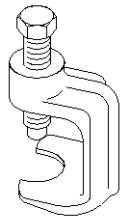
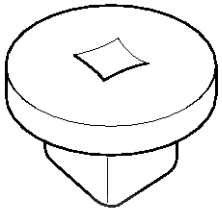
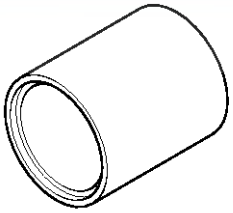
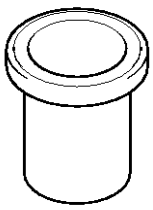
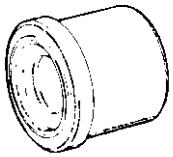
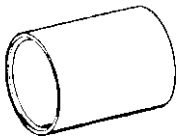
General Information

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 b-all 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 b-ushing(G) (Use with 09216-21100)
09216-21100 Mount bushing remover and installer		Removal & installation of lower arm b-ushing(G) (Use with 09216-32000)

Tool (Number and Name)	Illustration	Use
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 ☐	

BHKG500C

SYMPTOM CHART

Symptom	Suspect Area	Remedy
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 Birfied joint as necessary. 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.

Symptom	Suspect Area	Remedy
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 materal between the brake disc and hub.	Clean the mounting surfaces of the brake disc and hub. See DS group - front/rear axle.

Symptom	Suspect Area	Remedy
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 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	Go to detailed test K.
Vehicle leans	Tire/wheel Vehicle load Suspension components Incorrect ride height	Inflate tires to specification. Redistribute the load as necessary. Visually inspect the suspention 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	

CONDITIONS	DETAILS/RESULTS/ACTIONS
	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.**
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.

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	

CONDITIONS	DETAILS/RESULTS/ACTIONS
	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	

CONDITIONS	DETAILS/RESULTS/ACTIONS
	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 to**C8.** ⇒ **NO** Go to**C6.**
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 to**C7.**
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	

CONDITIONS	DETAILS/RESULTS/ACTIONS
	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.**
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.**
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.

DETAILED TEST D :

CONDITIONS	DETAILS/RESULTS/ACTIONS
CHECK FOR FRONT WHEEL BEARING ROUGHNESS	

CONDITIONS	DETAILS/RESULTS/ACTIONS
	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 to**D3.** ⇒ **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 to**D4.** ⇒ **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 to**D5.** ⇒ **NO** Install new tires as necessary and Balance the assembly. Test the system for normal operation.

CONDITIONS	DETAILS/RESULTS/ACTIONS
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, I-nstall a new tire. Test the system for normal operation. ⇒ **NO** Go to**D6.**
MATCH MOUNT THE TIRE AND WHEEL ASSEMBLY	
	Mark the high runout location on the tire and also on the wheel. Break the as-sembly 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 t-ire, Go to**D7.**
MEASURE THE WHEEL FLANGE RUNOUT	
	Dismount the tire and mount the wheel on a wheel balancer. Measure the ru-nout 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 t-he 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 t-he system for normal operation. If the condition persists, Go to**D8.**
CHECK FOR VIBRATION FROM THE FRONT OF THE VEHICLE	

CONDITIONS	DETAILS/RESULTS/ACTIONS
	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.

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	

CONDITIONS	DETAILS/RESULTS/ACTIONS
	1. Place the vehicle on an alignment rack. Check the vehicle alignmnt. ● Is the alignment within specification ? ⇒ **YES** Go to ⇒ **NO** Adjust the alignment as necessary. See page SS-69 (wheel alignment).
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.**

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	

CONDITIONS	DETAILS/RESULTS/ACTIONS
	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	

CONDITIONS	DETAILS/RESULTS/ACTIONS
	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**I3.**
INSPECT THE FRONT SUSPENSION	

CONDITIONS	DETAILS/RESULTS/ACTIONS
	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

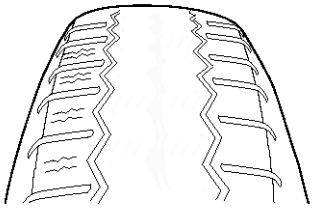
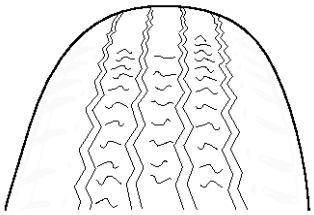
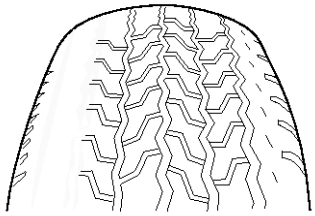
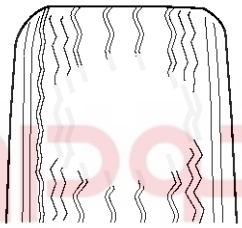
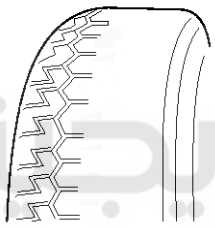
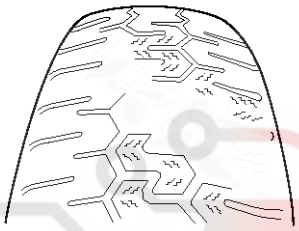
CONDITIONS	DETAILS/RESULTS/ACTIONS
ROAD TEST	

CONDITIONS	DETAILS/RESULTS/ACTIONS
	Accelerate the vehicle to the speed at which the customer indicated the vibration occured. ● Is the vibration present ? ⇒ **YES** Go to**K2.** ⇒ **NO** The vehicle is OK. Go to**TROUBLESHOOTING.**
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 rougness. ● Is the front wheel bearing OK ? ⇒ **YES** Go to**K4.** ⇒ **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 to**K5.** ⇒ **NO** Balance the tires and wheels as necessary.
MEASURE THE RUNOUTS	

CONDITIONS	DETAILS/RESULTS/ACTIONS
	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 to**K7.** ⇒ **NO** Go to**K6.**
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

SPECIFICATIONS

FRONT SUSPENSION SYSTEM

Items			Specification
Type			Macpherson strut
Shock Absorber	Type		Gas
	Stroke mm(in)		173 (6.81)
	Expansion mm(in)		536 ± 3 (21.10 ± 0.12)
	Compression mm(in)		363 +3, -free (14.29 +0.12, -free)
	I.D. Color		Red
	Damping force (Piston speed : 0.3 m/s)	Expansion N(kgf, lb)	1020 ± 157 (104 ± 16, 229 ± 35)
		Compression N(kgf, lb)	559 ± 108 (57 ± 11, 126 ± 24)
Spring	GSL2.0 /GSL2.4	Free height mm(in)	358.8 (14.13)
		I.D. Color	White - White
	GSL2.7 / GSL2.0 HIGH SUS.	Free height mm(in)	364.8 (14.36)
		I.D. Color	White - Yellow
	DSL2.0 / GSL2.7 HIGH SUS	Free height mm(in)	374.4 (14.74)
		I.D. Color	White - Red
	DSL2.0 HIGH SUS	Free height mm(in)	381.2 (15.01)
		I.D. Color	White - Green

REAR SUSPENSION SYSTEM

Items			Specification
Type			Multi link
Shock Absorber	Type		Gas
	Stroke mm(in)		173 (6.81)
	Expansion mm(in)		550 ± 3 (21.65 ± 0.12)
	Compression mm(in)		377 +3, -free (14.84 +0.12, -free)
	I.D. Color		Red
	Damping force (Piston speed : 0.3 m/s)	Expansion N(kgf, lb)	981 ± 147 (100 ± 15, 221 ± 33)
		Compression N(kgf, lb)	255 ± 59 (26 ± 6, 57 ± 13)
Spring	GSL / DSL	Free height mm(in)	330 (12.99)
		I.D. Color	Blue - White

WHEELS AND TIRES

Items		Specification	
Tire size		205/65 HR15	
		205/60 HR16	
		215/50 VR17	
Wheel size	Steel wheel	6.0J x 15	
		6.5J x 16	
	Aluminum wheel	6.5J x 16	
		6.5J x 17	
Tire pressure kPa (kg/cm², psi)		Front	Rear
	205/65 HR15	206 (2.1, 30)	206 (2.1, 30)
	205/60 HR16	226 (2.3, 33)	226 (2.3, 33)
	215/50 VR17	226 (2.3, 33)	226 (2.3, 33)
	T125/80 D16	412 (4.2, 60)	412 (4.2, 60)

WHEEL ALIGNMENT

Items	Front	Rear
Camber	-0.5°±0.5°	-1°±0.5°
Caster	4.74°±0.5°	-
Toe-in mm(in)	0°±0.2°	0.2°±0.2°
King pin angle	13.1°±0.5°	-

TIGHTENING TORQUE

FRONT SUSPENSION

Items	Nm	kgf.m	lb-ft
Wheel nut	88.3~ 107.9	9.0 ~ 11.0	65.1~ 79.6
Front strut assembly mounting bolt (to body)	44.1 ~ 58.8	4.5 ~ 6.0	32.5 ~ 43.4
Front strut assembly mounting bolt (to knuckle)	137.3 ~ 156.9	14.0 ~ 16.0	101.3 ~ 115.7
Front strut assembly self-locking nut	49.0 ~ 68.6	5.0 ~ 7.0	36.2 ~ 50.6
Front lower arm ball joint mounting bolt (to knuckle)	98.1 ~ 117.7	10.0 ~ 12.0	72.3 ~ 86.8
Front lower arm bushing(A) mounting bolt (to subframe)	98.1 ~ 117.7	10.0 ~ 12.0	72.3 ~ 86.8
Front lower arm bushing(G) mounting bolt (to subframe)	137.3 ~ 156.9	14.0 ~ 16.0	101.3 ~ 115.7
Front stabilizer link mounting nut (to front strut assembly)	98.1 ~ 117.7	10.0 ~ 12.0	72.3 ~ 86.8
Front stabilizer bar bracket mounting bolt (to subframe)	44.1 ~ 53.9	4.5 ~ 5.5	32.5 ~ 39.8
Front stabilizer link self-locking nut	98.1 ~ 117.7	10.0 ~ 12.0	72.3 ~ 86.8
Front sub frame mounting bolt (to body)	156.9 ~ 176.5	16.0 ~ 18.0	115.7 ~ 130.2
Front sub frame bracket mounting bolt (to body)	44.1 ~ 53.9	4.5 ~ 5.5	32.5 ~ 39.8

REAR SUSPENSION

Items	Nm	kgf.m	lb-ft
Wheel nut	88.3 ~ 107.9	9.0 ~ 11.0	65.1 ~ 79.6
Rear shock absorber bracket mounting bolt (to body)	44.1 ~ 53.9	4.5 ~ 5.5	32.5 ~ 39.8
Rear shock absorber mounting bolt (to carrier)	137.3 ~ 156.9	14.0 ~ 16.0	101.3 ~ 115.7
Rear upper arm self-locking nut (to carrier)	98.1 ~ 117.7	10.0 ~ 12.0	72.3 ~ 86.8
Rear upper arm mounting bolt (to cross member)	98.1 ~ 117.7	10.0 ~ 12.0	72.3 ~ 86.8
Rear lower arm mounting nut (to carrier)	137.3 ~ 156.9	14.0 ~ 16.0	101.3 ~ 115.7
Rear lower arm mounting nut (to cross member)	137.3 ~ 156.9	14.0 ~ 16.0	101.3 ~ 115.7
Rear assist arm ball joint self-locking nut (to carrier)	44.1 ~ 53.9	4.5 ~ 5.5	32.5 ~ 39.8
Rear assist arm mounting nut (to cross member)	78.5 ~ 98.1	8.0 ~ 10.0	57.9 ~ 72.3
Trailing arm mounting bolt (to body)	137.3 ~ 156.9	14.0 ~ 16.0	101.3 ~ 115.7
Trailing arm mounting bolt (to carrier)	44.1 ~ 53.9	4.5 ~ 5.5	32.5 ~ 39.8
Rear stabilizer bar bracket mounting bolt (to cross member)	44.1 ~ 53.9	4.5 ~ 5.5	32.5 ~ 39.8
Rear stabilizer link self-locking nut (to trailing arm)	44.1 ~ 53.9	4.5 ~ 5.5	32.5 ~ 39.8
Rear stabilizer link self-locking nut	44.1 ~ 53.9	4.5 ~ 5.5	32.5 ~ 39.8

⚠CAUTION

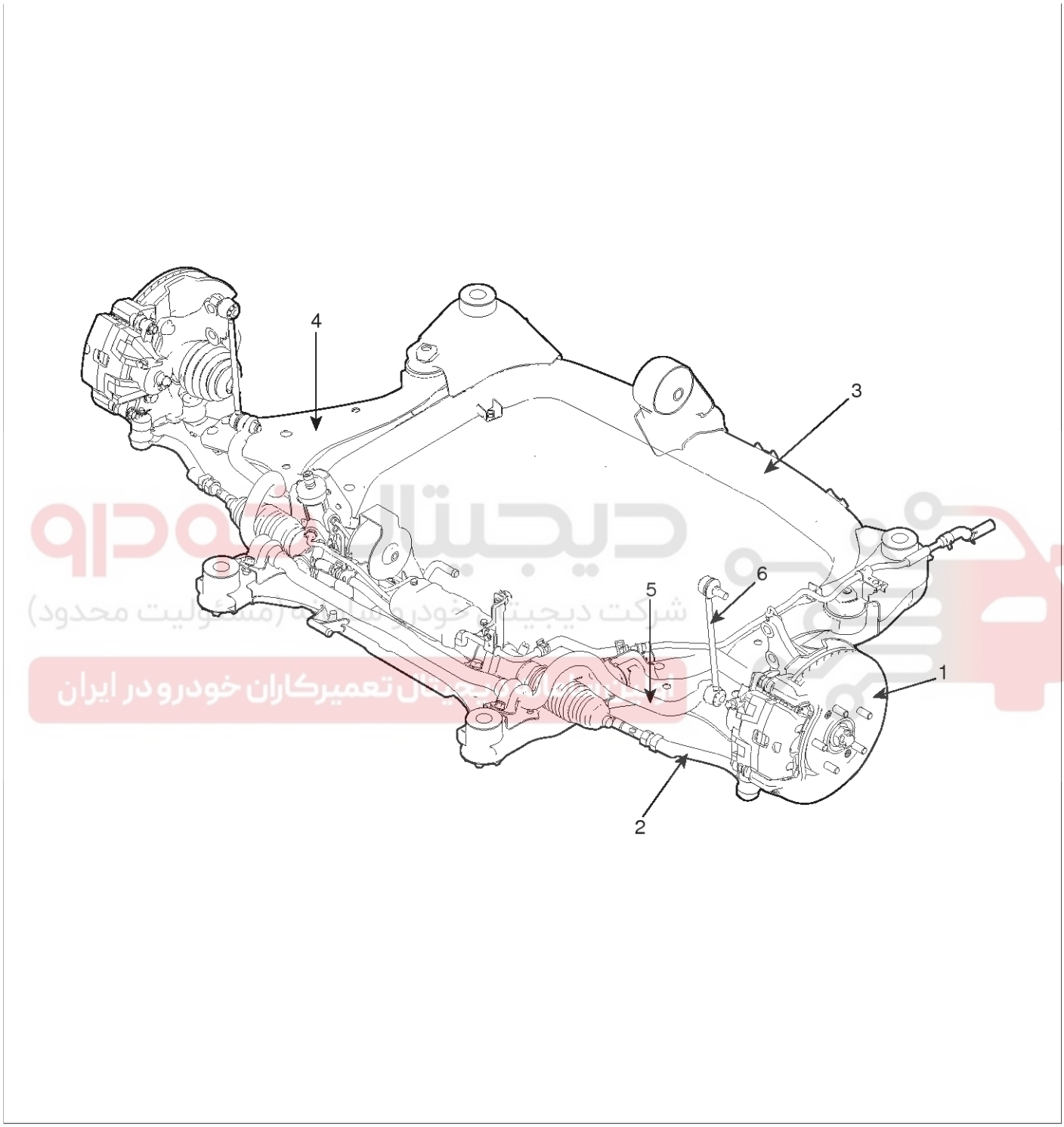
Replace the self-locking nuts with new ones after removal.

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)		

Front Suspension System

COMPONENTS

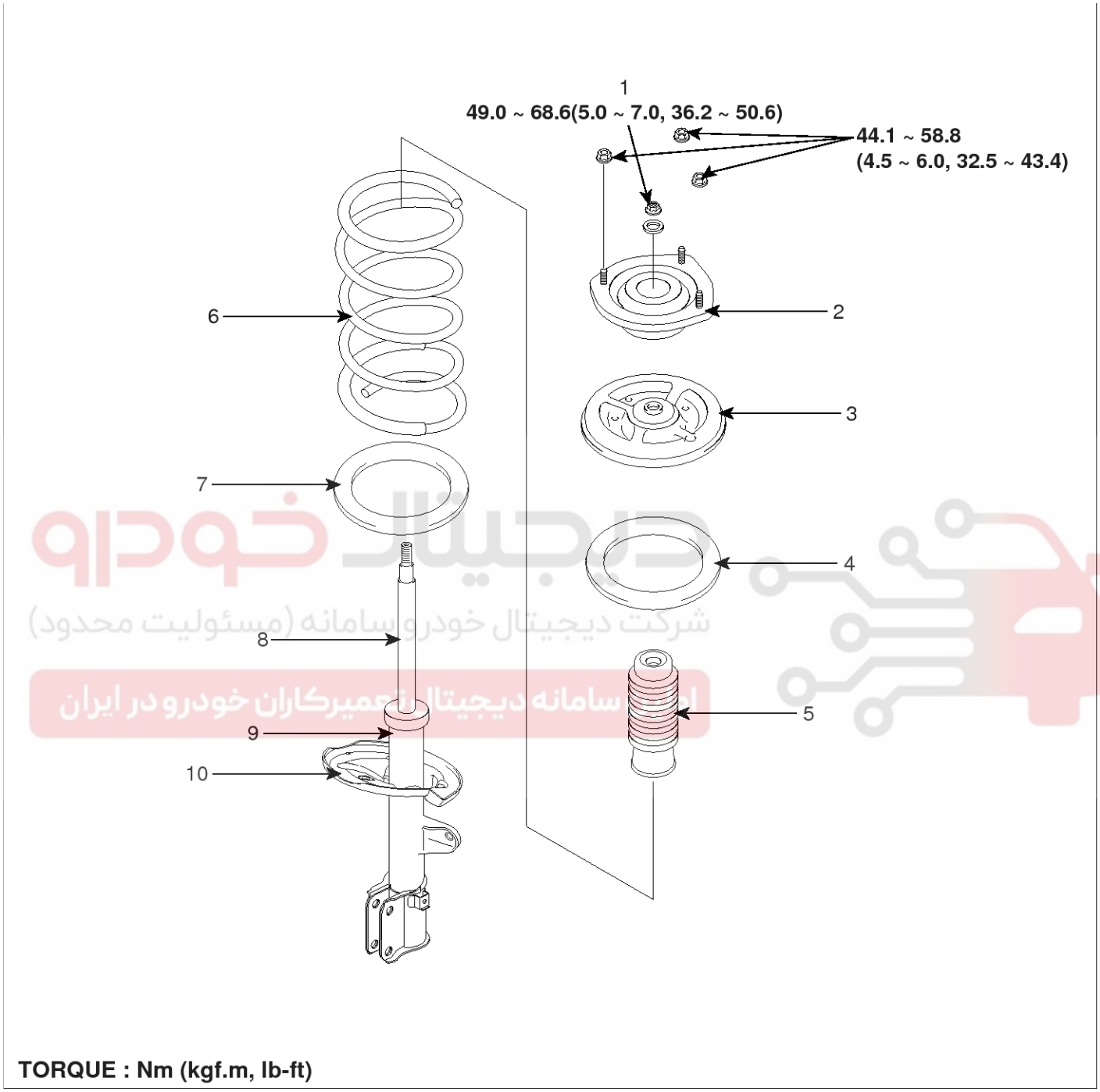


1. Front disk
2. Tie rod end assembly
3. Front subframe
4. Front lower arm
5. Front stabilizer bar assembly
6. Front stabilizer link assembly

LHLG500A

Front Strut Assembly

COMPONENTS



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

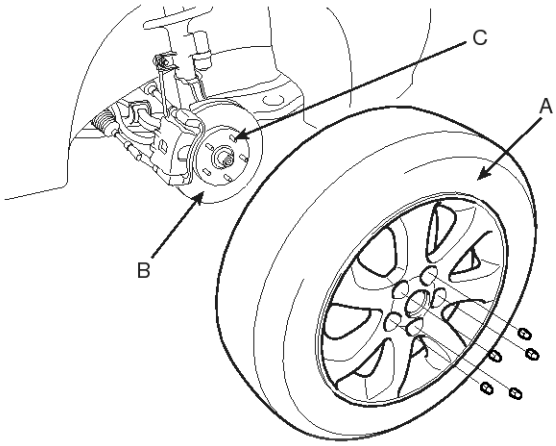
LHLG500B

REMOVAL

1. Loosen the wheel nuts slightly.

   Raise the vehicle, and make sure it is securely supported.

2. Remove the front wheel and tire (A) from front hub (B).

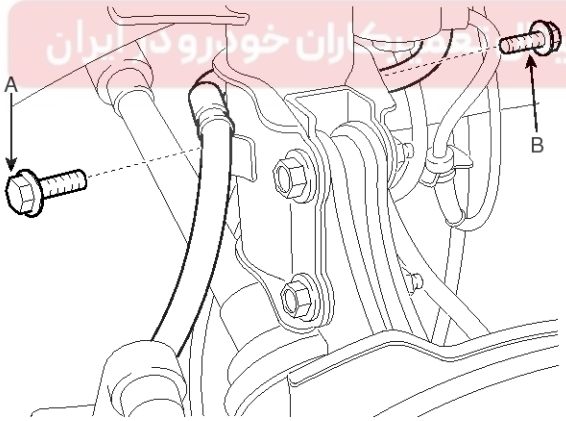


AHLG500B

⚠CAUTION

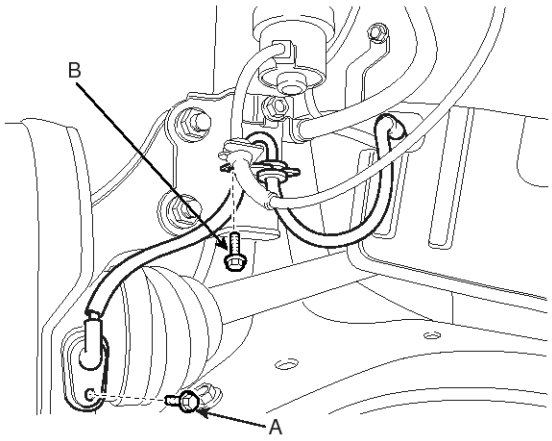
Be careful not to damage to the hub bolts (C) when removing the front wheel and tire (A).

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



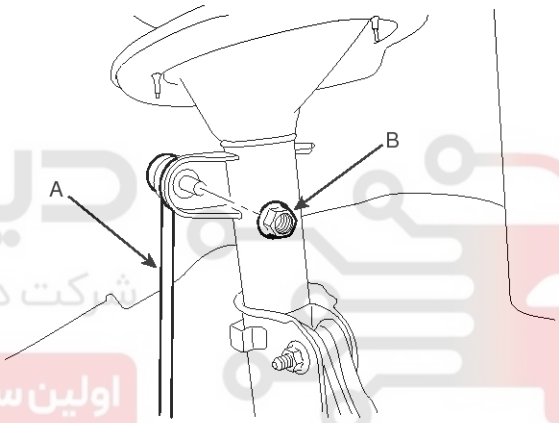
AHLG500C

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



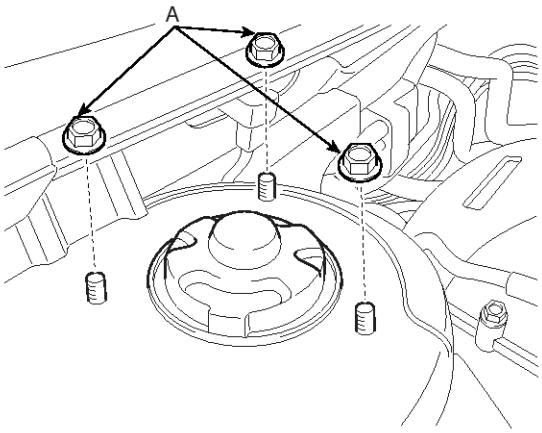
AHLG500D

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



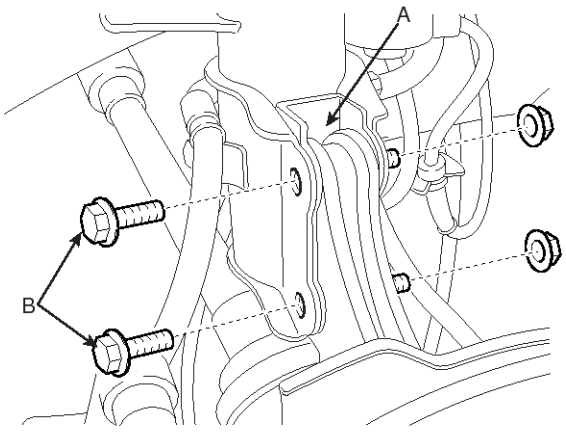
AHKF110D

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



AHLG500E

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

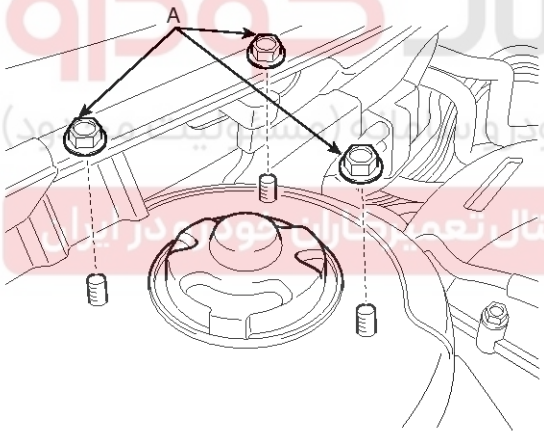


AHLG500F

INSTALLATION

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

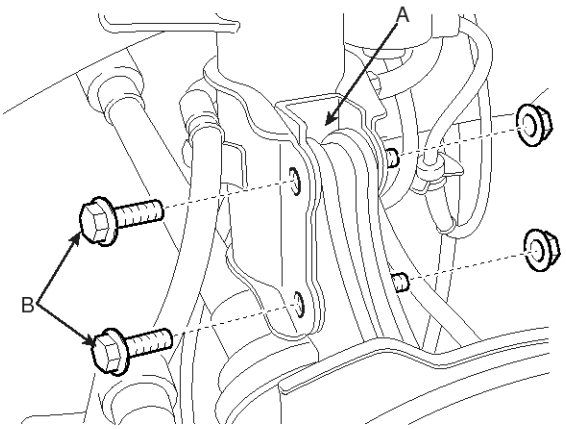
Tightening torque Nm (kgf.m, lb-ft) :
44.1 ~ 58.8 (4.5 ~ 6.0, 32.5 ~ 43.4)



AHLG500E

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

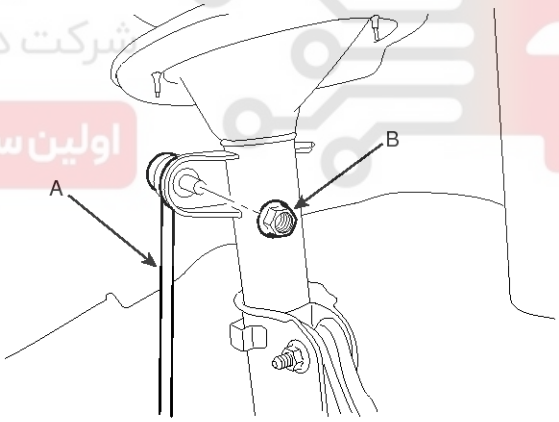
Tightening torque Nm (kgf.m, lb-ft) :
137.3 ~ 156.9 (14.0 ~ 16.0, 101.3 ~ 115.7)



AHLG500F

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

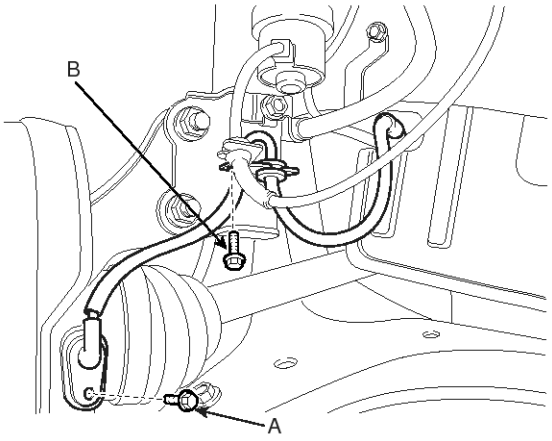
Tightening torque Nm (kgf.m, lb-ft) :
98.1 ~ 117.7 (10 ~ 12, 72.3 ~ 86.8)



AHKF110D

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

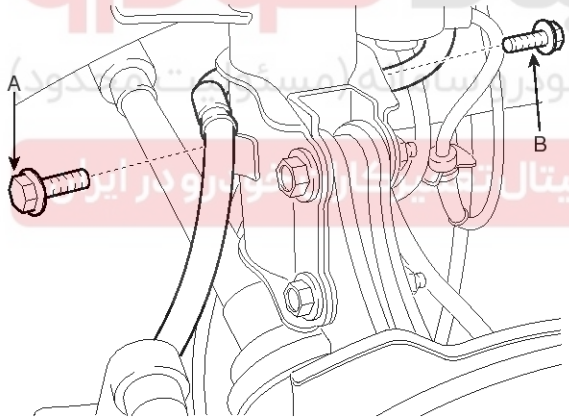
Tightening torque Nm (kgf.m, lb-ft) :
6.9 ~ 10.8 (0.7 ~ 1.1, 5.1 ~ 8.0)



AHLG500D

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

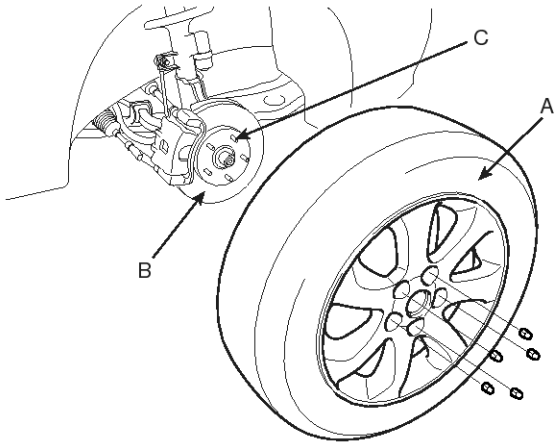
Tightening torque Nm (kgf.m, lb-ft) :
6.9 ~ 10.8 (0.7 ~ 1.1, 5.1 ~ 8.0)



AHLG500C

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

Tightening torque Nm (kgf.m, lb-ft) :
88.3 ~ 107.9 (9 ~ 11, 65.1 ~ 79.5)

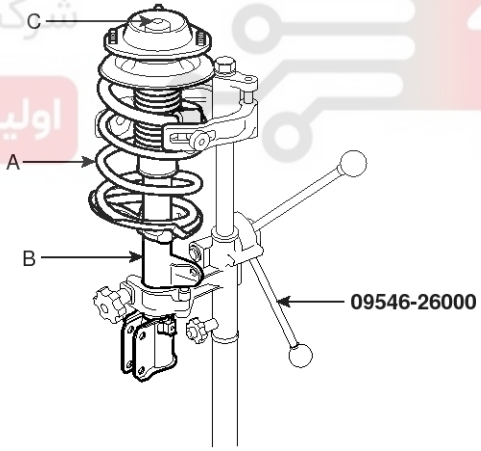


AHLG500B

⚠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).

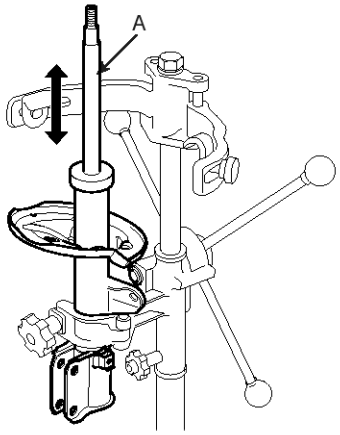


AHJF101J

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

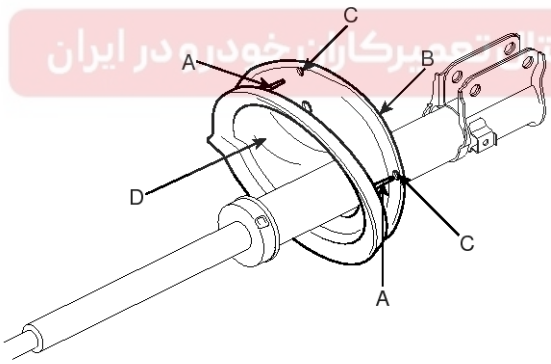
1. Check the strut insulator for wear or damage.
2. Check rubber parts for damage or deterioration.
3. Compress and extend the piston rod (A) and check that there is no abnormal resistance or unusual sound during operation.



AHJF101L

REASSEMBLY

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



AHIE101S

2. Compress coil spring using special tool (09546-26000).

   Install compressed coil spring into shock absorber.

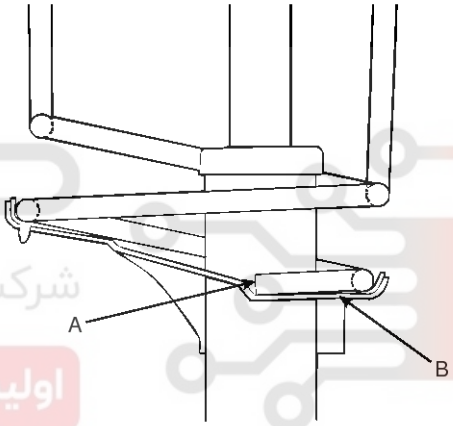
   NOTICE

   a. *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 distiuguish between the two marks and then install them.

   b. *Install the coil spring wth 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.



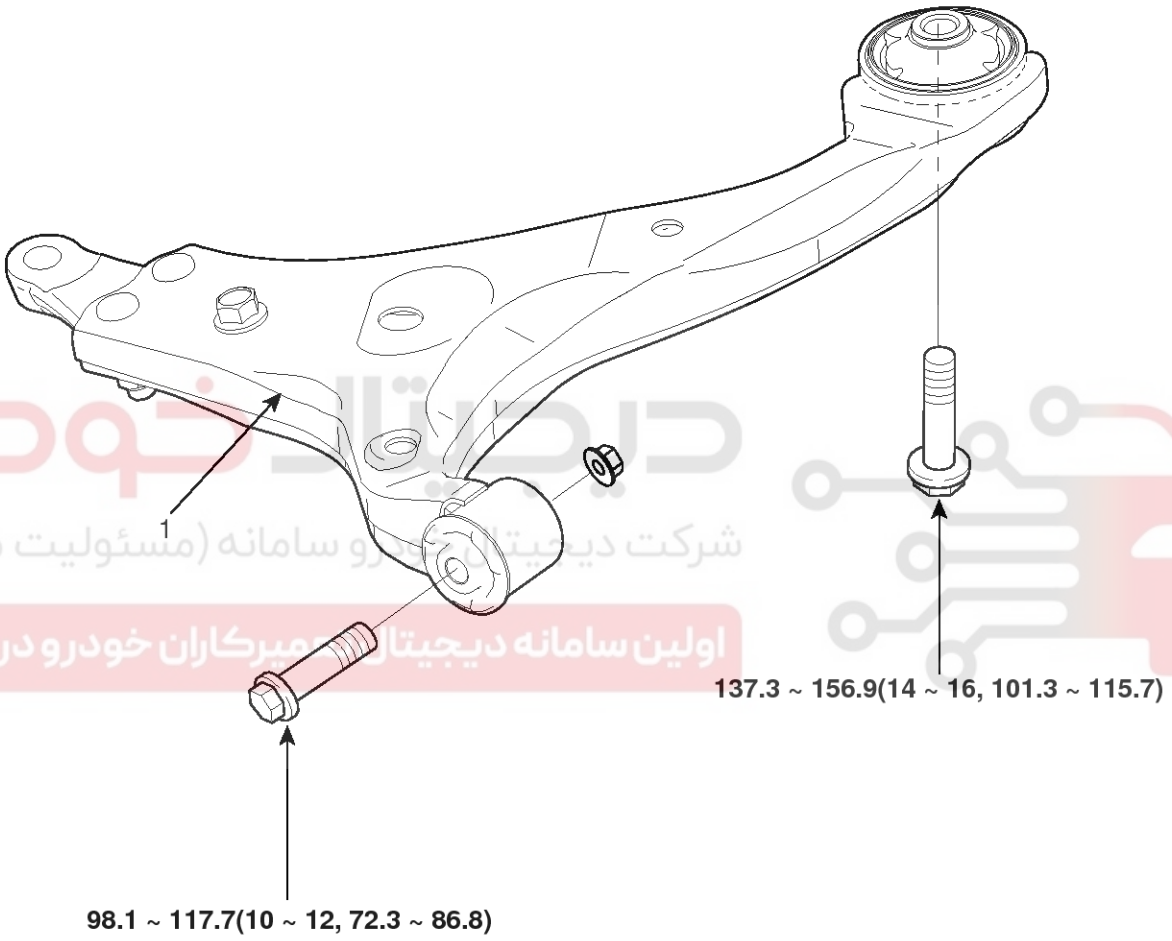
AHIE101T

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

Tightening torque :
49.0 ~ 68.6 Nm (5.0 ~7.0 kgf.m, 36.2 ~ 50.6 lb-ft)

Front Lower Arm

COMPONENTS



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

1. Front lower arm

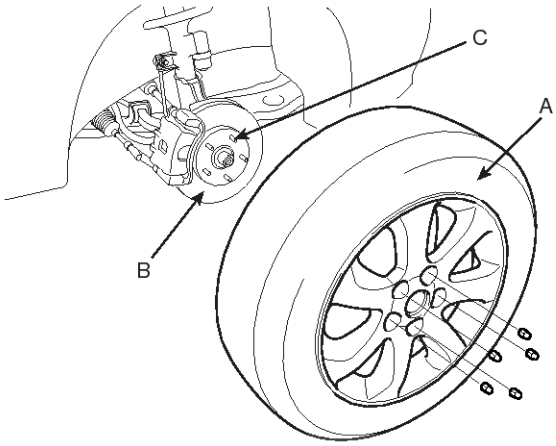
LHLG500C

REMOVAL

1. Loosen the wheel nuts slightly.

   Raise the vehicle, and make sure it is securely supported.

2. Remove the front wheel and tire (A) from front hub (B).

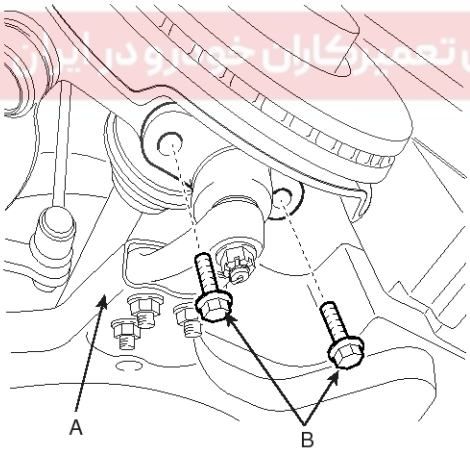


AHLG500B

⚠CAUTION

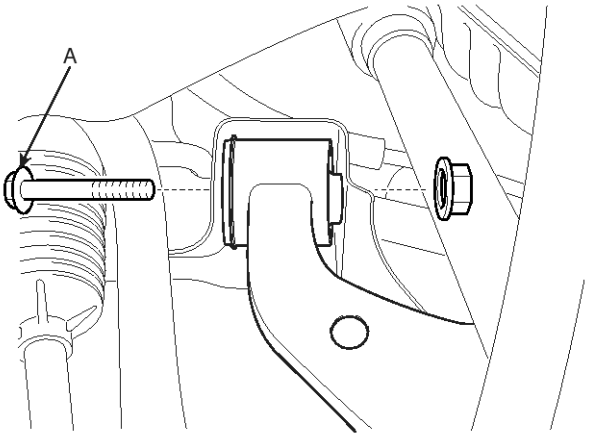
Be careful not to damage the hub bolts(C) when removing the front wheel and tire(A).

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

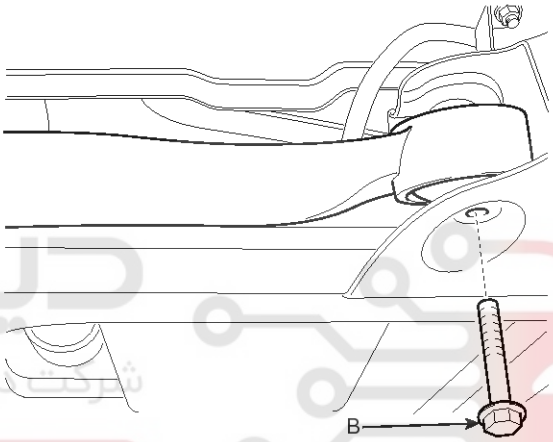


AHLG500K

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



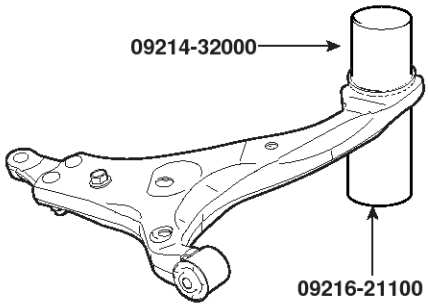
AHLG500L



AHLG502J

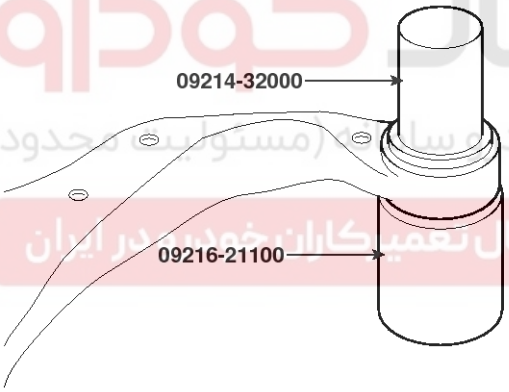
REPLACEMENT

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



AHLG500M

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

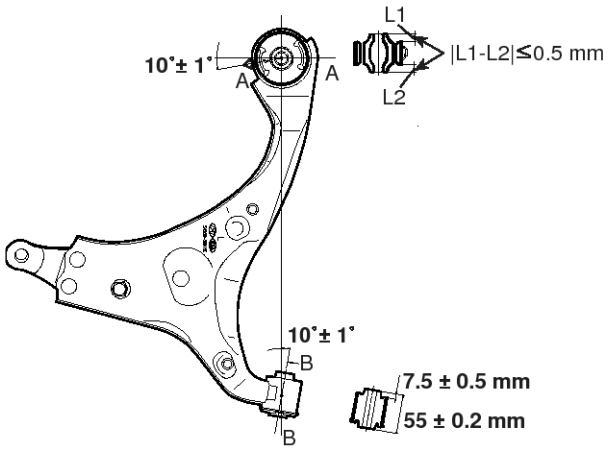


AHLG500N

⚠CAUTION

Insert bushing in the direction shown in the illustration.

Separation force is over 7845 Nm (800Kgf, 1764 lbf)

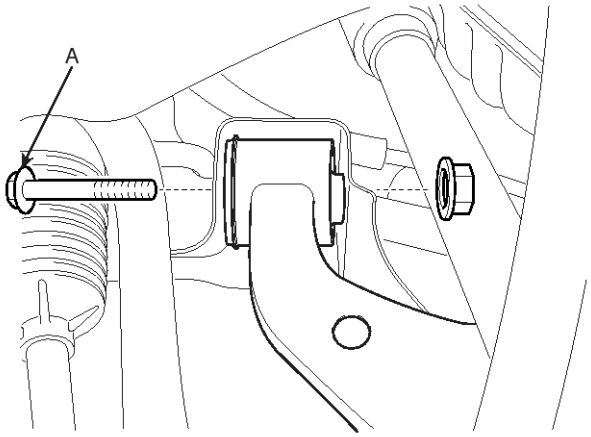


AHLG500O

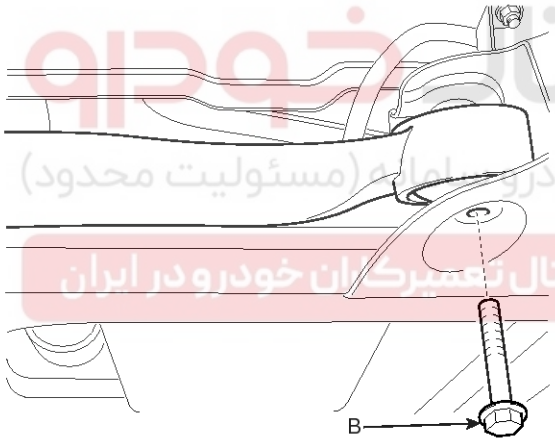
INSTALLATION

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

Tightening torque Nm (kgf.m, lb-ft) :
Bolt (A) : 98.1 ~ 117.7 (10.0 ~ 12.0, 72.3 ~ 86.8)
Bolt (B) : 137.3 ~ 156.9 (14.0 ~ 16.0, 101.3 ~ 115.7)



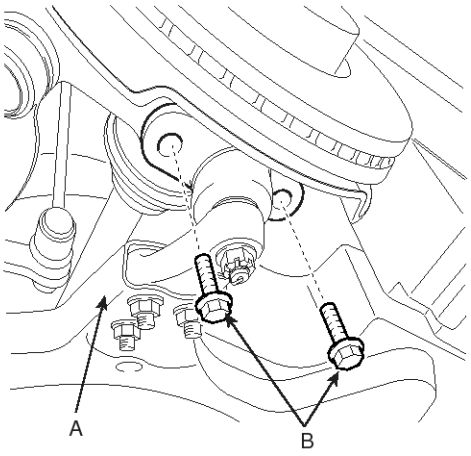
AHLG500L



AHLG502J

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

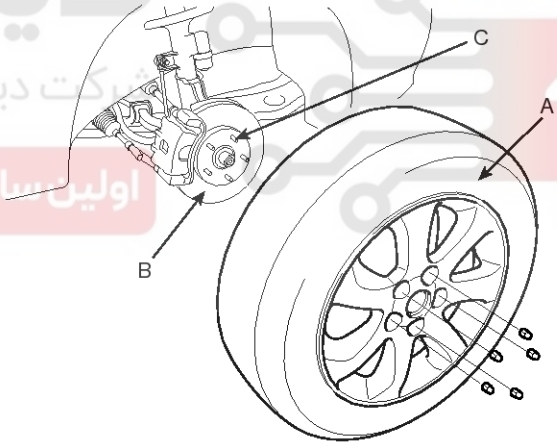
Tightening torque Nm (kgf.m, lb-ft) :
98.1 ~ 117.7 (10.0 ~ 12.0, 72.3 ~ 86.8)



AHLG500K

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

Tightening torque Nm (kgf.m, lb-ft) :
88.3 ~ 107.9 (9 ~ 11, 65.1 ~ 79.5)



AHLG500B

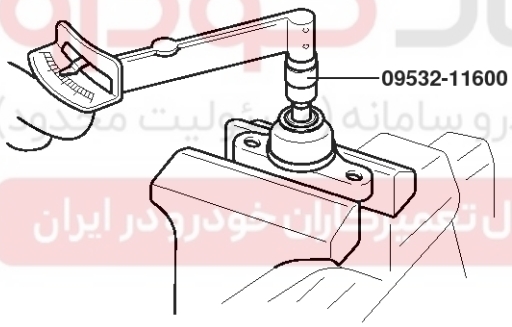
⚠CAUTION
Be careful not to damage the hub bolts (C) when installing the front wheel and tire (A).

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.

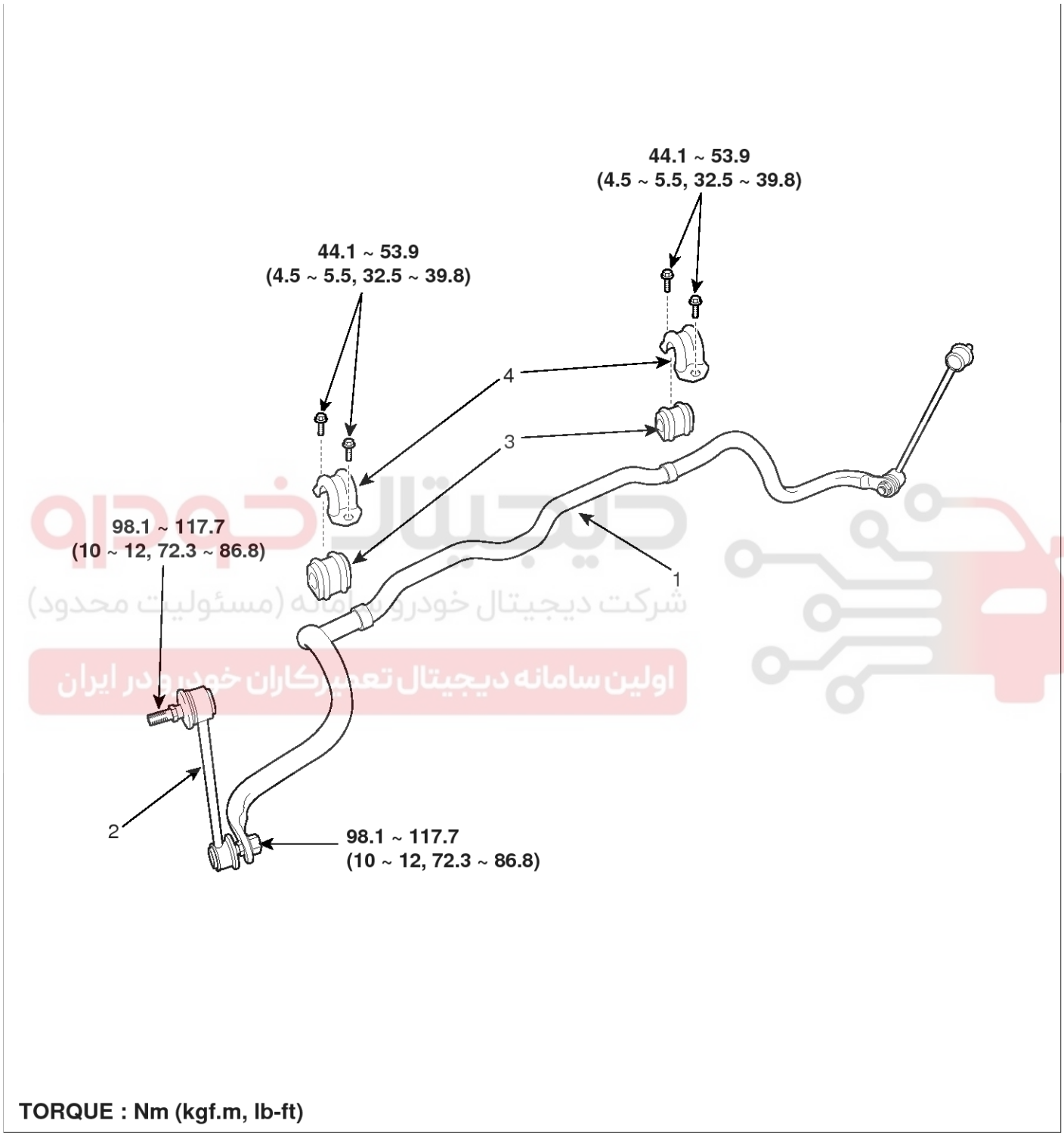


EHRF122A

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.

Front Stabilizer Bar

COMPONENTS



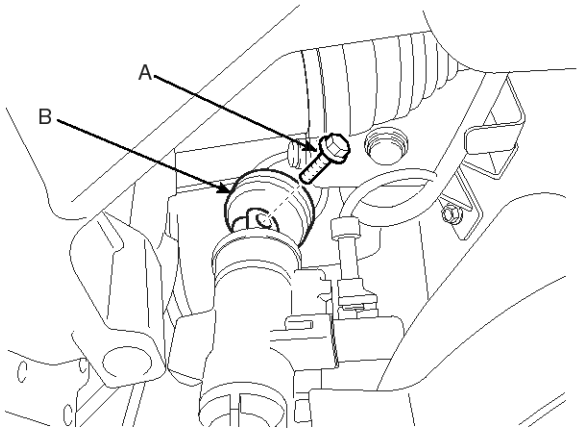
TORQUE : Nm (kgf.m, lb-ft)

1. Front stabilizer bar
2. Front stabilizer link
3. Bushing
4. Bracket

LHLG500D

REMOVAL

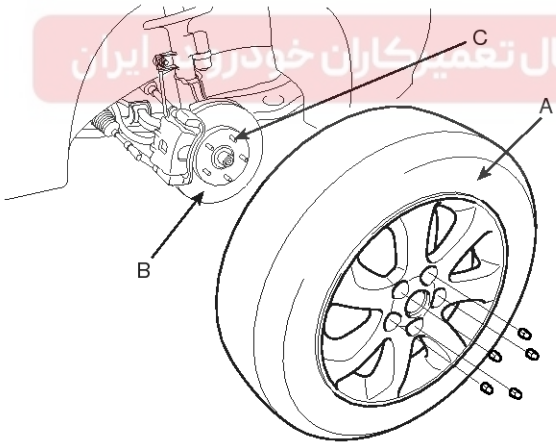
1. Remove the connecting bolt (A) between the steering universal joint assembly (B) and the pinion assembly.



AHLG500R

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

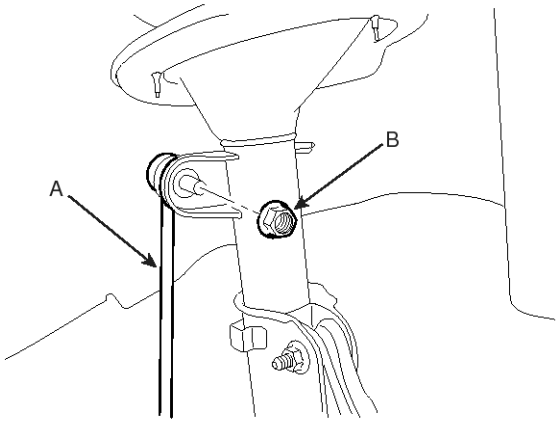
2. Loosen the wheel nuts slightly. Raise the vehicle, and make sure it is securely supported.
3. Remove the front wheel and tire (A) from front hub (B).



AHLG500B

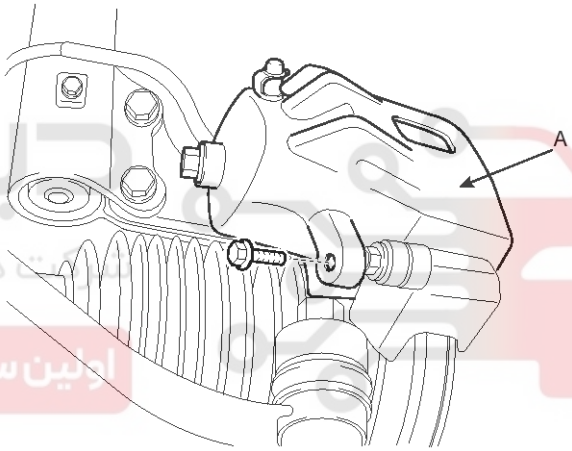
⚠CAUTION
Be careful not to damage the hub bolts (C) when removing the front wheel and tire (A).

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



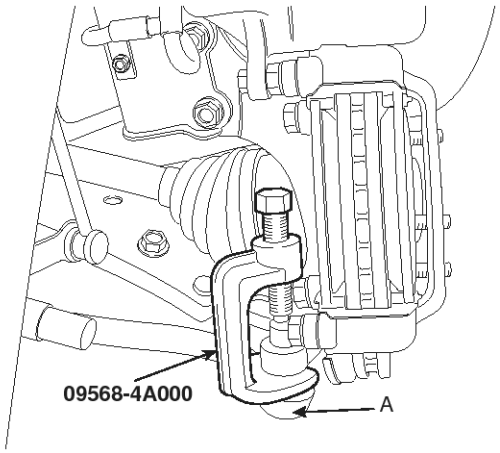
AHKF110D

5. Remove the brake caliper (A).



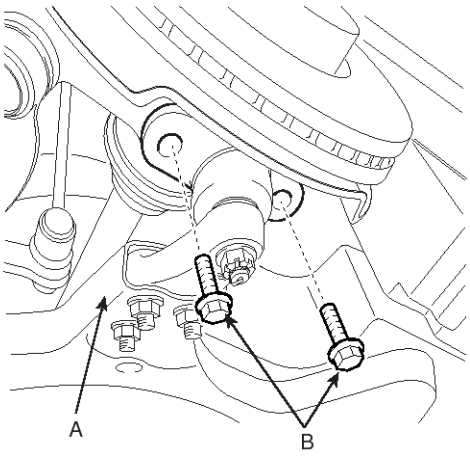
AHLG500S

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



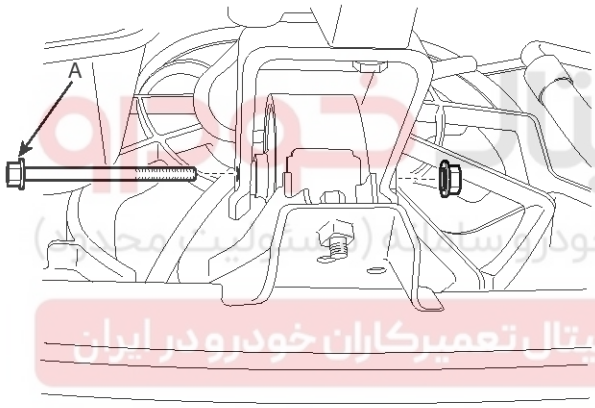
AHLG502L

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

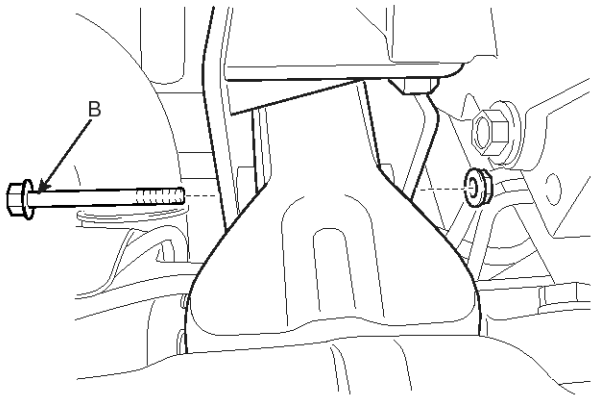


AHLG500K

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

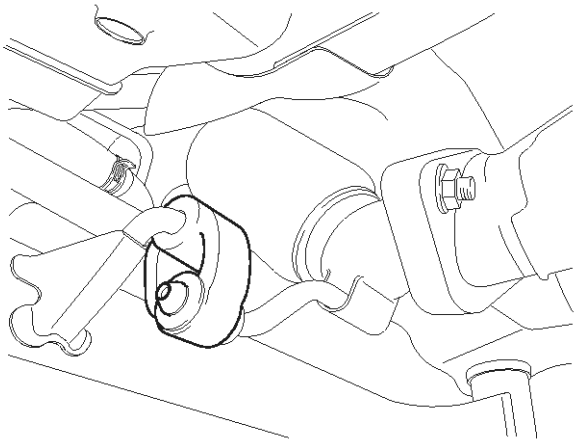


AHLG500U



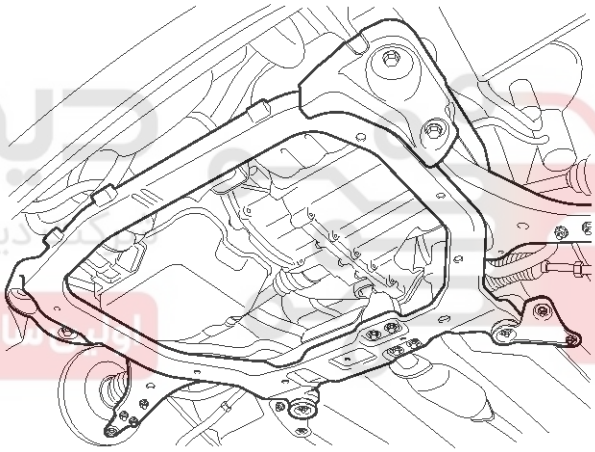
AHLG500V

9. Remove the front muffler rubber hanger from the sub-frame.



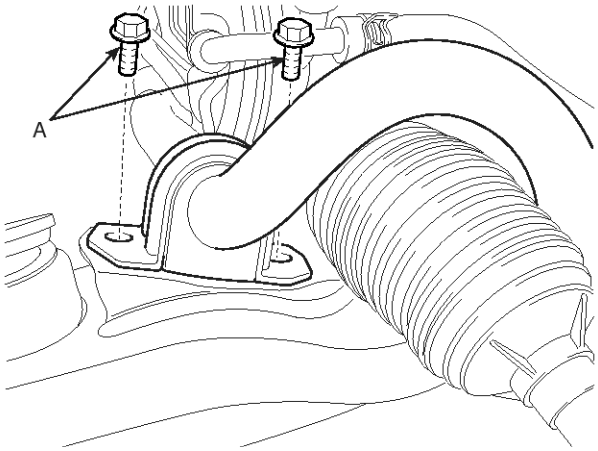
AHLG500W

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



AHLG500P

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

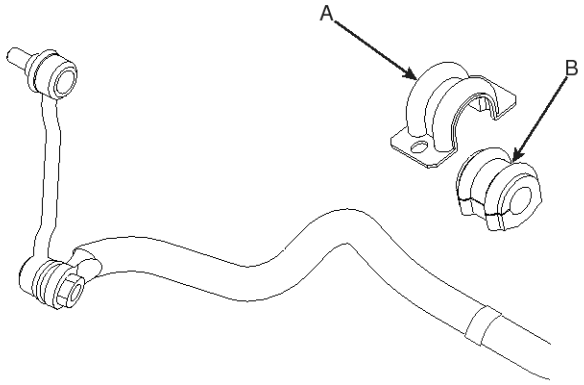


AHLG500X

12. 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.

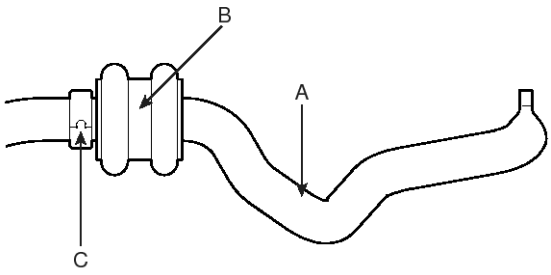
13. Remove the brackets (A) and the bushings (B).



KHBF140I

INSTALLATION

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

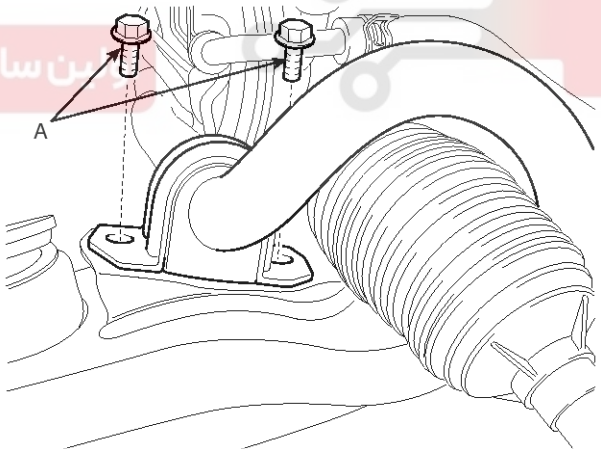


KHRE144A

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 subframe.

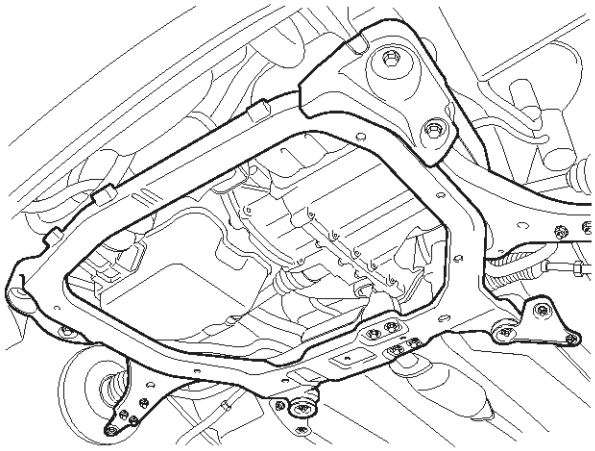
Tightening torque Nm (kgf.m, lb-ft) :
44.1 ~ 53.9 (4.5 ~ 5.5, 32.5 ~ 39.8)



AHLG500X

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) : 156.9 ~ 176.5 (16 ~ 18, 115.7 ~ 130.2)
Bolt (B) : 44.1 ~ 53.9 (4.5 ~ 5.5, 32.5 ~ 39.8)



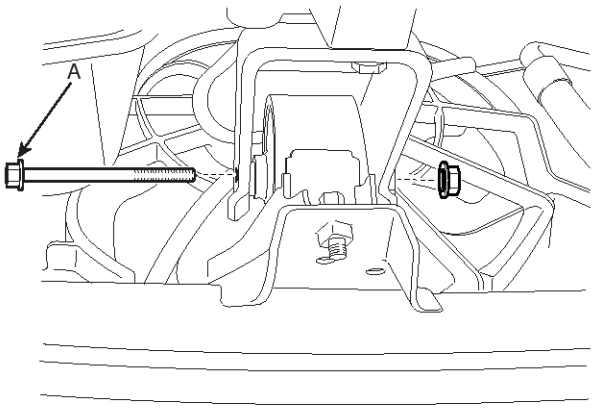
AHLG500P

6. Install the front muffler rubber hanger to the sub-frame.

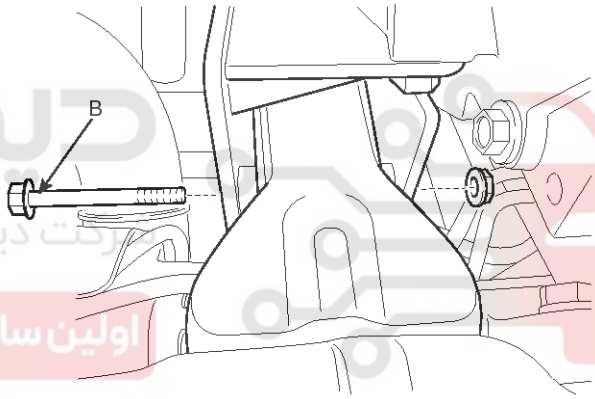
AHLG500W

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

Tightening torque Nm (kgf.m, lb-ft) :
63.7 ~ 83.4 (6.5 ~ 8.5, 47.0 ~ 61.5)



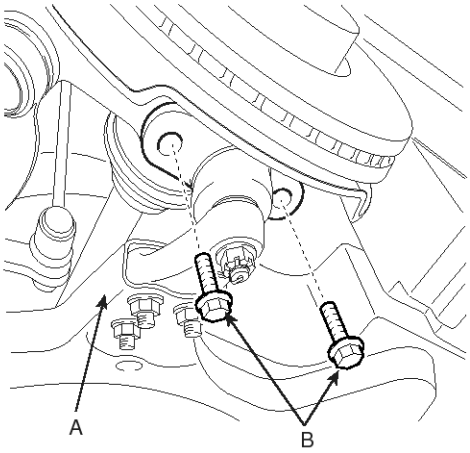
AHLG500U



AHLG500V

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

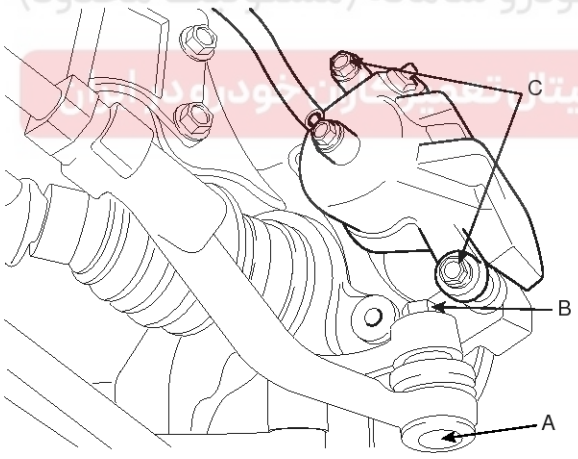
Tightening torque Nm (kgf.m, lb-ft) :
98.1 ~ 117.7 (10.0 ~ 12.0, 72.3 ~ 86.8)



AHLG500K

9. Install both sides of the tie rod end (A) self-locking nuts (B). Install the brake caliper then bolt (C) is torqued to specifications.

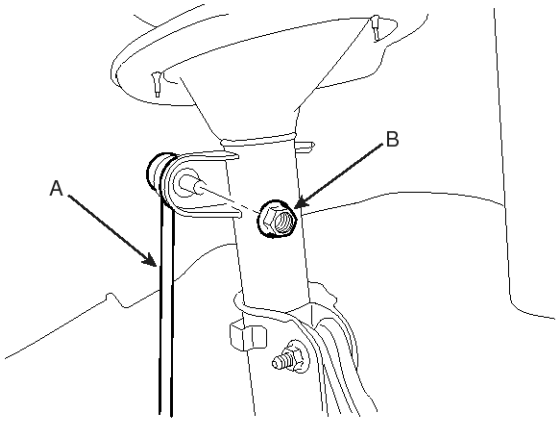
Tightening torque Nm (kgf.m, lb-ft) :
Bolt (B) : 23.5 ~ 33.3 (2.4 ~ 3.4, 17.4 ~ 24.6)
Bolt (C) : 21.6 ~ 31.4 (2.2 ~ 3.2, 15.9 ~ 23.1)



LHLG500E

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

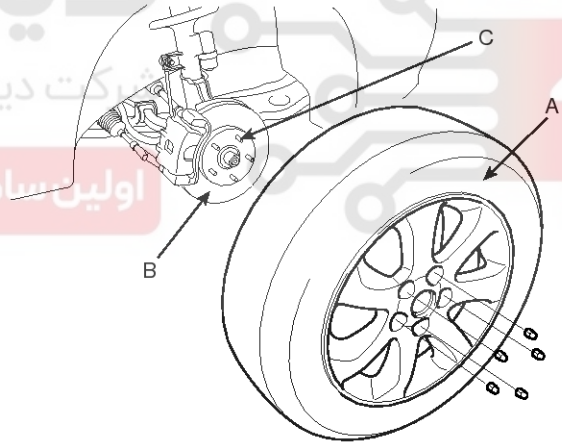
Tightening torque Nm (kgf.m, lb-ft) :
98.1 ~ 117.7 (10 ~ 12, 72.3 ~ 86.8)



AHKF110D

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

Tightening torque Nm (kgf.m, lb-ft) :
88.3 ~ 107.9 (9 ~ 11, 65.1 ~ 79.5)

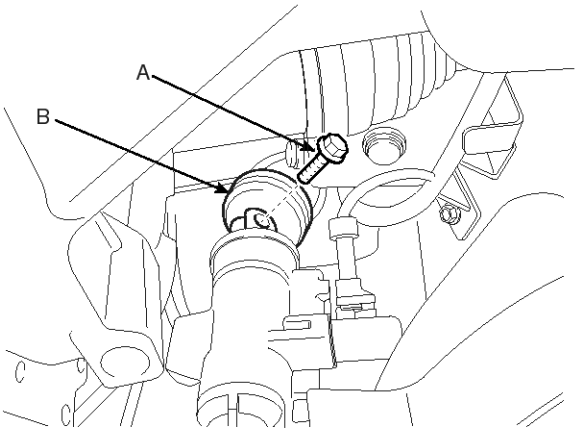


AHLG500B

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

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

Tightening torque Nm (kgf.m, lb-ft) :
12.7 ~ 17.7 (1.3 ~ 1.8, 9.4 ~ 13.0)



AHLG500R

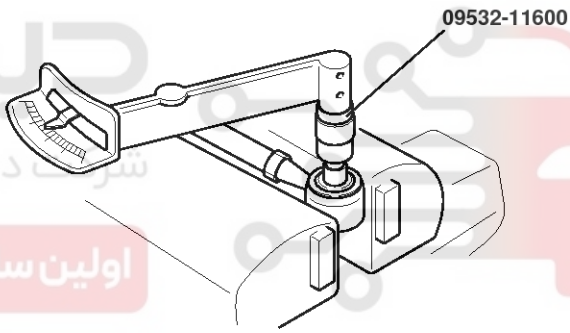
CAUTION
After installation, if neccessary, adjust the alignment of the steering wheel and front tires

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.cm., 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.

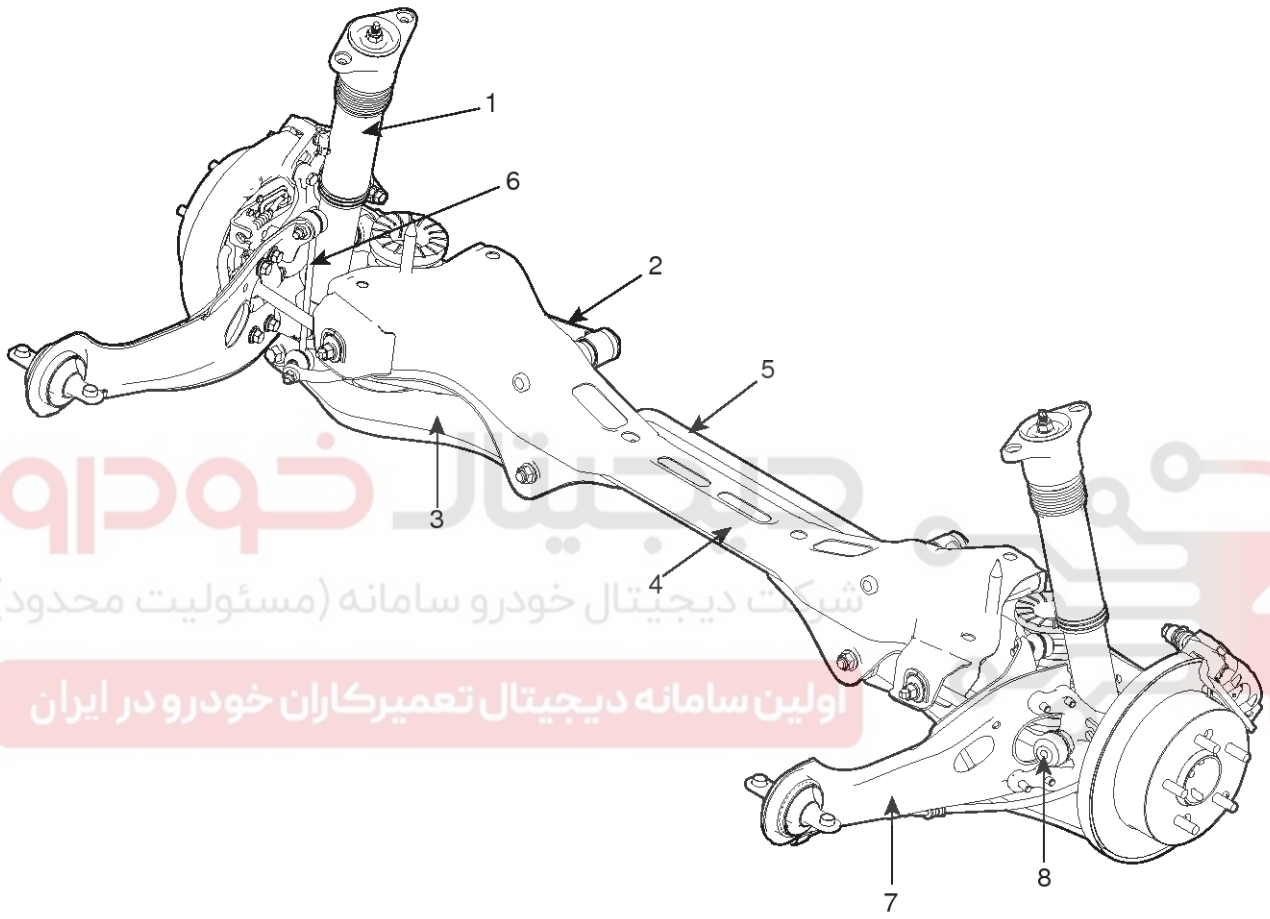


EHRF142A

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.

Rear Suspension System

COMPONENTS

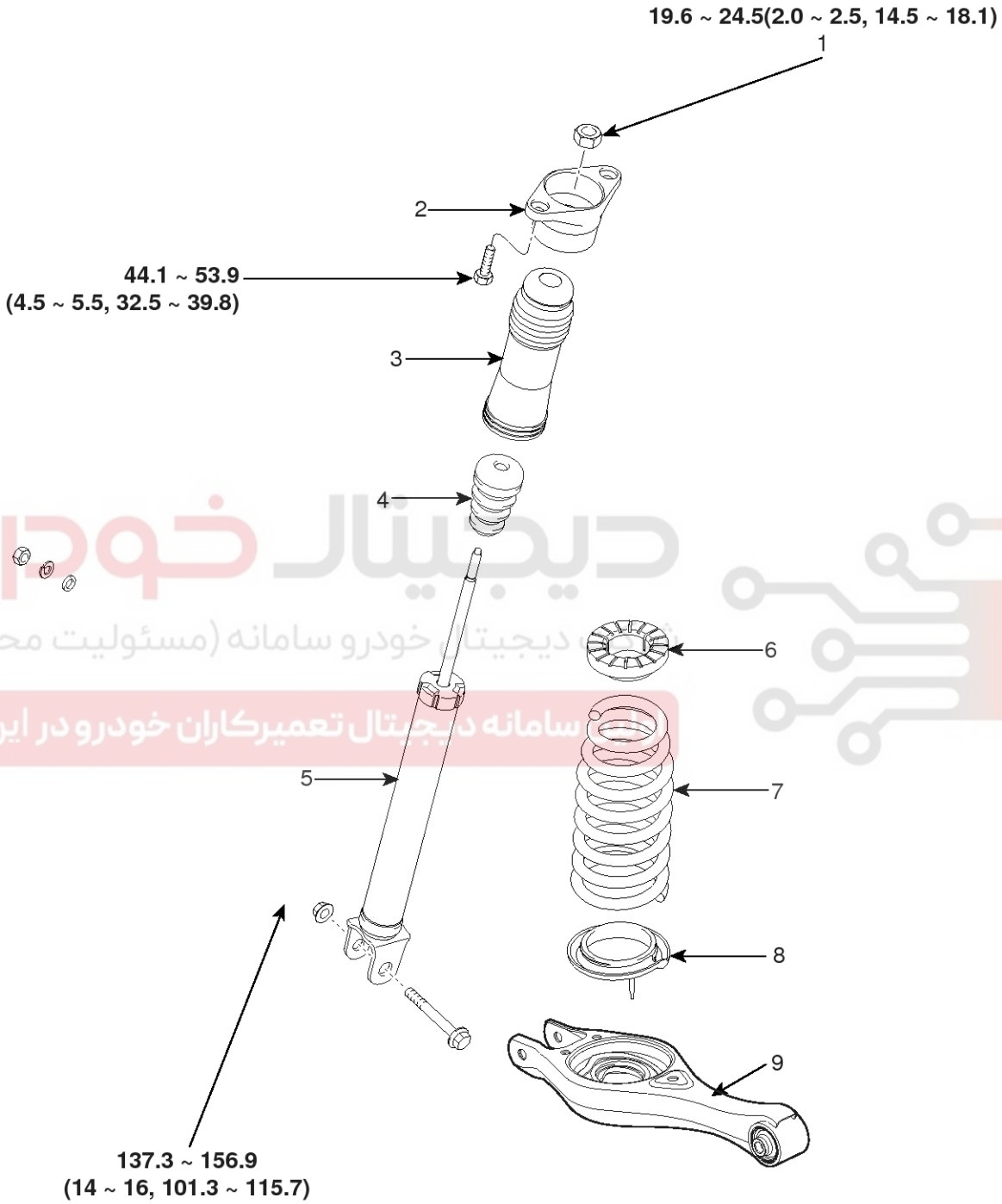


1. Rear shock absorber assembly
2. Rear upper arm
3. Rear lower arm
4. Rear cross member
5. Rear stabilizer bar assembly
6. Rear stabilizer link assembly
7. Trailing arm
8. Rear assist arm

LHLG500F

Rear Shock Absorber

COMPONENTS



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

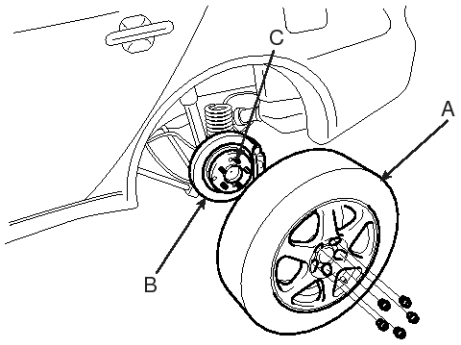
1. Locking nut
2. Bracket
3. Dust cover
4. Urethan bumper
5. Shock absorber
6. Upper pad
7. Spring
8. Lower pad
9. Rear lower arm

LHLG500G

REMOVAL

1. Loosen the wheel nuts slightly.

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

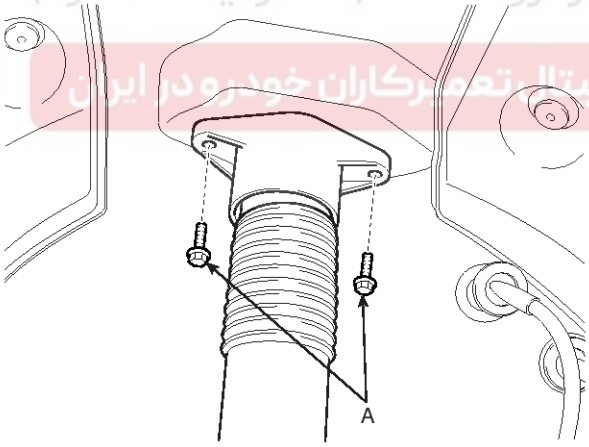


KHBF201A

⚠CAUTION

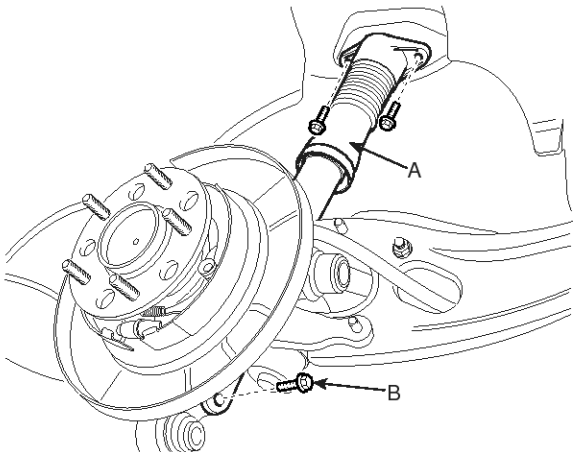
Be careful not to damage the hub bolts (C) when removing the rear wheel and tire (A).

3. Remove the rear shock absorber assembly mounting nuts (A) from the body.



AHLG501E

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

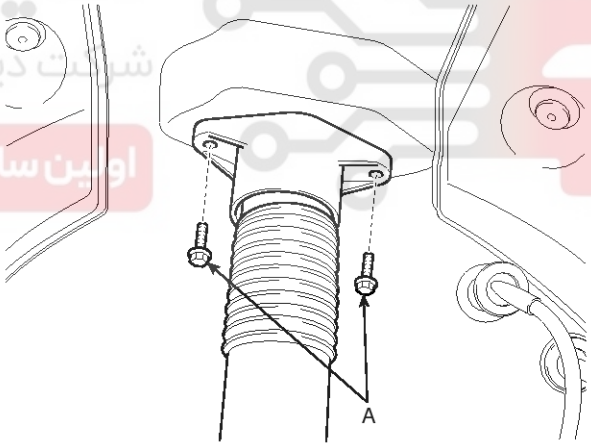


AHLG501F

INSTALLATION

1. Install the rear shock absorber mounting bolt (A) to the body.

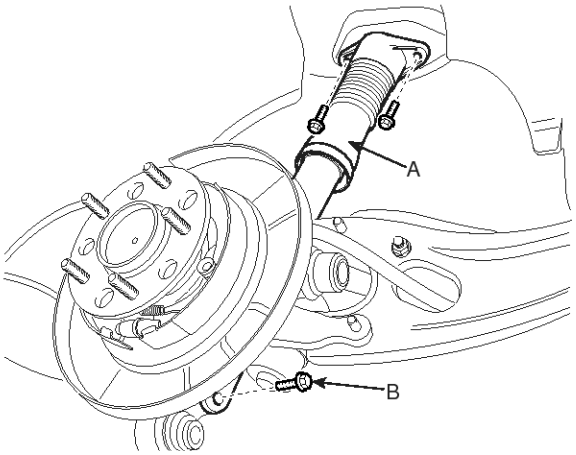
Tightening torque Nm(kgf.m, lb-ft) :
44.1 ~ 53.9 (4.5 ~ 5.5, 32.5 ~ 39.8)



AHLG501E

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

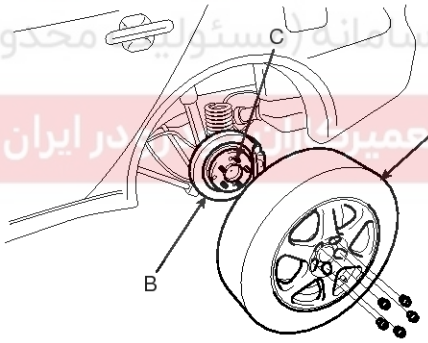
Tightening torque Nm(kgf.m, lb-ft) :
137.3 ~ 156.9 (14.0 ~ 16.0, 101.3 ~ 115.7)



AHLG501F

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

Tightening torque Nm (kgf.m, lb-ft) :
88.3 ~ 107.9 (9 ~ 11, 65.1 ~ 79.6)

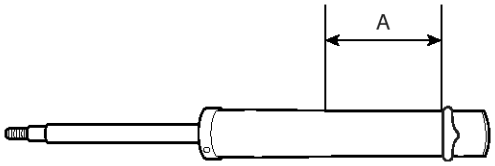


KHBF201A

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

DISPOSAL

1. Fully extend the shock absorber rod.
2. Drill a hole to remove gas from the cylinder.

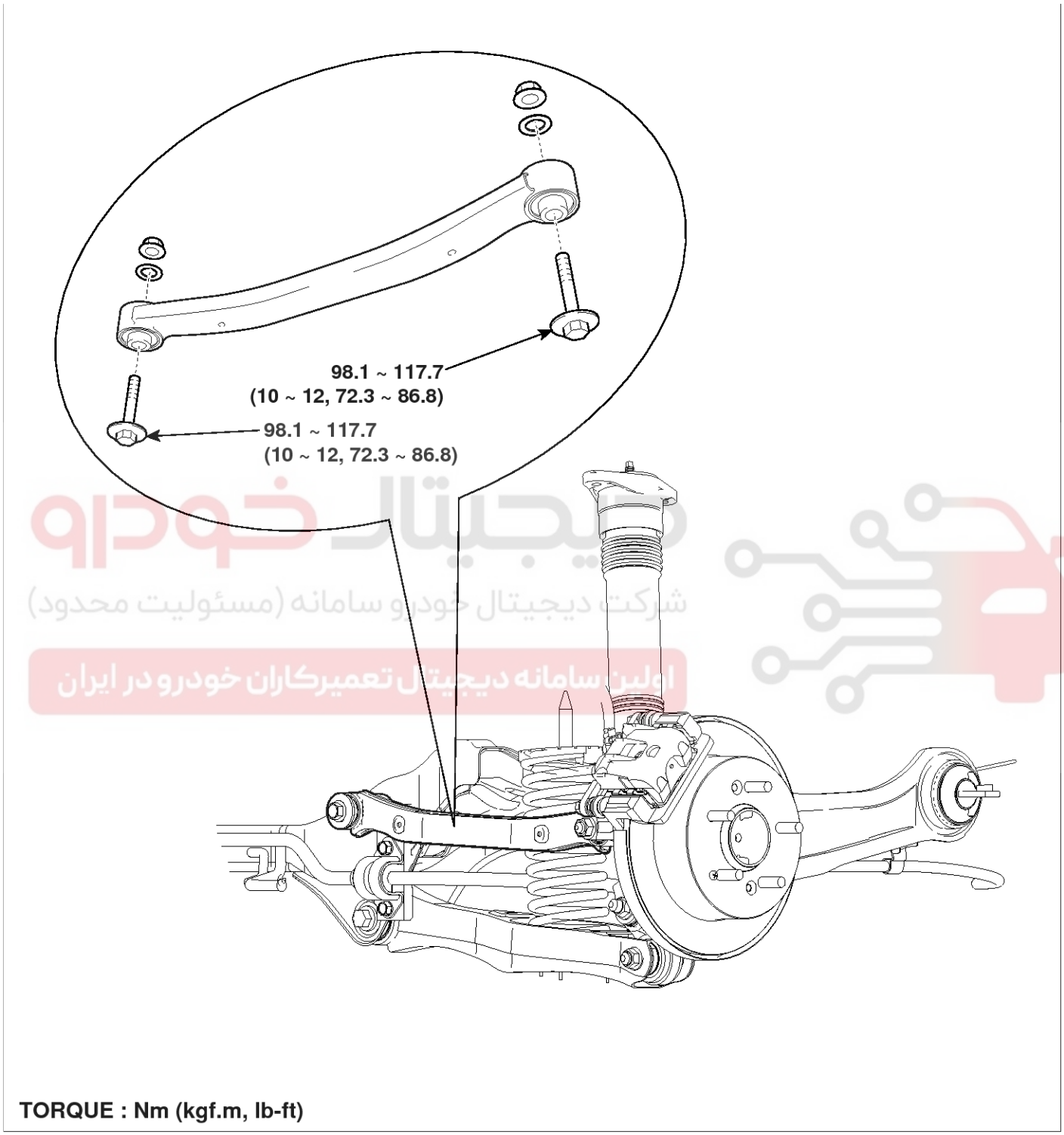


KHRE112B

⚠CAUTION
The gas coming out is harmless, but be careful of chips that may fly up when drilling. Be sure to use face shield and safety goggles.

Rear Upper Arm

COMPONENTS

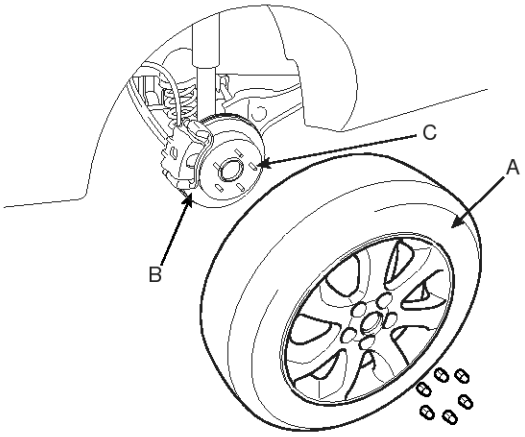


1. Rear upper arm
2. Rear cross member

LHLG500H

REMOVAL

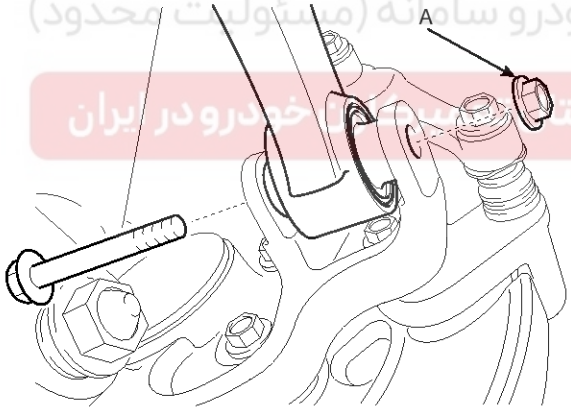
1. Loosen the wheel nuts slightly. Raise the vehicle, and make sure it is securely supported.
2. Remove the rear wheel and tire (A) from rear hub (B).



AHLG501I

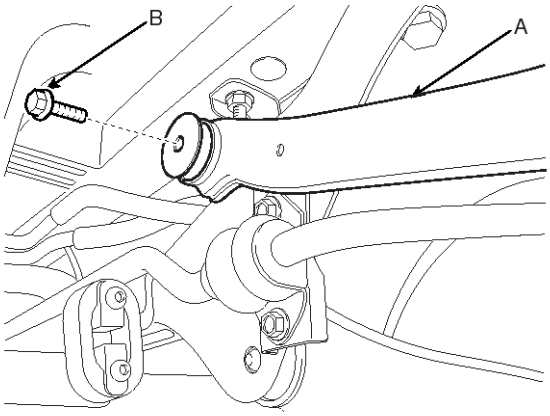
⚠CAUTION
Be careful not to damage the hub bolts (C) when removing the rear wheel and tire (A).

3. Remove the rear upper arm bolt and nut (A) from the knuckle.



AHLG501J

4. Remove the rear upper arm (A) bolt (B) from the cross member.

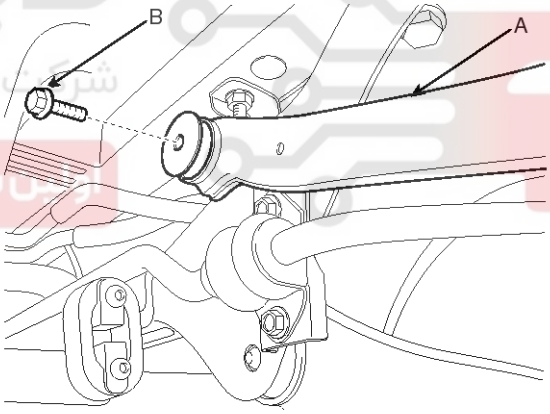


AHLG501K

INSTALLATION

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

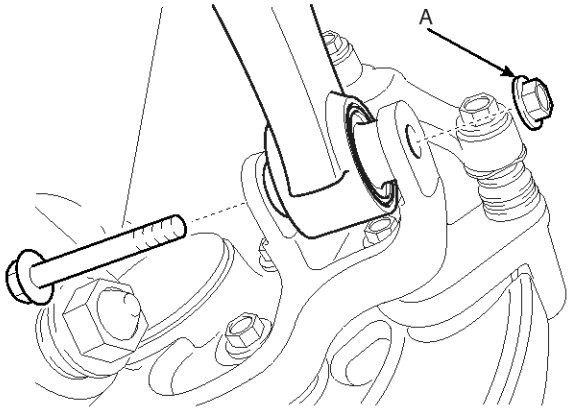
Tightening torque Nm (kgf.m, lb-ft) :
98.1 ~ 117.7 (10.0 ~ 12.0, 72.3 ~ 86.8)



AHLG501K

2. Install the rear upper arm mounting nut (A) to the knuckle.

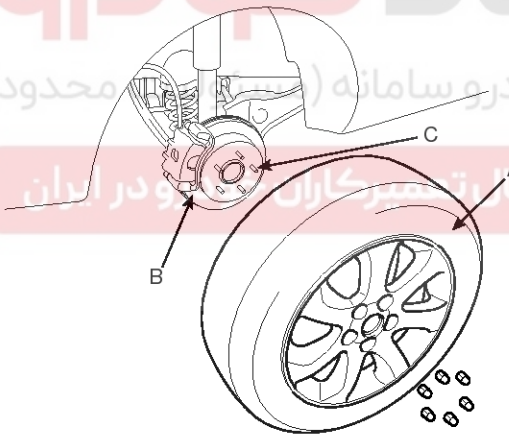
Tightening torque Nm (kgf.m, lb-ft) :
98.1 ~ 117.7 (10.0 ~ 12.0, 72.3 ~ 86.8)



AHLG501J

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

Tightening torque Nm (kgf.m, lb-ft) :
88.3 ~ 107.9 (9 ~ 11, 65.1 ~ 79.6)



AHLG501I

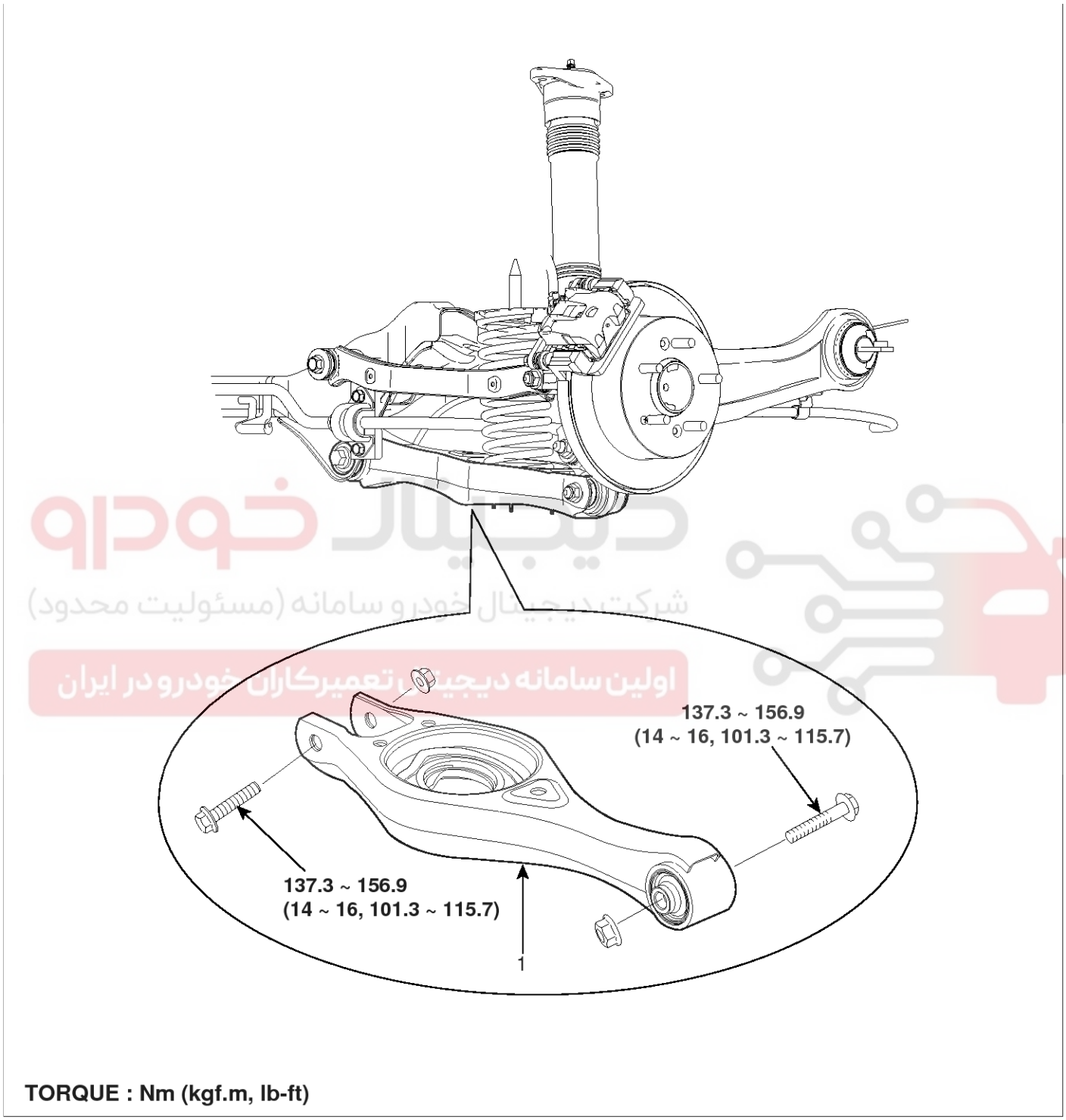
⚠CAUTION
Be careful not to damage the hub bolts (C) when installing the rear wheel and tire (A).

INSPECTION

1. Check the bushing for wear and deterioration.
2. Check the upper arm for bending or breakage.

Rear Lower Arm

COMPONENTS



1. Rear lower arm

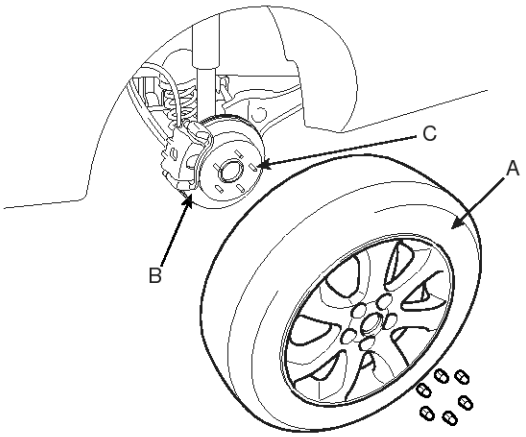
LHLG500I

REMOVAL

1. Loosen the wheel nuts slightly.

   Raise the vehicle, and make sure it is securely supported.

2. Remove the rear wheel and tire (A) from rear hub (B).

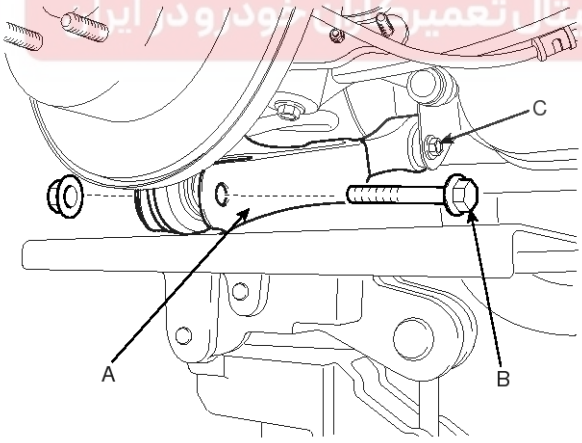


AHLG501I

⚠CAUTION

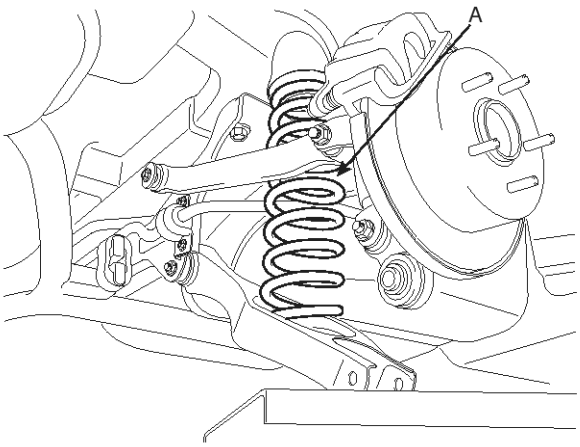
Be careful not to damage the hub bolts (C) when removing the rear wheel and tire (A).

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.



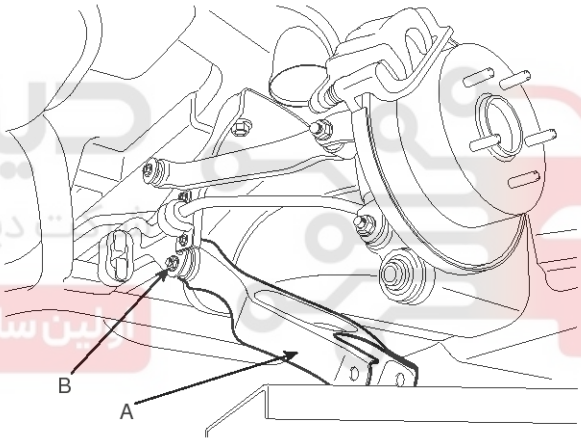
LHLG500J

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



LHLG500K

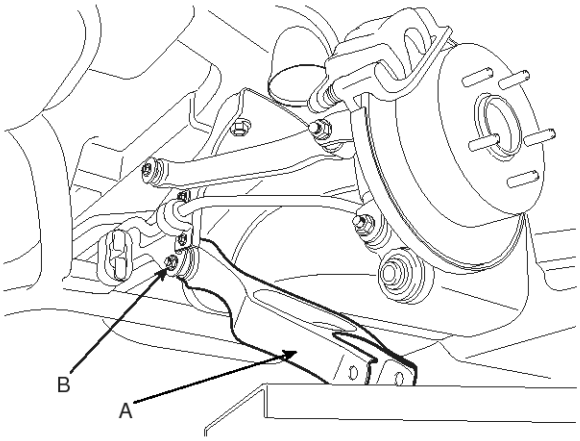
5. Remove the lower arm (A) mounting bolts (B) from the cross member.



AHLG501Q

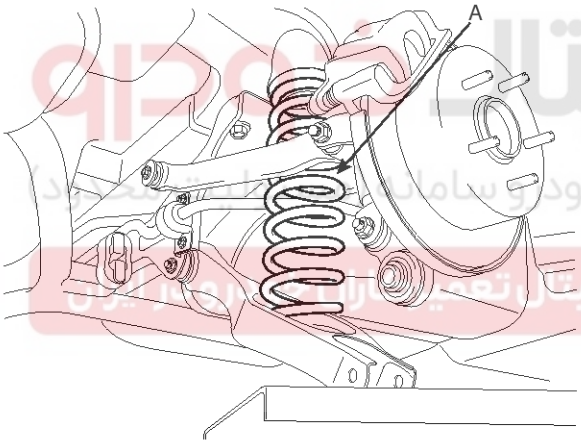
INSTALLATION

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



AHLG501Q

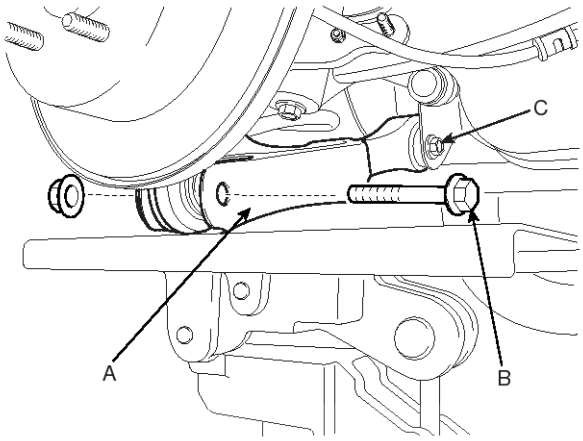
2. Install the spring (A), the lower seat, and the upper pad.



LHLG500K

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.

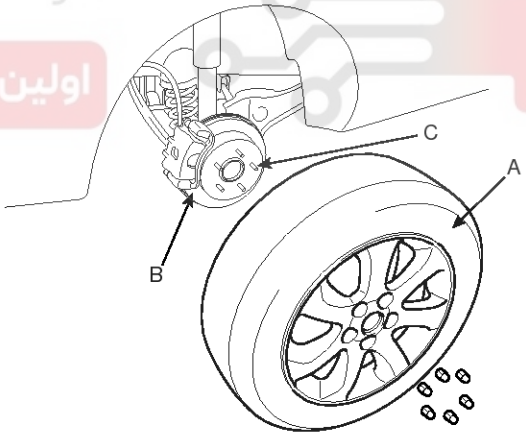
Tightening torque Nm (kgf.m, lb-ft) :
Bokt (B) : 137.3 ~ 56.9 (14.0 ~ 16.0, 101.3 ~ 115.7)
Bolt (C) : 137.3 ~ 56.9 (14.0 ~ 16.0, 101.3 ~ 115.7)



LHLG500J

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

Tightening torque Nm (kgf.m, lb-ft) :
88.3 ~ 107.9 (9 ~ 11, 65.1 ~ 79.6)



AHLG501I

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

INSPECTION

Rear lower arm

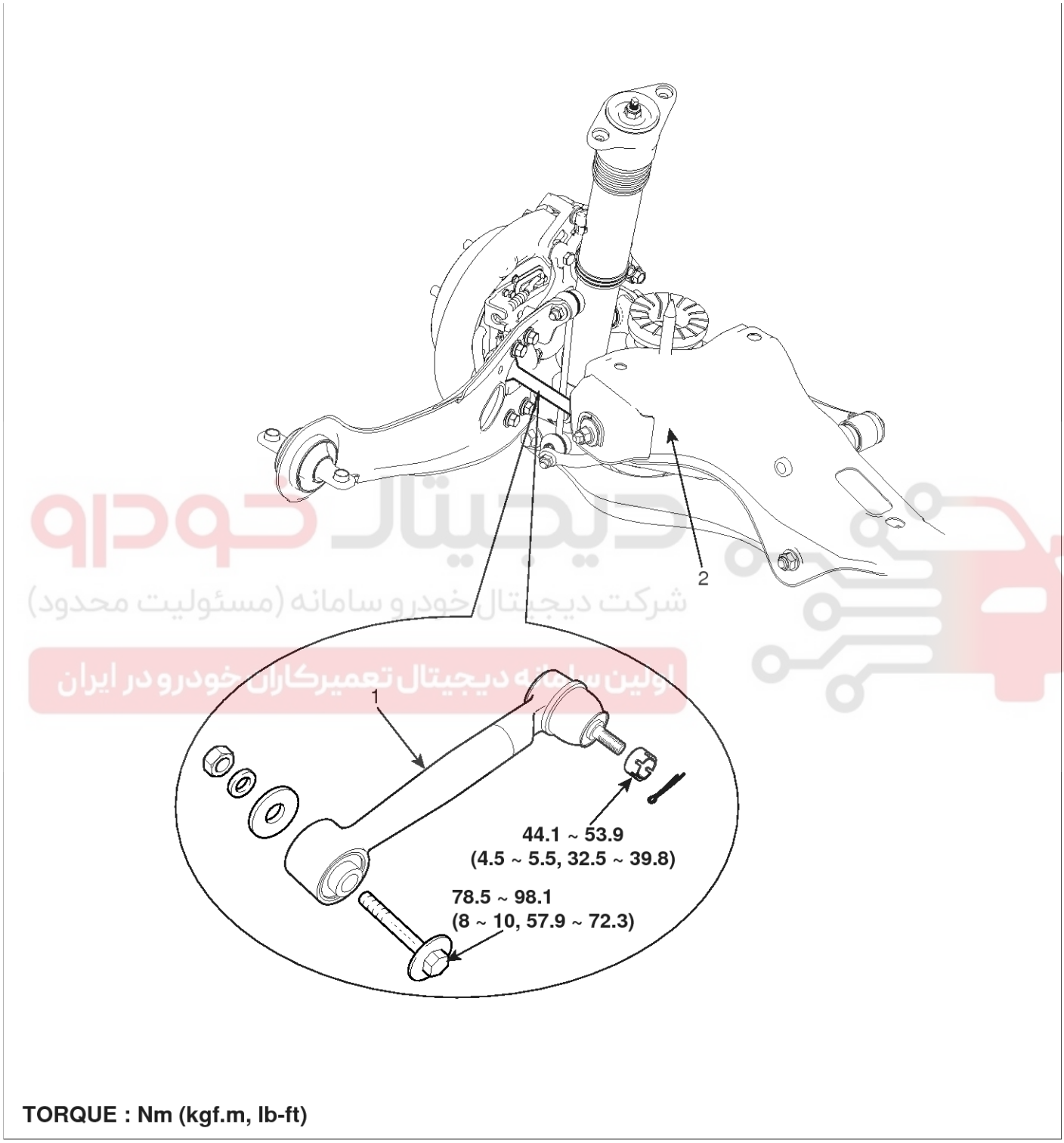
1. Check the bushing for wear and deterioration.
2. Check the center arm for bending or breakage.
3. Check the bolts for damage.

Spring

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

Rear Assist Arm

COMPONENTS

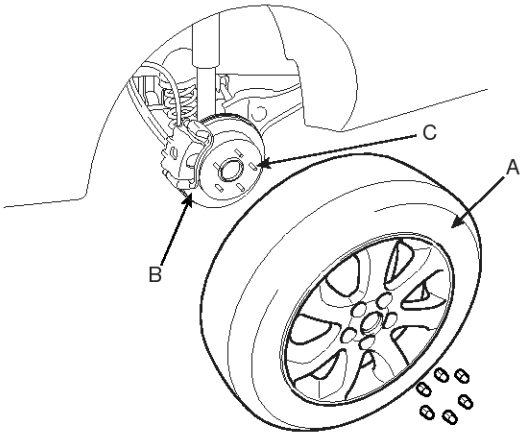


1. Rear assist arm
2. Rear cross member

LHLG500L

REMOVAL

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

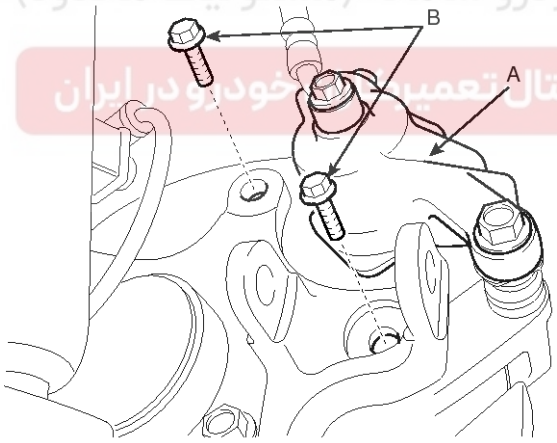


AHLG501I

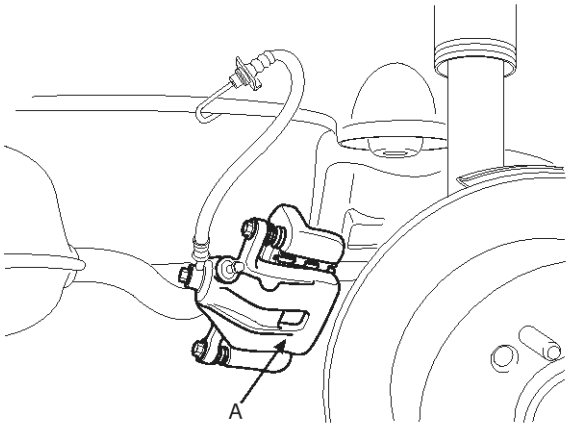
⚠CAUTION

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

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

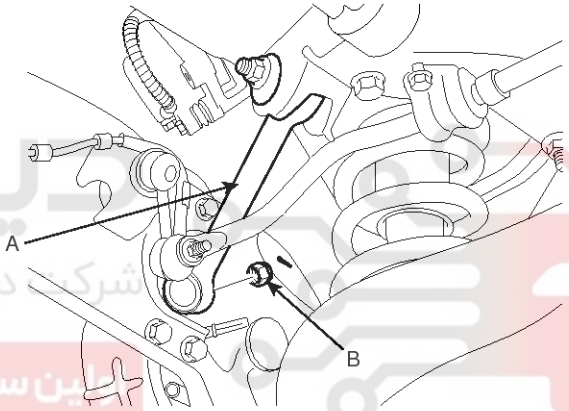


AHLG502O



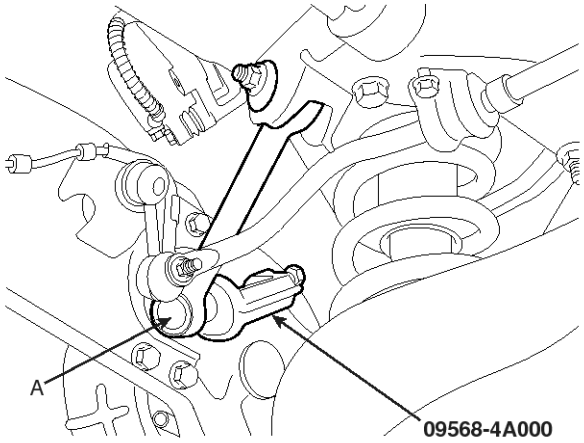
AHLG502P

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



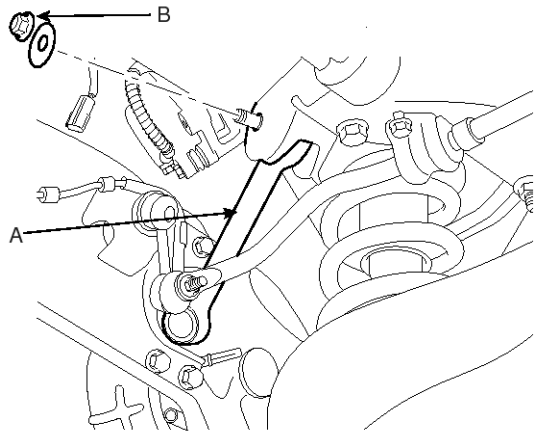
AHLG502Q

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



LHLG500M

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

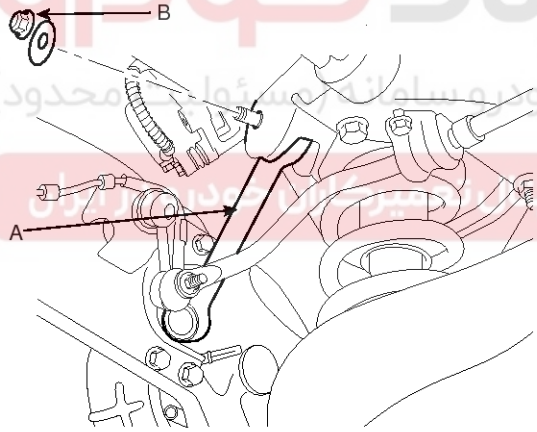


AHKF240F

INSTALLATION

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

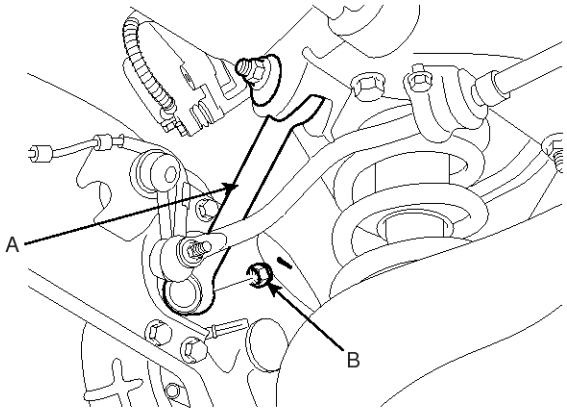
Tightening torque Nm (kgf.m, lb-ft) :
78.5 ~ 98.1 (8.0 ~ 11.0, 57.9 ~ 72.3)



AHLG502R

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

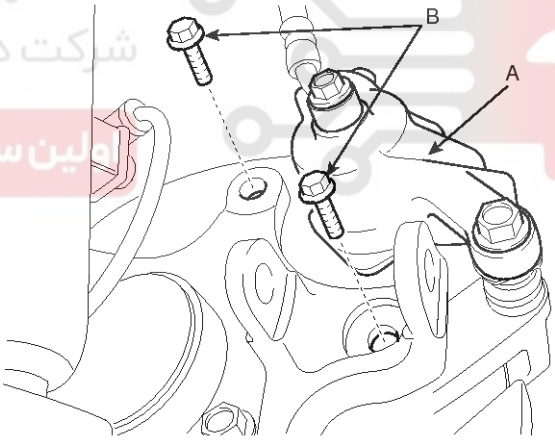
Tightening torque Nm (kgf.m, lb-ft) :
44.1 ~ 53.9 (4.5 ~ 5.5, 32.5 ~ 39.8)



AHLG502Q

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

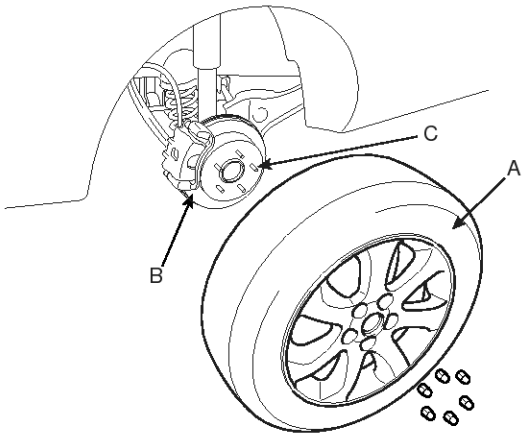
Tightening torque Nm (kgf.m, lb-ft) :
49.0 ~ 58.8 (5.0 ~ 6.0, 36.2 ~ 43.4)



AHLG502O

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

Tightening torque Nm (kgf.m, lb-ft) :
88.3 ~ 107.9 (9 ~ 11, 65.1 ~ 79.6)



AHLG501I

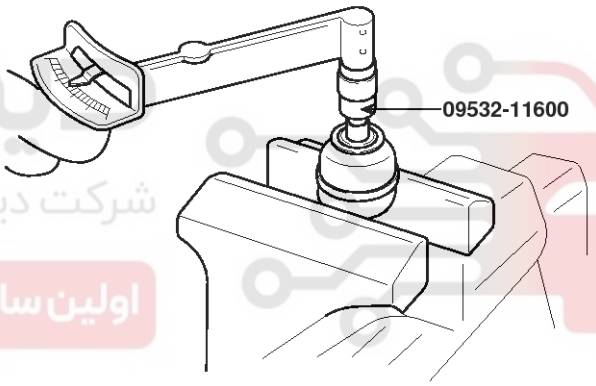
CAUTION
Be careful not to damage the hub bolts (C) when installing the rear wheel and tire (A).

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.

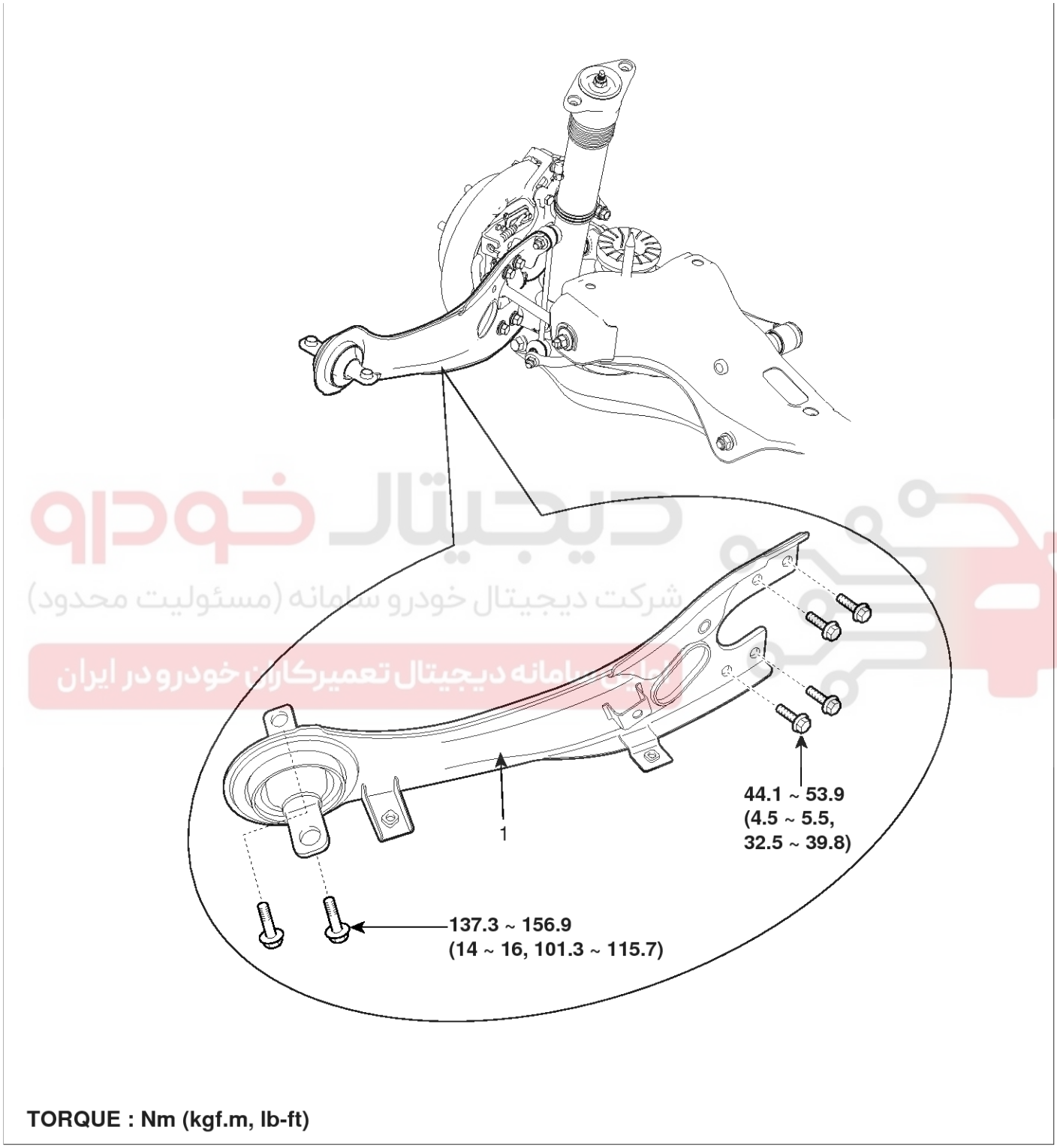


AHKF500B

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.

Trailing Arm

COMPONENTS

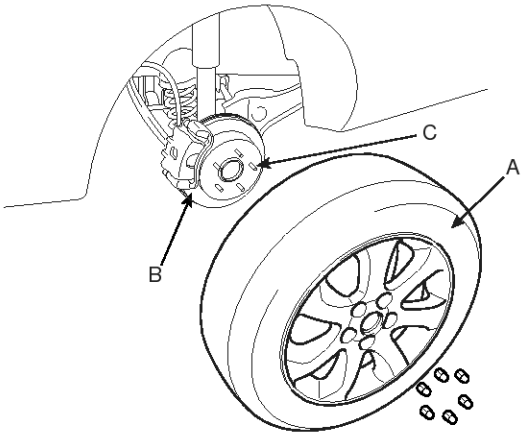


1. Trailing arm

LHLG500N

REMOVAL

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

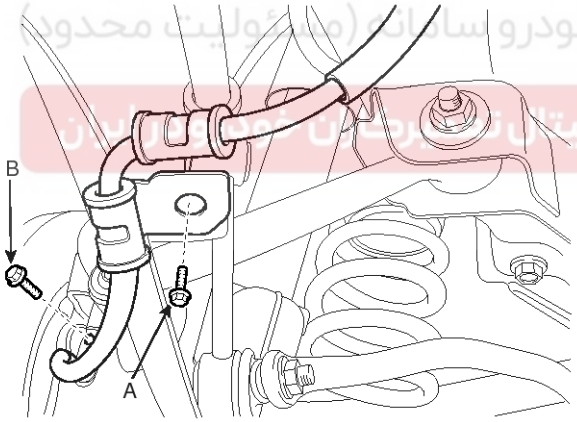


AHLG501I

⚠CAUTION

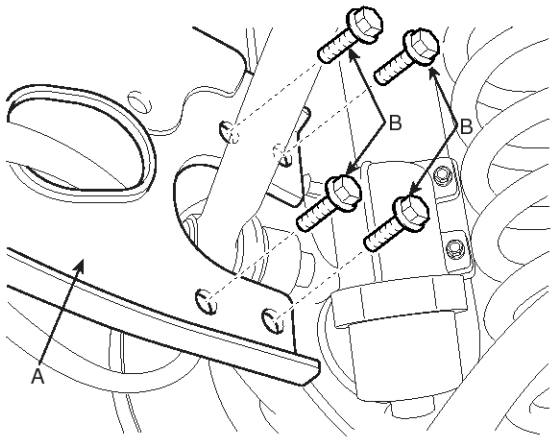
Be careful not to damage the hub bolts (C) when removing the rear wheel and tire (A).

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



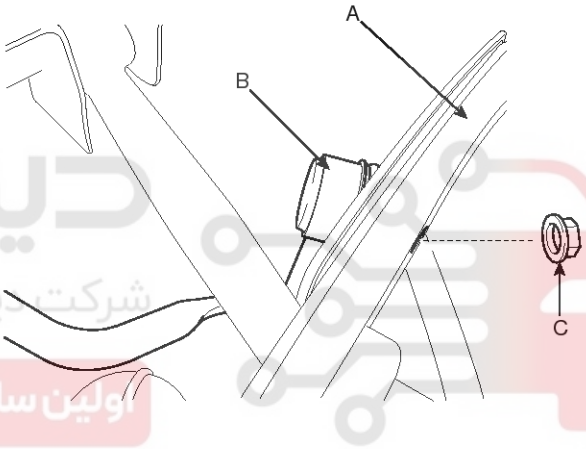
AHLG501Y

4. Remove the trailing arm (A) mounting bolts (B) from the knuckle.



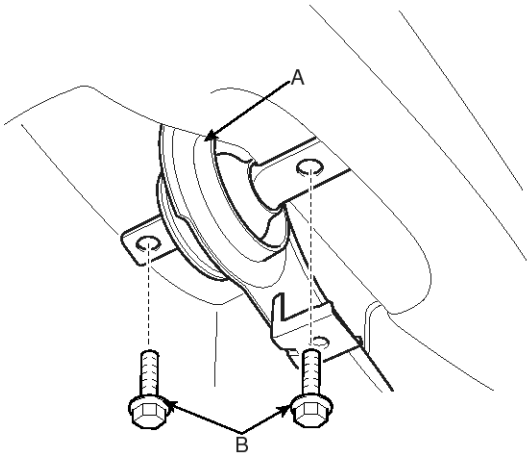
AHLG501Z

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



AHLG502A

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

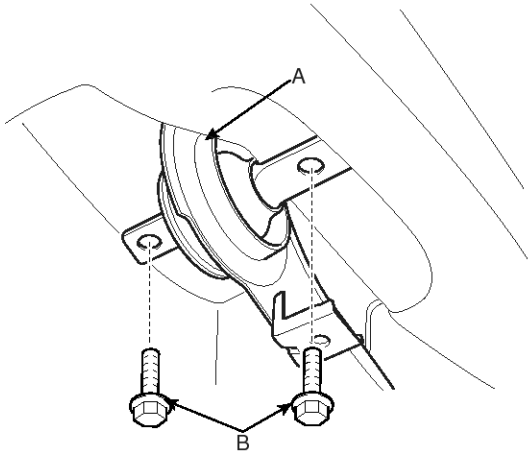


AHLG502B

INSTALLATION

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

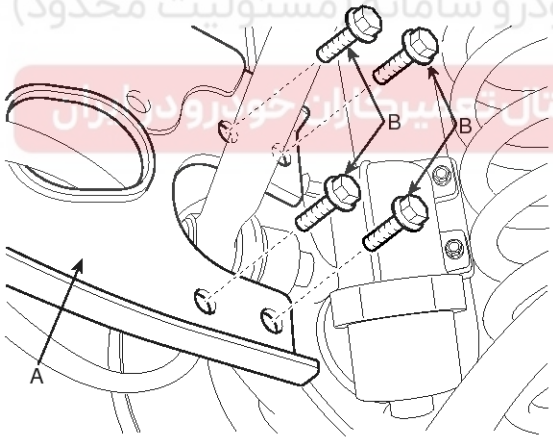
Tightening torque Nm (kgf.m, lb-ft) :
137.3 ~ 156.9 (14.0 ~ 16.0, 101.3 ~ 115.7)



AHLG502B

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

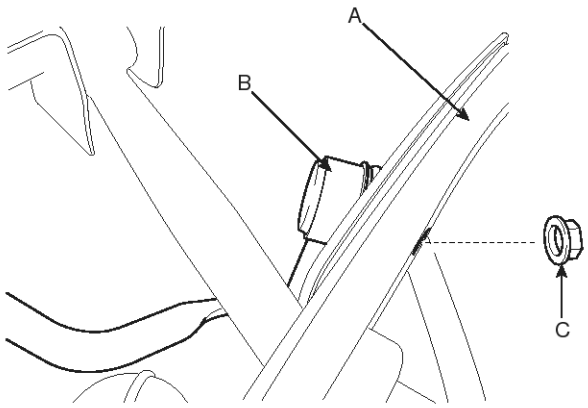
Tightening torque Nm (kgf.m, lb-ft) :
44.1 ~ 53.9 (4.5 ~ 5.5, 32.5 ~ 39.8)



AHLG501Z

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

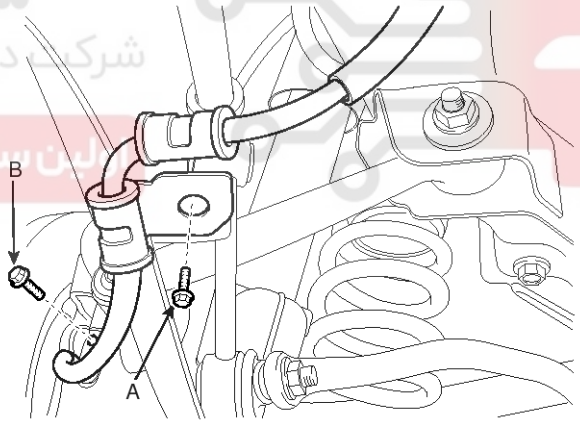
Tightening torque Nm (kgf.m, lb-ft) :
44.1 ~ 53.9 (4.5 ~ 5.5, 32.5 ~ 39.8)



AHLG502A

4. Install the wheel speed sensor wire's bracket bolt (A, B) from the body.

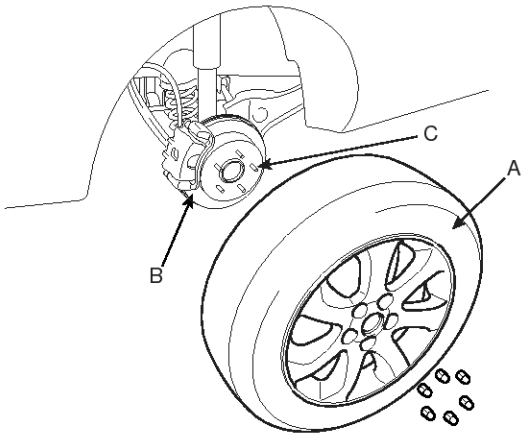
Tightening torque Nm (kgf.m, lb-ft) :
6.9 ~ 10.8 (0.7 ~ 1.1, 5.1 ~ 8.0)



AHLG501Y

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

Tightening torque Nm (kgf.m, lb-ft) :
88.3 ~ 107.9 (9 ~ 11, 65.1 ~ 79.5)



AHLG501I

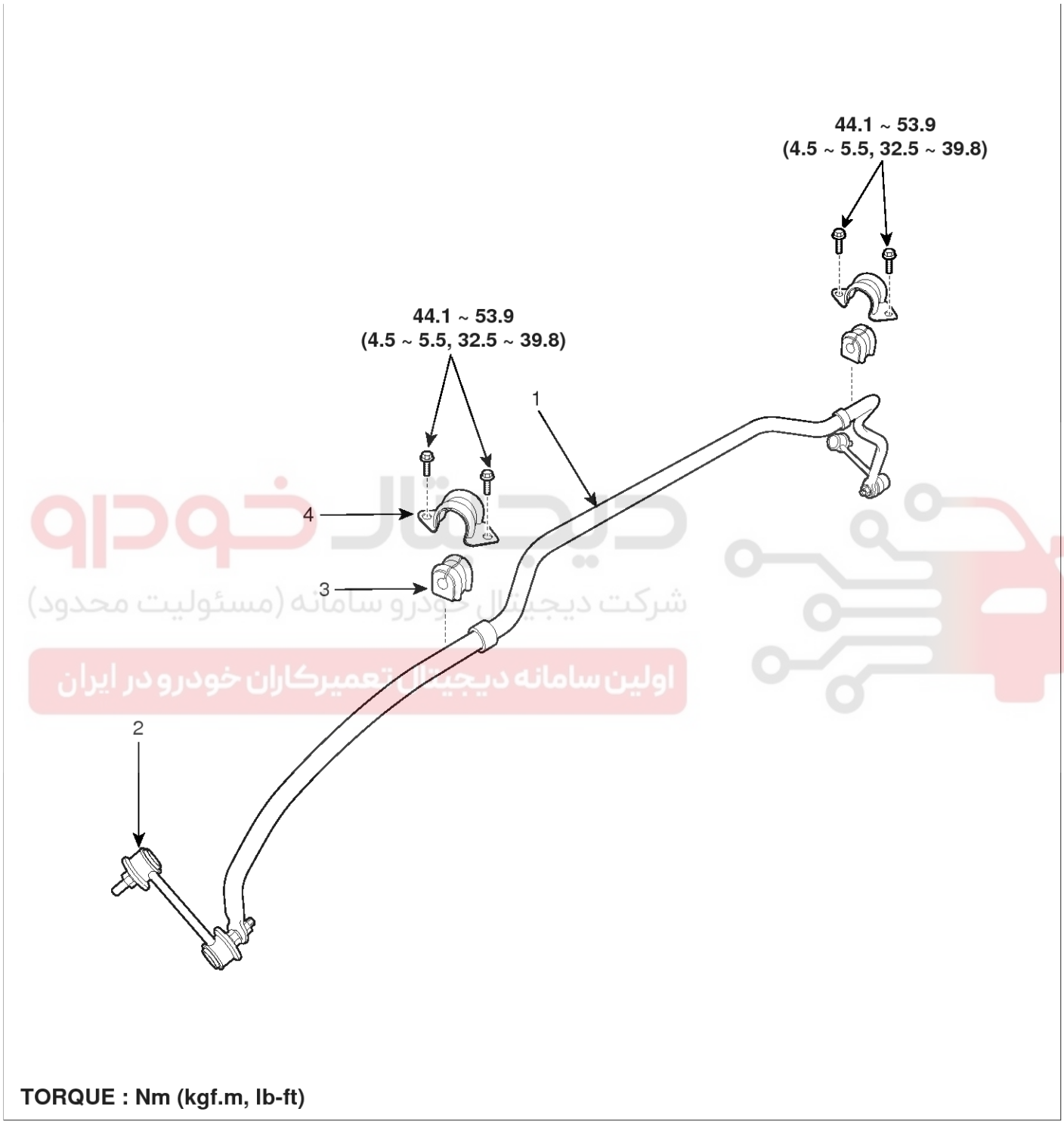
CAUTION
Be careful not to damage the hub bolts (C) when installing the rear wheel and tire (A).

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.

Rear Stabilizer Bar

COMPONENTS



1. Rear stabilizer bar
2. Rear stabilizer link
3. Bushing
4. Bracket

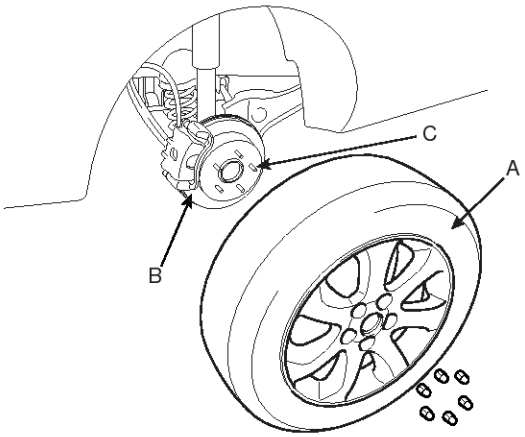
LHLG500O

REMOVAL

1. Loosen the wheel nuts slightly.

   Raise the vehicle, and make sure it is securely supported.

2. Remove the rear wheel and tire (A) from rear hub (B).

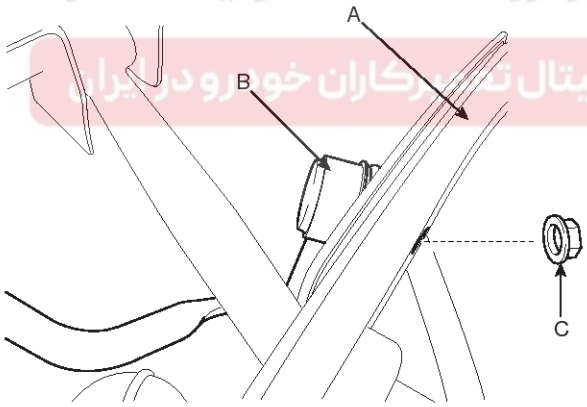


AHLG501I

⚠CAUTION

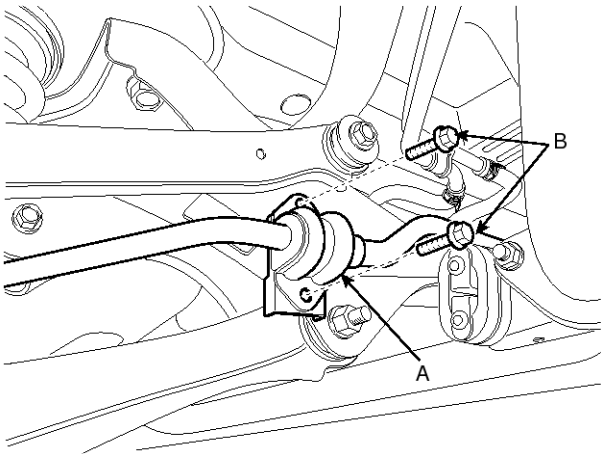
Be careful not to damage the hub bolts (C) when removing the rear wheel and tire (A).

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



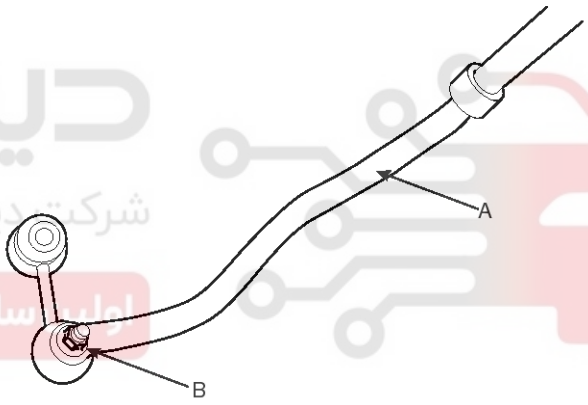
AHLG502A

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



AHLG502S

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

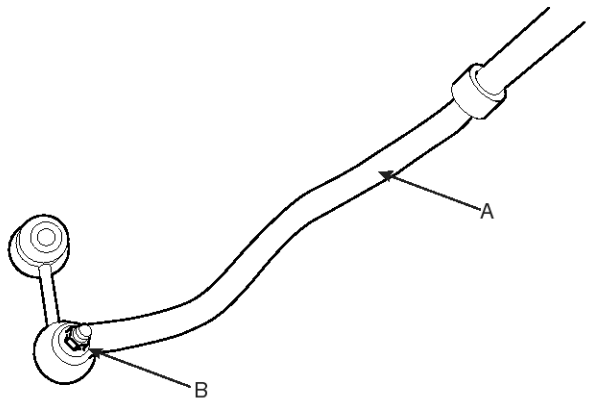


AHKF260D

INSTALLATION

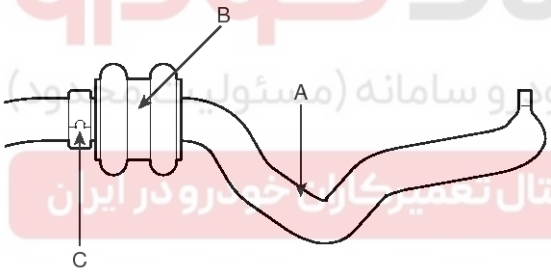
1. Install the rear stabilizer link (A) nut (B) to the stabilizer bar assembly.

Tightening torque Nm (kgf.m, lb-ft) :
44.1 ~ 53.9 (4.5 ~ 5.5, 32.5 ~ 39.8)



AHKF260D

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



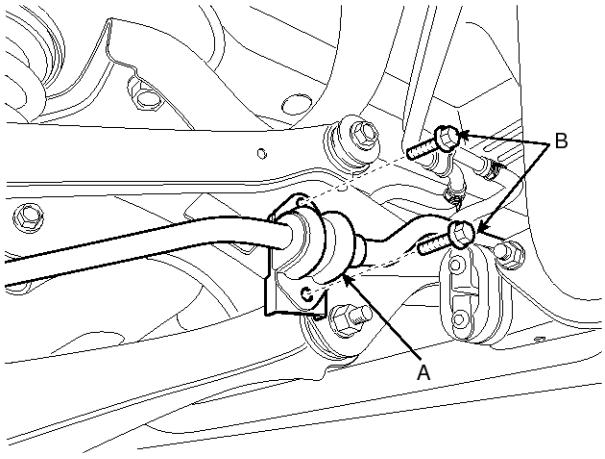
KHRE144A

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.

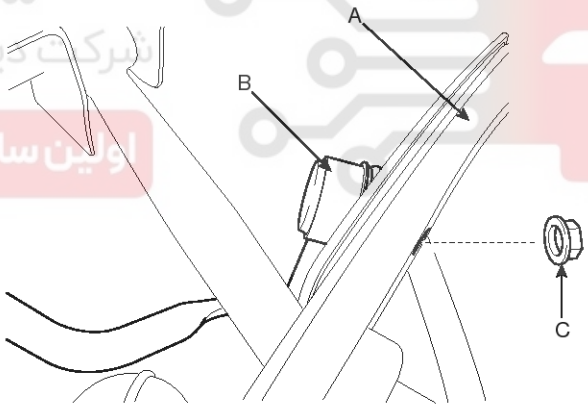
Tightening torque Nm (kgf.m, lb-ft) :
44.1 ~ 53.9 (4.5 ~ 5.5, 32.5 ~ 39.8)



AHLG502S

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

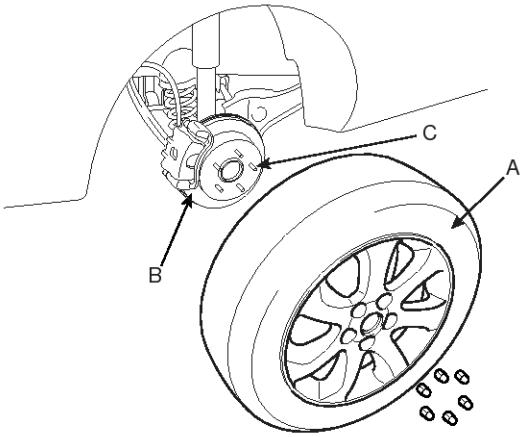
Tightening torque Nm (kgf.m, lb-ft) :
44.1 ~ 53.9 (4.5 ~ 5.5, 32.5 ~ 39.8)



AHLG502A

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) :
88.3 ~ 107.9 (9 ~ 11, 65.1 ~ 79.6)



AHLG501I

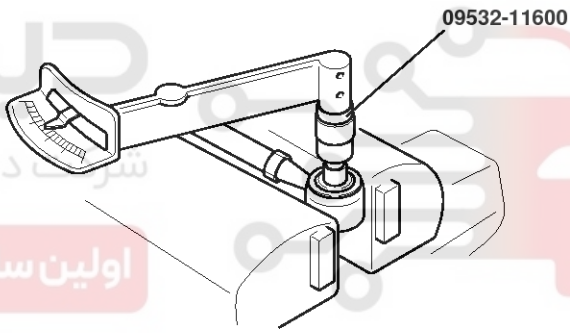
CAUTION
Be careful not to damage the hub bolts (C) when installing the rear wheel and tire (A).

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.cm, 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.



EHRF142A

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.

Tires/Wheels

Tire

TIRE WEAR

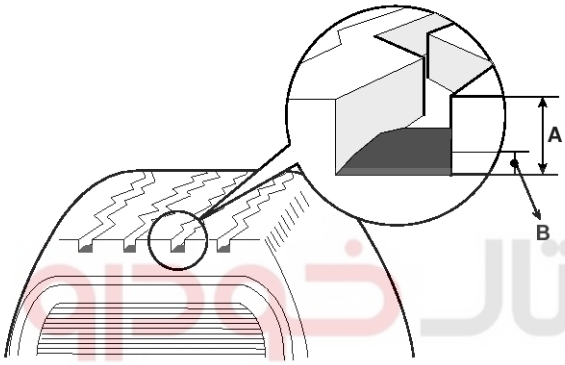
1. Measure the tread depth of the tires.

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

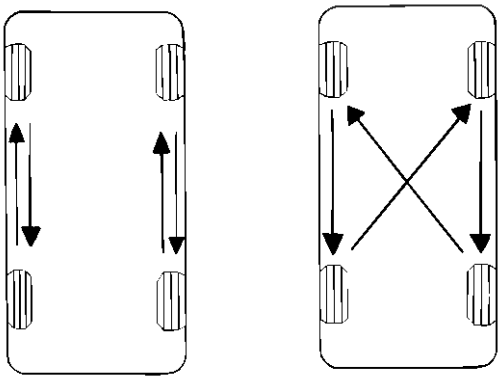
When the tread depth of the tires is less than 1.6 mm (0.063 in), the wear indicators(B) will appear.



KHRE404A

TIRE ROTATION

Rotate the tires in the pattern illustrated.

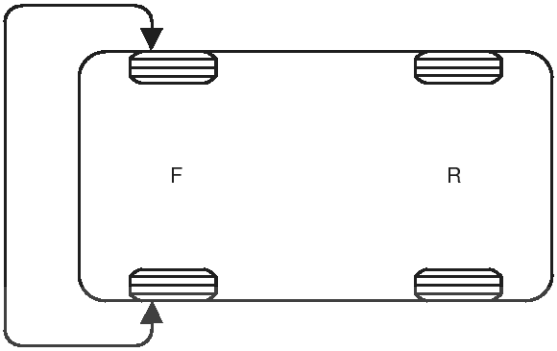


KHRE405A

CHECKING FOR PULL AND WANDER

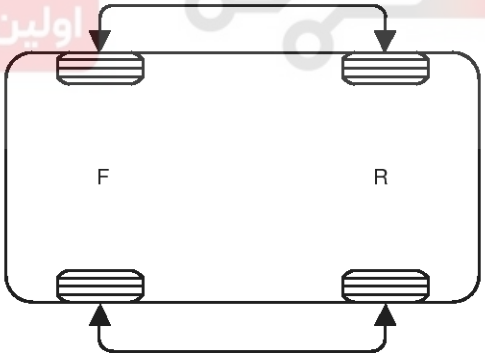
If the steering pulls to one side, rotate the tires according to the following wheel rotation procedure.

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



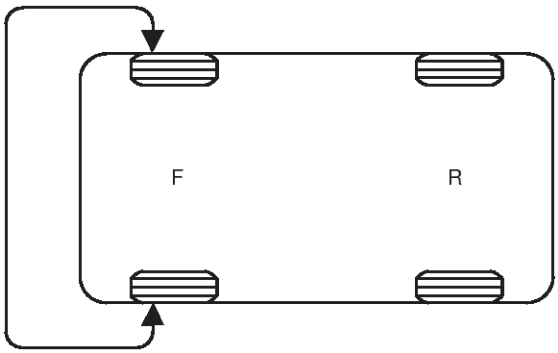
EHRF405B

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



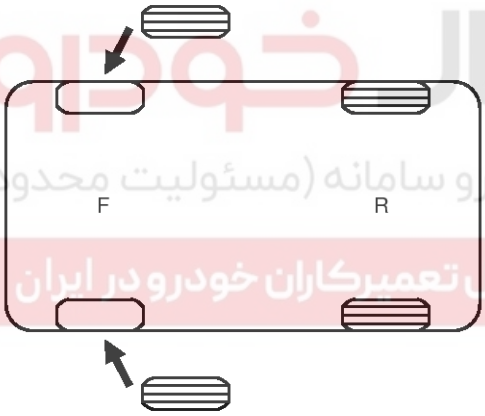
EHRF405C

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



EHRF405B

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



EHRF405E

Wheel

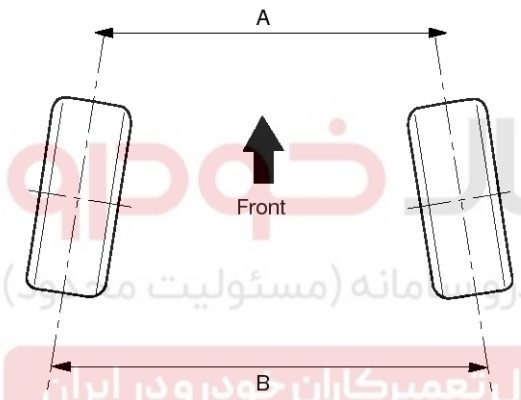
WHEEL ALIGNMENT

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.



EHRF400A

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.

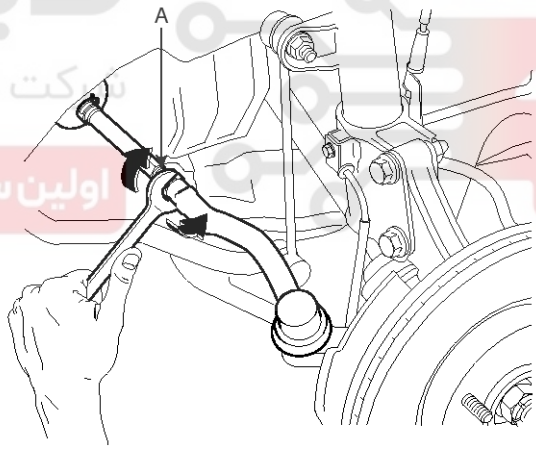
Standard value :

Toe-in (B-A) (in) : 0°±0.2° (0 ± 0.0787)

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 ±0.1°.*

Tie rod(A) Specified torque Nm (kgf.m, lb-ft) :
68.6 ~ 78.5 (7.0 ~ 8.0, 50.6 ~ 57.9)



AHIE107B

[REAR]

Standard value :

Toe-in (B-A) (in) : 0.2°±0.2° (0.0787 ± 0.0787)

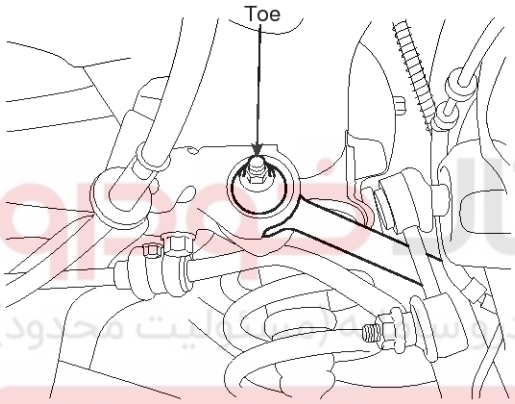
Adjust the toe-in by turning the cambolt of the assist arm.

Left cambolt : Clockwise → toe-in
Right cambolt : Clockwise → toe-out
The variation of toe by a rotation of the cambolt :
About 0.3° (0.126 in)

CAUTION

- **Each toe should be within ±0.1° (± 0.039 in).**

  If the difference between right and left is not within ±0.2° (0.079 in), repeat adjustment.
- **After adjusting the cambolt, tighten the nut to the specified torque.**



LHKG500O

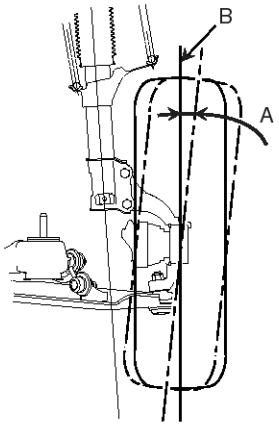
Specified torque

78.8 ~ 98.1 Nm (8.0 ~ 10.0 kgf.m, 57.9 ~ 75.3 lb-ft)

CAMBER

[FRONT]

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



AHKF400F

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(-).

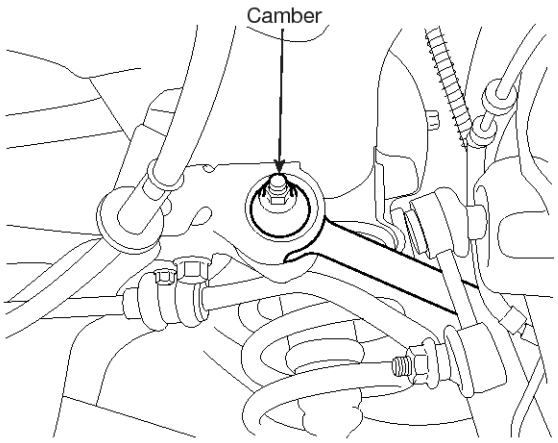
Standard value : -0.5°±0.5°
Difference between right and left angle is within 0.5°

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 : -1˚±0.5˚
Difference between right and left angle is within 0.5˚



LHKG500P

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

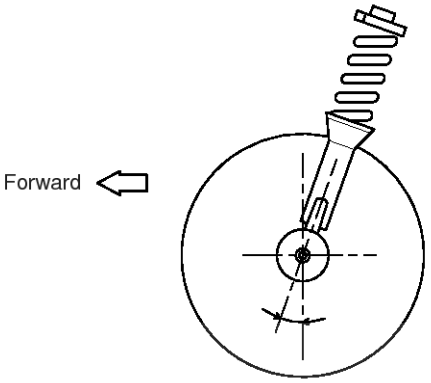
Left cambolt : Clockwise → camber(+)
Right cambolt : Clockwise →camber(-)

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 : 4.75˚±0.5˚



EHOF400C

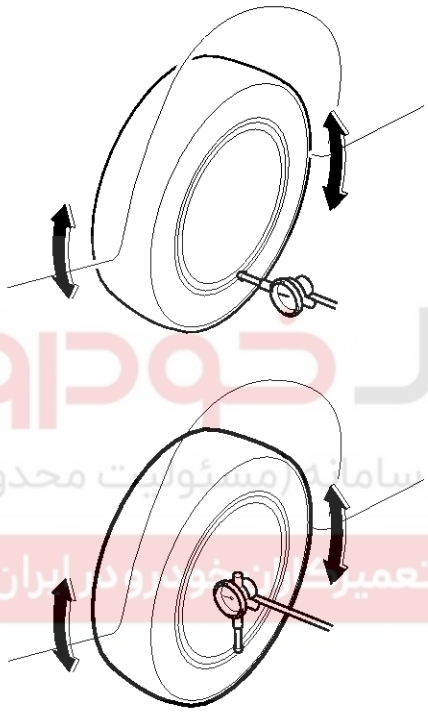
NOTICE

- *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	0.6 (0.024)	1.0 (0.039)
	Aluminium	0.3 (0.012)	0.3 (0.012)



KHRE402A

WHEEL NUT TIGHTENING

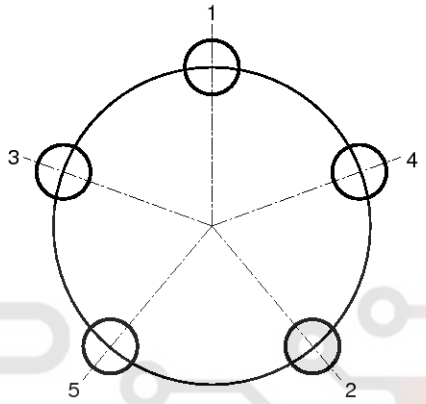
1. Tightening torque.

Tightening torque Nm (kgf.m, lb-ft) :
88.3 ~ 107.9 (9 ~11, 65.1 ~ 79.5)

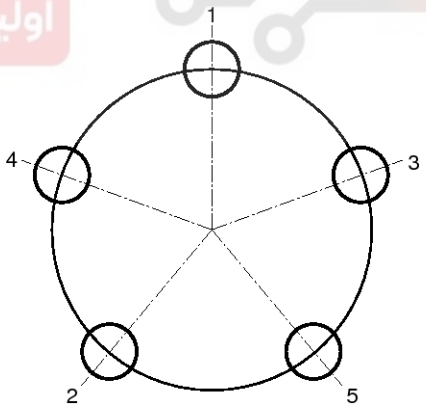
⚠CAUTION
When using an impact gun, final tightening torque should be checked using a torque wrench.

2. Tightening order.

   Check the torque again after tightening the wheel nuts diagonally.



AHIE107G



AHIE107H