

SECTION : 2C

FRONT SUSPENSION

CAUTION : *Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.*

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SPECIFICATIONS

GENERAL SPECIFICATIONS

Application	Trim Height
Center of Front Wheel to Bottom of Front Wheel Well	368 mm (14.4 in.)
Center of Rear Wheel to Bottom of Rear Wheel Well	367 mm (14.4 in.)

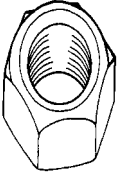
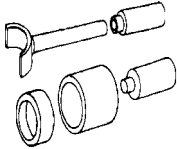
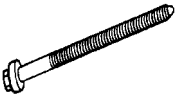
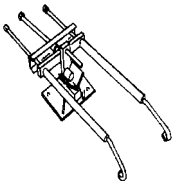
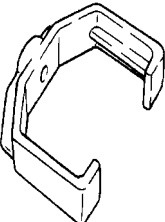
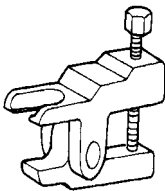
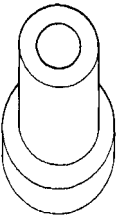
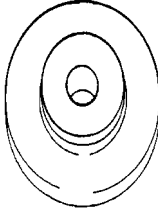
* CONDITION : Full Fuel in the Tank

FASTENER TIGHTENING SPECIFICATIONS

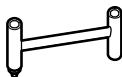
Application	N•m	Lb-Ft	Lb-In
Ball Joint Pinch Bolt Nut	60	44	–
Ball Joint-to-Control Arm Nuts	100	74	–
Front Control Arm-to-Crossmember Bolt	125	92	–
Rear Control Arm-to-Crossmember Bolt	110	81	–
Crossmember Link-to-Crossmember Bolt	114	84	–
Crossmember Link-to-Transaxle Bracket Nut	169	125	–
Drive Axle-to-Hub Caulking Nut	300	221	–
Front Crossmember-to-Body Bolts	130	96	–
Piston Rod Nut	75	55	–
Rear Crossmember-to-Body Bolts	196	145	–
Stabilizer Link-to-Strut Assembly Nut	47	35	–
Stabilizer Shaft-to-Crossmember Clamp Bolts	25	18	–
Stabilizer Shaft-to-Stabilizer Link Nut	47	35	–
Steering Knuckle-to-Strut Assembly Nuts/Bolts	120	89	–
Strut Assembly-to-Body Nut	65	48	–

SPECIAL TOOLS

SPECIAL TOOLS TABLE

 50020	500-20 Hex Nut	 KM158	KM-158 Remover/Installer
 J366612	J-36661-2 Forcing Screw	 KM329A	KM-329-A Spring Compressor
 J37105B1	J-37105-B-1 Support Bridge	 KM507B	KM-507-B Ball Joint Remover
 J37105B3	J-37105-B-3 Hub Adapter	 J37105B2	J-37105-B-2 Bearing Adapter

2C – 4 FRONT SUSPENSION

 J42468	J-42468 Front Strut Mount Nut Wrench
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DIAGNOSIS

STRUT DAMPENER

A strut dampener is basically a shock absorber. However, strut dampeners are easier to extend and retract by hand than are shock absorbers.

Struts Seem Weak

Checks	Action
Check the tire pressures.	Adjust the tire pressures to the specifications on the tire placard.
Check the load conditions under which the vehicle is normally driven.	Consult with the owner to confirm the owner's understanding of normal load conditions.
Check the compression and rebound effectiveness of the strut dampener.	Quickly push down and then lift up on the corner of the bumper nearest the strut dampener being tested. Compare the compression and rebound with those of a similar vehicle that has an acceptable ride quality. Replace the strut dampener, if needed.

Struts Are Noisy

Checks	Action
Check the mountings for looseness or damage.	Tighten the strut dampener mounting nuts. Replace the strut dampener, if needed.
Check the compression and rebound effectiveness of the strut dampener.	Quickly push down and then lift up on the corner of the bumper nearest the strut dampener being tested. Compare the compression and rebound with those of a similar vehicle that has an acceptable ride quality. Replace the strut dampener, if needed.

Leaks

Checks	Action
Check for a slight trace of fluid.	The strut dampener is OK.
Check the integrity of the seal cover on the fully extended strut.	Replace the strut dampener.
Check for an excessive amount of fluid on the strut dampener.	Replace the strut dampener.

BALL JOINT AND KNUCKLE

Ball Joint Inspection

1. Raise the front of the vehicle to allow the front suspension to hang free.
2. Grasp the tire at the top and the bottom.
3. Move the top of the tire in an in-and-out motion.
4. Look for any horizontal movement of the knuckle relative to the control arm.
5. Ball joints must be replaced under the following conditions:
 - The joint is loose.
 - The ball seal is cut.
 - The ball stud is disconnected from the knuckle.
 - The ball stud is loose at the knuckle.
 - The ball stud can be twisted in its socket with finger pressure.

Ball Stud Inspection

Make sure to check the tightness of the ball stud in the knuckle boss during each inspection of the ball joint. One way to inspect the ball stud for wear is to shake the wheel and feel for movement of the stud end at the knuckle boss.

Another way to inspect the ball stud for wear is to check the fastener torque at the pinch nut. A loose nut can indicate a stressed stud or a hole in the knuckle boss.

Worn or damaged ball joints and knuckles must be replaced.

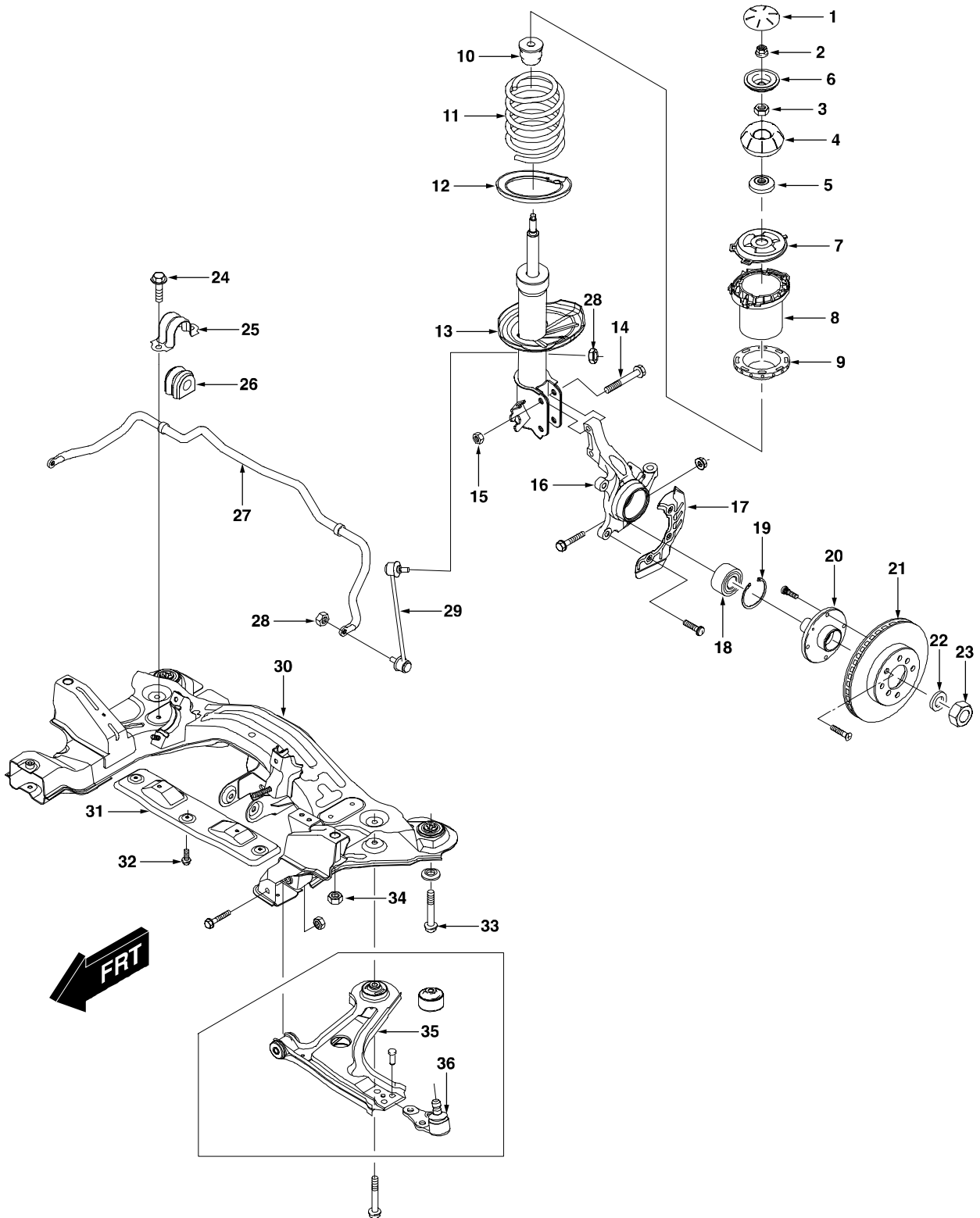
EXCESSIVE FRICTION CHECK

Use the following procedure to check for excessive friction in the front suspension:

1. Enlist the help of another technician to lift up on the front bumper, raising the vehicle as high as possible.
2. Slowly release the bumper, allowing the vehicle to assume its normal trim height. See "General Specifications" in this section.
3. Measure the distance from the street level to the center of the bumper.
4. Push down on the bumper, release slowly, and allow the vehicle to assume its normal trim height.
5. Measure the distance from the street level to the center of the bumper.
6. The difference between the two measurements should be less than 12.7 mm (0.5 inch). If the difference exceeds this limit, inspect the control arms, the struts, and the ball joints for damage or wear.

COMPONENT LOCATOR

FRONT SUSPENSION

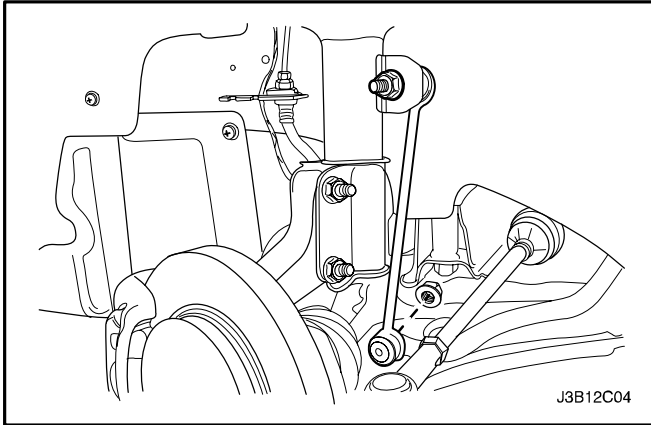


2C – 8 FRONT SUSPENSION

- | | |
|--|----------------------------------|
| 1. Cap | 19. Outer Snap Ring |
| 2. Strut Upper Nut | 20. Front Hub |
| 3. Piston Rod Nut | 21. Front Brake Disc |
| 4. Strut Mount | 22. Washer |
| 5. Strut Bearing | 23. Caulking Nut |
| 6. Washer | 24. Stabilizer Clamp Bolt |
| 7. Upper Spring Seat | 25. Stabilizer Clamp |
| 8. Front Spring Locator | 26. Stabilizer Clamp Insulator |
| 9. Upper Spring Insulator | 27. Stabilizer |
| 10. Hollow Bumper | 28. Stabilizer Link Nut |
| 11. Front Coil Spring | 29. Stabilizer Link |
| 12. Lower Spring Insulator | 30. Front Suspension Crossmember |
| 13. Front Strut | 31. Crossmember Cover |
| 14. Steering Knuckle-to-Strut Assembly | 32. Crossmember Cover Bolt |
| 15. Nut | 33. Crossmember Bolt |
| 16. Steering Knuckle | 34. Crossmember Nut |
| 17. Brake Shield | 35. Control Arm |
| 18. Front Hub Bearing | 36. Ball Joint |

MAINTENANCE AND REPAIR

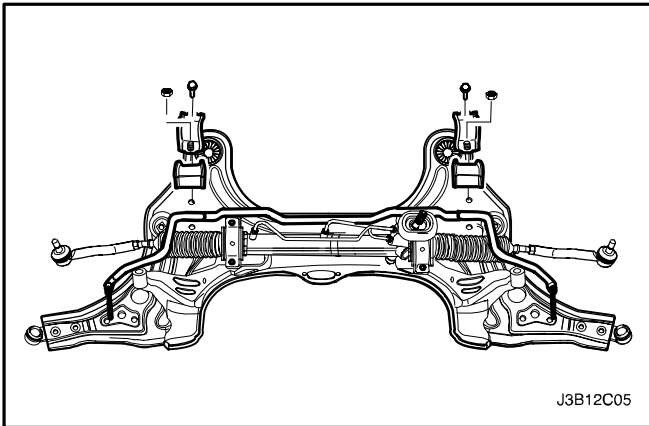
ON-VEHICLE SERVICE



STABILIZER SHAFT AND INSULATORS

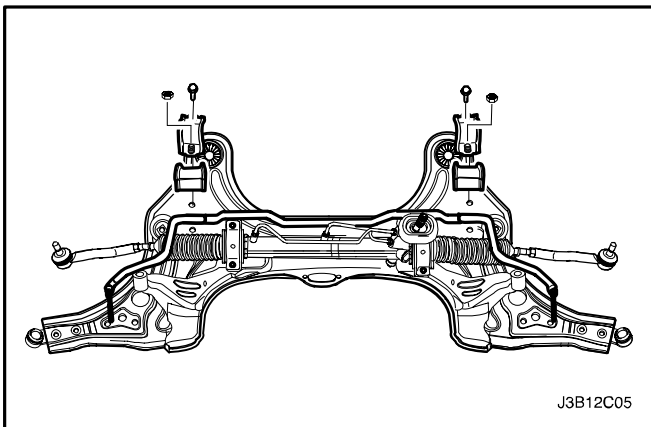
Removal Procedure

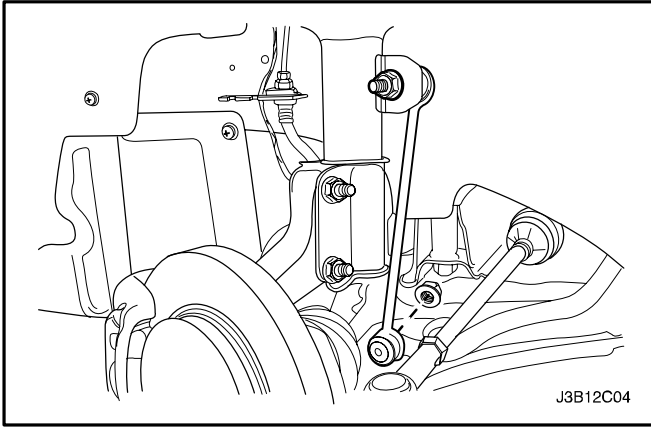
1. Raise and suitably support the vehicle.
2. Remove the stabilizer shaft-to-stabilizer link nut.
3. Remove the crossmember. Refer to "Crossmember Assembly" in this section.
4. Remove the stabilizer shaft-to-crossmember clamp bolts.
5. Remove the stabilizer shaft, the stabilizer shaft insulator clamp, and the insulators from the vehicle.



Installation Procedure

1. Install the stabilizer shaft.
2. Install the stabilizer shaft insulator clamps, the stabilizer shaft clamp bolt, and the insulators onto the crossmember. Do not tighten the bolt.



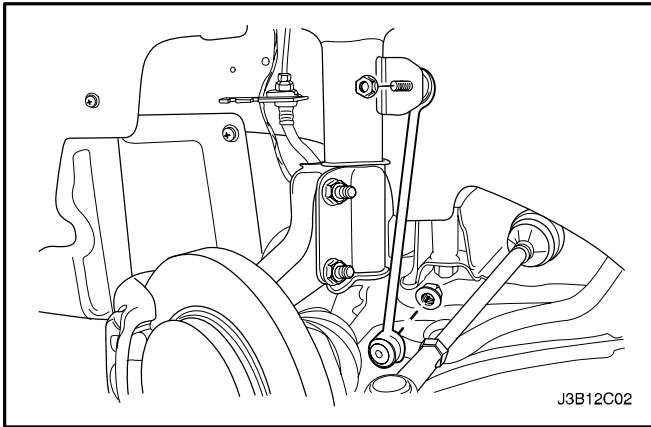


3. Install the stabilizer link onto the stabilizer shaft and connect them with the stabilizer shaft-to-stabilizer link nut.

Tighten

- Tighten the stabilizer shaft-to-stabilizer link nut to 47 N•m (35 lb–ft).
- Tighten the stabilizer shaft-to-crossmember clamp bolts to 25 N•m (18 lb–ft).

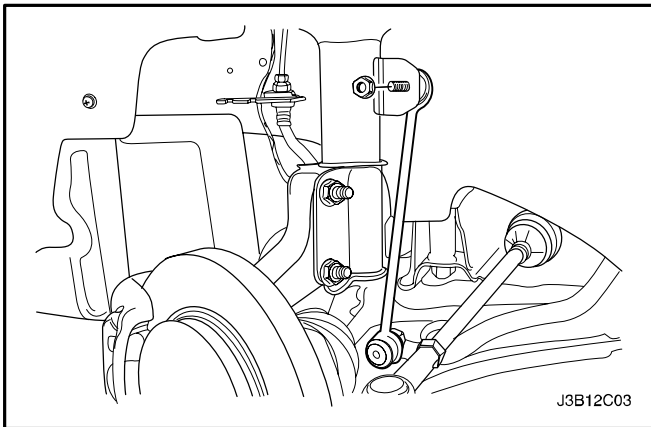
4. Install the front wheels. Refer to *Section 2E, Tires and Wheels*.



STABILIZER LINK

Removal Procedure

1. Remove the stabilizer shaft-to-stabilizer link nut.
2. Remove the stabilizer link-to-strut assembly nut.
3. Remove the stabilizer link.



Installation Procedure

1. Install the stabilizer link.
2. Install the stabilizer link-to-strut assembly nut.

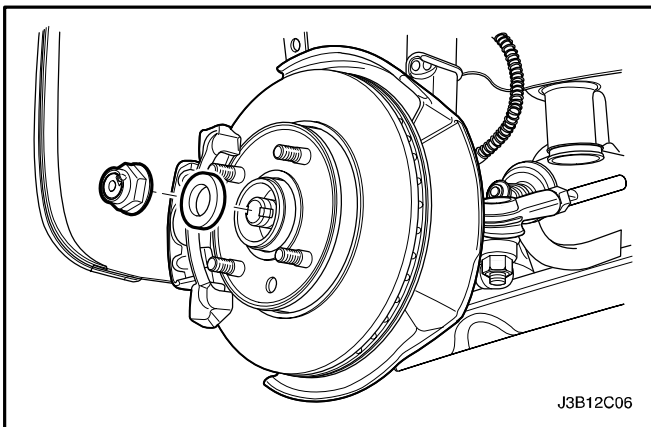
Tighten

Tighten the stabilizer link-to-strut assembly nut to 47 N•m (35 lb–ft).

3. Install the stabilizer shaft-to-stabilizer link nut.

Tighten

Tighten the stabilizer shaft-to-stabilizer link nut to 47 N•m (35 lb–ft).



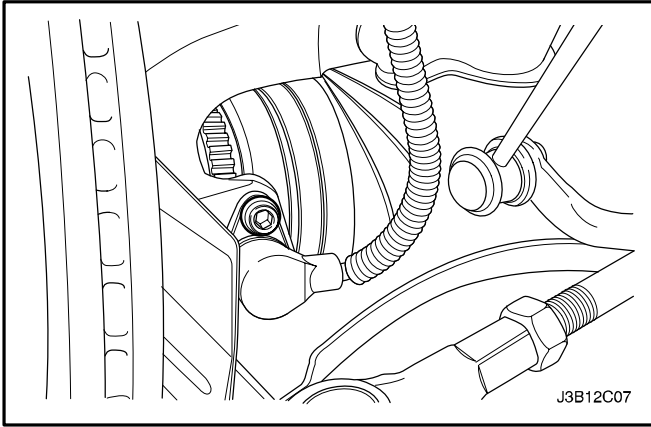
KNUCKLE ASSEMBLY

Tools Required

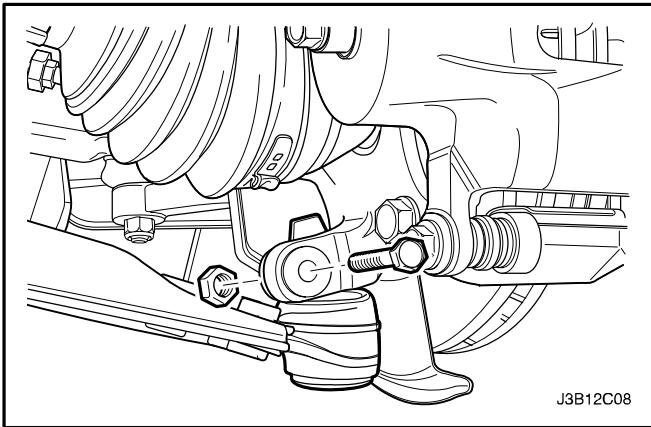
KM-507-B Ball Joint Remover

Removal Procedure

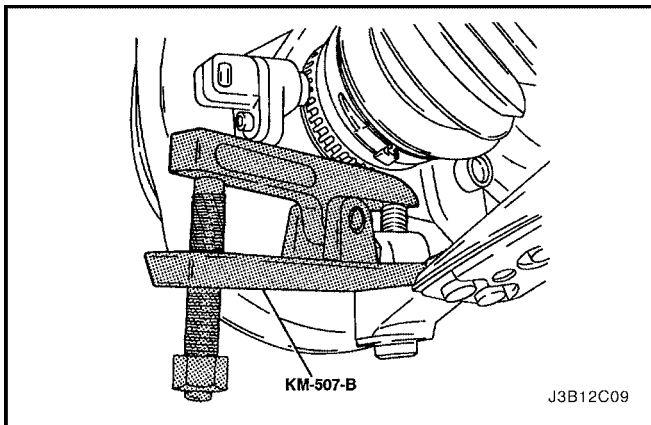
1. Raise and suitably support the vehicle.
2. Remove the wheel. Refer to *Section 2E, Tires and Wheels*.
3. Remove the caulking nut from the axle shaft.



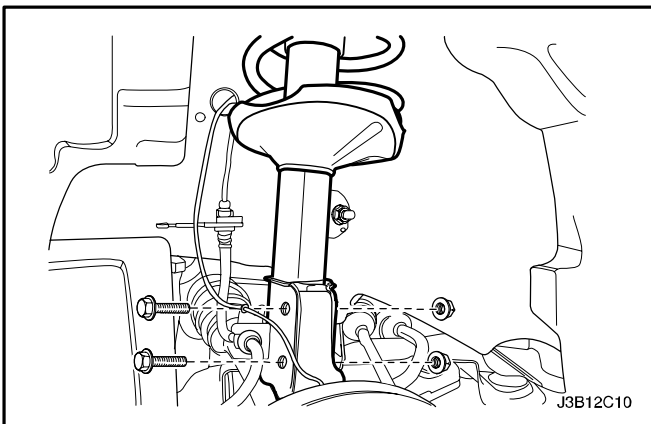
4. Remove the brake caliper from the rotor. Support the caliper so it does not hang from the hydraulic brake hose. Refer to *Section 4D, Front Disc Brakes*.
5. Remove the outer tie rod from the knuckle assembly. Refer to *Section 6C, Power Steering Gear*.
6. On vehicles equipped with the antilock braking system (ABS), disconnect the ABS speed sensor electrical connection from the knuckle.



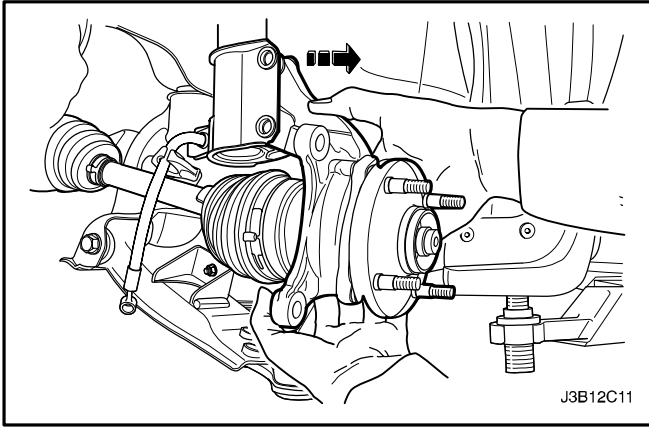
7. Remove the ball joint pinch bolt and the nut.



8. Separate the knuckle from the ball joint using the ball joint remover KM-507-B.

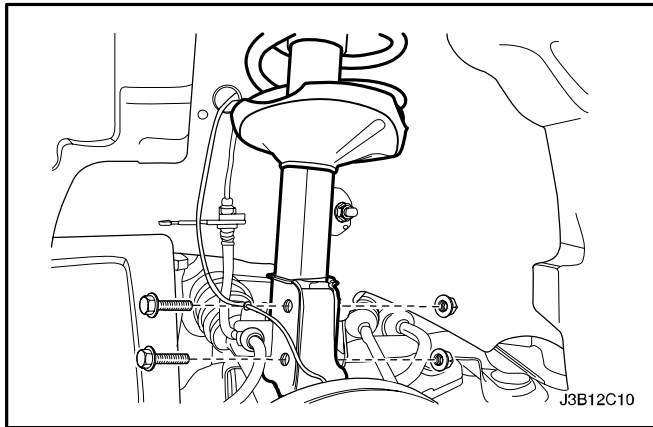


9. Remove the nuts from the bolts that connect the knuckle assembly to the strut assembly.



Notice : Do not over extend the axle joints. When either end of the shaft is disconnected, overextension of the joint can result in separation of internal components and possible joint failure. Use drive axle joint seal protectors whenever performing service on or near the drive axles. Failure to do so can cause internal joint or seal damage and result in possible joint failure.

10. Support the drive axle.
11. Separate the drive axle shaft from the wheel hub.
12. Remove the bolts that connect the knuckle assembly to the strut assembly.
13. Remove the knuckle assembly from the vehicle.



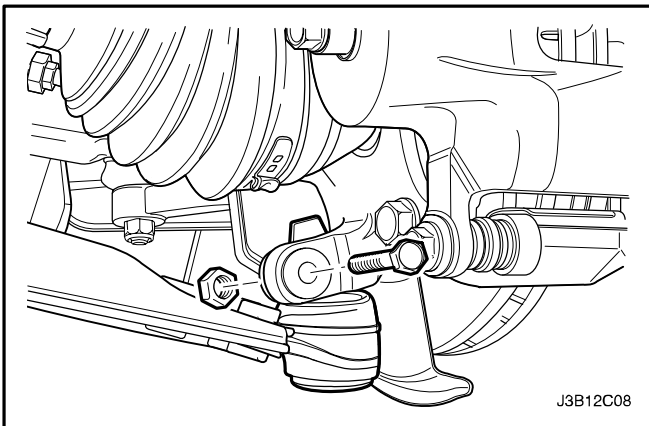
Installation Procedure

1. Install the knuckle assembly onto the vehicle.
2. Install the steering knuckle-to-strut assembly nuts.

Tighten

Tighten the steering knuckle-to-strut assembly nuts to 120 N•m (89 lb–ft).

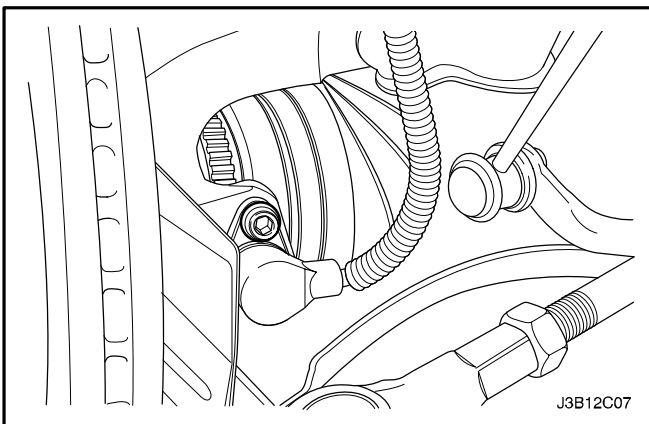
3. Connect the drive axle to the front wheel hub.



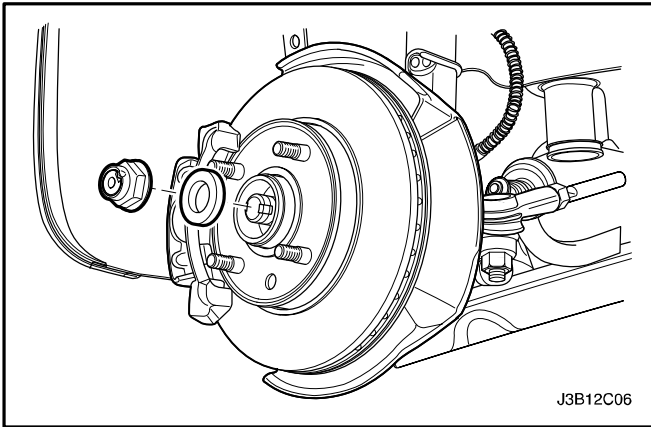
4. Connect the ball joint to the knuckle assembly.
5. Install the ball joint pinch bolt and the nut.

Tighten

Tighten the ball joint pinch bolt nut to 60 N•m (44 lb–ft).



6. Connect the ABS speed sensor electrical connection.

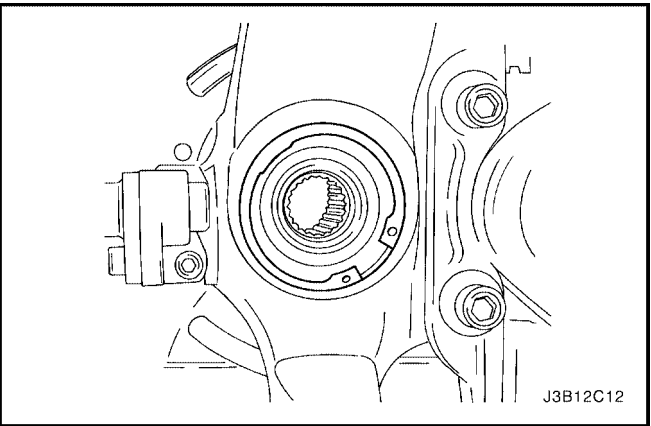


7. Connect the outer tie rod to the knuckle assembly. Refer to *Section 6C, Power Steering Gear*.
8. Install the brake caliper onto the rotor. Refer to *Section 4D, Front Disc Brakes*.
9. Install the caulking nut onto the axle shaft.

Tighten

Tighten the drive axle-to-hub caulking nut to 150 N•m (111 lb-ft). Loosen the nut, then retighten it to 275 N•m (126 lb-ft).

10. Install the wheel. Refer to *Section 2E, Tires and Wheels*.
11. Lower the vehicle.



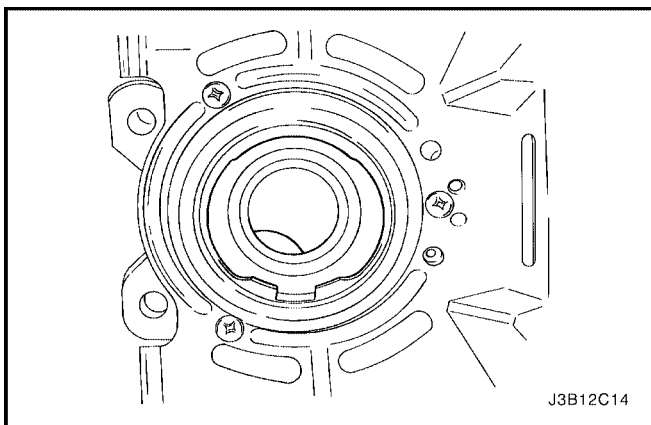
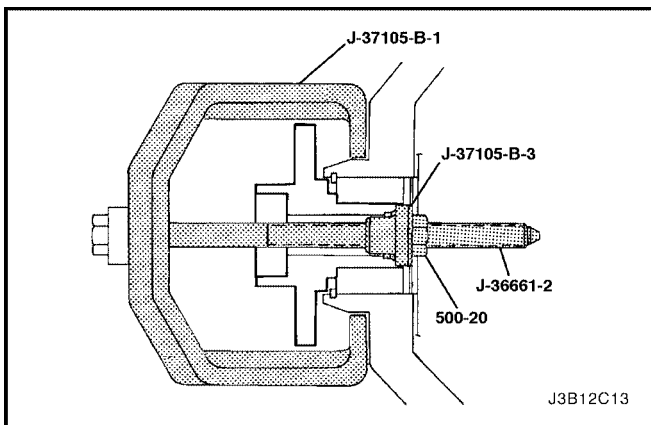
HUB AND BEARING

Tools Required

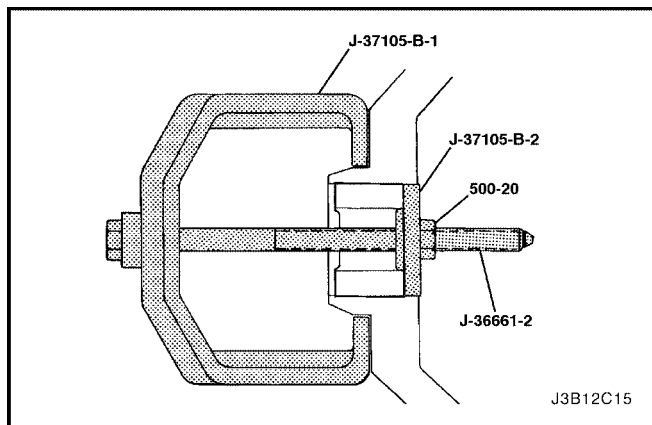
500–20 Hex Nut
 J–36661–2 Forcing Screw
 J–37105–B–1 Support Bridge
 J–37105–B–2 Bearing Adapter
 J–377105–B–3 Hub Adapter

Removal Procedure

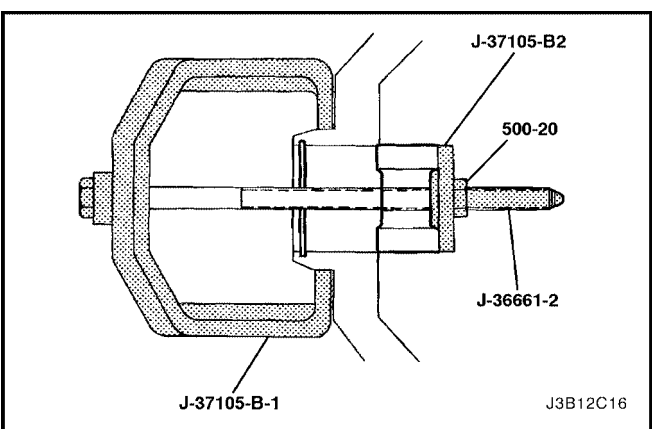
1. Remove the drive axle from the front wheel hub. Refer to "Knuckle Assembly" in this section.
2. Remove the inner snap ring.
3. Remove the wheel hub with the support bridge J–37105–B–1, the hub adapter J–377105–B–3, the hex nut 500–20, and the forcing screw J–36661–2.



4. Remove the brake shield. Refer to *Section 4D, Front Disc Brakes*.
5. Remove the outer snap ring.

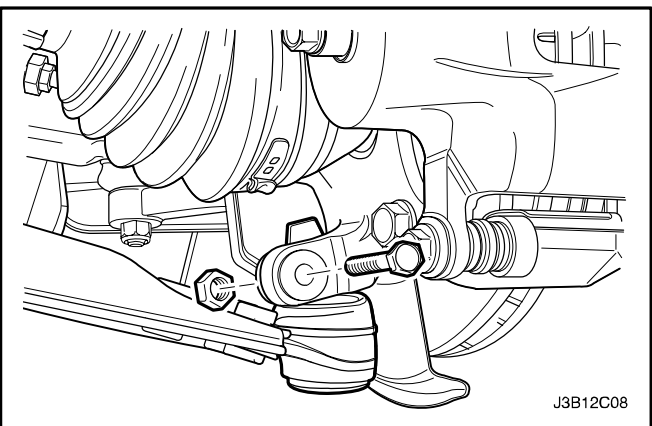
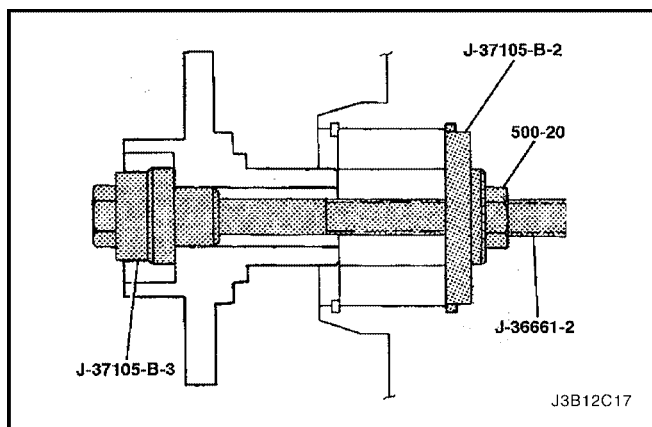


6. Remove the wheel bearing with the support bridge J-37105-B-1, the bearing adapter J-37105-B-2, the hex nut 500-20, and the forcing screw J-36661-2.
7. Clean the bore of the knuckle.



Installation Procedure

1. Install the outer snap ring and push the wheel bearing into place with the support bridge J-37105-B-1, the bearing adapter J-37105-B-2, the hex nut 500-20, and the forcing screw J-36661-2.
2. Install the brake shield. Refer to *Section 4D, Front Disc Brakes*.
3. Install the inner snap ring.
4. Push the wheel hub into place with the hub adapter J-37105-B-3, the bearing adapter J-37105-B-2, the hex nut 500-20, and the forcing screw J-36661-2.
5. Install the drive axle into the front wheel hub. Refer to *Knuckle/Strut Assembly* in this section.



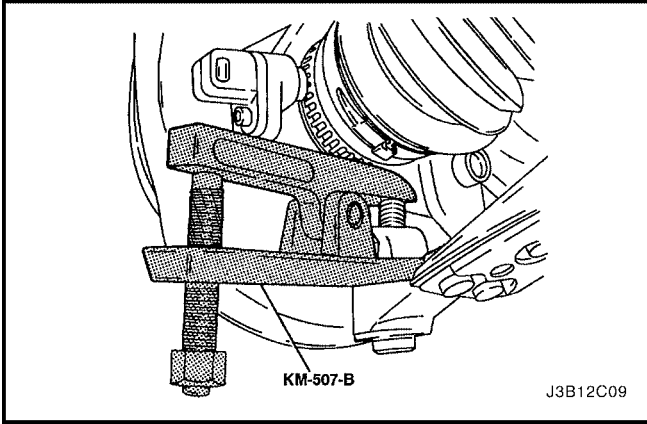
CONTROL ARM

Tools Required

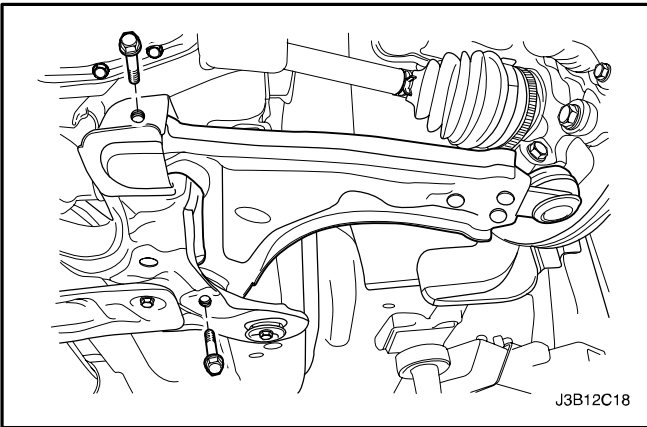
KM-507-B Ball Joint Remover

Removal Procedure

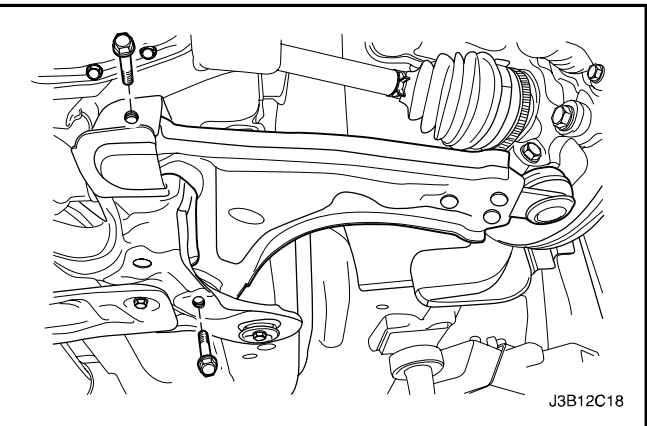
1. Raise and suitably support the vehicle. Let the control arms hang free.
2. Remove the wheel. Refer to *Section 2E, Tires and Wheels*.
3. Remove the pinch bolt and the nut from the ball joint.
4. In case of right-hand side, remove the engine mounting.



5. Disconnect the ball joint from the knuckle assembly using the ball joint remover KM-507-B.

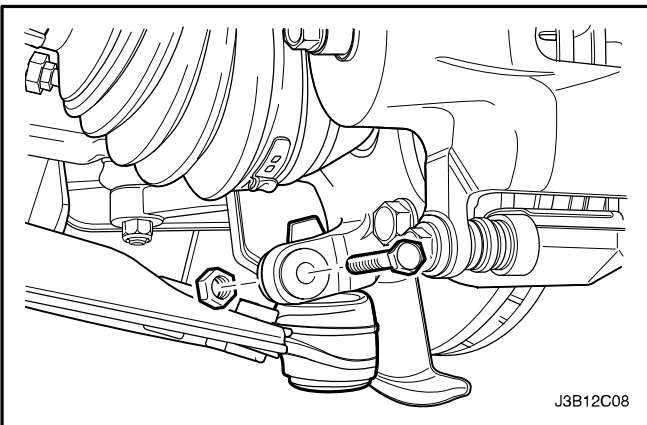


6. Remove the control arm-to-crossmember bolts.
7. Remove the control arm from the vehicle.



Installation Procedure

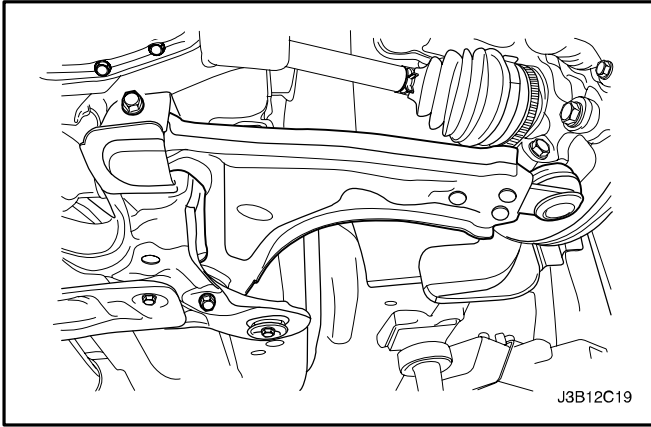
1. Install the control arm.
2. Install the control arm-to-crossmember bolts. Do not tighten the bolts.



3. Connect the ball joint to the steering knuckle.
4. Install the ball joint pinch bolt and the nut.

Tighten

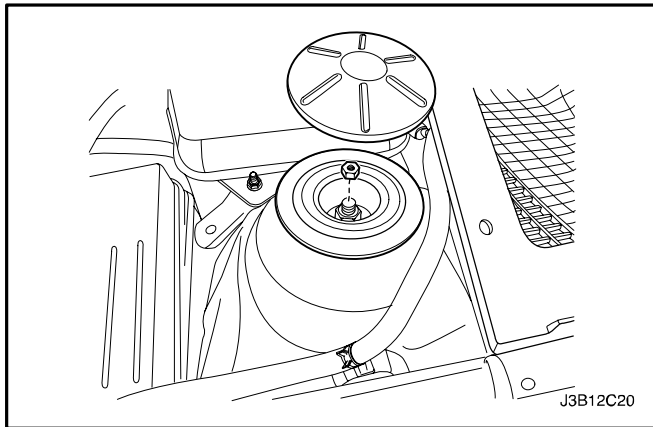
Tighten the ball joint pinch bolt nut to 60 N•m (44 lb-ft).



5. Install the control arm-to-crossmember bolts.

Tighten

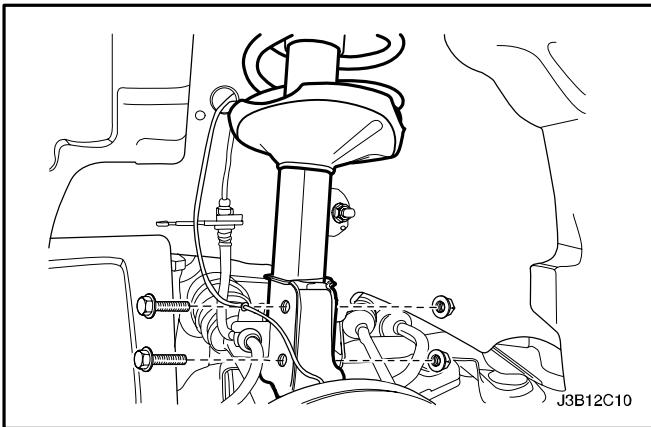
- Tighten the front control arm-to-crossmember bolt to 125 N•m (92 lb-ft).
 - Tighten the rear control arm-to-crossmember bolt to 110 N•m (81 lb-ft).
6. Install the wheel. Refer to *Section 2E, Tires and Wheels*.
 7. Lower the vehicle.



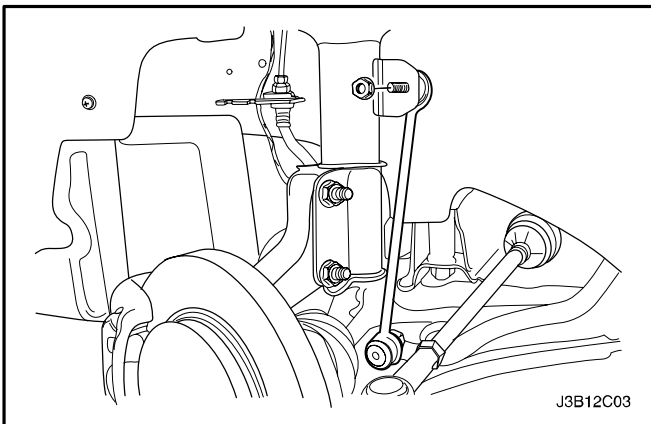
STRUT ASSEMBLY

Removal Procedure

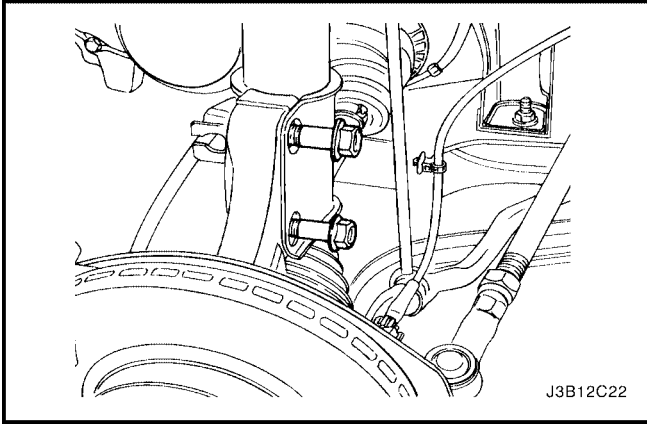
1. Remove the strut upper cap and nut.



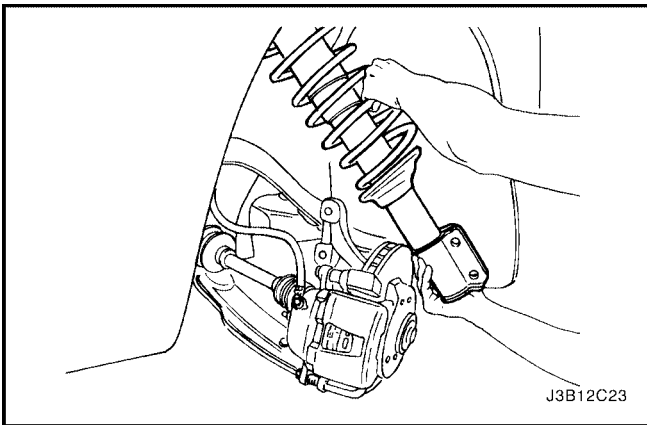
2. Raise and suitably support the vehicle.
3. Remove the wheel. Refer to *Section 2E, Tires and Wheels*.
4. On vehicles equipped with an antilock braking system (ABS), disconnect the ABS sensor line from the strut assembly.
5. Remove the brake line from the securing bracket on the strut assembly.



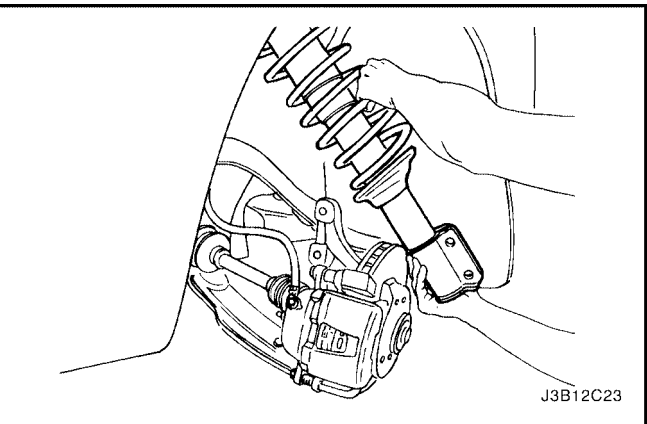
6. Disconnect the stabilizer shaft link by removing the stabilizer link-to-strut assembly nut.



7. Disconnect the steering knuckle by removing the steering knuckle-to-strut assembly nuts and the bolts.

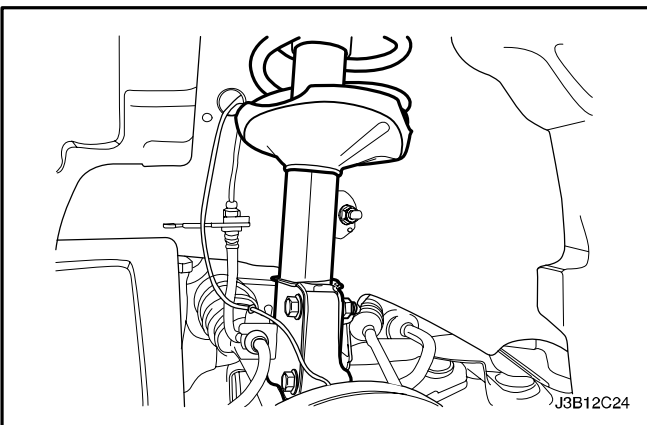


8. Remove the strut assembly.



Installation Procedure

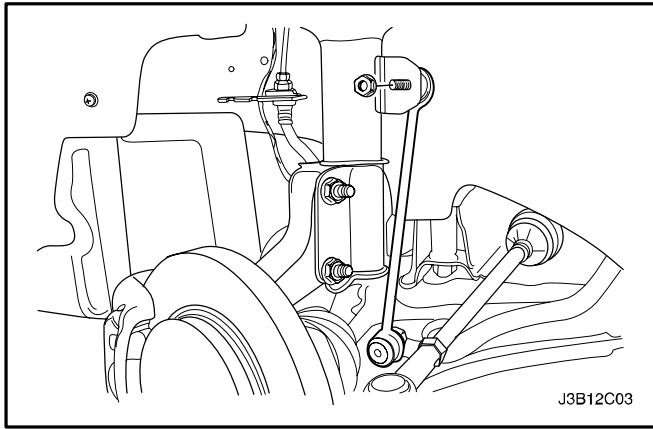
1. Install the strut assembly.



2. Connect the strut assembly to the steering knuckle by installing the steering knuckle-to-strut assembly nuts and the bolts.

Tighten

Tighten the steering knuckle-to-strut assembly nuts and the bolts to 120 N•m (89 lb-ft).

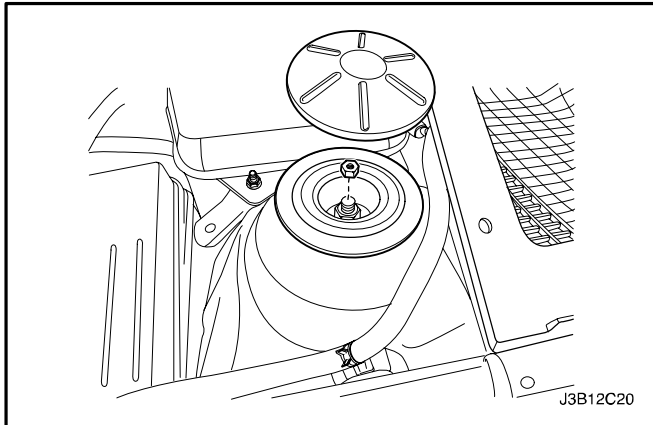


3. Connect the stabilizer shaft link to the strut assembly by attaching the stabilizer link-to-strut assembly nut.

Tighten

Tighten the stabilizer link-to-strut assembly nut to 47 N•m (35 lb-ft).

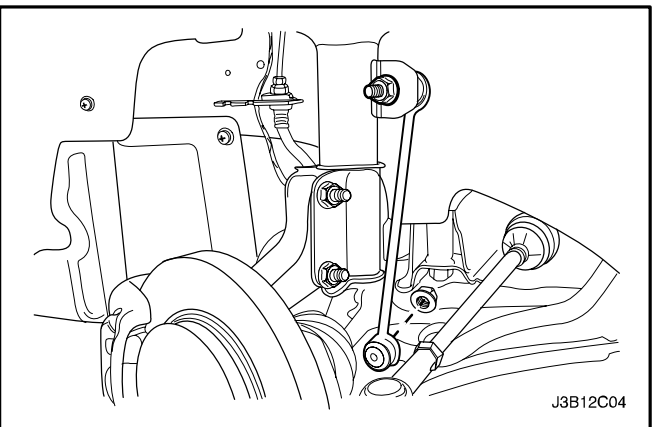
4. Install the brake line to the securing bracket on the strut assembly.
5. On vehicles equipped with the ABS, connect the ABS sensor line to the strut assembly.



6. Install the wheel. Refer to *Section 2E, Tires and Wheels*.
7. Lower the vehicle.
8. Install the nuts securing the strut assembly to the body of the vehicle.

Tighten

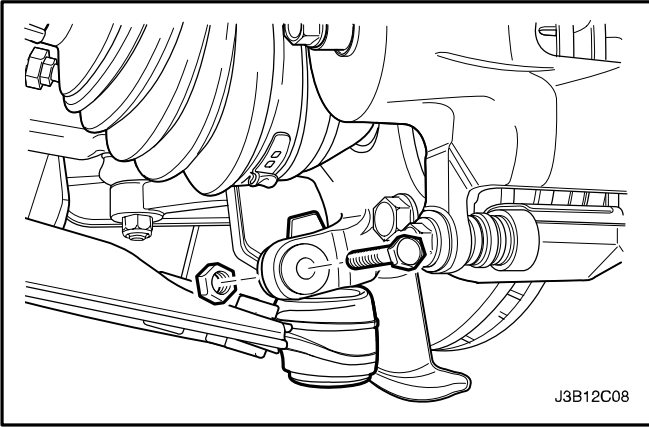
Tighten the strut assembly-to-body nuts to 65 N•m (48 lb-ft).



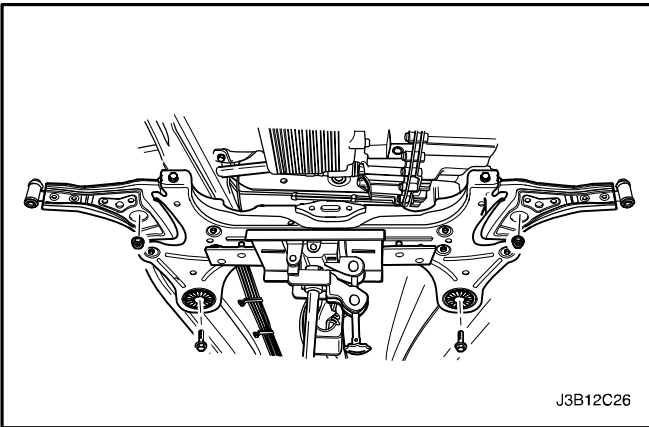
CROSSMEMBER ASSEMBLY

Removal Procedure

1. Raise and suitably support the vehicle.
2. Remove the wheels. Refer to *Section 2E, Tires and Wheels*.
3. Remove the nuts and bolts from the steering gear mounting bracket.
4. Remove the return line bolt from the clip on the crossmember.
5. Remove the exhaust pipe forward of the catalytic converter. Refer to *Section 1G, Engine Exhaust*.
6. Disconnect the tie rod from the knuckle assembly. Refer to *Section 6C, Power Steering Gear*.
7. Disconnect the ball joint from the knuckle assembly. Refer to "Knuckle Assembly" in this section.
8. Disconnect the stabilizer link from the strut assembly. Refer to "Stabilizer Link" in this section.
9. Remove the crossmember link-to-transaxle bracket nut.
 - 1) Remove the right lower engine mount.
 - 2) Remove the rear transmission mount bracket.

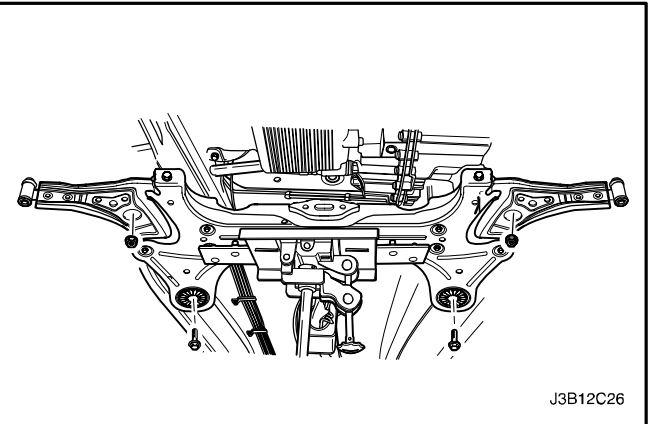


10. Remove the rear crossmember-to-body bolts.



CAUTION : Two technicians must hold the front crossmember assembly and suitably support the assembly with a jack stand during removal of the front attachment bolts. Failure to support the front crossmember properly can result in personal injury.

11. Remove the front crossmember-to-body bolts.
12. Remove the crossmember assembly from the vehicle.



Installation Procedure

1. Install the crossmember assembly.
2. Install the rear crossmember-to-body bolts.

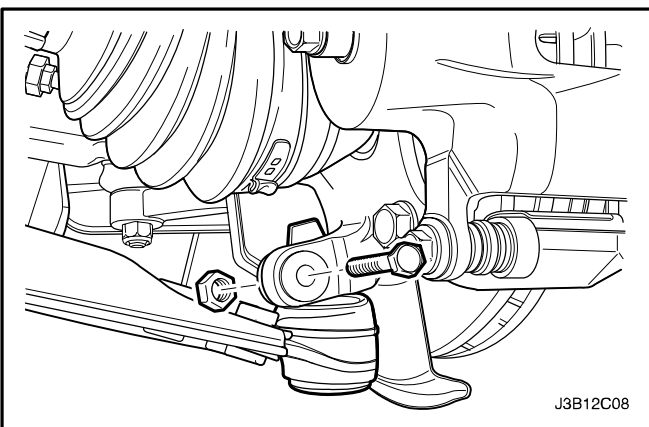
Tighten

Tighten the rear crossmember-to-body bolts to 196 N•m (145 lb-ft).

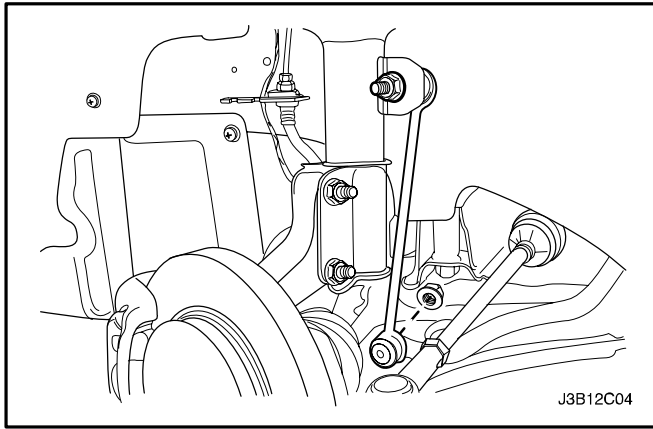
3. Install the front crossmember-to-body bolts.

Tighten

Tighten the front crossmember-to-body bolts to 130 N•m (96 lb-ft).



4. Install the bolts and nuts on the steering gear mounting brackets.
5. Install the return line bolt into the clip on the crossmember. Refer to Section 6C, Power Steering Gear.



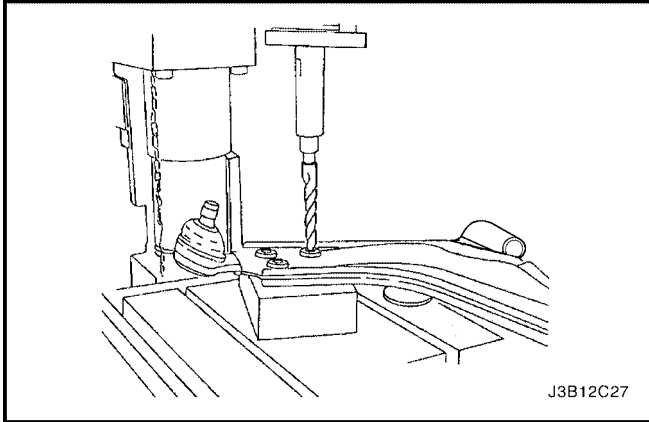
6. Install the crossmember link-to-transaxle bracket nut.

Tighten

Tighten the crossmember link-to-transaxle bracket nut to 169 N•m (125 lb–ft).

7. Connect the stabilizer link to the strut assembly. Refer to "Stabilizer Link" in this section.
8. Connect the ball joint to the knuckle assembly. Refer to "Knuckle Assembly" in this section.
9. Connect the tie rod from the knuckle assembly. Refer to *Section 6C, Power Steering Gear*.
10. Install the exhaust pipe into the vehicle. Refer to *Section 1G, Engine Exhaust*.
11. Install the wheels. Refer to *Section 2E, Tires and Wheels*.
12. Lower the vehicle.

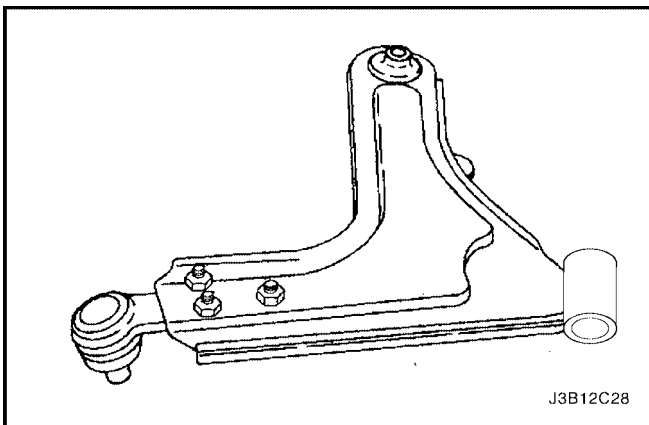
UNIT REPAIR



BALL JOINT

Disassembly Procedure

1. Remove the control arm. Refer to "Control Arm" in this section.
2. Drill off the heads of the two rivets with a 12 mm (0.47 inch) drill bit.
3. Punch out the rivets with a drift.



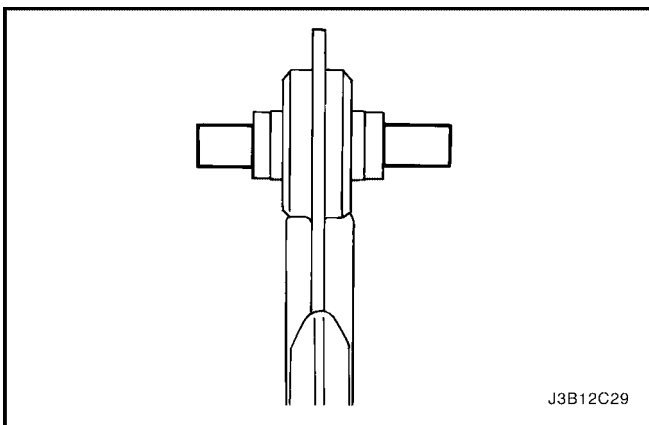
Assembly Procedure

1. Connect the ball joint to the control arm by inserting two ball joint bolts from below the control arm.

Tighten

Tighten the ball joint-to-control arm nuts to 100 N•m (74 lb-ft).

2. Install the control arm. Refer to "Control Arm" in this section.



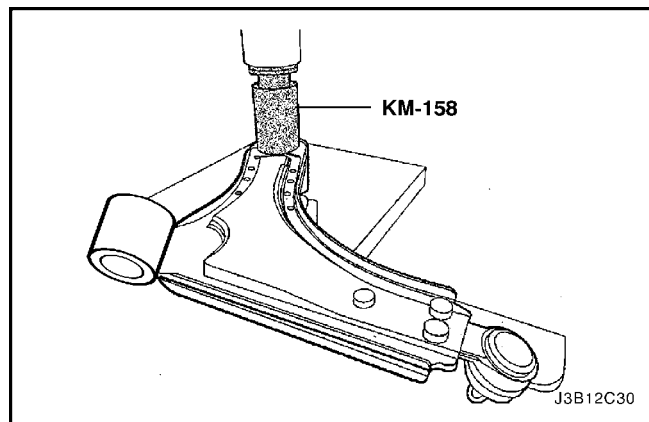
CONTROL ARM BUSHINGS

Tools Required

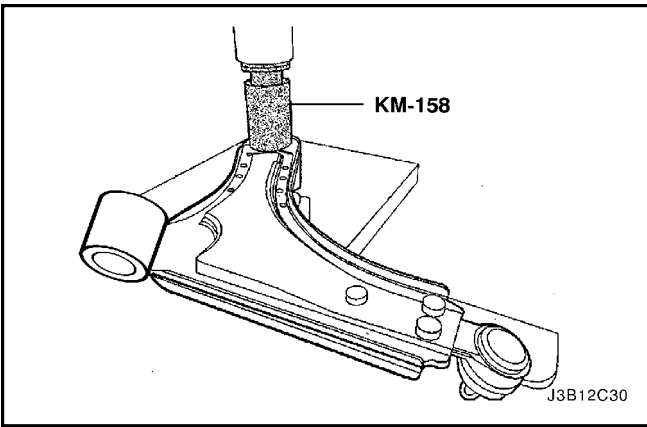
KM-158 Remover/Installer

Disassembly Procedure

1. Remove the control arm. Refer to "Control Arm" in this section.
2. Remove the split sleeves from the rear control arm bushing.

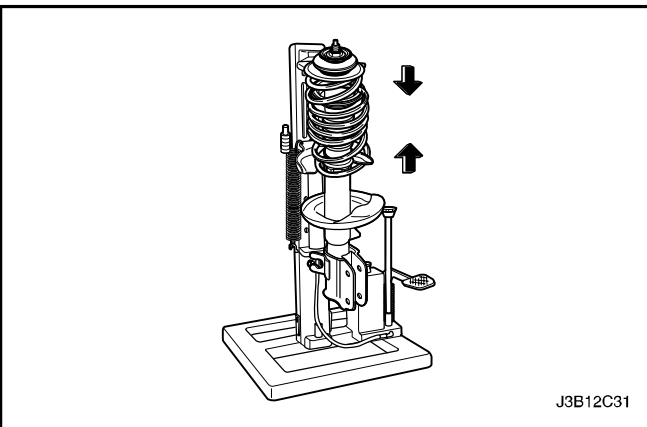
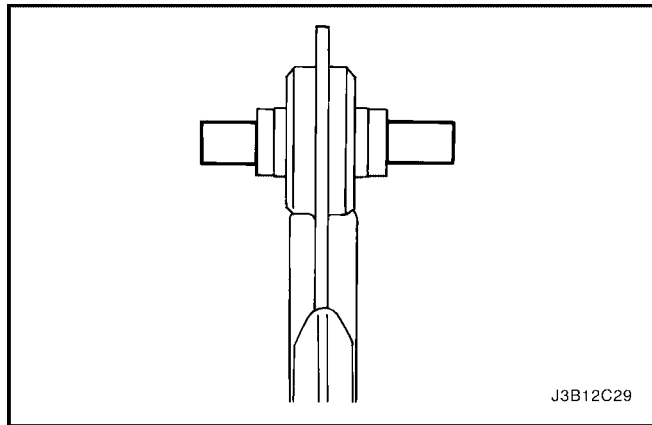


3. Press off the control arm rear damping bushing using a press and the remover/installer KM-158.



Assembly Procedure

1. Press the control arm rear damping bushing into the control arm using a press and the remover/installer KM-158.
2. Install the split sleeves into the rear control arm bushing.
3. Install the control arm. Refer to "Control Arm" in this section.



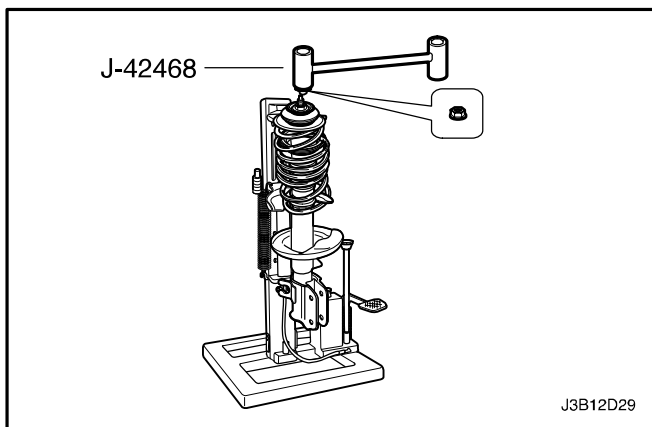
FRONT STRUT ASSEMBLY

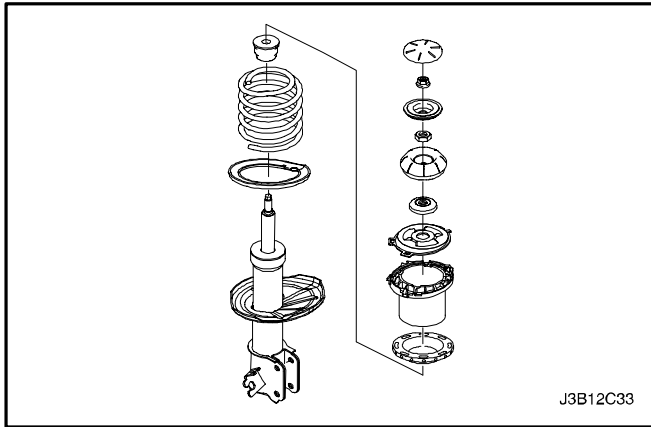
Tools Required

KM-329-A Spring Compressor
J-42468 Front Strut Mount Nut Wrench

Disassembly Procedure

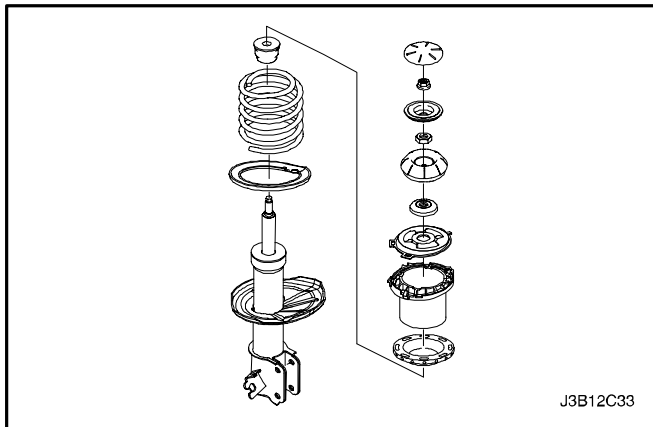
1. Remove the strut assembly. Refer to "Strut Assembly" in this section.
2. Fasten the strut assembly to the spring compressor (DW320-010 or KM-329-A). Make sure the hooks are seated on the strut spring properly.
3. Compress the front spring with the spring compressor.
4. Use an open end wrench to hold the threaded piston rod while removing the piston rod nut and the washer with a commercially available double ring spanner, sharply offset.





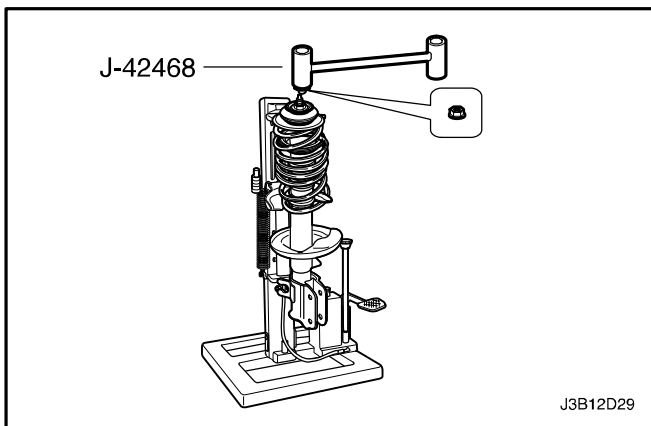
Important : Record the position of the front spring locator relative to the strut assembly-to-knuckle bracket. Place the front spring locator back in the same position during assembly.

5. Remove the upper strut mount, the mount bearing, the upper spring seat, the upper ring insulator, and the hollow bumper.
6. Release the spring.
7. Remove the spring and the lower ring insulator.



Assembly Procedure

1. Install the lower ring insulator and the spring.
2. Compress the spring using the spring compressor KM-329-A.
3. Install the hollow bumper, the upper ring insulator, the front spring locator, the upper spring seat, the upper strut mount, and the mount bearing. Be sure the upper spring seat is clipped to the front spring locator.



4. Install the piston rod nut.

Tighten

Tighten the piston rod nut to 75 N•m (55 lb-ft).

5. Release the spring compressor KM-329-A

KNUCKLE

Disassembly Procedure

1. Remove the knuckle assembly from the vehicle. Refer to "Knuckle Assembly" in this section.
2. Remove the rotor. Refer to *Section 4D, Front Disc Brakes*.
3. Remove the hub and bearing assembly. Refer to "Hub and Bearing" in this section.
4. Remove the brake splash shield. Refer to *Section 4D, Front Disc Brakes*.

Assembly Procedure

1. Install the brake splash shield. Refer to *Section 4D, Front Disc Brakes*.
2. Install the hub and bearing assembly. Refer to "Hub and Bearing" in this section.
3. Install the rotor. Refer to *Section 4D, Front Disc Brakes*.
4. Install the knuckle assembly onto the vehicle. Refer to "Knuckle Assembly" in this section.

GENERAL DESCRIPTION AND SYSTEM OPERATION

FRONT SUSPENSION

The front suspension for this vehicle is a combination of a strut assembly and a knuckle assembly. The strut assembly combines a strut dampener and spring mounted to the body of the vehicle. The upper end of the strut is isolated by a rubber mount and contains a bearing to allow the strut to turn. The knuckle is attached to the strut assembly and pivots on a ball joint bolted to the control arm. The control arms pivot from the body using rubber bushings.

The ball joint is fastened to the steering knuckle with a pinch bolt and nut, and to the lower control arm with rivets. The stabilizer bar interconnects both strut assemblies of

the vehicle through the stabilizer link and is attached to the front suspension crossmember. Jounce and rebound movements affecting one wheel are partially transmitted to the opposite wheel of the vehicle to stabilize body roll.

When servicing the control arm-to-body attachment and the stabilizer shaft-to-body insulators, make sure the attaching bolts are loose until the control arms are moved to the trim height, which is curb height. Trim height is the normal position to which the control arms move when the vehicle is sitting on the ground. Refer to "General Specifications" in this section.

The springs in the front suspension of engine family II are stronger and the strut dampeners heavier than are the springs and strut dampeners found in the front suspension of engine family I.