

GENESIS(BH) > 2012 > G 4.6 DOHC > Suspension System

Suspension System > General Information > Specifications

Specifications

Front Suspension

Item		Specification
Suspension type		Multi link
Shock absorber	Type	ASD (Amplitude Selective Damper)
Coil spring	Free Height [I.D. color]	351.8mm [Skyblue - Yellow] 327.3mm [Skyblue - Skyblue]

Rear Suspension

Item		Specification
Suspension type		Multi link
Shock absorber	Type	ASD (Amplitude Selective Damper)
Coil spring	Free Height [I.D. color]	343.1mm [Skyblue - Pink] 341.6mm [Skyblue - Skyblue]

Wheel And Tire

Item		Specification
Wheel		6.5J×17
		7.5J×18
Tire		215/60 R17
		225/55 R17
		235/50 R18
Tire pressure	Front	2.3kg/cm ² (33psi)
	Rear	2.3kg/cm ² (33psi)

Wheel Alignment

Item		Specification	
		Front	Rear
Toe-in	Total	0.1° ±0.2°	0.4° ±0.2°
	Individual	0.05° ±0.1°	0.2° ±0.1°
Camber angle		-0.53° ±0.5°	-1.43±0.5°
Caster angle		7.78° ±0.75°	-
King-pin angle		6.9°	-
Side Slip		In 4.7 ~ Out 1.2 mm	In 4.0 ~ In 9.9 mm

Tightening Torques

Front Suspension

	Tightening torque (kgf.m)

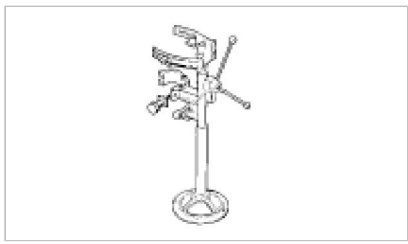
Item	N.m	kgf.m	lb-ft
Front strut assembly to front upper arm	100 ~ 120	10.0 ~ 12.0	72 ~ 87
Front upper arm to front axle	80 ~ 90	8.0 ~ 9.0	58 ~ 65
Front strut assembly to front lateral arm	140 ~ 160	14.0 ~ 16.0	101 ~ 116
Front tension arm to sub frame	140 ~ 160	14.0 ~ 16.0	101 ~ 116
Front lateral arm to sub frame	140 ~ 160	14.0 ~ 16.0	101 ~ 116
Front tension arm to front axle	90 ~ 110	9.0 ~ 11.0	65 ~ 80
Front lateral arm to front axle	90 ~ 110	9.0 ~ 11.0	65 ~ 80
Front stabilizer bar to sub frame	45 ~ 55	4.5 ~ 5.5	33 ~ 40
Front stabilizer bar to Stabilizer bar link	100 ~ 120	10.0 ~ 12.0	72 ~ 87

Rear Suspension

Item	Tightening torque		
	N.m	kgf.m	lb-ft
Hub nuts	200 ~ 280	20.0 ~ 28.0	145 ~ 203
Rear shock absorber to frame	50 ~ 65	5.0 ~ 6.5	36 ~ 47
Rear shock absorber to rear axle	140 ~ 160	14.0 ~ 16.0	101 ~ 116
Rear upper arm to frame	120 ~ 140	12.0 ~ 14.0	87 ~ 101
Rear upper arm to rear axle	80 ~ 90	8.0 ~ 9.0	58 ~ 65
Rear stabilizer bar link to rear lower arm	50 ~ 65	5.0 ~ 6.5	36 ~ 47
Rear stabilizer bar to Stabilizer bar link	50 ~ 65	5.0 ~ 6.5	36 ~ 47
Rear stabilizer bar to sub frame	45 ~ 55	4.5 ~ 5.5	33 ~ 40
Rear assist arm to rear axle	80 ~ 90	8.0 ~ 9.0	58 ~ 65
Rear assist arm to frame	100 ~ 120	10.0 ~ 12.0	72 ~ 87
Rear trailing arm to rear axle	100 ~ 120	10.0 ~ 12.0	72 ~ 87
Rear trailing arm to frame	100 ~ 120	10.0 ~ 12.0	72 ~ 87
Rear lower arm to rear axle	140 ~ 160	14.0 ~ 16.0	101 ~ 116
Rear lower arm to frame	100 ~ 120	10.0 ~ 12.0	72 ~ 87

Suspension System > General Information > Special Service Tools

Special Service Tools

Tool (Number and Name)	Illustration	Use
09546-26000 Strut spring compressor		Compression of coil spring
09568-2J100		Removal of Ball joint


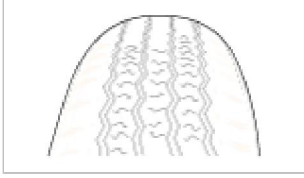
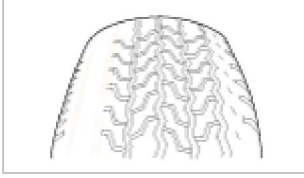
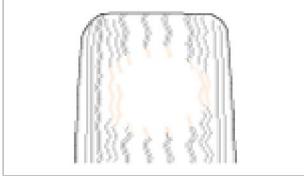
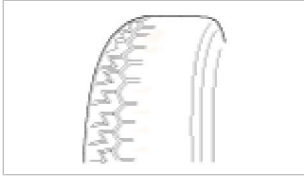

Ball joint remover



Suspension System > General Information > Troubleshooting

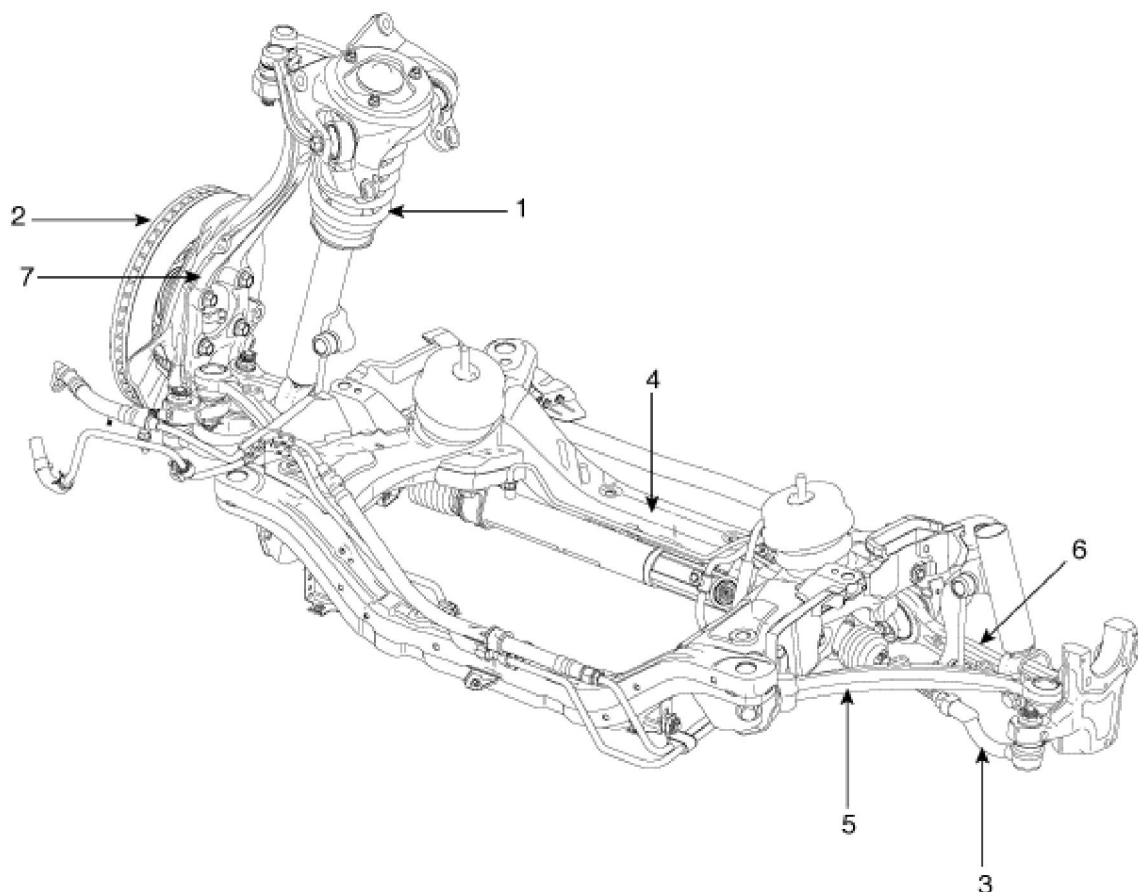
Troubleshooting

Trouble symptom	Probable cause	Remedy
Hard steering	Improper front wheel alignment	Repair
	Excessive turning resistance of lower arm ball joint	Replace
	Flat tire	Adjust
	No power assist	Repair or Replace
Poor return of steering wheel to center	Improper front wheel alignment	Repair
Poor ride quality	Improper front wheel alignment	Repair
	Damaged shock absorber	Repair or Replace
	Varied or damaged stabilizer	Replace
	Varied or damaged coil spring	Replace
	Worn lower arm bushing	Replace
Abnormal tire wear	Improper front wheel alignment	Repair
	Improper tire inflation pressure	Adjust
	Worn of shock absorber	Replace
Wandering	Improper front wheel alignment	Repair
	Poor turning resistance of lower arm ball joint	Repair
	Loose or worn lower arm bushing	Re-tighten or Replace
Vehicle pulls to one side	Improper front wheel alignment	Repair
	Excessive turning resistance of lower arm ball joint	Replace
	Varied or damaged coil spring	Replace
	Bent lower arm	Replace
Steering wheel shimmy	Improper front wheel alignment	Repair
	Excessive turning resistance of lower arm ball joint	Replace
	Varied or damaged stabilizer	Replace
	Worn lower arm bushing	Replace
	Worn of shock absorber	Replace
	Varied or damaged coil spring	Replace
Bottoming	Broken or worn spring	Replace
	Malfunction of shock absorber	Replace

Wheel And Tire Diagnosis		
Rapid wear at the center	Rapid wear at both shoulders	Wear at one shoulder
		
<ul style="list-style-type: none"> • Center-tread down to fabric due to excessive over inflated tires • Lack of rotation • Excessive toe on drive wheels • Heavy acceleration on drive 	<ul style="list-style-type: none"> • Under-inflated tires • Worn suspension components • Excessive cornering speeds • Lack of rotation 	<ul style="list-style-type: none"> • Toe adjustment out of specification • Camber out of specification • Damaged strut • Damaged lower arm • Under-inflated tires
Partial wear	Feathered edge	Wear pattern
		
<ul style="list-style-type: none"> • Caused by irregular burrs on brake drums. • Under-inflated tires • Lack of rotation 	<ul style="list-style-type: none"> • Toe adjustment out of specification • Damaged or worn tie rods • Damaged knuckle 	<ul style="list-style-type: none"> • Excessive toe on non-drive wheels • Lack of rotation

Suspension System > Front Suspension System > Components and Components Location

Components

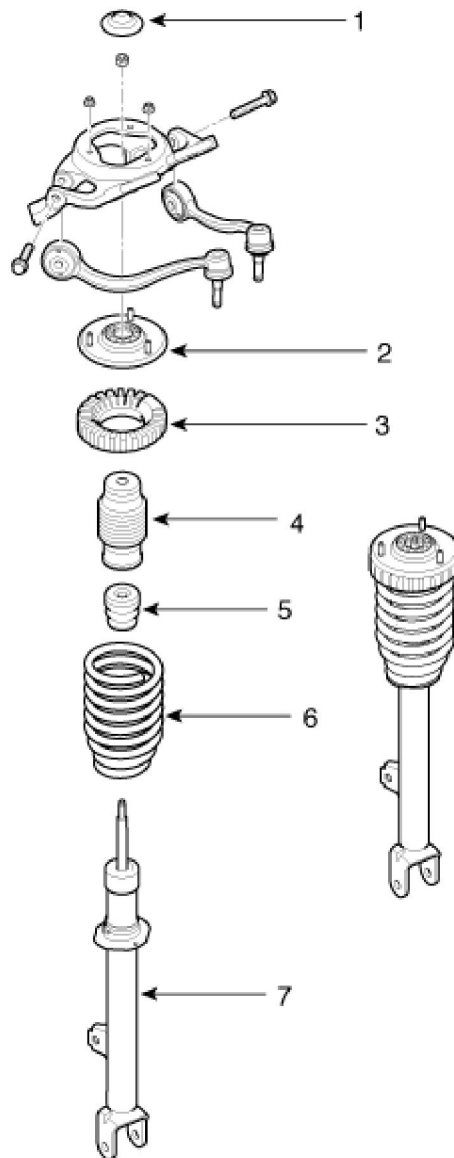


- 1. Front strut assembly
- 2. Front brake disc
- 3. Tie rod end assembly
- 4. Front sub frame

- 5. Front tension arm
- 6. Front lateral arm
- 7. Front knuckle assembly

Suspension System > Front Suspension System > Front Strut Assembly > Components and Components Location

Components



1. Insulator cap
2. Insulator assembly
3. Spring upper pad
4. Dust cover

5. Bump stopper
6. Coil spring
7. Shock absorber

Suspension System > Front Suspension System > Front Strut Assembly > Repair procedures

Replacement

1. Remove the front wheel & tire.

Tightening torque:

90 ~ 110N.m (9.0 ~ 11.0kgf.m, 65 ~ 80lb-ft)

-
2. Disconnect the stabilizer link with the front strut assembly by loosening the nuts (A).
-

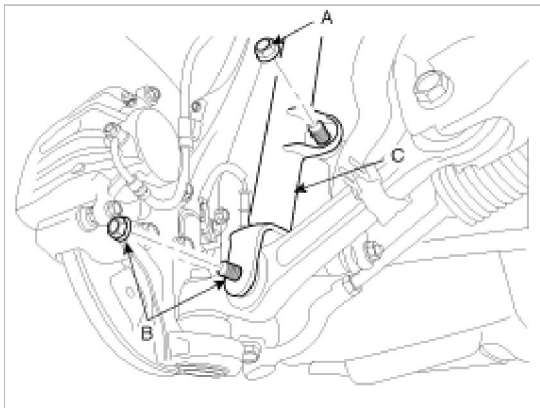
Tightening torque:

100 ~ 120N.m (10.0 ~ 12.0kgf.m, 72 ~ 87lb-ft)

3. Disconnect the front strut assembly (C) with the front lower arm by loosening the bolt & nuts (B).
-

Tightening torque:

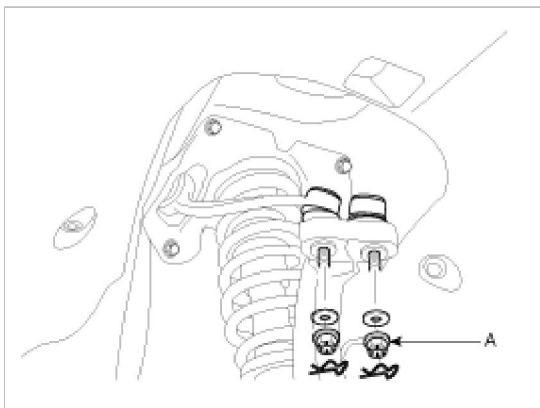
140 ~ 160N.m (14.0 ~ 16.0kgf.m, 101 ~ 116lb-ft)



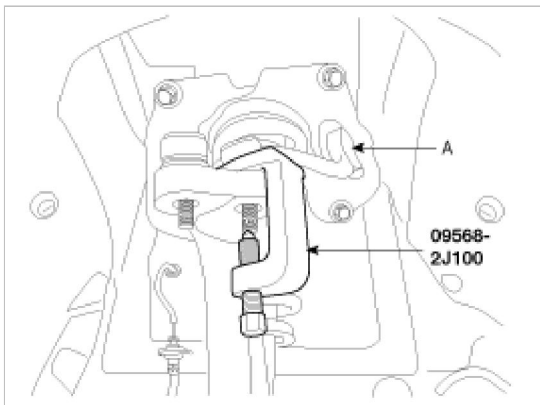
4. Remove the split pin and castle nuts (A).
-

Tightening torque:

80 ~ 90N.m (8.0 ~ 9.0kgf.m, 58 ~ 65lb-ft)



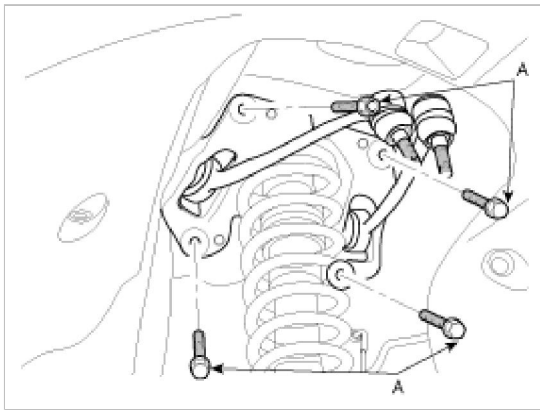
5. Disconnect the front upper arm (A) with the knuckle using a SST (09568-2J100).



6. Disconnect the front strut assembly with the frame by loosening the mounting bolt (A).
-

Tightening torque:

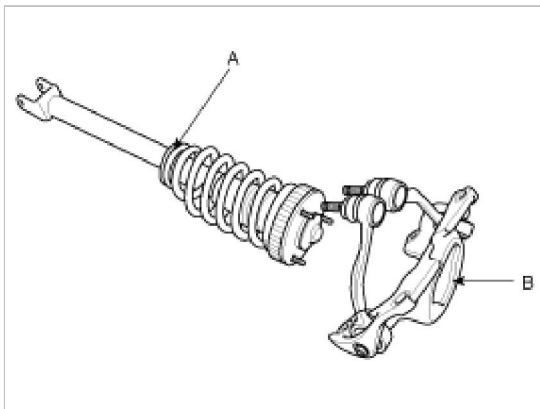
55 ~ 65N.m (5.5 ~ 6.5kgf.m, 40 ~ 47lb-ft)



7. Disconnect the bracket (B) with the front strut assembly (A) loosening the nuts.
-

Tightening torque:

20 ~ 30N.m (2.0 ~ 3.0kgf.m, 14 ~ 22lb-ft)



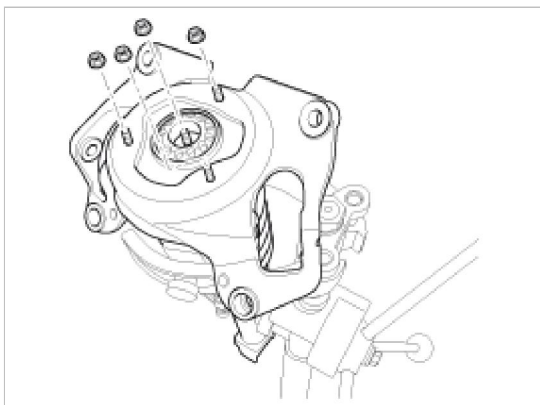
8. Installation is the reverse of removal.
-

Disassembly

1. Compress the coil spring with a strut spring compressor. Do not compress the spring more than necessary.
 2. Loosen the lock nut.
-

Tightening torque:

20 ~ 25N.m(2.0 ~ 2.5Kgf.m, 14 ~ 18lb-ft)



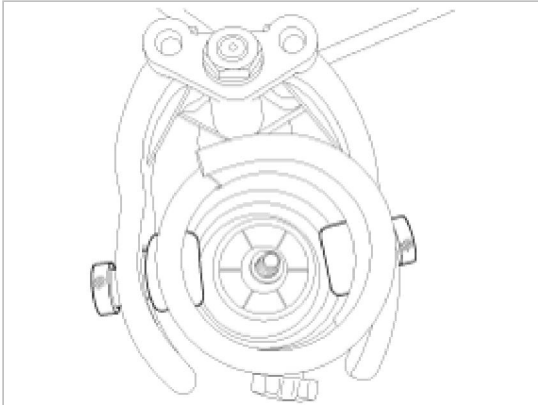
3. Disassemble the components of front strut assembly in sequence.

(Refer to front strut assembly components.)

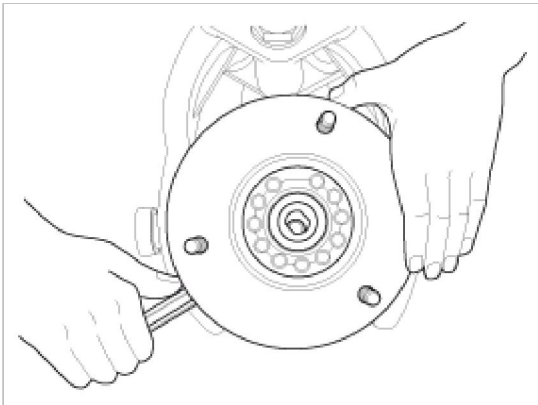
4. Reassembly is the reverse of the disassembly.

CAUTION

- Do not reuse the self locking nut.
- Set the hook with bilateral symmetry and then press the coil spring.



- The centerline of shock absorber is not aligned with coil spring, push the shock absorber to align the centerline.

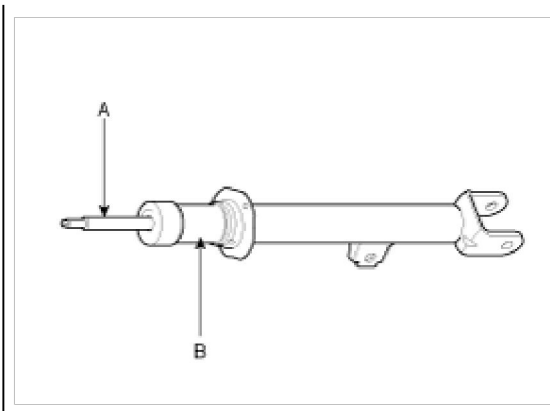


Inspection

1. Check the components for damage or deformation.
2. Compress and extend the piston rod and check that there is no abnormal resistance or unusual sound during operation.
3. When disposing the shock absorber, fully extend the piston rod (A) and then drill a hole on the B section to discharge gas from the cylinder.

CAUTION

The gas coming out is harmless, but be careful of chips that may fly when drilling. Be sure to wear safety goggles or eye protection when performing this task.



Suspension System > Front Suspension System > Front Upper Arm > Repair procedures

Replacement

1. Remove the front wheel & tire.

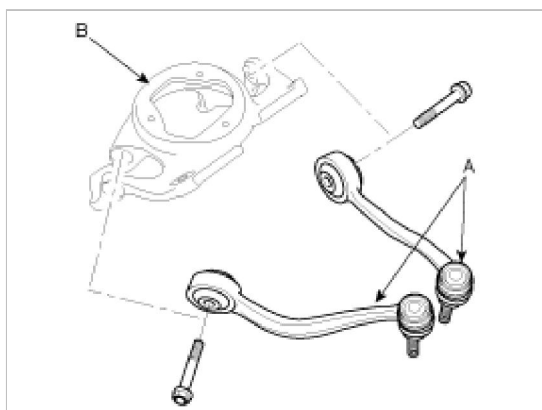
Tightening torque:

90 ~ 110 N.m(9.0 ~ 11.0kgf.m, 65 ~ 80lb-ft)

2. Remove the front assembly.
(Refer to front strut assembly.)
3. Disconnect the front upper arm (A) with the front strut assembly bracket (B) by loosening the bolt.

Tightening torque:

100 ~ 120N.m (10.0 ~ 12.0kgf.m, 72 ~ 87lb-ft)



4. Installation is the reverse of removal.

CAUTION

Keep mind in upper arm installing angle.

Inspection

1. Check the bushing for wear and deterioration.
2. Check the ball joint for rotating torque.

Suspension System > Front Suspension System > Front

Lower Arm > Repair procedures

Replacement

Replacement the lateral arm.

1. Remove the front wheel & tire.

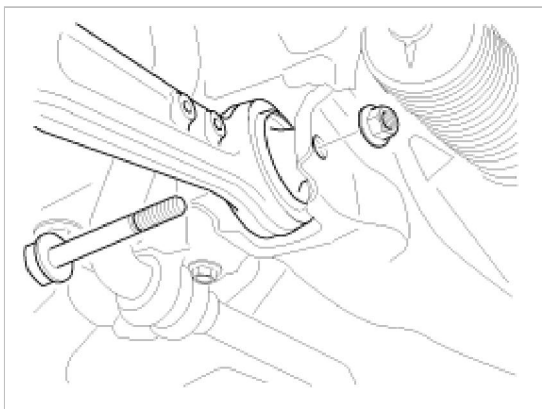
Tightening torque:

90 ~ 110N.m (9.0 ~ 11.0kgf.m, 65 ~ 80)

2. Loosen the flange bolt & lock nuts.

Tightening torque:

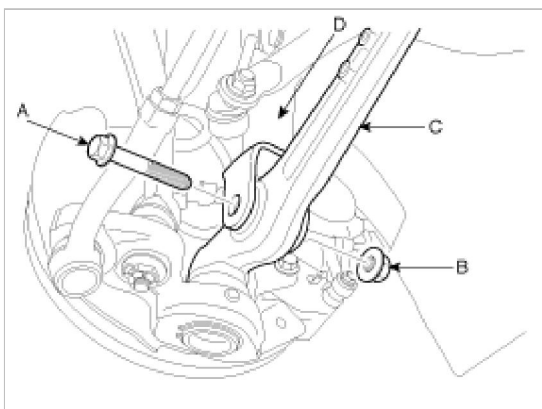
140 ~ 160N.m (14.0 ~ 16.0kgf.m, 101 ~ 116lb-ft)



3. Disconnect the lateral arm (C) with the front strut assembly (D) by loosening the flange bolts (A) & lock nuts (B).

Tightening torque:

140 ~ 160N.m (14.0 ~ 16.0kgf.m, 101 ~ 116lb-ft)

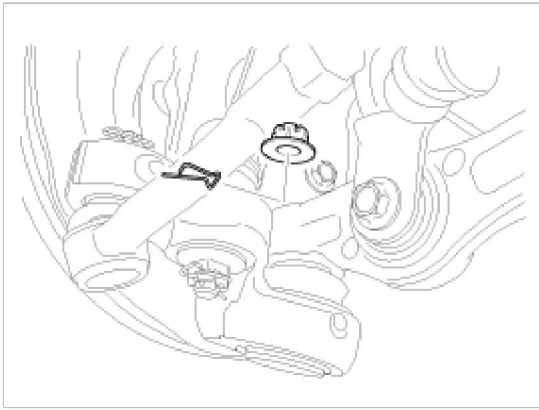
**CAUTION**

Do not use the lock nuts again.

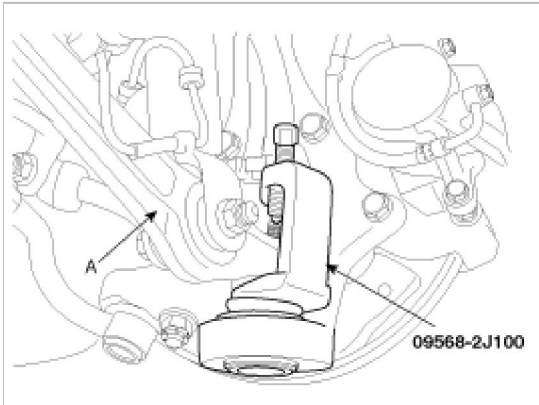
4. Remove the split pin and castle nuts.

Tightening torque:

90 ~ 110N.m (9.0 ~ 11.0kgf.m, 65 ~ 80)



5. Disconnect the lateral arm (A) with the front knuckle using a SST (09568-2J100).



6. Installation is the reverse of removal.

7. Check the alignment.
(Refer to Tires/Wheels - "Alingment")

Replacement the tension arm.

1. Remove the split pin and castle nuts.

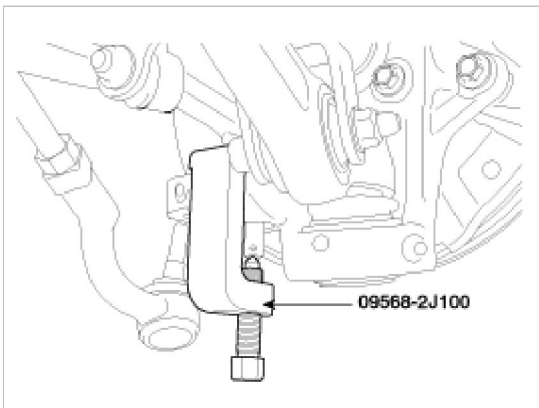
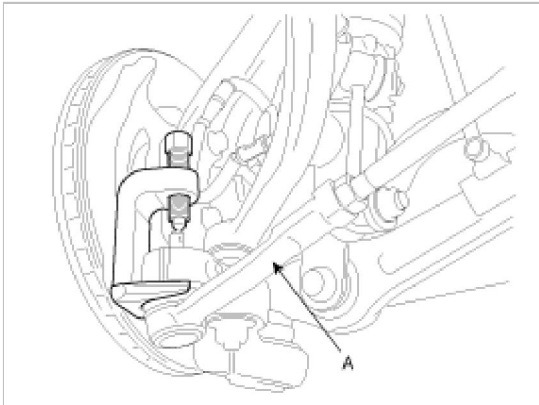
Tightening torque

Tie rod : 90 ~ 110N.m (9.0 ~ 11.0kgf.m, 65 ~ 80lb-ft)

Tension arm : 90 ~ 110N.m (9.0 ~ 11.0kgf.m, 65 ~ 80lb-ft)



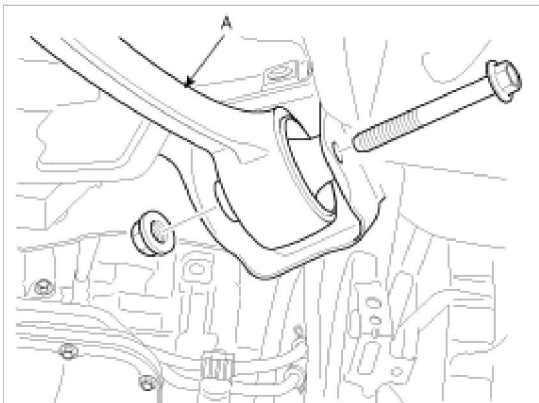
2. Disconnect the tension arm (A) with the front knuckle using a SST (09568-2J100).

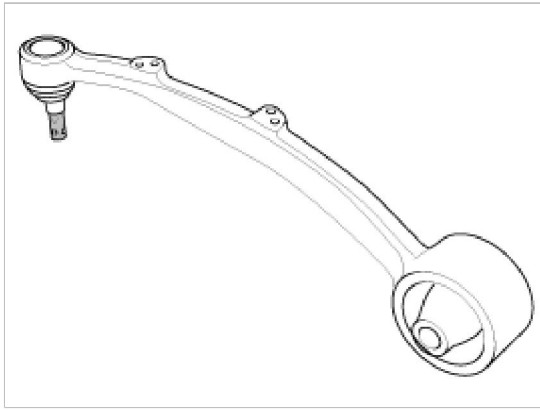


3. Disconnect the tension arm (A) with the frame by loosening the flange bolts & lock nuts.

Tightening torque:

140 ~ 160N.m (14.0 ~ 16.0kgf.m, 101 ~ 116lb-ft)





4. Installation is the reverse of removal.
5. Check the alignment.
(Refer to Tires/Wheels - "Alignment")

Inspection

1. Check the bushing for wear and deterioration.
2. Check the ball joint for rotating torque.
3. Check the lower arm for deformation.
4. Check the all bolts.

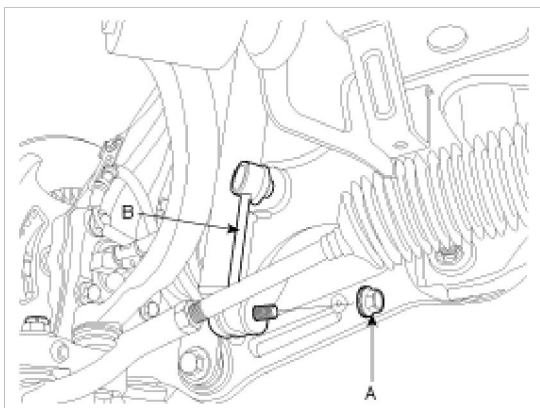
Suspension System > Front Suspension System > Front Stabilizer Bar > Repair procedures

Replacement

1. Disconnect the stabilizer link (B) with the front strut assembly by loosening the nuts (A).

Tightening torque:

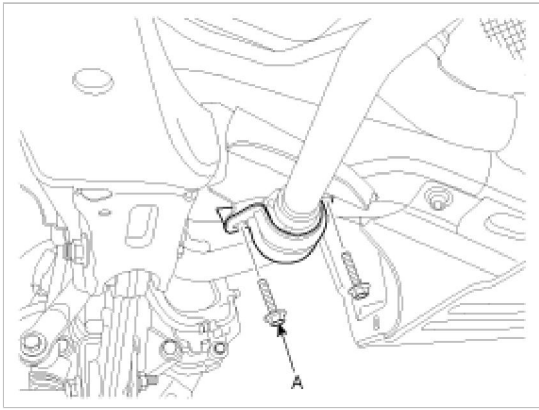
100 ~ 120N.m (10.0 ~ 12.0kgf.m, 72 ~ 87lb-ft)



2. Disconnect the stabilizer bar with the frame by loosening the bolts (A).

Tightening torque:

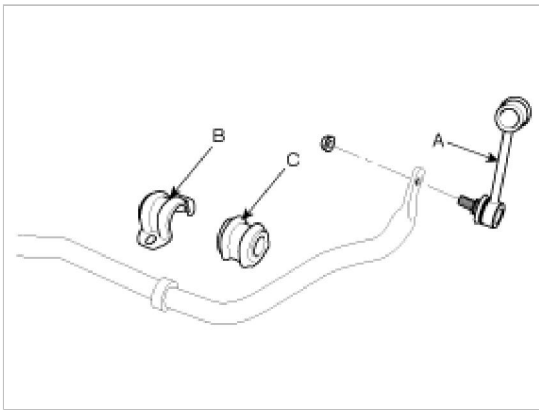
45 ~ 55N.m (4.5 ~ 5.5kgf.m, 33 ~ 40lb-ft)



3. Remove the stabilizer link (A), clamp (B), bushing (C).

Tightening torque:

100 ~ 120N.m (10.0 ~ 12.0kgf.m, 72 ~ 87lb-ft)



4. Installation is the reverse of removal.

CAUTION

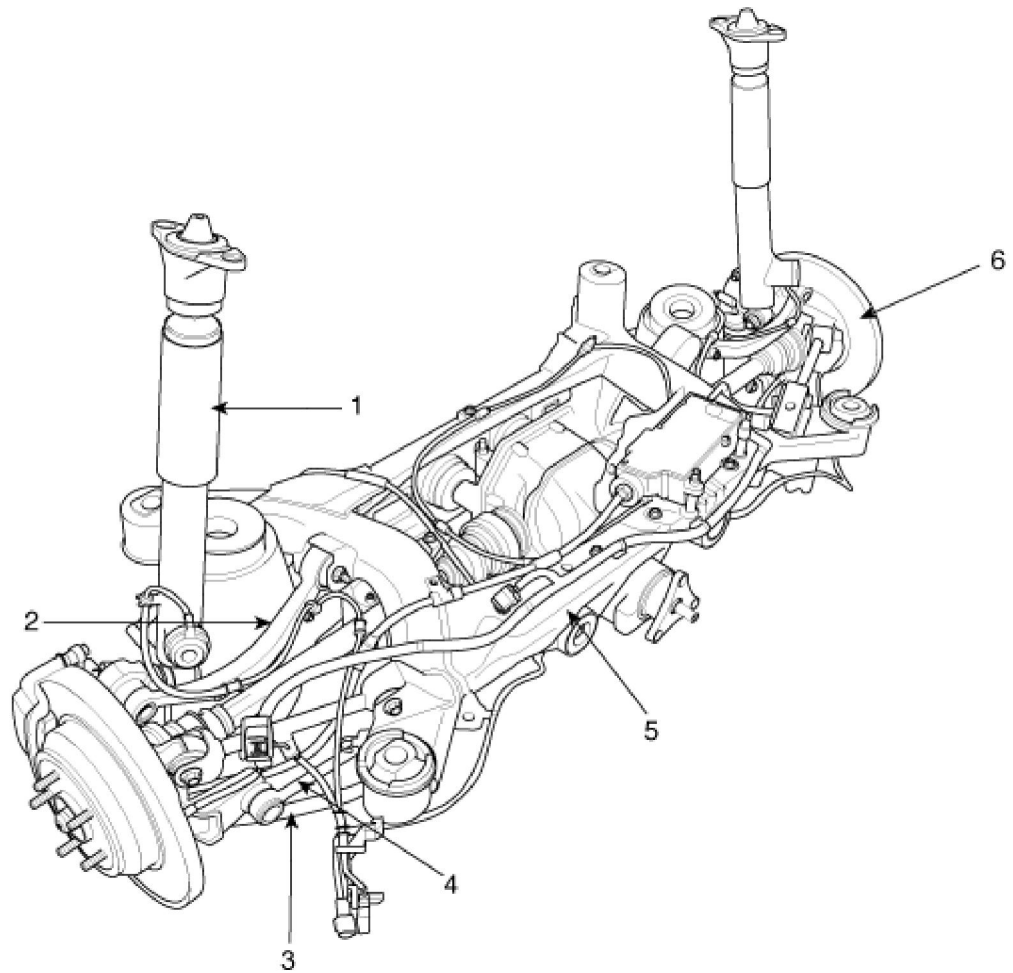
Do not use the lock nuts again.

Inspection

1. Check the bushing for wear and deterioration.
2. Check the ball joint for rotating torque.

Suspension System > Rear Suspension System > Components and Components Location

Components

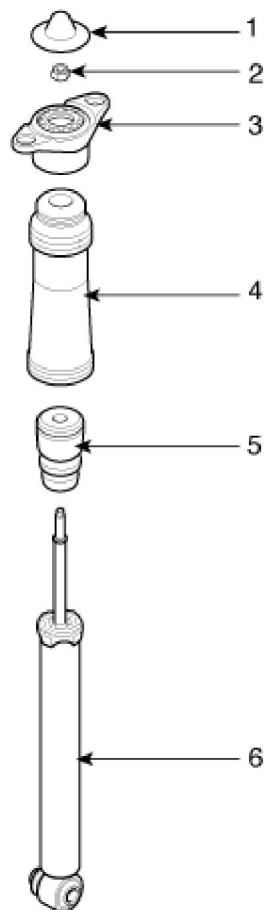


- 1. Rear shock absorber
- 2. Rear upper arm
- 3. Rear trailing arm

- 4. Rear Assist arm
- 5. Rear sub frame
- 6. Rear disk

Suspension System > Rear Suspension System > Rear Shock Absorber > Components and Components Location

Components



1. Insulator cap
2. Lock nuts
3. Bracket assembly

4. Dust cover
5. Bumper stopper
6. Shock absorber

Suspension System > Rear Suspension System > Rear Shock Absorber > Repair procedures

Replacement

1. Remove the rear wheel & tire.

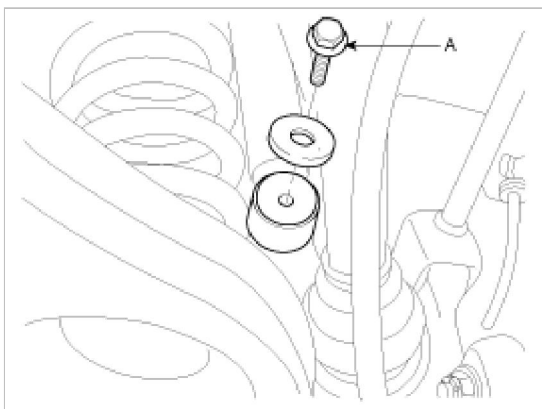
Tightening torque:

90 ~ 110N.m (9.0 ~ 11.0kgf.m, 65 ~ 80lb-ft)

2. Support the lower portion of the rear axle with a jack securely.
3. Disconnect the rear carrier with the rear shock absorber by loosening the bolts (A).

Tightening torque:

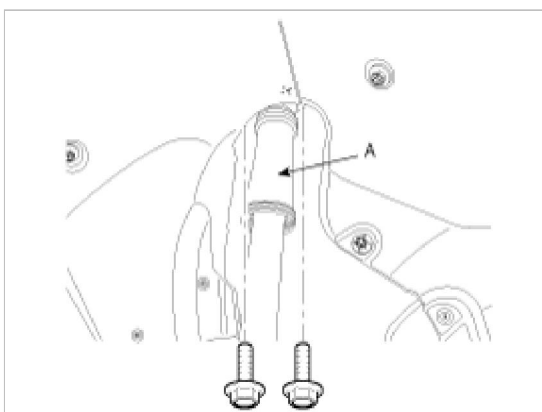
140 ~ 160N.m (14.0 ~ 16.0kgf.m, 101 ~ 116lb-ft)



4. Disconnect the rear shock absorber (A) with the wheel housing panel by loosening the mounting bolts.

Tightening torque:

50 ~ 65N.m (5.0 ~ 6.5kgf.m, 36 ~ 47lb-ft)



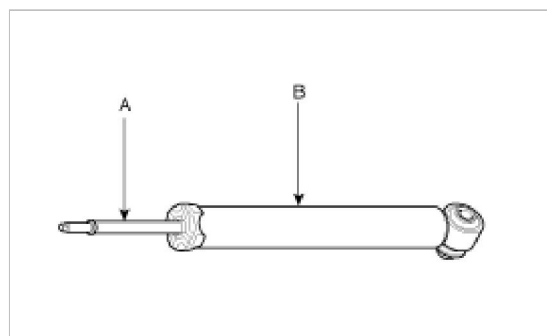
5. Installation is the reverse of removal.

Inspection

1. Check the components for damage or deformation.
2. Compress and extend the piston rod and check that there is no abnormal resistance or unusual sound during operation.
3. When disposing the shock absorber, fully extend the piston rod (A) and then drill a hole on the (B) section to discharge gas from the cylinder.

CAUTION

The gas coming out is harmless, but be careful of chips that may fly when drilling. Be sure to wear safety goggles or eye protection when performing this task.



Suspension System > Rear Suspension System > Rear Upper Arm > Repair procedures

Replacement

1. Remove the rear wheel & tire.

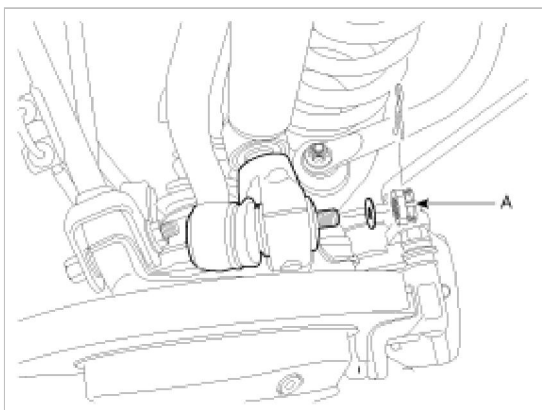
Tightening torque:

90 ~ 110N.m (9.0 ~ 11.0kgf.m, 65 ~ 80lb-ft)

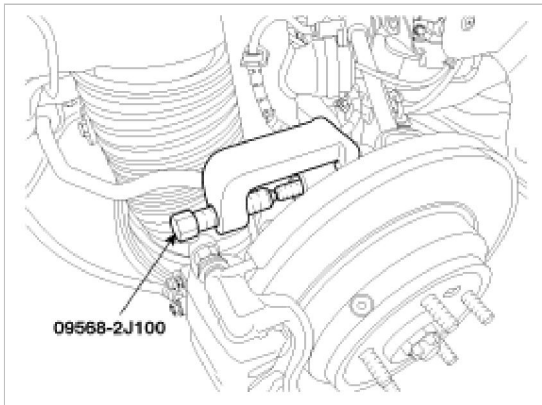
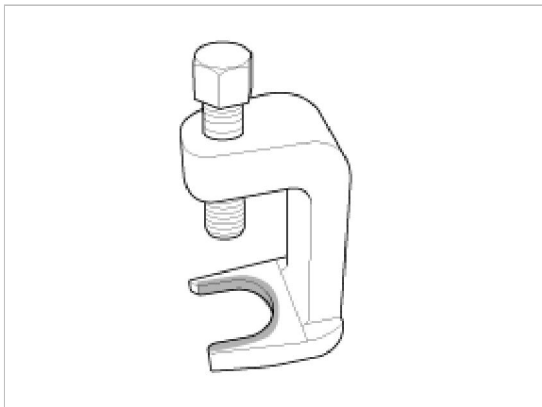
2. Support the lower portion of the rear axle with a jack securely.
3. Remove the split pin and castle nuts (A).

Tightening torque:

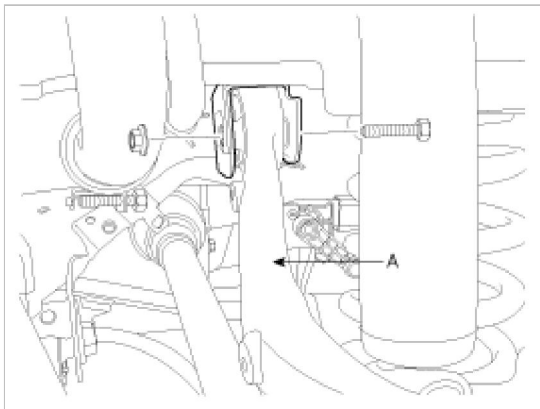
80 ~ 90N.m (8.0 ~ 9.0kgf.m, 58 ~ 65lb-ft)



4. Disconnect the rear upper arm (A) with the rear carrier using a SST (09568-2J100).



5. Loosen the flange bolt & lock nuts.



6. Installation is the reverse of removal.

CAUTION

Do not use the lock nuts again.

Inspection

1. Check the bushing for wear and deterioration.
2. Check the ball joint for rotating torque.

Suspension System > Rear Suspension System > Rear Assist Arm > Repair procedures

Replacement

1. Remove the rear wheel & tire.

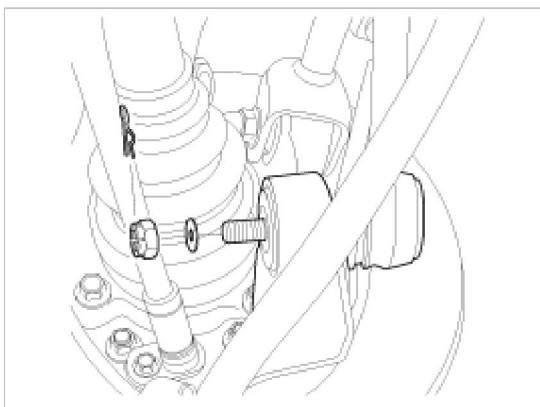
Tightening torque:

90 ~ 110N.m (9.0 ~ 11.0kgf.m, 65 ~ 80lb-ft)

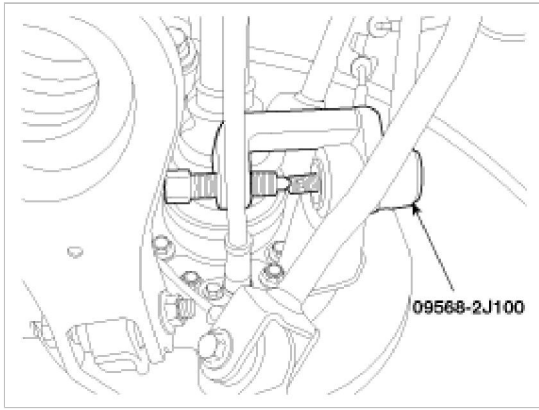
2. Remove the split pin and castle nuts.

Tightening torque:

80 ~ 90N.m (8.0 ~ 9.0kgf.m, 58 ~ 65lb-ft)



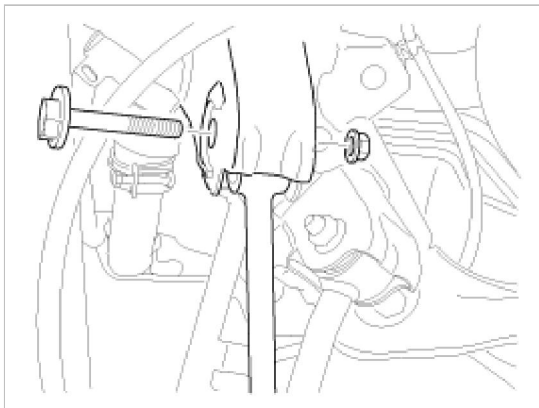
3. Disconnect the rear assist arm with the rear carrier using a SST (09568-2J100).



4. Loosen the bolt & lock nuts.

Tightening torque:

100 ~ 120N.m (10.0 ~ 12.0kgf.m, 72 ~ 87lb-ft)



5. Installation is the reverse of removal.
6. Check the alignment.
(Refer to Tires/Wheels - "Alingment")

Inspection

1. Check the bushing for wear and deterioration.
2. Check the ball joint for rotating torque.
3. Check the assist arm for deformation.

Suspension System > Rear Suspension System > Trailing Arm > Repair procedures

Replacement

1. Remove the rear wheel & tire.

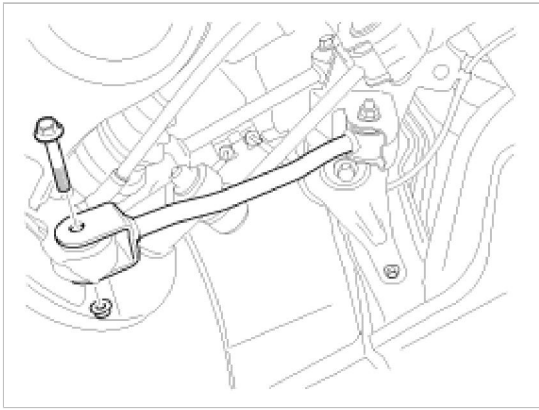
Tightening torque:

90 ~ 110N.m (9.0 ~ 11.0kgf.m, 65 ~ 80lb-ft)

2. Loosen the bolt & lock nuts.

Tightening torque:

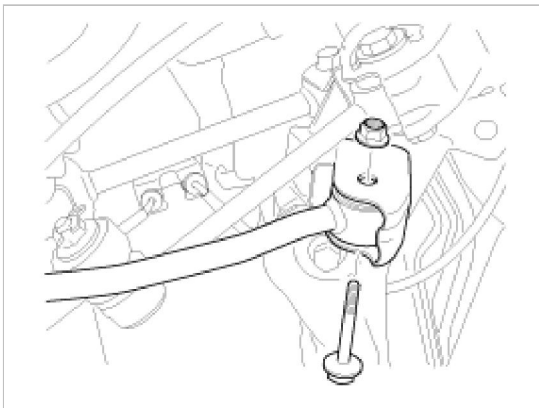
100 ~ 120N.m (10.0 ~ 12.0kgf.m, 72 ~ 87lb-ft)



3. Loosen the flange bolt & lock nuts.

Tightening torque:

100 ~ 120N.m (10.0 ~ 12.0kgf.m, 72 ~ 87lb-ft)



4. Installation is the reverse of removal.

Inspection

1. Check the bushing for wear and deterioration.
2. Check the trailing arm deformation.
3. Check the all bolts.

Suspension System > Rear Suspension System > Rear Lower Arm > Repair procedures

Replacement

1. Remove the rear wheel & tire.

Tightening torque:

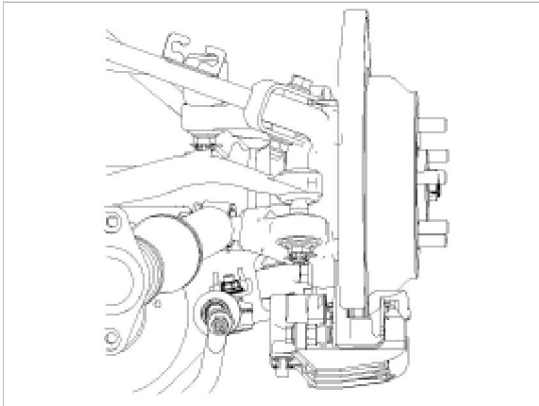
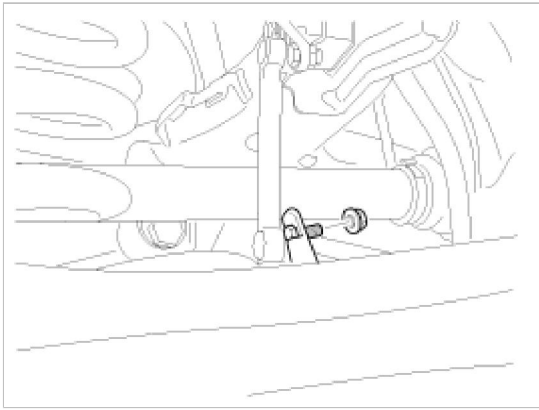
90 ~ 110N.m (9.0 ~ 11.0kgf.m, 65 ~ 80lb-ft)

2. Disconnect the rear height sensor & stabilizer link with the lower arm.

Tightening torque

Height sensor : 4 ~ 6N.m (0.4 ~ 0.6kgf.m, 3 ~ 4lb-ft)

Stabilizer link : 50 ~ 65N.m (5.0 ~ 6.5kgf.m, 36 ~ 47lb-ft)

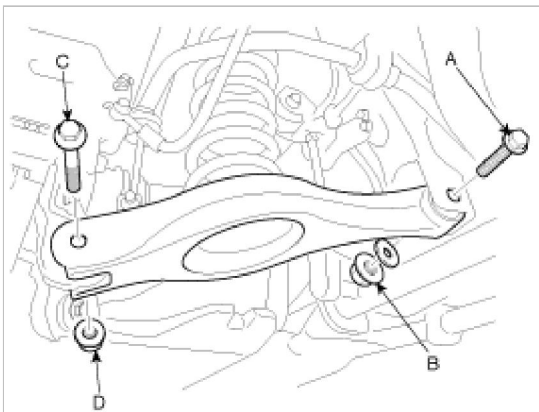


3. Loosen the bolt (A), nuts (B), flange bolt (C), lock nuts (D).

Tightening torque

Axle : 140 ~ 160N.m (14.0 ~ 16.0kgf.m, 101 ~ 116lb-ft)

Damper : 100 ~ 120N.m (10.0 ~ 12.0kgf.m, 72 ~ 87lb-ft)



4. Installation is the reverse of removal.
5. Check the alignment.
(Refer to Tires/Wheels - "Alingment")

Inspection

1. Check the bushing for wear and deterioration.
2. Check the rear lower arm deformation.
3. Check the all bolts.
4. Check the coil spring pad for deterioration and deformation.

Suspension System > Rear Suspension System > Rear Stabilizer Bar > Repair procedures

Replacement

1. Remove the rear wheel & tire.

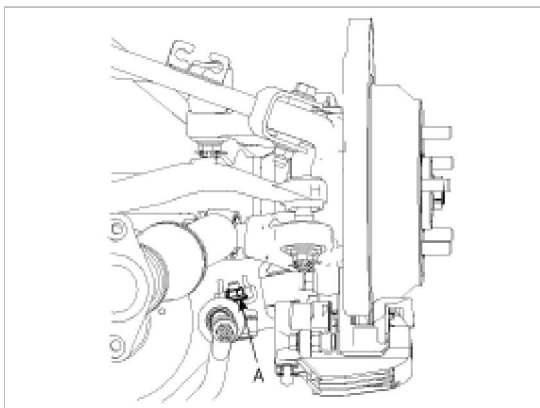
Tightening torque:

90 ~ 110N.m (9.0 ~ 11.0kgf.m, 65 ~ 80lb-ft)

2. Loosen the nuts (A).

Tightening torque:

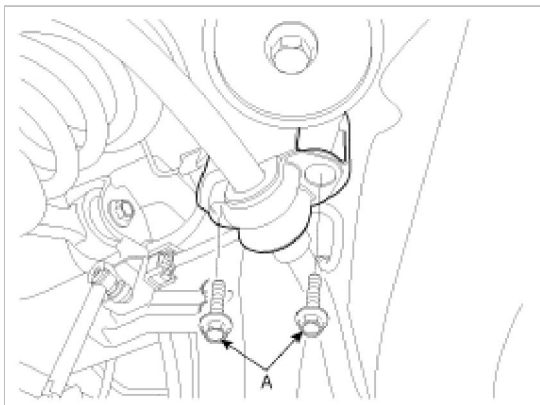
50 ~ 65N.m (5.0 ~ 6.5kgf.m, 36 ~ 47lb-ft)



3. Loosen the bolts (A).

Tightening torque:

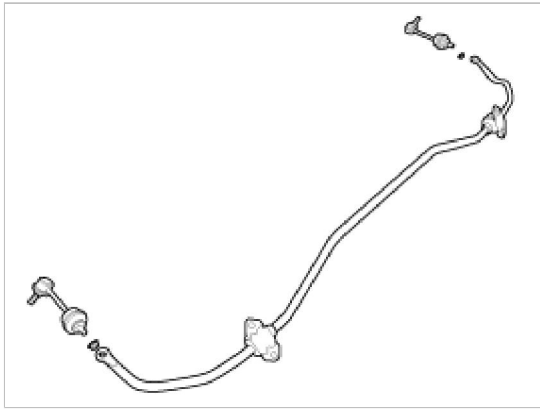
45 ~ 55N.m (4.5 ~ 5.5kgf.m, 33 ~ 40lb-ft)



4. Disconnect the rear stabilizer link with the stabilizer bar.

Tightening torque:

50 ~ 65N.m (5.0 ~ 6.5kgf.m, 36 ~ 47lb-ft)



5. Installation is the reverse of removal.

Inspection

1. Check the bushing for wear deterioration.
2. Check the all bolts.
3. Check the stabilizer bar for deformation.
4. Check the stabilizer link ball joint for damage.

Suspension System > Tires/Wheels > Tire > Repair procedures

Tire Wear

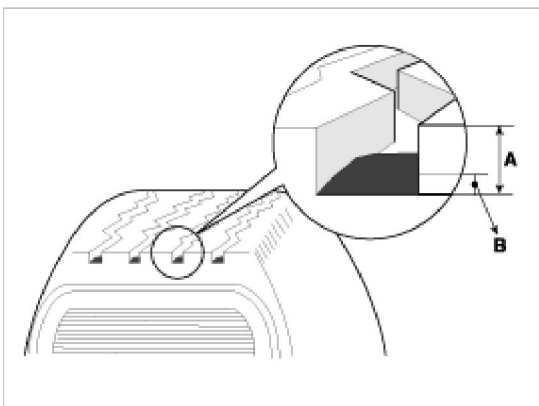
1. Measure the tread depth of the tires.

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

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

NOTE

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

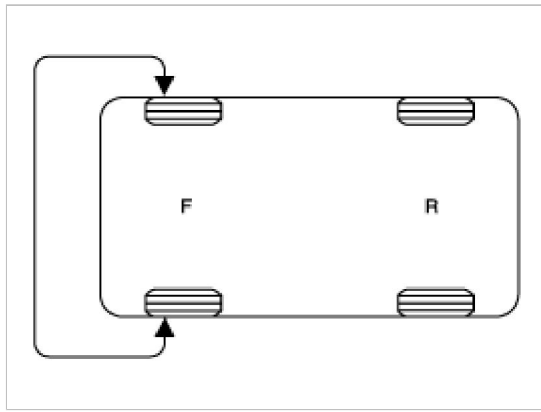


Tire Rotation

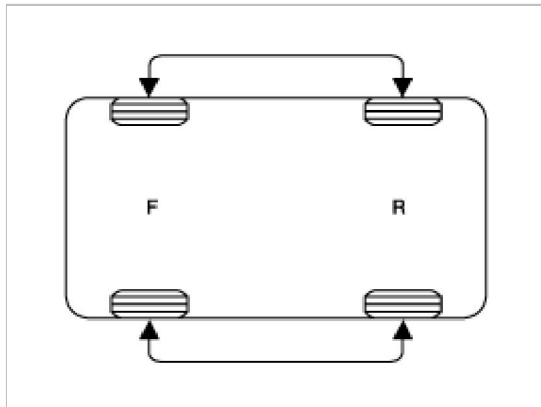
Checking For Pull And Wander

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

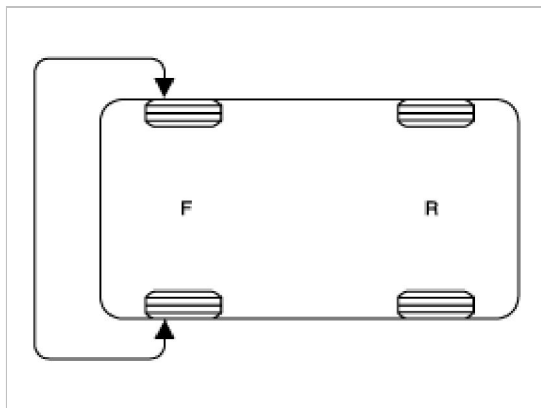
1. Rotate the front right and front left tires, and perform a road test in order to confirm vehicle stability.



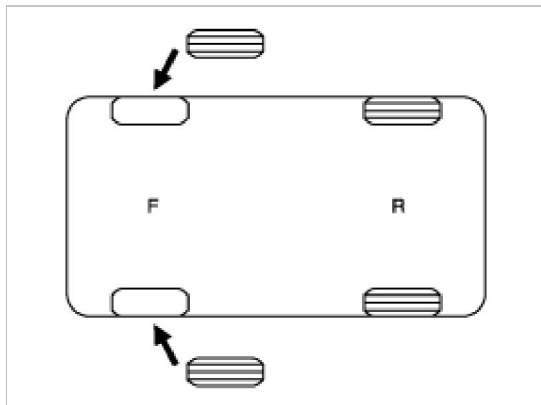
2. If the steering pulls to the opposite side, rotate the front and rear tires, and perform a road test again.



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



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



Suspension System > Tires/Wheels > Wheel > Repair procedures

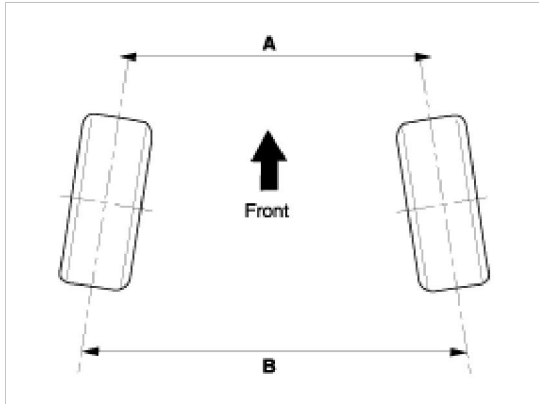
Wheel Alignment

When using commercially available computerized four wheel alignment equipment (caster, camber, toe) to inspect the front wheel alignment, always position the car on a level surface with the front wheels facing straight ahead.

Prior to inspection, make sure that the front suspension and steering system are in normal operating condition and that the wheels and tires face straight ahead and the tires are inflated to the specified pressure.

Toe

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



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

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

[Front]

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

Standard value :

Toe-in

Total : $0.1^{\circ} \pm 0.2^{\circ}$

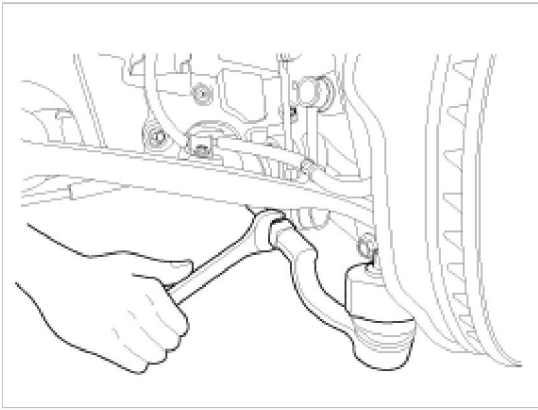
Individual : $0.05^{\circ} \pm 0.1^{\circ}$

NOTE

- Toe-in adjustment should be made by turning the right and left tie rods at the same amount.
- When adjusting toe-in, loosen the outer bellows clip to prevent twisting the bellows.
- After the adjustment, tighten the tie rod end lock nuts firmly and reinstall the bellows clip.
- Adjust each toe-in to be the range of $\pm 1^{\circ}$.

Tie rod (A) Specified torque :

50~55N.m (5~5.5kgf.m, 36.2~39.8lb-ft)



[Rear]

Standard value :

Toe-in

Total : $0.4^{\circ} \pm 0.2^{\circ}$

Individual : $0.2^{\circ} \pm 0.1^{\circ}$

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

Left cambolt : Clockwise → toe-out

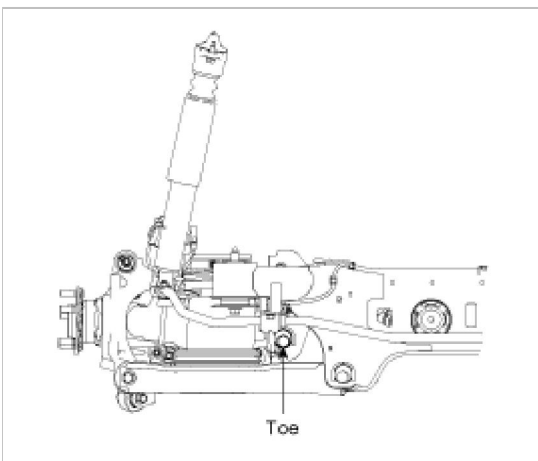
Right cambolt : Clockwise → toe-in

The variation of toe by a rotation of the cambolt :

About 0.4°

CAUTION

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



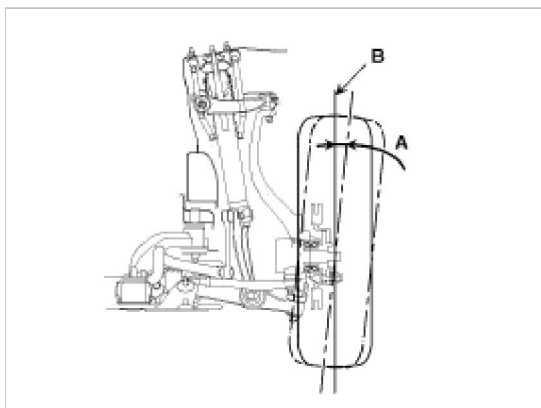
Tightening torque :

110 ~ 120N.m (11 ~ 12kgf • m, 79.5 ~ 86.8lb-ft)

Camber

[Front]

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



Item	Description
A	Positive camber angle
B	True vertical

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

Standard value : $-0.53^{\circ} \pm 0.5^{\circ}$

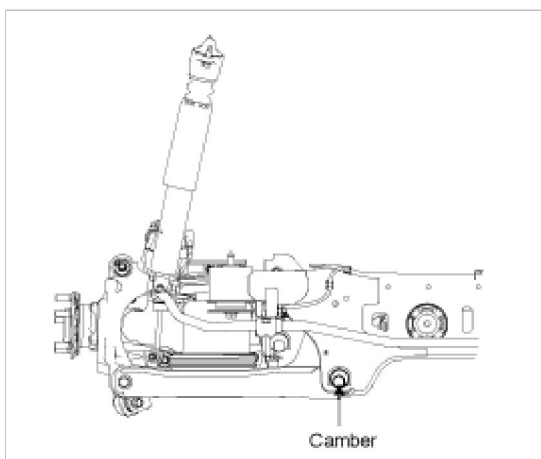
NOTE

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 : $-1.43^{\circ} \pm 0.5^{\circ}$

Difference between right and left angle is within 0.5°



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

Left cambolt : Clockwise → camber(-)

Right cambolt : Clockwise → camber(+)

The variation of camber by a rotation of the cambolt :

About 0.09°

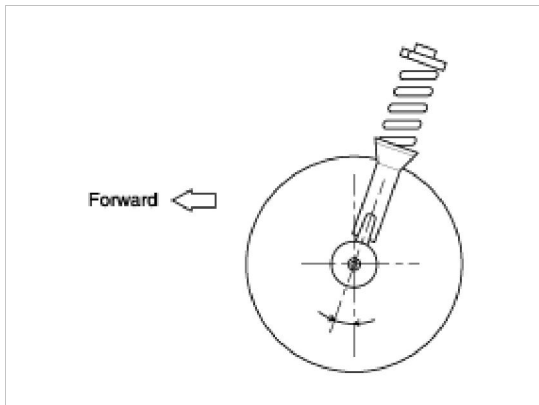
Caster

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 : $7.78^{\circ} \pm 0.75^{\circ}$



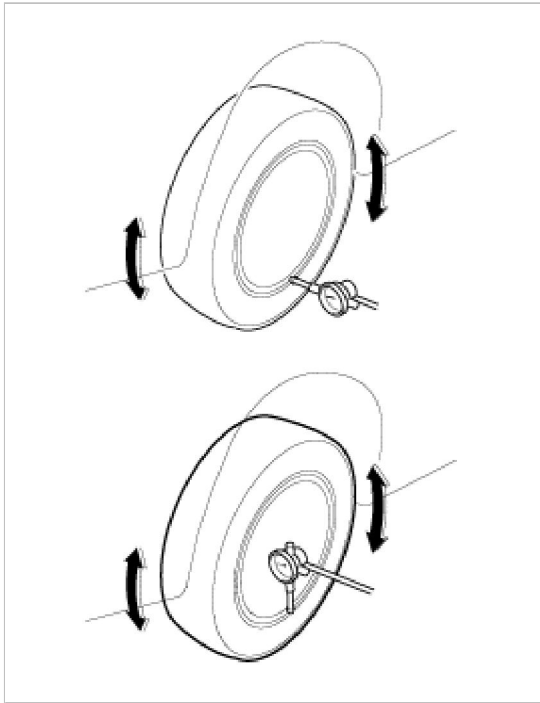
NOTE

- 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 $0^{\circ} \pm 0.5^{\circ}$.

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	Aluminium	0.3	0.3



Wheel Nut Tightening

1. Tightening torque.

Tightening torque :

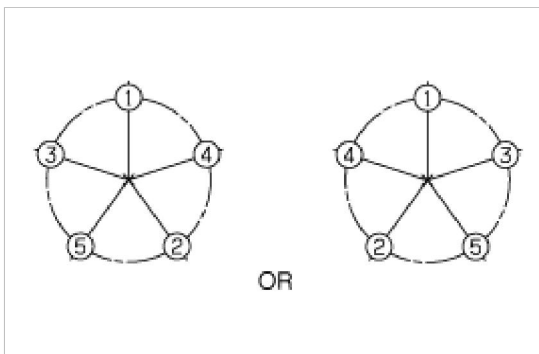
90 ~ 110N.m (9 ~ 11kgf.m, 65.1 ~ 79.5lb-ft)

CAUTION

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

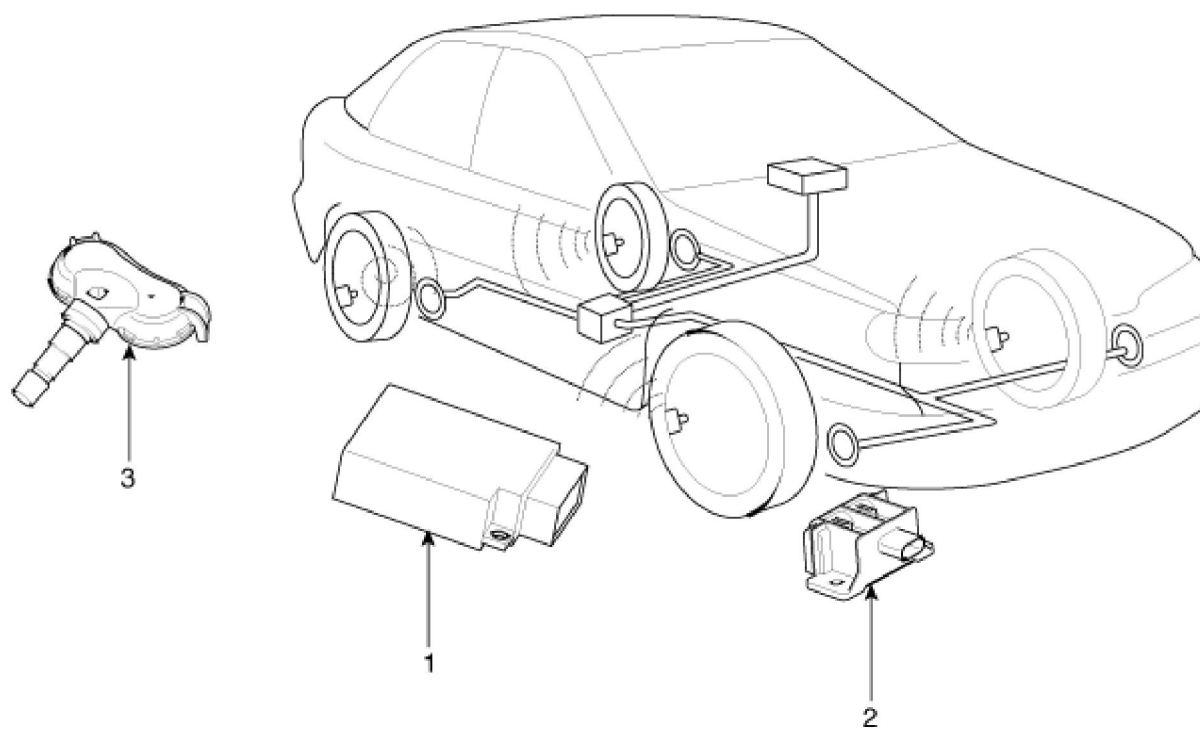
2. Tightening order.

Check the torque again after tightening the wheel nuts diagonally.



Suspension System > Tire Pressure Monitoring System > Components and Components Location

Components



1. Receiver
2. Initiator
3. TPMS sensor

Suspension System > Tire Pressure Monitoring System > Description and Operation

Description

Tread Lamp

- Tire Under Inflation / Leak Warning.



1. Turn on condition
 - A. When tire pressure is below allowed threshold
 - B. When rapid leak is detected by the sensor.
2. Turn off condition
 - A. Under-inflation ; When tire pressure is above (warning threshold + hysteresis).
 - B. Rapid Leak ; When tire pressure is above (leak warning threshold).

Wheel Location

1. Turn on condition
 - A. At the same time as TREAD Lamp.
 - B. Indicates wheel location where under inflation / leak has occurred.
2. Turn off condition
 - A. At the same time as TREAD Lamp.

NOTE

If wheel locations change in between Ignition cycles, then the system assumes the previous Auto-Located position. Once Auto-Location completes on the current Ignition cycle, the correct lamp will be lit.

DTC Warning

TPMS

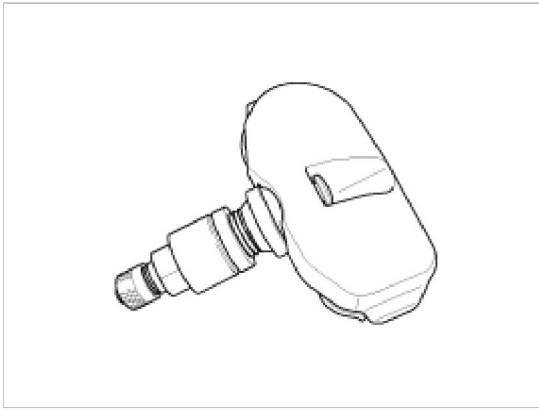
1. Turn on condition
 - A. When the system detects a fault that is external to the receiver / initiator / sensor.
 - B. When the system detects a receiver fault.
 - C. When the system detects an initiator fault.
 - D. When the system detects a sensor fault.
2. Turn off condition
 - A. If the fault is considered as 'critical', then the lamp is held on throughout the current Ignition cycle (even if the DTC has been demoted). This is because it is important to bring the problem to the drivers attention. On the following Ignition cycle, the demotion conditions will be re-checked. If the demotion conditions occur, the lamp will be turned off. It will be held on until DTC demotion checking is completed.
 - B. 'Non critical' faults are those that can occur temporarily e.g. vehicle battery under voltage. The lamp is therefore turned off when the DTC demotion condition occurs.

System Fault

1. General Function
 - A. The system monitors a number of inputs across time in order to determine that a fault exists.
 - B. Faults are prioritized according to which has the most likely cause.
 - C. Maximum fault store is equal to 15.
 - D. Certain faults are not covered through DTC. The main ones are:
 - 1) Receiver Micro-controller lock up ; requires observation of lamps at Ignition ON to diagnose.
 - 2) Ignition Line stuck ; requires observation of lamps at Ignition ON to diagnose.

Suspension System > Tire Pressure Monitoring System > TPMS Sensor > Description and Operation

Description



1. Mode

(1) Configuration State

- A. All sensors should be in the High Line (Auto) state.
- B. In High Line (Auto) configuration, sensor transmissions occur every 1 minute (nominal) and pressure is measured every 4 seconds.

(2) Normal Delayed Auto State

- A. This is High Line specific and is used for all HMC/KMC High Line applications.
- B. In this state, the sensor will transmit for approx. 12 minutes before automatically entering storage state.

(3) Storage Auto State

- A. This state is a Low quiescent current state.
- B. In this state;
 - 1) Ignition off.
 - 2) The sensor does not measure pressure / temperature / battery level.
 - 3) The sensor will not transmit, unless requested to do so by the initiate command.

(4) Alert State

- A. The sensor automatically enters this state if the measured temperature exceeds 110° C and over temperature shutdown is likely.
- B. In this state, pressure is measured every 4 seconds and RF data transmitted every 4 seconds.
- C. The state lasts for 1 minute if it is pressure triggered.

Suspension System > Tire Pressure Monitoring System > TPMS Sensor > Repair procedures

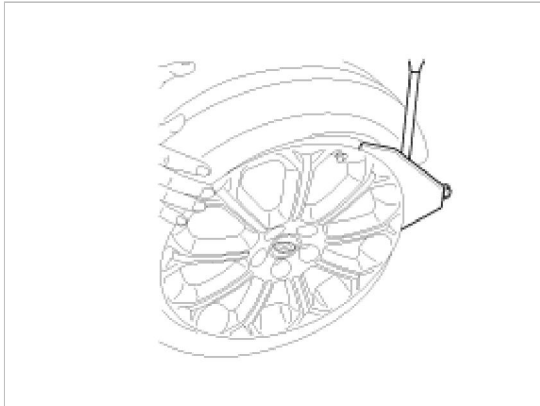
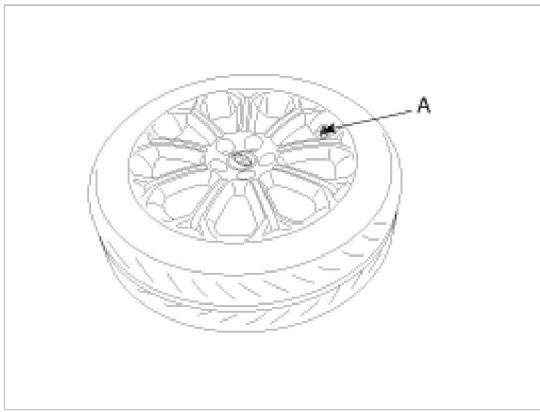
Removal

Tire Removal

1. Deflate tire & remove balance weights.

CAUTION

- The tire bead should be broken approx. 90° from the valve side of the wheel. The bead breaker should not be set too deep.
- Avoid tire/tool contact with the valve on dismount.
- Dismount should end near the valve.

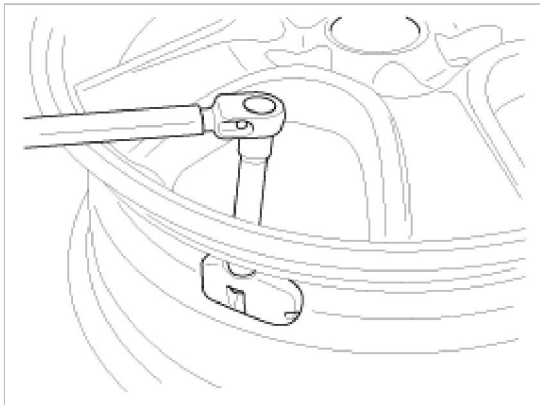


Sensor Removal

CAUTION

Handle the sensor with care.

1. Remove the valve nut.



CAUTION

The valve nut should not be re-used.

2. Discard the valve assembly.

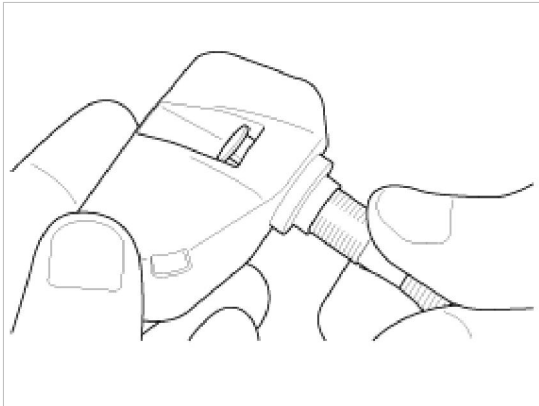
Installation

Sensor Fit

CAUTION

- Handle the sensor with care.
- Avoid lubricant contact if possible.

1. Assemble valve to sensor and turn valve 3 times with the square part of the screw in the slot.



CAUTION

- The fit should not be tight i.e. it should still be possible to easily adjust valve angle.
- Ensure that the wheel to be fitted is designed for sensor mount. There should normally be a mark to indicate this.
- Ensure that the valve hole and mating face of the wheel are clean.

2. Mount assembly to wheel.

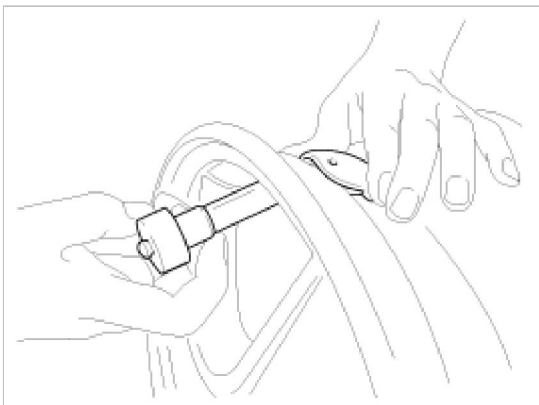
CAUTION

Ensure sensor feet are against the wheel throughout the remainder of the assembly process.

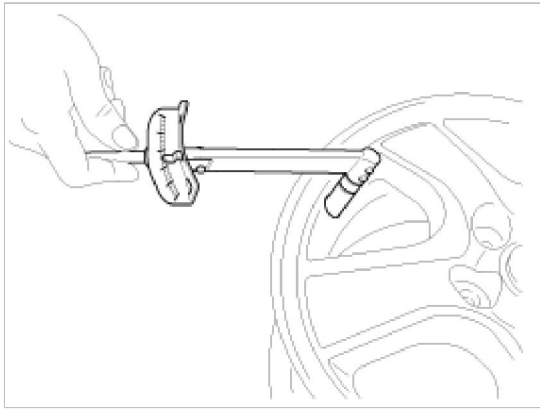
3. Tighten washer and nut by hand until the valve thread meets the nut built-in calibrated stop.

CAUTION

Ensure that the grommet remains in contact with the wheel.



4. Using a torque wrench, tighten the nut to 2.95 ± 0.37 lb-ft (4.0 ± 0.5 Nm) It is normal to feel a break as the 1.7 lb-ft (2.3Nm) calibrated stop in the nut snaps and the torque falls.



CAUTION

- Increase torque smoothly in order to achieve a clean break of the stop.
- Do not exceed allowed torque.
- Do not use electric or pneumatic tools.

Tire Fit

CAUTION

Only use wheels designed to accommodate the TPMS sensor.

1. Lubricate the tire bead not the rim. Excessive lubrication should not be applied.
2. Start tire mounting approx. 5.9 in(15 cm) from valve.
3. Move the mounting tool away from the valve.

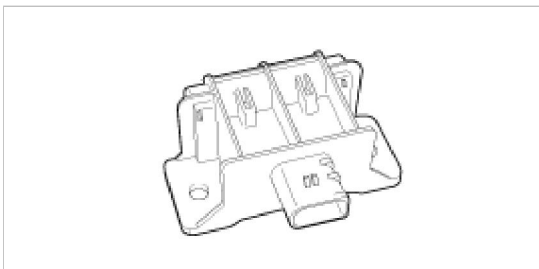
CAUTION

Avoid tire / tool contact with the valve.

4. Finish with mounting tool near to valve.
5. Carry out inflation / pressure correction and then fit valve cap.

Suspension System > Tire Pressure Monitoring System > TPMS Initiator > Description and Operation

Description



Initiators are used to radiate magnetic energy to the wheel sensors. The wheel initiators are used to communicate with the TPM wheel sensors. The wheel initiators receive a low energy control signal from the receiver. This signal is amplified and radiated as magnetic energy to initiate RF response from a wheel sensor.

1. Overview

- A. Only High Line systems are fitted with an LFI.
- B. The LFI is located in the wheel well of each tire, to enable the receiver to determine the vehicle position of each TPMS sensor for which it has a stored TPMS sensor ID code.

- C. When first turned on, the receiver activates the LFI's to wake up the TPMS sensors and get wheel status.
- D. The LFI's are activated every 9 minutes to keep the TPMS sensors awake while the key is on.

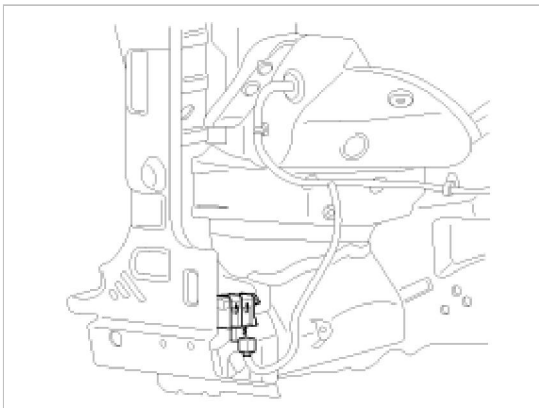
2. Operating mode

- A. When triggered by the receiver the LFI broadcasts a 125 KHz signal through the tire to the TPMS sensors to wake them up.
- B. After broadcasting the LFI returns to sleep mode until triggered again by the receiver.
- C. Once the TPMS sensor has received the 125 KHz wake up signal, it broadcasts its ID and status. This information plus which LFI triggered it allows the receiver to record which tire has which sensor.

Suspension System > Tire Pressure Monitoring System > TPMS Initiator > Repair procedures

Replacement

- 1. Disconnect vehicle battery.
- 2. Remove the malfunctioning part and fit new part.



- 3. Secure new part to vehicle and fit connector.
- 4. Re-connect the battery and turn ignition on.

Suspension System > Tire Pressure Monitoring System > TPMS Receiver > Description and Operation

Description

1. Mode

(1) Virgin State

- A. The receiver as a sole part is shipped in this state. Replacement parts should therefore arrive in this state.
- B. In this state, there is no Auto-Location, no sensor wake-up, no sensor monitoring and no DTC monitoring..
- C. The state indicates that platform specific parameters must be written to the receiver and that sensors are un-learned.

(2) Normal State

- A. In order for tire inflation state and DTC monitoring to occur, the receiver must be in this state.
- B. In this state, automatic sensor location / learning is enabled.

2. Overview

- A. Sends LF command data to initiators.
- B. Controls sensor state:
 - Ignition on - Normal Delayed
 - Ignition off - Storage.

- C. Auto-Locates sensors.
- D. Auto-Learns new sensors.
- E. Receives RF data from sensor.
- F. Uses sensor data to decide whether to turn on TREAD Lamp / wheel location LED's.
- G. Uses sensor information, distance traveled, background noise levels, Auto-learn status, short circuit output status, vehicle battery level, internal receiver states to determine if there is a system or a vehicle fault.

Operation

1. General Function
 - A. Auto-locate/learn takes place only once per Ignition cycle.
 - B. On successful completion, 4 road wheel sensor ID's, together with their respective road wheel positions are latched into memory for monitoring.
 - C. Until Auto-learn completes, previously learned sensors (together with their respective locations) are monitored for under inflation / leak warnings.
 - D. Spare tire inflation / DTC state is not displayed.
2. General Conditions to Learn New Sensors:
 - A. Receiver must Auto-Locate 4 road sensors.
 - B. Auto-location / learning only functions when speed is more than 20 kph (approx. 15 mph).
 - C. Receiver must determine that it is confident that sensor is not temporary:
 - 1) Uses vehicle speed.
 - 2) Uses confidence reduction of previously learned sensors.
 - D. Typical time at driving over 20 kph to learn a new sensor is up to 10 minutes.
3. General Conditions to Un-Learn a sensor that is removed:
 - A. It takes less than 10 minutes at 20~30kph.
 - B. Confidence reduction is dependant on vehicle speed and the number of sensors known to the receiver.

Suspension System > Tire Pressure Monitoring System > TPMS Receiver > Repair procedures

Replacement

NOTE

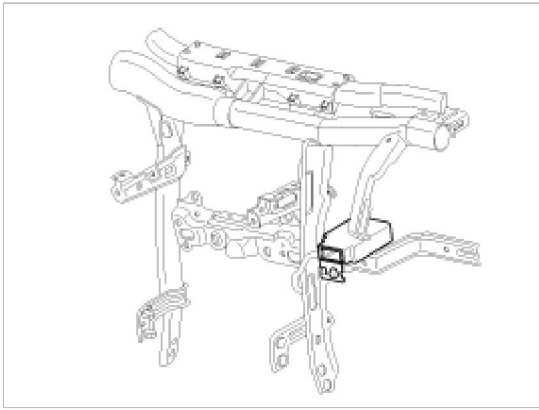
When the receiver first arrives for replacement:

- 1) It will be in Virgin State.
- 2) It will not be configured for any specific platform.
- 3) It will not have any sensor ID's memorized.

CAUTION

It is important to make sure that the correct receiver is used to replace the faulty part i.e. it must be High Line (95800-3M100) in order to have the correct inflation warning thresholds set.

1. Disconnect vehicle battery.
2. Remove faulty part and fit bracket assembly to new part.



3. Secure new part to vehicle and fit connector.
4. Re-connect battery and turn Ignition on.