. Remove the stabilizer shaft clamps, bolts and nuts retaining the shaft to the crossmember. See **Fig. 14** .
4. Remove the stabilizer shaft insulators from the stabilizer shaft.

Installation

1. Install the stabilizer shaft insulators to the stabilizer shaft. See **Fig. 14** .

NOTE: 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.

2. Install the stabilizer shaft insulator clamps to the stabilizer shaft and the crossmember.
 - Tighten the stabilizer shaft insulator clamp bolts to 65 N.m (49 lb ft).
 - Tighten the stabilizer shaft insulator clamp nuts to 95 N.m (70 lb ft).
3. Install the tire and wheel assemblies. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
4. Lower the vehicle.

STABILIZER SHAFT LINK**Removal**

1. Raise and support the vehicle.
2. Remove the tire and wheel assemblies. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
3. Remove the stabilizer shaft link nuts from the lower control arms. See **Fig. 14** .
4. Remove the stabilizer shaft link nuts and links from the shaft.

Installation

NOTE: 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.

1. Install the stabilizer shaft links and link nuts to the stabilizer shaft and to the lower crossmember. See **Fig. 14** . Tighten the stabilizer shaft link nuts to 72 N.m (53 lb ft).
2. Install the tire and wheel assemblies. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
3. Lower the vehicle.

SHOCK ABSORBER (W/O F55)

Removal

1. Raise and support the vehicle.
2. Remove the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
3. Disconnect the rear shock absorber electronic suspension control electrical (ESC) connector, if equipped. See **Fig. 3** .
4. Remove the lower mounting bolt retaining the shock absorber to the lower control arm. See **Fig. 4** .
5. Remove the shock upper mounting bolts.
6. Remove the tie rod from the control arm. Refer to **OUTER TIE ROD** .
7. Remove the shock absorber from the lower control arm and shock tower.
8. Remove the upper insulator retainer and insulator from the shock absorber.

Installation

1. Install the upper insulator and insulator retainer to the shock absorber. See **Fig. 4** .
2. Install the shock absorber to the shock tower and to the lower control arm.
3. Install the tie rod from the control arm. Refer to **OUTER TIE ROD** .

NOTE: 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 the upper shock absorber mounting bolts. Tighten the upper mounting bolts to 30 N.m (22 lb ft).

CAUTION: To avoid breaking the mounting bolt that attaches the shock absorber to the lower control arm, tighten the bolt. Do NOT tighten the nut.

5. Install the lower shock absorber mounting bolt. Tighten the shock absorber lower mounting bolt to 220 N.m (162 lb ft).
6. Connect the shock absorber ESC electrical connector, if equipped. See **Fig. 3**.
7. Install the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
8. Lower the vehicle.

SHOCK ABSORBER DISPOSAL

WARNING: Gas charged shock absorbers contain high pressure gas. Do not remove the snap ring from inside the top of the tube. If the snap ring is removed, the contents of the shock absorber will come out with extreme force which may result in personal injury.

WARNING: To prevent personal injury, wear safety glasses when centerpunching and drilling the shock absorber. Use care not to puncture the shock absorber tube with the centerpunch.

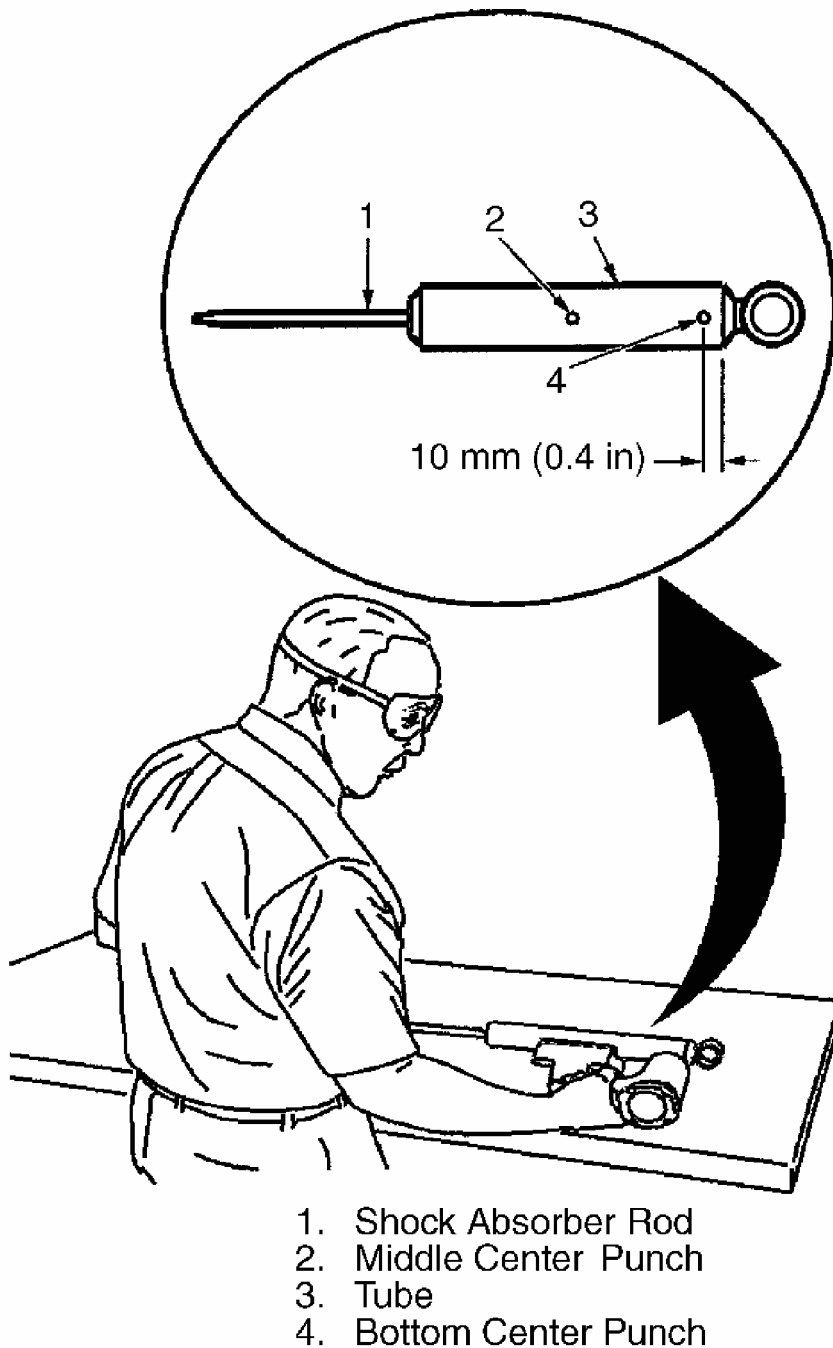
1. Make an indentation 10 mm (0.4 in) from the bottom (4) of the tube (3) using a centerpunch. See **Fig. 18**.
2. Clamp the shock absorber in a vise horizontally with the shock absorber rod (1) completely extended.
3. Drill a hole in the shock absorber at the centerpunch (4) using a 5 mm (3/16 in) drill bit. Gas or a gas/oil mixture will exhaust when the drill bit penetrates the shock absorber.

2002 Chevrolet Corvette

2002 SUSPENSION Rear - Corvette

Use shop towels in order to contain the escaping oil.

4. Make an indentation in the middle (2) of the tube (3) with a centerpunch.
5. Drill a second hole in the shock absorber at the centerpunch (2) using a 5 mm (3/16 in) drill bit. Oil will exhaust when the drill bit penetrates the shock absorber. Use shop towels in order to contain the escaping oil.
6. Remove the shock absorber from the vise. Hold the shock absorber over a drain pan horizontally with the holes down. Move the rod (1) in and out of the tube (3) to completely drain the oil from the shock absorber.



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Fig. 18: Shock Absorber Disposal
Courtesy of GENERAL MOTORS CORP.

SPRING BOLT AND INSULATORS

Removal

NOTE: Tools Required

- **J 33432-A Transverse Spring Compressor**

1. Raise and support the vehicle.
2. Remove the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
3. Measure the transverse spring stud height (1). See **Fig. 6** .

CAUTION: During this procedure, use care not to scratch rear transverse spring.

4. Install J 33432-A to the rear transverse spring and compress the spring. See **Fig. 12** .
5. Remove the retainers, nuts, insulators and spring bolts (2) from the lower control arm. See **Fig. 13** .

Installation

1. Position the rear transverse spring to the lower control arms.
2. Install the transverse spring bolts (2), insulators and nuts. See **Fig. 13** .
3. Release and remove J 33432-A from the transverse spring. See **Fig. 12** .
4. Set the transverse spring stud height (1) to the height measured during removal. See **Fig. 6** .
5. Install the retainers to the bolts.
6. Install the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
7. Lower the vehicle.

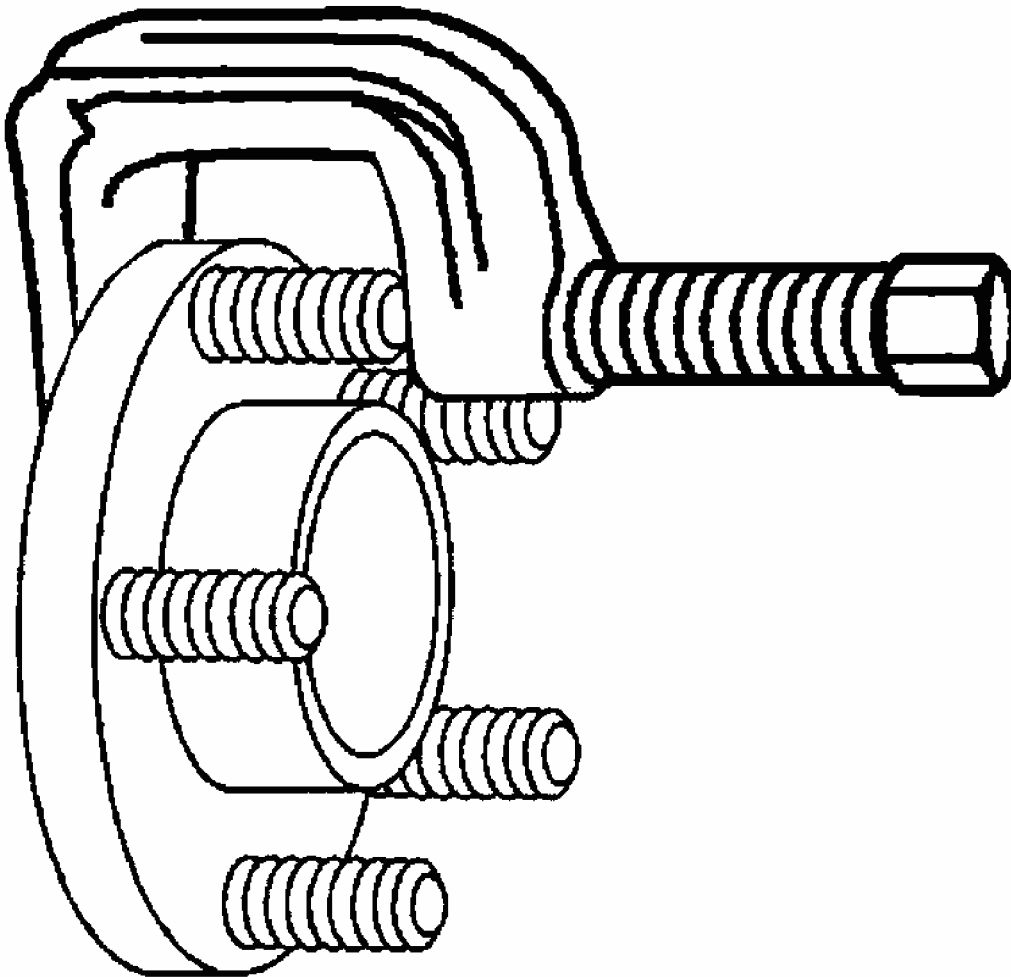
WHEEL STUD**Removal****NOTE: Tools Required**

- **J 43631 Ball Joint Separator**

1. Raise and support the vehicle.
2. Remove the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
3. Remove the rear wheel hub/speed sensor assembly from the suspension knuckle. Refer

to **WHEEL BEARING/HUB - REAR** .

4. Install J 43631 onto the wheel hub and stud. See **Fig. 19** .
5. Turn the forcing screw in until the stud is pushed out of the wheel hub.



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Fig. 19: Removing Wheel Stud Using J 43631 Ball Joint Separator
Courtesy of GENERAL MOTORS CORP.

Installation

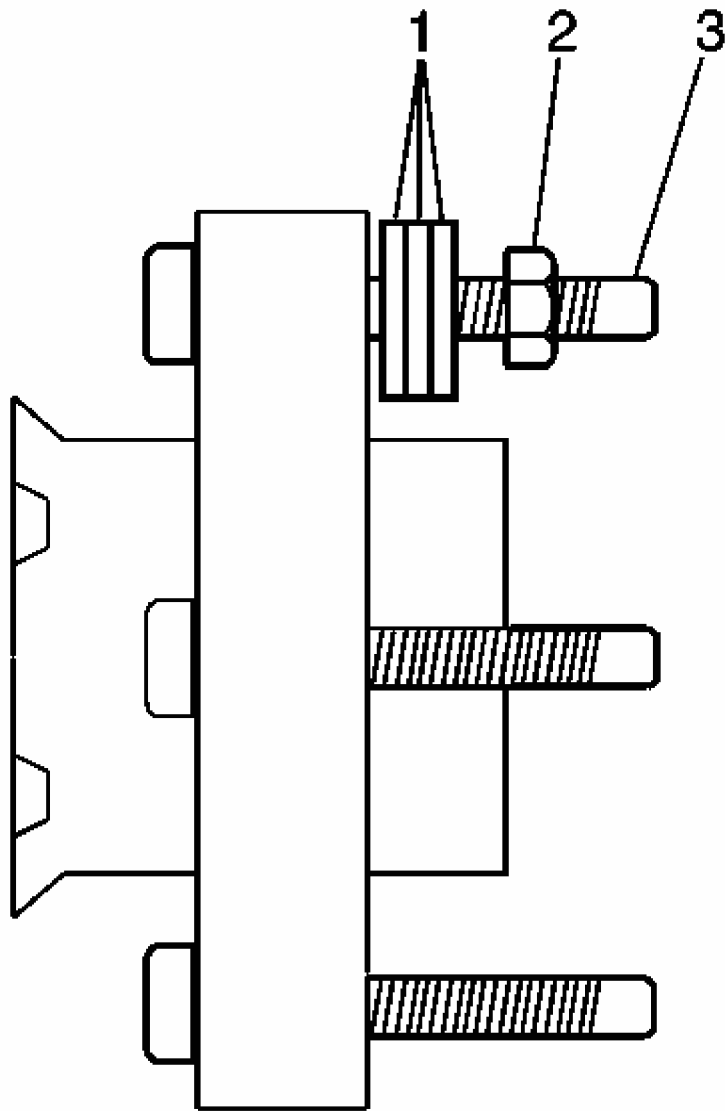
1. Place a new stud in the wheel hub.
2. Place some washers (1) onto the wheel stud (3). See **Fig. 20**

NOTE: **Make sure that the wheel stud is fully seated against the wheel hub flange.**

2002 Chevrolet Corvette

2002 SUSPENSION Rear - Corvette

3. With the flat side of a wheel nut against the washers, tighten the wheel nut until the wheel stud head seats against the wheel hub flange.
4. Remove the wheel nut and washers.
5. Install the rear wheel hub/speed sensor assembly into the suspension knuckle. Refer to **WHEEL BEARING/HUB - REAR** .
6. Install the tire and wheel assembly. Refer to TIRE AND WHEEL REMOVAL AND INSTALLATION in TIRES AND WHEELS article.
7. Lower the vehicle.



- 1. Washers
- 2. Wheel Nut
- 3. Wheel Stud

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Fig. 20: Placing Washers & Wheel Nut Onto Wheel Stud
Courtesy of GENERAL MOTORS CORP.

2002 Chevrolet Corvette

2002 SUSPENSION Rear - Corvette

TORQUE SPECIFICATIONS

| Application | Specification | |
|--|---------------|-----------|
| | Metric | English |
| Lower Control Arm Ball Joint Stud Nut | | |
| • First Pass | 20 N·m | 15 lb ft |
| • Second Pass | 3 ½ flats | |
| • Final Pass | 55 N·m | 41 lb ft |
| Lower Control Arm (Front) Cam Bolt Nut | 145 N·m | 107 lb ft |
| Lower Control Arm (Rear) Cam Bolt Nut | 95 N·m | 70 lb ft |
| Outer Tie Rod End Stud Nut | | |
| • First Pass | 20 N·m | 15 lb ft |
| • Second Pass | 160° | |
| • Final Pass | 45 N·m | 33 lb ft |
| Rear Crossmember Mounting Nuts (Use New Nuts) | 110 N·m | 81 lb ft |
| Rear Suspension Adjustment Link to Crossmember Nut | 60 N·m | 44 lb ft |
| Shock Absorber Lower Mounting Bolt | 220 N·m | 162 lb ft |
| Shock Absorber Upper Mounting Bolts | 30 N·m | 22 lb ft |
| Stabilizer Shaft Insulator (Upper) Clamp Bolt | 65 N·m | 49 lb ft |
| Stabilizer Shaft Insulator (Lower) Clamp Nut | 95 N·m | 70 lb ft |
| Stabilizer Shaft Link Nuts | 72 N·m | 53 lb ft |
| Transverse Spring Mounting Bracket Bolts | 62 N·m | 46 lb ft |
| Upper Control Arm Ball Joint Stud Nut | | |
| • First Pass | 20 N·m | 15 lb ft |
| • Second Pass | 250° | |
| • Final Pass | 55 N·m | 41 lb ft |
| Upper Control Arm Mounting Bolt | 110 N·m | 81 lb ft |
| Wheel Hub Mounting Bolts | 130 N·m | 96 lb ft |

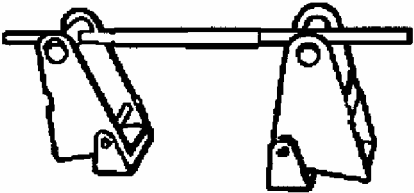
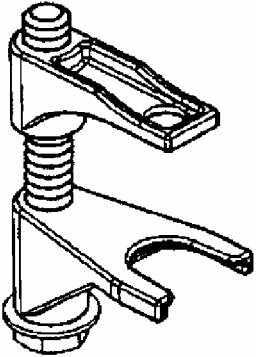
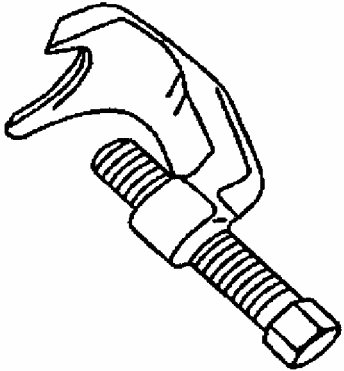
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Fig. 21: Torque Specifications
Courtesy of GENERAL MOTORS CORP.

SPECIAL TOOLS

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| Illustration | Tool Number/ Description |
|--|---|
|  | J 33432-A Transverse Spring Compressor |
|  | J 42188 Ball Joint Separator |
|  | J 43631 Ball Joint Separator Tool |

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Fig. 22: Special Tools

Courtesy of GENERAL MOTORS CORP.