



Suspension System

General Information



SPECIFICATIONS

FRONT SUSPENSION SYSTEM

Items					Specification	
Type					Macpherson strut	
Shock Absorber	Type				Gas	
	Stroke mm (in)				195.5 (7.70)	
	Expansion mm (in)				595.5 ± 3 (23.44 ± 0.12)	
	Compression mm (in)				400 + 3, -Free (15.75 + 3, Free)	
	I.D. Color			DIESEL	WHITE	
				GASOLINE	RED	
	Damping force (0.3 m/s)	DIESEL	Expansion N(kgf)		1265 ± 186 (129 ± 19)	
			Compression N (kgf)		618 ± 108 (63 ± 11)	
		GASOLINE	Expansion N(kgf)		980 ± 220 (100 ± 15)	
Compression N (kgf)			588 ± 118 (60 ± 12)			
Spring	DIESEL		Free height mm (in)		418.9 (16.49)	
			Load(kg)	I.D. Color	594.8~606.7	Yellow 2 point
					582.9~594.7	Yellow 1 point
	GASOLINE		Free height mm (in)		415.9 (16.37)	
			Load(kg)	I.D. Color	550.0~561.2	Green 2 point
					538.8~549.9	Green 1 point

REAR SUSPENSION SYSTEM

Items					Specification	
Type					Multi Link	
Shock Absorber	Type				Gas	
	Stroke mm (in)				170 (6.68)	
	Expansion mm (in)				478.0 ± 3 (18.82 ± 0.12)	
	Compression mm (in)				308 + 3, -Free (12.13 + 0.12, -Free)	
	I.D. Color			DIESEL	WHITE	
				GASOLINE	RED	
	Damping force (0.3 m/s)	DIESEL	Expansion N(kgf)		1540 ± 216 (157 ± 22)	
			Compression N (kgf)		647 ± 127 (66 ± 13)	
		GASOLINE	Expansion N(kgf)		1422 ± 206 (145 ± 21)	
			Compression N (kgf)		549 ± 108 (56 ± 11)	
	DIESEL		Free height mm (in)		286.7 (11.29)	
			Load(kg)	I.D. Color	642.2~674.7	Yellow 2 point

Spring	GASOLINE			610.0~642.2	Yellow 1 point
		Free height mm (in)		291.1(11.46)	
		Load(kg)	I.D. Color	623.6~653.0	White 2 point
				594.2~623.6	White 1 point

WHEELS AND TIRES

Items		Specification	
Tire Size		225/70 R16	
		235/60 R17	
Wheel Size	Steel	6.5J×16	
	Aluminium	6.5J×16	
		6.5J×17	
Tire Pressure KPa (kg/cm ² , psi)		Front	Rear
	225/70 R16	2.4(35)	2.4(35)
	235/60 R17	2.4(35)	2.4(35)

WHEEL ALIGNMENT

Items		Front	Rear
Camber		0°±0.5°	0.1°±0.5°
Caster	to Ground	3.77°±0.5°	-
Toe-in	Total	0°±0.2°	0.26°±0.2°
	Individual	0°±0.1°	0.17°±0.1°
King pin angle		12.45°±0.5°	-
Tread mm(in)		1685(66.34)	1685(66.34)

TIGHTENING TORQUE

FRONT SUSPENSION

Items	Nm	kgf.m	lb-ft
Front strut assembly mounting nut(to body)	45 ~ 60	4.5 ~ 6.0	32.5 ~ 43.4
Front strut assembly self-locking nut	60 ~ 70	6 ~ 7	43.4 ~ 50.6
Front strut assembly mounting bolt(to knuckle)	100 ~ 120	10 ~ 12	72.3 ~ 86.8
Front lower arm ball joint mounting bolt(to knuckle)	90 ~ 120	9 ~ 12	65.1 ~ 86.8
Front lower arm bushing(A) mounting bolt(to subframe)	160 ~ 180	16 ~ 18	115.7 ~ 130.2
Front lower arm bushing(G) mounting bolt(to subframe)	160 ~ 180	16 ~ 18	115.7 ~ 130.2
Front stabilizer link self-locking nut	100 ~ 120	10 ~ 12	72.3 ~ 86.8
Front stabilizer bar bracket mounting bolt(to Subframe)	39 ~ 60	3.9 ~ 6.0	28.2 ~ 43.4
Wheel nut	90 ~ 110	9 ~ 11	65.1 ~ 79.5

REAR SUSPENSION

Items	Nm	kgf.m	lb-ft
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Rear shock absorber bracket mounting bolt(to body)	80 ~ 110	8 ~ 11	57.9 ~ 79.5
Rear shock absorber bracket mounting nut(to body)	90 ~ 120	9~ 12	65.1 ~ 86.8
Rear shock absorber nut (to rear knuckle)	140 ~ 160	14 ~ 16	101.2 ~ 115.7
Rear upper arm ball joint nut (to rear knuckle)	90 ~ 110	9 ~ 11	65.1 ~ 79.5
Rear upper arm self-locking nut (to cross member)	160 ~ 180	16 ~ 18	115.7 ~ 130.2
Rear lower arm mounting bolt (to rear knuckle)	160 ~ 180	16 ~ 18	115.7 ~ 130.2
Rear lower arm mounting nut (to cross member)	200 ~ 270	20 ~ 27	144.7 ~ 195.3
Rear assist arm mounting bolt (to rear knuckle)	90 ~ 110	9 ~ 11	65.1 ~ 79.5
Rear assist arm mounting nut (to cross member)	90 ~ 120	9 ~ 12	65.1 ~ 86.8
Trailing arm bracket mounting nut (to body)	80 ~ 110	8 ~ 11	57.9 ~ 79.5
Trailing arm self-locking nut (to rear knuckle)	80 ~ 100	8 ~ 10	57.9 ~ 72.3
Trailing arm mounting bolt(to bracket)	160~ 180	16 ~ 18	115.7 ~ 130.2
Rear stabilizer bar bracket mounting bolt(to cross member)	39 ~ 60	3.9 ~ 6.0	28.2 ~ 43.4
Rear stabilizer link self-locking nut(to trailing arm)	50 ~ 65	5.0 ~ 6.5	36.2 ~ 47.0
Wheel nut	90 ~ 110	9 ~ 11	65.1 ~ 79.5
Rear cross member to body	160 ~ 180	16 ~ 18	115.7~130.2

CAUTION

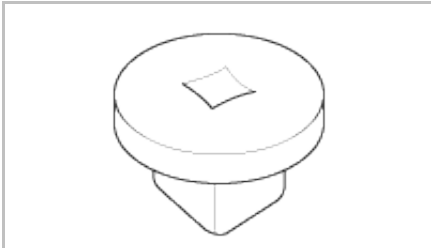
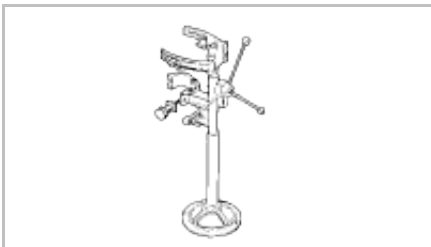
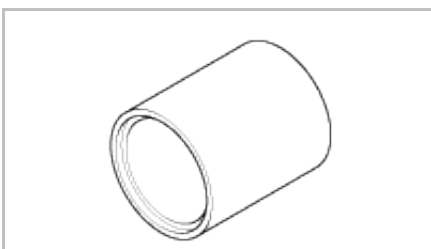
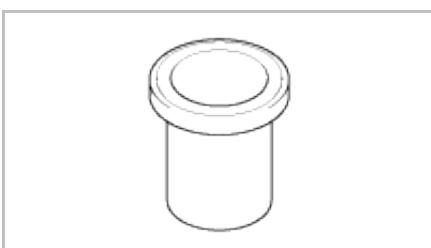
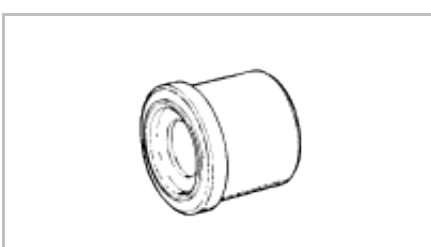
Replace the self-locking nuts with new ones after removal.

LUBRICANTS

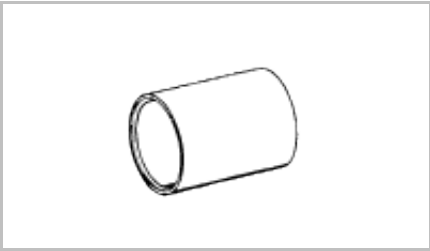
Items	The Recommended	Quantity
Front lower arm ball joint	Boot : CGMS03 (CMS-H006) Ball seat : CGMS02 (CMS-H006)	As required
Rear upper arm ball joint	Boot : CGMS03 (CMS-H006) Ball seat : CGMS01 (CMS-H006)	
Rear assist arm ball joint		
Stabilizer link ball joint(Front Rear)		



SPECIAL SERVICE TOOLS

Tool (Number and Name)	Illustration	Use
09568-4A000 Ball joint remover		Removal of Ball joint (Front upper arm/lower arm, & Rear upper arm)
09532-11600 Preload socket		Measurement of the front lower arm ball joint starting torque. (Use with torque wrench)
09546-26000 Strut spring compressor		Compression of the coil spring
09214-32000 Mount bushing remover and installer		Removal & installation of lower arm bushing(G) (Use with 09216-21100)
09216-21100 Mount bushing remover and installer		Removal & installation of lower arm bushing(G) (Use with 09216-32000)
09216-21600 Mount bushing remover and installer arbor		Removal and installation of trailing arm bushing (Use with 09552-38100)

09552-38100
Rear trailing arm bushing remover
and installer



Removal and installation of the rear
trailing arm bushing
(Use with 09216-21600)



TROUBLESHOOTING

Vehicle inspection

WHEEL/TIRE CHECK :

Tire Pressure Check **Yes/No**

Balance Check **Yes / No**

Maximum Runout Allowed :

Wheel : Radial _____ Lateral _____

Tire : Radial _____ Lateral _____

Measured Runout :

Tire/Wheel Radial : LF _____ LR _____ RF _____ RR _____

Lateral : LF _____ LR _____ RF _____ RR _____

Wheel Only Radial : LF _____ LR _____ RF _____ RR _____

Lateral : LF _____ LR _____ RF _____ RR _____

SUSPENSION INSPECTION :

Concerns Shimmy ☐ Clunk ☐ Squeak ☐ Harshness ☐

Suspension Bushing : Loose ☐ Worn ☐ Missing ☐ OK ☐

Front stabilizer ☐ Rear stabilizer (sway bar) ☐ Rear trailing arm ☐

Front lower arm ☐ Rear suspension front ☐ Rear suspension rear arm ☐

Other _____

Suspension/Components : Loose Worn Missing OK

Ball Joint ☐ Shock absorbers F/R ☐ Springs F/R ☐ The rod ends/sleeve ☐

SYMPTOM CHART

Symptom	Suspect Area	Remedy (See page)
Squeak or grunt-noise from the front suspension, occurs more in cold ambient temperatures-more noticeable over rough roads or when turning	Front stabilizer bar	Under these conditions, the noise is acceptable.
Clunk-noise from the front suspension, occurs in and out of turns	Loose front struts or shocks	Inspect for loose nuts or bolts. Tighten to specifications.
Clunk-noise from the rear suspension, occurs when shifting from reverse to drive	Loose rear suspension components	Inspect for loose or damaged rear suspension components. Repair or install new components as necessary.
Click or pop - noise from the front suspension - more noticeable over rough roads or over bumps	Worn or damaged ball joints	Install new lower arm as necessary.
Click or pop - noise occurs when vehicle is turning	Worn or damaged ball joints	Install new lower arm as necessary.
Click or snap - occurs when accelerating around a corner	Damaged or worn Birfield joint	Repair or install a new Birfield joint as necessary.

accelerating around a corner		See DS group - driveshaft.
Front suspension noise - A squeak, creak, or rattle noise - occurs mostly over bumps or rough roads	Steering components Loose or bent front struts or shock absorbers Damaged spring or spring mounts Damaged or worn arm bushings Worn or damaged stabilizer bar bushing or links	Go to detailed test A.
Groaning or grinding - noise from the front strut, occurs when driving on bumpy roads or turning the vehicle	Uneven seating surface between the insulator and panel by the burrs around the strut insulator mounting bolts and the insulator boltes mounting holes	Repair or install a new parts as necessary.
Rear suspension noise - a squeak, creak or rattle noise - occurs mostly over bumps or rough roads	Loose or bent rear shock absorbers Damaged spring or spring mounts Damaged or worn control arm bushings	Go to detailed test B.
Shudder - occurs during acceleration from a slow speed or stop	Rear axle assembly mis-positioned Damaged or worn front suspension components	Check the axle mounts and rear suspension for damage or wear. Repair as necessary. Check for a loose stabilizer bar, damaged or loose strut/strut bushings or loose or worn ball joints. Inspect the steering linkage for wear or damage. Repair or Install new components as necessary.
Shimmy - most noticeable on coast/deceleration - also hard steering condition	Excessive positive caster	Check the caster alignment angle. Correct as necessary.
Tire noise - hum/moan at constant speeds	Abnormal wear patterns	Spin the tire and Check for tire wear. Install a new tire as necessary. Inspect for damaged/worn suspension components. Perform wheel alignment.
Tire noise - noise tone lowers as the vehicle speed is lowered	Out-of-balance tire	Balance the tire and road test. Install a new tire as necessary.
Tire noise - ticking noise, change with speed	Nail puncture or stone in tire tread	Inspect the tire. Repair or replace as necessary.
Wheel and tire - vibration and noise concern is directly related to vehicle speed and is not affected by acceleration, coasting or decelerating	Damaged or worn tire	Go to detailed test C.
Tire wobble or shudder - occurs at lower speeds	Damaged wheel bearings	Spin the tire and check for abnormal wheel bearing play or roughness. Adjust or Install new wheel bearings as necessary. See DS group - front/rear axle.
	Damaged wheel	Inspect the wheel for damage. Install a new wheel as necessary.
	Damaged or worn suspension components	Inspect the suspension components for wear or damage. Repair as necessary.

	Loosen wheel nuts	Check the wheel nuts. Tighten to specification.
	Damaged or uneven tire wear	Spin the tire and Check for abnormal tire wear or damage. Install a new tire as necessary.
Tire shimmy or shake - occurs at lower speeds	Wheel/tire out of balance	
	Uneven tire wear	Check for abnormal tire wear. Install a new tire as necessary.
	Excessive radial runout of wheel or tire	Perform a radial runout test of the wheel and tire. Install a new tire as necessary.
	Worn or damaged wheel studs or elongate stud holes	Inspect the wheel studs and wheels. Install new components as necessary.
	Excessive lateral runout of the wheel or tire	Perform a lateral runout test of the wheel and tire. Check the wheel, tire and hub. Repair or Install new components as necessary.
	Foreign material between the brake disc and hub.	Clean the mounting surfaces of the brake disc and hub. See DS group - front/rear axle.
High speed shake or shimmy - occurs at high speeds	Excessive wheel hub runout Damaged or worn tires Damaged or worn wheel bearings Worn or damaged suspension or steering linkage Brake disc or drum imbalance	Go to detailed test D.
Drift left or right	Tires Steering linkage Alignment Base brake system	Go to detailed test E.
Steering wheel	Alignment Steering linkage Front lower arm ball joint	Go to detailed test F.
Tracks incorrectly	Rear suspension Caster	Go to detailed test G.
Rough ride	Front strut and spring assembly Rear shock absorber and spring assembly	Go to detailed test H.
Excessive noise	Front or rear stabilizer bar components Springs Suspension components Shock absorbers	Go to detailed test I.
Incorrect tire wear	Tire or unbalanced wheels Tire inflation Strut Alignment	Go to detailed test J.
Vibration	Wheel/tire Front wheel driveshaft(s) Steering system	Go to detailed test K.

	Strut and spring assembly Spring and strut mounting Front lower arm ball joint Front lower arm mounting bolt bushing Stabilizer bar bushings Wheel hubs and bearing Rear suspension arms and bushings	
Vehicle leans	Tire/wheel Vehicle load Suspension components Incorrect ride height	Inflate tires to specification. Redistribute the load as necessary. Visually inspect the suspension system. Correct the ride height as necessary.
Poor steering returnability	High knuckle rotating torque Alignment	Go to detailed test E.

DETAILED TEST A : FRONT SUSPENSION NOISE

CONDITIONS	DETAILS/RESULTS/ACTIONS
ROAD TEST THE VEHICLE	
	1. Test drive the vehicle. 2. During the road test, drive the vehicle over a rough road. Determine from which area/component the noise is originating. • Is there a squeak, creak or rattle noise ? → YES Go to → NO The suspension system is OK. Conduct a diagnosis on other suspect systems.
INSPECT THE STEERING SYSTEM	
	1. Check the steering system for wear or damage. Perform a steering linkage test. Inspect the tire wear pattern. • Are the steering components worn or damaged ? → YES Repair the steering system. Install new components as necessary. Test the system for normal operation. → NO Go to
FRONT SHOCK ABSORBER/STRUT CHECK	
	1. Check the front shock absorbers/strut mounts for loose bolts or nuts. 2. Check the front shock absorbers/struts for damage. Perform a shock absorber check. • Are the front shock absorbers/struts loose or damaged ? → YES Tighten to specifications if loose. Install new front shock absorbers/struts if damaged. Test the system for normal operation. → NO Go to
CHECK THE FRONT SPRINGS	
	Check the front spring and front spring mounts/brackets for wear or damage

	• Are the front springs or spring mounts/brackets worn or damaged ? → YES Repair or Install new components as necessary. Test the system for normal operation. → NO Go to A5.
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CHECK THE STABILIZER BAR

	1. Check the stabilizer bar bushings and links for damage or wear. 2. Check the stabilizer bar for damage. 3. Check for loose or damaged stabilizer brackets. • Are the stabilizer bar/track bar components loose, worn or damaged ? → YES Repair or Install new components as necessary. Test the system for normal operation. → NO Suspension system is OK. Conduct diagnosis on other suspect systems.
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DETAILED TEST B : REAR SUSPENSION NOISE

CONDITIONS	DETAILS/RESULTS/ACTIONS
ROAD TEST THE VEHICLE	
	1. Test drive the vehicle. 2. During the road test, drive the vehicle over a rough road. Determine from which area/component the noise is originating. • Is there a squeak, creak or rattle noise ? → YES Go to → NO The suspension system is OK. Conduct a diagnosis on other suspect systems.
REAR SHOCK ABSORBER/STRUT CHECK	
	1. Raise and support the vehicle. See GI group - lift support point. 2. Check the rear shock absorber/strut mounts for loose bolts or nuts. 3. Check the rear shock absorbers/strut for damage. Perform a shock absorber check. • Are the rear shock absorbers/struts loose or damaged ? → YES Tighten to specifications if loose. Install new rear shock absorbers/struts if damaged. Test the system for normal operation. → NO Go to
CHECK THE REAR SPRINGS	
	Check the rear springs and rear spring mounts/brackets for wear or damage. • Are the rear springs or spring mounts/brackets worn or damaged ? → YES Repair or Install new components as necessary. Test the system for normal

	operation. → NO Go to B4 .
CHECK THE TRAILING ARMS	
	1. Inspect the trailing arm bushings for wear or damage. Check for loose trailing arm bolts. 2. Inspect for twisted or bent trailing arms. • Are the trailing arms loose, damaged or worn ? → YES Repair or Install new components as necessary. Test the system for normal operation. → NO Suspension system is OK. Conduct diagnosis on other suspect systems.

DETAILED TEST C : WHEEL AND TIRE

CONDITIONS	DETAILS/RESULTS/ACTIONS
ROAD TEST THE VEHICLE	
	NOTICE Wheel or tire vibrations felt in the steering wheel are most likely related to the front wheel or tire. Vibration felt through the seat are most likely related to the rear wheel or tire. This may not always be true, but it can help to isolate the problem to the front or rear of the vehicle. Test drive the vehicle at different speed ranges. During the road test, if the vibration can be eliminated by placing the vehicle in neutral or is affected by the speed of the engine, the cause is not the wheels or tires. • Is there a vibration and noise ? → YES Go to C2 . → NO The wheel and tires are OK. Conduct a diagnosis on other suspect systems.
CHECK THE FRONT WHEEL BEARINGS	
	Check the front wheel bearings. Refer to Wheel Bearing Check (See DS group - front axle). • Are the wheel bearings OK ? → YES Go to C3 . → NO Inspect the wheel bearings. Adjust or Repair as necessary. Test the system for normal operation.
INSPECT THE TIRES	
	1. Check the tires for missing weights. 2. Check the wheels for damage.

	3. Inspect the tire wear pattern. Do the tires have an abnormal wear pattern ? → YES Correct the condition that caused the abnormal wear. Install new tire(s). Test the system for normal operation. → NO Go to
TIRE ROTATION DIAGNOSIS	
	1. Spin the tires slowly and watch for signs of lateral runout. 2. Spin the tires slowly and watch for signs of radial runout. Are there signs of visual runout ? → YES Go to → NO Check the wheel and tire balance. Correct as necessary. Test the system for normal operation.
RADIAL RUNOUT CHECK ON THE TIRE	
	Measure the radial runout of the wheel and tire assembly. A typical specification for total radial runout is 1.15mm (0.059 inch). Is the radial runout within specifications ? → YES Go toC8. → NO Go toC6.
RADIAL RUNOUT CHECK ON THE WHEEL	
	Measure the radial runout of the wheel. A typical specification for total radial runout is 1.14mm (0.045 inch.). Is the radial runout within specifications ? → YES Install a new tire. Test the system for normal operation. → NO Go toC7.
CHECK THE HUB/BRAKE DISC OR DRUM PILOT RUNOUT OR BOLT CIRCLE RUNOUT	
	Measure the pilot or bolt circle runout. A typical specification for radial runout is : - pilot runout - less than 0.15mm (0.006 inch.) - bolt circle runout - less than 0.38 mm (0.015 inch.) - Is the radial runout within specification ? → YES Install a new wheel. Test the system for normal operation. → NO Repair or Install new components as necessary.
LATERAL RUNOUT CHECK ON THE TIRE	
	Measure the lateral runout of the wheel and tire assembly. A typical

	specification for total lateral runout is 2.5mm (0.098 inch). • Is the lateral runout within specifications ? → YES Wheel and tires are OK. Conduct diagnosis on other suspect systems. → NO Go to C9.
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LATERAL RUNOUT CHECK ON THE WHEEL

	Measure the lateral runout of the wheel. A typical specification for total radial runout is 1.2mm (0.047 inch.) • Is the lateral runout within specifications ? → YES Install a new tire. Test the system for normal operation. → NO Go to C10.
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CHECK THE FLANGE FACE LATERAL RUNOUT

	Measure the flange face lateral runout. A typical specification for lateral runout is : • hub/brake disc - less than 0.13mm (0.005 inch) • Is the lateral runout within specifications ? → YES Install a new wheel. Test the system for normal operation. → NO Repair or Install new components as necessary.
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DETAILED TEST D :

CONDITIONS	DETAILS/RESULTS/ACTIONS
CHECK FOR FRONT WHEEL BEARING ROUGHNESS	
	1. Raise and support the front end of the vehicle so that the front wheel and tire assemblies can spin. See GI group - lift support point. 2. Spin the front tires by hand. • Do the wheel bearings feel rough ? → YES Inspect the wheel bearings. Repair as necessary. Test the system for normal operation. → NO Go to
CHECK THE END PLAY OF THE FRONT WHEEL BEARINGS	
	Check the end play of the front wheel bearings. • Is the end play OK ? → YES

	Go toD3. → NO Adjust or Repair as necessary. Test the system for normal operation.
MEASURE THE LATERAL RUNOUT AND THE RADIAL RUNOUT OF THE FRONT WHEELS ON THE VEHICLE	
	Measure the lateral runout and the radial runout of the front wheels on the vehicle. Go to detailed test C. • Are the measurements within specifications ? → YES Go toD4. → NO Install new wheels as necessary and Balance the assembly. Test the system for normal operation.
MEASURE THE LATERAL RUNOUT OF THE FRONT TIRES ON THE VEHICLE	
	Measure the lateral runout of the front tires on the vehicle. Go to detailed test C. • Is the runout within specifications ? → YES Go toD5. → NO Install new tires as necessary and Balance the assembly. Test the system for normal operation.
MEASURE THE RADIAL RUNOUT OF THE FRONT TIRES ON THE VEHICLE	
	Measure the radial runout of the front tires on the vehicle. Go to detailed test C. • Is the runout within specifications ? → YES Balance the front wheel and tire assemblies. If any tire cannot be balanced, Install a new tire. Test the system for normal operation. → NO Go toD6.
MATCH MOUNT THE TIRE AND WHEEL ASSEMBLY	
	Mark the high runout location on the tire and also on the wheel. Break the assembly down and rotate the tire 180 degrees (halfway around) on the wheel. Inflate the tire and measure the radial runout. • Is the runout within specifications ? → YES Balance the assembly. Test the system for normal operation. → NO If the high spot is not within 101.6mm (4 inches) of the first high spot on the tire, Go toD7.
MEASURE THE WHEEL FLANGE RUNOUT	

	Dismount the tire and mount the wheel on a wheel balancer. Measure the runout on both wheel flanges. Go to detailed test C • Is the runout within specifications ? → YES Locate and Mark the low spot on the wheel. Install the tire, matching the high spot on the tire with the low spot on the wheel. Balance the assembly. Test the system for normal operation. If the condition persists, Go to D8. → NO Install a new wheel. Check the runout on the new wheel. If the new wheel is within limits, locate and Mark the low spot. Install the tire, matching the high spot on the tire with the low spot on the wheel. Balance the assembly. Test the system for normal operation. If the condition persists, Go to D8.
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CHECK FOR VIBRATION FROM THE FRONT OF THE VEHICLE

	Spin the front wheel and tire assemblies with a wheel balancer while the vehicle is raised on a hoist. Feel for vibration in the front fender or while seated in the vehicle. • Is the vibration present ? → YES Substitute known good wheel and tire assemblies as necessary. Test the system for normal operation. → NO Check the driveline components. Test the system for normal operation.
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DETAILED TEST E : DRIFT LEFT OR RIGHT

CONDITIONS	DETAILS/RESULTS/ACTIONS
CHECK THE TIRES	
	Inspect the tires for excessive wear or damage. • Are the tires excessively worn or damaged ? → YES Install new tires. → NO Go to E2.
CHECK THE STEERING LINKAGE	
	1. Raise and support the vehicle. 2. Check the steering components for indications of excessive wear or damage. See ST group - specification. • Is there an indication of excessive wear or damage ? → YES Repair or Install new components as necessary. → NO Go to
CHECK THE VEHICLE ALIGNMENT	
	1. Place the vehicle on an alignment rack.

	Check the vehicle alignment. • Is the alignment within specification ? → YES Go to → NO Adjust the alignment as necessary. See page SS-69 (wheel alignment).
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BRAKE DRAG DIAGNOSIS

	Apply the brakes while driving. • Does drift or pull occur when the brakes are applied ? → YES See BR group - specification. → NO If the steering wheel is in the center, the vehicle is OK. If the steering wheel is off-center, Go to Detailed Test F.
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DETAILED TEST F : STEERING WHEEL OFF-CENTER

CONDITIONS	DETAILS/RESULTS/ACTIONS
CHECK THE CLEAR VISION	
	Place the vehicle on an alignment rack. • Is the clear vision within specification ? → YES Go to F2. → NO Adjust the clear vision to specification.
INSPECT THE STEERING COMPONENTS	
	1. Raise and support the vehicle. 2. Inspect the steering components for excessive wear or damage. See ST group - specification. • Are the steering components excessively worn or damaged ? → YES Repair or Install new components as necessary. → NO If it tracks correctly, vehicle is OK. If it tracks incorrectly, Go to Detailed Test

DETAILED TEST G : TRACKS INCORRECTLY

CONDITIONS	DETAILS/RESULTS/ACTIONS
CHECK THE CASTER	
	Place the vehicle on an alignment rack. • Is the caster within specification ? → YES Go to G2.

	→ NO Replace bent or damaged parts.
CHECK THE REAR SUSPENSION	
	1. Measure the vehicle wheel base for LH and RH. 2. Compare the measurements. • Are the measurements the same ? → YES If the ride is smooth, vehicle is OK. If the ride is rough, Go to Detailed Test → NO Inspect the rear suspension components for wear or damage. Repair or Install new components as necessary.

DETAILED TEST H : ROUGH RIDE

CONDITIONS	DETAILS/RESULTS/ACTIONS
CHECK THE FRONT SHOCK ABSORBER	
	1. Raise support the vehicle. 2. Inspect the front shock absorber for oil leaks or damage. • Are the tires excessively worn or damaged ? → YES Install new front shock absorbers. → NO Go to
CHECK THE REAR SHOCK ABSORBERS	
	Inspect the rear shock absorbers for oil leaks or damage. • Are the rear shock absorbers leaking ? → YES Install new rear shock absorbers. → NO The vehicle is OK. Go to TROUBLESHOOTING.

DETAILED TEST I : EXCESSIVE NOISE

CONDITIONS	DETAILS/RESULTS/ACTIONS
INSPECT THE SUSPENSION	
	1. Raise and support the vehicle. 2. Inspect the shock absorber mounting bolts. • Are the mounting bolts loose or broken ? → YES Tighten or Install new shock absorber mounting bolts. → NO Go to
INSPECT THE SPRING AND TORSION BARS	
	Inspect the springs and stabilizer bars for damage. • Are the spring or stabilizer bars damaged ? → YES

	Install new spring and/or stabilizer bars. → NO Go to 3 .
INSPECT THE FRONT SUSPENSION	
	Inspect the front suspension components for excessive wear or damage. • Are the front suspension components worn or damaged ? → YES Install new front suspension components. → NO The vehicle is OK. Go to TROUBLESHOOTING .

DETAILED TEST J : INCORRECT TIRE WEAR

CONDITIONS	DETAILS/RESULTS/ACTIONS
INSPECT THE TIRES	
	1. Raise and support the vehicle. 2. Inspect the tires for uneven wear on the inner or outer shoulder. • Is there uneven tire wear ? → YES Align the vehicle. Install new tires if badly worn. → NO Go to
UNEVEN TIRE WEAR	
	Inspect the tires for a feathering pattern. • Do the tires have a feathering pattern ? → YES Align the vehicle. Install new tires if badly worn. → NO Go to J3 .
CHECK FOR CUPPED TIRE	
	Inspect the tires for cupping or dishing. • Are the tires cupped or dished ? → YES Balance and Rotate the tires. → NO The vehicle is OK. Go to TROUBLESHOOTING .

DETAILED TEST K : VIBRATION

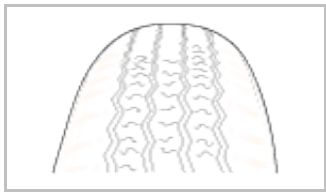
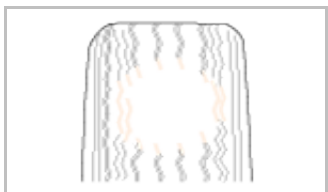
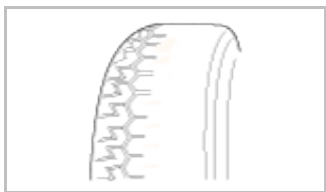
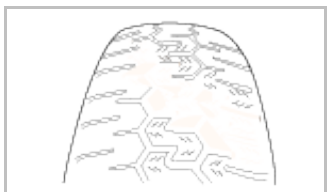
CONDITIONS	DETAILS/RESULTS/ACTIONS
ROAD TEST	
	Accelerate the vehicle to the speed at which the customer indicated the vibration occurred.

	• Is the vibration present ? → YES Go toK2. → NO The vehicle is OK. Go toTROUBLESHOOTING.
INSPECT THE TIRES	
	1. Raise and support the vehicle with a frame contact hoist. 2. Inspect the tires for extreme wear or damage, cupping, or flat spots. • Are the tires OK ? → YES Go to → NO Check the suspension components for misalignment, abnormal wear, or damage that may have contributed to the tire wear. Correct the suspension concerns and Install new tires.
INSPECT THE WHEEL BEARINGS	
	Spin the tires by hand to check for wheel bearing roughness. • Is the front wheel bearing OK ? → YES Go toK4. → NO Install new front wheel bearings as necessary. See Ds group - front axle.
TIRE/WHEEL BALANCE	
	Check the tire/wheel balance. • Are the tires balanced ? → YES Go toK5. → NO Balance the tires and wheels as necessary.
MEASURE THE RUNOUTS	
	For each wheel position measure, locate and mark the following items. - High point of the tire/wheel assembly total radial runout - High point of the wheel radial runout - High point of the wheel lateral runout • Are the runouts as specified ? → YES Go toK7. → NO Go toK6.
SUBSTITUTE THE WHEELS AND TIRE	

1. Substitute a known good set of wheels and tires.
2. Perform a road test.
3. If the vehicle still exhibits a shake or vibration, note the vehicle speed and/or engine rpm which it occurs.
 - Is the vibration felt ?
 - **YES**
Engine/transmission imbalance.
See the specification of TR group, EM group, FL group and EC group.
 - **NO**
Install the original tire/wheel assemblies one by one, Road testing at each step until the damaged tire(s)/wheel(s) as necessary. Test the system for normal operation.

Wheel /tire noise, vibration and harshness concerns are directly related to vehicle speed and are not generally affected by acceleration, coasting or decelerating. Also, out-of-balance wheel and tires can vibrate at more than one speed. A vibration that is affected by the engine rpm, or is eliminated by placing the transmission in Neutral is not related to the tire and wheel. As a general rule, tire and wheel vibrations felt in the steering wheel are related to the front tire and wheel assemblies. Vibrations felt in the seat or floor are related to the rear tire and wheel assemblies. This can initially isolate a concern to the front or rear.

Careful attention must be paid to the tire and wheels. There are several symptoms that can be caused by damaged or worn tire and wheels. Perform a careful visual inspection of the tires and wheel assemblies. Spin the tires slowly and watch for signs of lateral or radial runout. Refer to the tire wear chart to determine the tire wear conditions and actions

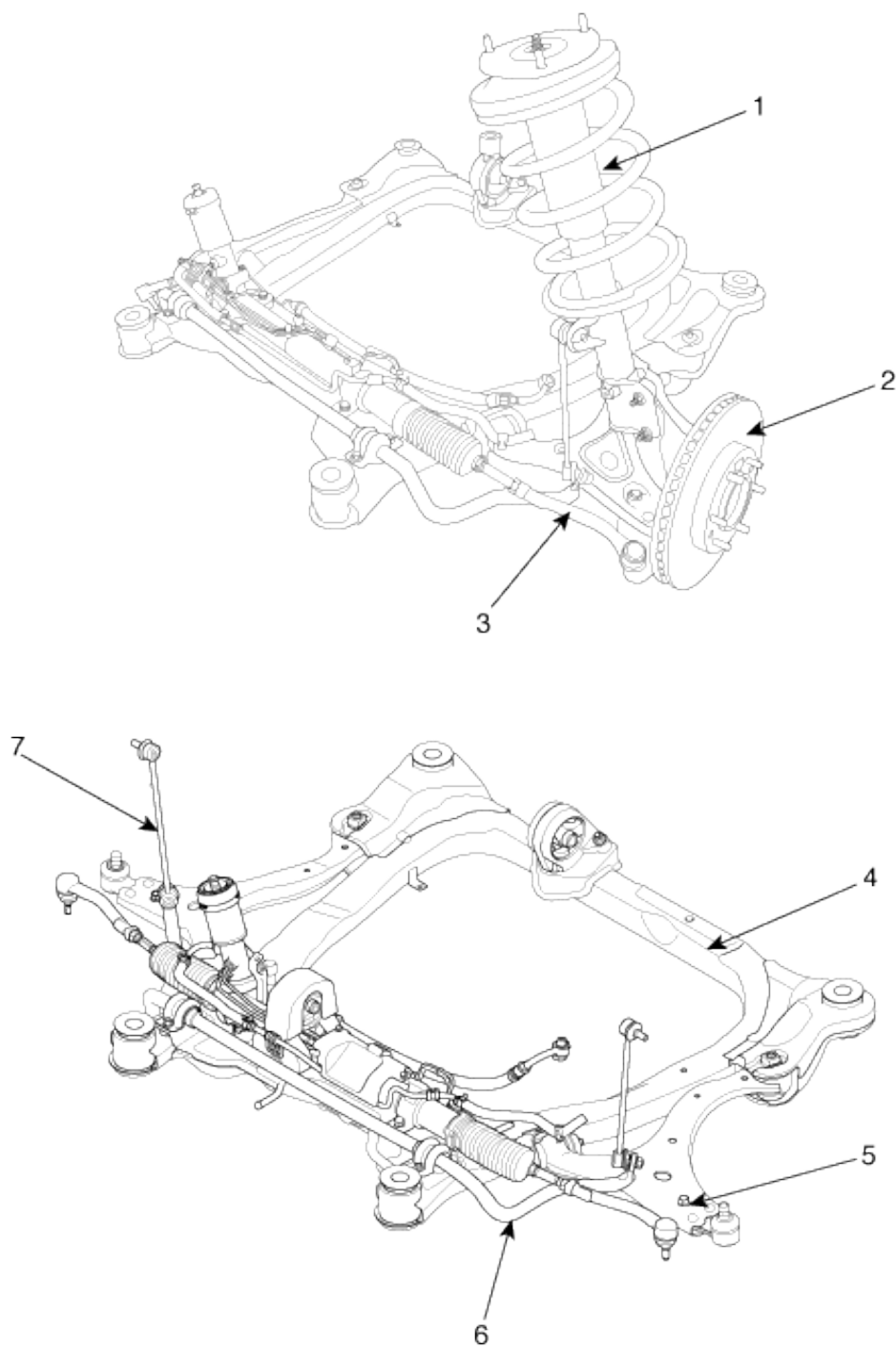
WHEEL AND TIRE DIAGNOSIS		
Rapid wear at the center	Rapid wear at both shoulders	Wear at one shoulder
		
• Center-tread down to fabric due to excessive over inflated tires • Lack of rotation • Excessive toe on drive wheels • Heavy acceleration on drive	• Under-inflated tires • Worn suspension components • Excessive cornering speeds • Lack of rotation	• Toe adjustment out of specification • Camber out of specification • Damaged strut • Damaged lower arm
Partial wear	Feathered edge	Wear pattern
		
• Caused by irregular burrs on brake drums	• Toe adjustment out of specification • Damaged or worn tie rods • Damaged knuckle	• Excessive toe on non-drive wheels • Lack of rotation



Suspension System

Front Suspension System

COMPONENTS



- 1. Front strut assembly
- 2. Front disk
- 3. Tie rod end assembly
- 4. Front subframe

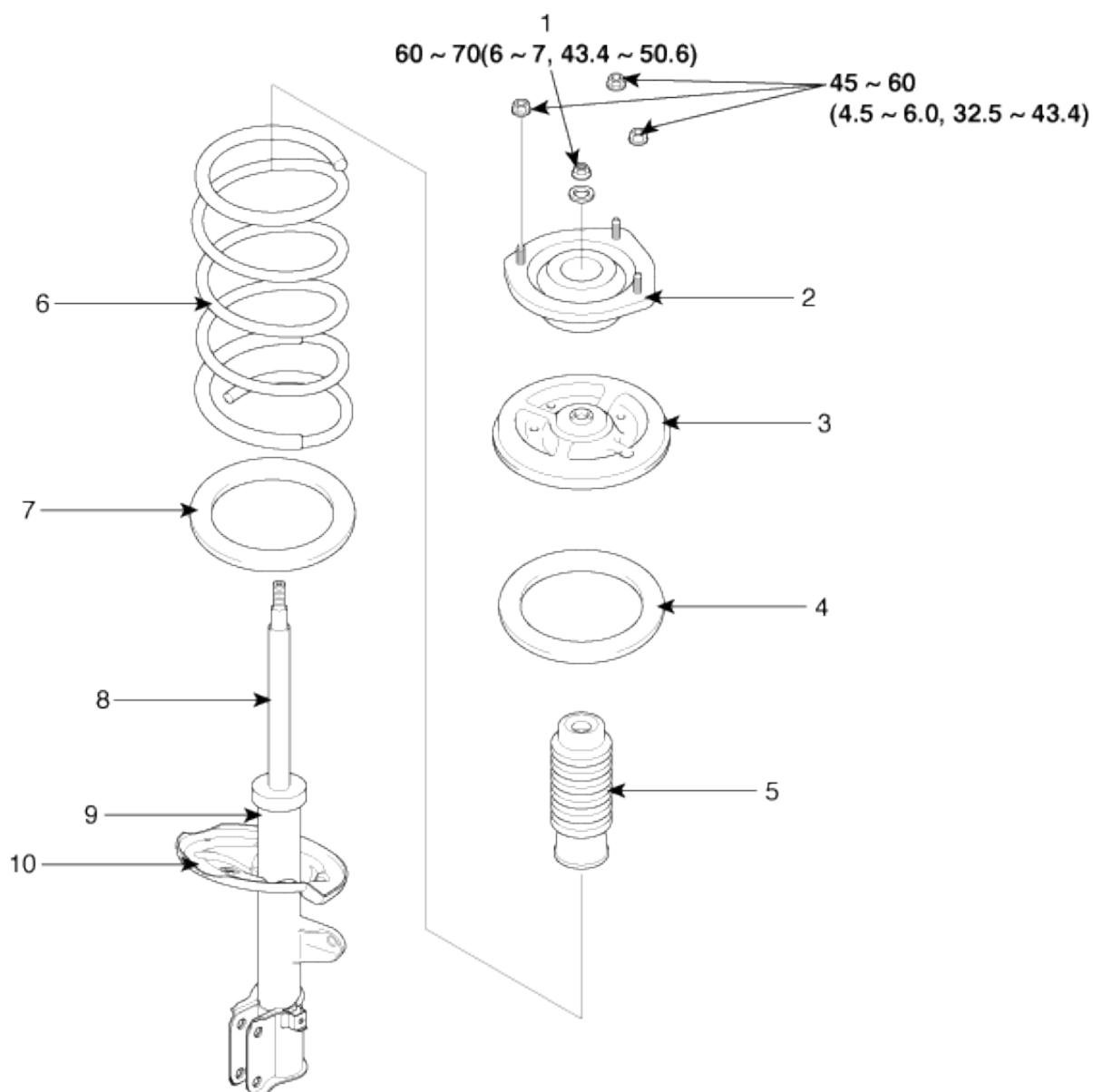
- 5. Front lower arm
- 6. Front stabilizer bar assembly
- 7. Front stabilizer link assembly



Suspension System

Front Suspension System - Front Strut Assembly

COMPONENTS



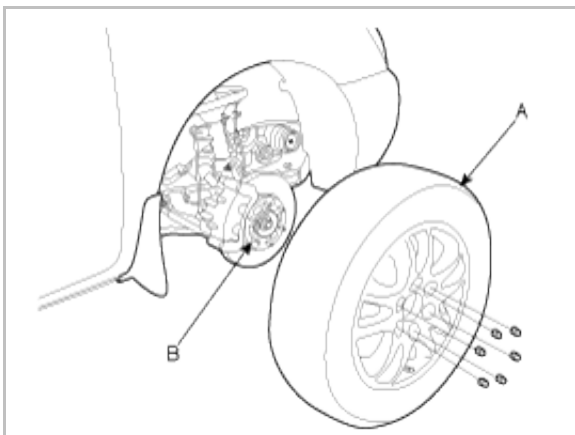
TORQUE : Nm (kgf.m, lb-ft)

- | | |
|---|-----------------------|
| 1. Self-locking nut | 6. Coil spring |
| 2. Insulator | 7. Spring lower pad |
| 3. Spring upper seat | 8. Piston rod |
| 4. Spring upper pad | 9. Strut assembly |
| 5. Strut dust cover and Urethane bumper | 10. Spring lower seat |



REMOVAL

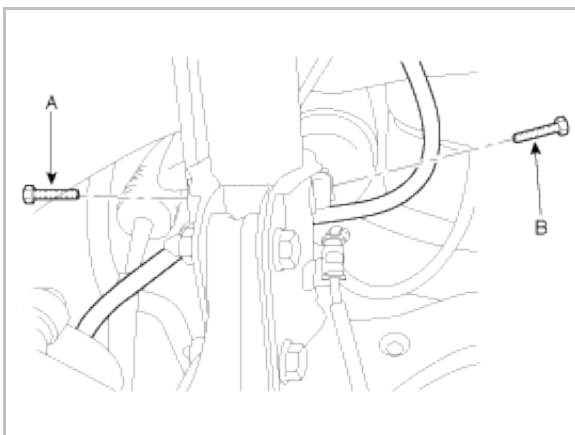
1. Loosen the wheel nuts slightly.
Raise the front of the vehicle, and make sure it is securely supported.
2. Remove the front wheel and tire (A) from front hub (B).



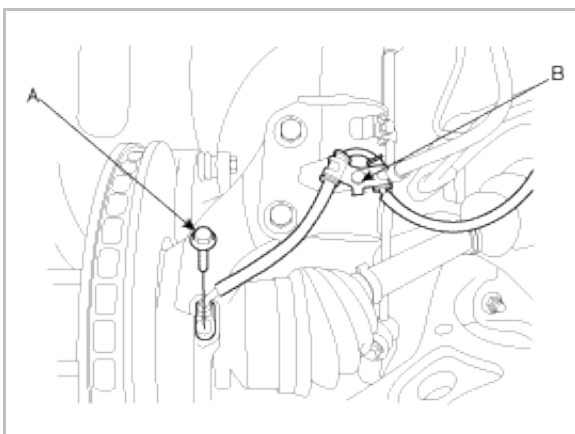
CAUTION

Be careful not to damage to the hub bolts (C) when removing the front wheel and tire (A).

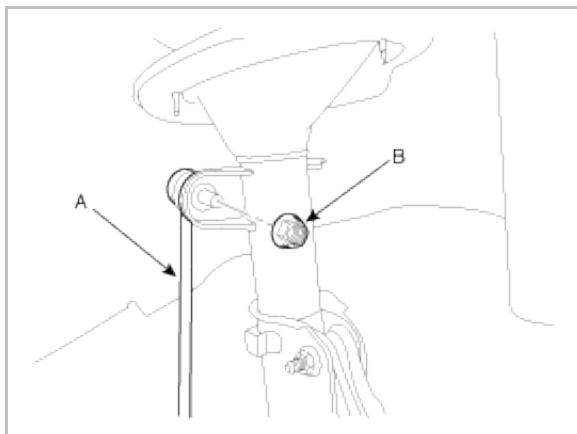
3. Remove the brake hose bracket bolt (A, B) from the front strtu assembly.



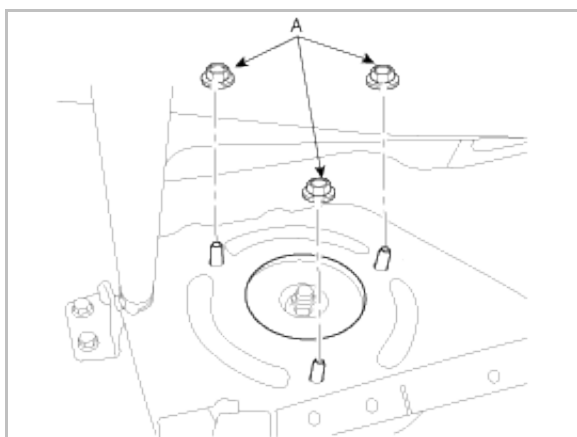
4. Remove the speed sensor (A) and wire (B) bolts from the front knuckle.



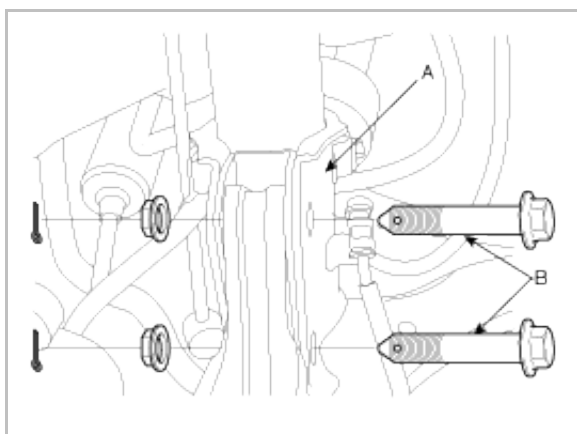
5. Remove the front stabilizer link (A) nut (B) from the strut assembly.



6. Remove the strut upper mounting nuts(A).



7. Remove the front strut assembly (A) bolts (B) from the front knuckle.

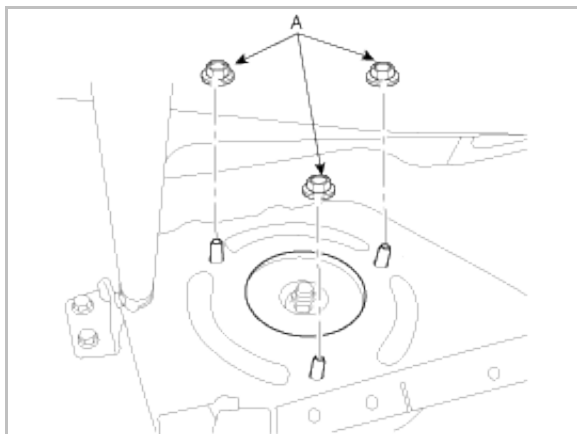


INSTALLATION

1. Install the strut upper mounting nuts (A).

Tightening torque Nm (kgf.m, lb-ft) :

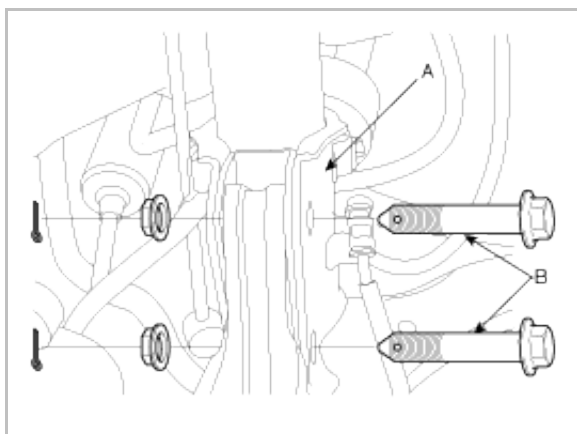
45 ~ 60 (4.5 ~ 6.0, 32.5 ~ 43.4)



2. Install the front strut assembly (A) bolts (B) to the front knuckle.

Tightening torque Nm (kgf.m, lb-ft) :

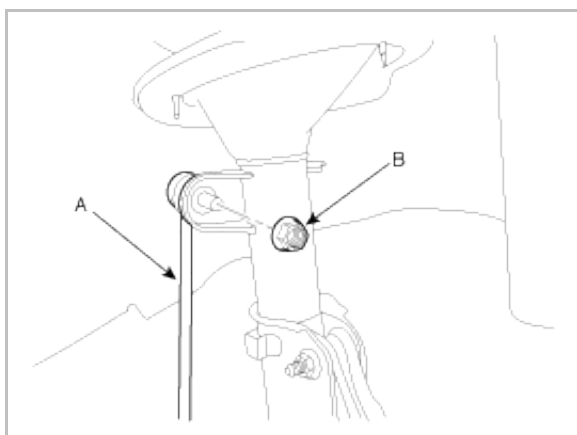
100 ~ 120 (10 ~ 12, 72.3 ~ 86.8)



3. Install the front stabilizer link (A) nut (B) to the strut assembly.

Tightening torque Nm (kgf.m, lb-ft) :

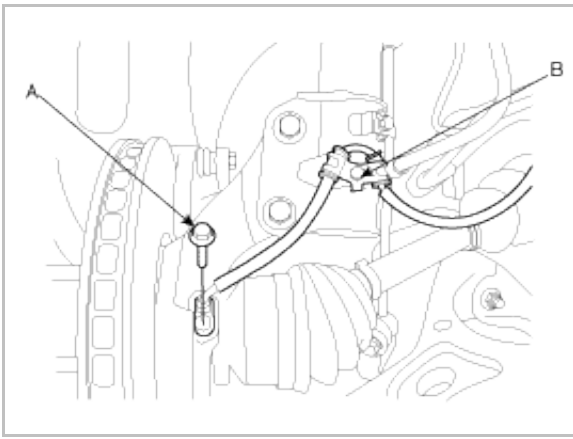
100 ~ 120 (10 ~ 12, 72.3 ~ 86.8)



4. Install the speed sensor (A) and wire (B) bolts.

Tightening torque Nm (kgf.m, lb-ft) :

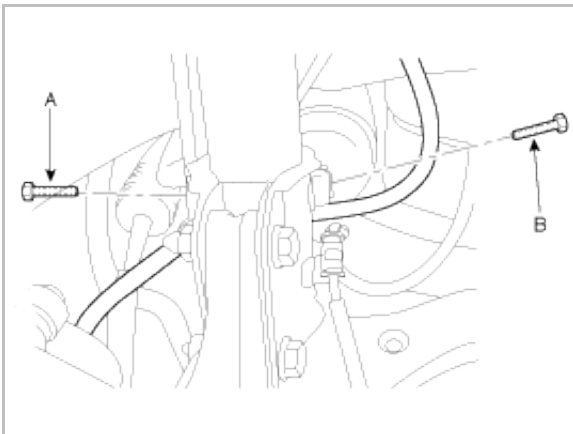
7 ~ 11 (0.7 ~ 1.1, 5.1 ~ 8.0)



5. Install the brake hose bracket bolt (A, B) to the axle assembly.

Tightening torque Nm (kgf.m, lb-ft) :

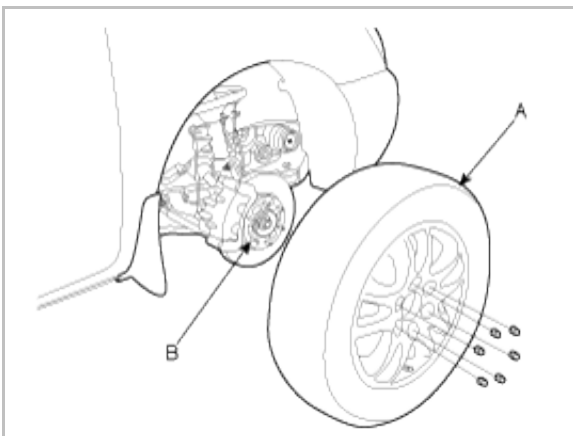
6.9 ~ 11 (0.7 ~ 1.1, 5.1 ~ 8.0)



6. Install the wheel and the tire (A) to the front hub (B).

Tightening torque Nm (kgf.m, lb-ft) :

90 ~ 110 (9 ~ 11, 65.1 ~ 79.5)

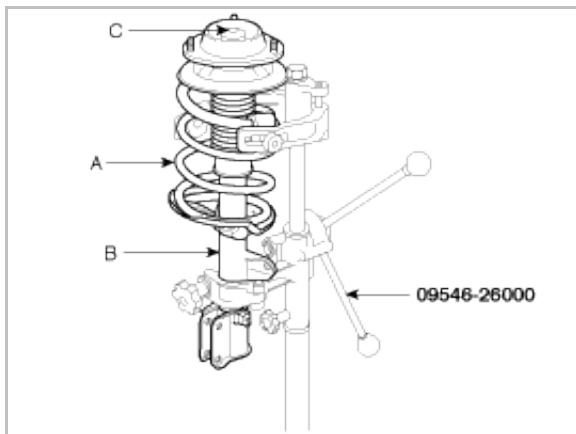


CAUTION

Be careful not to damage the hub bolts(C) when installing the front wheel and tire(A).

DISASSEMBLY

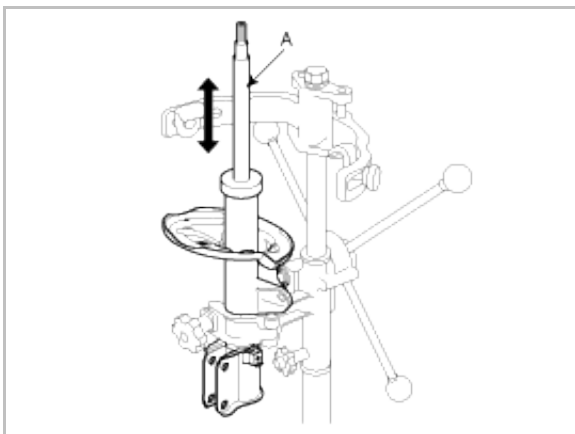
1. Using the special tool (09546-26000), compress the coil spring (A).



2. Remove the self-locking nut (C) from the strut assembly (B).
3. Remove the insulator, spring seat, coil spring and dust cover from the strut assembly.

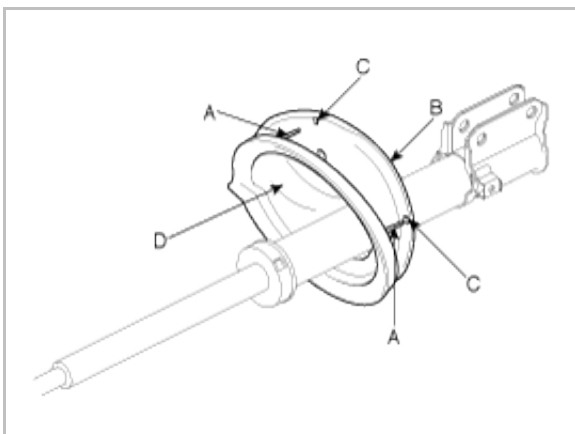
INSPECTION

1. Check the strut insulator for wear or damage.
2. Check rubber parts for damage or deterioration.
3. Compress and extend the piston rod (A) and check that there is no abnormal resistance or unusual sound during operation.



REASSEMBLY

1. Install the spring lower pad (D) so that the protrusions (A) fit in the holes (C) in the spring lower seat (B).



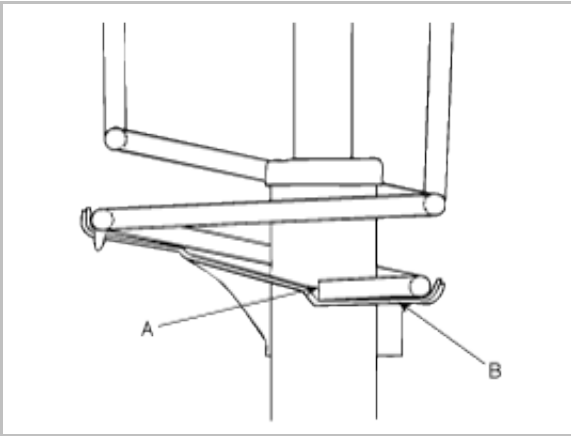
2. Compress coil spring using special tool (09546-26000).
Install compressed coil spring into shock absorber.

NOTICE

- 1) Indicated two identification color marks on the coil spring one follows model option the other follows load classification according to the below.
Pay attention to distinguish between the two marks and then install them.

2) Install the coil spring with the identification mark directed toward the knuckle.

3. After fully extending the piston rod, install the spring upper seat and insulator assembly.
4. After seating the upper and lower ends of the coil spring (A) in the upper and lower spring seat grooves (B) correctly, tighten new self-locking nut temporarily.



5. Remove the special tool (09546-26000).
6. Tighten the self-locking nut to the specified torque.

Tightening torque :

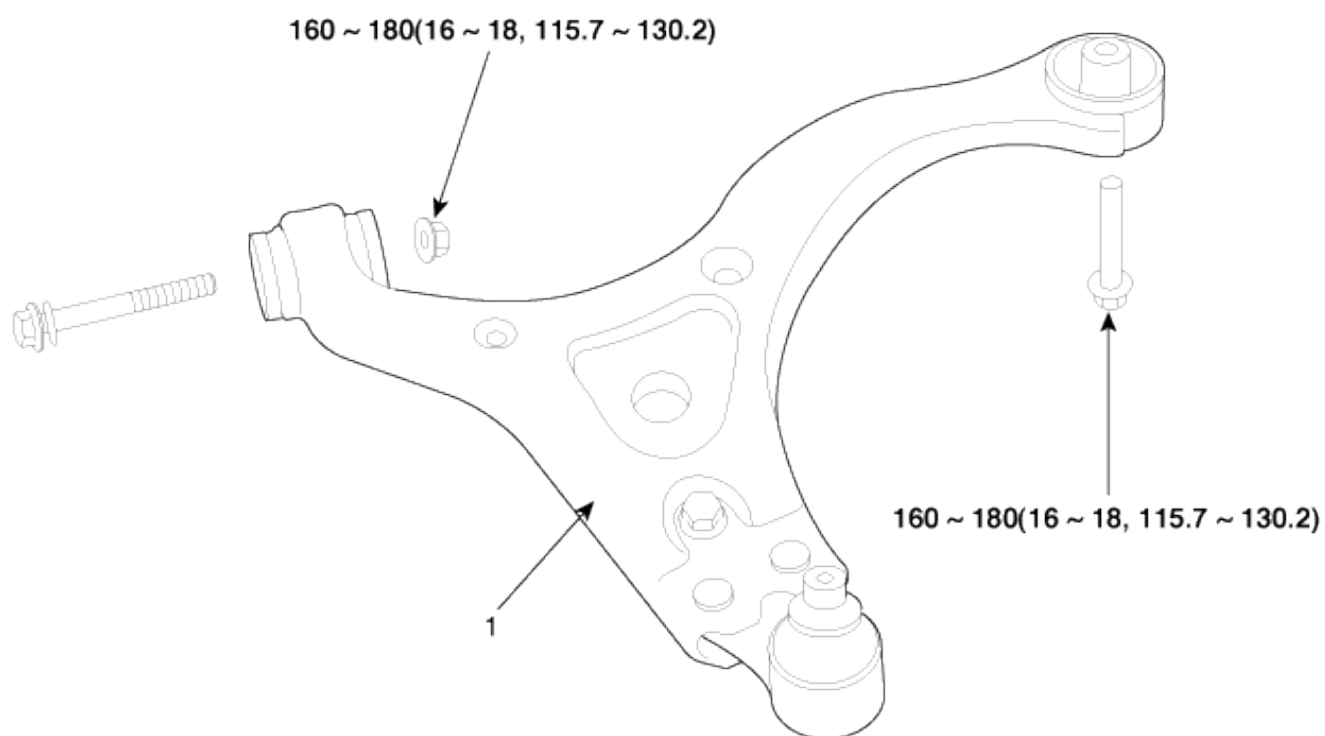
60 ~ 70 Nm (6 ~7 kgf.m, 43.4 ~ 50.6 lb-ft)



Suspension System

Front Suspension System - Front Lower Arm

COMPONENTS



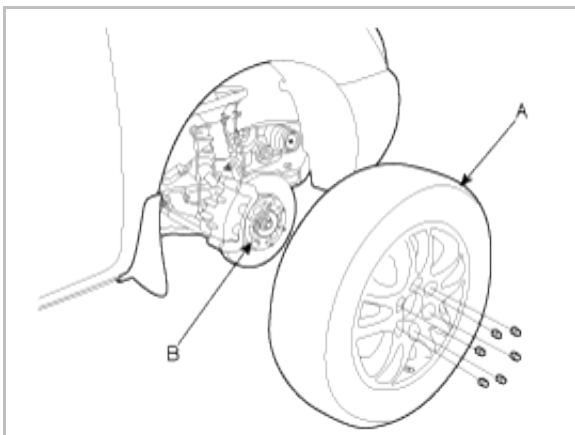
TORQUE : Nm (kgf.m, lb-ft)

1. Front lower arm



REMOVAL

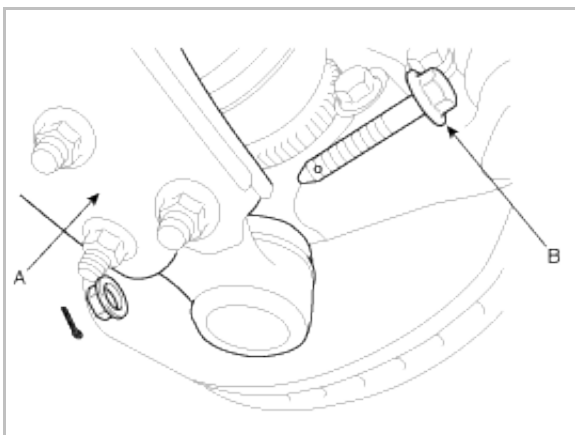
1. Loosen the wheel nuts slightly.
Raise the front of the vehicle, and make sure it is securely supported.
2. Remove the front wheel and tire (A) from front hub (B).



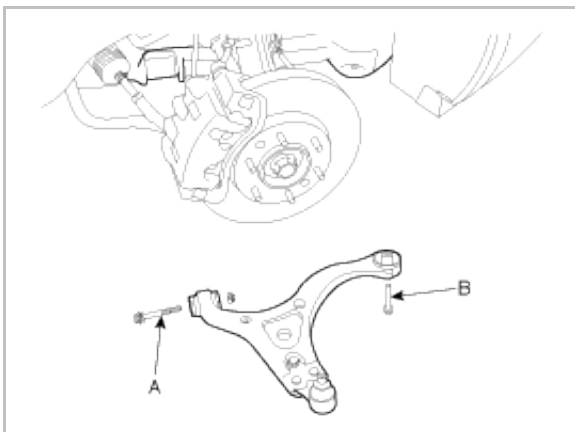
CAUTION

Be careful not to damage the hub bolts(C) when removing the front wheel and tire(A).

3. Remove the front lower arm (A) mounting bolt (B) from the knuckle.

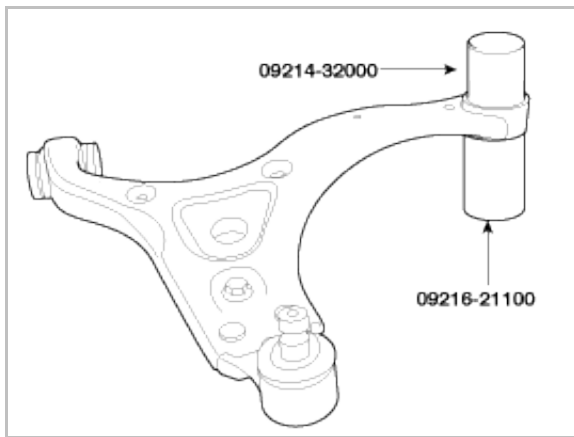


4. Remove the lower arm mounting bolts (A, B).

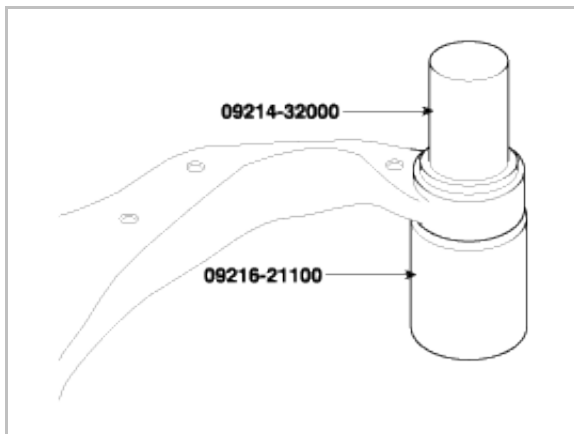


REPLACEMENT

1. Using the special tools(09214-32000 & 09216- 211000), remove the bushing from the lower arm.



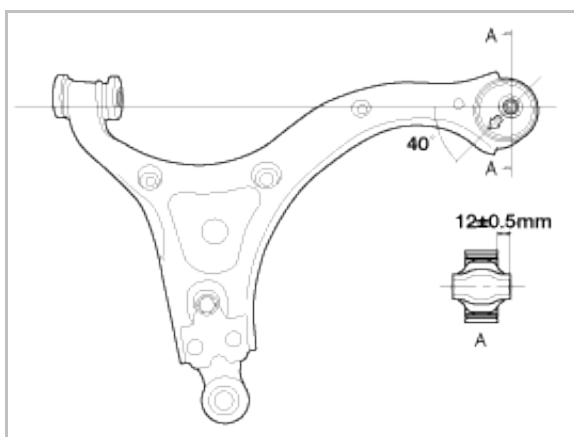
2. Apply soap solution to the following parts.
 - A. Outer surface of the bushing.
 - B. Inner surface of the lower bushing mounting part.
3. Using the special tools(09214-32000 & 09216-21100), install the busing on the lower arm.



CAUTION

Insert bushing in the direction shown in the illustration.

Separation force is over 100 Nm (1000Kgf, 2204 lbf)

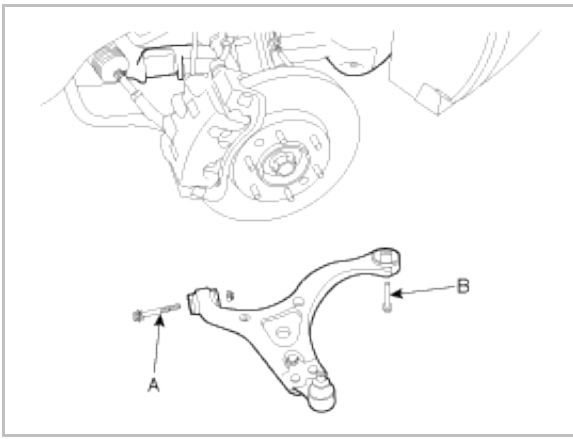


INSTALLATION

1. Install the lower arm mounting bolts (A, B).

Tightening torque Nm (kgf.m, lb-ft) :

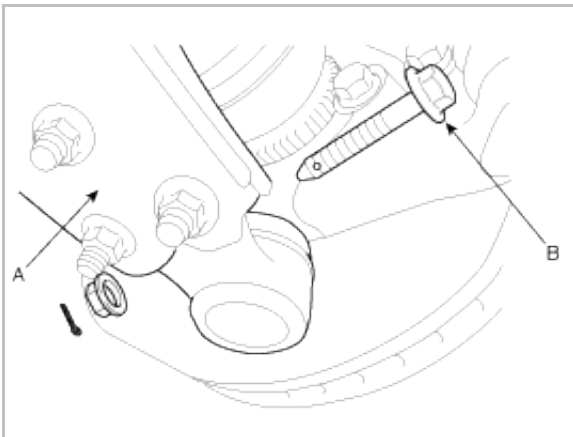
160 ~ 180 (16 ~ 18, 115.7 ~ 130.2)



2. Install the front lower arm (A) ball joint mounting bolt (B) to the knuckle.

Tightening torque Nm (kgf.m, lb-ft) :

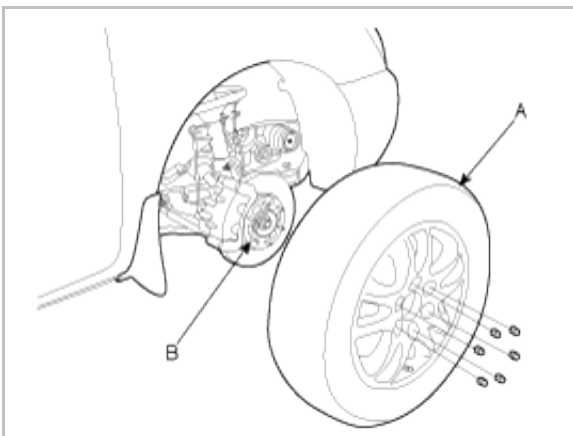
90 ~ 120 (9 ~ 12, 65.1 ~ 86.8)



3. Install the wheel and the tire(A) to the front hub(B).

Tightening torque Nm (kgf.m, lb-ft) :

90 ~ 110 (9 ~ 11, 65.1 ~ 79.5)



CAUTION

Be careful not to damage the hub bolts(C) when installing the front wheel and tire(A).

INSPECTION

1. Check the bushing for wear and deterioration.
2. Check the lower arm for bending or breakage.
3. Check the ball joint dust cover for cracks.

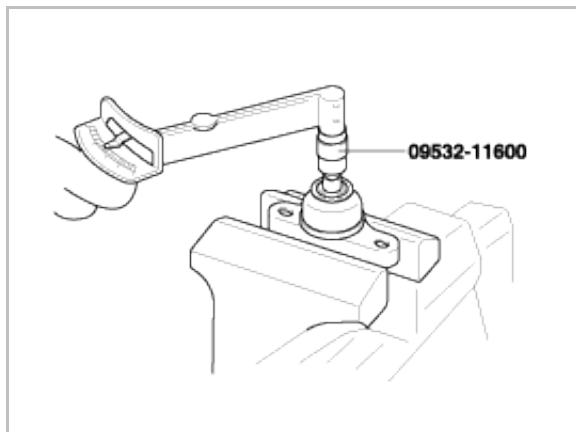
4. Check all bolts.
5. Check the lower arm ball joint for rotating torque.
 - (1) If a crack is noted in the dust cover, replace the ball joint assembly.
 - (2) Move the ball joint stud several times in a circular motion.
 - (3) Measure the ball joint rotating torque.

Standard value :

1 ~ 3.5 Nm (10 ~ 35 kgf.cm, 0.72 ~ 2.53 lb-ft)

NOTICE

Measure torque using the special tool(09532-11600) and torque wrench at the range of 0.5 - 2 rpm after moving the ball joint stud 10 times at room temperature.



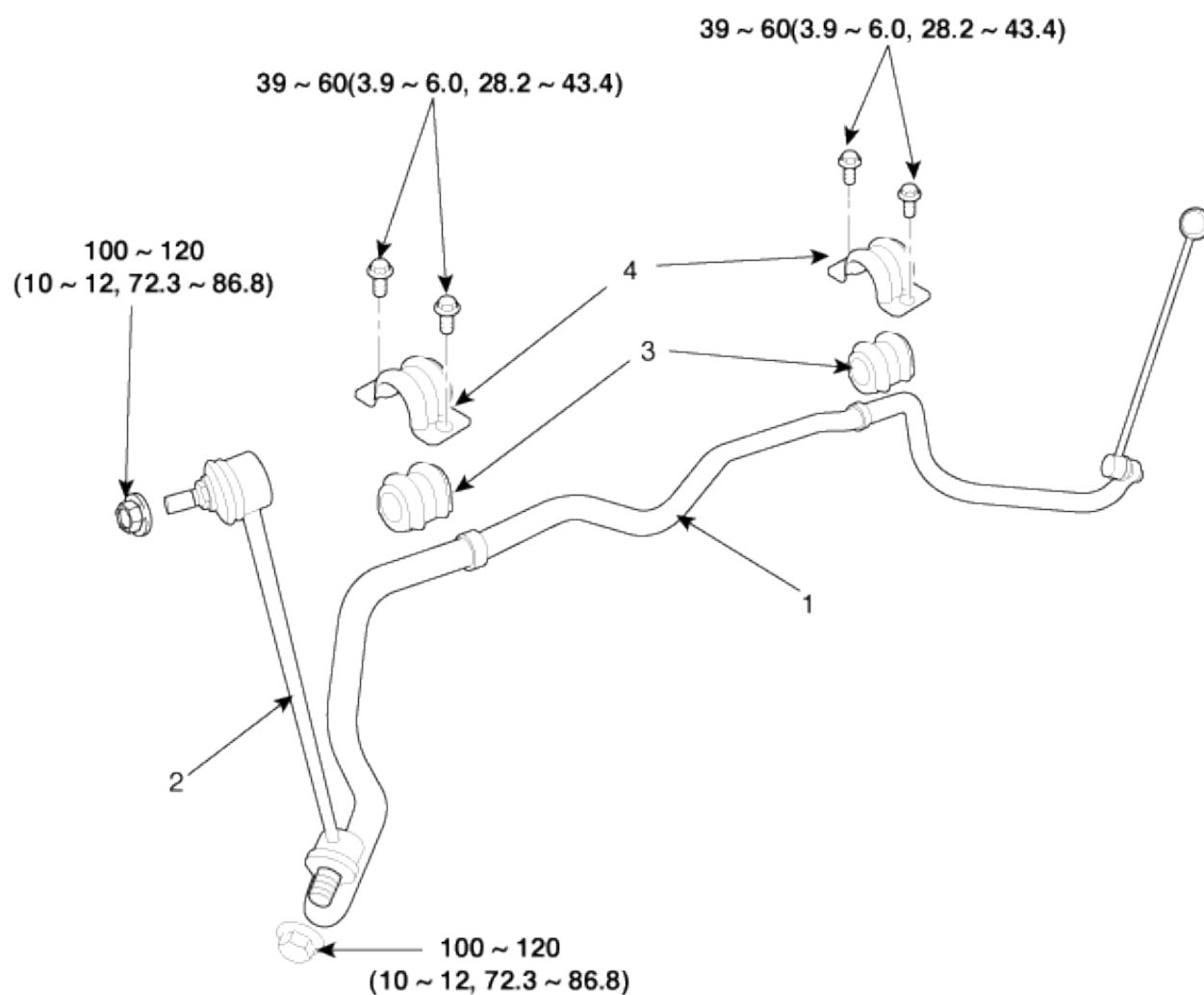
- (4) If the rotating torque is below the lower limit of standard value, replace the ball joint assembly.
- (5) Even if the rotating torque is below the lower limit of the standard value, the ball joint may be reused unless it has drag and excessive play.



Suspension System

Front Suspension System - Front Stabilizer Bar

COMPONENTS



TORQUE : Nm (kgf.m, lb-ft)

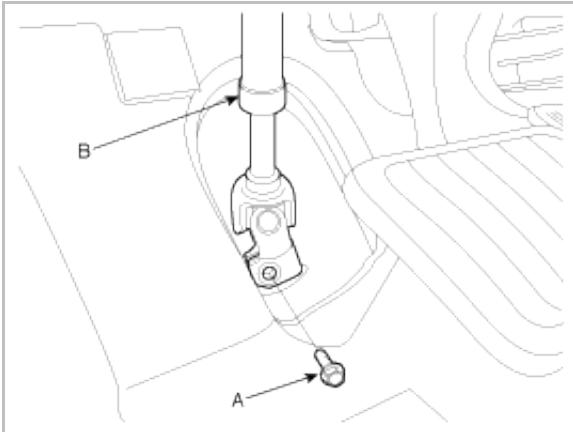
- 1. Front stabilizer bar
- 2. Front stabilizer link

- 3. Bushing
- 4. Bracket



REMOVAL

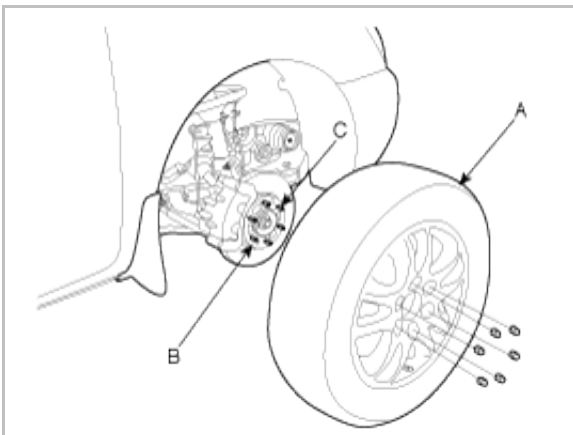
1. Remove the connecting bolt (A) between the steering universal joint assembly (B) and the pinion assembly.



CAUTION

Keep the neutral-range to prevent the damage of the clock spring inner cable when you handle the steering wheel.

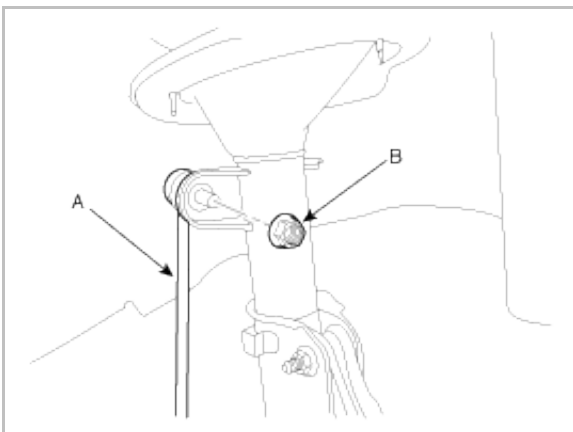
2. Loosen the wheel nuts slightly. Raise the front of the vehicle, and make sure it is securely supported.
3. Remove the front wheel and tire (A) from front hub (B).



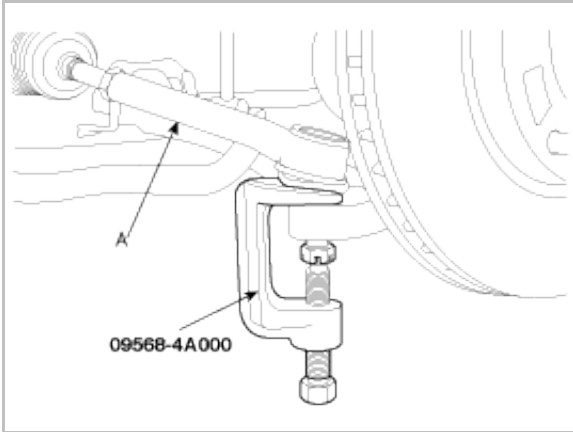
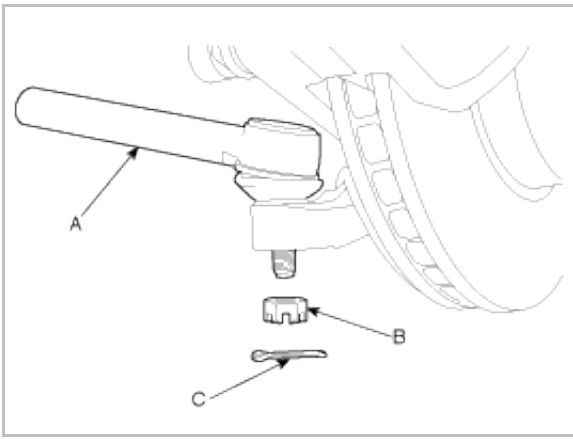
CAUTION

Be careful not to damage the hub bolts (C) when removing the front wheel and tire (A).

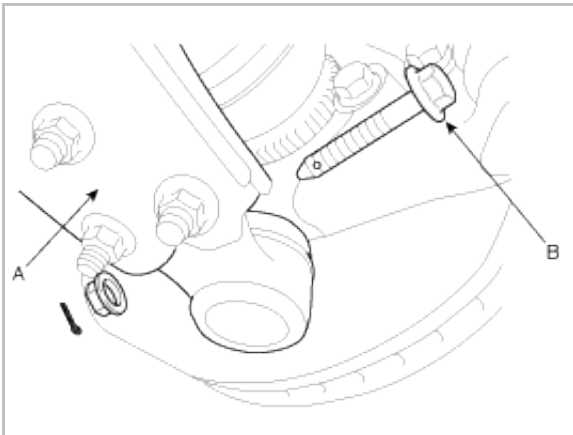
4. Remove the front stabilizer link (A) nut (B) from the strut assembly.



5. After removing both sides of the tie rod end (A) self-locking nuts (B) and cotterpin (C), remove the ball joint by using the special tool (09568-4A000).

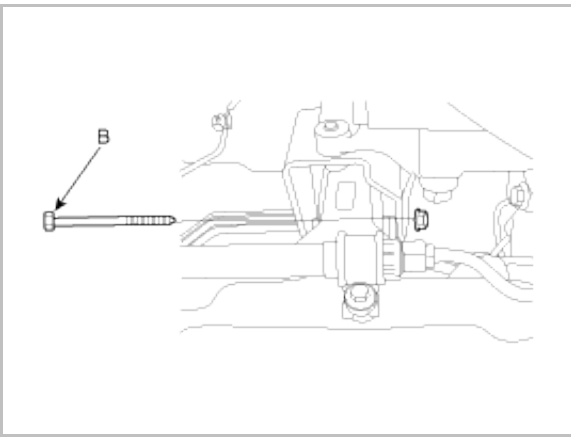


6. Remove both sides of the lower arm (A) mounting bolts (B).

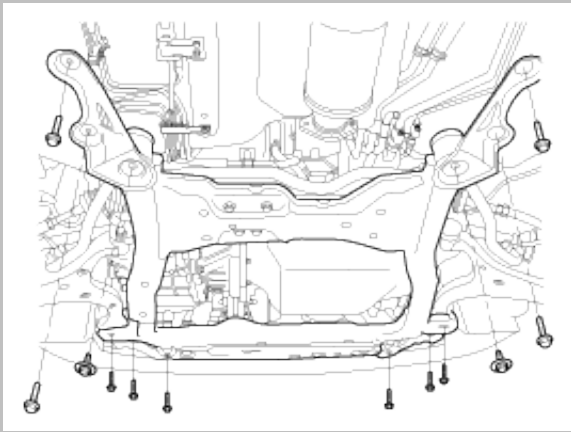


7. Remove the engine mounting bolts (A, B)

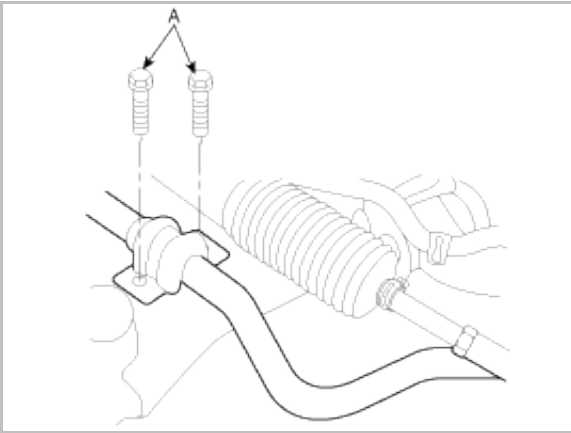




8. Remove the twelve bolts and nuts of the sub frame by supporting it with a jack.



9. After lowering the jack which supports the sub frame in a proper level, remove both sides of the stabilizer bar assembly mounting bolts (A).

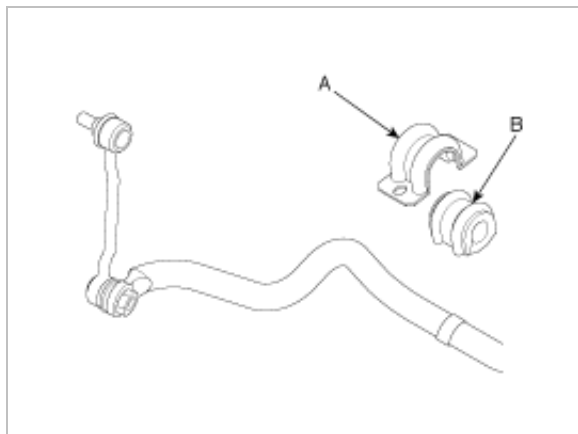


10. Remove the stabilizer bar assembly through the gap between the body and the rear side of the sub frame.

CAUTION

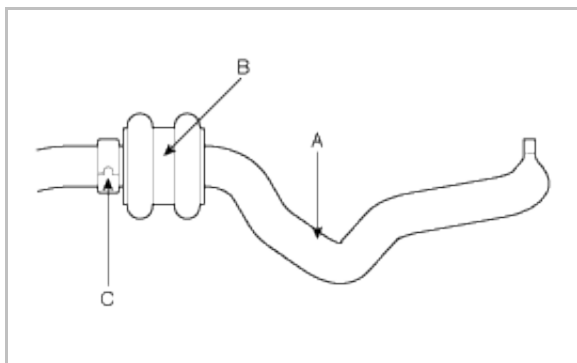
Be careful not to damage to the power steering related tubes.

11. Remove the brackets (A) and the bushings (B).



INSTALLATION

1. Install the bushing (B) on the stabilizer bar (A).



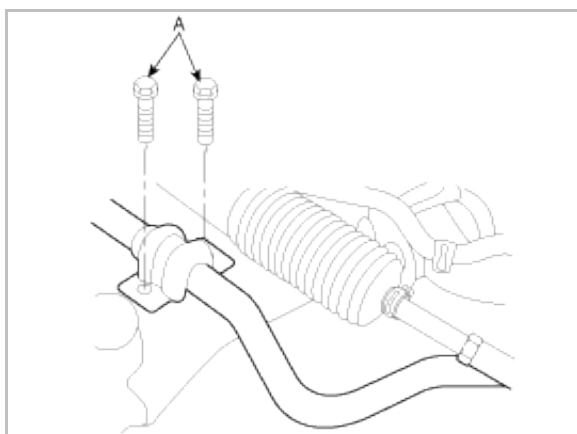
NOTICE

Bring clamp (C) of stabilizer bar (A) into contact with bushing (B).

2. Install the bracket on the bushing (B).
3. After tightening the bolts of the bushing bracket temporarily, install the bushing bracket on the opposite side.
4. Install the stabilizer bar bracket mounting bolts (A) to the sub frame.

Tightening torque Nm (kgf.m, lb-ft) :

39 ~ 60 (3.9 ~ 6.0, 28.2 ~ 43.4)

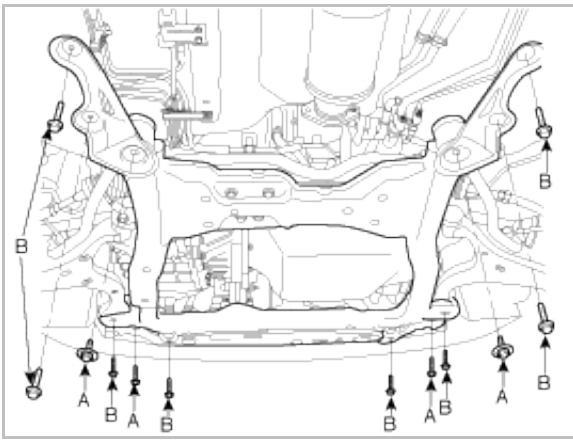


5. After lifting the jack which supports the sub frame, install the four bolts (A) of the sub frame and the eight bolts (B) of the guide bracket.

Tightening torque Nm (kgf.m, lb-ft) :

Bolt (A) : 160 ~ 180 (16 ~ 18, 115.7 ~ 130.2)

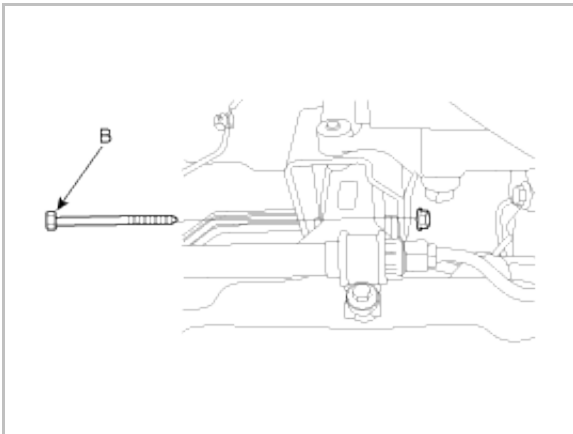
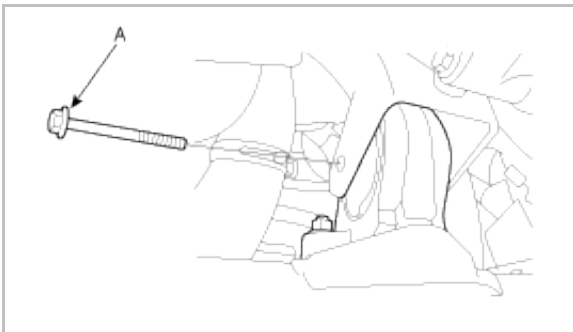
Bolt (B) : 45 ~ 60 (4.5 ~ 6.0, 32.5 ~ 43.4)



6. Install the engine mounting bolts (A, B)

Tightening torque Nm (kgf.m, lb-ft) :

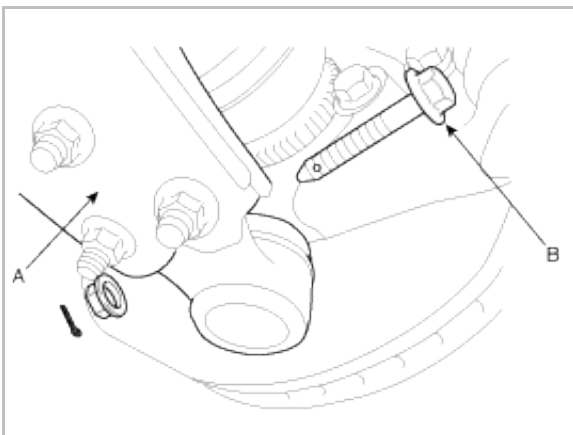
65 ~ 85 (6.5 ~ 8.5, 47.0 ~ 61.5)



7. Install both sides of the lower arm (A) mounting bolts(B).

Tightening torque Nm (kgf.m, lb-ft) :

90 ~ 120 (9 ~ 12, 65.1 ~ 86.8)

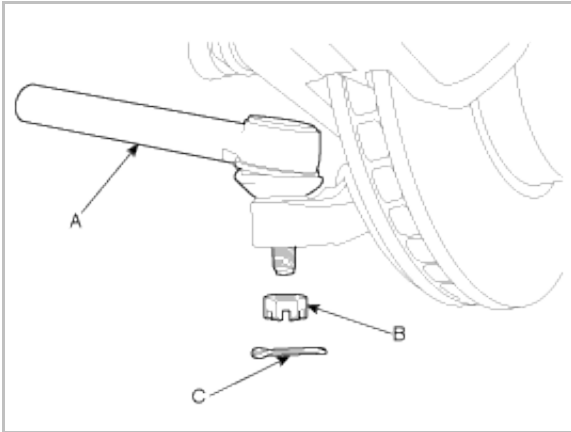


8. Install both sides of the tie rod end (A) self-locking nuts (B). Insert cooter pin (C) after nut is torqued to

specification.

Tightening torque Nm (kgf.m, lb-ft) :

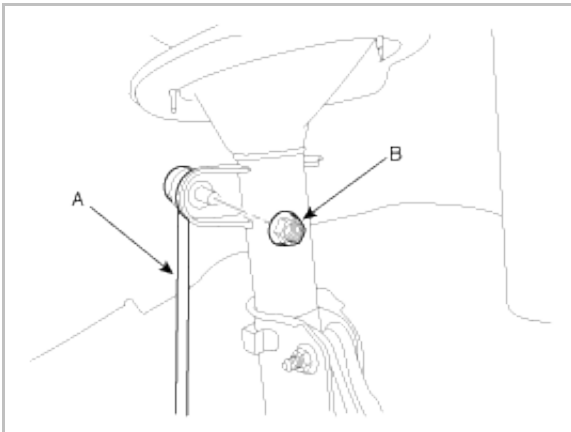
65 ~ 80 (6 ~ 8, 43.4 ~ 57.8)



9. Install the front stabilizer link (A) nut (B) to the strut assembly.

Tightening torque Nm (kgf.m, lb-ft) :

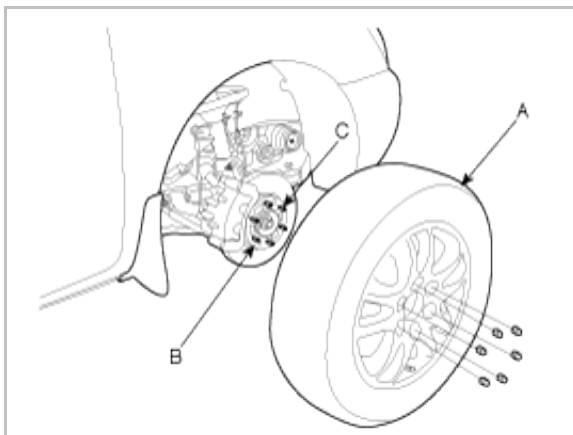
100 ~ 120 (10 ~ 12, 72.3 ~ 86.8)



10. Install the wheel and the tire (A) to the front hub (B).

Tightening torque Nm (kgf.m, lb-ft) :

90 ~ 110 (9 ~ 11, 65.1 ~ 79.5)



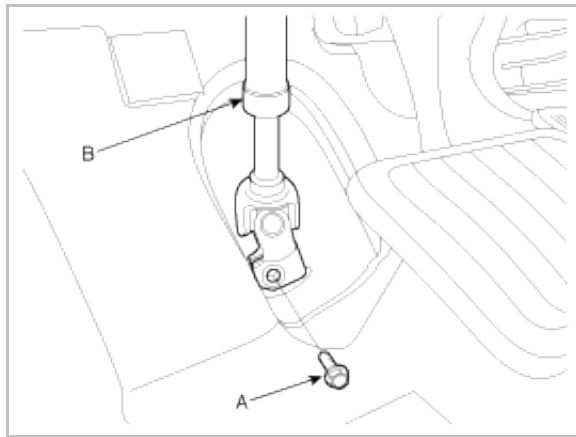
CAUTION

Be careful not to damage the hub bolts(C) when installing the front wheel and tire(A).

11. Install the connecting bolt (A) between the steering universal joint assembly (B) and the pinion assembly.

Tightening torque Nm (kgf.m, lb-ft) :

13 ~ 18 (1.3 ~ 1.8, 9.4 ~ 13.0)

**CAUTION**

After installation, if necessary, adjust the alignment of the steering wheel and front tires

INSPECTION

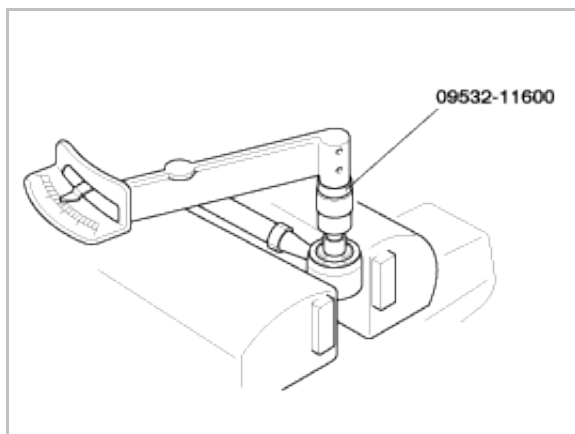
1. Check the bushing for wear and deterioration.
2. Check the stabilizer bar for bending or breakage.
3. Check the ball joint for rotating torque.
 - (1) If there is a crack in the dust cover, replace it and add grease.
 - (2) Move the stabilizer link ball joint stud several times in a circular motion.
 - (3) Mount the self-locking nut on the ball joint, and then measure the ball joint rotating torque.

Standard value :

0.5 ~ 2.5 Nm (5 ~ 25 kgf., 0.36 ~ 1.81 lb-ft)

NOTICE

Measure torque using the special tool(09532-11600) and torque wrench at the range of 0.5 - 2 rpm after moving the ball joint stud 10 times at room temperature.



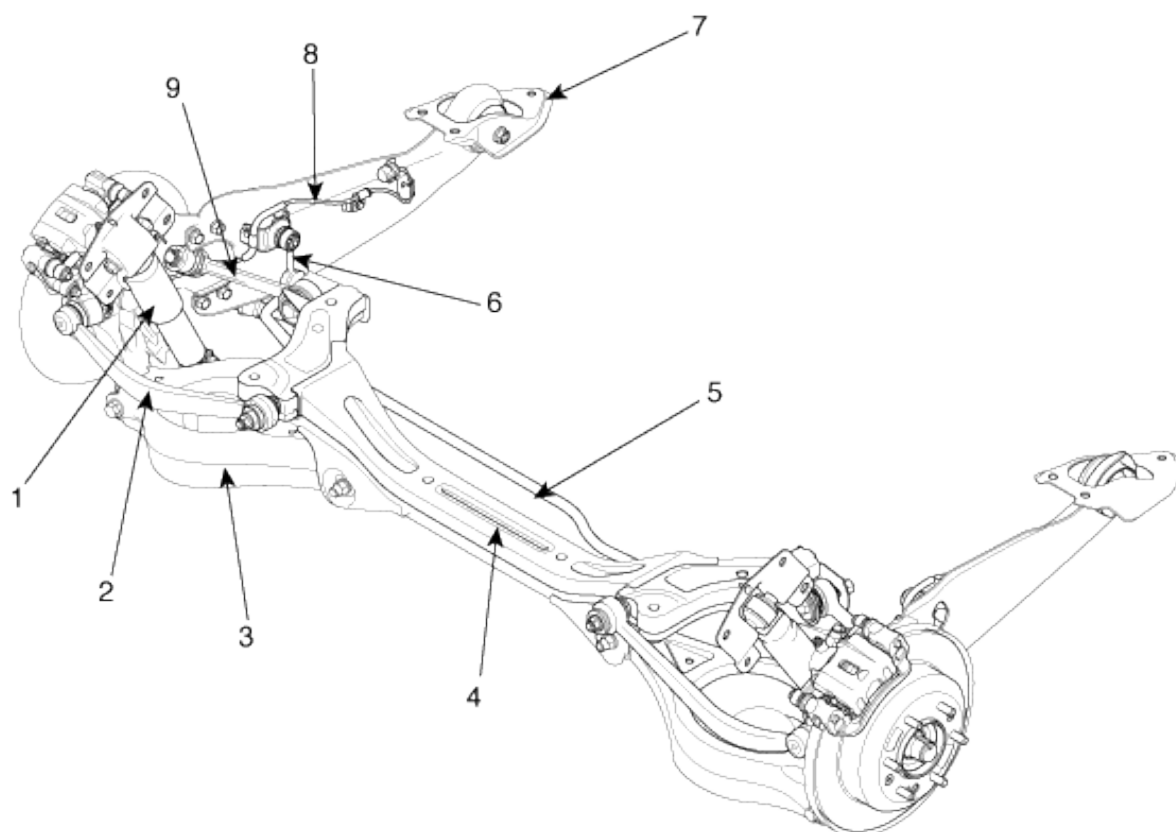
- (4) If the rotating torque exceeds the upper limit of standard value, replace the upper arm assembly.
- (5) Even if the rotating torque is below the lower limit of the standard value, the ball joint may be reused unless it has drag and excessive play.



Suspension System

Rear Suspension System

COMPONENTS



Cross member mounting blot : 160 N.m (16 ~ 18 kgf.m 115.7 ~ 130.2 lb-ft)

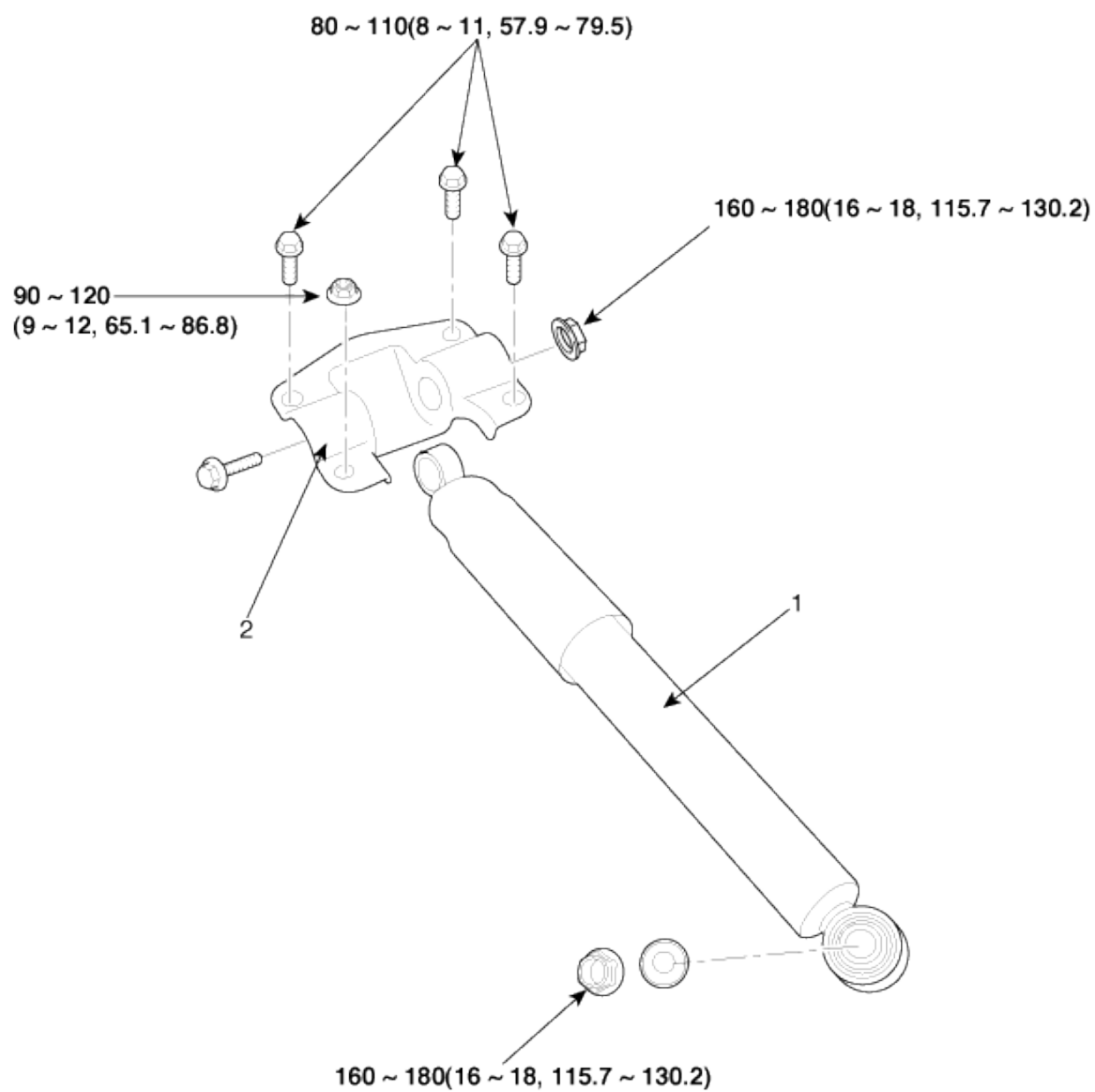
- 1. Rear shock absorber assembly
- 2. Rear upper arm
- 3. Rear lower arm
- 4. Rear cross member
- 5. Rear stabilizer bar assembly

- 6. Rear stabilizer link assembly
- 7. Trailing arm bracket
- 8. Trailing arm
- 9. Rear assist arm

Suspension System

Rear Suspension System - Rear Shock
Absorber

COMPONENTS



TORQUE : Nm (kgf.m, lb-ft)

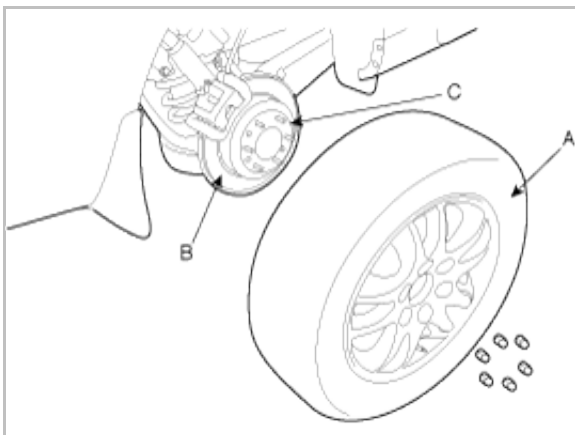
1. Rear shock absorber

2. Rear shock absorber bracket



REMOVAL

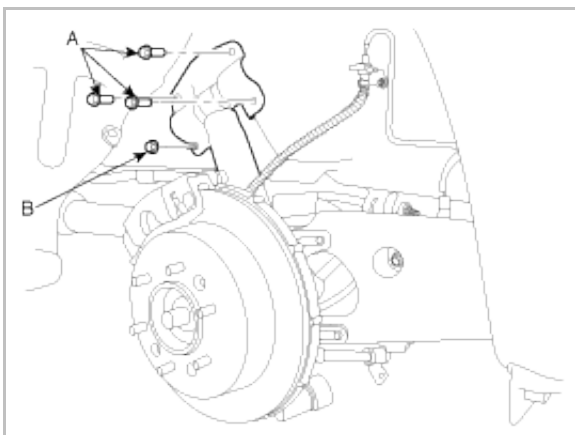
1. Loosen the wheel nuts slightly.
Raise the rear of the vehicle, and make sure it is securely supported.
2. Remove the rear wheel and tire (A) from rear hub (B).



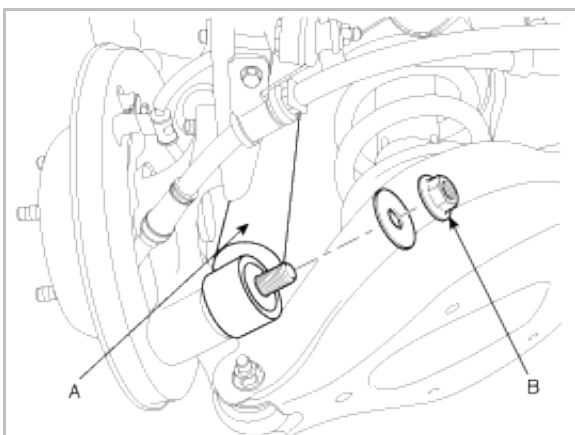
CAUTION

Be careful not to damage the hub bolts (C) when removing the rear wheel and tire (A).

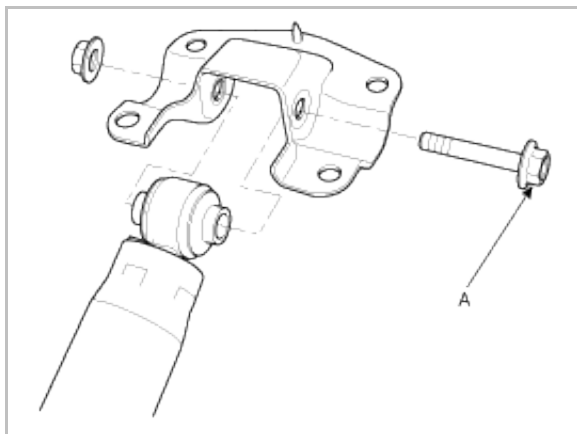
3. Remove the rear shock absorber assembly mounting bolts (A) and nut (B) from the baby.



4. Remove the rear shock absorber assembly nut (B) from the rear knuckle, then remove the shock absorber assembly (A).



5. Remove the rear shock absorber bracket bolt (A).

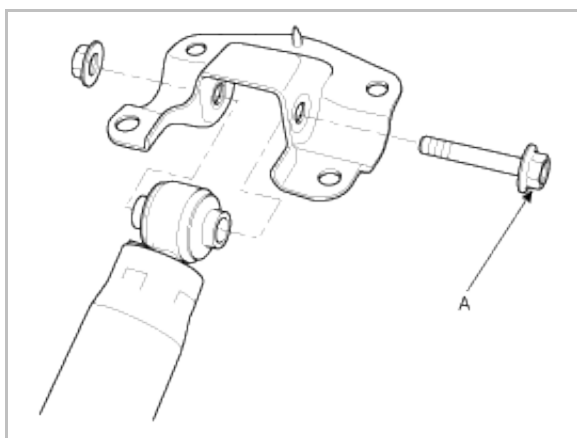


INSTALLATION

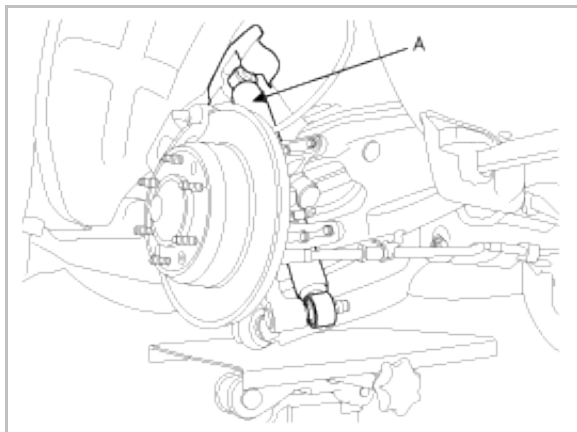
1. Install the connecting bolt (A) between the rear shock absorber and the bracket.

Tightening torque Nm(kgf.m, lb-ft) :

160 ~ 180 (16 ~ 18, 115.7 ~ 130.2)



2. Install the rear shock absorber (A) to the knuckle temporarily.

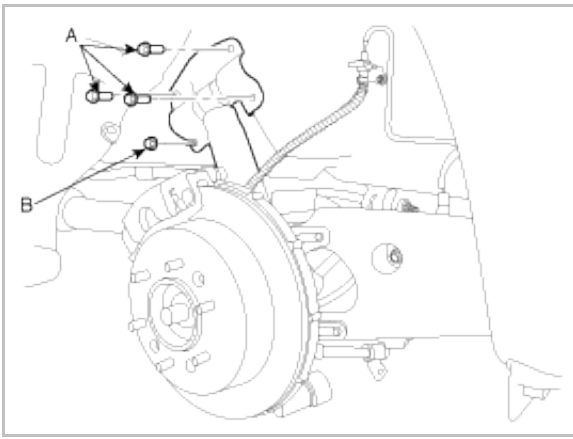


3. Install the rear shock absorber bracket mounting bolts (A) and nut (B).

Tightening torque Nm(kgf.m, lb-ft) :

Bolt : 80 ~ 110 (8 ~ 11, 59.7 ~ 79.5)

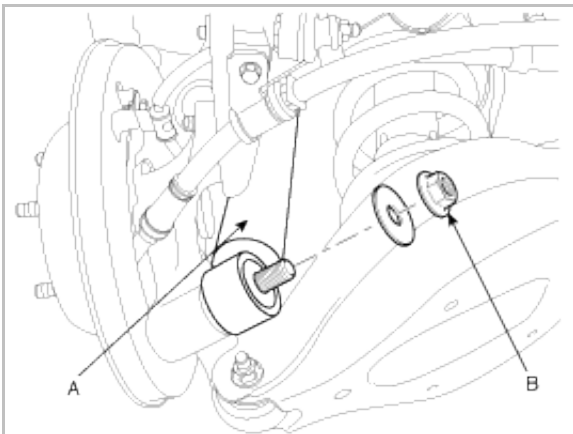
Nut : 90 ~ 120 (9 ~ 12, 65.1 ~ 86.8)



4. Install the rear shock absorber (A) nut (B) to the knuckle.

Tightening torque Nm(kgf.m, lb-ft) :

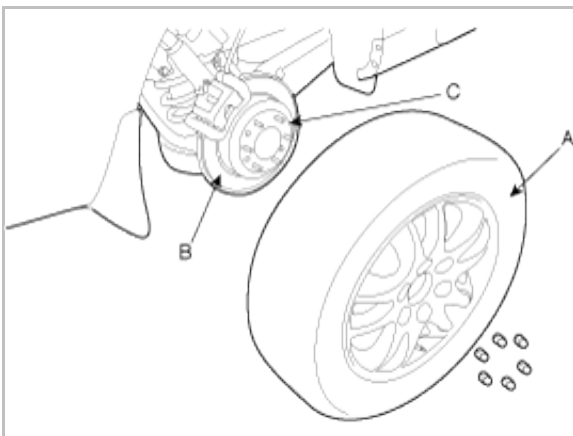
160 ~ 180 (16 ~ 18, 115.7 ~ 130.2)



5. Install the wheel and the tire (A) to the rear hub (B).

Tightening torque Nm (kgf.m, lb-ft) :

90 ~ 110 (9 ~ 11, 65.1 ~ 79.5)



CAUTION

Be careful not to damage the hub bolts (C) when installing the rear wheel and tire (A).

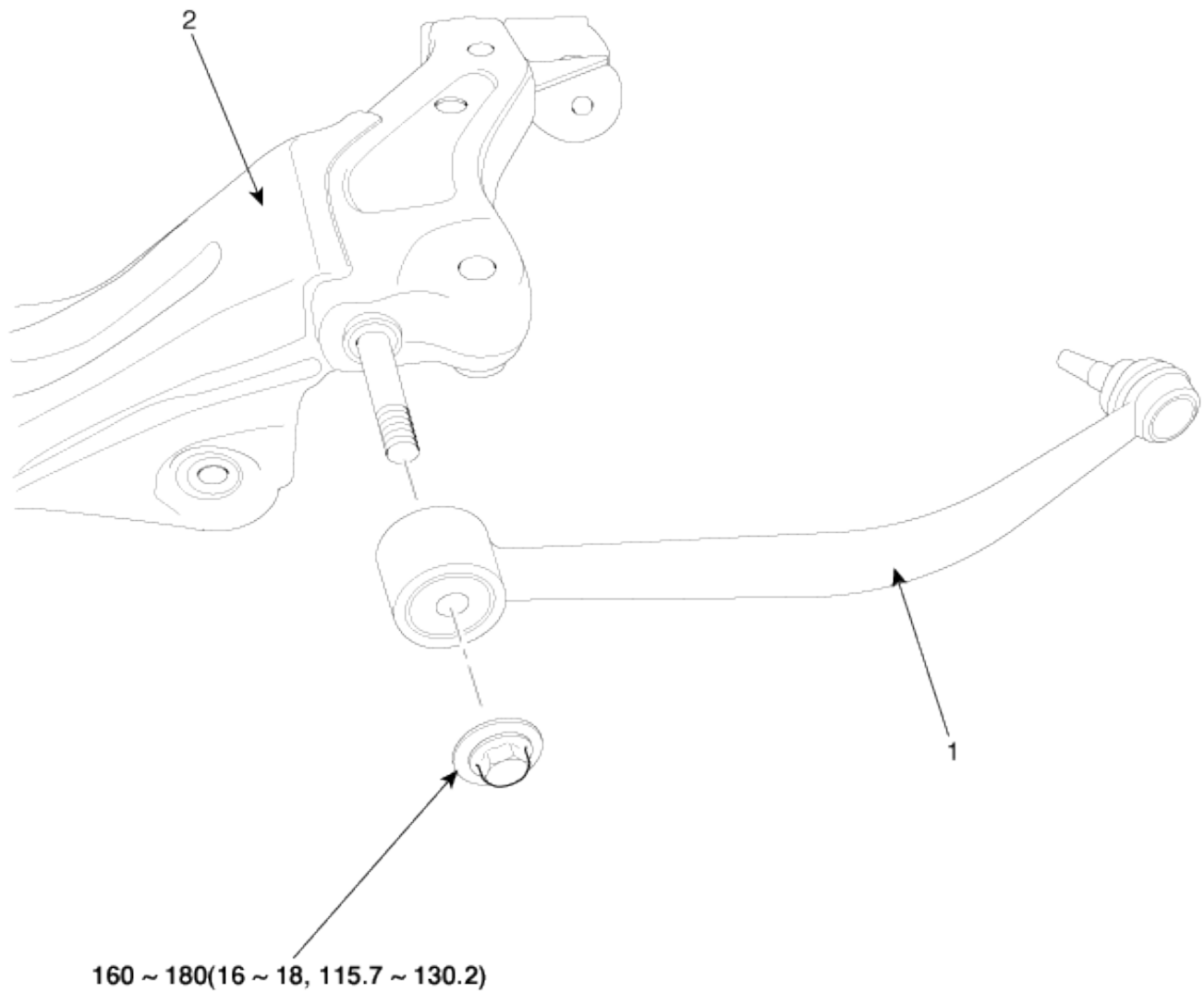
INSPECTION

1. Check the rubber parts for damage or deterioration.
2. Check the shock absorber for abnormal resistance or unusual sounds.



Suspension System

Rear Suspension System - Rear Upper Arm

COMPONENTS**TORQUE : Nm (kgf.m, lb-ft)**

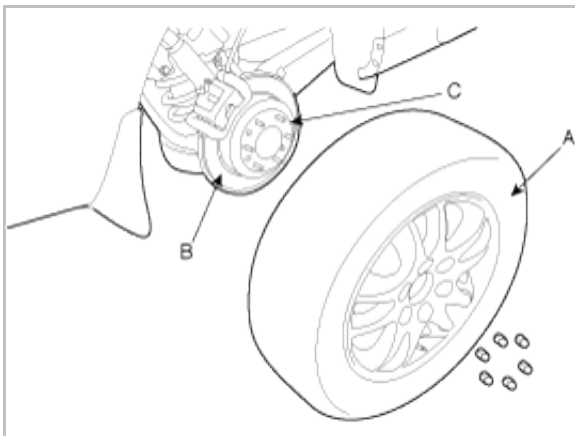
1. Rear upper arm

2. Rear cross member



REMOVAL

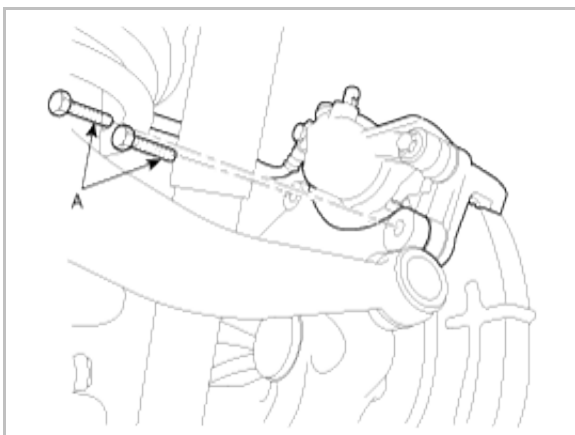
1. Loosen the wheel nuts slightly. Raise the rear of the vehicle, and make sure it is securely supported.
2. Remove the rear wheel and tire (A) from rear hub (B).



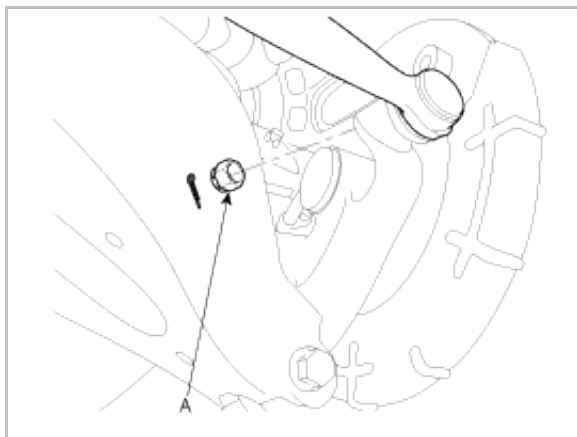
CAUTION

Be careful not to damage the hub bolts (C) when removing the rear wheel and tire (A).

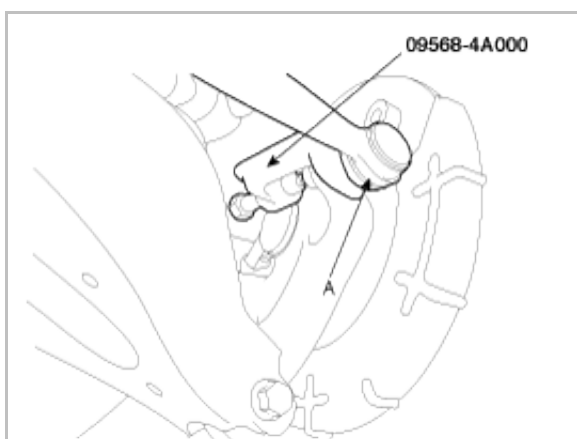
3. Remove the brake caliper mounting bolts (A), and then place the brake caliper assembly (B) with wire as shown in the illustration.



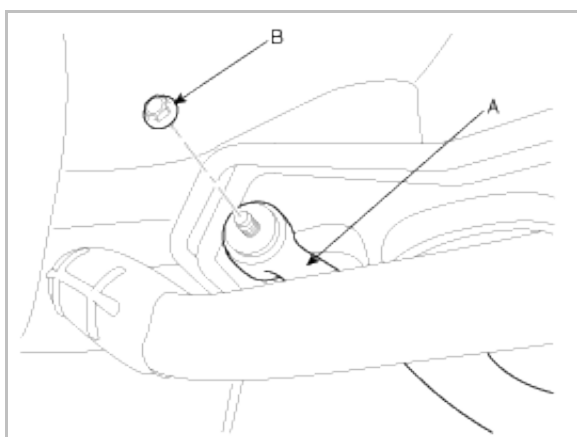
4. Remove the rear upper arm ball joint self-locking nut (A) and the cotter pin.



5. Remove the rear upper arm ball joint (A) by using the special tool(09568-4A000).



6. Remove the rear upper arm (A) mounting nut (B) from the cross member.

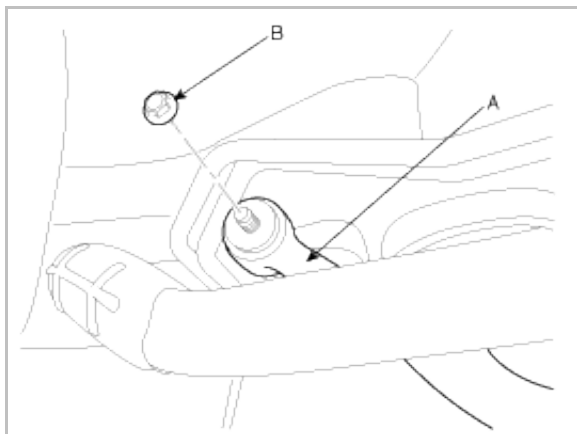


INSTALLATION

1. Install the rear upper arm (A) mounting nut (B) to the cross member.

Tightening torque Nm (kgf.m, lb-ft) :

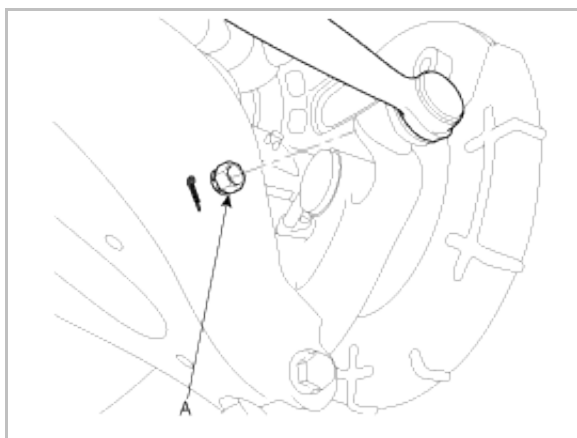
160 ~ 180 (16 ~ 18, 115.7 ~ 130.2)



2. Install the rear upper arm ball joint self-locking nut (A) and the cotter pin.

Tightening torque Nm (kgf.m, lb-ft) :

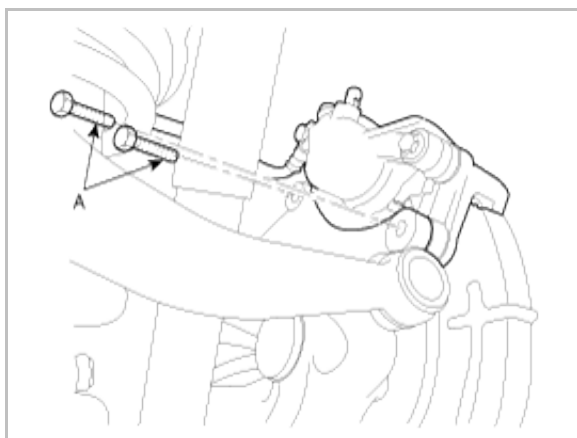
90 ~ 110 (9 ~ 11, 65.1 ~ 79.5)



3. Install the brake caliper mounting bolts (A).

Tightening torque Nm (kgf.m, lb-ft) :

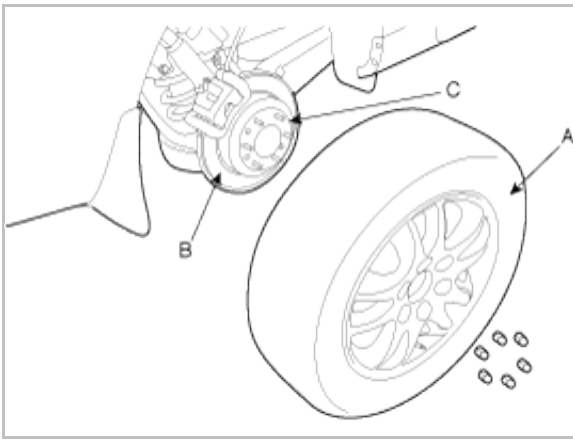
50 ~ 60 (5.0 ~ 6.0, 36.2 ~ 43.4)



4. Install the wheel and the tire (A) to the rear hub (B).

Tightening torque Nm (kgf.m, lb-ft) :

90 ~ 110 (9 ~ 11, 65.1 ~ 79.5)



CAUTION

Be careful not to damage the hub bolts (C) when installing the rear wheel and tire (A).

INSPECTION

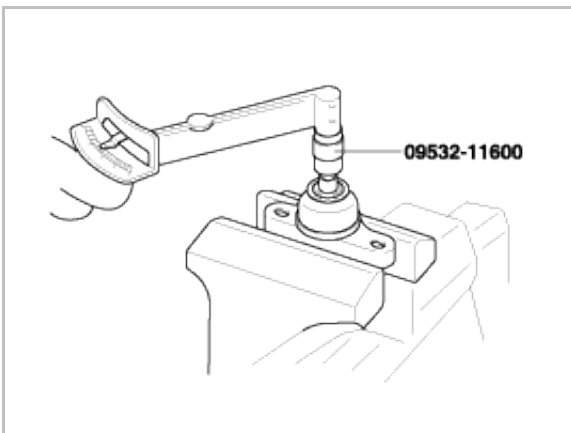
1. Check the bushing for wear and deterioration.
2. Check the upper arm for bending or breakage.
3. Check the ball joint for rotating torque.
 - (1) If there is a crack in the dust cover, replace it and add grease.
 - (2) Move the stabilizer link ball joint stud several times in a circular motion.
 - (3) Mount the self-locking nut on the ball joint, and then measure the ball joint rotating torque.

Specified torque :

1 ~ 3 Nm (10 ~ 30 kgf.cm, 0.72 ~ 2.17 lb-ft)

NOTICE

Measure a torque by using the special tool(09532-11600) and torque wrench, at the range of 0.5 ~ 2 rpm after moving the ball joint stud 10 times at room temperature.

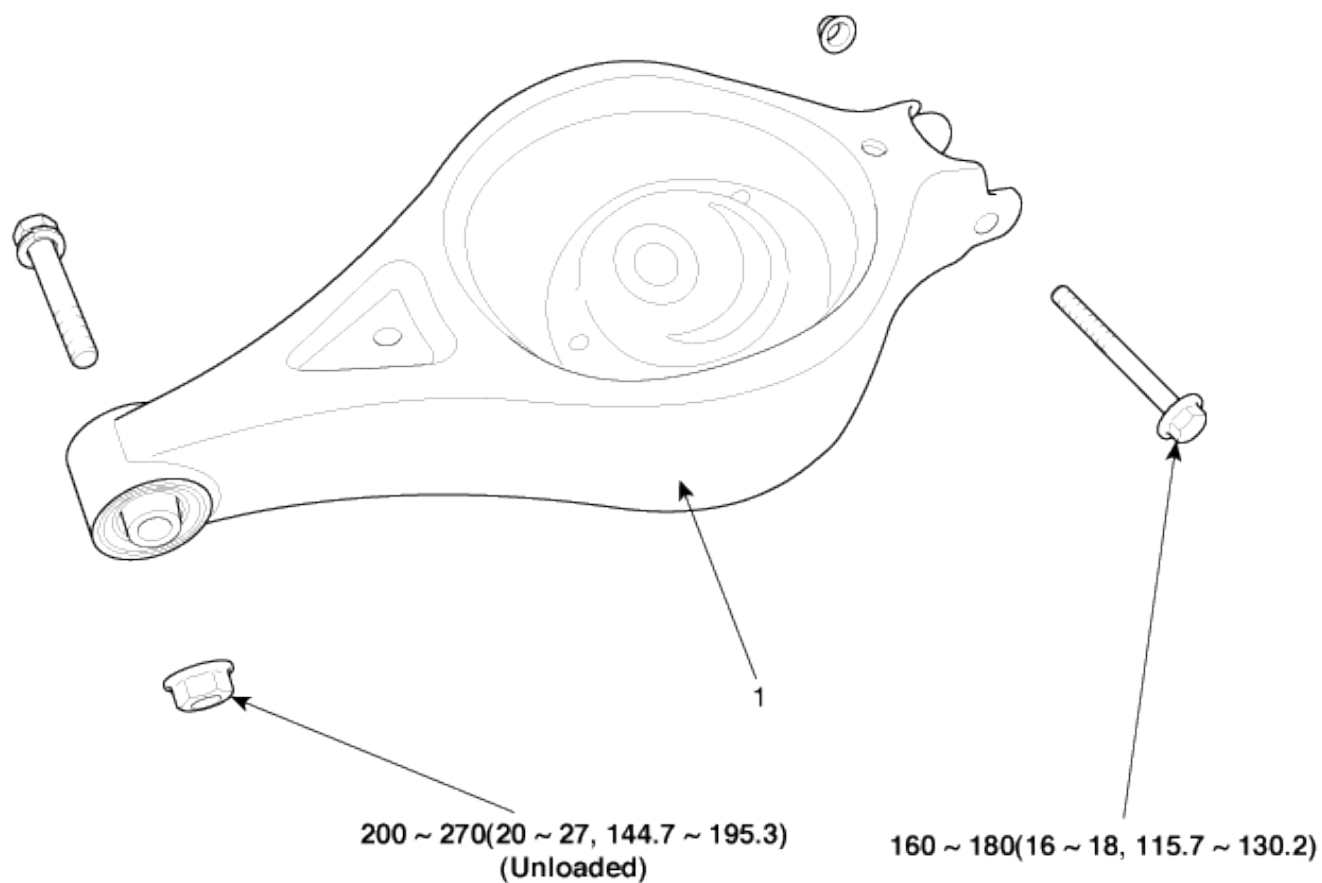


- (4) If the rotating torque exceeds the upper limit of standard value, replace the upper arm assembly.
- (5) Even if the rotating torque is below the lower limit of the standard value, the ball joint may be reused unless it has drag and excessive play.

Suspension System

Rear Suspension System - Rear Lower Arm

COMPONENTS



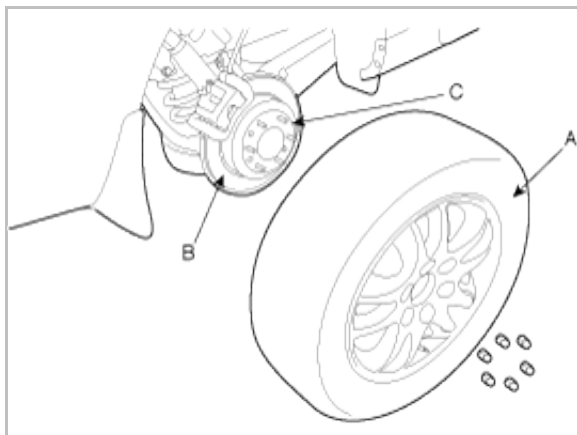
TORQUE : Nm (kgf.m, lb-ft)

1. Rear lower arm



REMOVAL

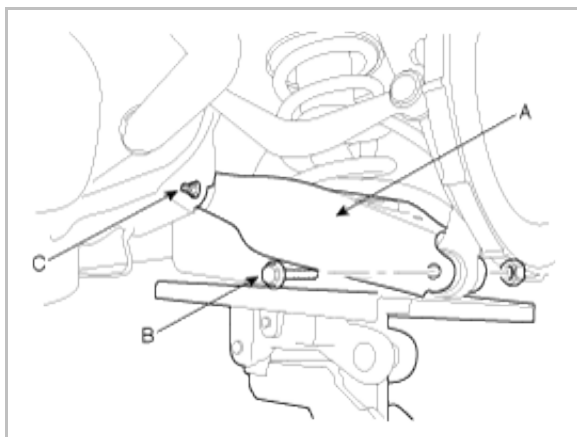
1. Loosen the wheel nuts slightly.
Raise the rear of the vehicle, and make sure it is securely supported.
2. Remove the rear wheel and tire (A) from rear hub (B).



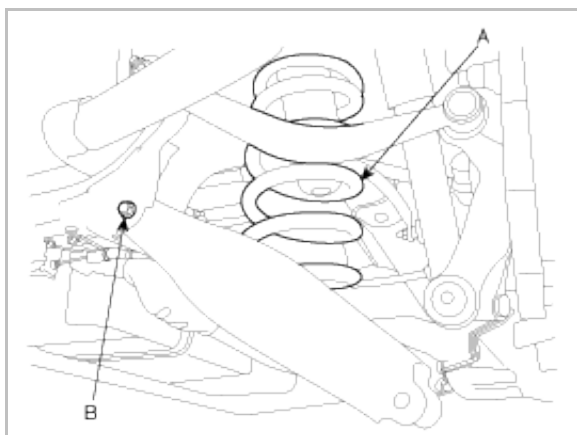
CAUTION

Be careful not to damage the hub bolts (C) when removing the rear wheel and tire (A).

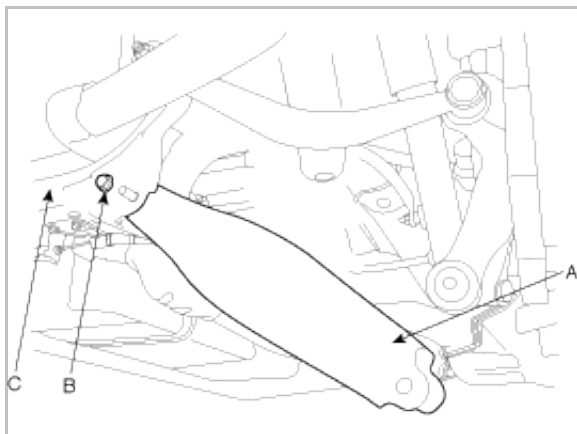
3. Remove the lower arm bolt (B) from the rear knuckle, while supporting the lower arm (A) with a jack as shown in the illustration. Loosen the lower arm bolt (C) from the cross member.



4. Remove the spring (A), the lower seat, and the upper pad.

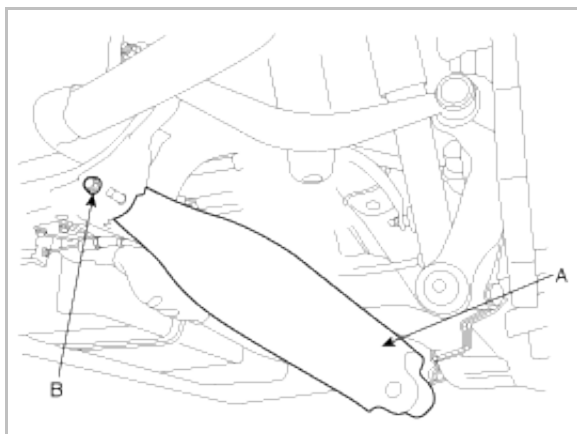


5. Remove the lower arm (A) mounting bolts (B) from the cross member (C).

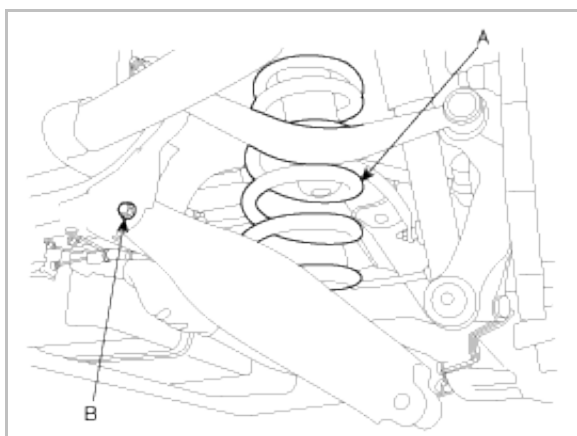


INSTALLATION

1. Pretighten the lower arm (A) mounting bolts (B) to the cross member.



2. Install the spring (A), the lower seat, and the upper pad.

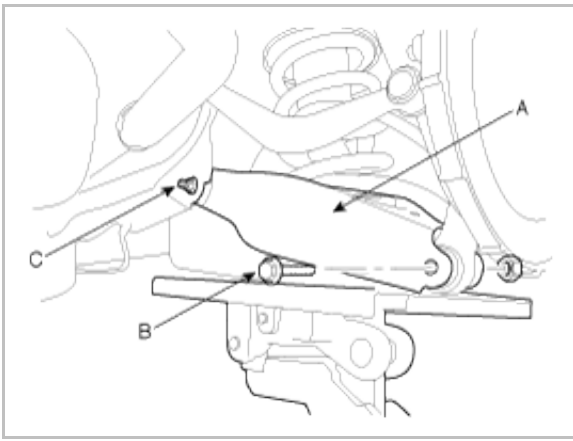


3. Install the lower arm bolt (B) to the rear knuckle and the lower arm bolt (C) to the cross member with a specified torque, while supporting the lower arm (A) with a jack as shown in the illustration.

Tightening torque Nm (kgf.m, lb-ft) :

Bolt (B) : 120 ~ 160 (12 ~ 16, 86.8 ~ 115.7)

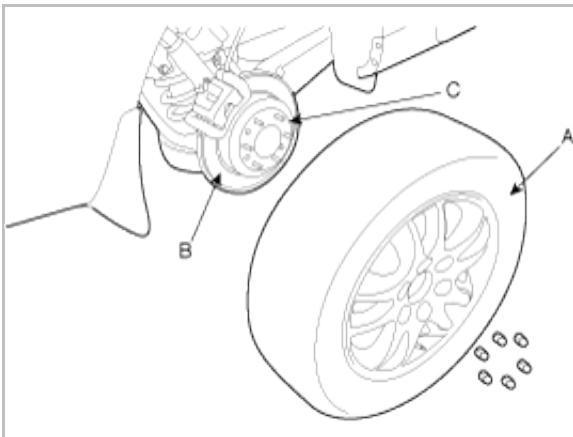
Bolt (C) : 200 ~ 270 (20 ~ 27, 144.7 ~ 195.3)



4. Install the wheel and the tire (A) to the rear hub (B).

Tightening torque Nm (kgf.m, lb-ft) :

90 ~ 110 (9 ~ 11, 65.1 ~ 79.5)



CAUTION

Be careful not to damage the hub bolts (C) when installing the rear wheel and tire (A).

INSPECTION

Rear lower arm

1. Check the bushing for wear and deterioration.
2. Check the center arm for bending or breakage.
3. Check the bolts for damage.

Spring

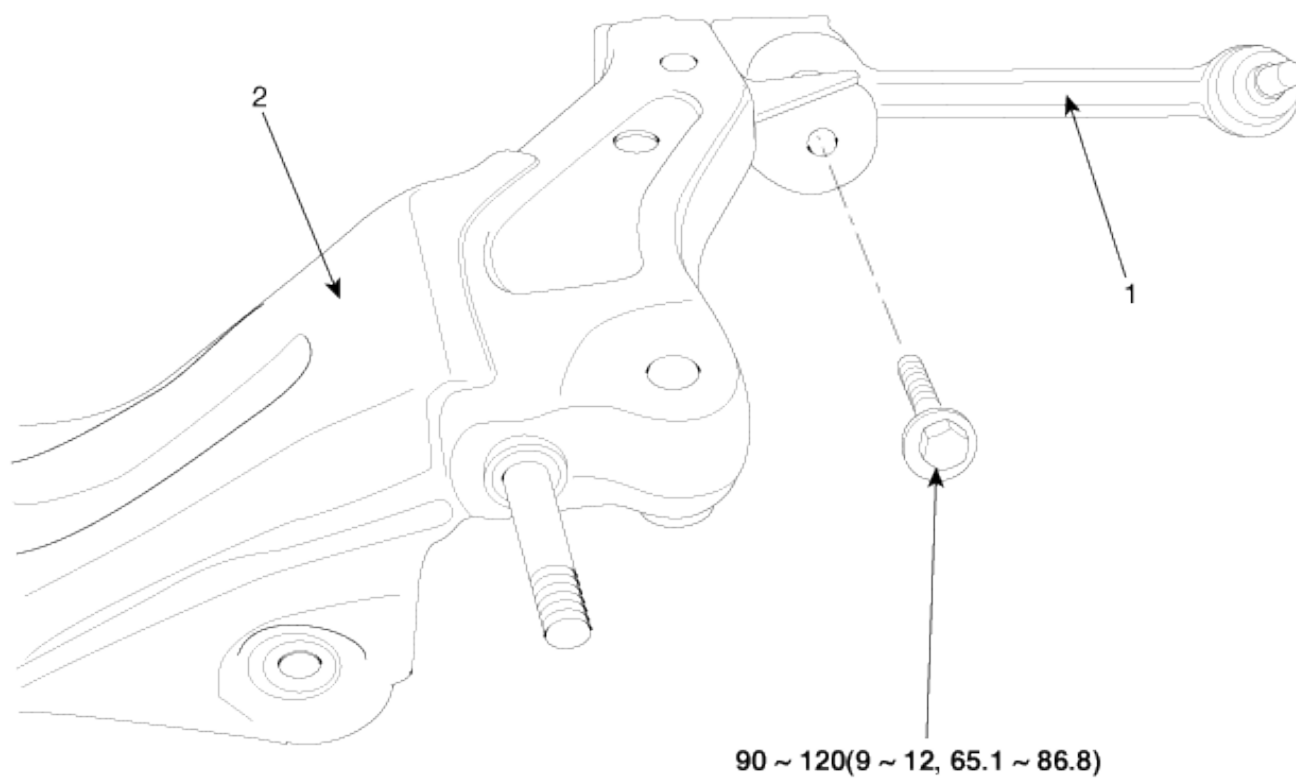
1. Check the spring for distortion, aging or damage.
2. Check the spring upper pad for aging or damage.



Suspension System

Rear Suspension System - Rear Assist Arm

COMPONENTS



90 ~ 120(9 ~ 12, 65.1 ~ 86.8)

TORQUE : Nm (kgf.m, lb-ft)

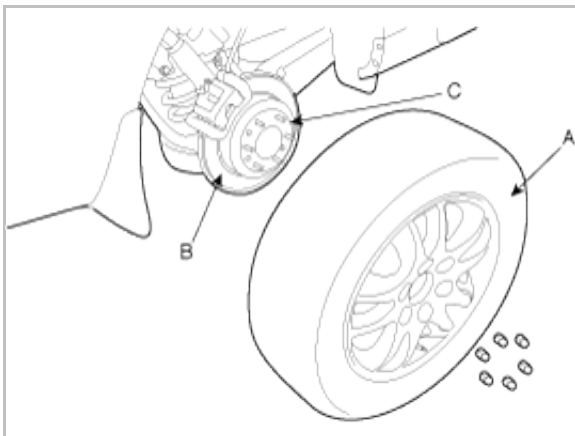
1. Rear assist arm

2. Rear cross member



REMOVAL

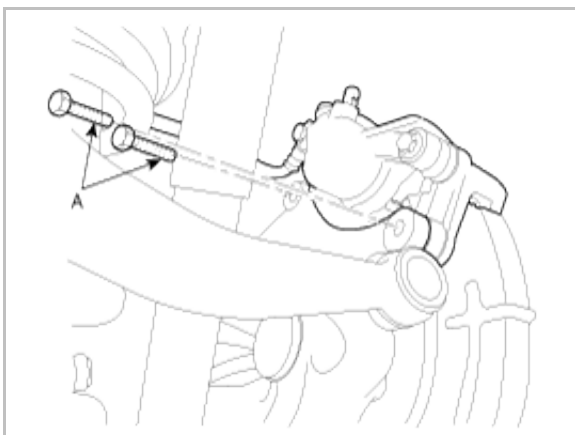
1. Loosen the wheel nuts slightly. Raise the rear of the vehicle, and make sure it is securely supported.
2. Remove the rear wheel and tire (A) from rear hub (B).



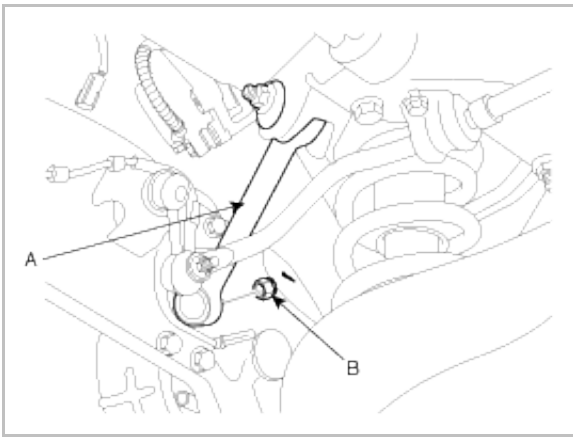
CAUTION

Be careful not to damage the hub bolts (C) when removing the rear wheel and tire (A).

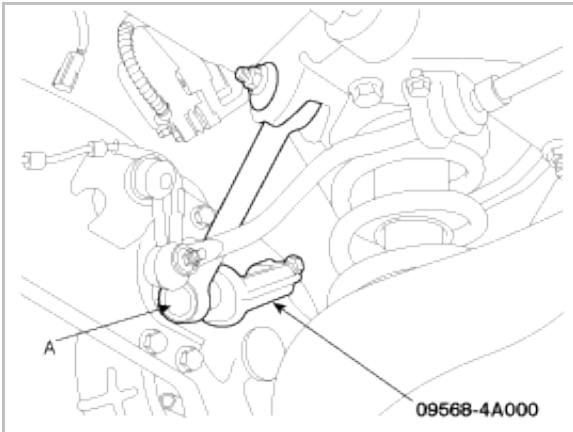
3. Remove the brake caliper mounting bolts (A), and then place the brake caliper assembly (B) with wire as shown in the illustration.



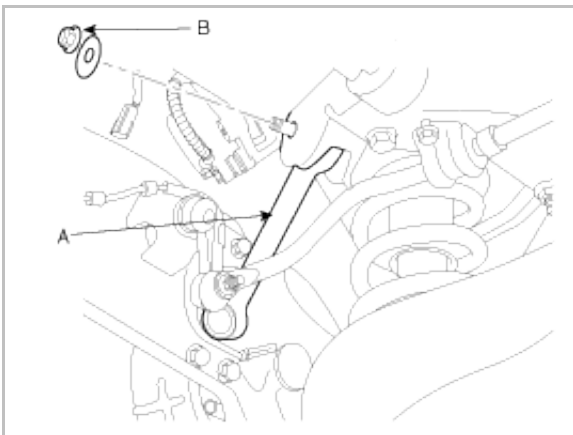
4. Remove the rear assist arm (A) ball joint self-locking nut (B) and the cotter pin.



5. Remove the rear assist arm ball joint (A) by using the special tool(09568-4A000).



6. Remove the rear assist arm (A) mounting nut (B) from the cross member.

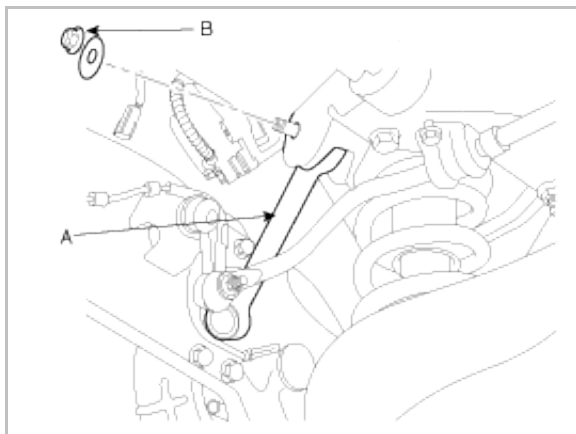


INSTALLATION

1. Install the rear assist arm (A) mounting nut (B) to the cross member.

Tightening torque Nm (kgf.m, lb-ft) :

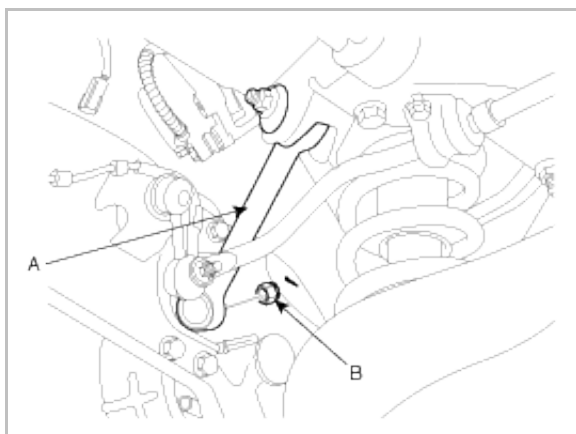
90 ~ 120 (9 ~ 12, 65.1 ~ 86.8)



2. Install the rear assist arm (A) ball joint self-locking nut (B) and the cotter pin.

Tightening torque Nm (kgf.m, lb-ft) :

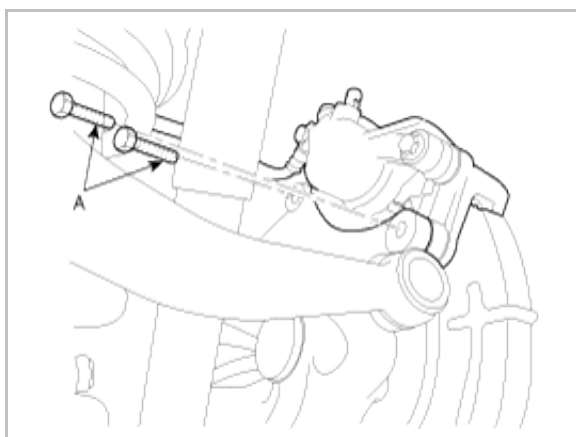
160 ~ 180 (16 ~ 18, 115.7 ~ 130.2)



3. Install the brake caliper mounting bolts (A).

Tightening torque Nm (kgf.m, lb-ft) :

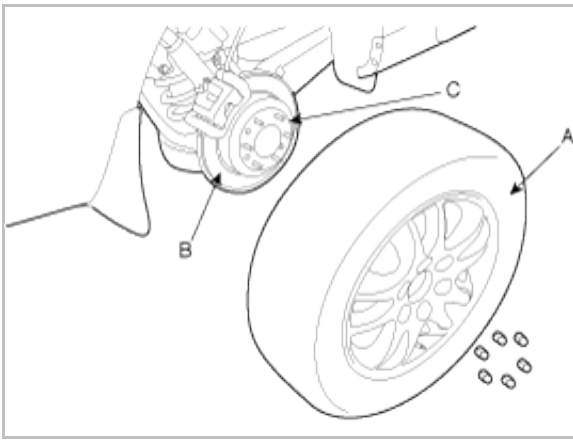
50 ~ 60 (5.0 ~ 6.0, 36.2 ~ 43.4)



4. Install the wheel and the tire (A) to the rear hub (B).

Tightening torque Nm (kgf.m, lb-ft) :

90 ~ 110 (9 ~ 11, 65.1 ~ 79.5)



CAUTION

Be careful not to damage the hub bolts (C) when installing the rear wheel and tire (A).

INSPECTION

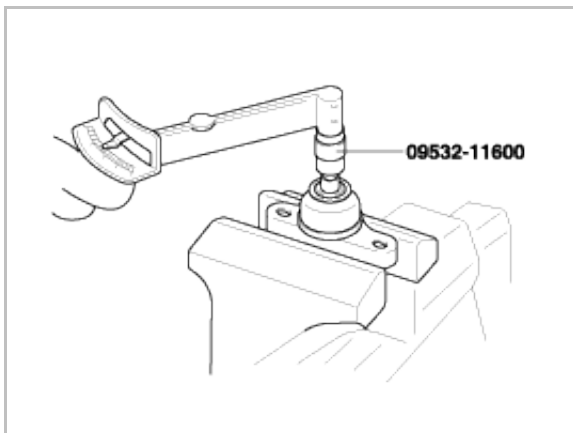
1. Check the bushing for wear and deterioration.
2. Check the upper arm for bending or breakage.
3. Check the ball joint for rotating torque.
 - (1) If there is a crack in the dust cover, replace it and add grease.
 - (2) Move the stabilizer link ball joint stud several times in a circular motion.
 - (3) Mount the self-locking nut on the ball joint, and then measure the ball joint rotating torque.

Specified torque :

1 ~ 3 Nm (10 ~ 30 kgf.cm, 0.72 ~ 2.17 lb-ft)

NOTICE

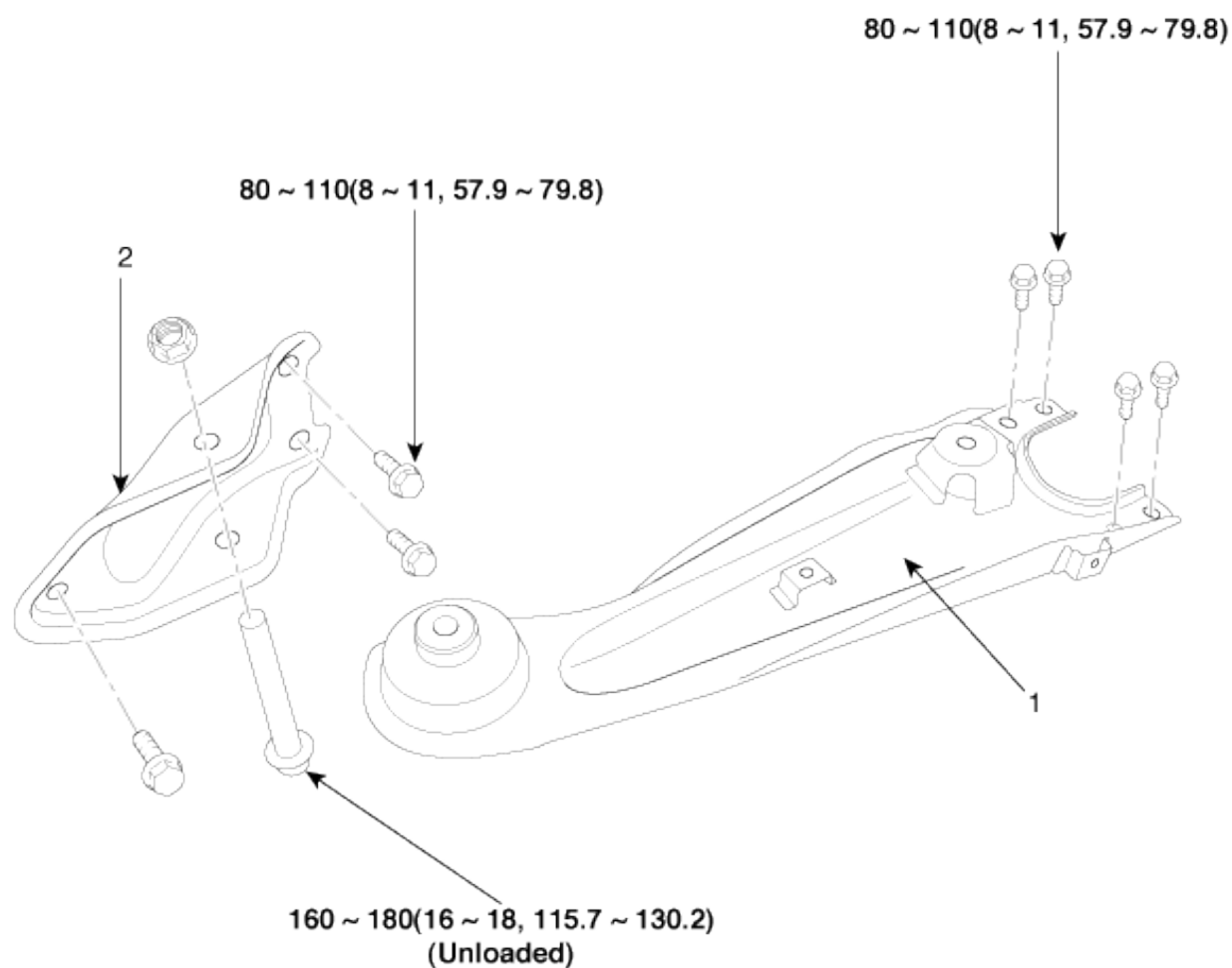
Measure a torque by using the special tool(09532-11600) and torque wrench, at the range of 0.5-2 rpm after moving the ball joint stud 10 times at room temperature.



- (4) If the rotating torque exceeds the upper limit of standard value, replace the upper arm assembly.
- (5) Even if the rotating torque is below the lower limit of the standard value, the ball joint may be reused unless it has drag and excessive play.

Suspension System

Rear Suspension System - Trailing Arm

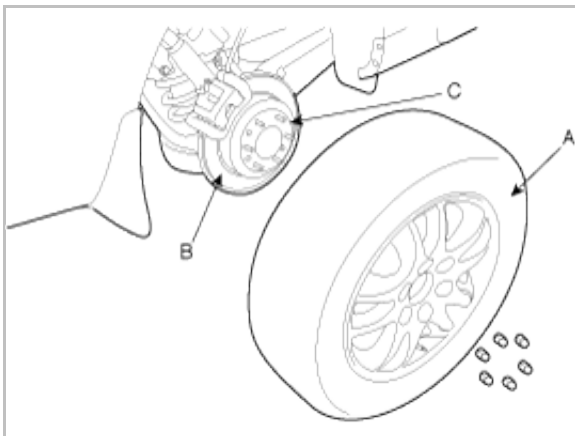
COMPONENTS**TORQUE : Nm (kgf.m, lb-ft)**

- 1. Trailing arm
- 2. Bracket



REMOVAL

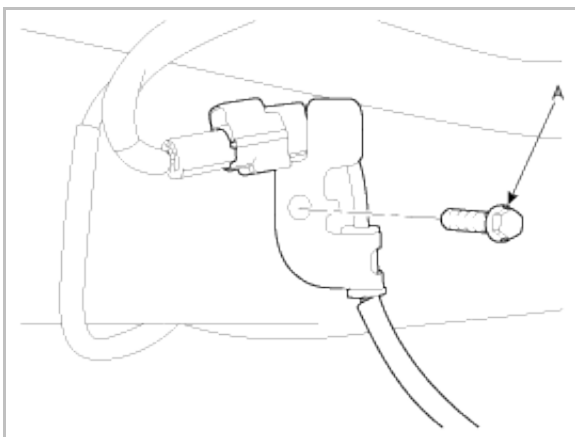
1. Loosen the wheel nuts slightly. Raise the rear of the vehicle, and make sure it is securely supported.
2. Remove the rear wheel and tire (A) from rear hub (B).



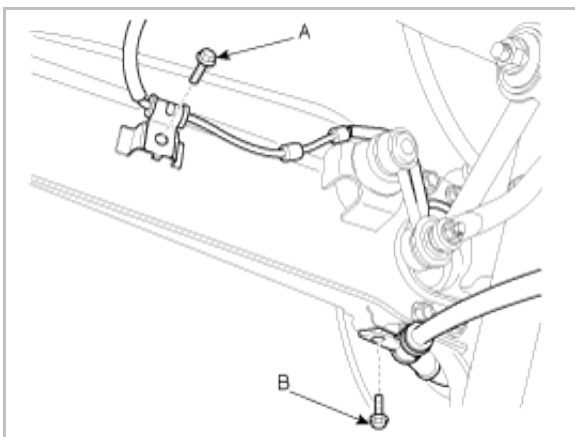
CAUTION

Be careful not to damage the hub bolts (C) when removing the rear wheel and tire (A).

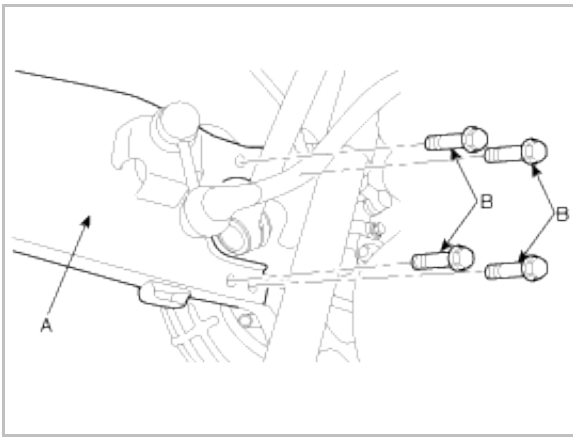
3. Remove the wheel speed sensor wire's bracket bolt (A) from the body and the connector.



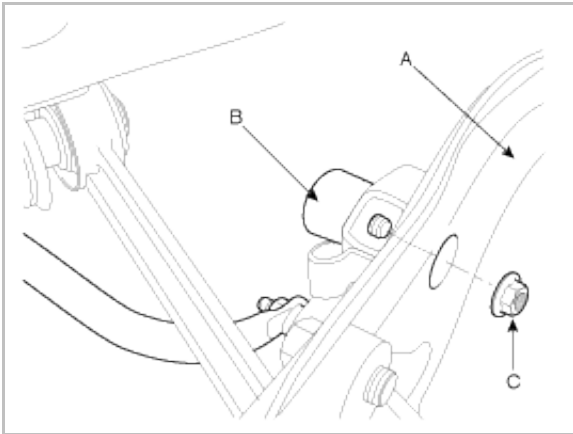
4. Remove the wheel speed sensor wire's bracket bolt (A) and the parking brake wire's bracket bolt (B).



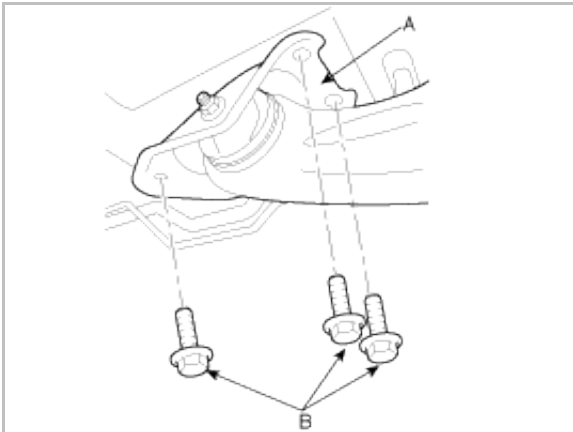
5. Remove the trailing arm (A) mounting nuts (B) from the knuckle.



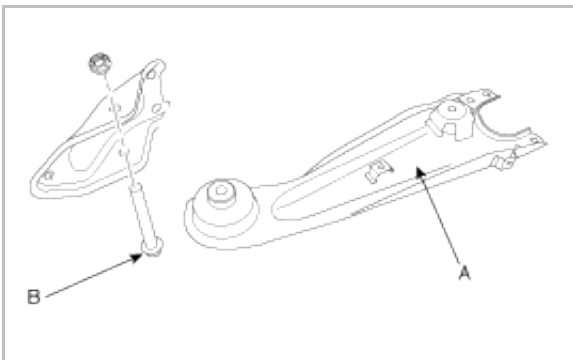
6. Remove the stabilizer link (B) nut (C) from the trailing arm (A).



7. Remove the trailing arm bracket (A) mounting bolts (B) from the body.



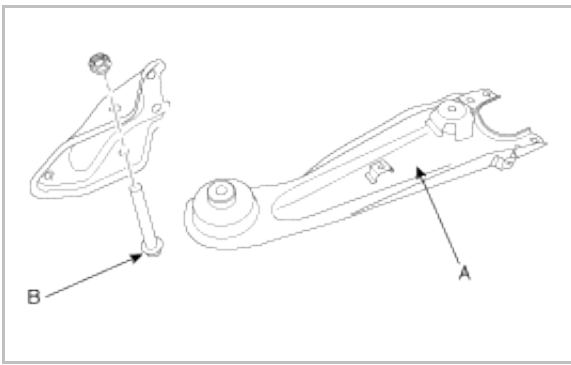
8. Remove the connecting bolt (B) between the trailing arm (A) and the bracket.



INSTALLATION

1. Install the connecting bolt (B) between the trailing arm (A) and the bracket.

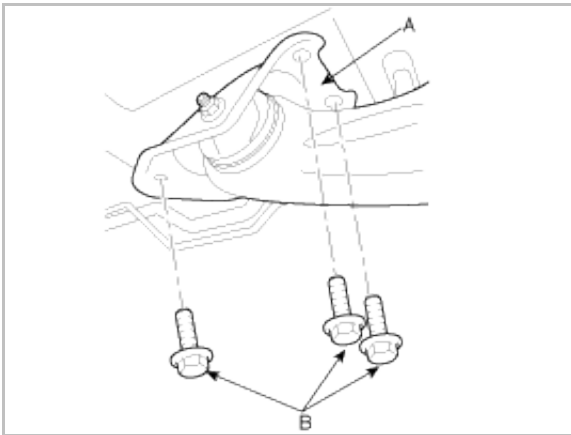
Tightening torque Nm (kgf.m, lb-ft) :
 160 ~ 180 (16 ~ 18, 115.7 ~ 130.2)



2. Install the trailing arm bracket (A) mounting bolts (B) from the body.

Tightening torque Nm (kgf.m, lb-ft) :

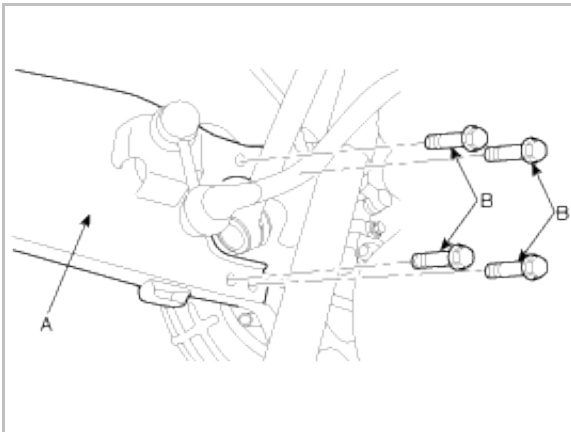
80 ~ 110 (8 ~ 11, 57.9 ~ 79.5)



3. Install the trailing arm (A) mounting nuts (B) from the knuckle.

Tightening torque Nm (kgf.m, lb-ft) :

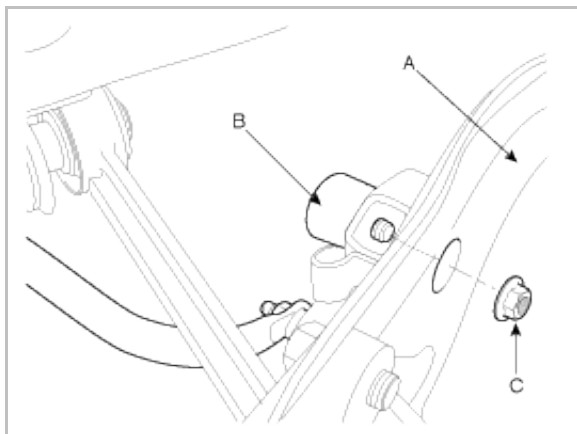
80 ~ 100 (8 ~ 10, 57.9 ~ 72.3)



4. Install the stabilizer link (B) nut (C) to the trailing arm (A).

Tightening torque Nm (kgf.m, lb-ft) :

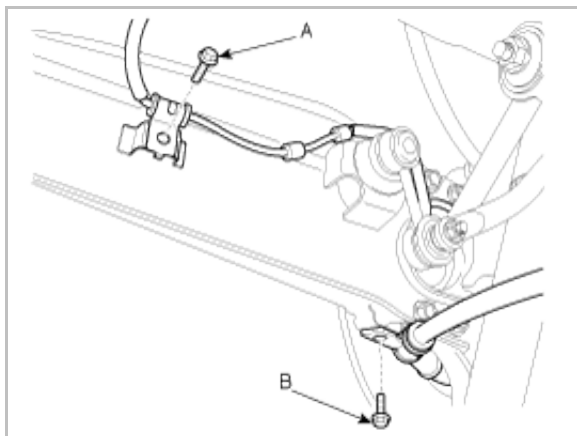
50 ~ 65 (5.0 ~ 6.5, 36.2 ~ 47.0)



5. Remove the wheel speed sensor wire's bracket bolt (A) and the parking brake wire's bracket bolt (B).

Tightening torque Nm (kgf.m, lb-ft) :

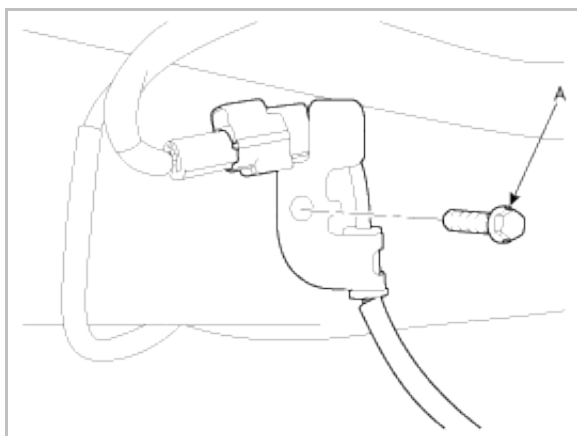
7 ~ 11 (0.7 ~ 1.1, 5.1 ~ 8.0)



6. Install the wheel speed sensor wire's bracket bolt (A) from the body and the connector.

Tightening torque Nm (kgf.m, lb-ft) :

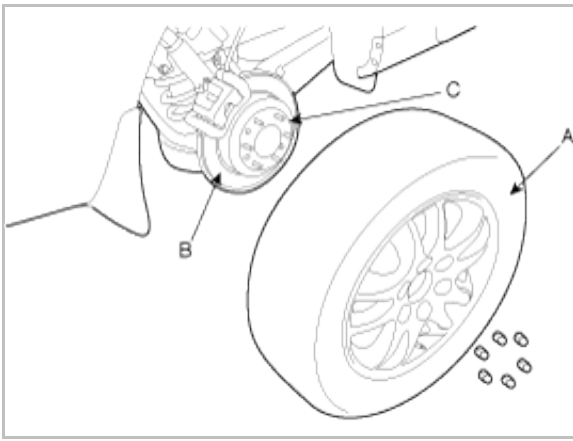
7 ~ 11 (0.7 ~ 1.1, 5.1 ~ 8.0)



7. Install the wheel and the tire (A) to the rear hub (B).

Tightening torque Nm (kgf.m, lb-ft) :

90 ~ 110 (9 ~ 11, 65.1 ~ 79.5)



CAUTION

Be careful not to damage the hub bolts (C) when installing the rear wheel and tire (A).

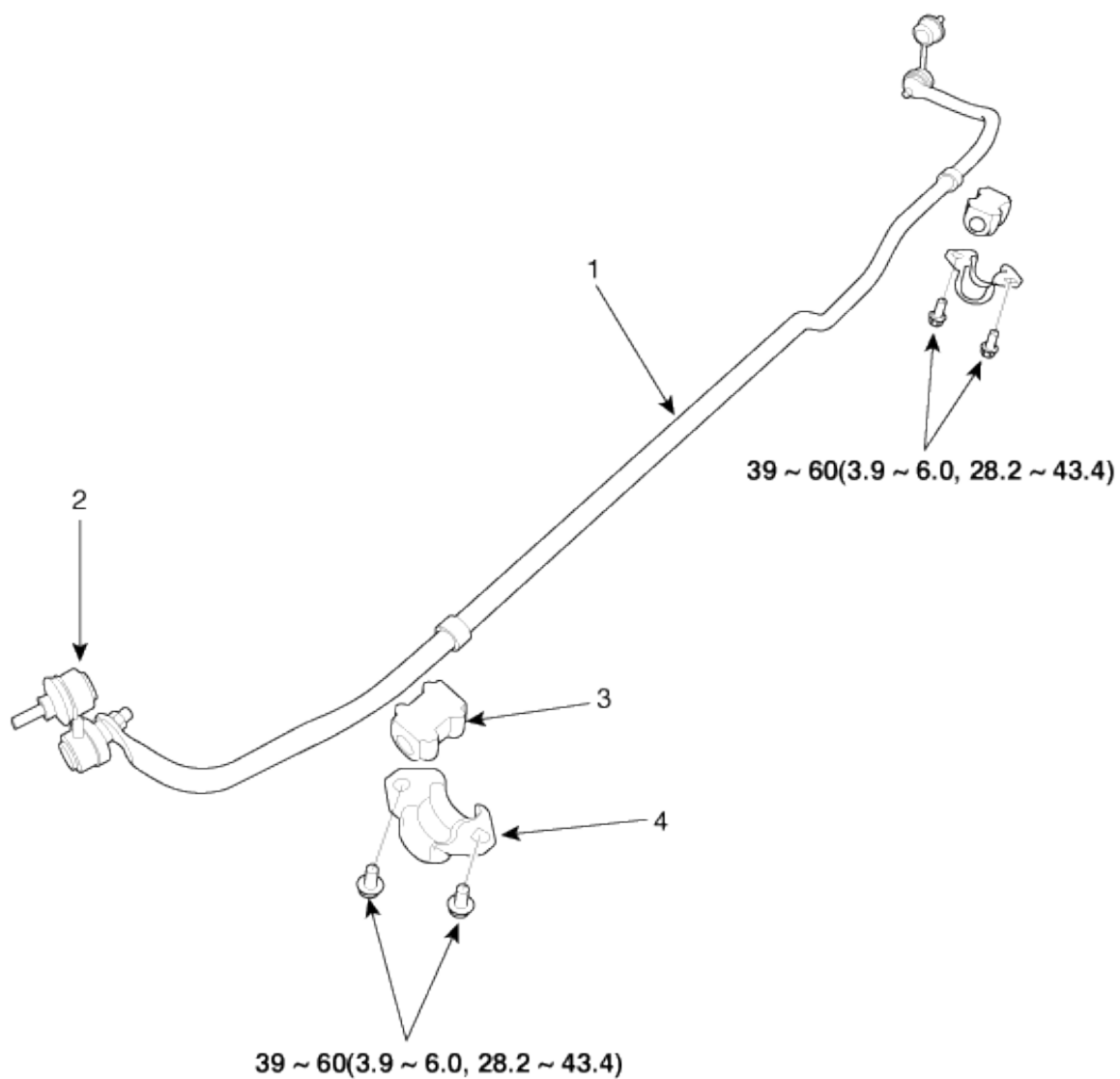
INSPECTION

1. Check the bushing for wear and deterioration.
2. Check the trailing arm for bending or breakage.
3. Check all the bolts for damage.

Suspension System

Rear Suspension System - Rear Stabilizer
Bar

COMPONENTS



TORQUE : Nm (kgf.m, lb-ft)

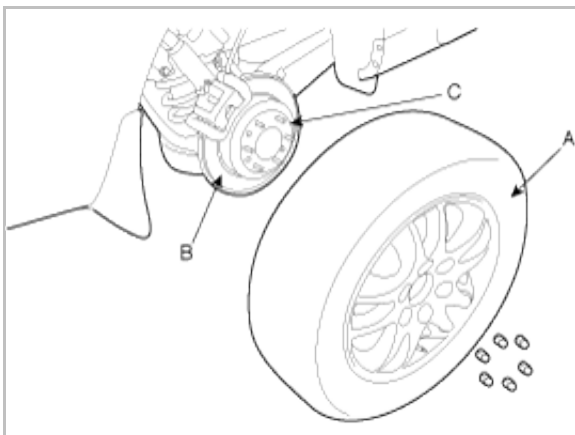
- 1. Rear stabilizer bar
- 2. Rear stabilizer link

- 3. Bushing
- 4. Bracket



REMOVAL

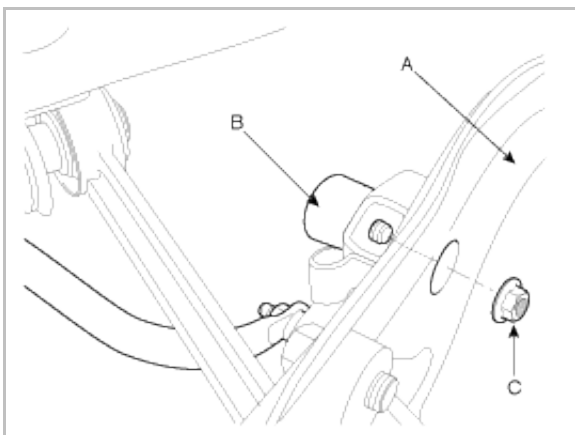
1. Loosen the wheel nuts slightly.
Raise the rear of the vehicle, and make sure it is securely supported.
2. Remove the rear wheel and tire (A) from rear hub (B).



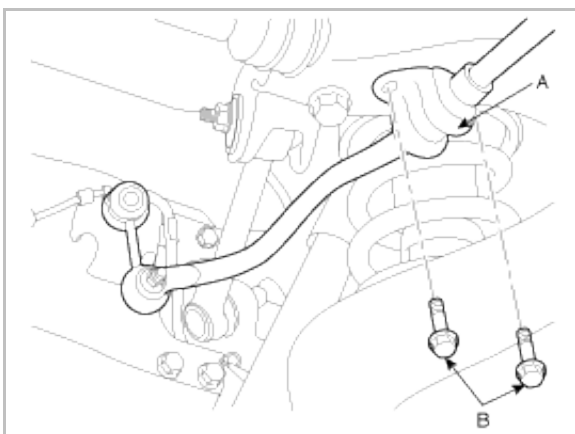
CAUTION

Be careful not to damage the hub bolts (C) when removing the rear wheel and tire (A).

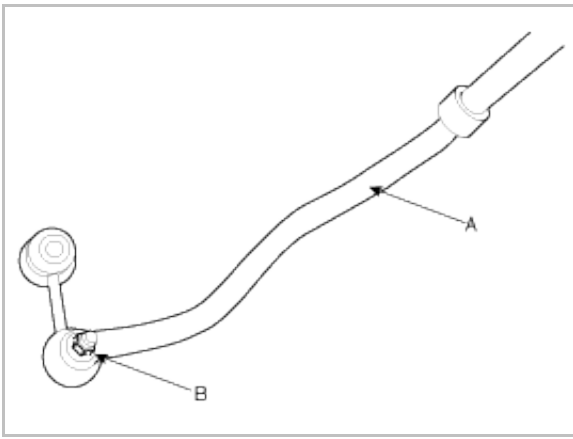
3. Remove the left/right nuts (C) of the rear stabilizer links (B) from the trailing arm (A).



4. Remove the left/right mounting nuts (B) of the rear stabilizer bar brackets (A).



5. Remove the rear stabilizer link (A) nut (B) from the stabilizer bar assembly.

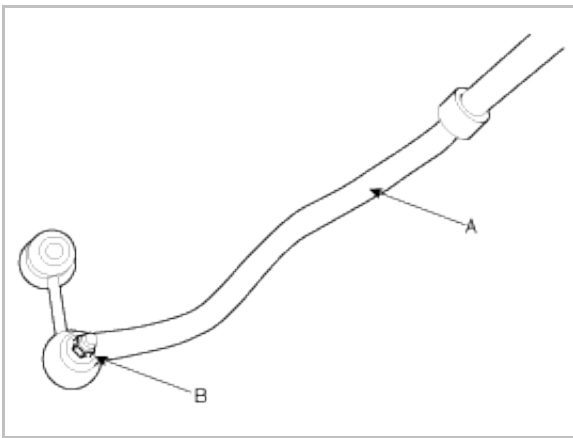


INSTALLATION

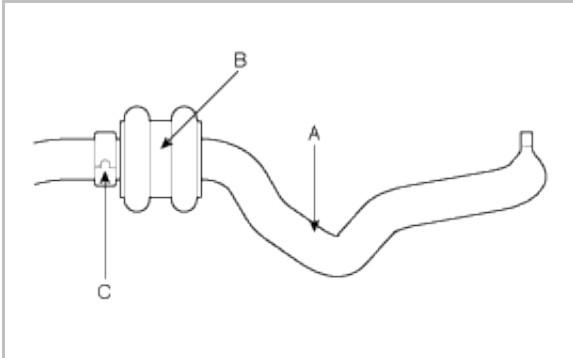
1. Install the rear stabilizer link (A) nut (B) to the stabilizer bar assembly.

Tightening torque Nm (kgf.m, lb-ft) :

50 ~ 65 (5.0 ~ 6.5, 36.2 ~ 47.0)



2. Install the bushing (B) on the stabilizer bar (A).



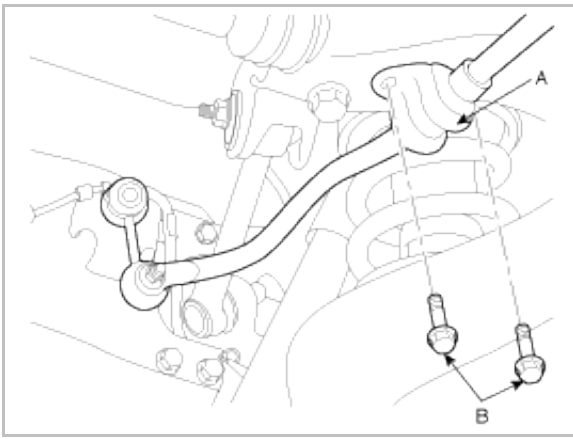
NOTICE

Bring clamp (C) of stabilizer bar (A) into contact with bushing (B).

3. One side bracket should be temporarily tightened, and then install the bushing on the opposite side.
4. Install the stabilizer bracket (A) bolt (B) to the cross member.

Tightening torque Nm (kgf.m, lb-ft) :

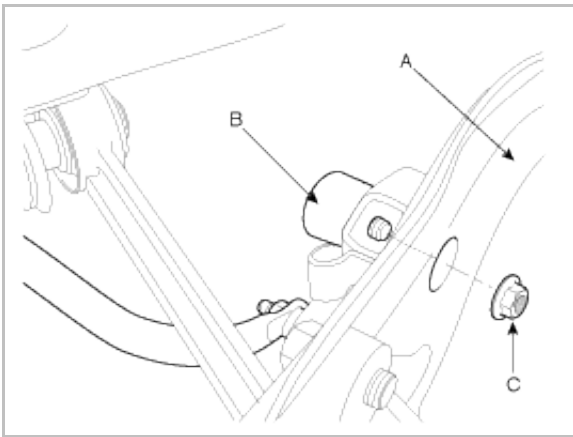
39 ~ 60 (3.9 ~ 6.0, 28.2 ~ 43.4)



5. Install the stabilizer link (B) nut (C) to the trailing arm (A).

Tightening torque Nm (kgf.m, lb-ft) :

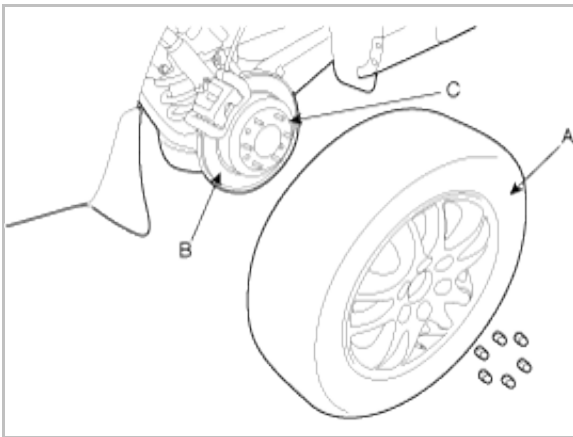
50 ~ 65 (5.0 ~ 6.5, 36.2 ~ 47.0)



6. Repeat step 4 and 5 for the other side.
7. Install the wheel and the tire (A) to the rear hub (B).

Tightening torque Nm (kgf.m, lb-ft) :

90 ~ 110 (9 ~ 11, 65.1 ~ 79.5)



CAUTION

Be careful not to damage the hub bolts (C) when installing the rear wheel and tire (A).

INSPECTION

1. Check the bushing for wear and deterioration.
2. Check the stabilizer bar for bending or breakage.

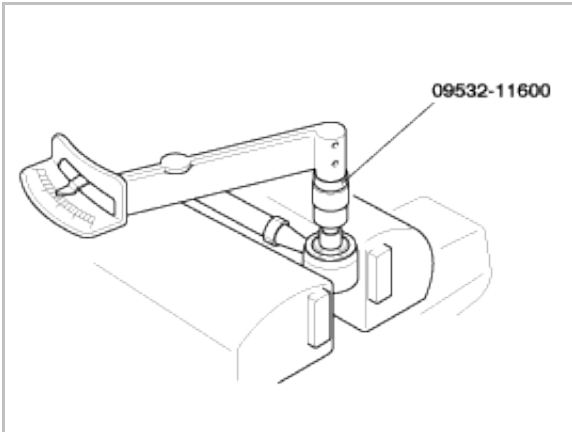
3. Check the ball joint for rotating torque.
 - (1) If there is a crack in the dust cover, replace it and add grease.
 - (2) Shake the stabilizer link ball joint stud several times.
 - (3) Mount the self-locking nut on the ball joint, and then measure the ball joint rotating torque.

Specified torque :

0.5 ~ 2.5 Nm (5 ~ 25 kgf.m, 3.62 ~ 1.81 lb-ft)

NOTICE

Measure torque using the special tool(09532-11600) and torque wrench at the range of 0.5 - 2 rpm after moving the ball joint stud 10 times at room temperature.



- (4) If the rotating torque exceeds the upper limit of standard value, replace the upper arm assembly.
- (5) Even if the rotating torque is below the lower limit of the standard value, the ball joint may be reused unless it has drag and excessive play.



Suspension System

Tires/Wheels - Tire



TIRE WEAR

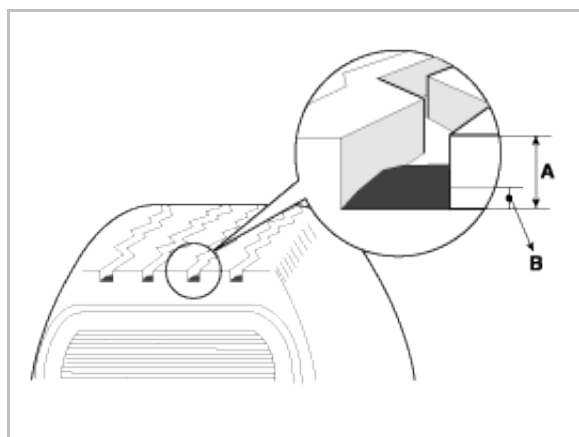
1. Measure the tread depth of the tires.

Tread depth [limit] : 1.6 mm (0.063 in)

2. If the remaining tread(A) depth is less than the limit, replace the tire.

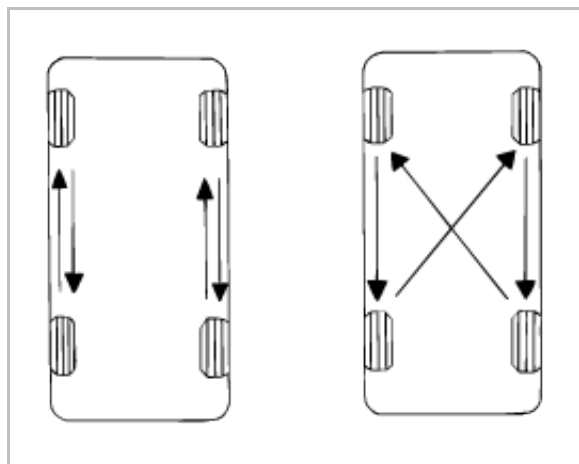
NOTICE

When the tread depth of the tires is less than 1.6 mm (0.063 in), the wear indicators(B) will appear.



TIRE ROTATION

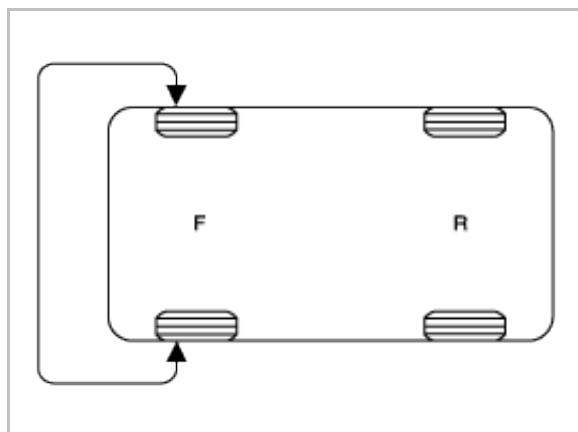
Rotate the tires in the pattern illustrated.



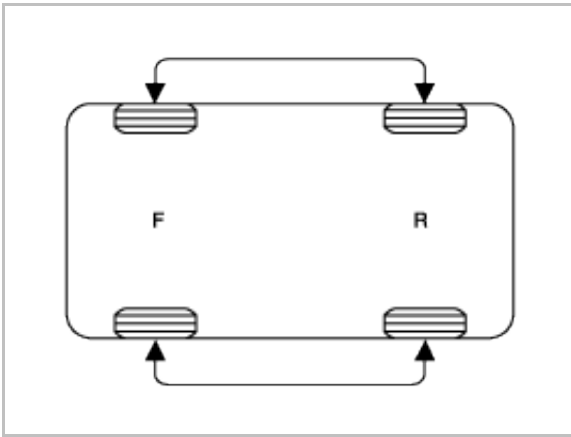
CHECKING FOR PULL AND WANDER

If the steering pulls to one side, rotate the tires according to the following wheel rotation procedure.

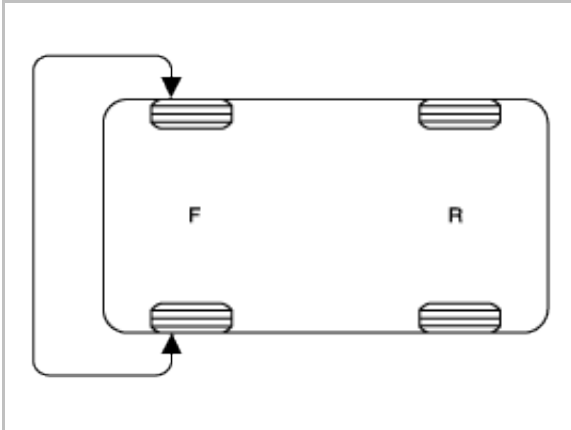
1. Rotate the front right and front left tires, and perform a road test in order to confirm vehicle stability.



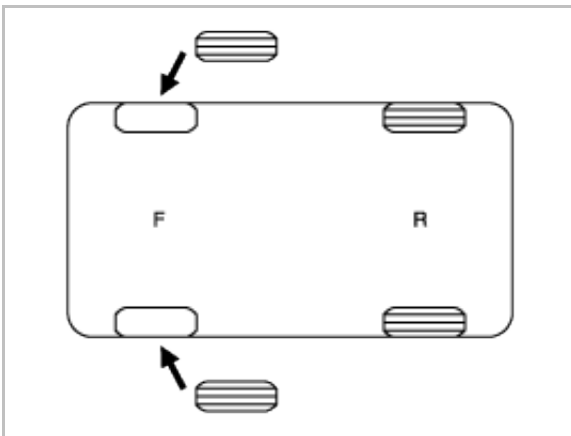
2. If the steering pulls to the opposite side, rotate the front and rear tires, and perform a road test again.



3. If the steering continues to pull to one side, rotate the front right and left tires again, and perform a road test.



4. If the steering continues to pull to the opposite side, replace the front wheels with new ones.





Suspension System

Tires/Wheels - Wheel

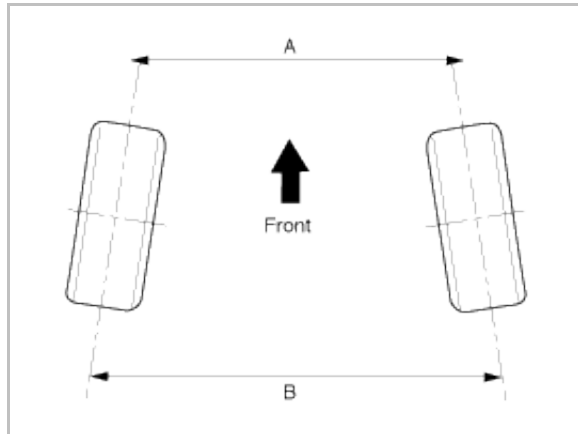


WHEEL ALIGNMENT

When using commercially available computerized four wheel alignment equipment (caster, camber, toe) to inspect the front wheel alignment, always position the car on a level surface with the front wheels facing straight ahead. Prior to inspection, make sure that the front suspension and steering system are in normal operating condition and that the wheels and tires face straight ahead and the tires are inflated to the specified pressure.

TOE

Toe is a measurement of how much the front of the wheels are turned in or out from the straight-ahead position.



Item	Description
$A - B < 0$	Positive (+) toe (toe in)
$A - B > 0$	Negative (-) toe (toe out)

When the wheels are turned in toward the front of the vehicle, toe is positive (+) (toe in). When the wheels are turned out toward the front of the vehicle, toe is negative(-) (toe out). Toe is measured in degrees, from side to side, and totaled.

[FRONT]

Toe-in(B-A or angle a+b) is adjusted by turning the tie rod turnbuckles. Toe-in on the left front wheel can be reduced by turning the tie rod toward the rear of the car. Toe- in change is adjusted by turning the tie rods for the right and left heels simultaneously at the same amount as follows.

Standard value :

Toe-in

Total : $0^{\circ} \pm 0.2^{\circ}$

Individual : $0^{\circ} \pm 0.1^{\circ}$

NOTICE

- Toe-in adjustment should be made by turning the right and left tie rods at the same amount.
- When adjusting toe-in, loosen the outer bellows clip to prevent twisting the bellows.
- After the adjustment, tighten the tie rod end lock nuts firmly and reinstall the bellows clip.
- Adjust each toe-in to be the range of $\pm 0.1^{\circ}$.

Tie rod(A) Specified torque Nm (kgf.m, lb-ft) :

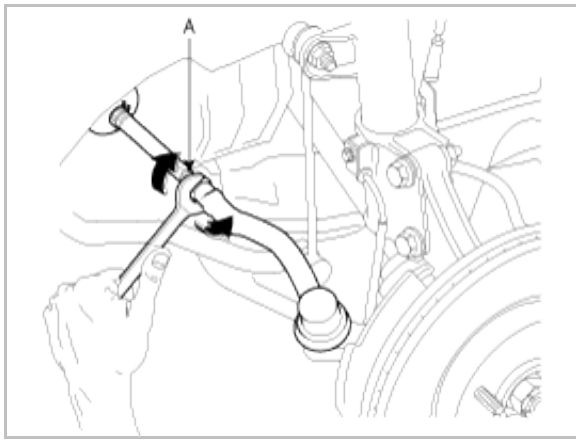
70 ~ 80 (7 ~ 8, 50.6 ~ 57.8)

Standard value :

Toe-in

Total : $0^{\circ} \pm 0.2^{\circ}$

Individual : $0^{\circ} \pm 0.1^{\circ}$



[REAR]

Standard value :

Toe-in

Total : $0.26^{\circ} \pm 0.2^{\circ}$

Individual : $0.17^{\circ} \pm 0.1^{\circ}$

Adjust the toe-in by turning the cambolt of the assist arm.

Left cambolt : Clockwise → toe-in

Right cambolt : Clockwise → toe-out

The variation of toe by a rotation of the cambolt :

About 0.3°

Standard value :

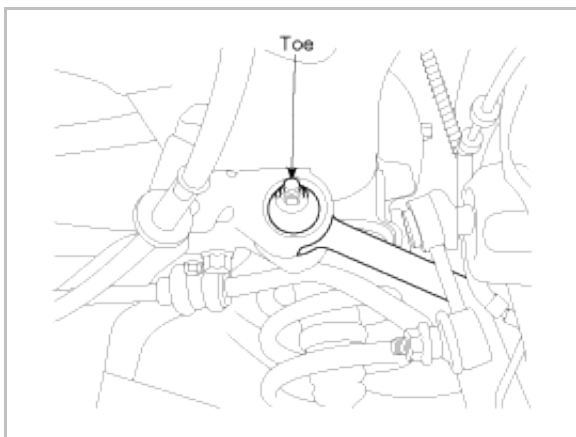
Toe-in

Total : $0.26^{\circ} \pm 0.2^{\circ}$

Individual : $0.17^{\circ} \pm 0.1^{\circ}$

CAUTION

- Each toe should be within $\pm 0.1^{\circ}$.
If the difference between right and left is not within $\pm 0.2^{\circ}$, repeat adjustment.
- After adjusting the cambolt, tighten the nut to the specified torque.



Specified torque

90 ~ 120 Nm (9 ~ 12 kgf.m, 65.1 ~ 86.8 lb-ft)

Standard value :

Toe-in

Total : $0.26^{\circ} \pm 0.2^{\circ}$

Individual : $0.17^{\circ} \pm 0.1^{\circ}$

Left cambolt : Clockwise → toe-in

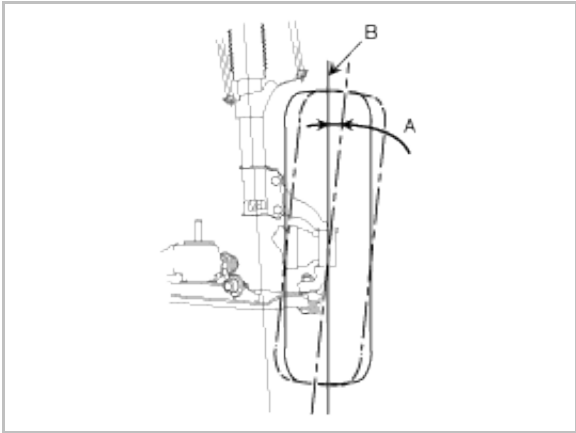
Right cambolt : Clockwise → toe-out

The variation of toe by a rotation of the cambolt :
About 0.3°

CAMBER

[FRONT]

Camber is the inward or outward tilting of the wheels at the top.



Item	Description
A	Positive camber angle
B	True vertical

When the wheel tilts out at the top, then the camber is positive (+).
When the wheel tilts in at the top, then the camber is negative(-).

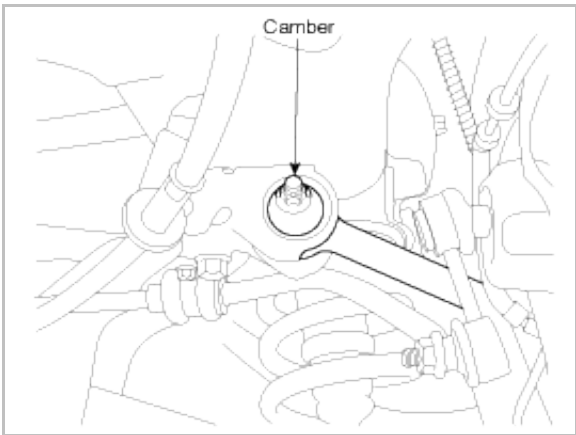
Standard value : 0°±0.5°
Difference between right and left angle is within 0.5°

NOTICE

Camber is pre-set at the factory and doesn't need to be adjusted. If the camber is not within the standard value, replace the bent or damaged parts.

[REAR]

Standard value : 0.1°±0.5°
Difference between right and left angle is within 0.5°



Adjust the camber by turning the cambolt of the rear upper arm.

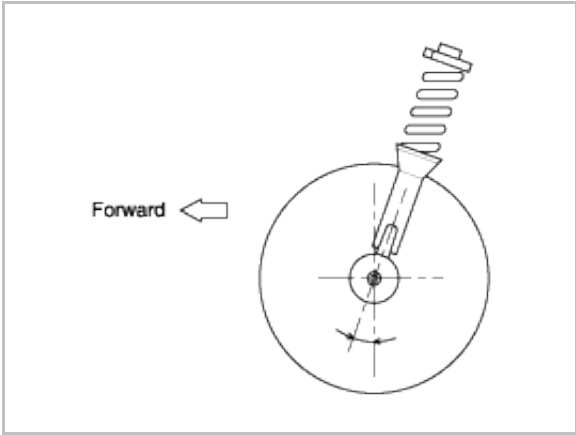
Left cambolt : Clockwise → camber(-)
Right cambolt : Clockwise →camber(+)

The variation of camber by a rotation of the cambolt :
About 0.9°

CASTER

Caster is the tilting of the strut axis either forward or backward from vertical. A backward tilt is positive (+) and a forward tilt is negative (-).
Caster is pre-set at the factory and doesn't need to be adjusted. If the caster is not within the standard value, replace the bent or damaged parts.

Caster : 3.77°±0.5°



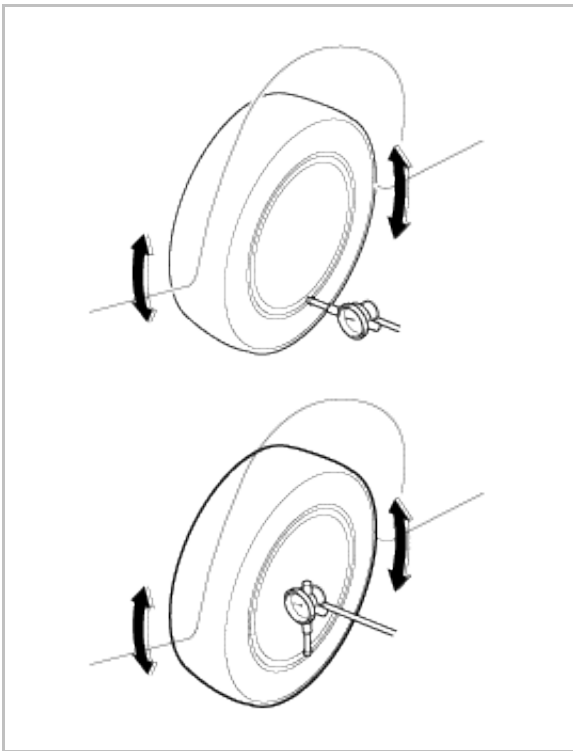
NOTICE

- The worn loose or damaged parts of the front suspension assembly must be replaced prior to measuring front wheel alignment.
- Caster are pre-set to the specified value at the factory and don't need to be adjusted.
- If the caster are not within specifications, replace bent or damaged parts.
- The difference of left and right wheels about the the caster must be within the range of 0±0.5°.

WHEEL RUNOUT

1. Jack up the vehicle and support it with jack stands.
2. Measure the wheel runout with a dial indicator as illustrated.
3. Replace the wheel if the wheel runout exceeds the limit.

Limit		Radial	Axial
Runout mm(in)	Steel	0.7(0.028)	1.1(0.043)
	Aluminium	0.3(0.012)	0.3(0.012)



WHEEL NUT TIGHTENING

1. Tightening torque.

Tightening torque Nm (kgf.m, lb-ft) :

90 ~ 110 (9 ~11, 65.1 ~ 79.5)

CAUTION

When using an impact gun, final tightening torque should be checked using a torque wrench.

2. Tightening order.

Check the torque again after tightening the wheel nuts diagonally.

