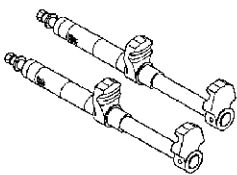
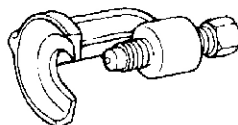


2004-05 SUSPENSION

Front Suspension - Sedona

GENERAL

SPECIAL SERVICE TOOLS

Tool (Number and Name)	Illustration	Use
OK2A1 341 AA1A Coil spring comp		Used to remove and install coil spring.
OK130 283 021 Ball joint puller		Used to remove tie rod and ball joint.

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Fig. 1: Illustrating Service Tools
Courtesy of KIA MOTORS AMERICA, INC.

SYMPTOM-RELATED DIAGNOSTIC PROCEDURE

SUSPENSION SYSTEM

2005 Kia Sedona EX

2004-05 SUSPENSION Front Suspension - Sedona

Problem	Possible cause	Action
Body rolls	Deteriorated stabilizer bar and stabilizer control links Worn or deteriorated stabilizer bar bushing Worn or deteriorated lower arm bushing Shock absorber malfunction	Replace Replace Replace Replace
Poor riding comfort	Weak coil spring Shock absorber malfunction	Replace Replace
Abnormal noise from suspension	Poor lubrication or wear of lower arm ball joint Shock absorber malfunction Worn or deteriorated stabilizer bar bushing Worn or deteriorated lower arm bushing	Replace, Lubricate Replace Replace Replace
Instable riding	Weak coil spring Shock absorber malfunction Worn or deteriorated lower arm bushing Worn or deteriorated stabilizer bar bushing Improperly adjusted wheel alignment Damaged lower arm ball joint Steering system malfunction Deformed or unbalanced wheel	Replace Replace Replace Replace Adjust Replace <i>Refer to section ST Gr.</i> <i>Refer to next page</i>
Heavy steering wheel operation	Poor lubrication or wear of lower arm ball joint Improperly adjusted wheel alignment Steering system malfunction Deformed or unbalanced wheel	Replace, Lubricate Adjust <i>Refer to section ST GR.</i> <i>Refer to next page</i>
Steering pulls to one side	Weak coil spring Worn or deteriorated stabilizer bar bushing Worn or deteriorated lower arm bushing Damaged lower arm ball joint Improperly adjusted wheel alignment Steering system malfunction Brake system malfunction Deformed or unbalanced wheel	Replace Replace Replace Replace Replace <i>Refer to section ST Gr.</i> <i>Refer to section BR Gr.</i> <i>Refer to next page</i>
Steering wheel vibrates	Damaged lower arm ball joint Shock absorber malfunction Loose shock absorber installation Worn or deteriorated lower arm bush Worn or deteriorated stabilizer bar bush Improperly adjusted wheel alignment Worn or damaged wheel bearing Steering system malfunction Deformed or unbalanced wheel	Replace Replace Tighten Replace Replace Adjust Replace <i>Refer to section ST Gr.</i> <i>Refer to next page</i>
Steering wheel does not return	Lower arm ball joint stuck or damaged Improperly adjusted wheel alignment Steering system malfunction Deformed or unbalanced wheel	Replace Adjust <i>Refer to section ST Gr.</i> <i>Refer to next page</i>

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Fig. 2: Diagnostic Procedure Chart
Courtesy of KIA MOTORS AMERICA, INC.

SPECIFICATIONS

SUSPENSION SYSTEM

Item				Specification
Front	Suspension type			Macpherson strut
	Shock absorber			Double-acting, Gas filled
	Stabilizer	Type		Torsion bar
		Diameter in (mm)		1.02 (ø26)
	Wheel alignment	Toe in (mm)	No passenger load	-0.04±0.1 (-0.9±2.5)
			Five passenger load	-0.01±0.1 (-0.3±2.5)
		Camber (degree)	No passenger load	0.51°±0.5°
			Five passengers load	0.26°±0.5°
		Caster (degree)	No passenger load	1.88°±0.5°
Five passengers load			1.94°±0.5°	
Rear	Suspension type			Five links & coil
	Shock absorber			Double-acting, Gas filled
	Stabilizer	Type		Torsion bar
		Diameter in (mm)		1.18 (ø30)

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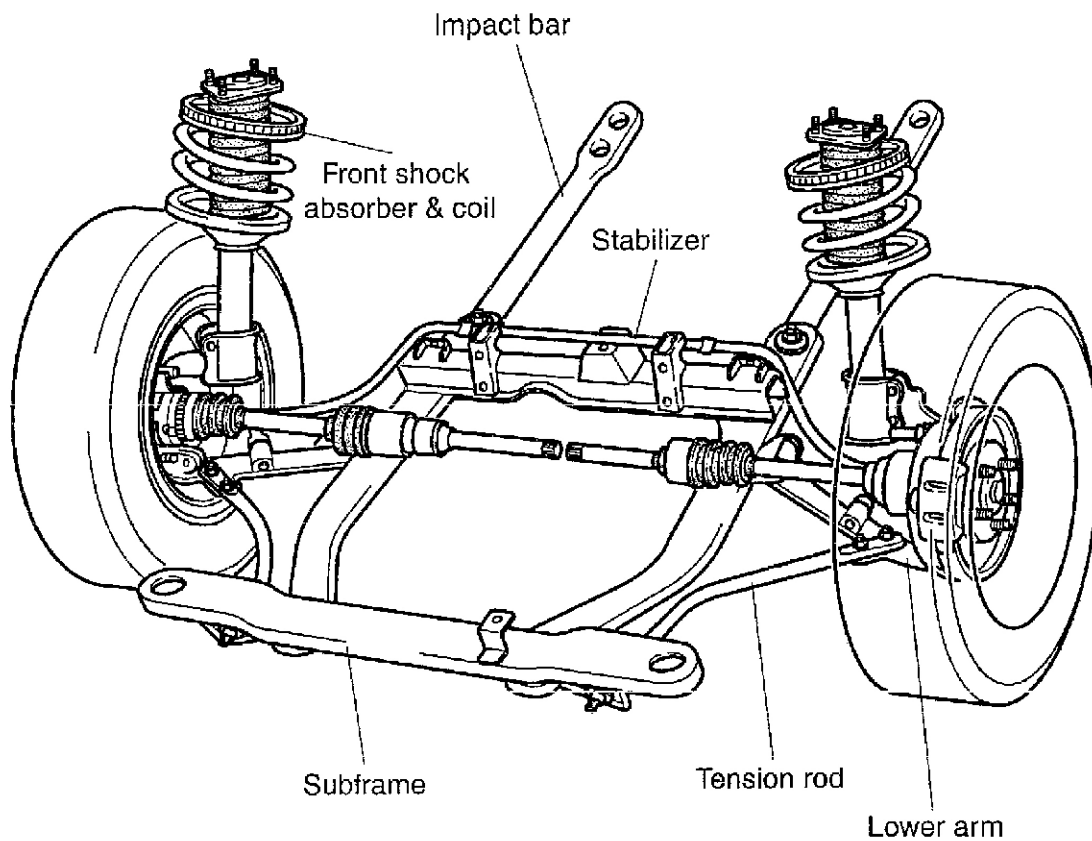
Fig. 3: Suspension System Specifications

Courtesy of KIA MOTORS AMERICA, INC.

FRONT SUSPENSION SYSTEM

COMPONENT

CAUTION: When tightening (by specified torque) the nuts of the arms and links of the front suspension system, the wheels of the vehicle shall be in contact with ground and under loads (2 passengers load at the front seats if possible).



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Fig. 4: Illustrating Front Suspension System Components
Courtesy of KIA MOTORS AMERICA, INC.

DESCRIPTION AND OPERATION

FRONT SUSPENSION DESCRIPTION

An independent MacPherson strut type front suspension is used on these vehicles. Vertical shock absorbing MacPherson struts attach to the top of the steering knuckle and to the front strut tower.

This interconnection between the steering knuckle and the body of the vehicle provides for the correct steering knuckle position. This steering knuckle position provides for the correct front caster and camber settings for the vehicle, at the time the vehicle is designed. Lower arms are attached inboard to the front suspension subframe and outboard to the bottom of the steering knuckle. Attachment of the lower arm to the steering knuckle is done through a ball joint in the lower arm. During steering maneuvers, the strut and the steering knuckle (through the ball joint and a pivot bearing in the strut's upper retainer) turn as an assembly.

SUSPENSION SUBFRAME

This vehicle uses one piece subframe for the front suspension. The subframe is used as the attaching points for the lower arm, stabilizer bar, tension rod and steering gear. The subframe is mounted to the body of the vehicle at four points.

STEERING KNUCKLE

The front suspension knuckle is not a repairable component of the vehicle front suspension. It must be replaced, if bent, broken or damaged in any way, do not attempt to straighten or repair the steering knuckle.

Service replacement of the front hub/bearing assembly can be done with the front steering knuckle remaining on the vehicle.

WHEEL ALIGNMENT

Wheel alignment is the proper adjustment of all the interrelated suspension angles affecting the running and steering of the front and rear wheels of the vehicle. There are six basic factors which are the foundation to front wheel alignment. There are vehicle height, caster, camber, toe-in, steering axis inclination and toe-out on turns of the six basic factors toe-in, camber, and caster are normally mechanically adjustable on this vehicle.

CAUTION: Do not attempt to modify any suspension or steering components to meet vehicle alignment specifications by heating and (or) bending.

Alignment checks and adjustment should be made in the following sequence:

- Camber.
- Toe.

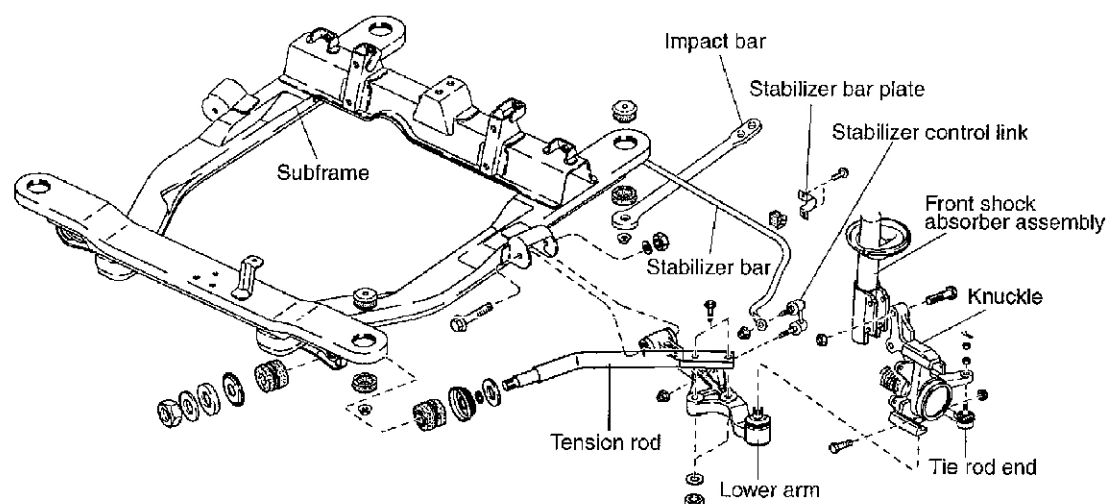
Camber is the number of degrees tilted inboard or outboard from a true vertical line when looking from front view. Inboard tilt is negative camber. Outboard tilt is positive camber. Excessive camber is a tire wear factor: negative camber causes wear on the inside of the tires tread surface, while positive camber causes wear to the outside of the tires tread surface.

Toe is measured in degree or inches (millimeters) and is the distance the front edges of the tires are closer (or farther apart) than the rear edges.

TENSION ROD

COMPONENT

CAUTION: When tightening (by specified torque) the nuts of the arm and links of the front suspension system, the wheels of the vehicle shall be in contact with ground and under loads (2 passengers load at the front seats if possible).



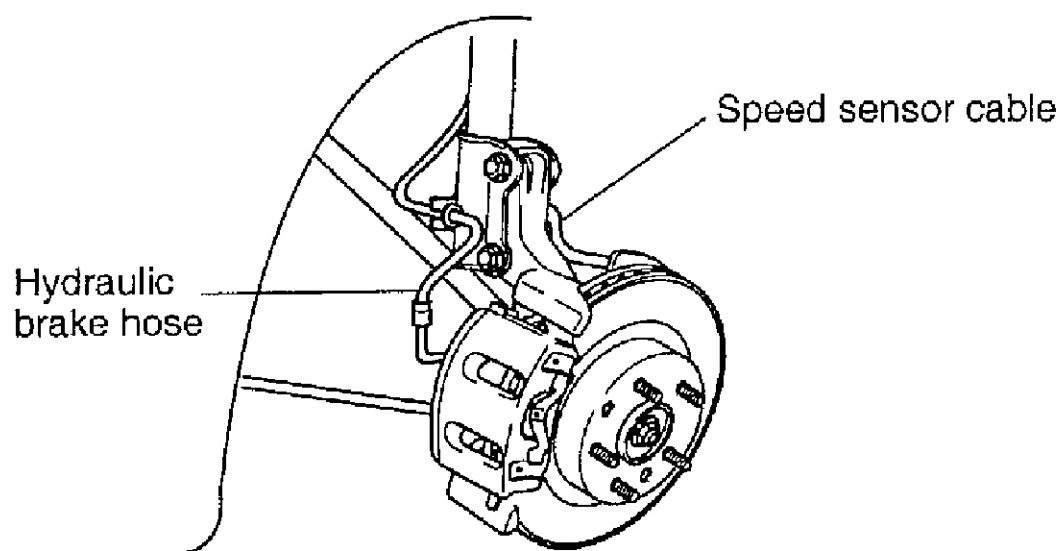
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Fig. 5: Illustrating Tension Rod Components

Courtesy of KIA MOTORS AMERICA, INC.

REMOVAL

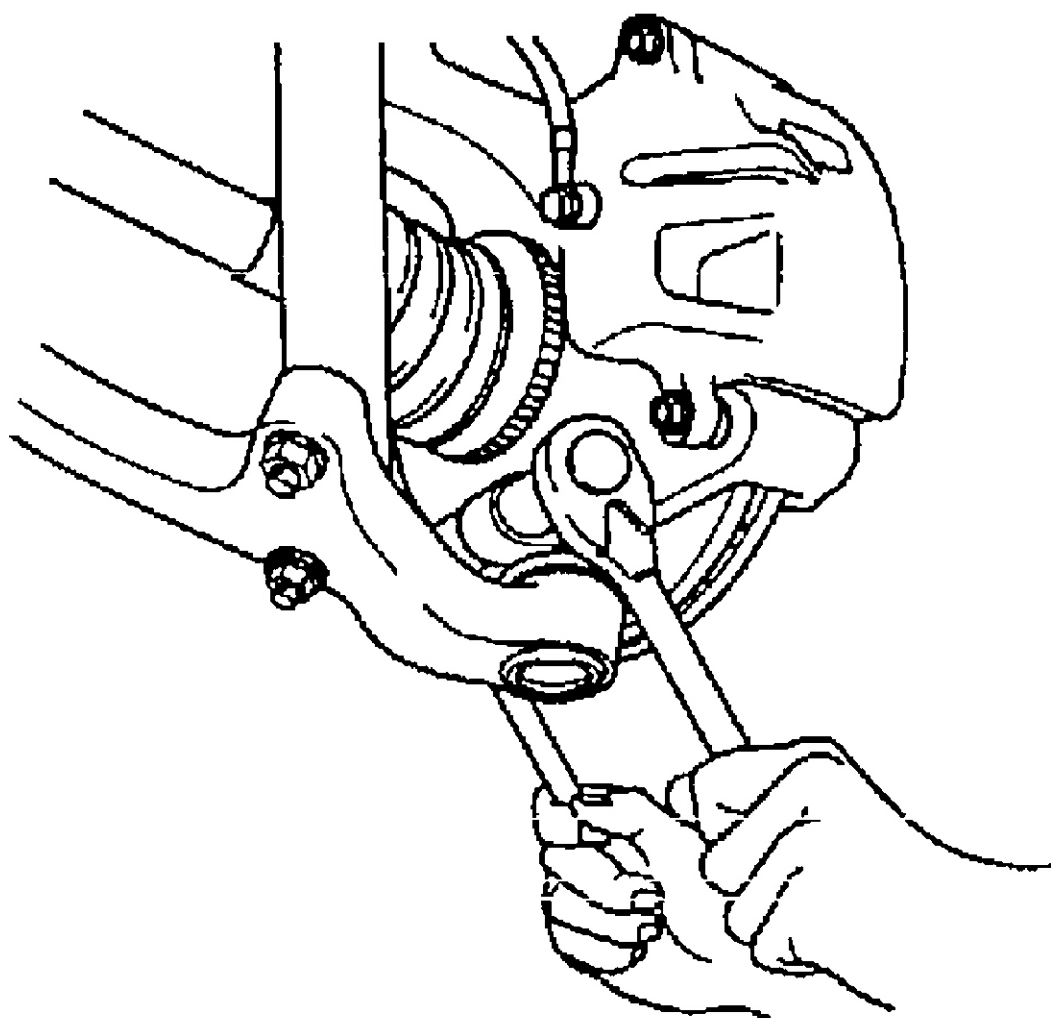
1. Raise vehicle and support it with safety stands.
2. Remove wheel and tires assembly.
3. Remove the hydraulic brake hose and the speed sensor cable from routing bracket on the strut assembly.



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Fig. 6: Removing The Hydraulic Brake Hose & The Speed Sensor Cable
Courtesy of KIA MOTORS AMERICA, INC.

4. Remove the two stabilizer control link nut from installing on the lower control arm and to the end of the stabilizer.
5. Remove the tension rod from the lower control arm after loosening two bolts and nuts.
6. Remove the lower arm ball joint bolt and nut from steering knuckle.

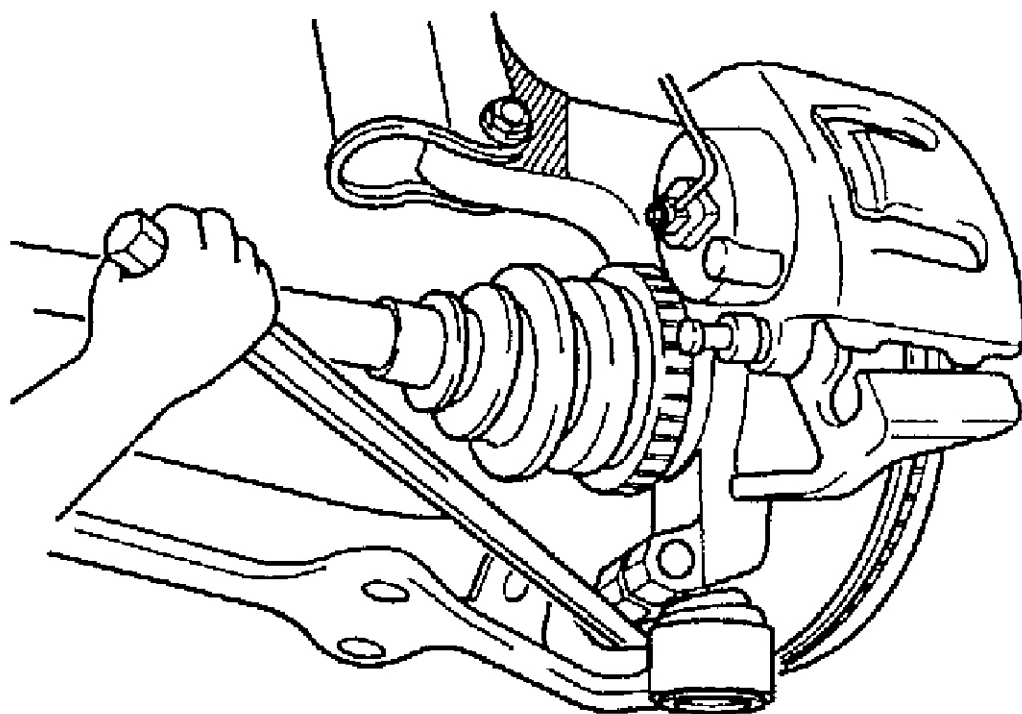


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Fig. 7: Removing The Lower Arm Ball Joint Bolt & Nut
Courtesy of KIA MOTORS AMERICA, INC.

7. Using a pry bar, separate steering knuckle from lower control arm.

NOTE: Use caution when separating lower control arm from steering knuckle, so ball joint seal does not get cut.

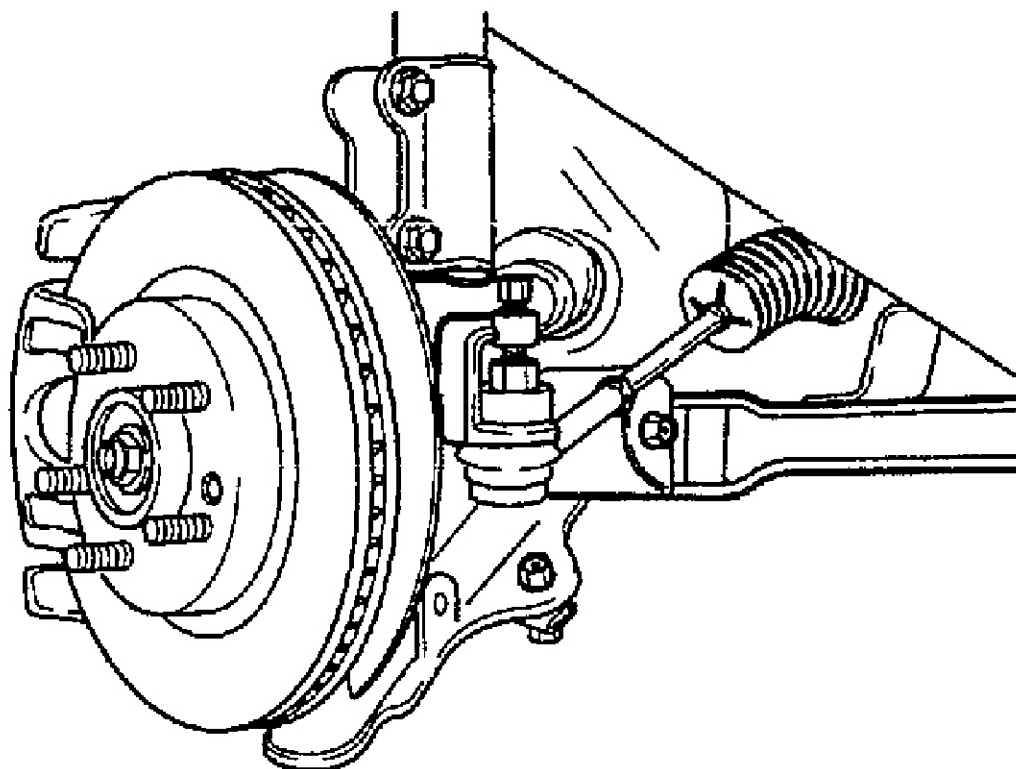


G01093393

Fig. 8: Separating Steering Knuckle From Lower Control Arm
Courtesy of KIA MOTORS AMERICA, INC.

NOTE: Do not damage dust boot when removing dust boot from ball joint.

8. Remove the tie rod end nut and disconnect the tie-rod end with SST (0K130 283 021).



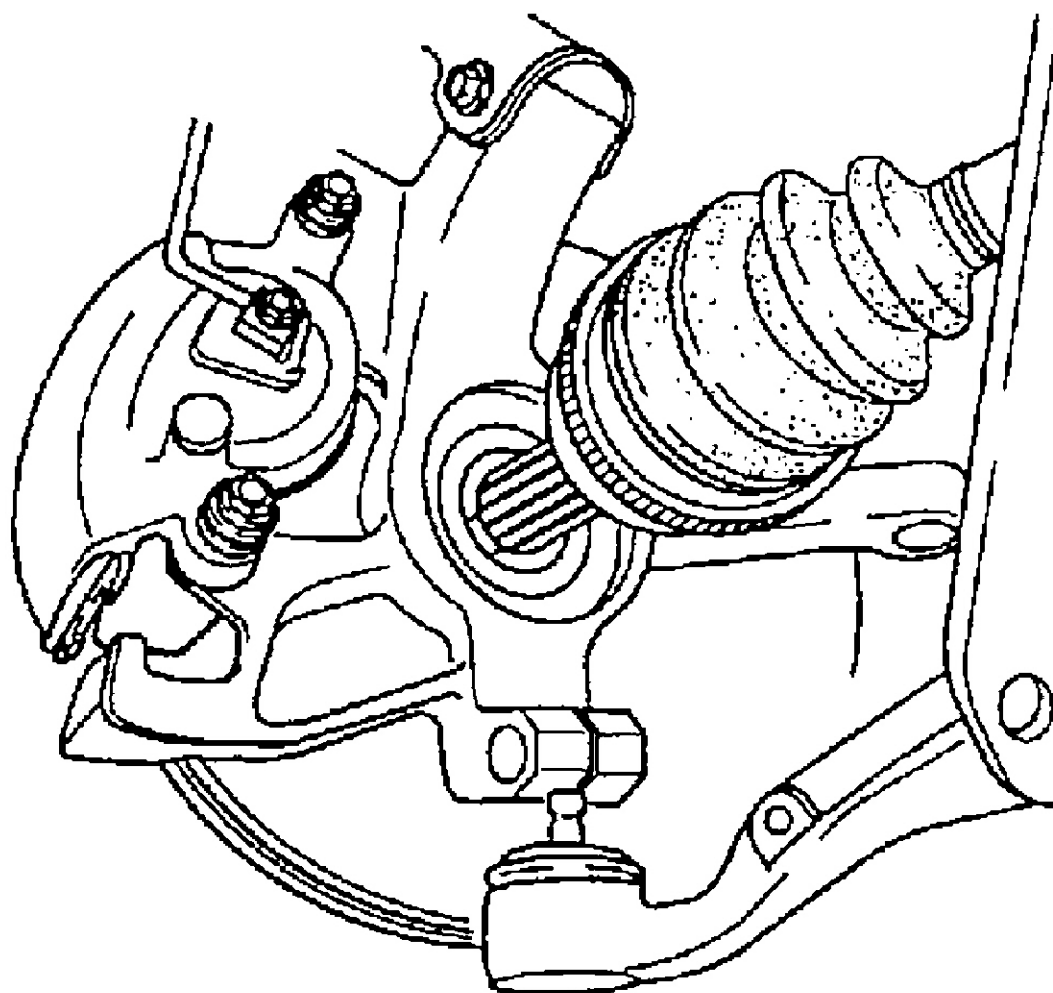
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Fig. 9: Disconnecting The Tie-Rod End
Courtesy of KIA MOTORS AMERICA, INC.

NOTE:

- Care must be taken not to separate the inner C/V joint during this operation.
- Do not allow driveshaft to hang by inner C/V joint after removing outer C/V joint from the hub/bearing assembly in steering knuckle.

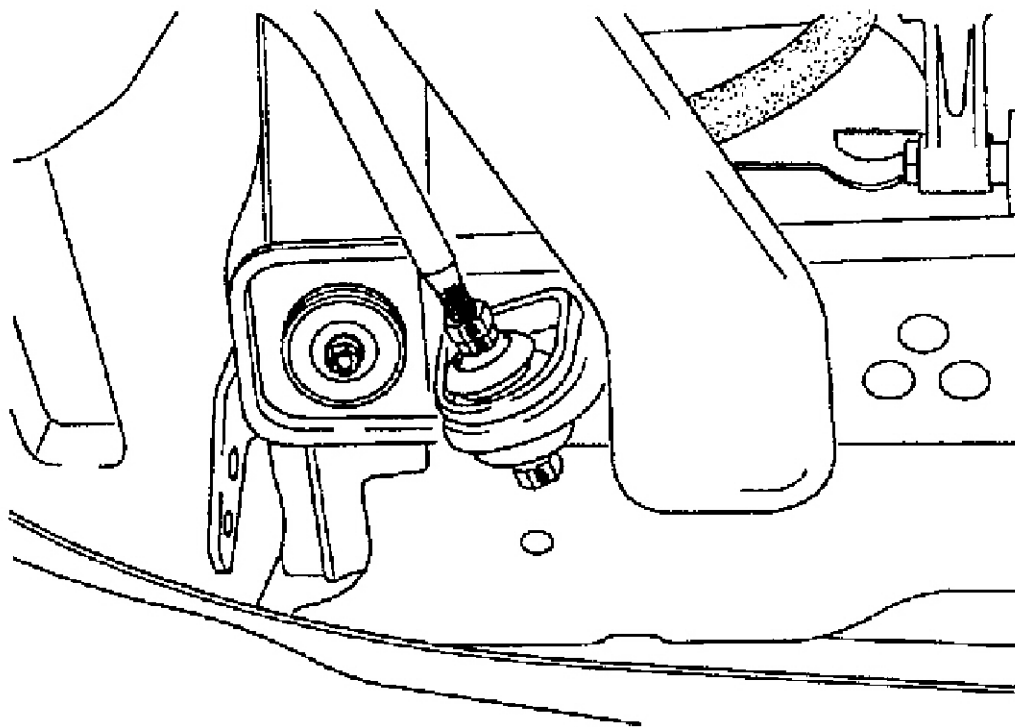
9. Pull steering knuckle out and away from the outer C/V joint of the driveshaft.



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Fig. 10: Pulling Steering Knuckle Out & Away
Courtesy of KIA MOTORS AMERICA, INC.

10. Remove the steering knuckle from the front shock absorber assembly after loosening bolts and nuts.
11. Remove four nuts attaching the front shock absorber assembly upper mount.
12. Remove the lower control arm from the subframe after loosening bolt and nut.
13. Mark alignment of tension rod nuts and spacer washers before loosening tension rod nuts.



G01093396

Fig. 11: Marking Alignment Of Tension Rod Nuts & Spacer Washers
Courtesy of KIA MOTORS AMERICA, INC.

14. Remove the tension rod from the subframe.
15. Remove the stabilizer bar from the subframe after loosening bolts installed to subframe.
16. Remove the exhaust pipe.
17. Remove the fixed bracket after removing the power steering rack and pinion.
18. Support engine with engine support bar SST (0K201 170 AA0).
19. Remove the engine mounting No. 1 and 2 from the subframe.
20. Remove mounting bolt and nuts of the impact bar.
21. Remove the subframe.

REPLACEMENT

1. Tighten the subframe with bolts.

Tightening torque:

88-101 lb. ft (120-137 N.m, 12.2-14 kg.m)

2. Install the impact bar to the subframe and tighten bolts and nuts.

Tightening torque:

Bolt: 65-85 lb. ft (93-115 N.m, 9.5-11.7 kg.m)

Nut: 88-101 lb. ft (120-137 N.m, 12.2-14 kg.m)

3. Install the engine mounting No. 1 and 2 to the subframe and tighten bolts and nuts.
4. Install the power steering rack and pinion to the subframe.

Tightening torque:

55-69 lb. ft (74-93 N.m, 7.5-9.5 kg.m)

NOTE: When installing oil seal, be careful not to damage oil seal.

5. Install the exhaust pipe.
6. Remove engine support bar SST (0K201 170 AA0) from engine.
7. Install the stabilizer bar and stabilizer bar plate to the subframe and tighten bolts.

Tightening torque:

16-20 lb. ft (21-26 N.m, 2.2-2.7 kg.m)

8. Put lower arm into the side of the subframe and then tighten lower arm and subframe with bolts and nuts.

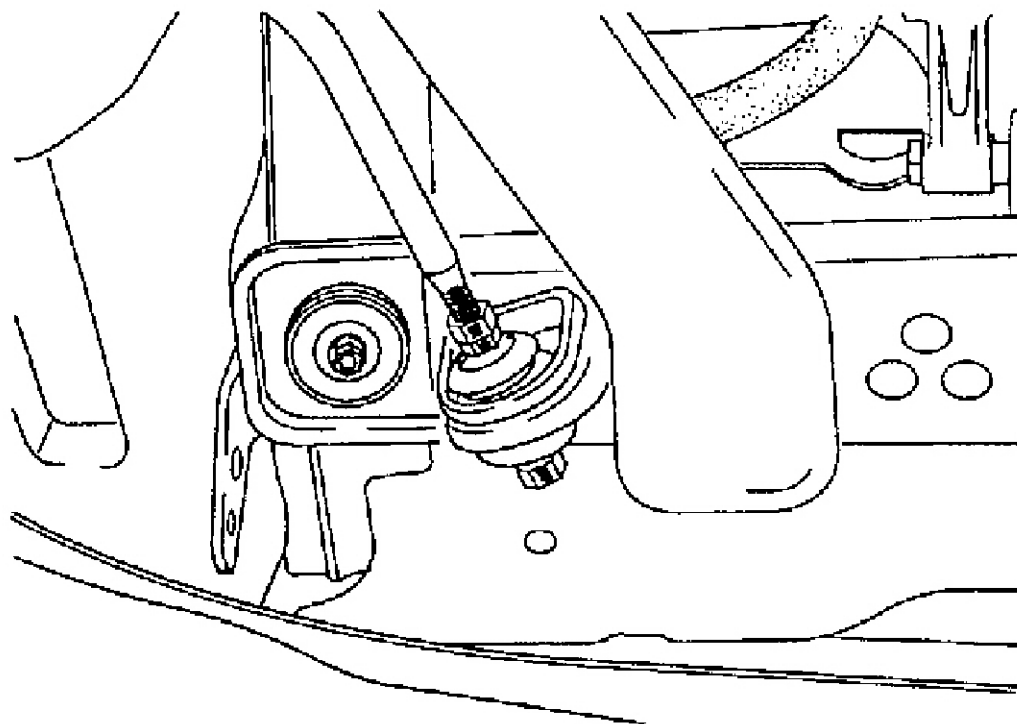
Tightening torque:

88-101 lb. ft (120-137 N.m, 12.2-14 kg.m)

9. Tighten tension rod nuts after aligning with mark made.

Tightening torque:

115-130 lb. ft (157-177 N.m, 16-18 kg.m)



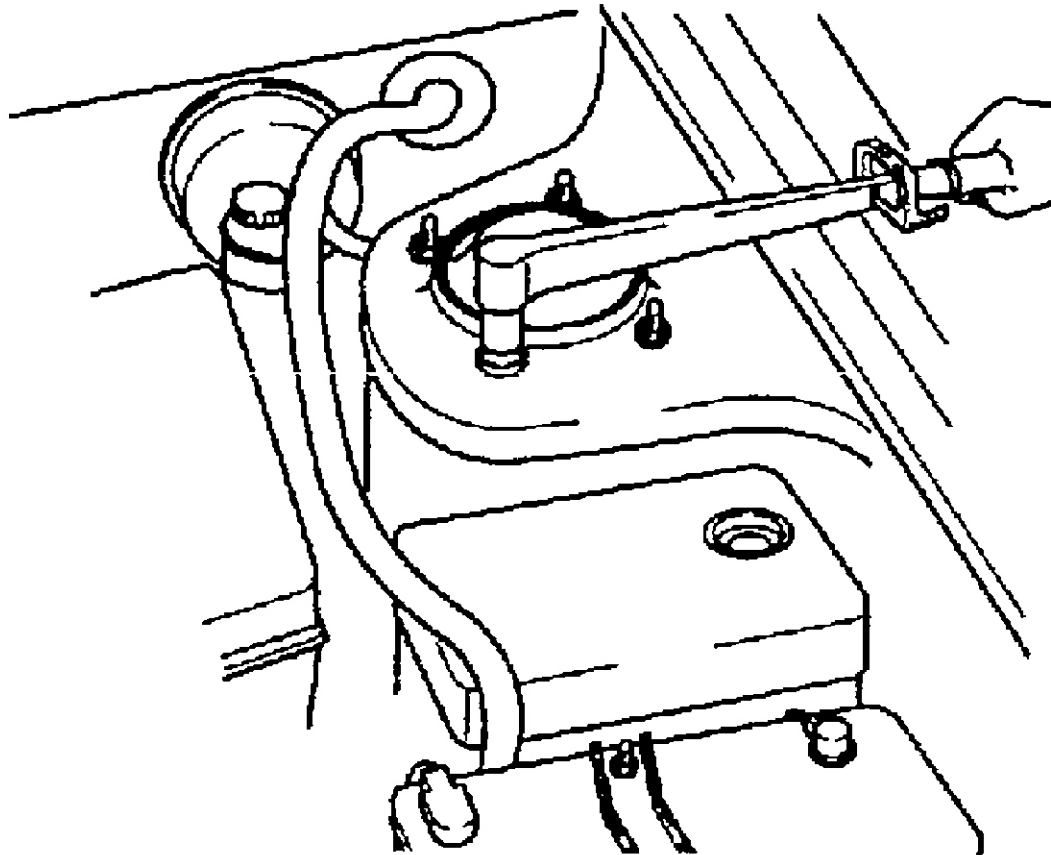
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Fig. 12: Tightening Tension Rod Nuts
Courtesy of KIA MOTORS AMERICA, INC.

10. Install the front shock absorber assembly upper mount and tighten nuts to specified torque.

Tightening torque:

34-46 lb. ft (46-63 N.m, 4.7-6.4 kg.m)



G01093398

Fig. 13: Installing The Front Shock Absorber Assembly Upper Mount
Courtesy of KIA MOTORS AMERICA, INC.

11. Install the steering knuckle to shock absorber strut bracket and tighten nuts and bolts.

Tightening torque:

88-101 lb. ft (119-137 N.m, 12.2-14 kg.m)

12. Slide driveshaft back into the front hub and bearing assembly.
13. Install tension rod to the lower arm and tighten bolts and nuts.

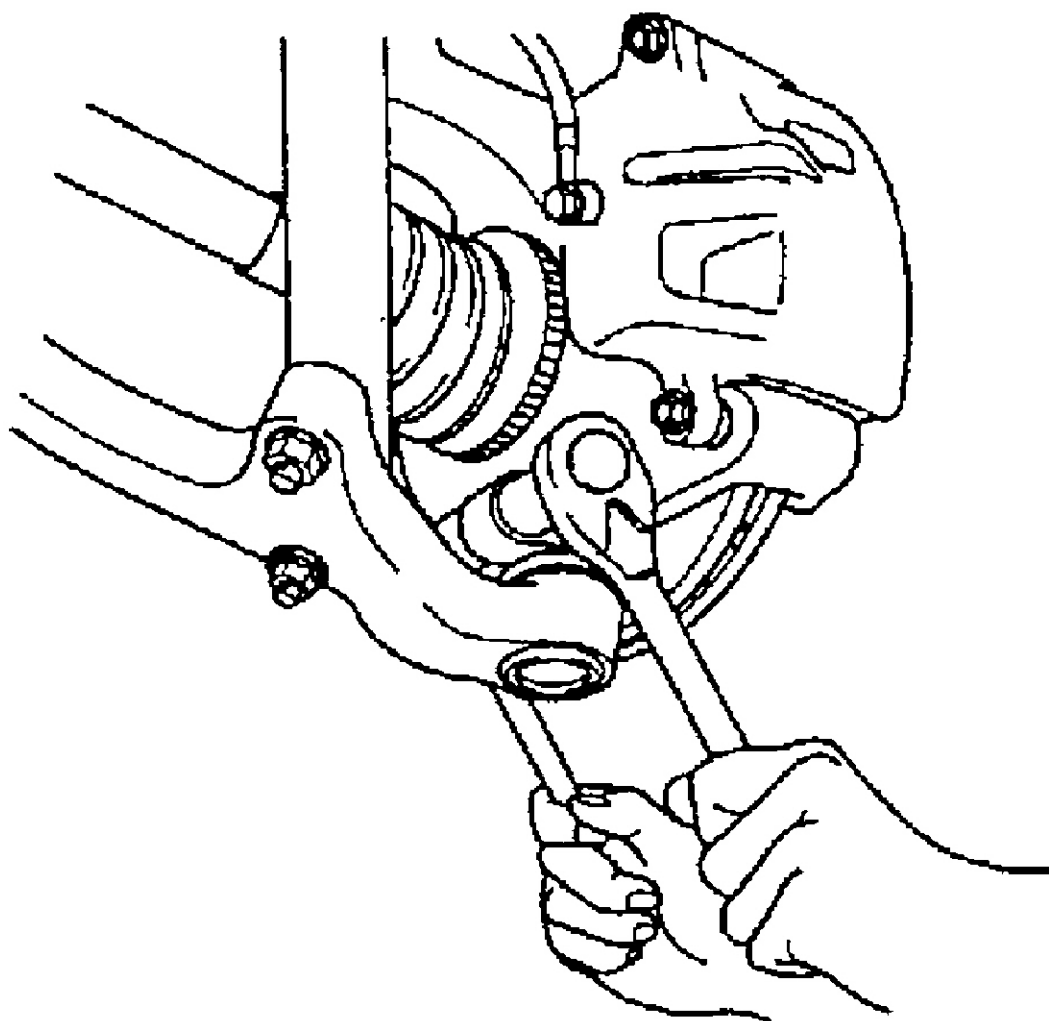
Tightening torque:

88-101 lb. ft (119-137 N.m, 12.2-14 kg.m)

14. Attach the lower arm ball joint to the front wheel knuckle and tighten the lower arm ball joint nut and bolt.

Tightening torque:

69-85 lb. ft (93-115 N.m, 9.5-11.7 kg.m)



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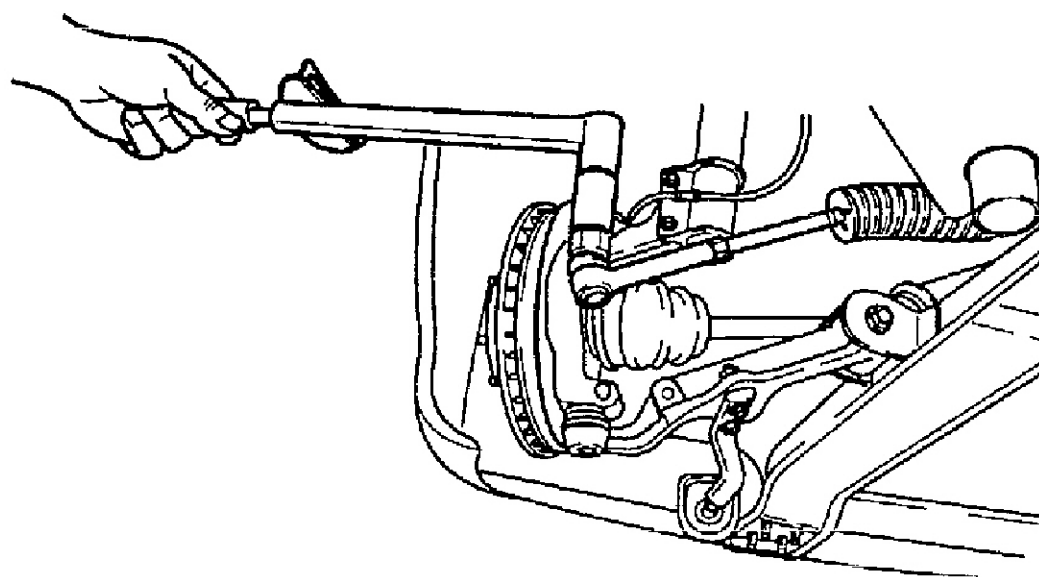
Fig. 14: Tightening The Lower Arm Ball Joint Nut
Courtesy of KIA MOTORS AMERICA, INC.

15. Install the stabilizer to the lower arm and tighten the stabilizer bolts.

Tightening torque:

69-85 lb. ft (93-115 N.m, 9.5-11.7 kg.m)

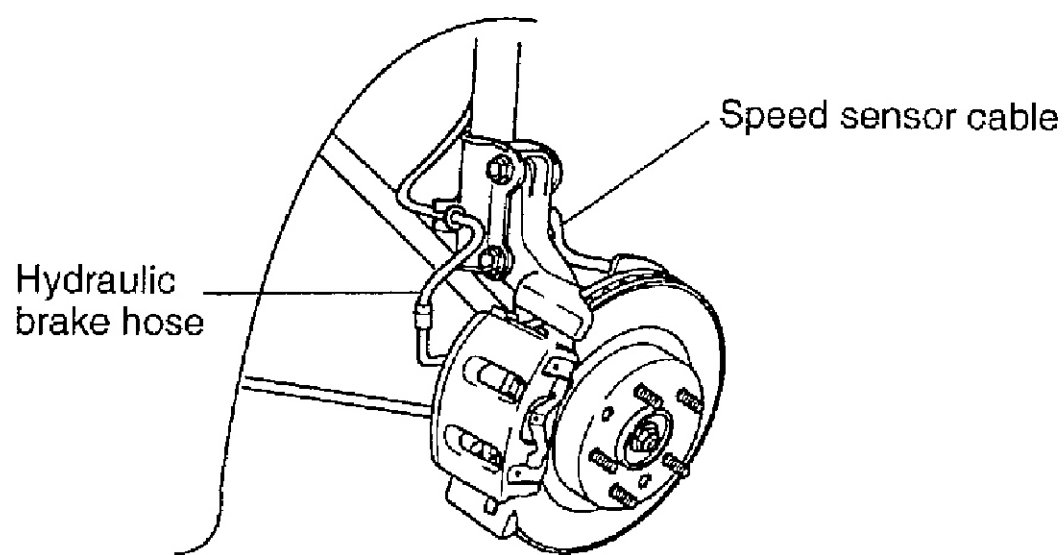
16. Attach the tie rod end to the front wheel knuckle. Tighten the tie rod nut and then install a new tie rod end cotter pin.



G01093400

Fig. 15: Attaching The Tie Rod End To The Front Wheel Knuckle
Courtesy of KIA MOTORS AMERICA, INC.

17. Install the hydraulic brake hose and the speed sensor cable to routing bracket on the strut assembly.



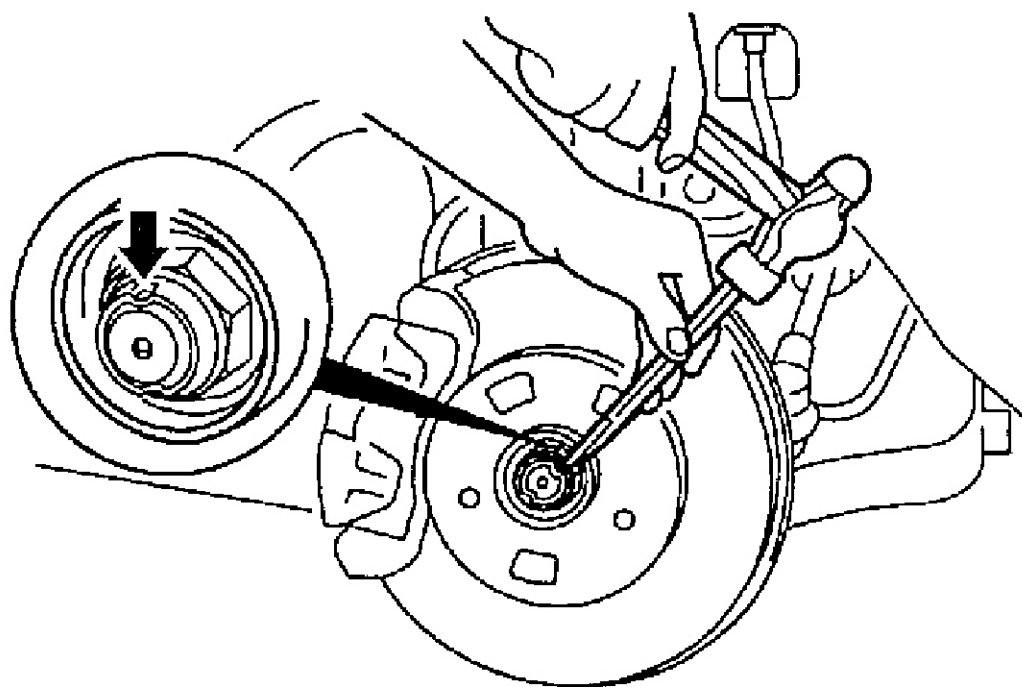
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Fig. 16: Installing The Hydraulic Brake Hose & The Speed Sensor Cable
Courtesy of KIA MOTORS AMERICA, INC.

18. Install a new driveshaft lock nut and stake it, as shown.

Tightening torque:

177-199 lb. ft (240-270 N.m, 24.5-27.5 kg.m)



G01093402

Fig. 17: Installing A New Driveshaft Lock Nut & Stake It
Courtesy of KIA MOTORS AMERICA, INC.

19. Install front wheel and tire assembly and tighten nuts.

Tightening torque:

65-79 lb. ft (88-108 N.m, 9.0-11.0 kg.m)

20. Lower vehicle.
21. Set front wheel alignment on vehicle to required specification.

STRUT ASSEMBLY

COMPONENT

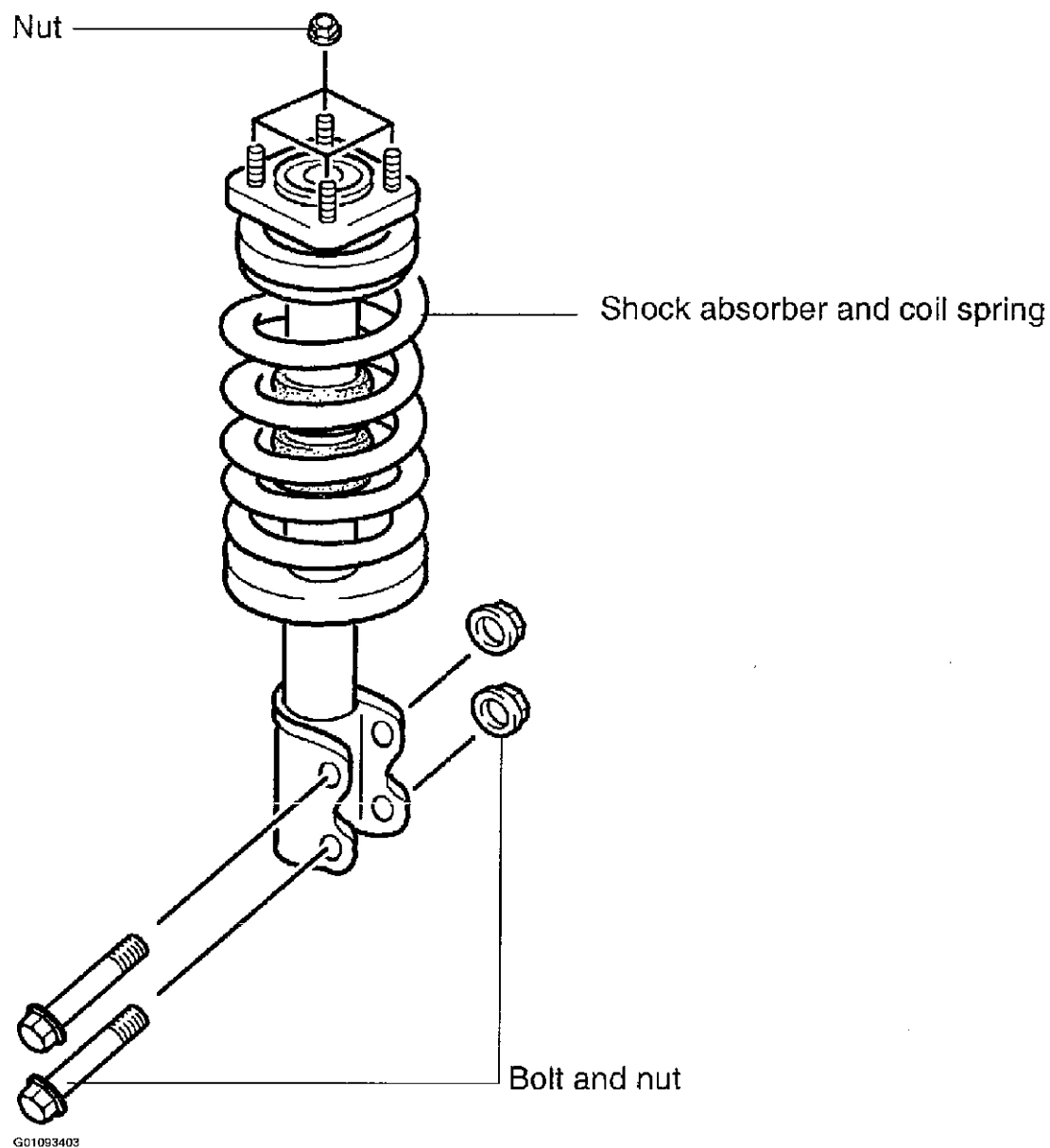


Fig. 18: Illustrating Strut Assembly
Courtesy of KIA MOTORS AMERICA, INC.

REMOVAL

1. Lift vehicle and support with safety stands.
2. Remove wheel and tire assembly.
3. Remove the brake hose and the speed sensor cable from routing bracket on the shock absorber strut assembly.

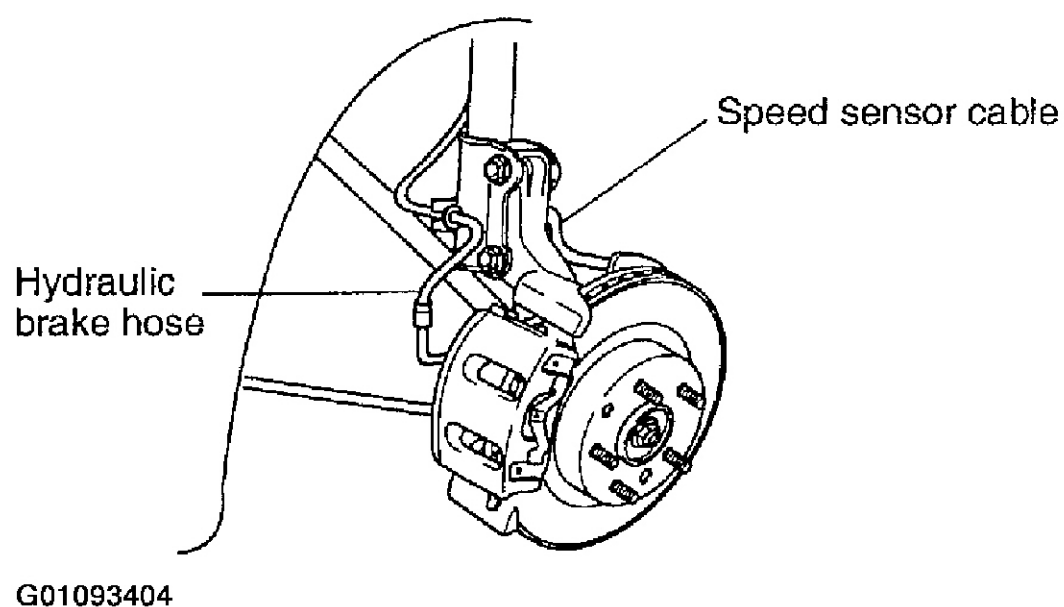


Fig. 19: Removing The Brake Hose & The Speed Sensor Cable
 Courtesy of KIA MOTORS AMERICA, INC.

4. Remove the two shock absorber strut mounting nuts and bolts securing the spring and shock assembly to front wheel knuckle.
5. Remove the four front shock absorber upper mounting nuts.

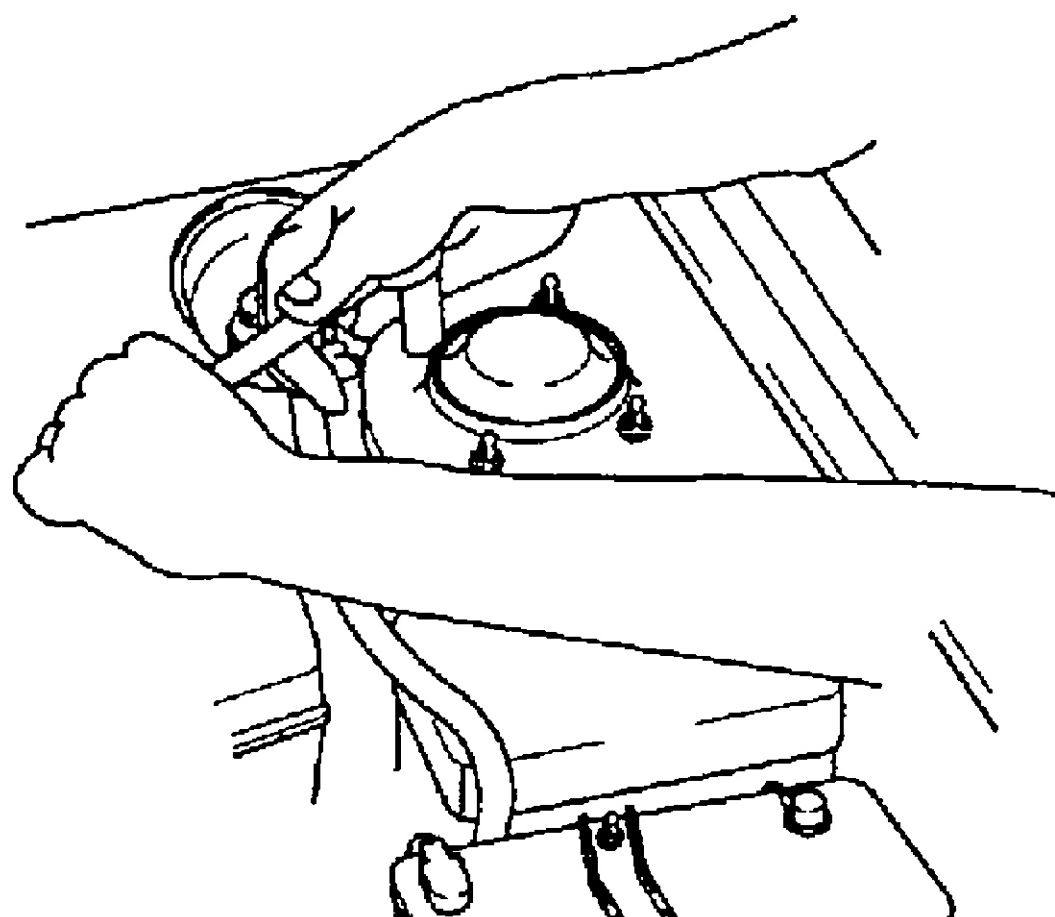


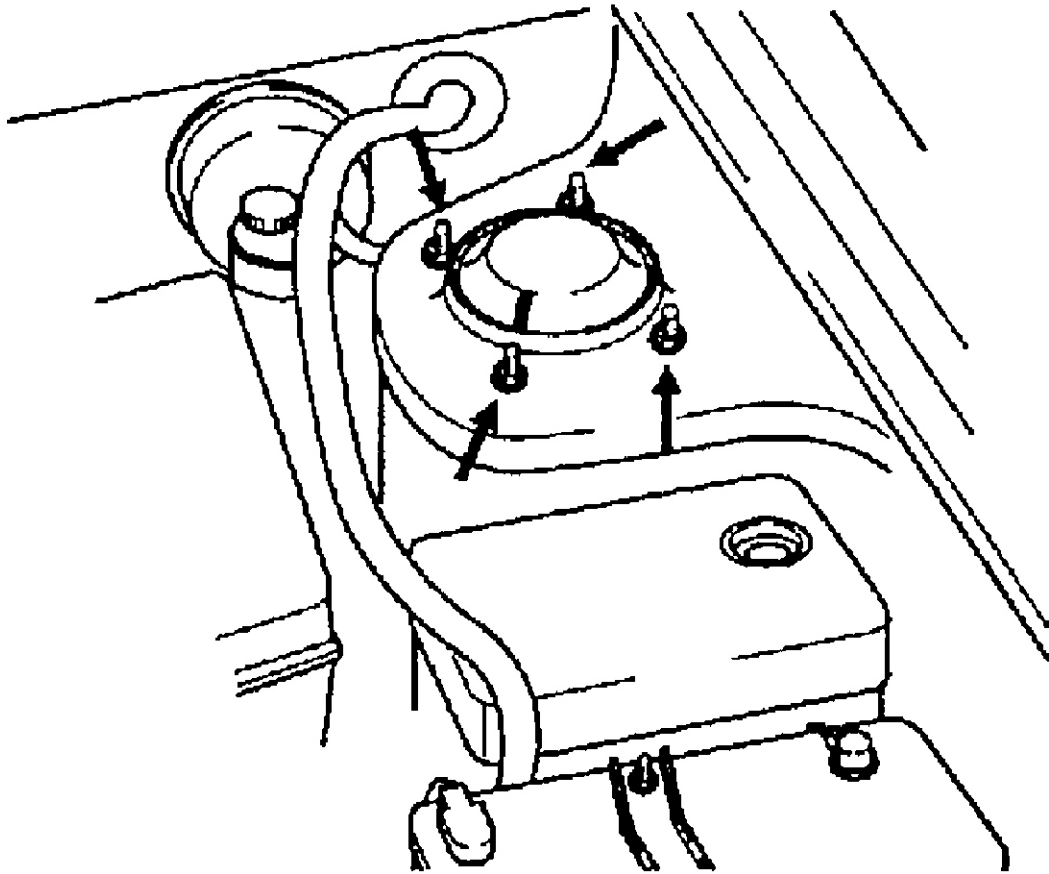
Fig. 20: Removing The Four Front Shock Absorber Upper Mounting Nuts

Courtesy of KIA MOTORS AMERICA, INC.

6. Remove the shock absorber assembly from vehicle.

REPLACEMENT

1. Position the shock absorber assembly into the wheel housing. Be sure the direction indicator on the front shock absorber upper mounting bracket.



G01093406

Fig. 21: Positioning The Shock Absorber Assembly Into The Wheel Housing

Courtesy of KIA MOTORS AMERICA, INC.

2. Secure the front shock absorber upper mounting bracket to the shock tower with nuts. Tighten the front shock absorber upper mounting bracket nuts.

Tightening torque:

33-46 lb. ft (46-62 N.m, 4.7-6.4 kg.m)

3. Install the front shock absorber assembly to the front wheel knuckle. Tighten the shock absorber knuckle attaching nuts.

Tightening torque:

88-101 lb. ft (119-137 N.m, 12.2-14 kg.m)

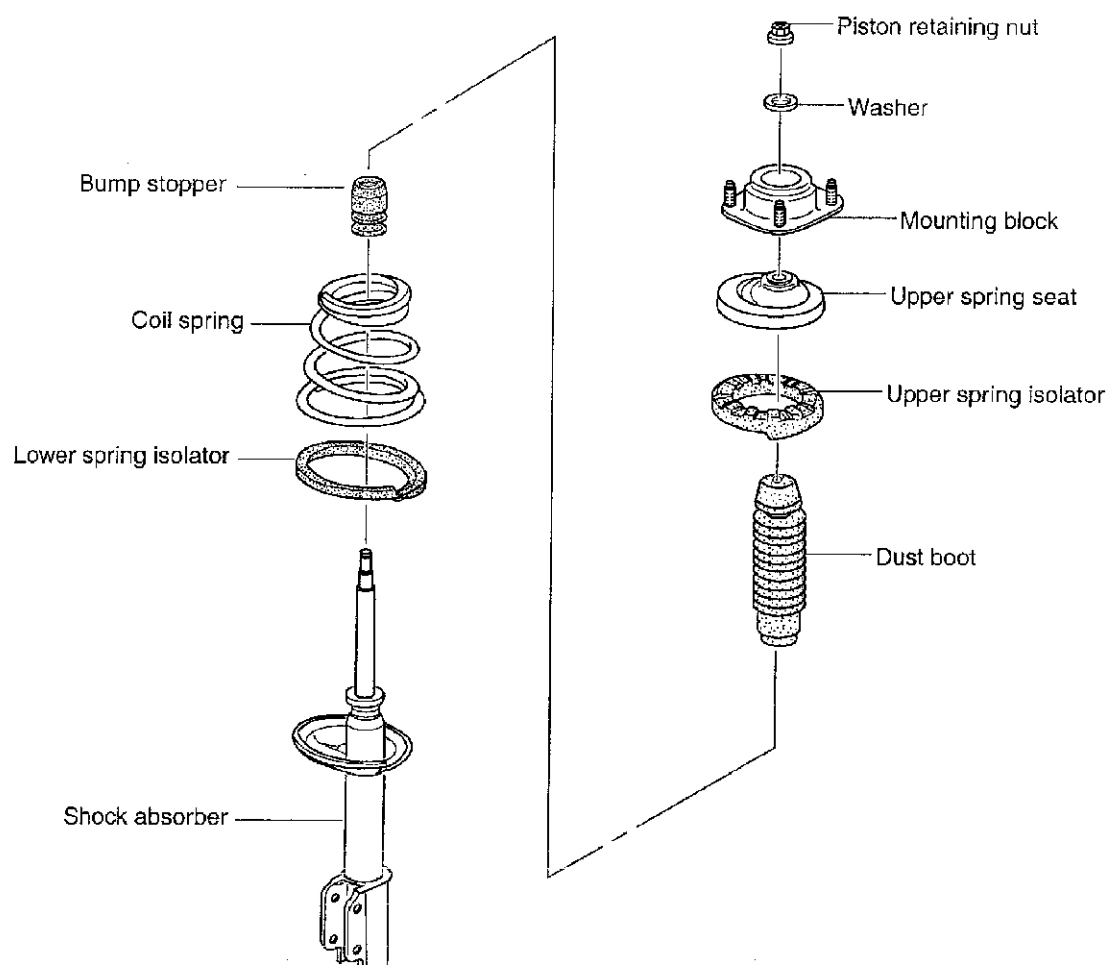
4. Position the hydraulic brake hose and speed sensor cable to the shock absorber assembly.
5. Install the wheel and tire assembly and tighten nuts.

Tightening torque:

65-79 lb. ft (88-108 N.m, 9.0-11.0 kg.m)

6. Lower vehicle.
7. Check the front wheel alignment.

COMPONENT



G01093407

Fig. 22: Illustrating Strut Components
 Courtesy of KIA MOTORS AMERICA, INC.

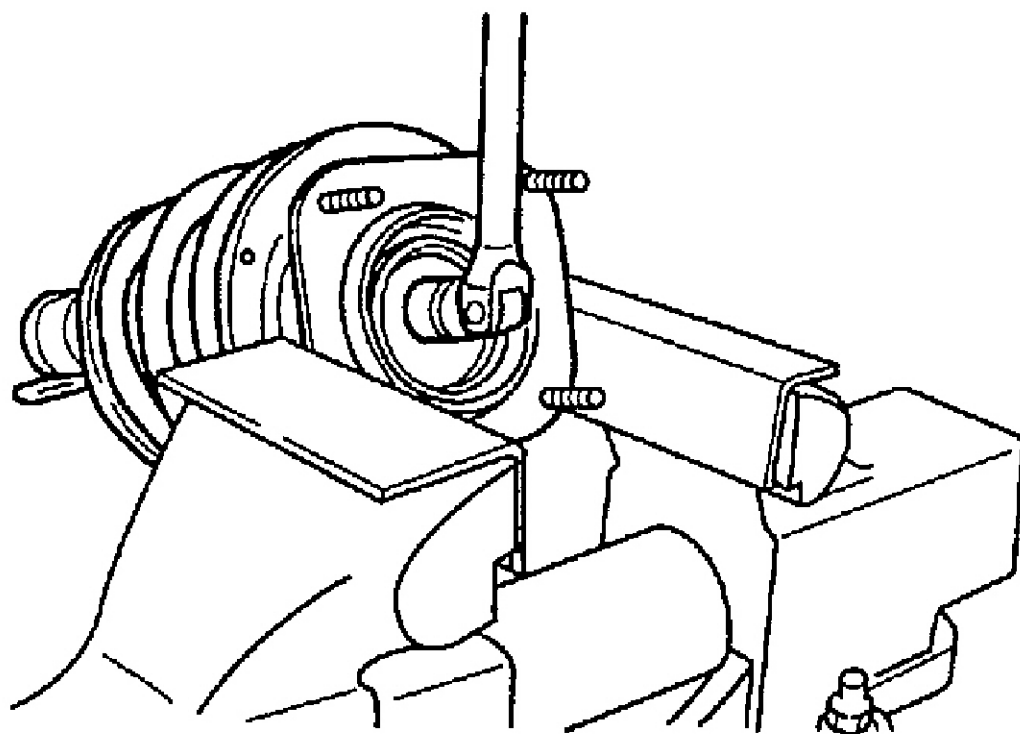
DISASSEMBLY

1. Remove the front spring and shock absorber. See **STRUT ASSEMBLY**.
2. Loosen four mounting bolts.
3. Place the mounting block in a vise.

NOTE: Use protective plates to cover jaws of vise.

4. Loosen retaining nut two to three turns.

NOTE: Do not remove nut.

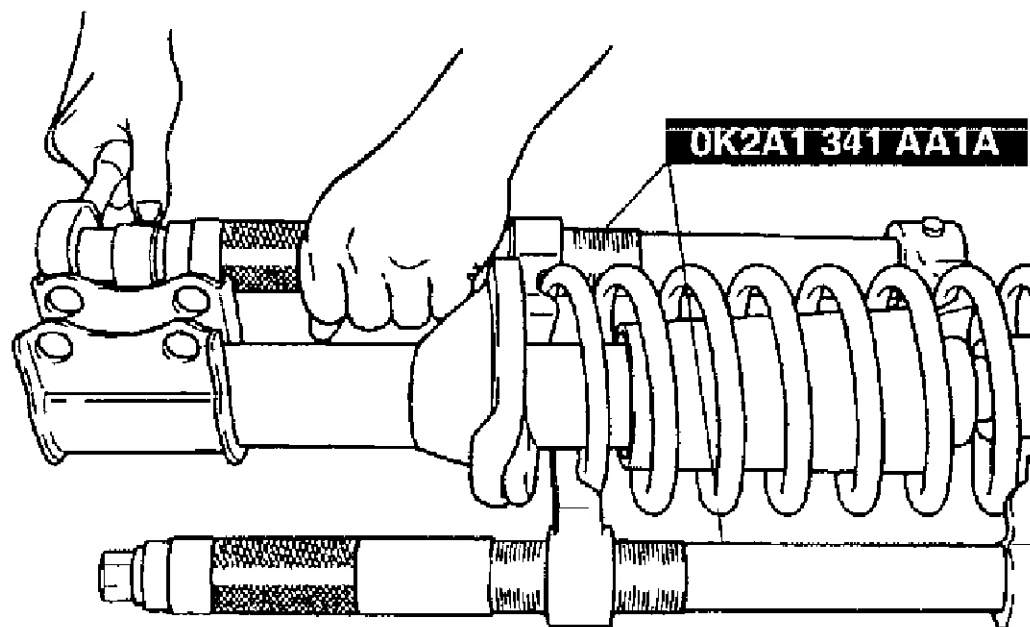


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Fig. 23: Loosening Retaining Nut

Courtesy of KIA MOTORS AMERICA, INC.

5. Compress the coil spring with SST (0K2A1 341 001).
6. Remove the retaining nut.
7. Note the position of the mounting block, then remove it. Remove the upper spring seat, upper spring isolator, coil spring, dust boot, bump stopper and lower spring seat.

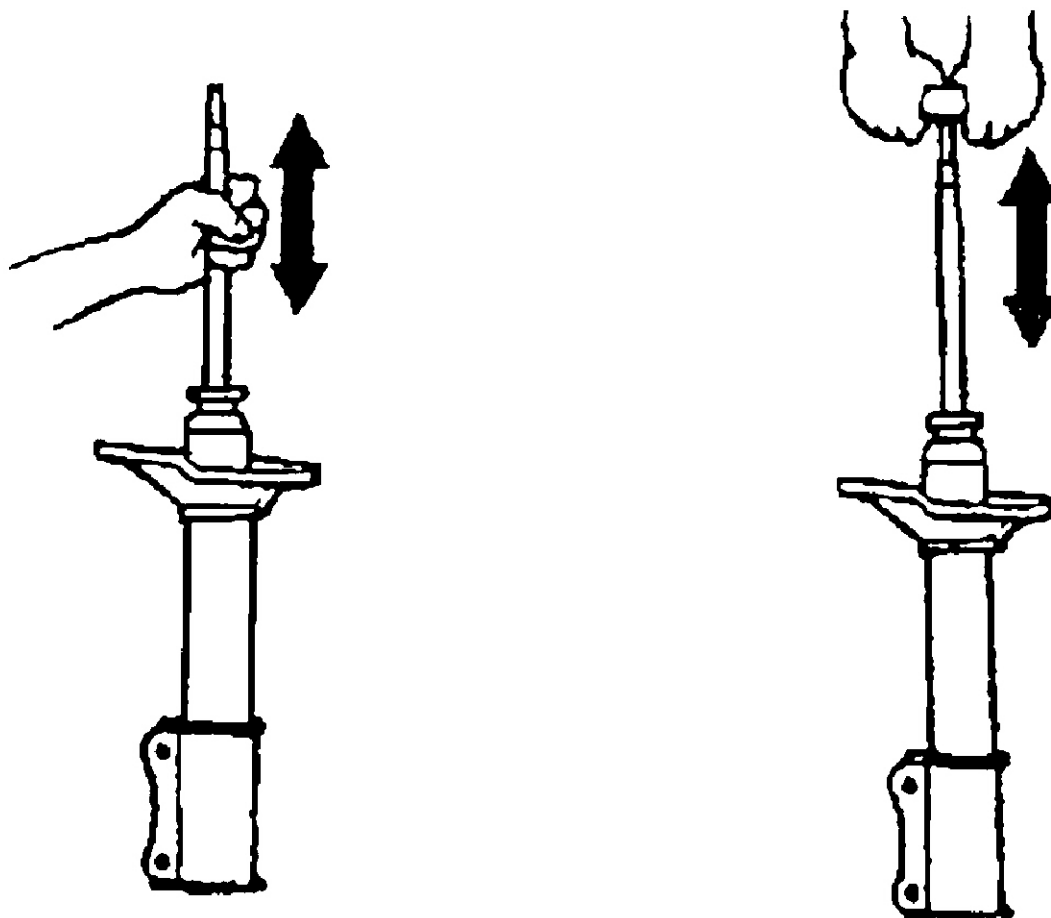


G01093409

Fig. 24: Compressing Coil Spring
Courtesy of KIA MOTORS AMERICA, INC.

INSPECTION

1. Check for the following and replace the strut if necessary:
 - a. Attach a handle to the piston rod, then collapse and expand the strut at least three times.
 - b. Verify that operation is smooth, continuous, and does not change with each stroke.
 - c. Verify that there is no unusual noise from within the strut.



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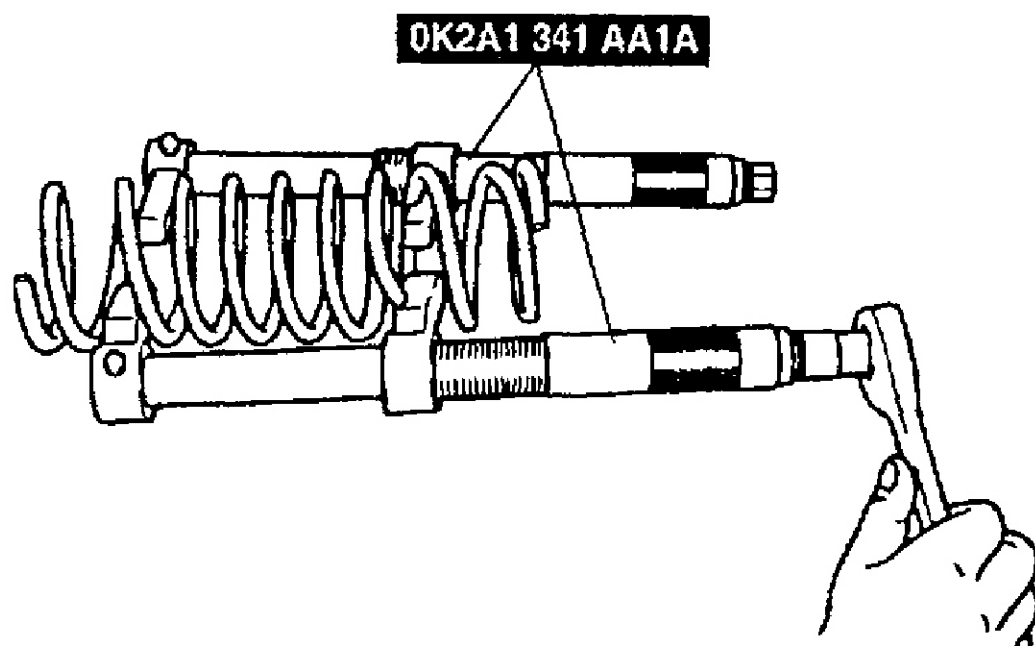
Fig. 25: Testing Strut Operation
Courtesy of KIA MOTORS AMERICA, INC.

ASSEMBLY

1. Secure the shock absorber in a vise.

NOTE: Use protective plates to cover jaws of vise.

2. Compress the coil spring with SST (0K2A1 341 001).
3. Install the coil spring, inserting the bottom end of the spring into the recess of the lower seat.
4. Install the bump stopper.

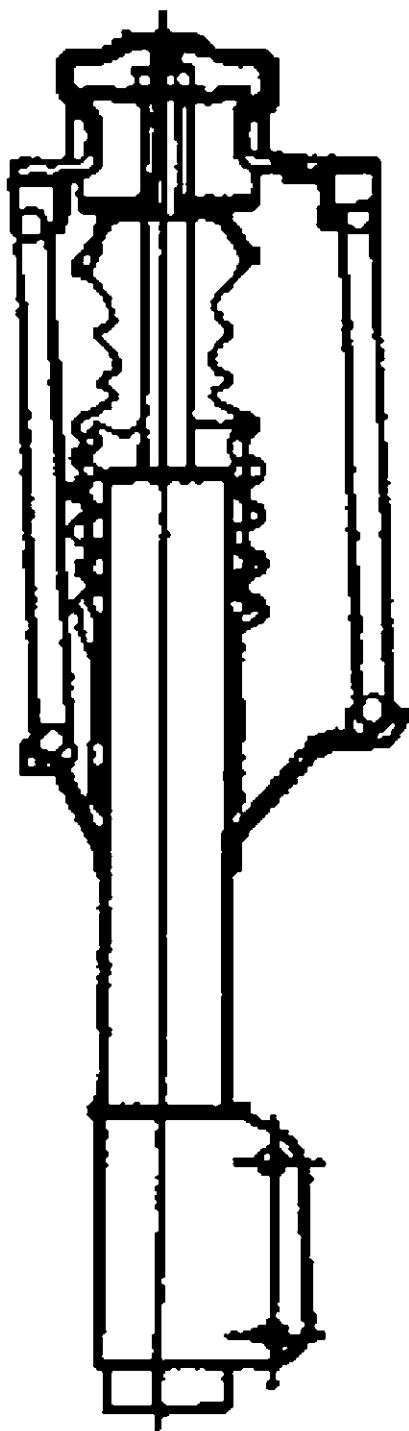


G01093411

Fig. 26: Compressing The Coil Spring
Courtesy of KIA MOTORS AMERICA, INC.

5. Apply rubber lubricant to the bump stopper and the upper spring seat contact surface.
6. Install the upper spring isolator and the upper spring seat.
7. Install the mounting block in its original position.
8. Install the piston retaining nut and tighten slightly.
9. Carefully loosen and remove SST (0K2A1 341 001).

NOTE: Verify that the coil spring is correctly seated in the upper and lower seats.



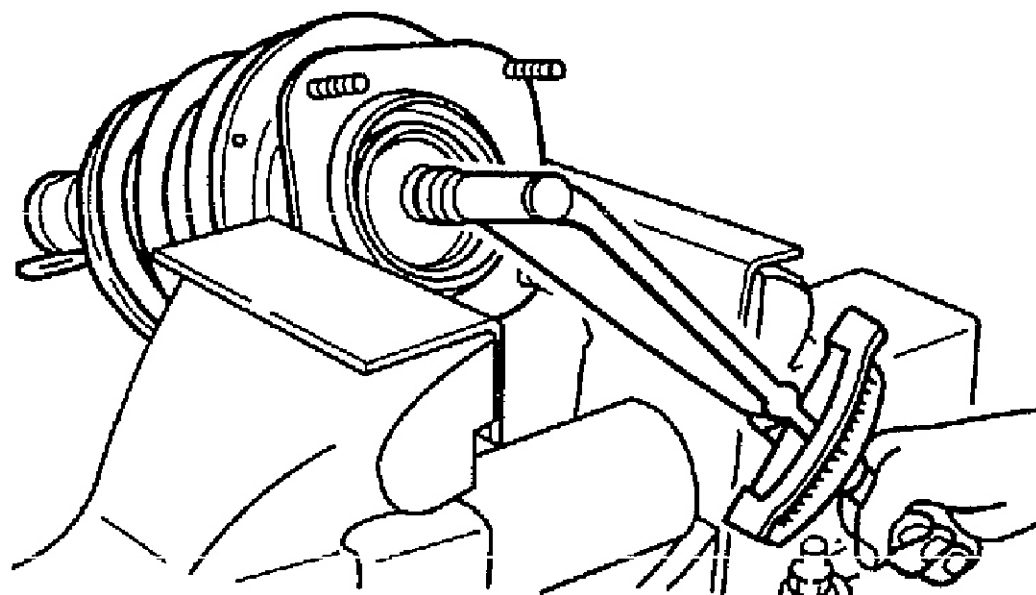
G01093412

Fig. 27: Positioning Coil Spring
Courtesy of KIA MOTORS AMERICA, INC.

10. Secure the mounting block in a vise.
11. Tighten the piston retaining nut to specified torque.

Tightening torque:

88-101 lb. ft (120-137 N.m, 12.2-14 kg.m)

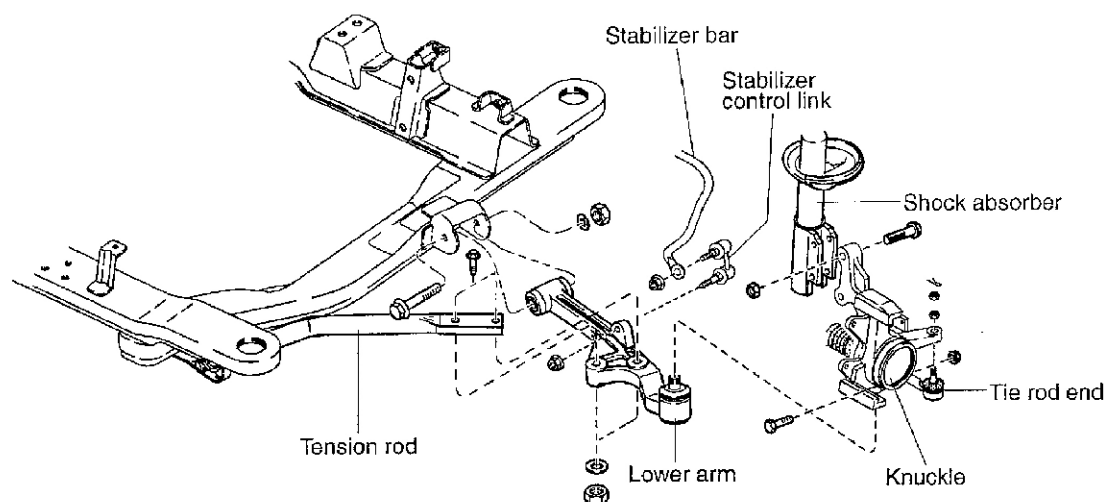


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Fig. 28: Tightening Piston Retaining Nut
 Courtesy of KIA MOTORS AMERICA, INC.

LOWER ARM

COMPONENT

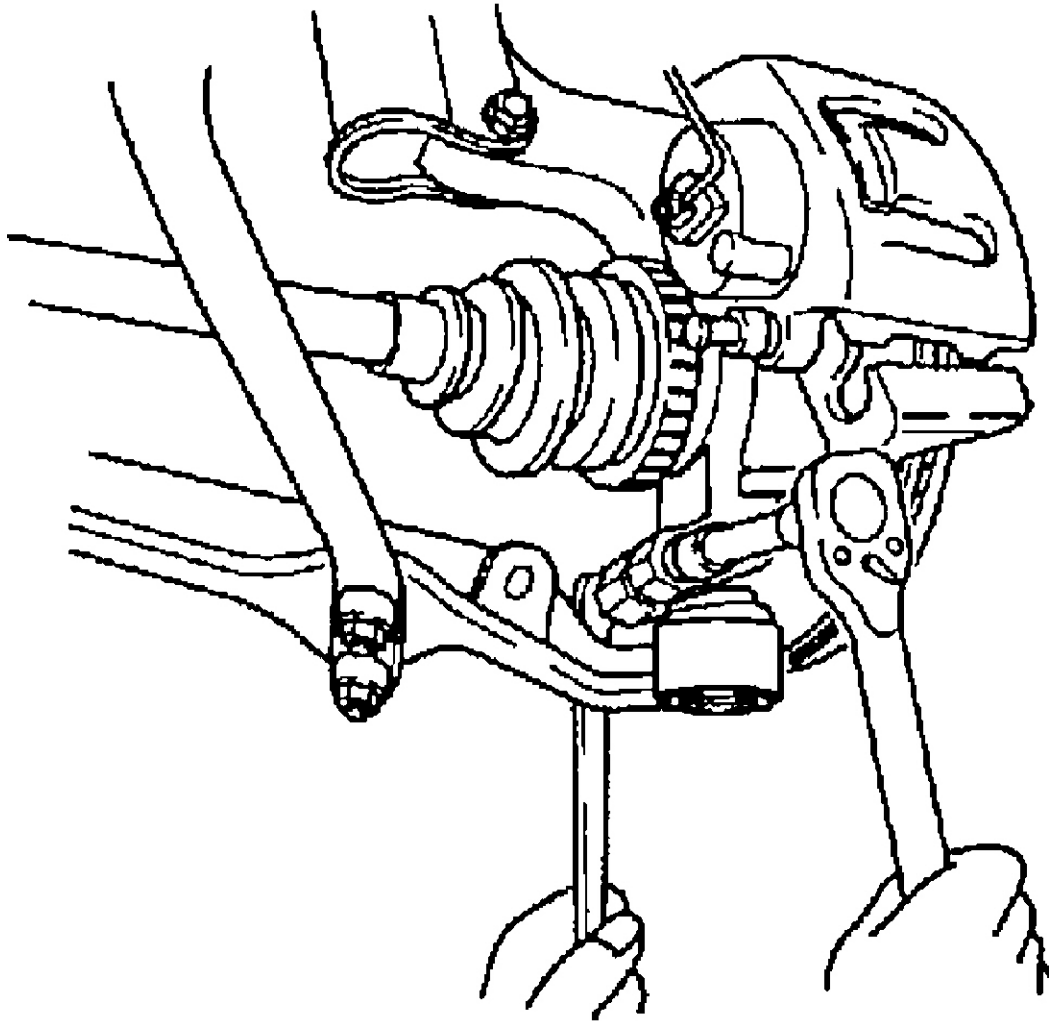


G01093414

Fig. 29: Illustrating Lower Arm Components
 Courtesy of KIA MOTORS AMERICA, INC.

REMOVAL

1. Lift vehicle and support with safety stands.
2. Remove wheel and tire assembly.
3. Remove stabilizer control link nut on the lower control arm.
4. Remove stabilizer control link nut from the stabilizer bar.
5. Remove the tension rod from the lower control arm after loosening two bolts and nuts.
6. Remove the lower arm ball joint bolt and nut from steering knuckle.

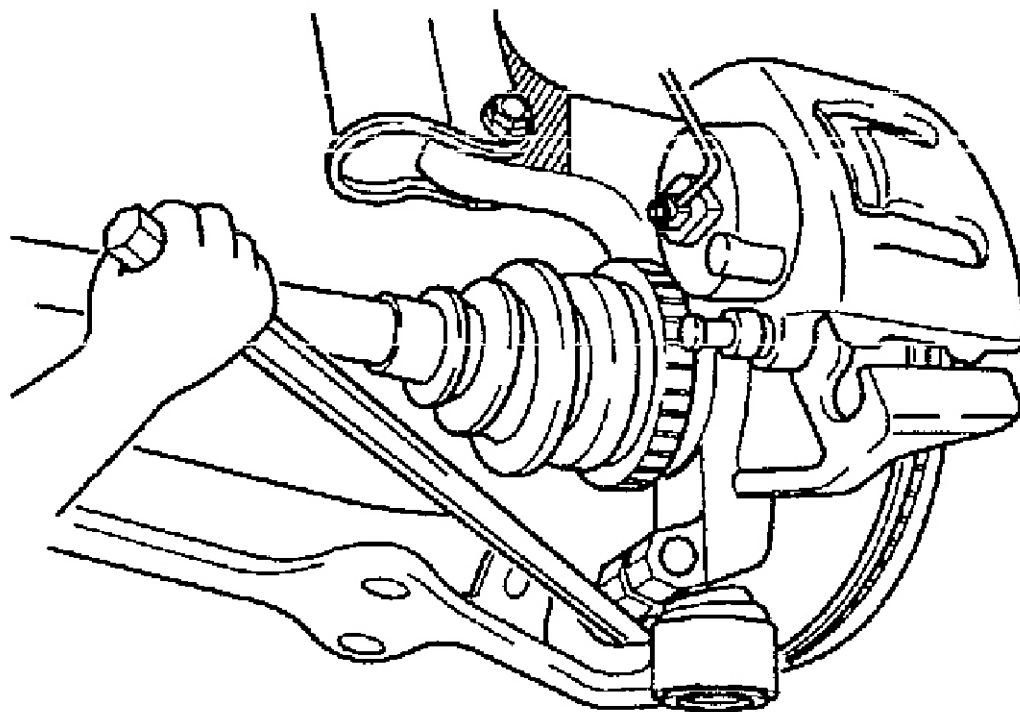


G01093415

Fig. 30: Removing The Lower Arm Ball Joint Bolt & Nut
Courtesy of KIA MOTORS AMERICA, INC.

NOTE: Use caution when separating lower control arm from steering knuckle, so ball joint seal does not get cut.

7. Using a prybar, separate the steering knuckle from lower control arm.



G01093416

Fig. 31: Separating The Steering Knuckle From Lower Control Arm
Courtesy of KIA MOTORS AMERICA, INC.

8. Remove the lower control arm from the subframe after loosening bolt and nut.

REPLACEMENT

1. Position the front lower arm to the subframe and secure it with bolt.

Tighten the lower arm nut.

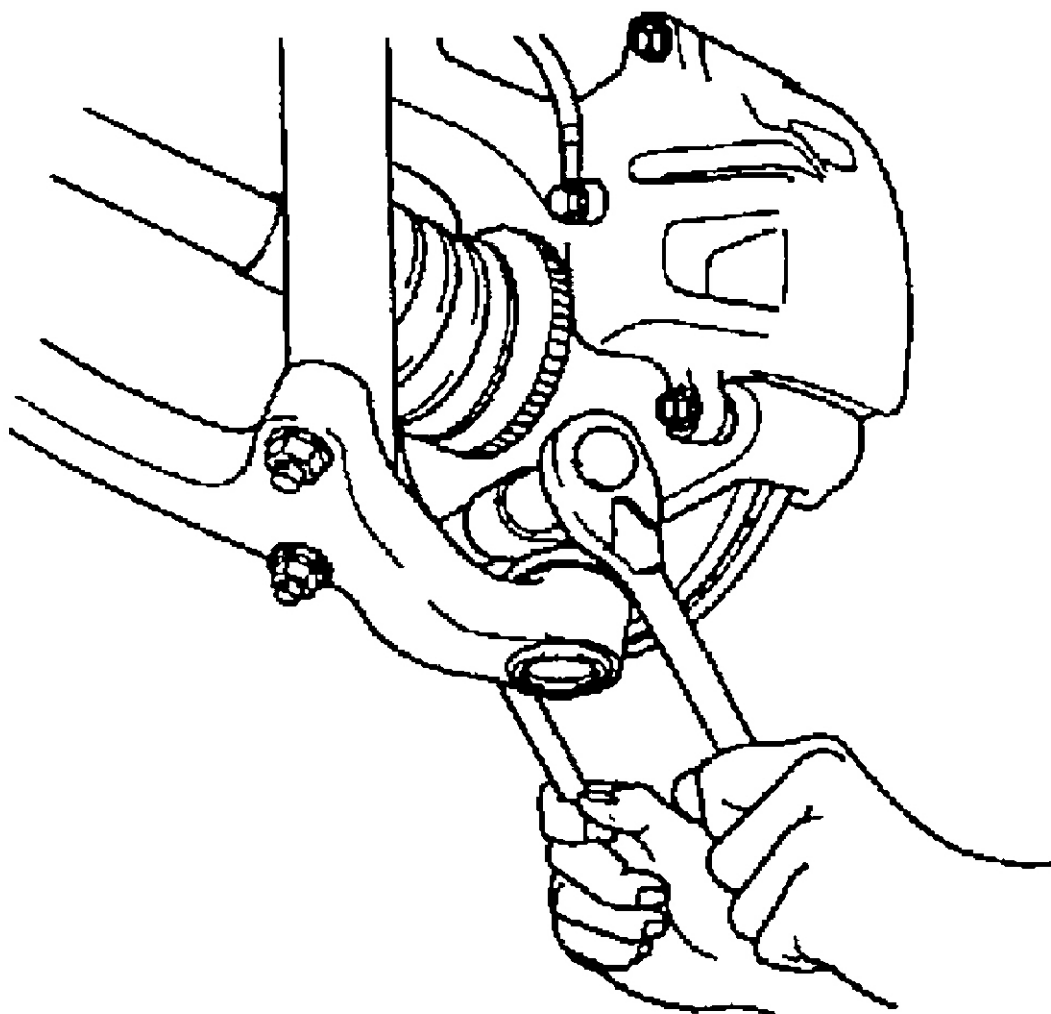
Tightening torque:

88-101 lb. ft (120-137 N.m, 12.2-14 kg.m)

2. Position the front lower arm ball joint into the wheel knuckle.
3. Tighten the lower arm ball joint bolt and nut to steering knuckle.

Tightening torque:

69-85 lb. ft (93-15 N.m, 9.5-11.7 kg.m)



G01093417

Fig. 32: Tightening The Lower Arm Ball Joint Bolt & Nut
Courtesy of KIA MOTORS AMERICA, INC.

4. Install the tension rod to the lower arm. Tighten bolts and nuts.

Tightening torque:

88-101 lb. ft (120-137 N.m, 12.2-14 kg.m)

5. Tighten the stabilizer control link nut to the stabilizer bar.

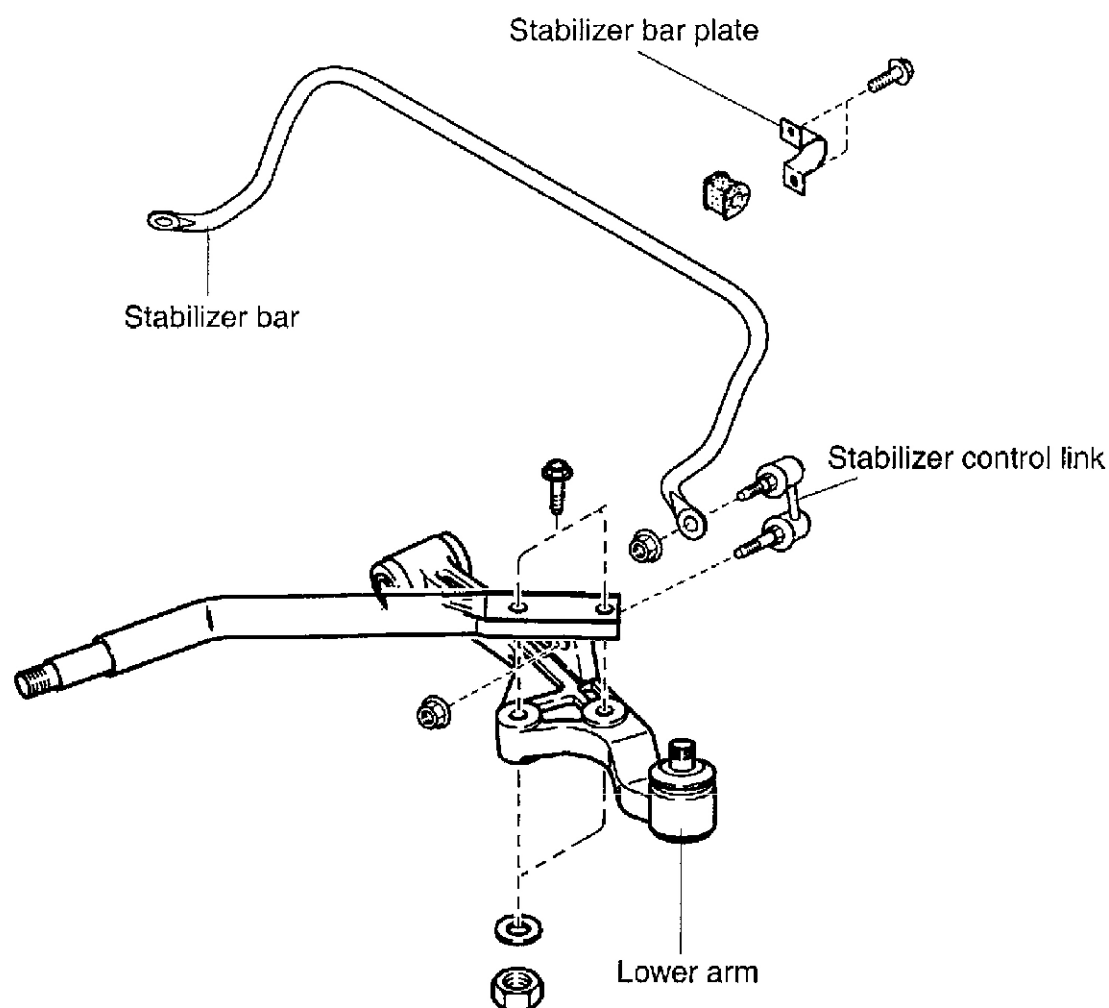
Tightening torque:

69-85 lb. ft (93-115 N.m, 9.5-11.7 kg.m)

6. Tighten the stabilizer control link nut on the lower control arm.
7. Install wheel and tire assembly.
8. Lower vehicle.
9. Check the front wheel alignment.

FRONT STABILIZER BAR

COMPONENT

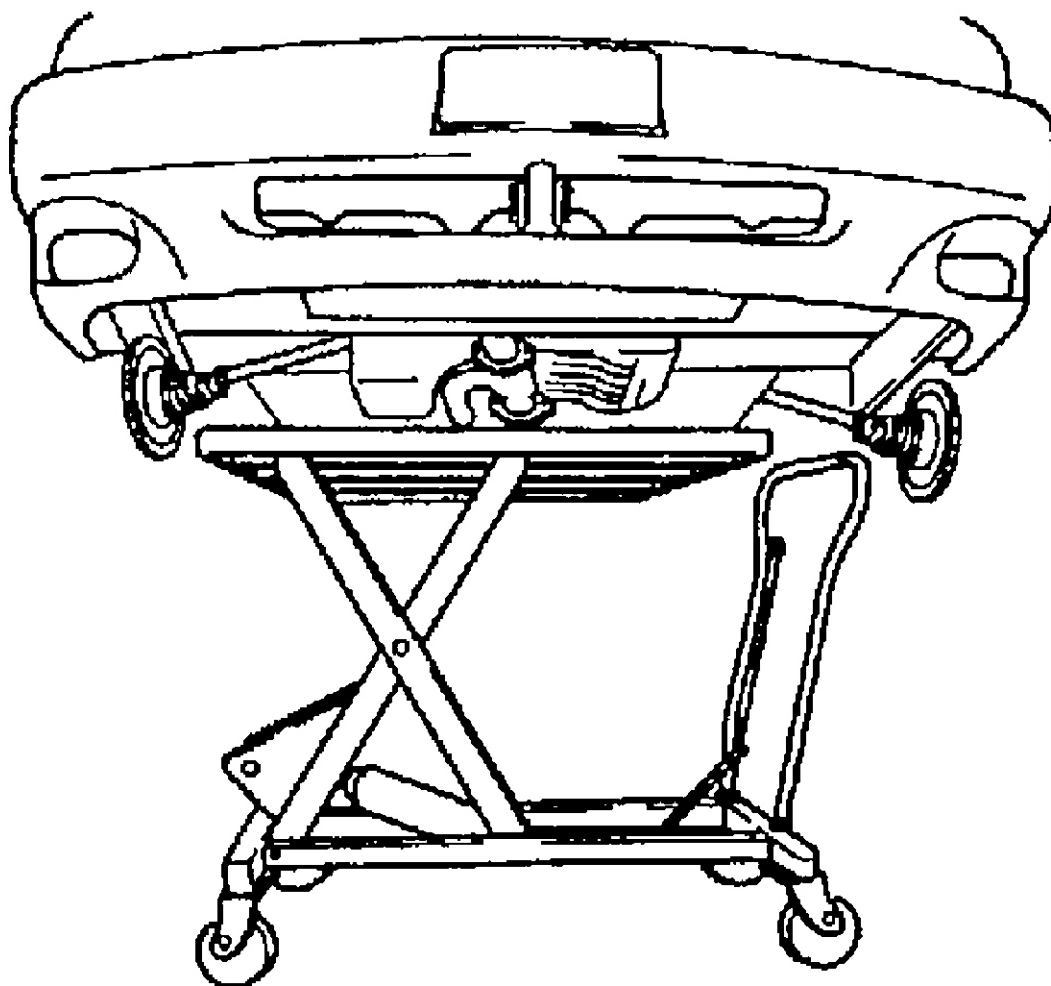


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Fig. 33: Illustrating Front Stabilizer Bar Components
Courtesy of KIA MOTORS AMERICA, INC.

REMOVAL

1. Lift front of vehicle and support it with safety stands.
2. Remove wheel and tire.
3. Remove stabilizer from control link.
4. Remove control link from the lower control arm.
5. Remove the exhaust pipe.
6. Position a suitable transaxle jack under the transaxle and secure it to the transaxle.



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Fig. 34: Positioning A Suitable Transaxle Jack
Courtesy of KIA MOTORS AMERICA, INC.

7. Remove engine mounting No. 1 and 2 from the subframe.
8. Remove stabilizer mounting bolts from the subframe.
9. Lower the subframe enough to pull the stabilizer out from behind the subframe.
10. Remove the stabilizer bar.

REPLACEMENT

1. Align the stabilizer bushing with the steel clamp on the stabilizer bar. Locate the bushing adjacent to the position line on stabilizer bar.

NOTE: Do not change replacement direction of the stabilizer control link when installing.

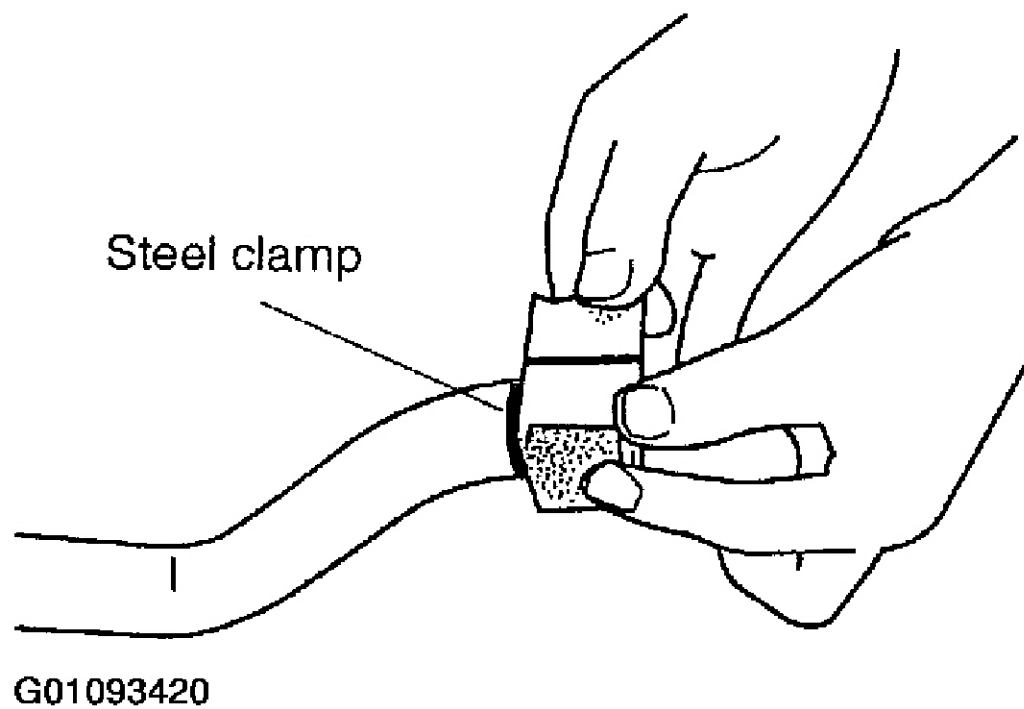
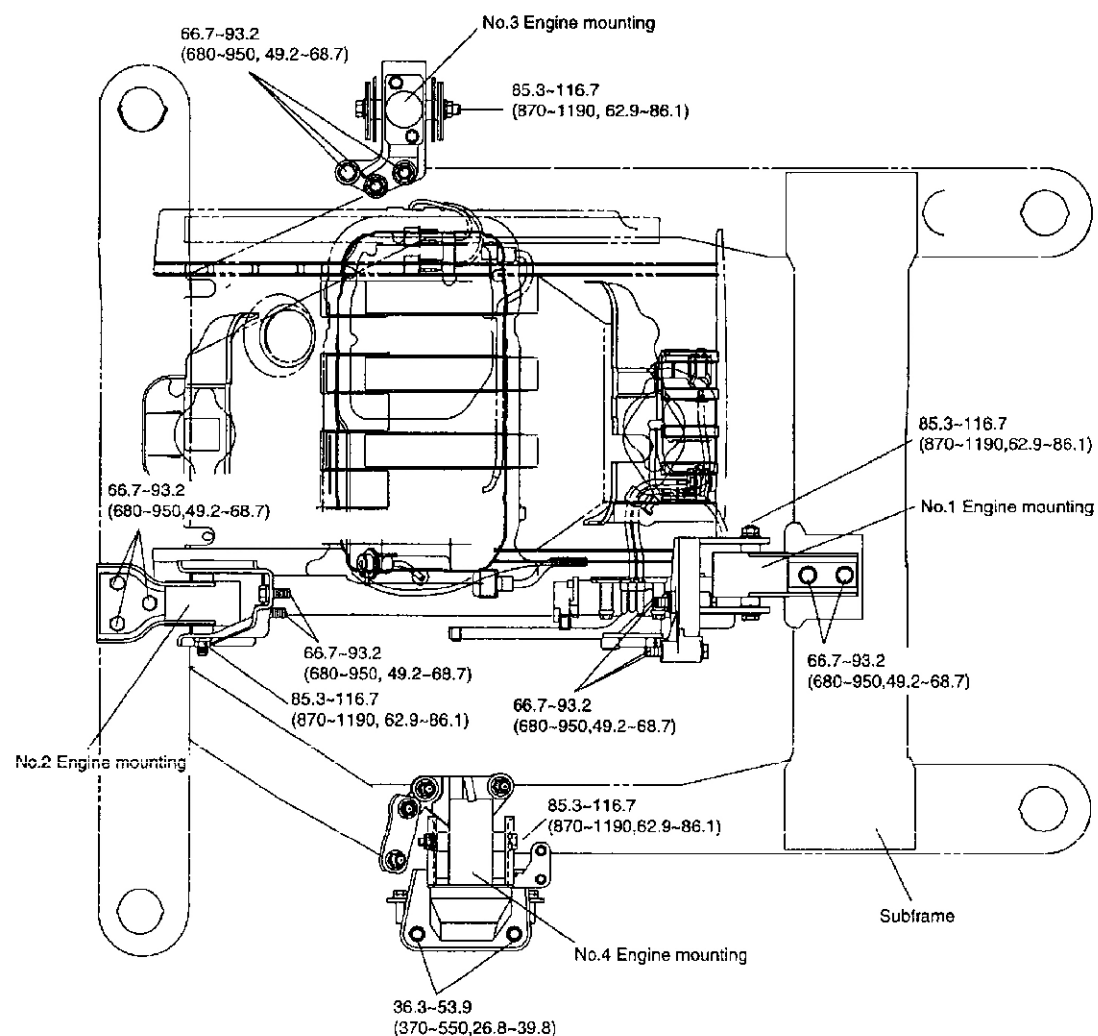


Fig. 35: Locating The Stabilizer Bushing
Courtesy of KIA MOTORS AMERICA, INC.

2. Position stabilizer behind the subframe.
3. Raise the subframe into place and tighten engine mounting No. 1 and 2 bolts and nuts to specified torque.



TORQUE : N·m (kg·cm, lb·ft)

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Fig. 36: Installing Engine Mounting Bolts & Nuts (1 Of 2)
 Courtesy of KIA MOTORS AMERICA, INC.

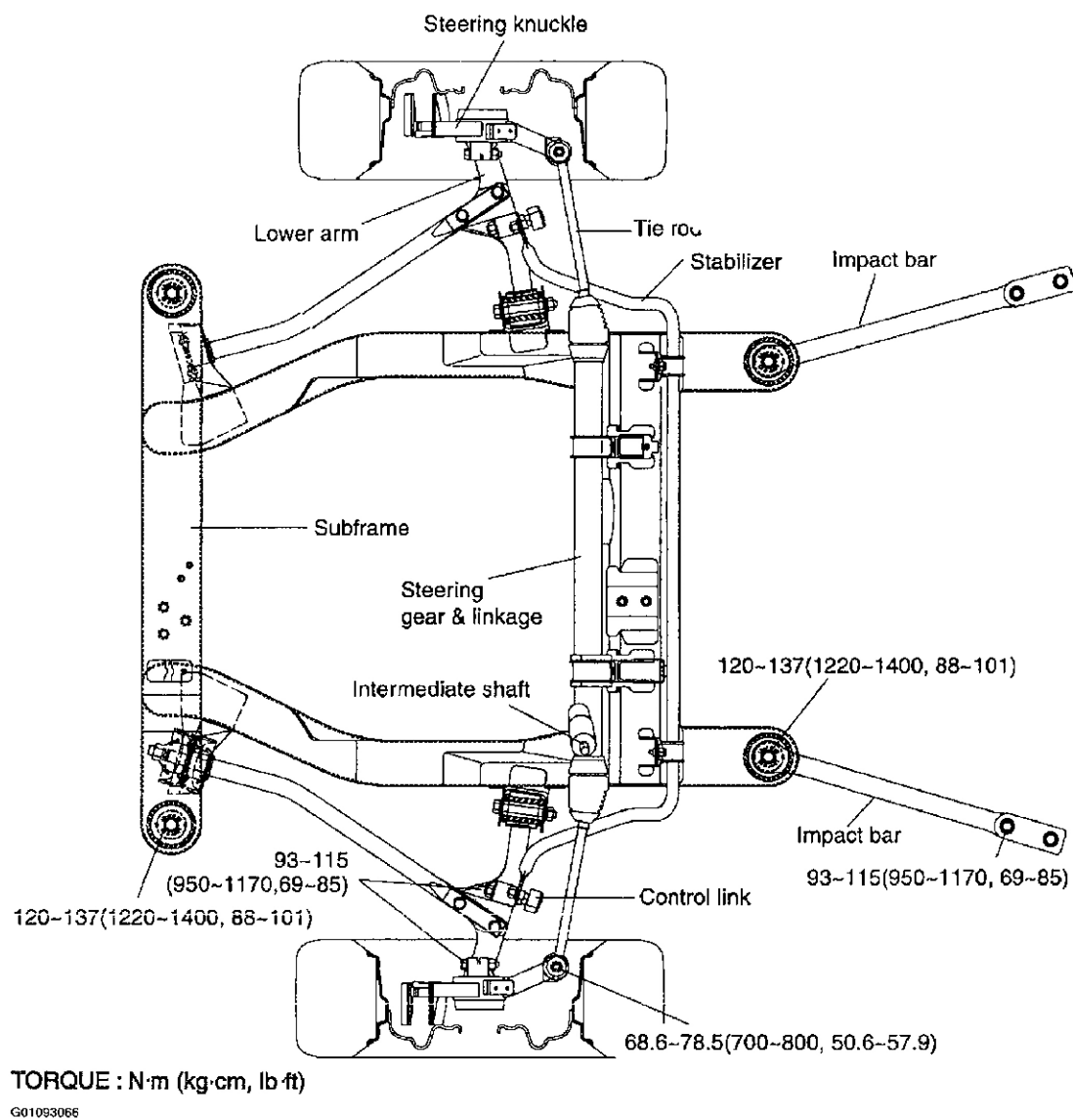


Fig. 37: Installing Engine Mounting Bolts & Nuts (2 Of 2)
 Courtesy of KIA MOTORS AMERICA, INC.

4. Tighten the stabilizer mounting bolts to the subframe.

Tightening torque:

16-20 lb. ft (21-26 N.m, 2.2-2.7 kg.m)

5. Install the exhaust pipe.
6. Install the stabilizer control link to the lower arm and stabilizer bar and then tighten two control link nuts.

Tightening torque:

69-85 lb. ft (93-115 N.m, 9.5-11.7 kg.m)

NOTE: Tighten the two control link nuts to specified torque before lowering vehicle.
 (Unload condition)

7. Remove a suitable transaxle jack under transaxle.

2005 Kia Sedona EX
2004-05 SUSPENSION Front Suspension - Sedona

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