

SPORTAGE(SL) > 2013 > G 2.4 DOHC > Suspension System**Suspension System > General Information > Specifications**

Specifications

Front Suspension

Item		Specification
Suspension type		Macpherson Strut
Shock absorber	Type	Gas
		H.P.D (High Performance Damper)
Coil spring	Free Height [I.D. color]	318.1 mm (Green - Green)
		312.8 mm (Yellow - Yellow)

Rear Suspension

Item		Specification
Suspension type		Multi link
Shock absorber	Type	Gas
		H.P.D (High Performance Damper)
Coil spring	Free Height [I.D. color]	330.1 mm (Pink - Yellow)
		317.4 mm (Pink - Orange)

Wheel & Tire

Item		Specification
Wheel	Aluminum	6.5J * 16
		6.5J * 17
		7.0J * 18
Tire		215/70 R16
		225/60 R17
		235/55 R18
Tire pressure	215/70 R16	2.3+0.07kg/cm ² (33+1.0psi)
	225/60 R17	
	235/55 R18	
	T155/90 D16	4.2+0.07kg/cm ² (60+1.0psi)

Wheel Alignment

Item		Specification	
		Front	Rear
Toe-in	Individual	$0^{\circ} \pm 0.1^{\circ}$	$0.1^{\circ} \pm 0.1^{\circ}$
	Total	$0^{\circ} \pm 0.2^{\circ}$	$0.2^{\circ} \pm 0.2^{\circ}$
Camber angle		$-0.5^{\circ} \pm 0.5^{\circ}$	$-1.0^{\circ} \pm 0.5^{\circ}$
Caster angle		$4.02^{\circ} \pm 0.5^{\circ}$	-
King-pin angle		$12.91^{\circ} \pm 0.5^{\circ}$	-

Tightening torque

Front Suspension

Item	Tightening torque (kgf.m)		
	Nm	kgf.m	lb-ft
Wheel nut	88.3 ~ 107.9	9.0 ~ 11.0	65.1 ~ 79.6
Strut assembly to knuckle	137.3 ~ 156.9	14.0 ~ 16.0	101.3 ~ 115.7
Strut assembly lock nut	44.1 ~ 58.8	4.5 ~ 6.0	32.5 ~ 43.4
Stabilizer link to strut assembly	98.1 ~ 117.7	10.0 ~ 12.0	72.3 ~ 86.8
Lower arm to sub frame (Front)	117.7 ~ 137.3	12.0 ~ 14.0	86.8 ~ 101.3
Lower arm to sub frame (Rear)	137.3 ~ 156.9	14.0 ~ 16.0	101.3 ~ 115.7
Lower arm to knuckle	98.1 ~ 117.7	10.0 ~ 12.0	72.3 ~ 86.8
Stabilizer bar to stabilizer link	98.1 ~ 117.7	10.0 ~ 12.0	72.3 ~ 86.8
Stabilizer bracket mounting bolts	44.1 ~ 53.9	4.5 ~ 5.5	32.5 ~ 39.8
Sub frame mounting bolts	176.5 ~ 196.1	18.0 ~ 20.0	130.2 ~ 144.7
Sub frame bracket mounting bolts	44.1 ~ 58.8	4.5 ~ 6.0	32.5 ~ 43.4
Tie rod end castle nut	34.3 ~ 44.1	3.5 ~ 4.5	25.3 ~ 32.5
Universal joint to pinion of steering gear	29.4 ~ 34.3	3.0 ~ 3.5	21.7 ~ 25.3
Roll rod mounting bolt & nut	107.9 ~ 127.5	11.0 ~ 13.0	79.6 ~ 94.0

Rear Suspension

Item		Tightening torque (kgf.m)		
		Nm	kgf.m	lb-ft
Hub nuts		88.3 ~ 107.9	9.0 ~ 11.0	65.1 ~ 79.6
Trailing arm to body		98.1 ~ 117.7	10.0 ~ 12.0	72.3 ~ 86.8
Trailing arm to knuckle		34.3 ~ 53.9	3.5 ~ 5.5	25.3 ~ 39.8
Assist arm to sub frame		107.9 ~ 117.7	11.0 ~ 12.0	79.6 ~ 86.8
Assist arm to knuckle	2WD	44.1 ~ 53.9	4.5 ~ 5.5	32.5 ~ 39.8
	4WD	137.3 ~ 156.9	14.0 ~ 16.0	101.3 ~ 115.7
Lower arm to sub frame		337.3 ~ 156.9	14.0 ~ 16.0	101.3 ~ 115.7
Lower arm to knuckle		137.3 ~ 156.9	14.0 ~ 16.0	101.3 ~ 115.7
Upper arm to sub frame	2WD	137.3 ~ 156.9	14.0 ~ 16.0	101.3 ~ 115.7
	4WD	98.1 ~ 117.7	10.0 ~ 12.0	72.3 ~ 86.8
Upper arm to knuckle	2WD	137.3 ~ 156.9	14.0 ~ 16.0	101.3 ~ 115.7
	4WD	98.1 ~ 117.7	10.0 ~ 12.0	72.3 ~ 86.8
Shock absorber to frame		49.0 ~ 63.7	5.0 ~ 6.5	36.2 ~ 47.0
Shock absorber to knuckle		137.3 ~ 156.9	14.0 ~ 16.0	101.3 ~ 115.7
Stabilizer bar to stabilizer link		98.1 ~ 117.7	10.0 ~ 12.0	72.3 ~ 86.8
Stabilizer bar to sub frame		44.1 ~ 53.9	4.5 ~ 5.5	32.5 ~ 39.8
Sub frame mounting bolt & nut		156.9 ~ 176.5	16.0 ~ 18.0	115.7 ~ 130.2

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

Suspension System > General Information > Troubleshooting

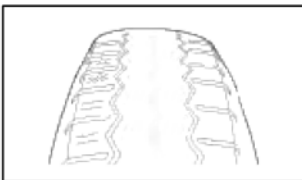
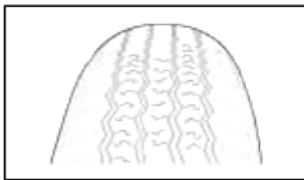
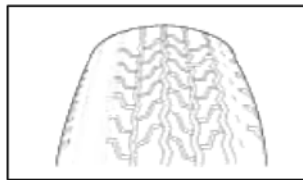
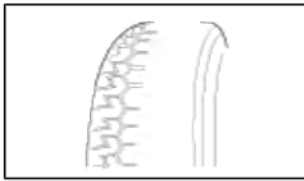
Troubleshooting

Symptom	Possible cause	Remedy
Hard steering	Improper front wheel alignment Excessive turning resistance of lower arm ball joint Low tire pressure No power assist	Correct Replace Adjust Repair and replace
Poor return of steering wheel to center	Improper front wheel alignment	Correct
Poor or rough ride	Improper front wheel alignment Malfunctioning shock absorber Broken or worn stabilizer Broken or worn coil spring Worn lower arm bushing	Correct Repair or replace Replace Replace Replace the lower arm assembly
Abnormal tire wear	Improper front wheel alignment Improper tire pressure Malfunctioning shock absorber	Correct Adjust Replace
Wandering	Improper front wheel alignment Poor turning resistance of lower arm ball joint Loose or worn lower arm bushing	Correct Repair Retighten or replace
Vehicle pulls to one side	Improper front wheel alignment Excessive turning resistance of lower arm ball joint Broken or worn coil spring Bent lower arm	Correct Replace Replace Repair
Steering wheel shimmy	Improper front wheel alignment Poor turning resistance of lower arm ball joint Broken or worn stabilizer Worn lower arm bushing Malfunctioning shock absorber Broken or worn coil spring	Correct Replace Replace Replace Replace Replace

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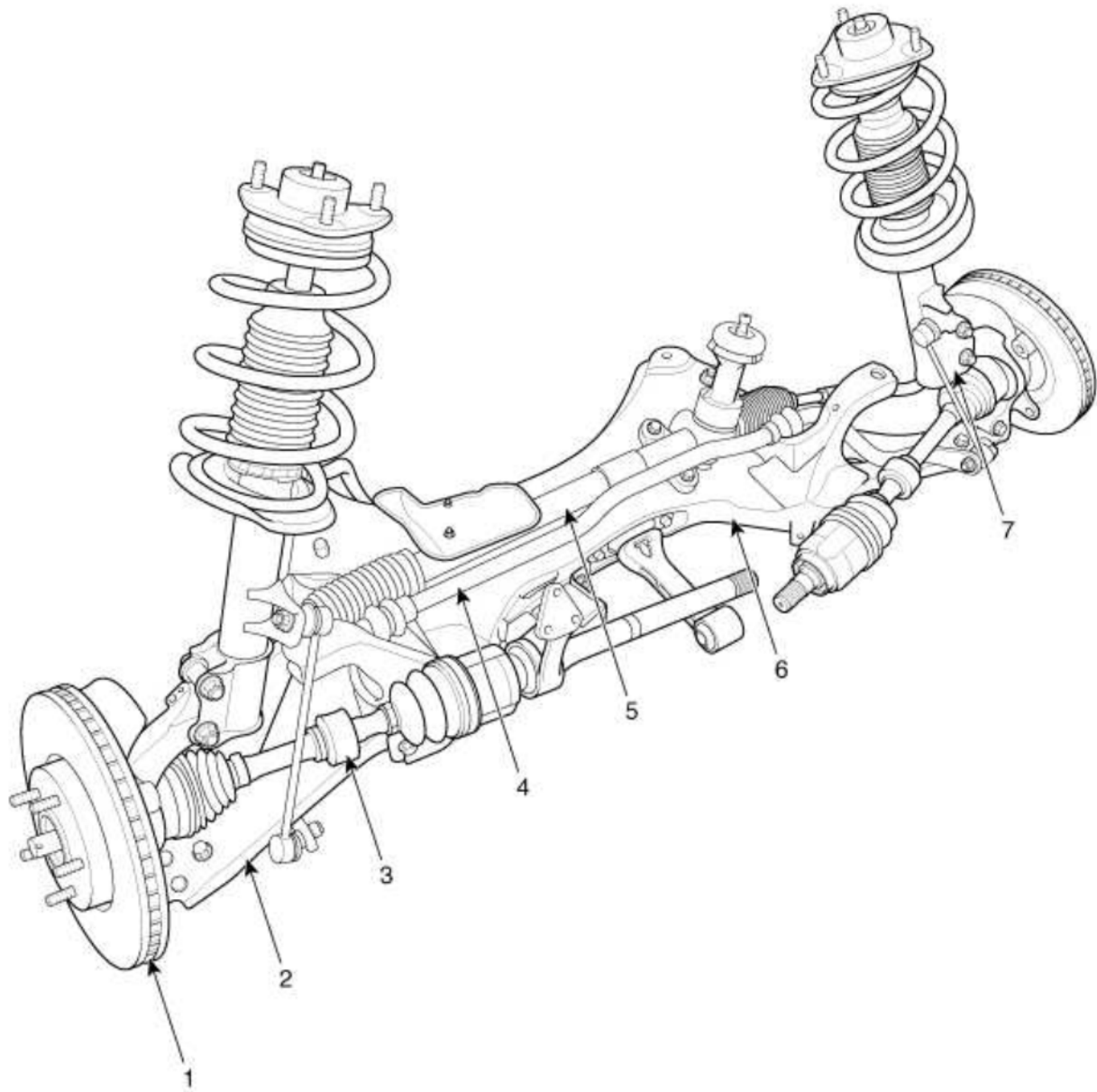
Wheel /tire noise, vibration and harshness concerns are directly related to vehicle speed and are not generally affected by acceleration, coasting or decelerating. Also, out-of-balance wheel and tires can vibrate at more than one speed. A vibration that is affected by the engine rpm, or is eliminated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

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

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

Suspension System > Front Suspension System > Components and Components Location

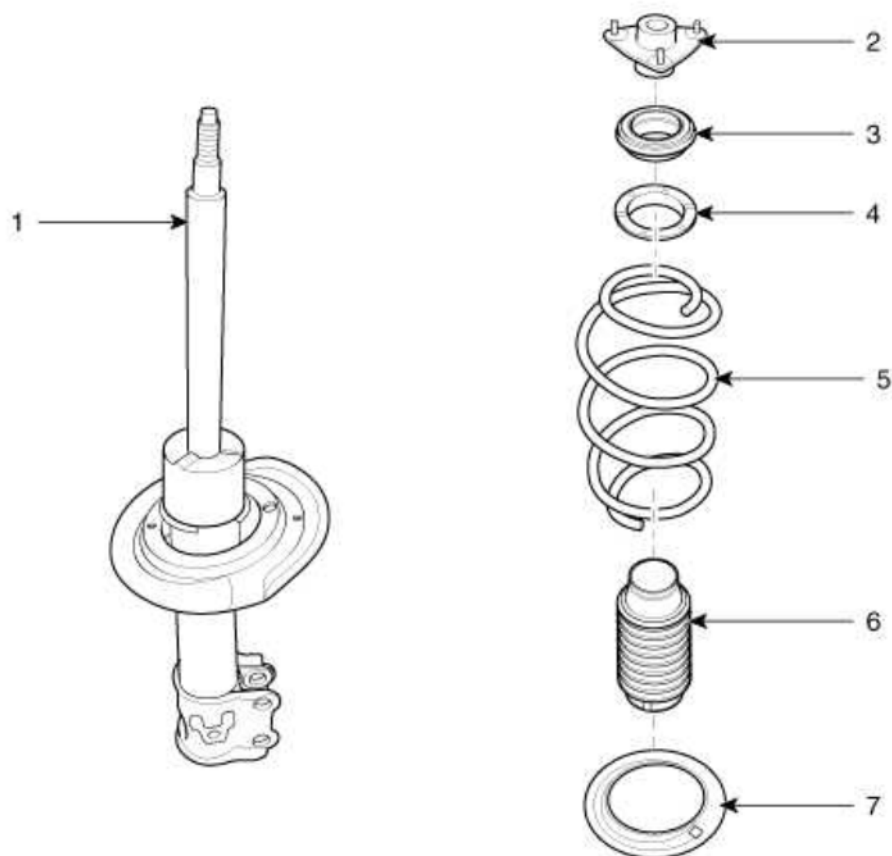
Components Location



1. Front axle	5. Steering gearbox
2. Front lower arm	6. Sub frame
3. Drive shaft	7. Front strut assembly
4. Stabilizer bar	

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

Components



1. Strut assembly	5. Spring
2. Insulator	6. Dust cover
3. Bearing	7. Spring lower pad
4. Spring upper pad	

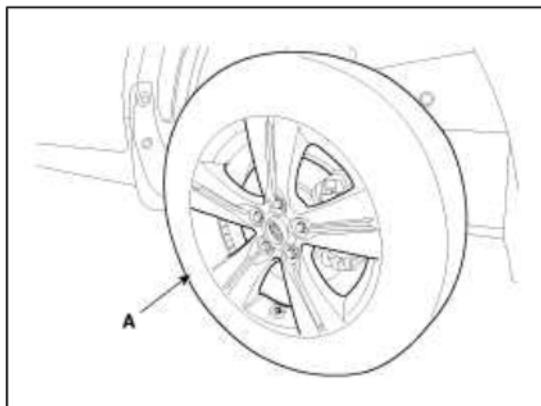
Suspension System > Front Suspension System > Front Strut Assembly > Repair procedures

Replacement

1. Remove the front wheel & tire.

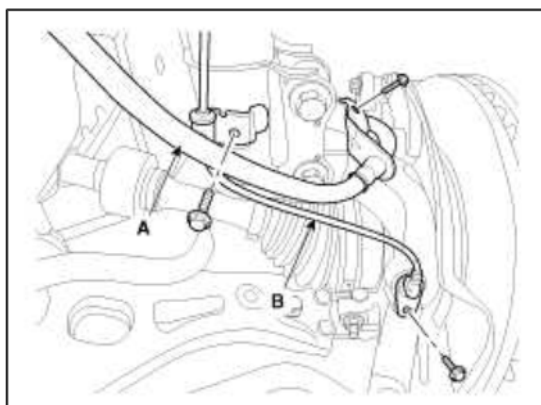
Tightening torque :

88.3 ~ 107.9N.m (9.0 ~ 11.0kgf.m, 65.1 ~ 79.6lb-ft)


CAUTION

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

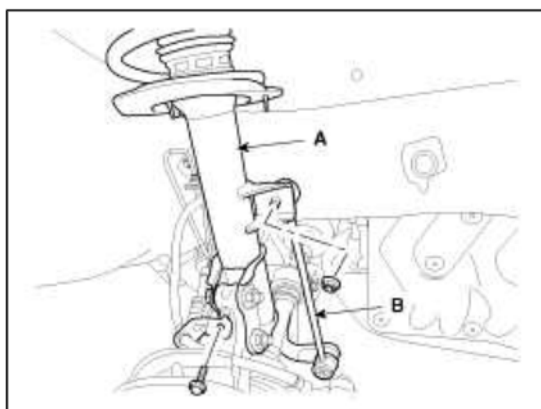
2. Remove the brake hose (A) & wheel speed sensor bracket (B) from the front strut assembly by loosening mounting bolts.



3. Disconnect the stabilizer link (B) from the front strut assembly (A) after loosening the nut.

Tightening torque :

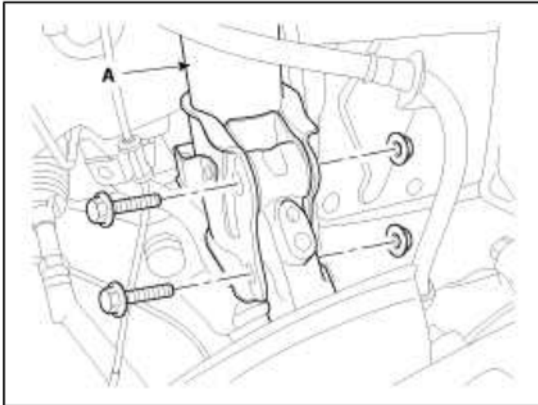
98.1 ~ 117.7N.m (10.0 ~ 12.0kgf.m, 72.3 ~ 86.8lb-ft)



4. Disconnect the front strut assembly (A) with the knuckle by loosening the bolt & nut.

Tightening torque :

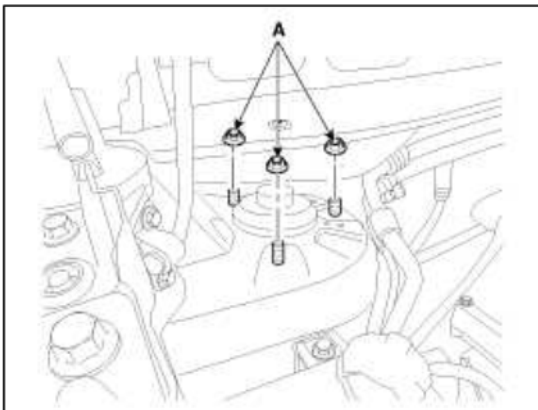
137.3 ~ 156.9N.m (14.0 ~ 16.0kgf.m, 101.3 ~ 115.7lb-ft)



5. Remove the front strut assembly and then loosen the strut mounting nuts (A).

Tightening torque :

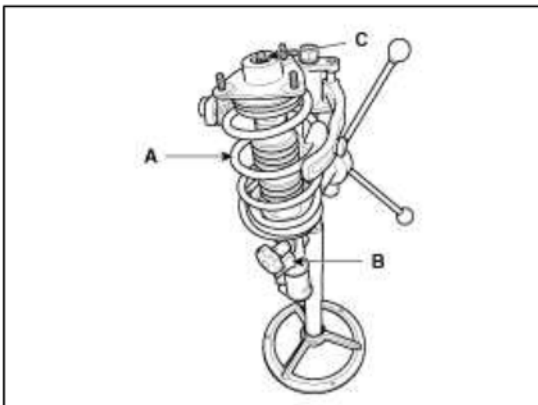
44.1 ~ 58.8N.m (4.5 ~ 6.0kgf.m, 32.5 ~ 43.4lb-ft)



6. Installation is the reverse of removal.

Disassembly

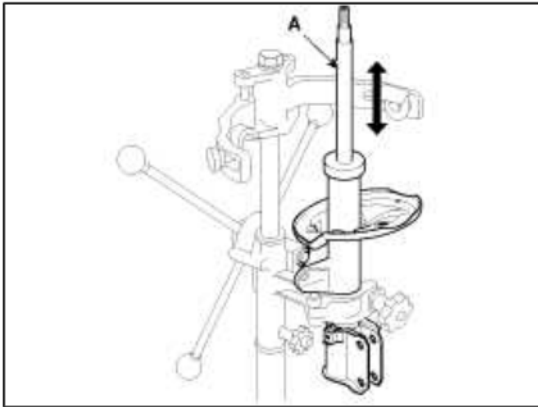
1. Using the special tool (09546-26000), compress the coil spring (A).



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

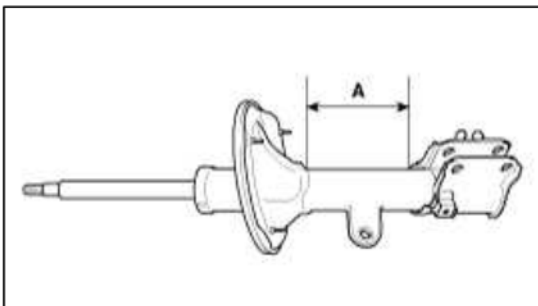
Inspection

1. Check the strut bearing for wear and damage.
2. Check the spring upper and lower seat for damage and deterioration.
3. Compress and extend the piston rod (A) and check that there is no abnormal resistance or unusual sound during operation.



Disposal

1. Fully extend the piston rod.
2. Drill a hole on the A section to remove 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.

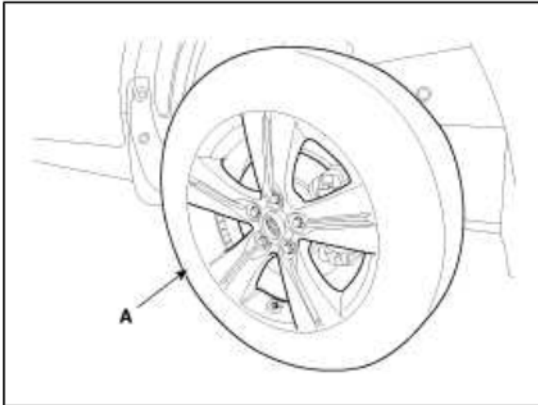
Suspension System > Front Suspension System > Front Lower Arm > Repair procedures

Replacement

1. Remove the front wheel & tire.

Tightening torque :

88.3 ~ 107.9N.m (9.0 ~ 11.0kgf.m, 65.1 ~ 79.6lb-ft)

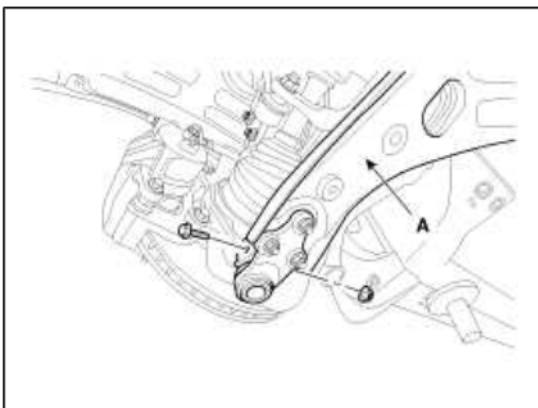
**CAUTION**

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

2. Loosen the bolt & nut and then remove the lower arm (A).

Tightening torque :

98.1 ~ 117.7N.m (10.0 ~ 12.0kgf.m, 72.3 ~ 86.8lb-ft)



3. Remove the front lower arm (A) and then loosen the bolts & nuts.

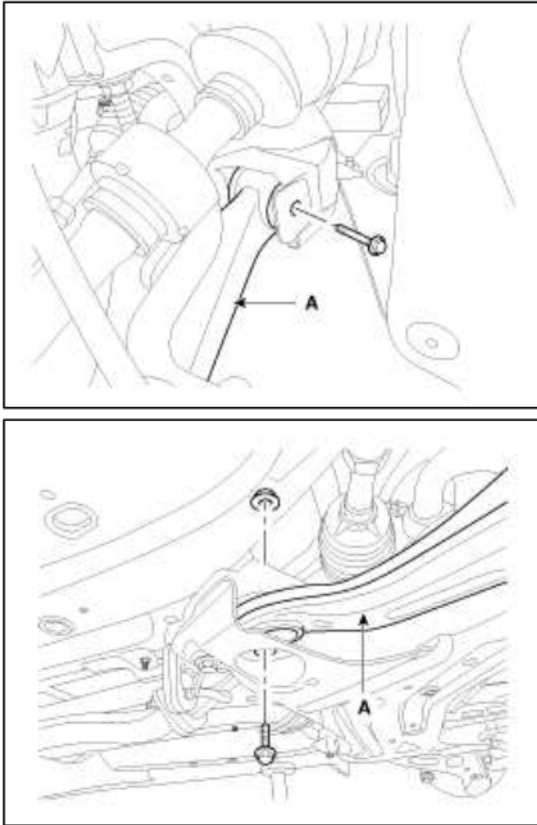
Tightening torque :

Front

117.7 ~ 137.3N.m (12.0 ~ 14.0kgf.m, 86.8 ~ 101.3lb-ft)

Rear

137.3 ~ 156.9N.m (14.0 ~ 16.0kgf.m, 101.3 ~ 115.7lb-ft)



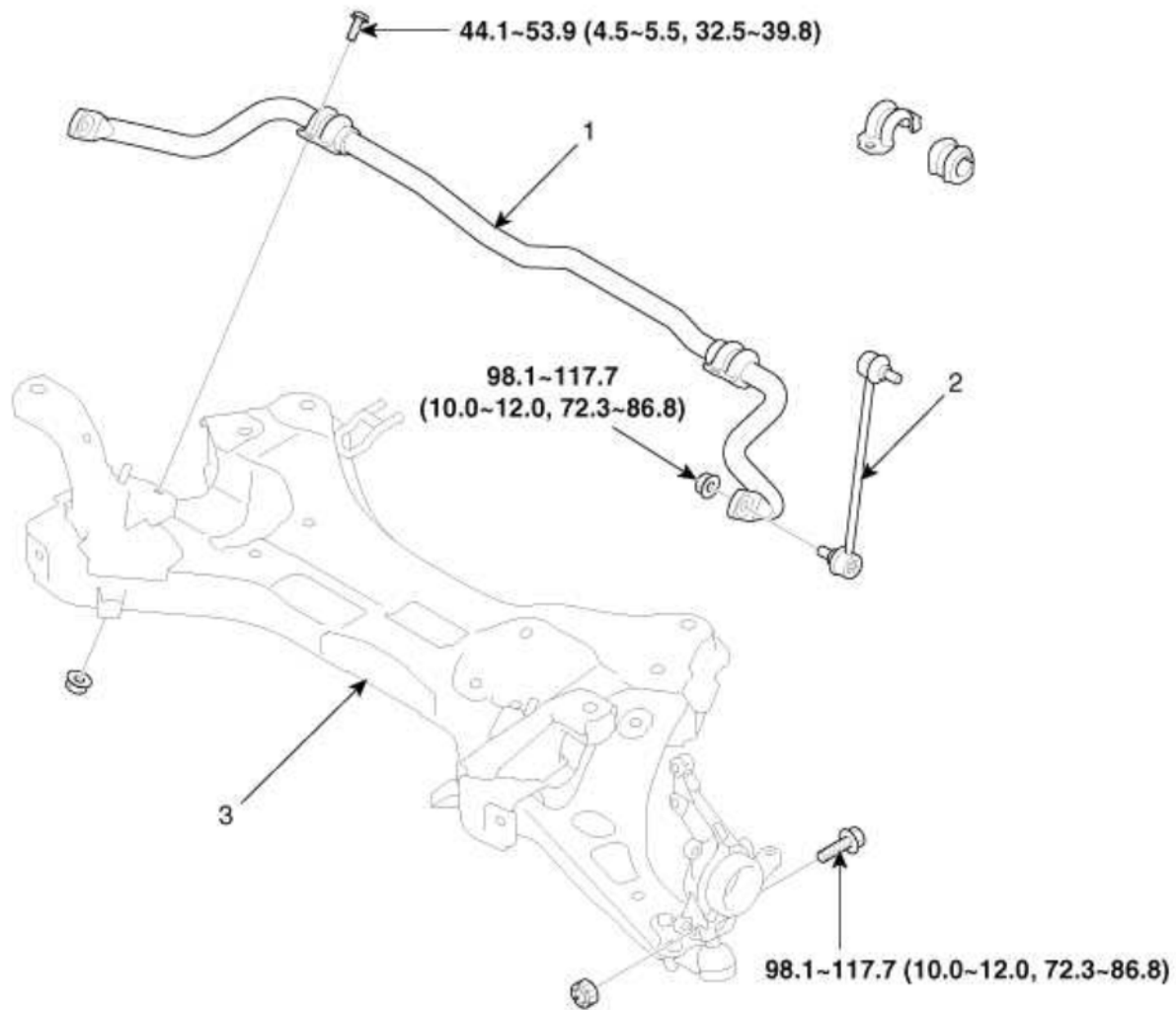
4. Installation is the reverse of removal.

Inspection

1. Check the bushing for wear and deterioration.
2. Check the lower arm for bending or breakage.
3. Check the lower arm for deformation.
4. Check the all bolts and nuts.

Suspension System > Front Suspension System > Front Stabilizer Bar > Components and Components Location

Components



Torque : N.m (kgf.m, lb-ft)

1. Stabilizer bar	3. Sub frame
2. Stabilizer link	

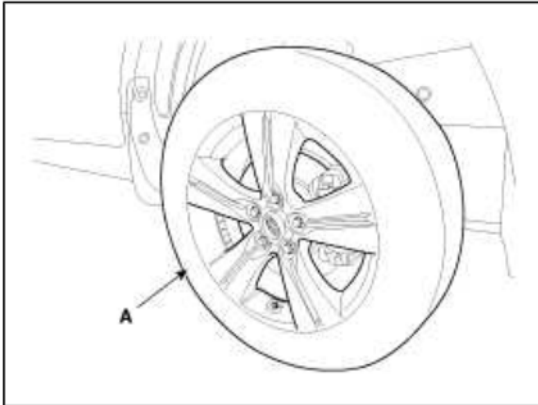
Suspension System > Front Suspension System > Front Stabilizer Bar > Repair procedures

Replacement

1. Remove the front wheel & tire.

Tightening torque :

88.3 ~ 107.9N.m (9.0 ~ 11.0kgf.m, 65.1 ~ 79.6lb-ft)

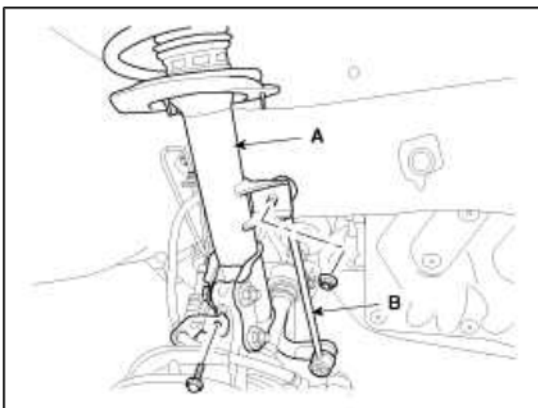

CAUTION

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

2. Disconnect the stabilizer link (B) from the front strut assembly (A) after loosening the nut.

Tightening torque :

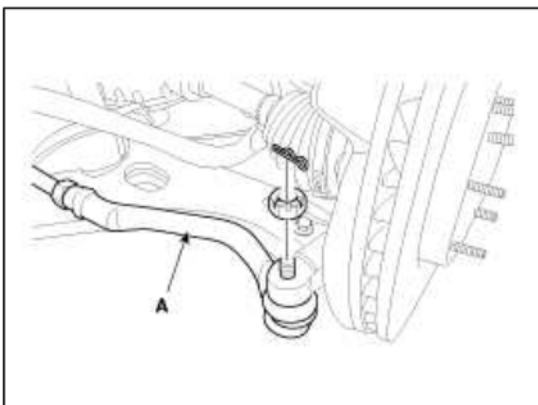
98.1 ~ 117.7N.m (10.0 ~ 12.0kgf.m, 72.3 ~ 86.8lb-ft)



3. Remove the split pin and castle nut and then disconnect the tie-rod end (A) from the front knuckle.

Tightening torque :

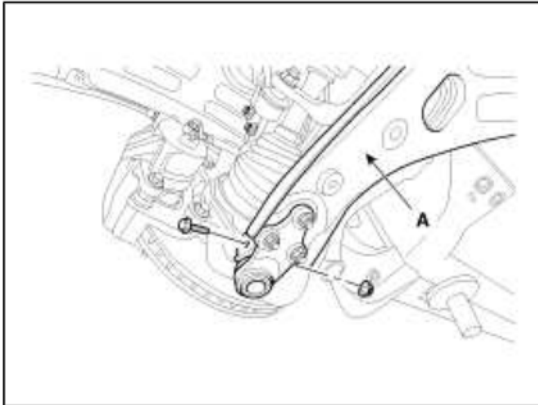
34.3 ~ 44.1N.m (3.5 ~ 4.5kgf.m, 25.3 ~ 32.5lb-ft)



4. Loosen the bolt & nut and then remove the lower arm (A).

Tightening torque :

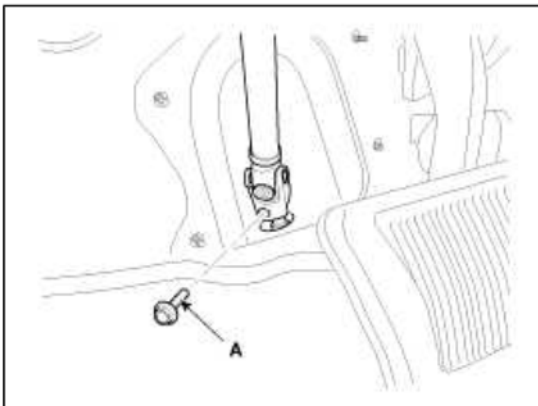
98.1 ~ 117.7N.m (10.0 ~ 12.0kgf.m, 72.3 ~ 86.8lb-ft)



5. Remove the dust cover.
 6. Loosen the bolt (A) and then disconnect the universal joint assembly from the pinion of the steering gear box.

Tightening torque :

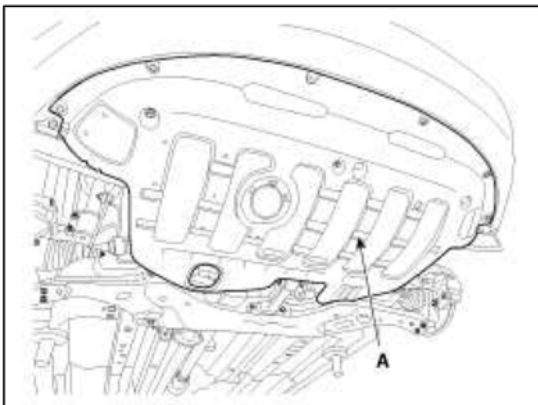
29.4 ~ 34.3N.m (3.0 ~ 3.5kgf.m, 21.7 ~ 25.3lb-ft)



CAUTION

- Keep the neutral-range to prevent the damage of the clock spring inner cable when you handle the steering wheel.
- Do not use the bolt again.

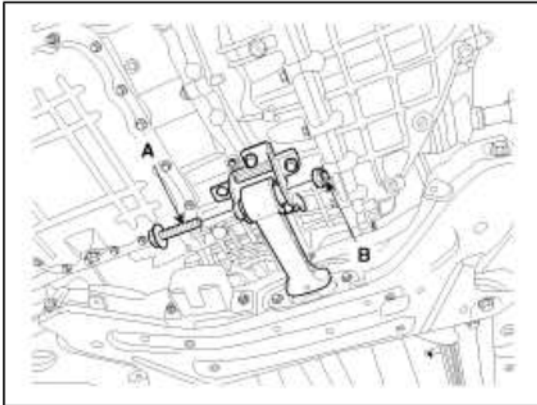
7. Remove the under cover (A).



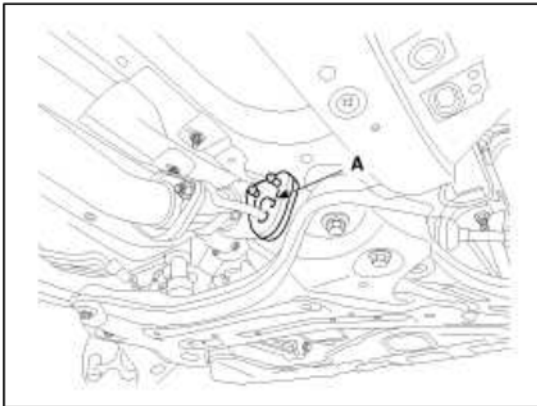
8. Loosen the bolt (A) & nut (B) and then remove the roll rod stopper.

Tightening torque :

107.9 ~ 127.5N.m (11.0 ~ 13.0kgf.m, 79.6 ~ 94.0lb-ft)



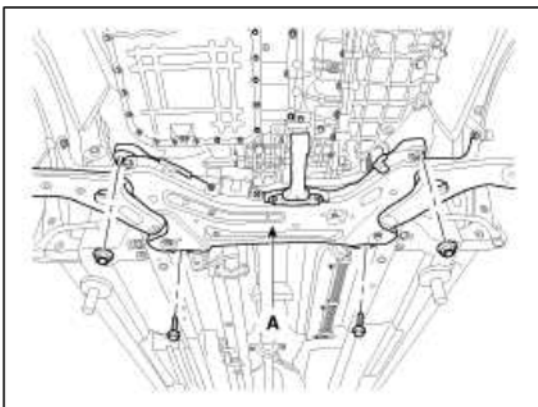
9. Disconnect the muffler rubber hanger (A).



10. Loosen the bolts & nuts and then remove the sub frame.

Tightening torque :

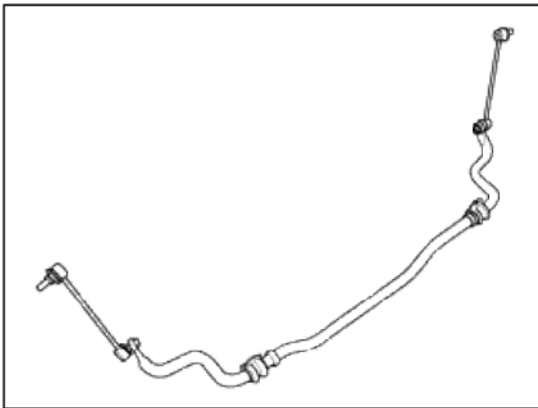
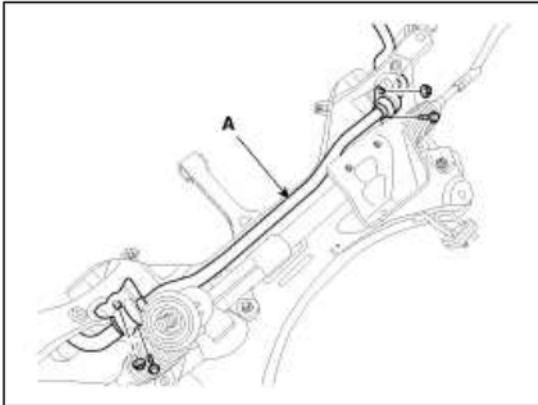
176.5 ~ 196.1N.m (18.0 ~ 20.0kgf.m, 130.2 ~ 144.7lb-ft)



11. Loosen the bolt and then remove the stabilizer (A) from the sub frame.

Tightening torque :

44.1 ~ 53.9N.m (4.5 ~ 5.5kgf.m, 32.5 ~ 39.8lb-ft)



12. Installation is the reverse of removal.

Inspection

1. Check the bushing for wear and deterioration.
2. Check the front stabilizer bar for deformation.
3. Check the front stabilizer link ball joint for damage.

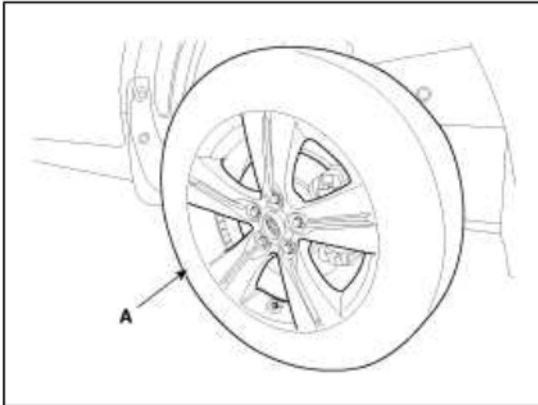
Suspension System > Front Suspension System > Front Cross Member > Repair procedures

Replacement

1. Remove the front wheel & tire.

Tightening torque :

88.3 ~ 107.9N.m (9.0 ~ 11.0kgf.m, 65.1 ~ 79.6lb-ft)

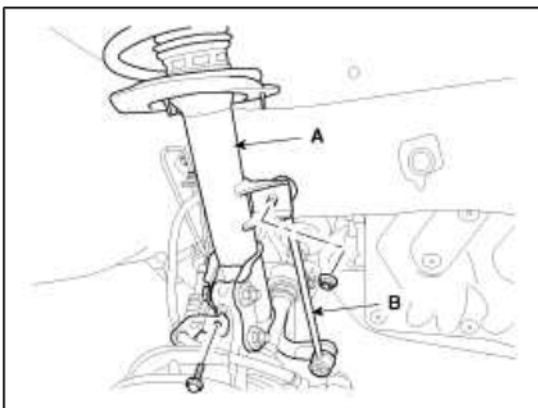

CAUTION

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

2. Disconnect the stabilizer link (B) from the front strut assembly (A) after loosening the nut.

Tightening torque :

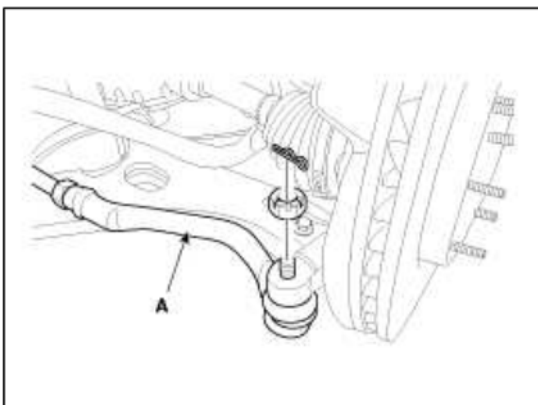
98.1 ~ 117.7N.m (10.0 ~ 12.0kgf.m, 72.3 ~ 86.8lb-ft)



3. Remove the split pin and castle nut and then disconnect the tie-rod end (A) from the front knuckle.

Tightening torque :

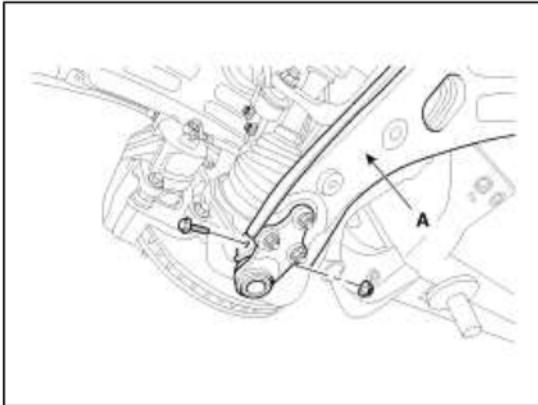
34.3 ~ 44.1N.m (3.5 ~ 4.5kgf.m, 25.3 ~ 32.5lb-ft)



4. Loosen the bolt & nut and then remove the lower arm (A).

Tightening torque :

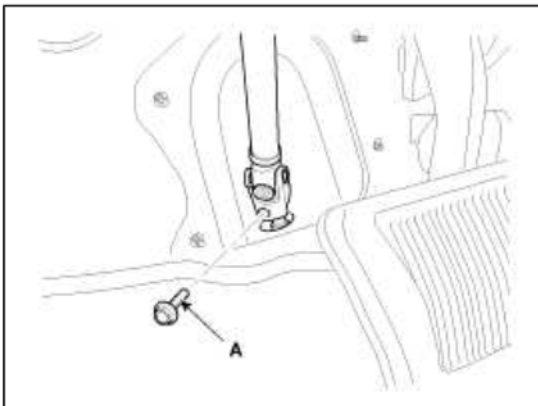
98.1 ~ 117.7N.m (10.0 ~ 12.0kgf.m, 72.3 ~ 86.8lb-ft)



5. Remove the dust cover.
6. Loosen the bolt (A) and then disconnect the universal joint assembly from the pinion of the steering gear box.

Tightening torque :

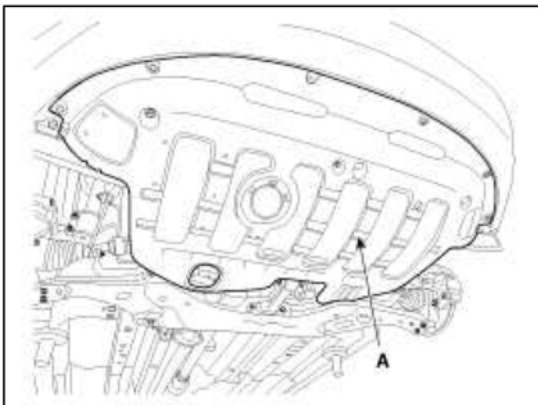
29.4 ~ 34.3N.m (3.0 ~ 3.5kgf.m, 21.7 ~ 25.3lb-ft)



CAUTION

- Keep the neutral-range to prevent the damage of the clock spring inner cable when you handle the steering wheel.
- Do not use the bolt again.

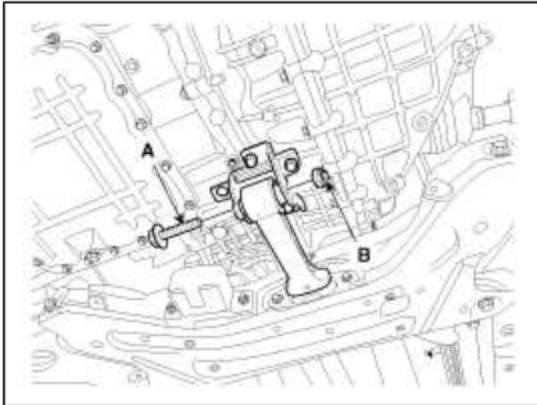
7. Remove the under cover (A).



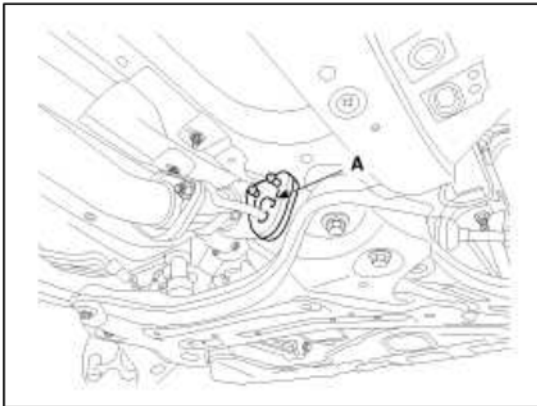
8. Loosen the bolt (A) & nut (B) and then remove the roll rod stopper.

Tightening torque :

107.9 ~ 127.5N.m (11.0 ~ 13.0kgf.m, 79.6 ~ 94.0lb-ft)



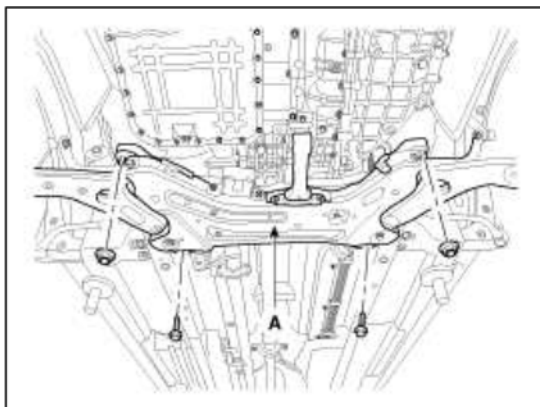
9. Disconnect the muffler rubber hanger (A).



10. Loosen the bolts & nuts and then remove the sub frame.

Tightening torque :

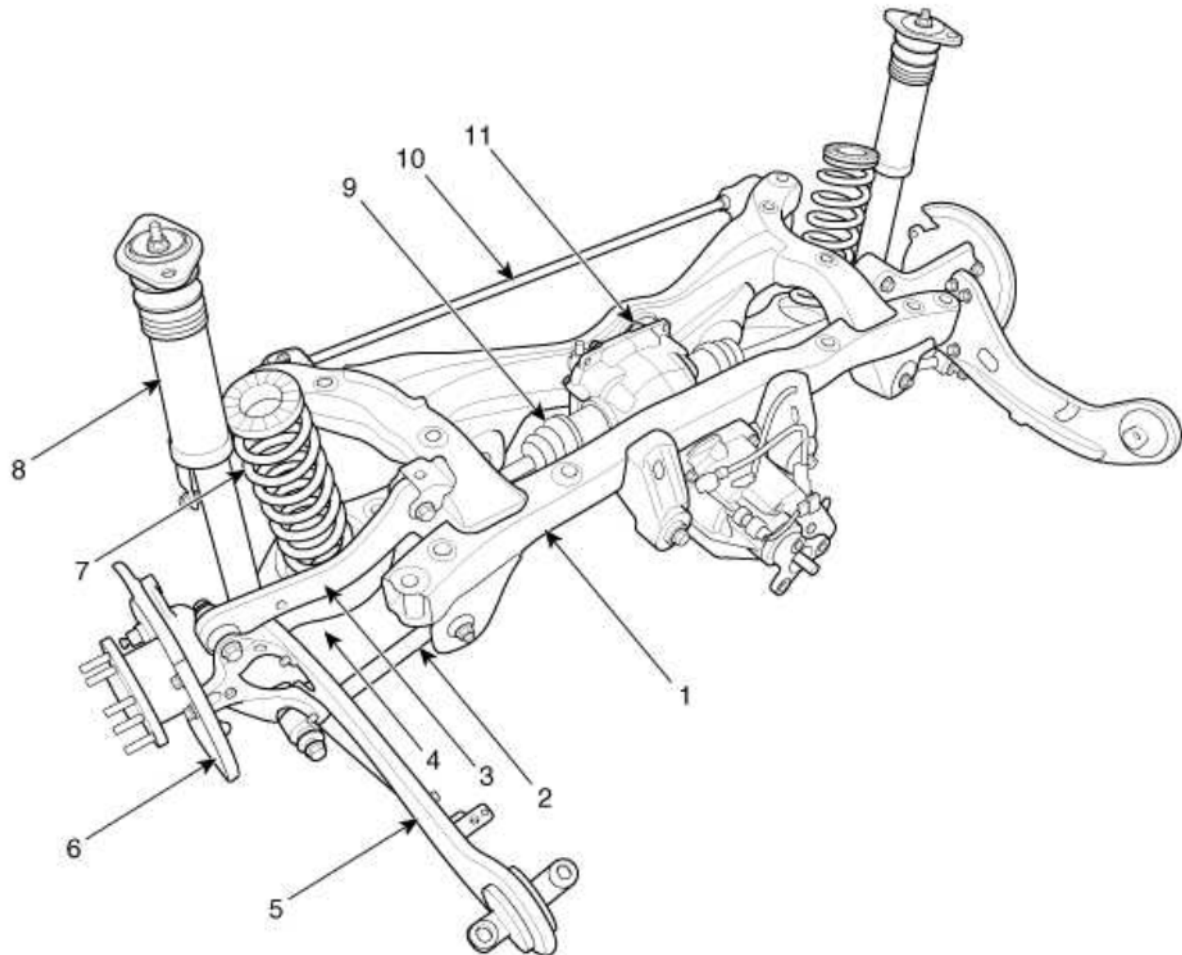
176.5 ~ 196.1N.m (18.0 ~ 20.0kgf.m, 130.2 ~ 144.7lb-ft)



11. Remove the front lower arm.
(Refer to Front lower arm)
12. Remove the front stabilizer.
(Refer to Front stabilizer)
13. Remove the steering gearbox.
(Refer to "Steering Gearbox" in ST group)
14. Installation is the reverse of removal.

Suspension System > Rear Suspension System > Components and Components Location

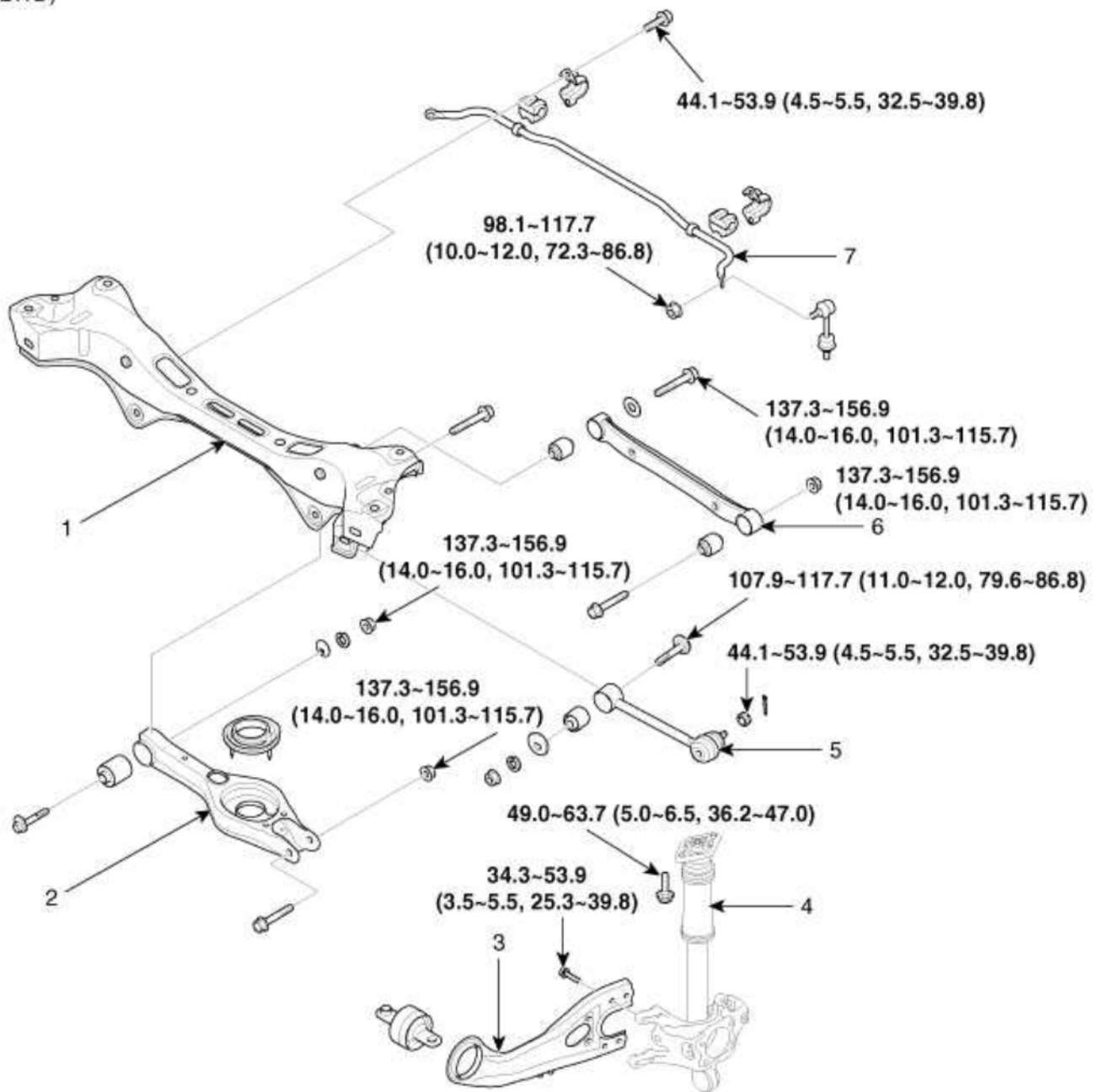
Components Location



1. Sub frame	7. Coil spring
2. Assist arm	8. Shock absorber
3. Upper arm	9. Drive shaft
4. Lower arm	10. Stabilizer
5. Trailing arm	11. Differential carrier
6. Rear axle	

Components

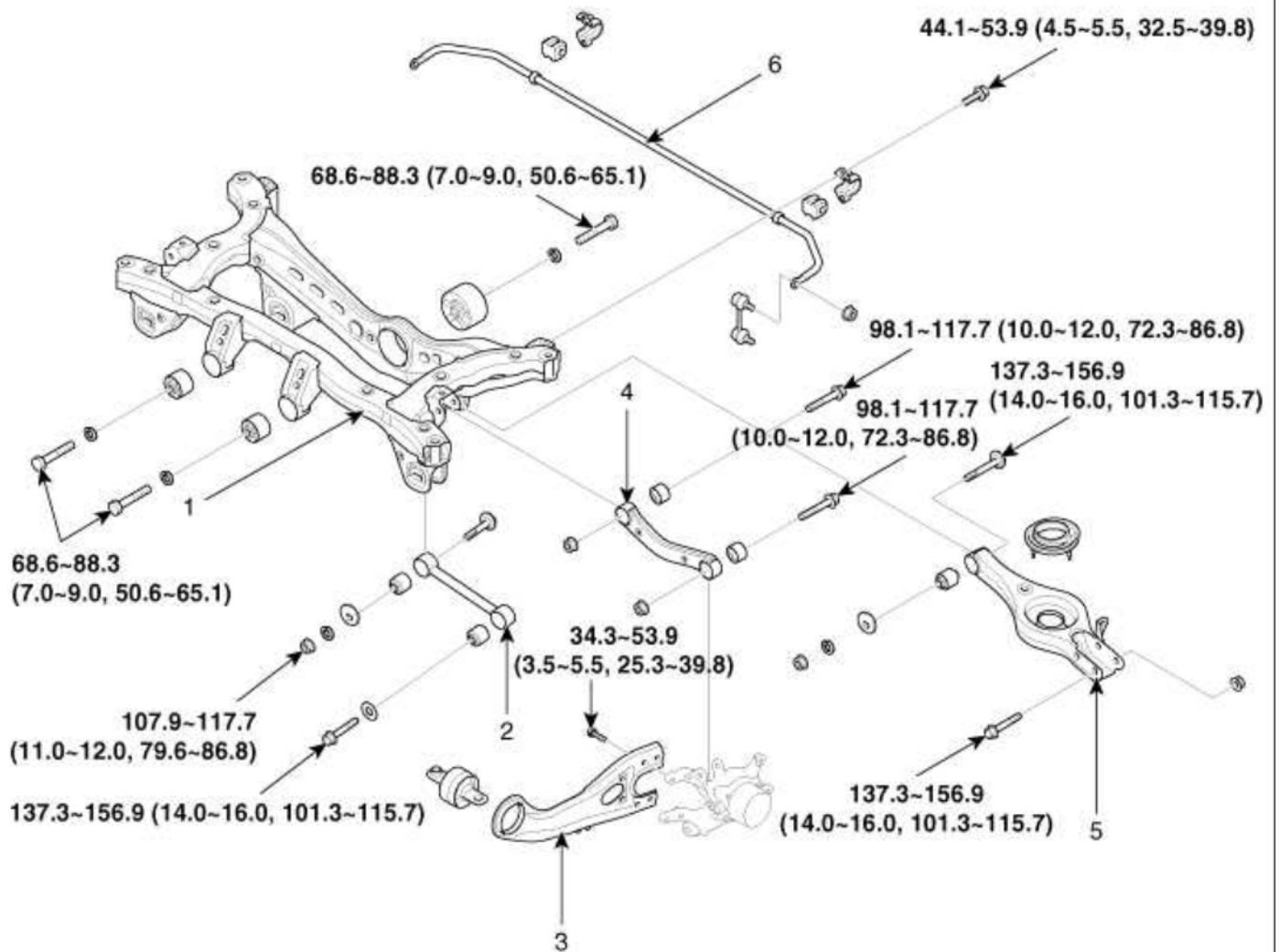
(2WD)



Torque : N.m (kgf.m, lb-ft)

1. Sub frame	5. Assist arm
2. Lower arm	6. Upper arm
3. Trailing arm	7. Stabilizer bar
4. Shock absorber	

(4WD)

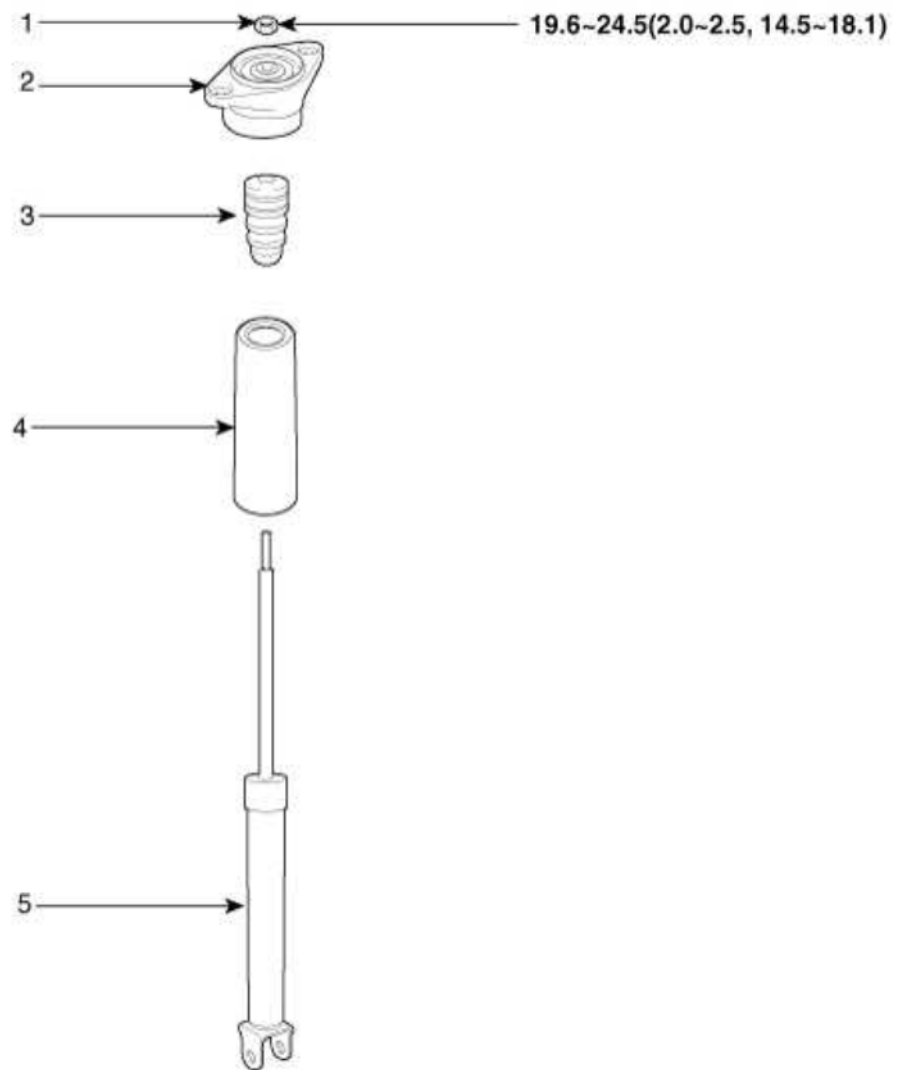


Torque : N.m (kgf.m, lb-ft)

1. Sub frame	4. Upper arm
2. Assist arm	5. Lower arm
3. Trailing arm	6. Stabilizer bar

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

Components



Torque : N.m (kgf.m, lb-ft)

1. Self locking nut	4. Dust cover
2. Bracket assembly	5. Shock absorber
3. Bumper rubber	

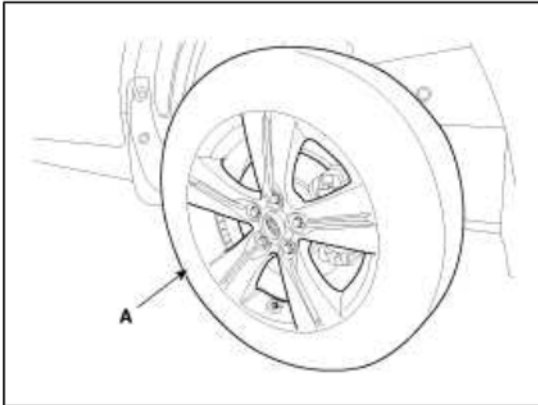
Suspension System > Rear Suspension System > Rear Shock Absorber > Repair procedures

Replacement

1. Remove the rear wheel & tire.

Tightening torque :

88.3 ~ 107.9N.m (9.0 ~ 11.0kgf.m, 65.1 ~ 79.6lb-ft)

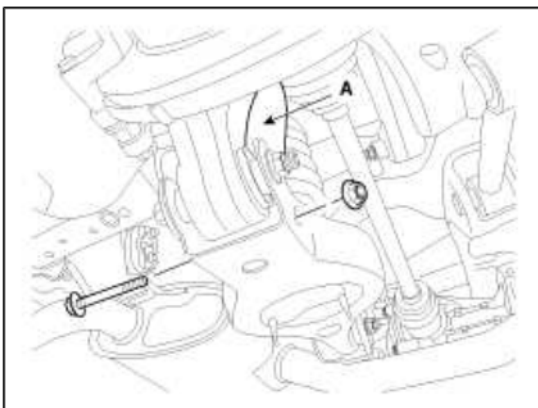

CAUTION

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

2. Loosen the bolt & nut and then disconnect the shock absorber (A) with the rear axle.

Tightening torque :

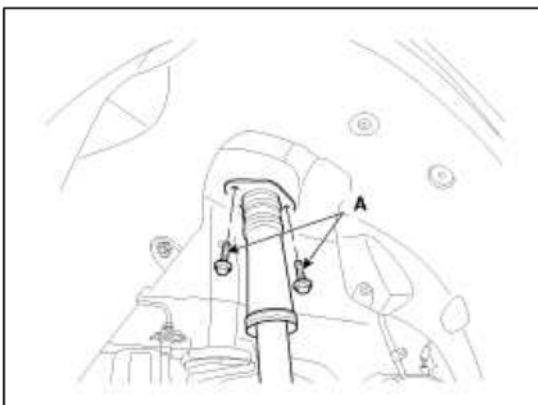
137.3 ~ 156.9N.m (14.0 ~ 16.0kgf.m, 101.3 ~ 115.7lb-ft)



3. Loosen the shock absorber mounting bolts (A).

Tightening torque :

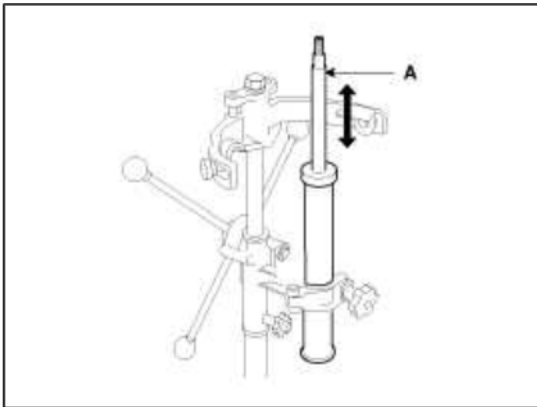
49.0 ~ 63.7N.m (5.0 ~ 6.5kgf.m, 36.2 ~ 47.0lb-ft)



4. Installation is the reverse of removal.

Inspection

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



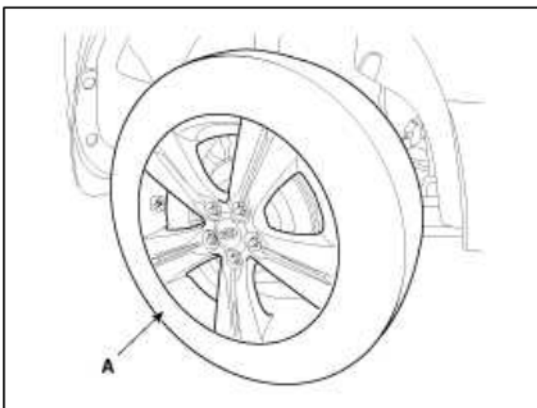
Suspension System > Rear Suspension System > Rear Upper Arm > Repair procedures

Replacement

1. Remove the rear wheel & tire.

Tightening torque :

88.3 ~ 107.9N.m (9.0 ~ 11.0kgf.m, 65.1 ~ 79.6lb-ft)



CAUTION

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

2. Loosen the bolt & nut and then remove the rear upper arm (A) with the rear axle.

Tightening torque :

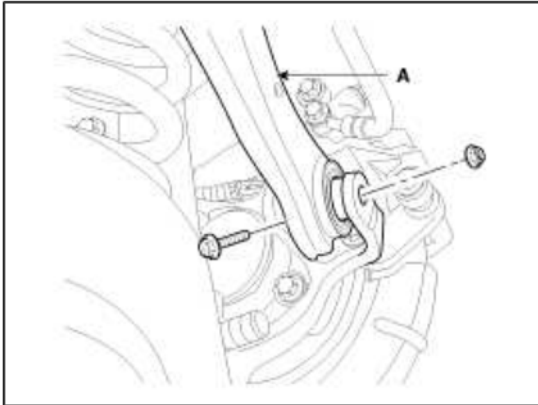
2WD

137.3 ~ 156.9N.m (14.0 ~ 16.0kgf.m, 101.3 ~ 115.7lb-ft)

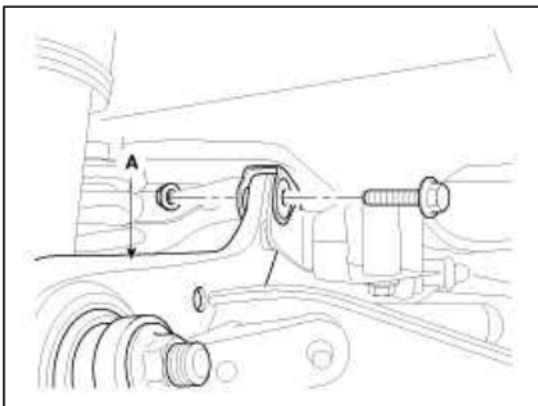
4WD

98.1 ~ 117.7N.m (10.0 ~ 12.0kgf.m, 72.3 ~ 86.8lb-ft)

[2WD]



[4WD]



3. Loosen the bolt & nut and then remove the rear upper arm (A) with the sub frame.

Tightening torque :

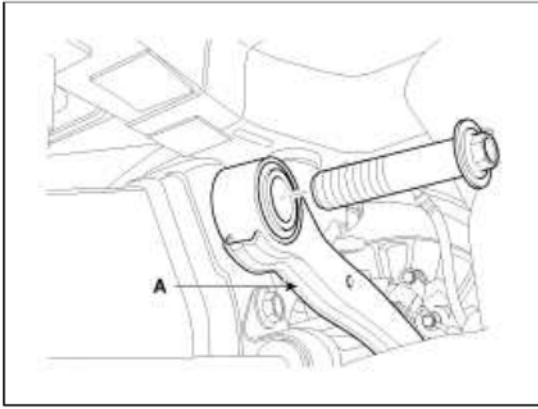
2WD

137.3 ~ 156.9N.m (14.0 ~ 16.0kgf.m, 101.3 ~ 115.7lb-ft)

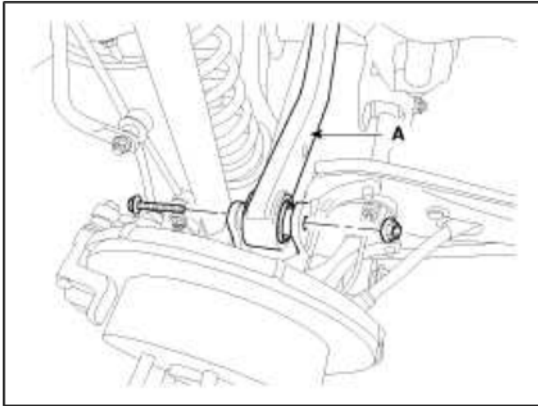
4WD

98.1 ~ 117.7N.m (10.0 ~ 12.0kgf.m, 72.3 ~ 86.8lb-ft)

[2WD]



[4WD]



4. Installation is the reverse of removal.

CAUTION

Install the rear upper arm so that the letter 'R' can face the rear of vehicle.

Inspection

1. Check the bushing for wear and deterioration.
2. Check the rear upper arm or damage and deformation.
3. Check for all bolts and nut.

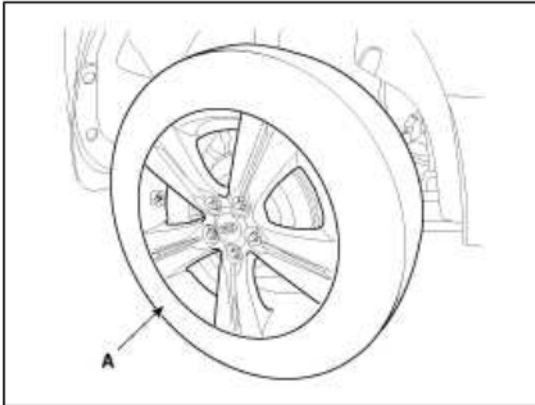
Suspension System > Rear Suspension System > Rear Lower Arm > Repair procedures

Replacement

1. Remove the rear wheel & tire.

Tightening torque :

88.3 ~ 107.9N.m (9.0 ~ 11.0kgf.m, 65.1 ~ 79.6lb-ft)

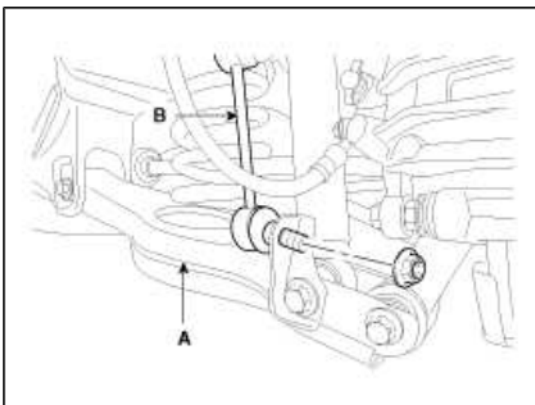

CAUTION

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

2. Loosen the nut and then remove the rear stabilizer link (B) with the rear lower arm (A).

Tightening torque :

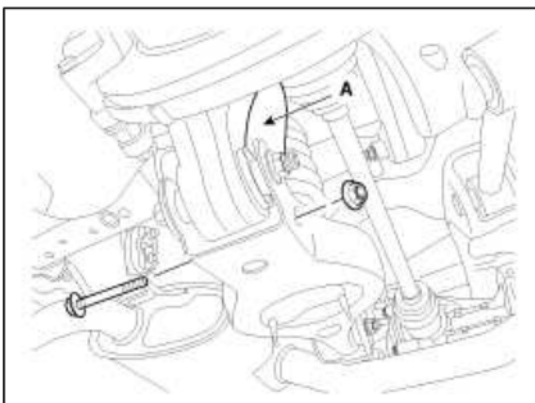
98.1 ~ 117.7N.m (10.0 ~ 12.0kgf.m, 72.3 ~ 86.8lb-ft)



3. Loosen the bolt & nut and then remove the rear shock absorber (A) with the lower arm.

Tightening torque :

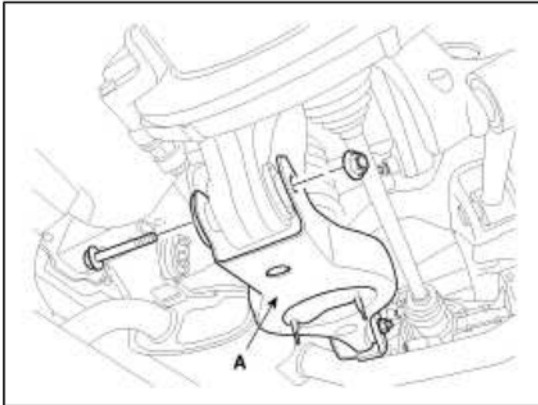
137.3 ~ 156.9N.m (14.0 ~ 16.0kgf.m, 101.3 ~ 115.7lb-ft)



4. Loosen the bolt & nut and then remove the rear lower arm (A) with the rear axle.

Tightening torque :

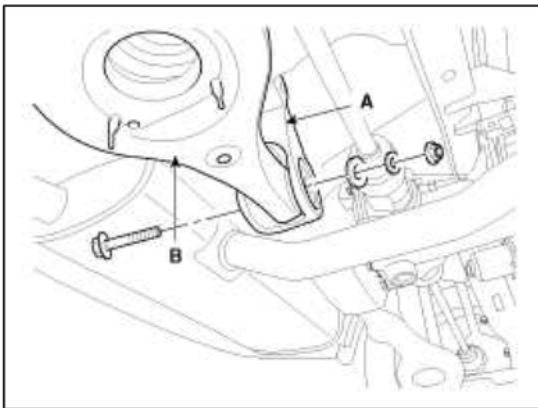
137.3 ~ 156.9N.m (14.0 ~ 16.0kgf.m, 101.3 ~ 115.7lb-ft)



5. Loosen the bolt & nut and then remove the rear lower arm (B) with the sub frame (A).

Tightening torque :

137.3 ~ 156.9N.m (14.0 ~ 16.0kgf.m, 101.3 ~ 115.7lb-ft)



6. Installation is the reverse of removal.

Inspection

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

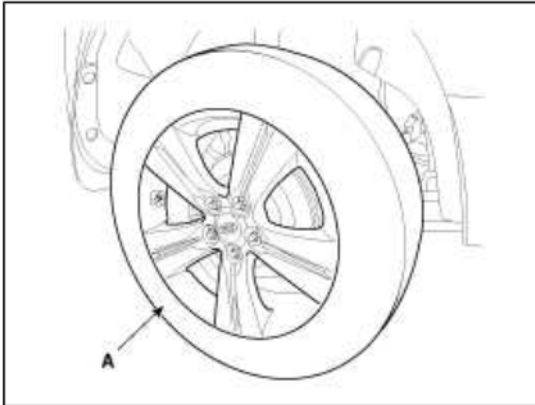
Suspension System > Rear Suspension System > Rear Stabilizer Bar > Repair procedures

Replacement

1. Remove the rear wheel & tire.

Tightening torque :

88.3 ~ 107.9N.m (9.0 ~ 11.0kgf.m, 65.1 ~ 79.6lb-ft)



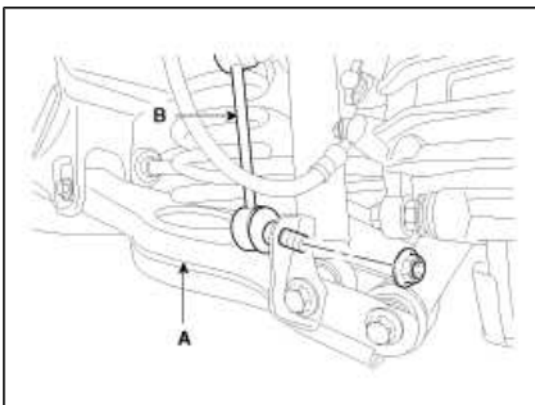
CAUTION

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

2. Loosen the nut and then remove the rear stabilizer link (B) with the rear lower arm (A).

Tightening torque :

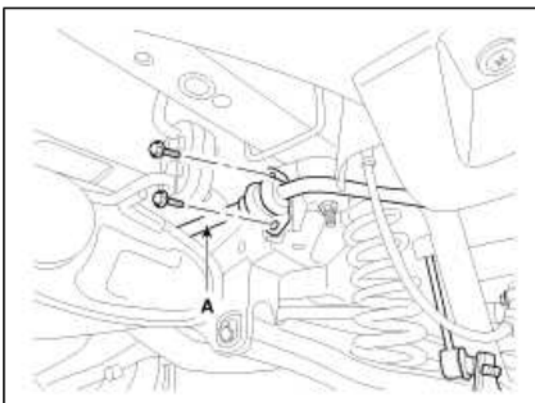
98.1 ~ 117.7N.m (10.0 ~ 12.0kgf.m, 72.3 ~ 86.8lb-ft)



3. Loosen the mounting bolt and then remove the stabilizer bar (A) with the sub frame.

Tightening torque :

44.1 ~ 53.9N.m (4.5 ~ 5.5kgf.m, 32.5 ~ 39.8lb-ft)



4. Installation is the reverse of removal.

Inspection

1. Check the rear stabilizer bar for deformation.
2. Check the rear stabilizer link ball joint for damage.

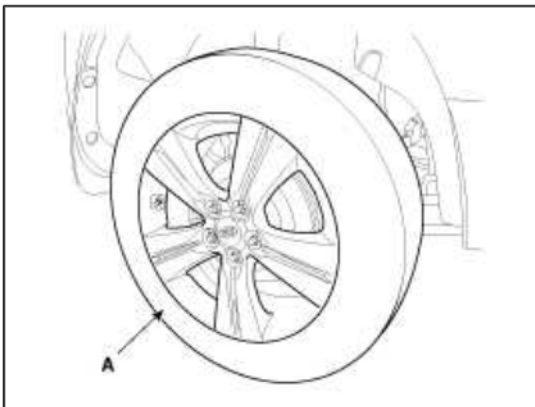
Suspension System > Rear Suspension System > Rear Assist Arm > Repair procedures

Replacement

1. Remove the rear wheel & tire.

Tightening torque :

88.3 ~ 107.9N.m (9.0 ~ 11.0kgf.m, 65.1 ~ 79.6lb-ft)



CAUTION

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

2. Remove the spirit pin and castle nut or bolt and then disconnect the rear assist arm (A) from the rear axle.

Tightening torque :

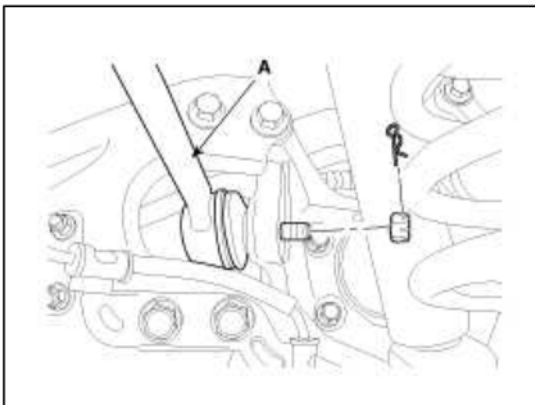
2WD

44.1 ~ 53.9N.m (4.5 ~ 5.5kgf.m, 32.5 ~ 39.8lb-ft)

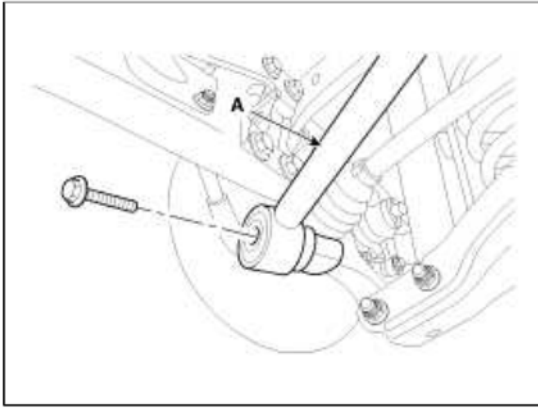
4WD

137.3 ~ 156.9N.m (14.0 ~ 16.0kgf.m, 101.3 ~ 115.7lb-ft)

[2WD]



[4WD]

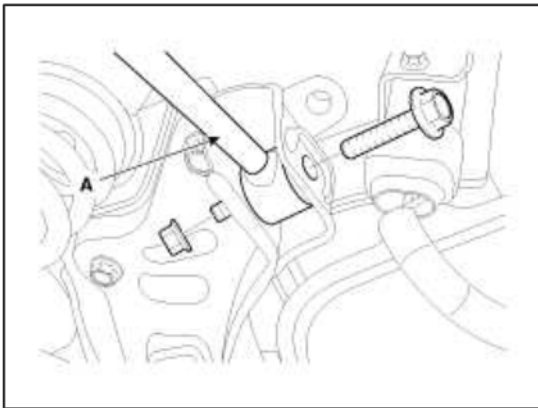


3. Loosen the bolt & nut and then remove the rear assist arm (A) from the sub frame.

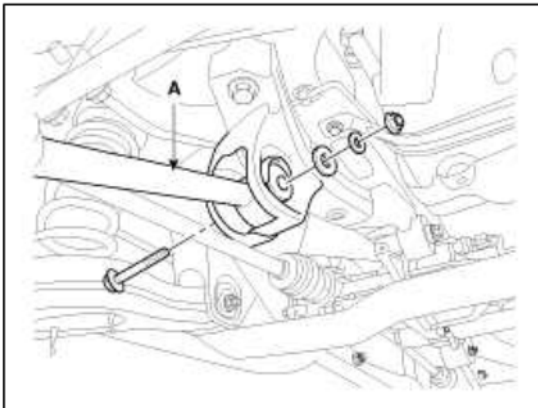
Tightening torque :

107.9 ~ 117.7N.m (11.0 ~ 12.0kgf.m, 79.6 ~ 86.8lb-ft)

[2WD]



[4WD]



4. Installation is the reverse of removal.

Inspection

1. Check the bushing for wear and deterioration.
2. Check the rear assist arm for deformation.
3. Check ball joint for damage.
4. Check for the all bolts and nuts.

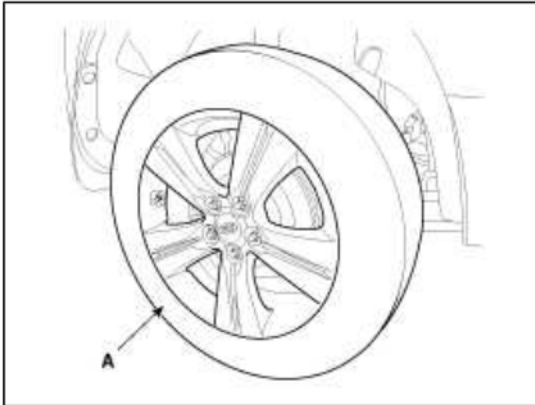
Suspension System > Rear Suspension System > Trailing Arm > Repair procedures

Replacement

1. Remove the rear wheel & tire.

Tightening torque :

88.3 ~ 107.9N.m (9.0 ~ 11.0kgf.m, 65.1 ~ 79.6lb-ft)


CAUTION

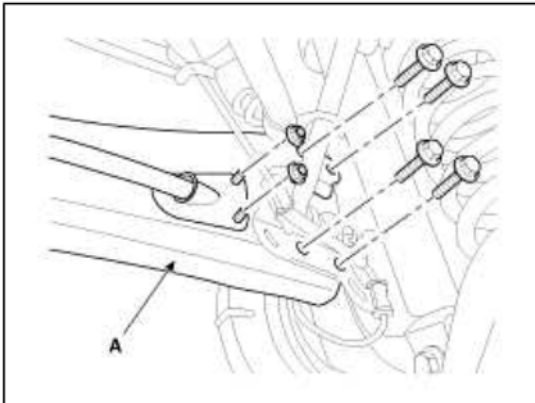
Be careful not to damage to the hub bolts when removing the front wheel & tire (A).

2. Loosen the nuts & bolts and then remove the trailing arm (A) from the rear axle.

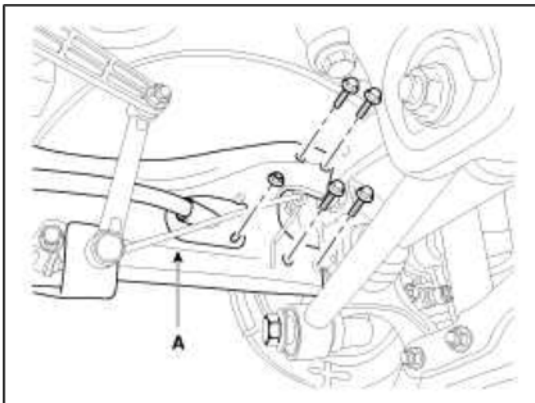
Tightening torque

34.3 ~ 53.9N.m (3.5 ~ 5.5kgf.m, 25.3 ~ 39.8lb-ft)

[2WD]

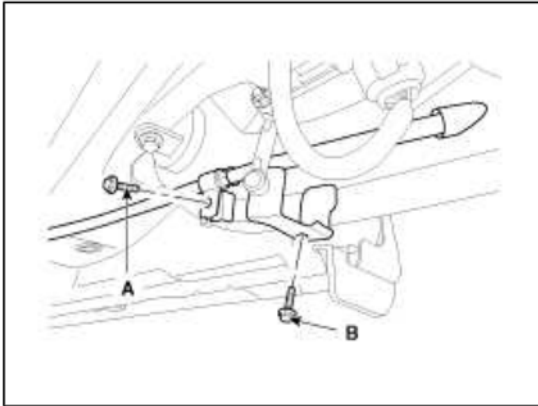


[4WD]

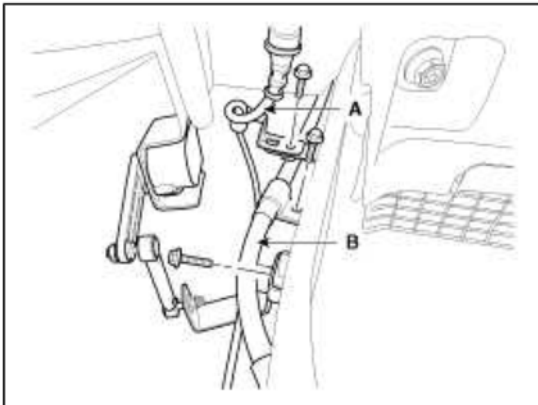


3. Loosen the parking brake cable bracket bolt (A) & height sensor bracket bolt (B).

[2WD]



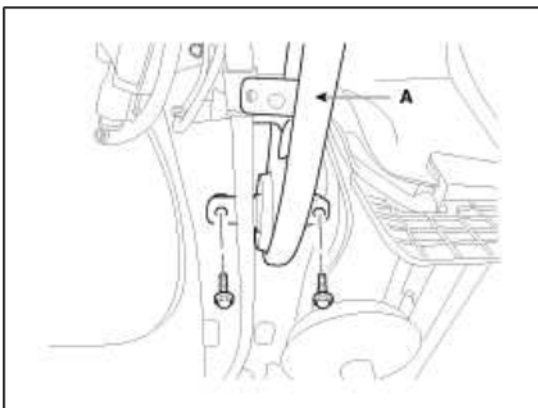
[4WD]



4. Loosen the mounting bolt and then remove the trailing arm (A) with the frame.

Tightening torque :

98.1 ~ 117.7N.m (10.0 ~ 12.0kgf.m, 72.3 ~ 86.8lb-ft)



5. Installation is the reverse of removal.

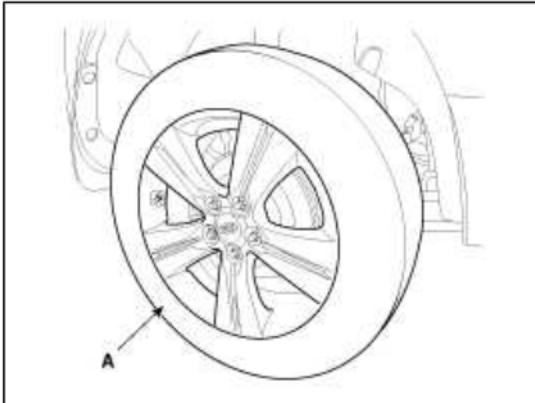
Suspension System > Rear Suspension System > Rear Cross Member > Repair procedures

Replacement

1. Remove the rear wheel & tire.

Tightening torque :

88.3 ~ 107.9N.m (9.0 ~ 11.0kgf.m, 65.1 ~ 79.6lb-ft)

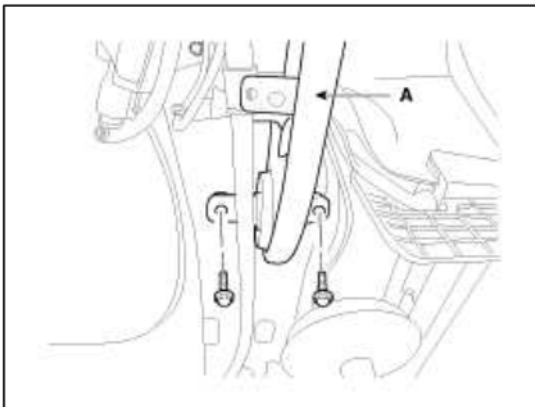

CAUTION

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

2. Remove the parking brake cable.
(Refer to "Parking Brake System" in BR group)
3. Loosen the bolt and then remove the trailing arm (A).

Tightening torque :

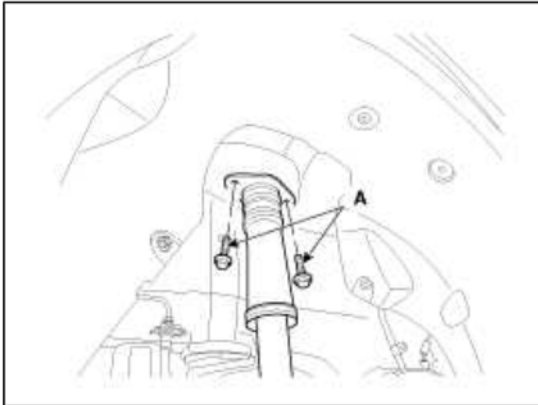
98.1 ~ 117.7N.m (10.0 ~ 12.0kgf.m, 72.3 ~ 86.8lb-ft)



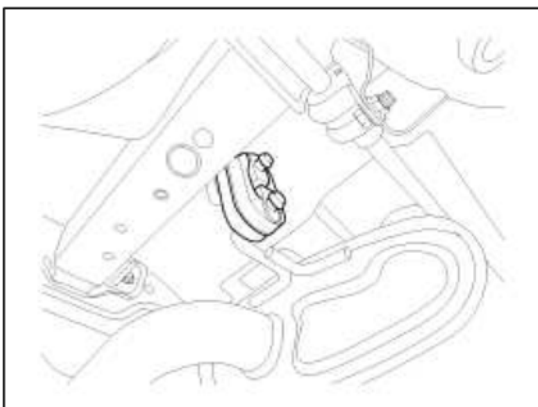
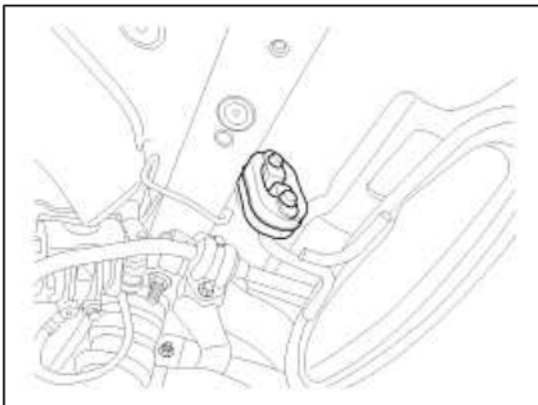
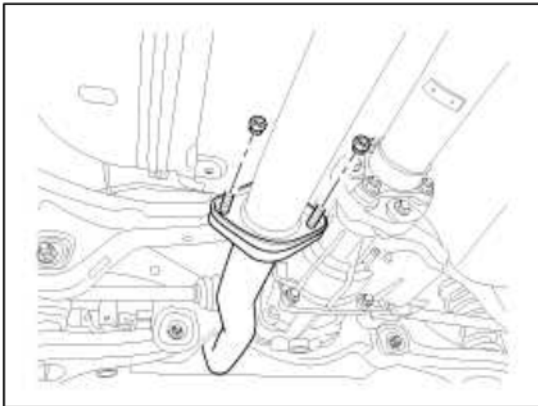
4. Loosen the shock absorber mounting bolts (A).

Tightening torque :

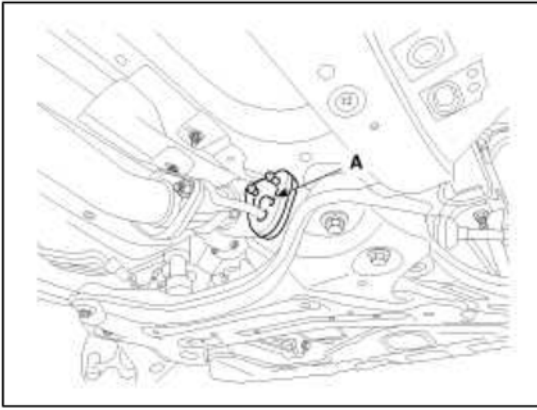
49.0 ~ 63.7N.m (5.0 ~ 6.5kgf.m, 36.2 ~ 47.0lb-ft)



5. Remove the rear muffler.



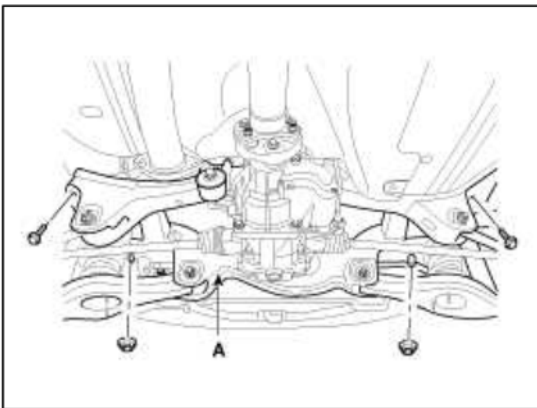
6. Loosen the bolt and then remove the propellar shaft (A).



7. Loosen the mounting bolts and then remove the rear cross member (A) with the frame.

Tightening torque :

156.9 ~ 176.5N.m (16.0 ~ 18.0kgf.m, 115.7 ~ 130.2lb-ft)



8. Remove the rear lower arm.
(Refer to lower arm)
9. Remove the rear shock absorber.
(Refer to rear shock absorber)
10. Remove the rear upper arm.
(Refer to rear upper arm)
11. Remove the trailing arm.
(Refer to trailing arm)
12. Remove the rear assist arm.
(Refer to rear assist arm)
13. Remove the drive shaft.
(Refer to "Rear Drive Shaft" in DS group)
14. Remove the differential carrier.
(Refer to "Differential Carrier" in DS group)
15. Installation is the reverse of removal.

Suspension System > Tires/Wheels > Tire > Repair procedures

Tire wear

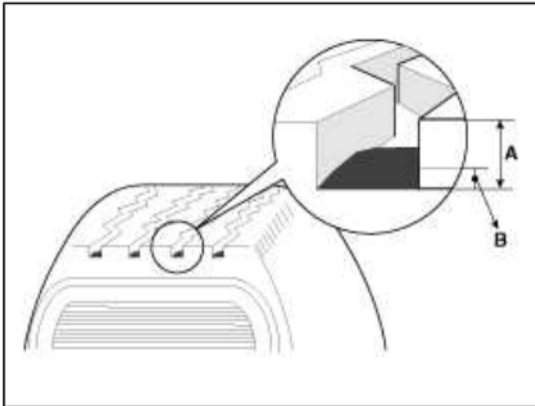
1. Measure the tread depth of the tires.

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

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

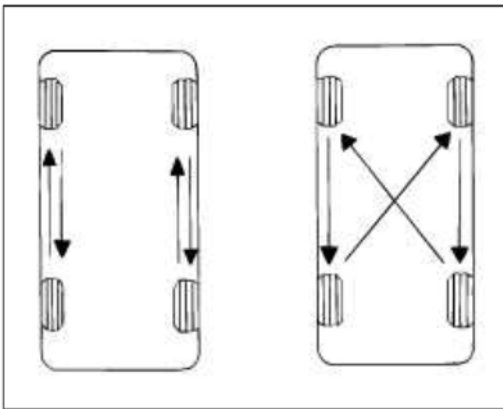
NOTE

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



Tire Rotation

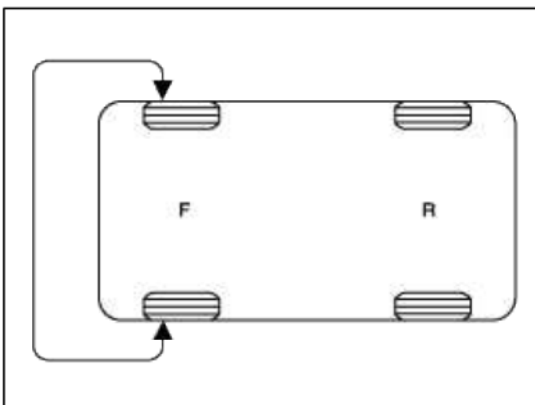
Rotate the tires in the pattern illustrated.



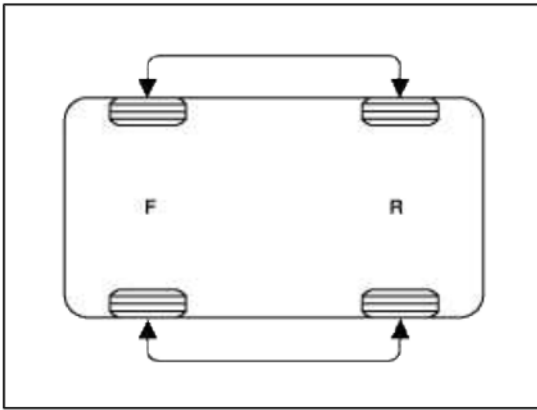
Checking For Pull and Wander

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

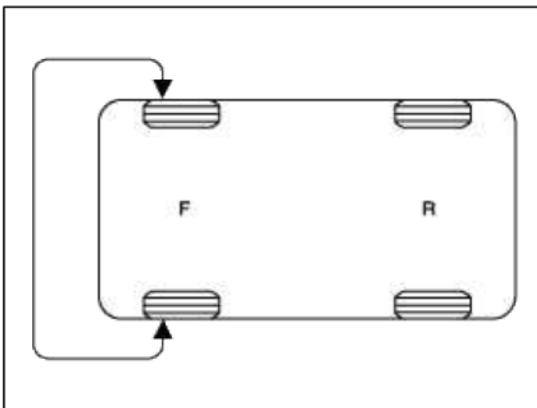
1. Rotate the front right and front left tires, and perform a road test in order to confirm vehicle stability.



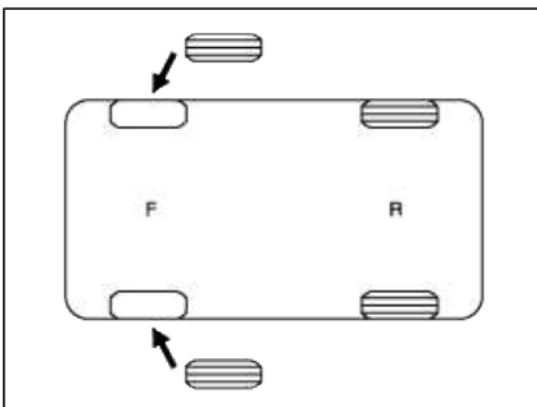
2. If the steering pulls to the opposite side, check vehicle's wheel alignment specification first before rotating the tires according to the following wheel rotation procedure.



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.



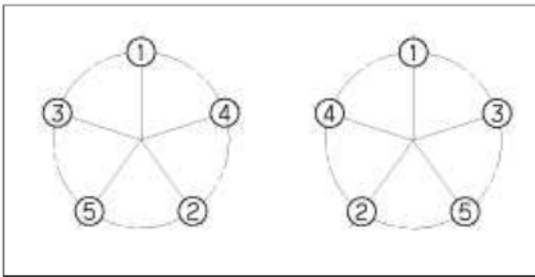
Suspension System > Tires/Wheels > Wheel > Repair procedures

Hub nut tightening sequence

Tighten the hub nuts as follows.

Tightening torque :

88.3 ~ 107.9N.m (9.0 ~ 11.0kgf.m, 65.1 ~ 79.6lb-ft)

**CAUTION**

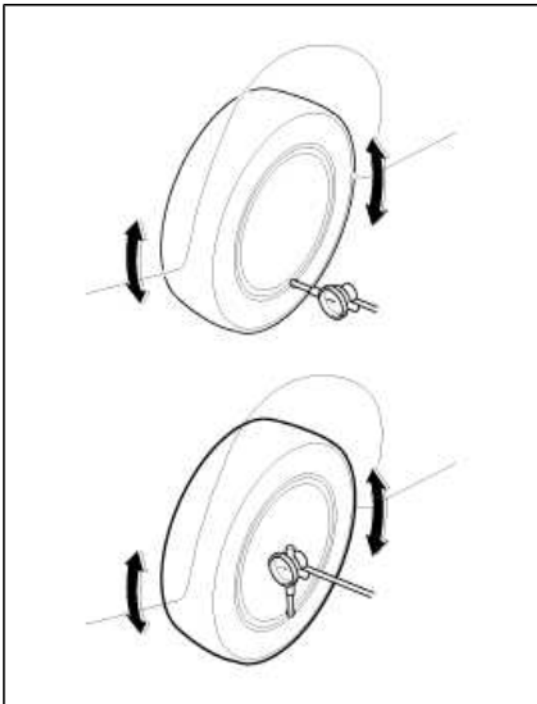
When using an impact gun, final tightening torque should be checked using a torque wrench.

Run out inspection

1. Jack up the vehicle.
2. Measure the wheel Run-out by using a dial indicator as illustration below.

Run-out	Aluminum	Steel
Radial mm(in.)	Below 0.3(0.012)	Below 1.0(0.039)
Axial mm(in.)	Below 0.3(0.012)	Below 0.6(0.024)

3. If measured value exceeds the standard value, replace the wheel.



Suspension System > Tires/Wheels > Alignment > Repair procedures

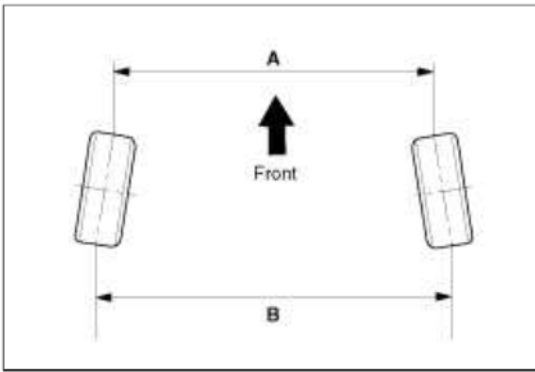
Front Wheel Alignment

CAUTION

When using a commercially available computerized wheel alignment equipment to inspect the front wheel alignment, always position the vehicle 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 tires are inflated to the specified pressure.

Toe



$B - A > 0$: Toe in (+)

$B - A < 0$: Toe out (-)

Toe adjustment

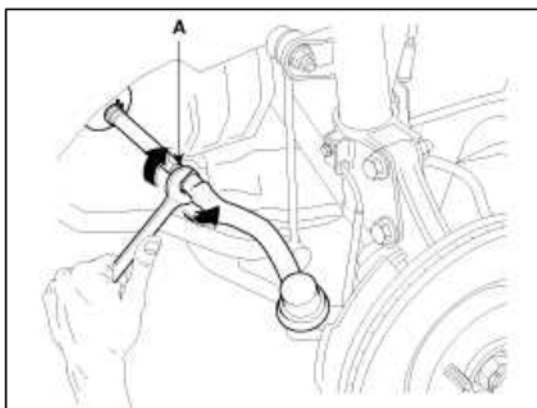
1. Loosen the tie rod end lock nut.
2. Remove the bellows clip to prevent the bellows from being twisted.
3. Adjust the toe by screwing or unscrewing the tie rod. Toe adjustment should be made by turning the right and left tie rods by the same amount.

Toe

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

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

Tie rod	Turning direction	Toe
LH (Driver's side)	Backward	Decrease (Toe in)
	Forward	Increase (Toe out)
RH	Backward	Increase (Toe out)
	Forward	Decrease (Toe in)



4. When completing the toe adjustment, install the bellows clip and tighten the tie rod end lock nut to specified torque.

Tightening torque :

49.0 ~ 53.9N.m (5.0 ~ 5.5kgf.m, 36.2 ~ 39.8lb-ft)

Camber and Caster

Camber and Caster are pre-set at the factory, so they do not need to be adjusted. If the camber and caster are not within the standard value, replace or repair the damaged parts and then inspect again.

Camber angle : $-0.5^{\circ} \pm 0.5^{\circ}$

Caster angle : $4.02^{\circ} \pm 0.5^{\circ}$

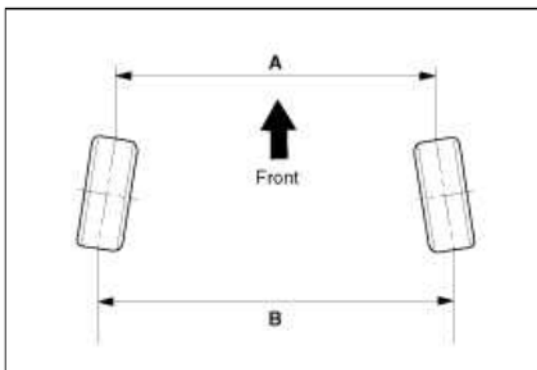
Rear Wheel Alignment

CAUTION

When using a commercially available computerized wheel alignment equipment to inspect the rear wheel alignment, always position the vehicle on a level surface.

Prior to inspection, make sure that the rear suspension system is in normal operating condition and that the tires are inflated to the specified pressure.

Toe



$B - A > 0$: Toe in (+)

$B - A < 0$: Toe out (-)

Toe adjustment

1. Loosen the nut holding the assist arm cam bolt (A).

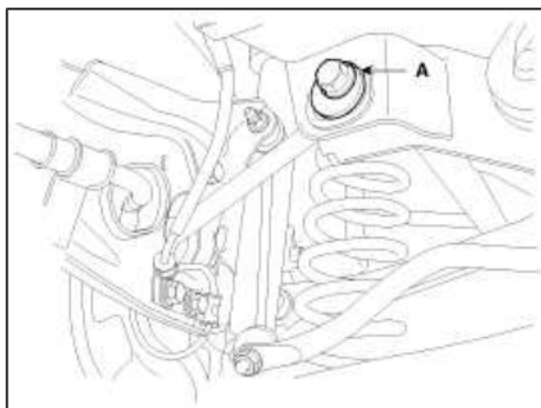
2. Adjust rear toe by turning the rear assist arm cam bolt (A) clockwise or counter clockwise. Toe adjustment should be made by turning the right and left cam bolt by the same amount.

Toe

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

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

Cam bolt	Turning direction	Toe
LH (Driver's side)	Clockwise	Decrease (Toe out)
	Counter clockwise	Increase (Toe in)
RH	Clockwise	Increase (Toe in)
	Counter clockwise	Decrease (Toe out)



3. When completing the toe adjustment, tighten the nut to specified torque.

Tightening torque :

107.9 ~ 117.7N.m (11.0 ~ 12.0kgf.m, 79.6 ~ 86.8lb-ft)

Camber

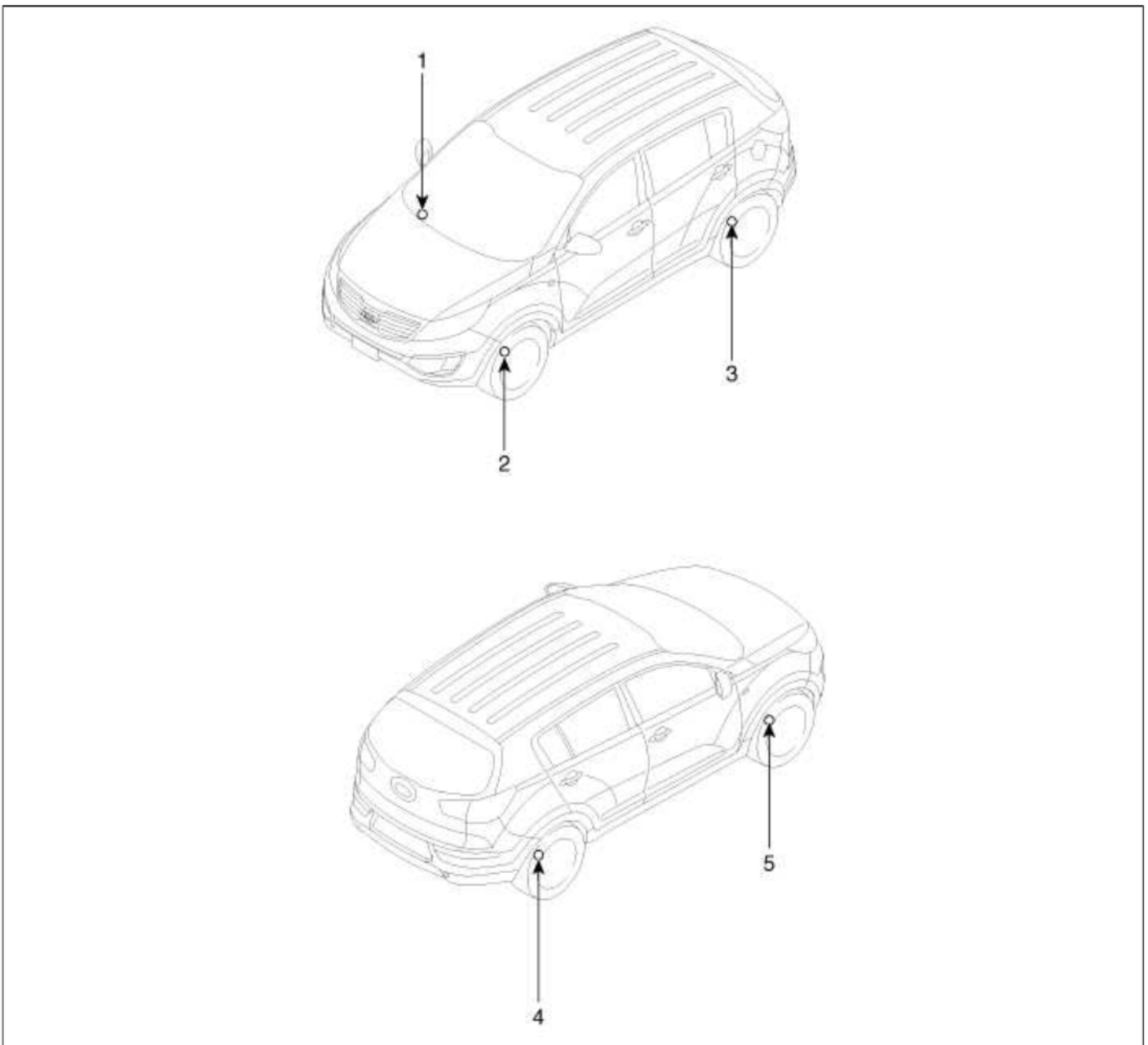
Adjust the camber by turning the cambolt of the rear lower arm.

Camber: $-1.0^{\circ} \pm 0.5^{\circ}$

Cam bolt	Turning direction	Toe
LH (Driver's side)	Clockwise	Camber -
	Counter clockwise	Camber +
RH	Clockwise	Camber +
	Counter clockwise	Camber -

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

Components Location



1. Receiver	4. TPMS Sensor
2. TPMS Sensor	5. TPMS Sensor
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.
 - C. Indicates that tire needs to be re-inflated to placard pressure / repaired.
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).

DTC Warning

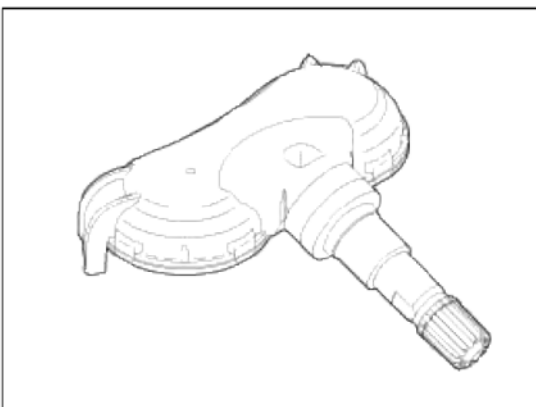
1. Turn on condition
 - A. When the system detects a fault that is external to the receiver/ sensor.
 - B. When the system detects a receiver fault.
 - C. When the system detects a sensor fault.
2. Turn off condition
 - A. If the fault is considered as 'critical', then the lamp is held on throughout the current Ignition cycle (even if the DTC has been de-activated). This is because it is important to bring the problem to the drivers attention. On the following Ignition cycle, the de-activated conditions will be re-checked. If the de-activate 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 stored is equal to 15.
 - D. Certain faults are not covered through DTC. The main ones are:
 - 1) Sensor thermal shutdown (over 257°F/125°C).
 - 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) Normal Fixed Base State

- A. Sensor transmissions continue at the Low Line (Base) configuration defined rates until the state is either changed by LF command or by the sensor detecting a condition that requires a temporary change to another state.
- B. The LF command to this state must contain the sensors ID.

(2) Storage Auto State :

- A. This state is a Low current consumption state.
- B. Sensors are in this state when they first arrive at the dealership (either on the vehicle or as replacement spares).
- C. In this state, the sensor does not measure pressure / temperature / battery level.
- D. The sensor will not transmit in this state unless requested to do so by the initiate command.

(3) Alert State :

- A. The sensor automatically enters this state if the measured temperature exceeds 230 °F(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.
- D. This state is also entered when a 3 psi change in pressure from the last RF transmission occurs.

NOTE

Sensor mode is used to configure sensor between high line and low line system. TPMS sensor for UB should be set to low line.

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

Removal

Tire Removal

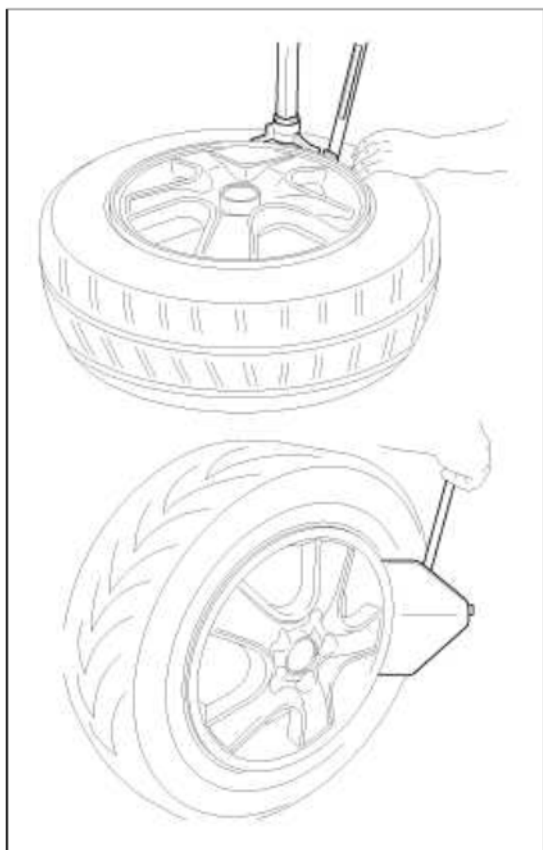
1. Deflate tire & remove balance weights.

NOTE

Sensor can be unscrewed before unseating the tire bead.

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.

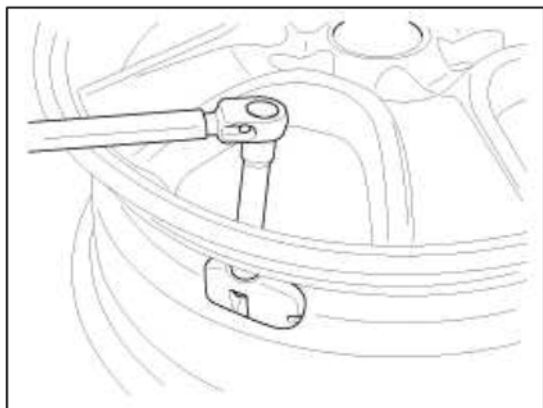


Sensor Removal

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.

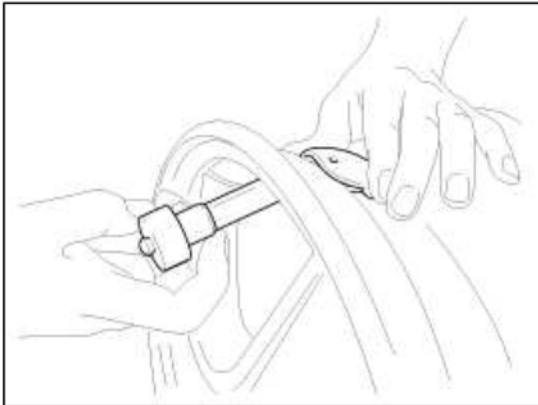
Installation

Sensor Fit

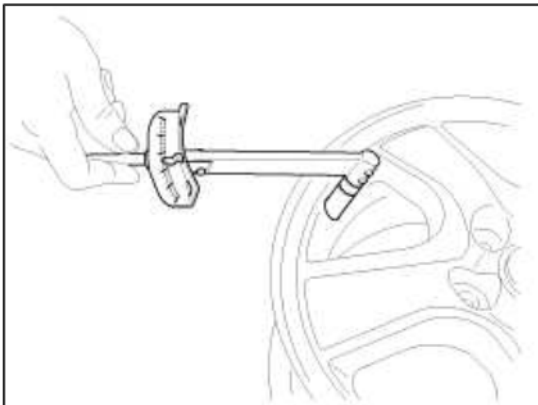
CAUTION

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

1. Slide the sensor-valve unit through the valve hole of the rim. Hold the sensor against the rim and the rubber grommet against the sealing surface.
2. Insert the nut over the valve stem and then tighten the nut.



3. Continue to tightening the nut until contact with the rim and then tighten to 3.5 ~ 4.5Nm.

**CAUTION**

- Tighten slowly with quarter turn steps until the final torque is reached.
- Do not exceed allowed torque.
- Do not use electric or pneumatic tools.

4. Check that the sensor is firmly attached to the rim.

CAUTION

Risk of damage during the tire installation/ removal if the sensor is not firmly attached to the rim.

5. Carry out inflation / pressure correction and then fit valve cap.

CAUTION

Change the newly installed sensor mode to Normal Fixed Base(Low Line) with the 'GDS'. Mode (Status / option) of the sensor installed to the vehicle should be Normal Fixed Base (Low).

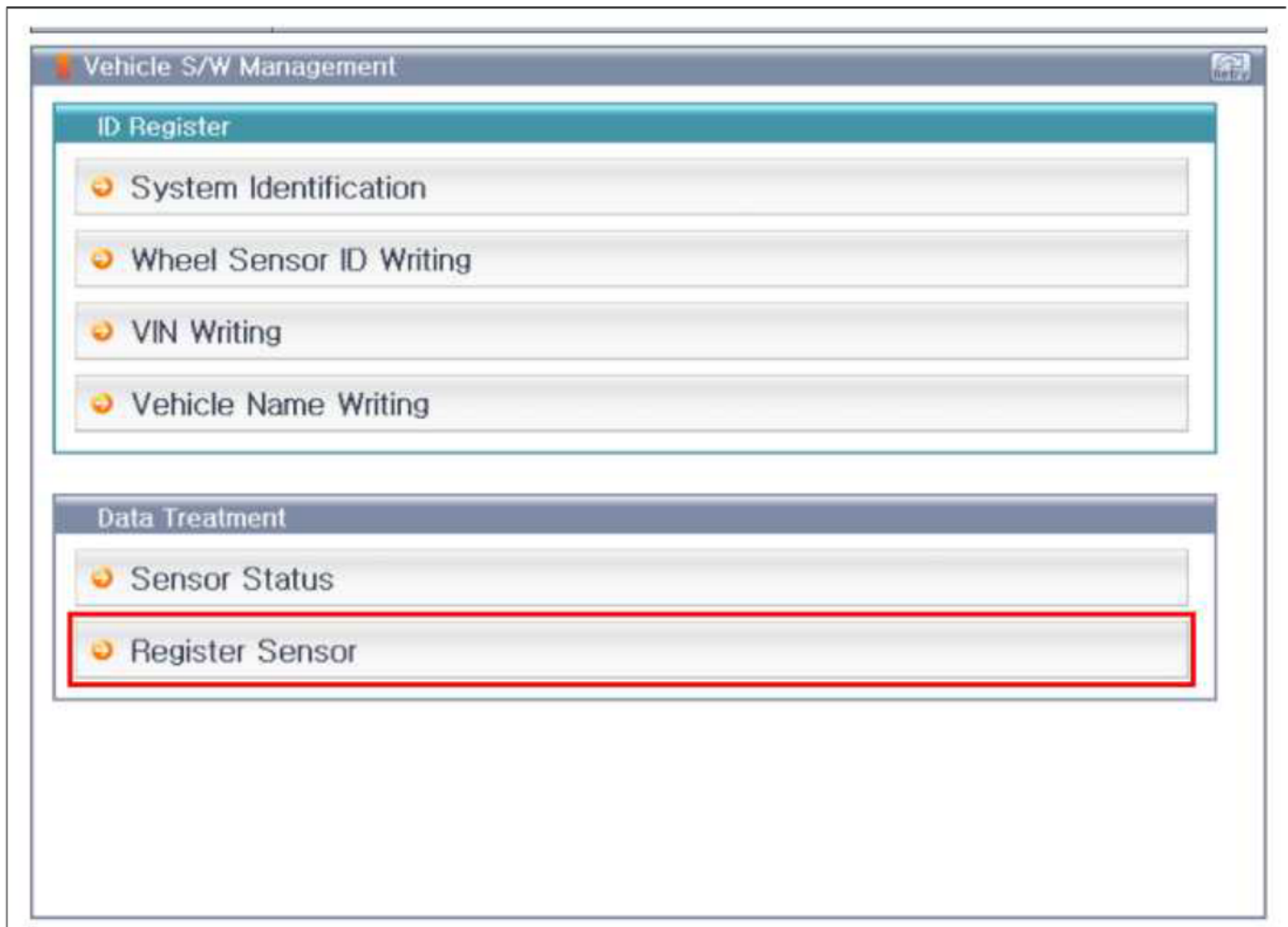
6. Install the tire. (Refer to "Tire Installation")
7. In the case of TPMS sensor failure, TPMS sensor needs learning. Faulty sensor is replaced new units, conduct learning of TPMS sensors.

Diagnosis procedure by using diagnostic device

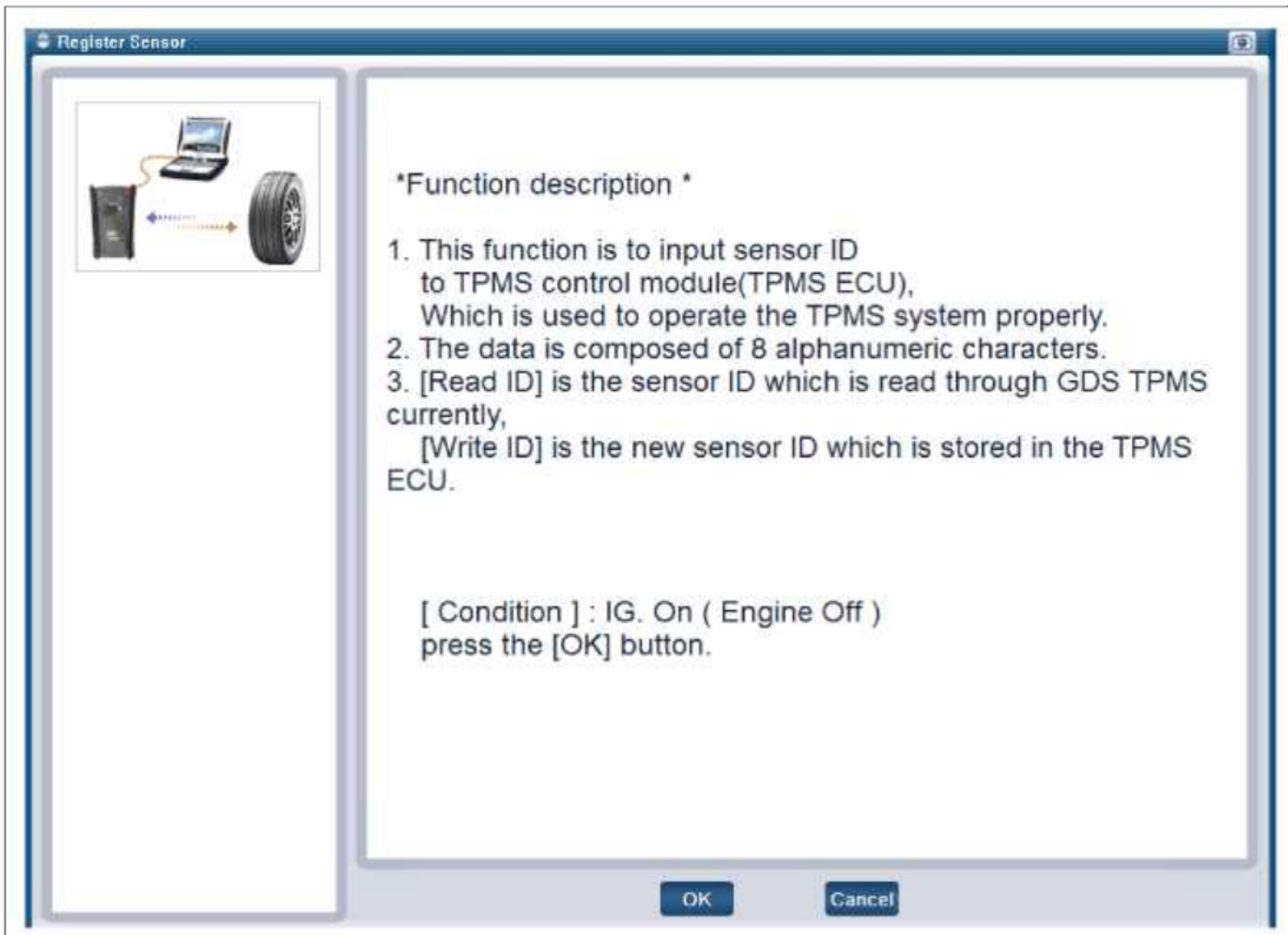
As manual for diagnosis methods by using diagnosis device, the main contents are as follows:

1. Connect self-diagnosis connector(16pins) located in the lower of driver side crash pad to self-diagnosis device, and then turn the self-diagnosis device after key is ON.
2. Select the "vehicle model" and "TPMS" on GDS vehicle selection screen, then select OK.

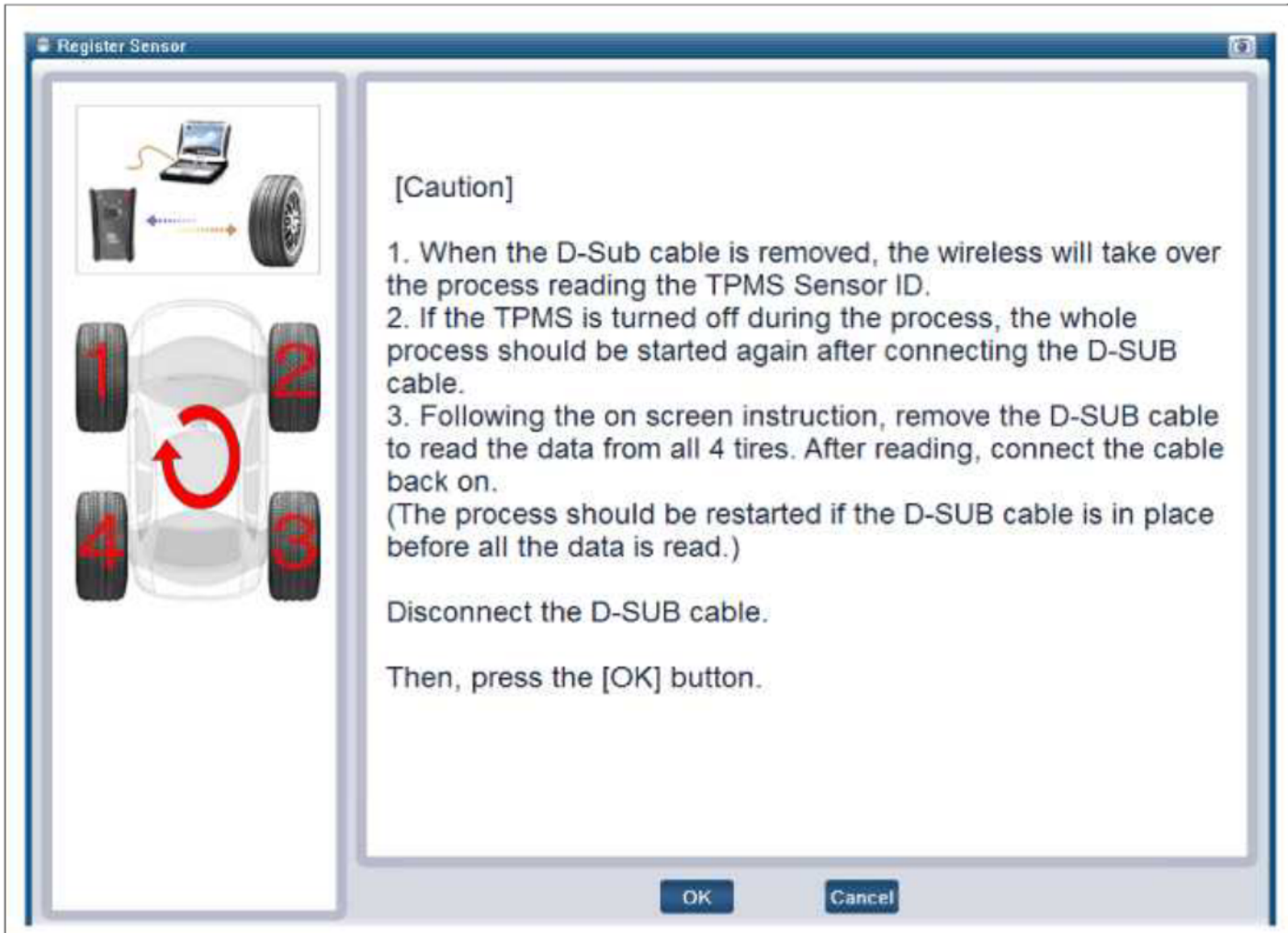
[Register Sensor initialization]



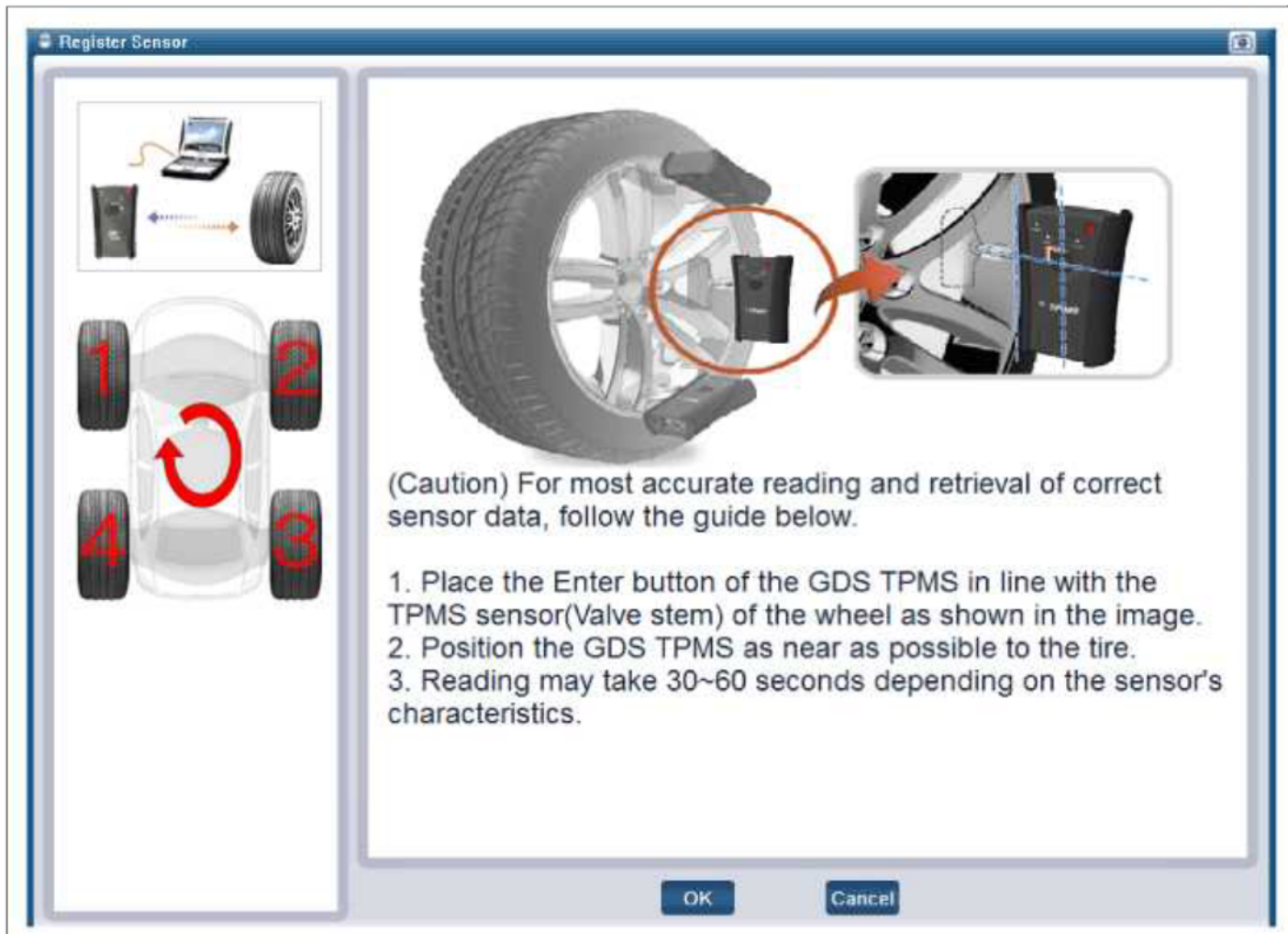
[Register Sensor function description]



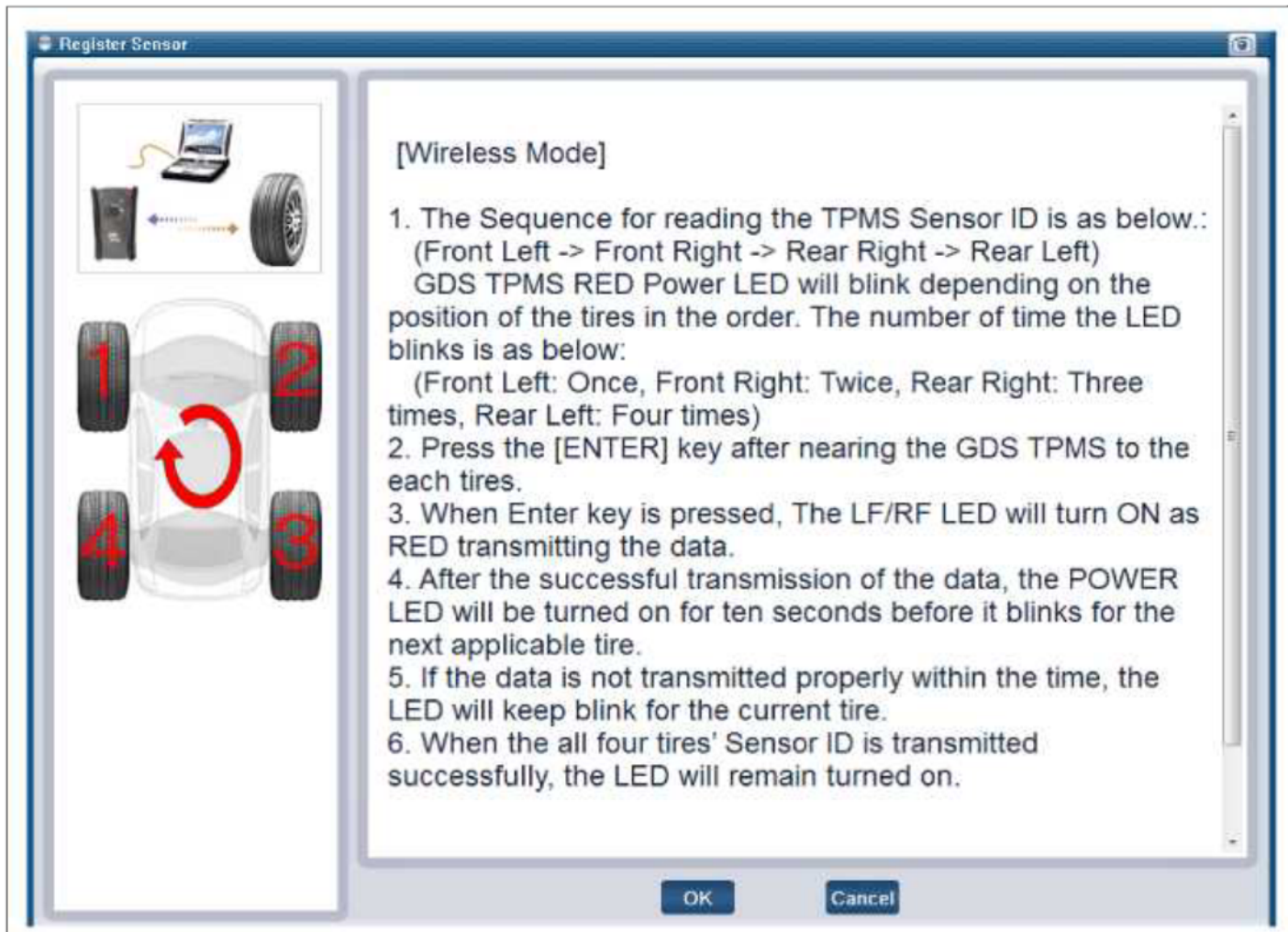
[Preparation phase sensor measurements]



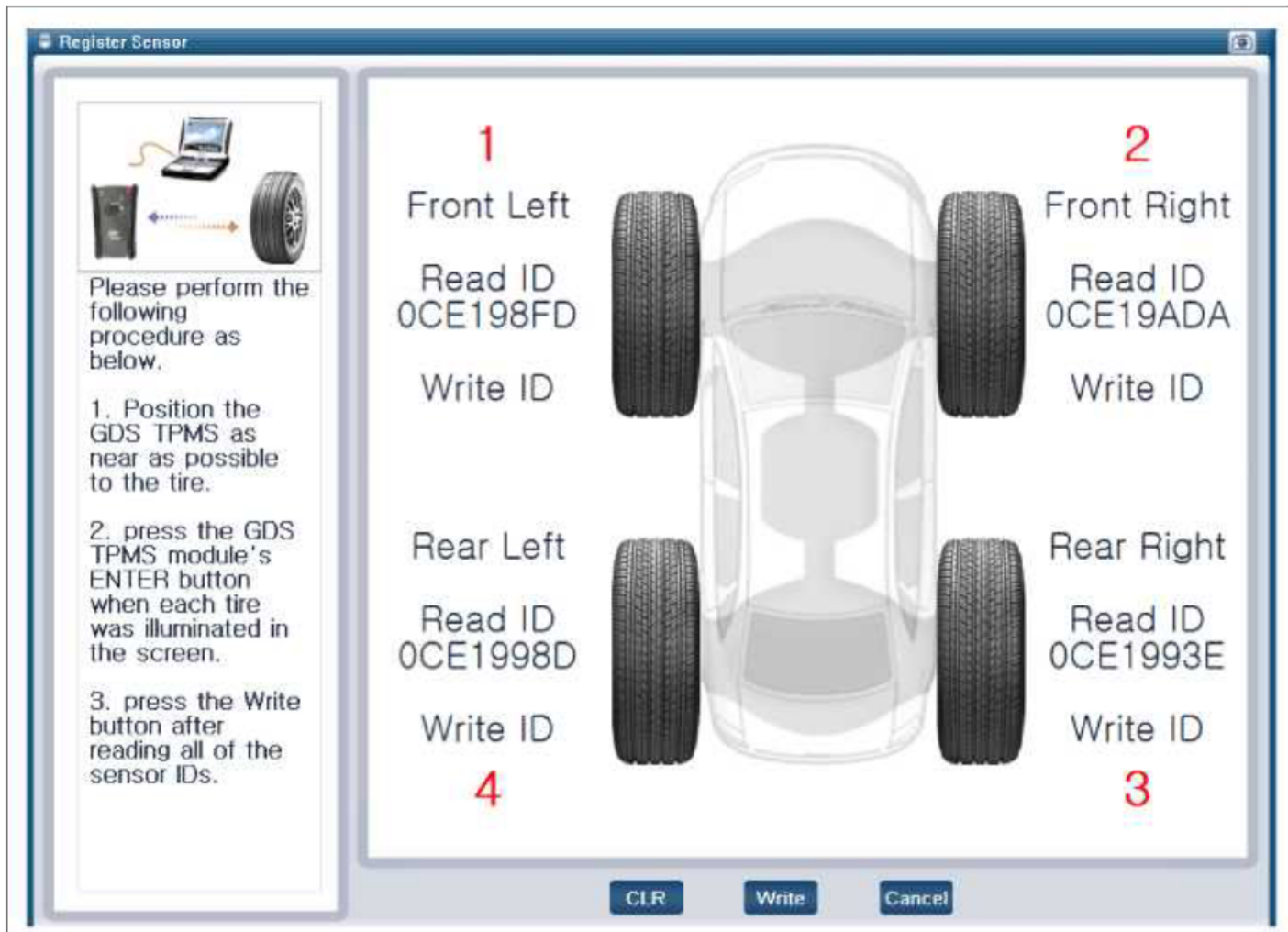
[Sensor register method 1]



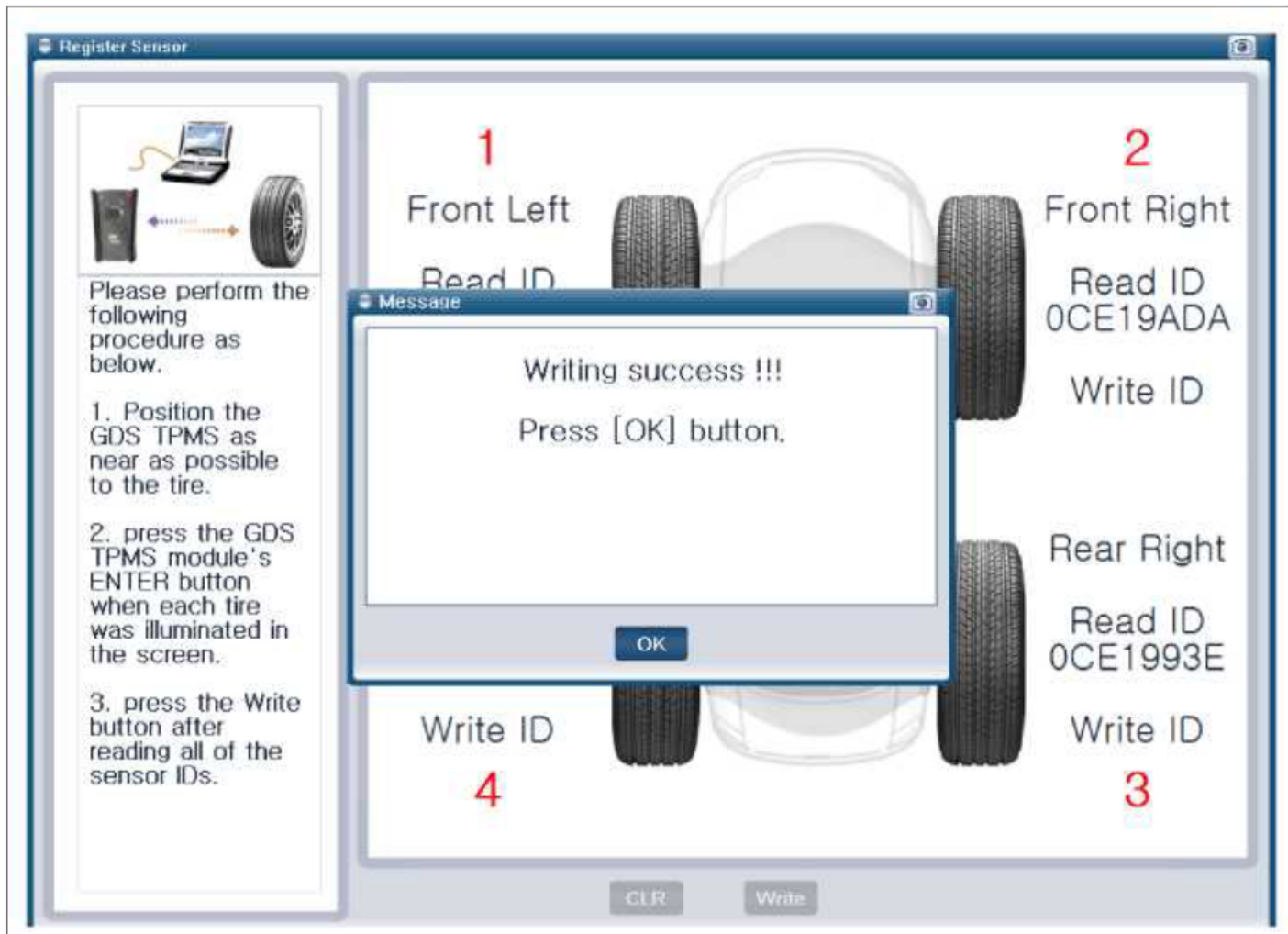
[Sensor register method 2]



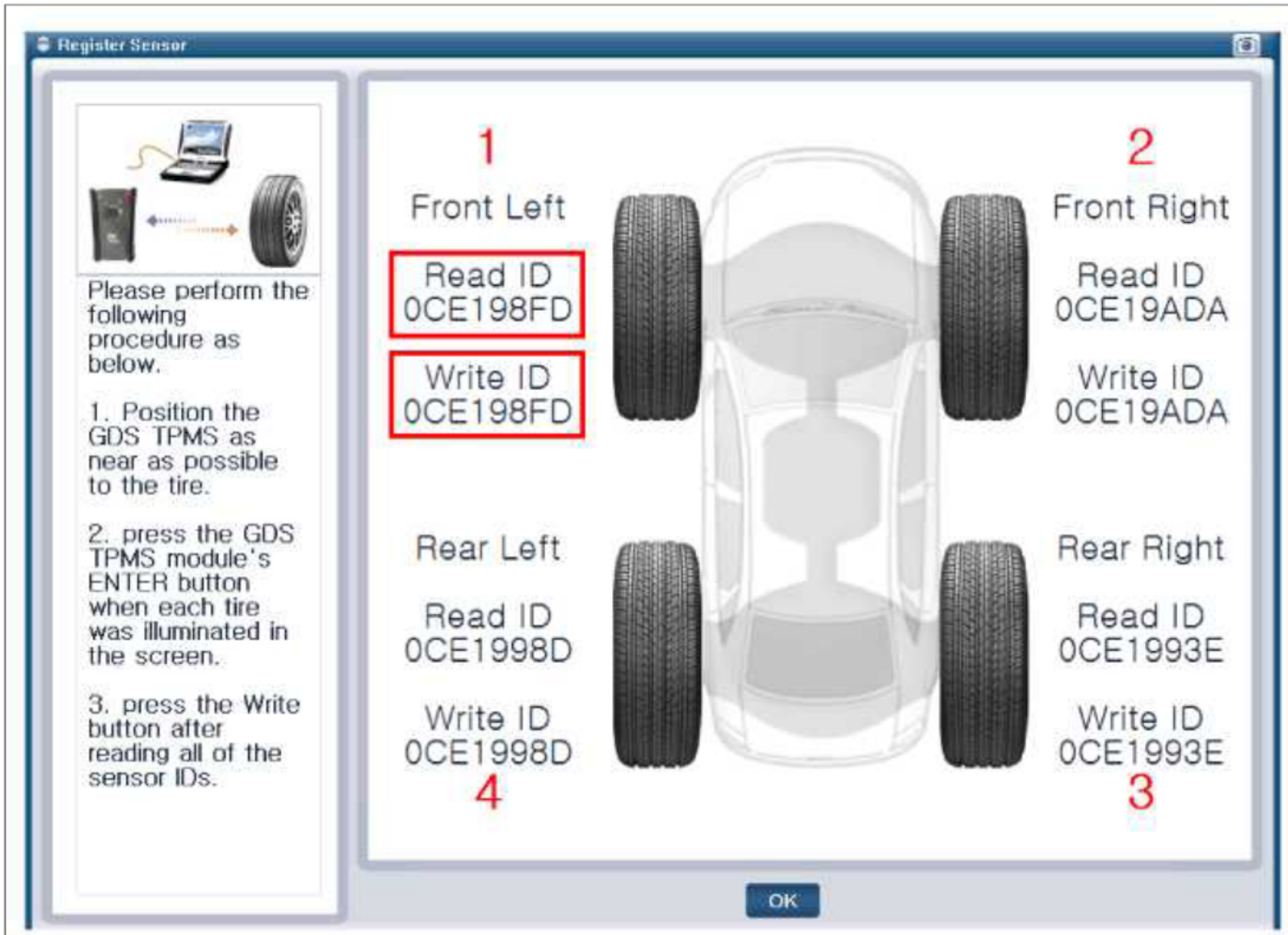
[Sensor register method 3]



[Sensor register method 4]

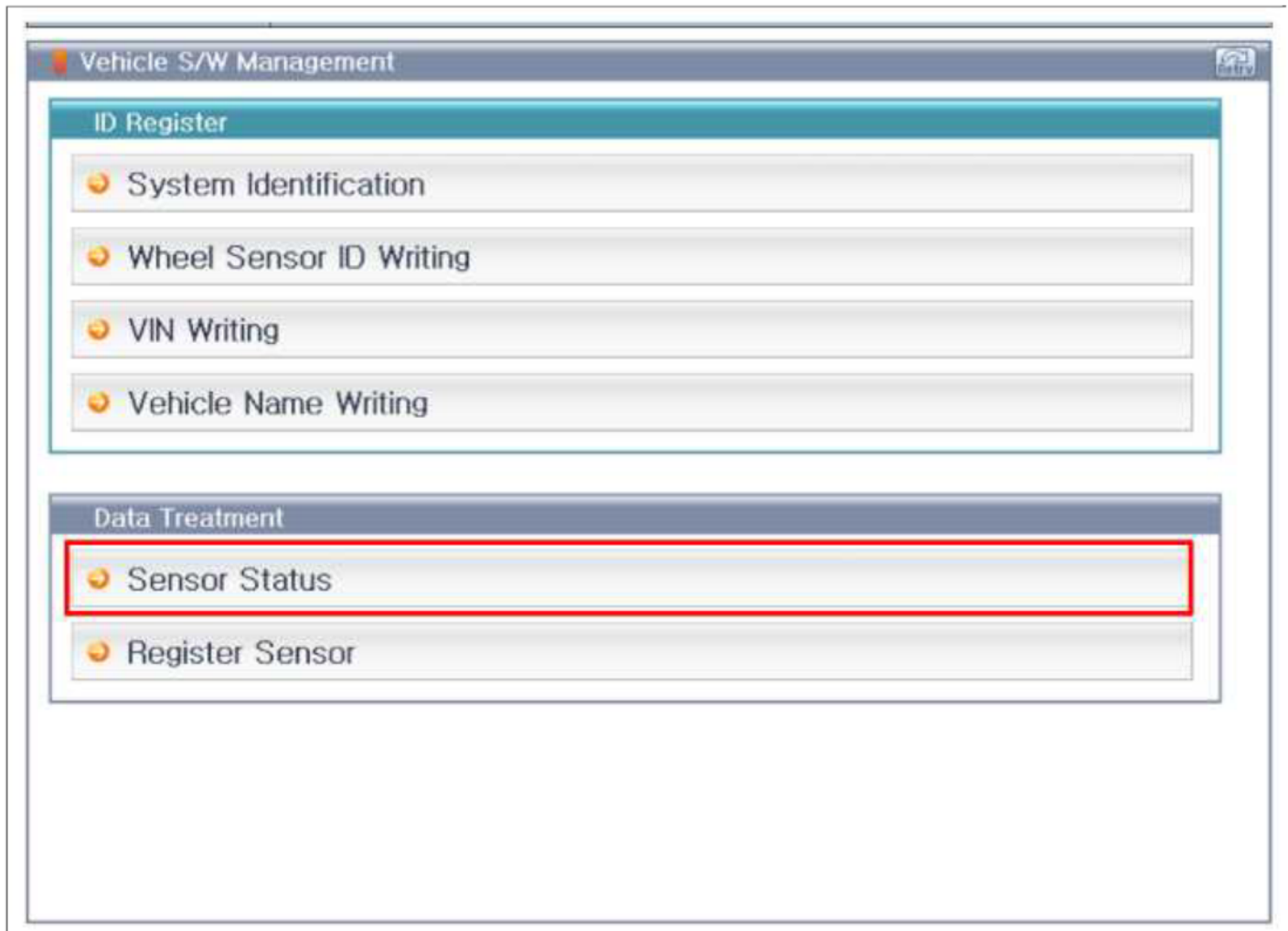


[Sensor register method 5]

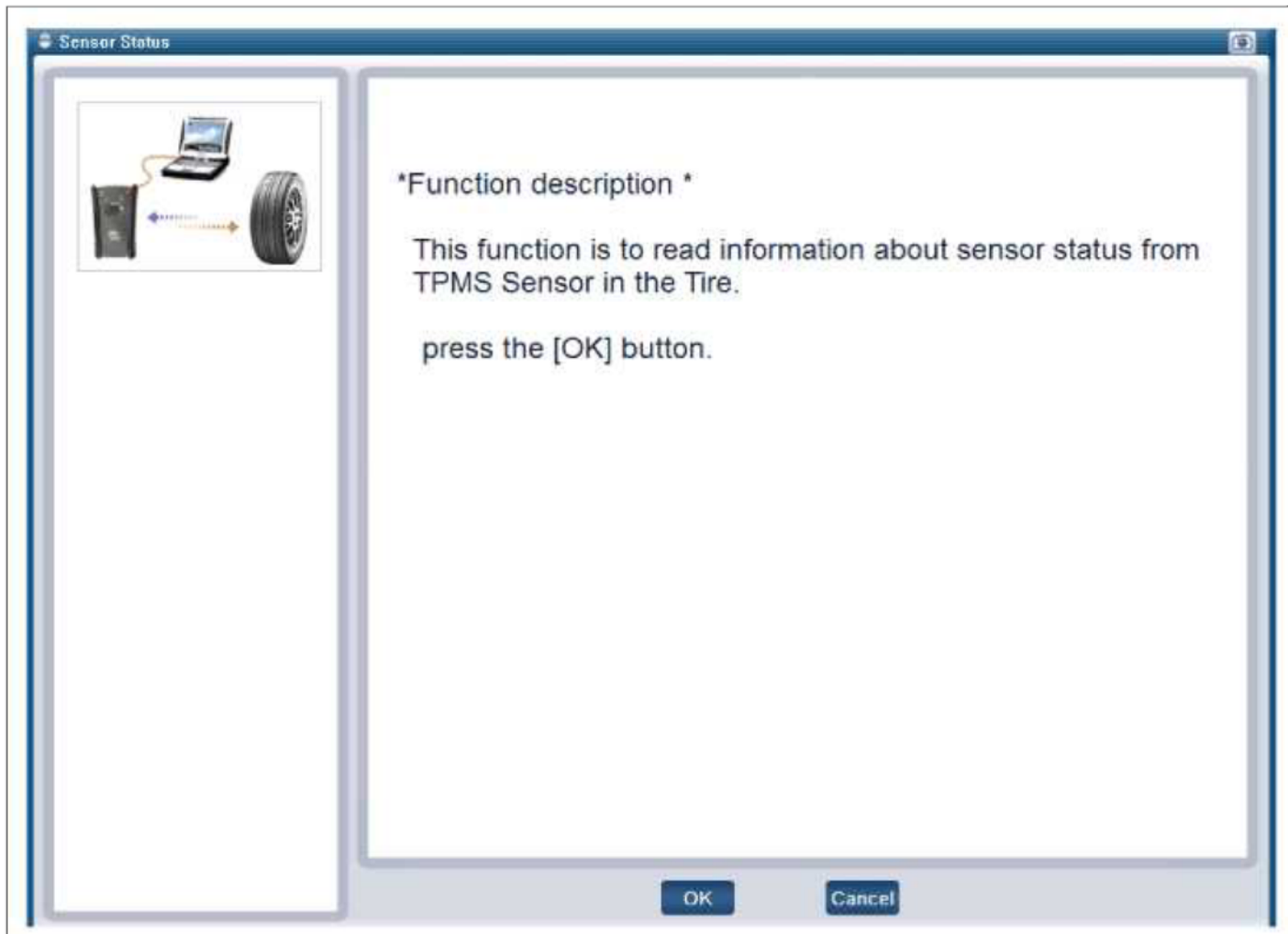
**NOTE**

- Write ID Read ID and be sure to check are the same.
- After registering successfully sensor "Sensor Wireless Information" by the execution determines whether the sensor is working properly.

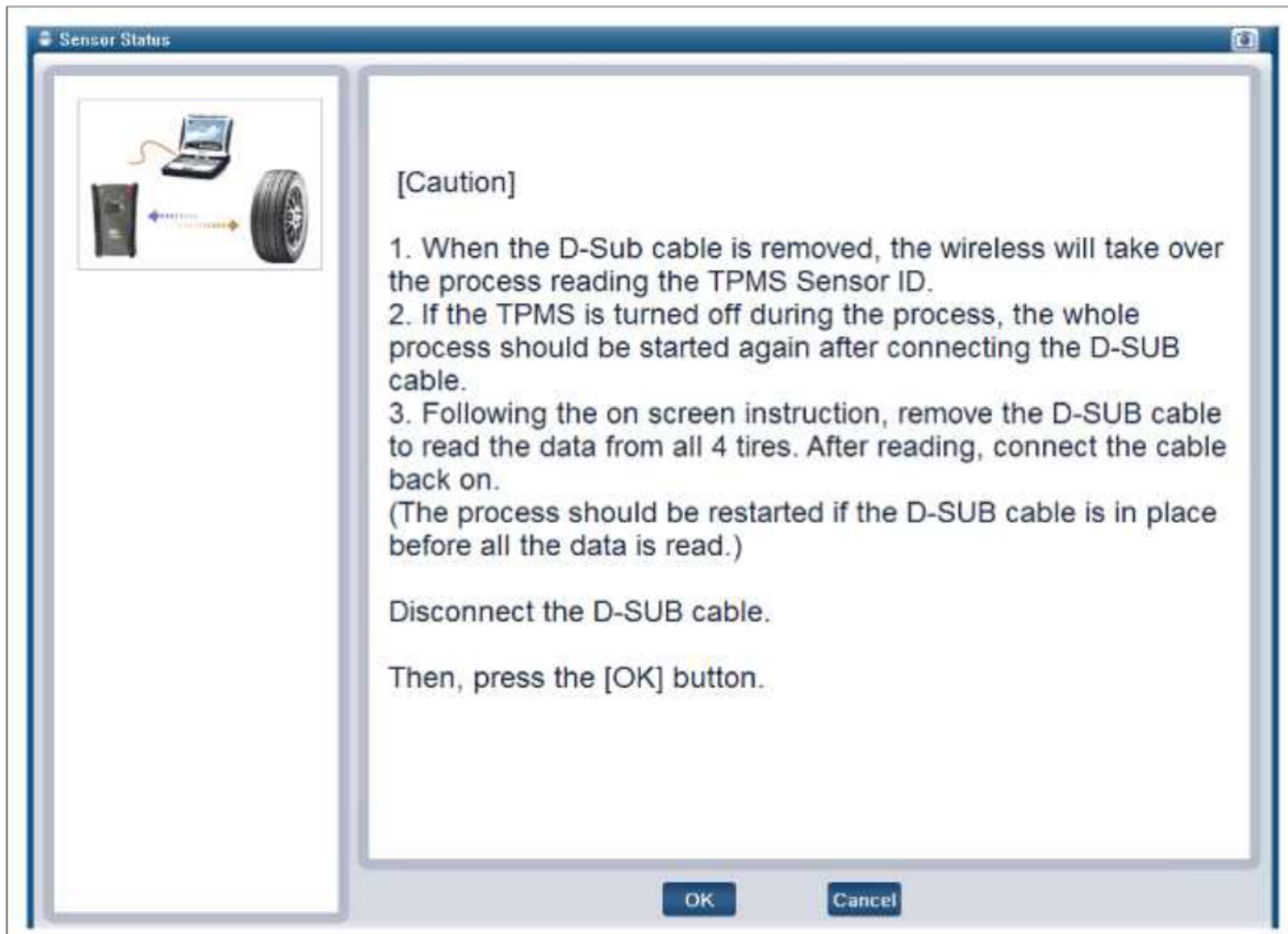
[Sensor Status initialization]



[Sensor function description]

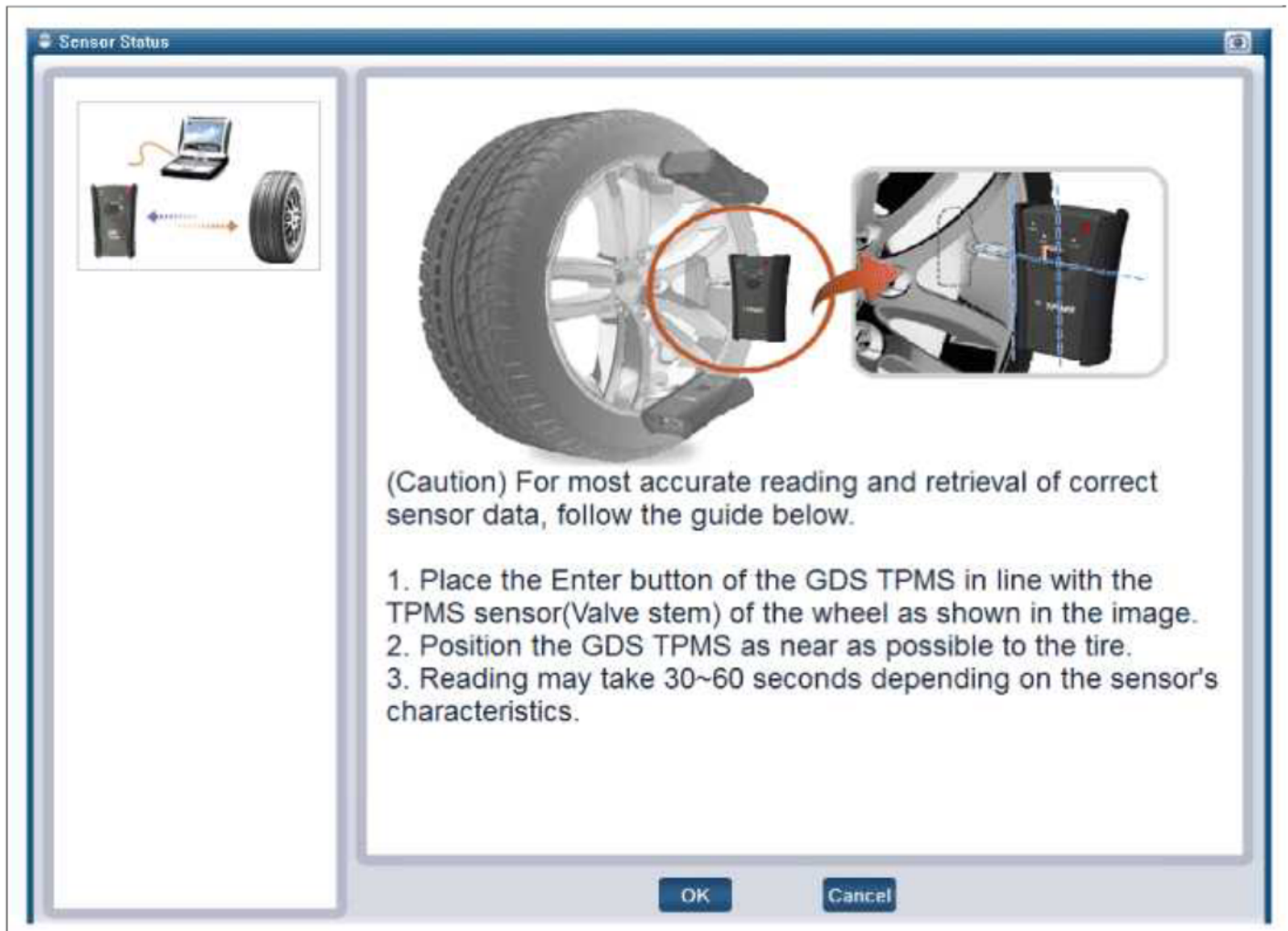


[Preparation phase sensor measurements]

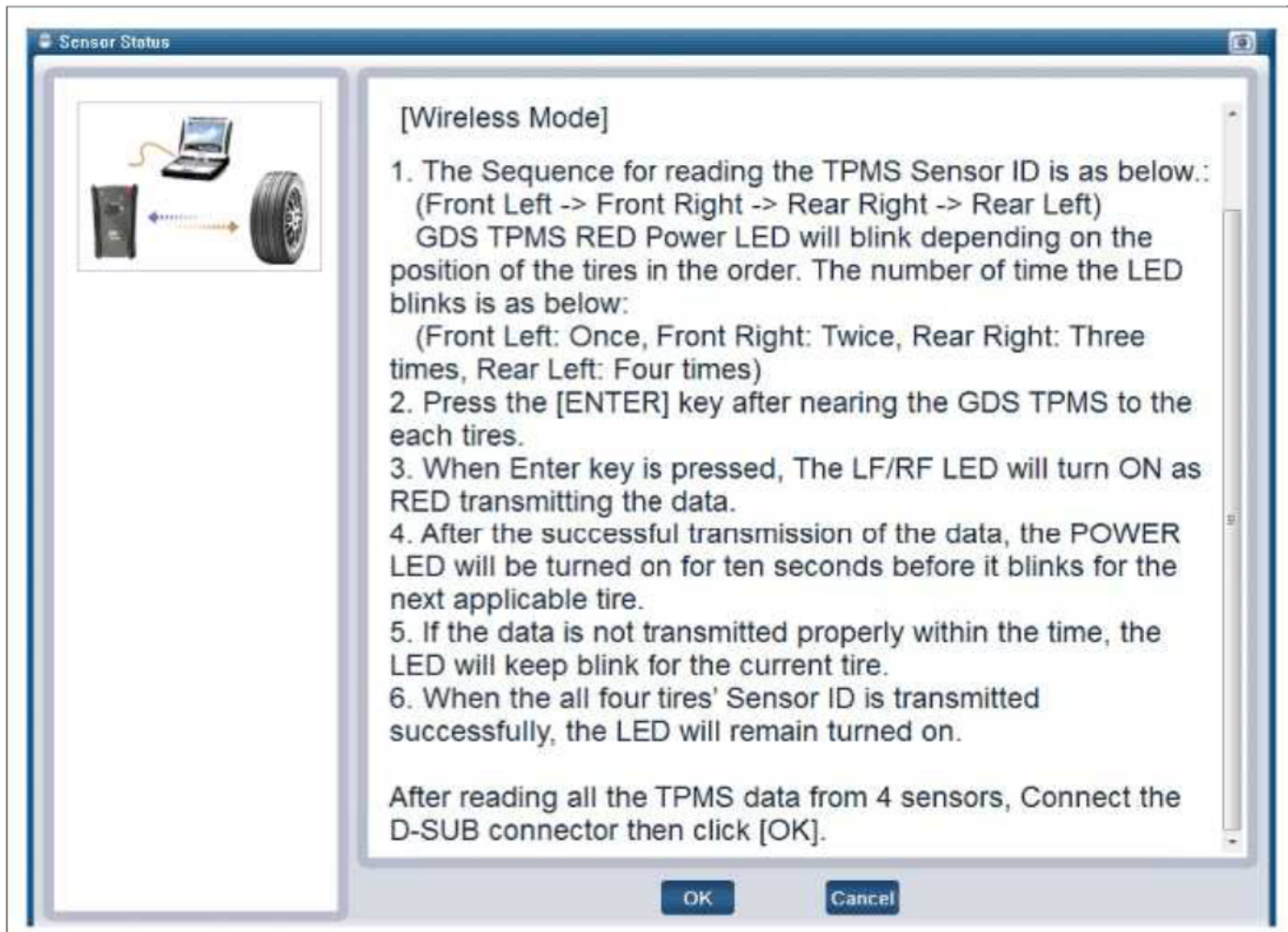
**NOTE**

- In North America, the cable is measured separately.
- In Domestic/General(European) area, the cable is measured without separation.

[Sensor measurements 1]



[Sensor measurements 2]



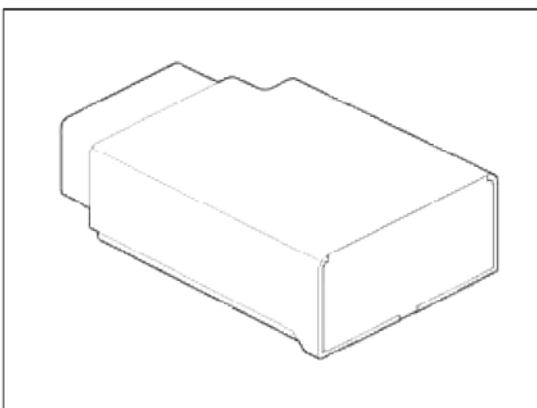
[Sensor Status]

**NOTE**

- Each entry must check whether each sensor normal.
- After replacing the tires or sensors, check the status of sensor is working properly after sensor registration process.

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 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 learning is enabled.

(3) Test State

- A. This state is only used in manufacturing plant to check RF transmission between sensor and receiver.

2. Overview

- A. Receives RF data from sensor.
- B. Uses sensor data to decide whether to turn on TREAD Lamp.
- C. Learn TPM sensor for under inflation monitoring automatically.
- D. Uses sensor information, distance travelled, background noise levels, Auto-learn status, short / open 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-learn takes place only once per Ignition cycle.
- B. On successful completion, 4 road wheel sensor ID's are latched into memory for monitoring.
- C. Until Auto-learn completes, previously learned sensors are monitored for under inflation / leak warnings.

2. General Conditions to Learn New Sensors:

- A. Receiver must determine that it is confident that sensor is not temporary:
 - 1) Uses vehicle speed.
 - 2) Uses confidence reduction of previously learned sensors.
- B. Typical time at driving continuously over 12.4 mph(20 kph) to learn a new sensor is up to 20 minutes.

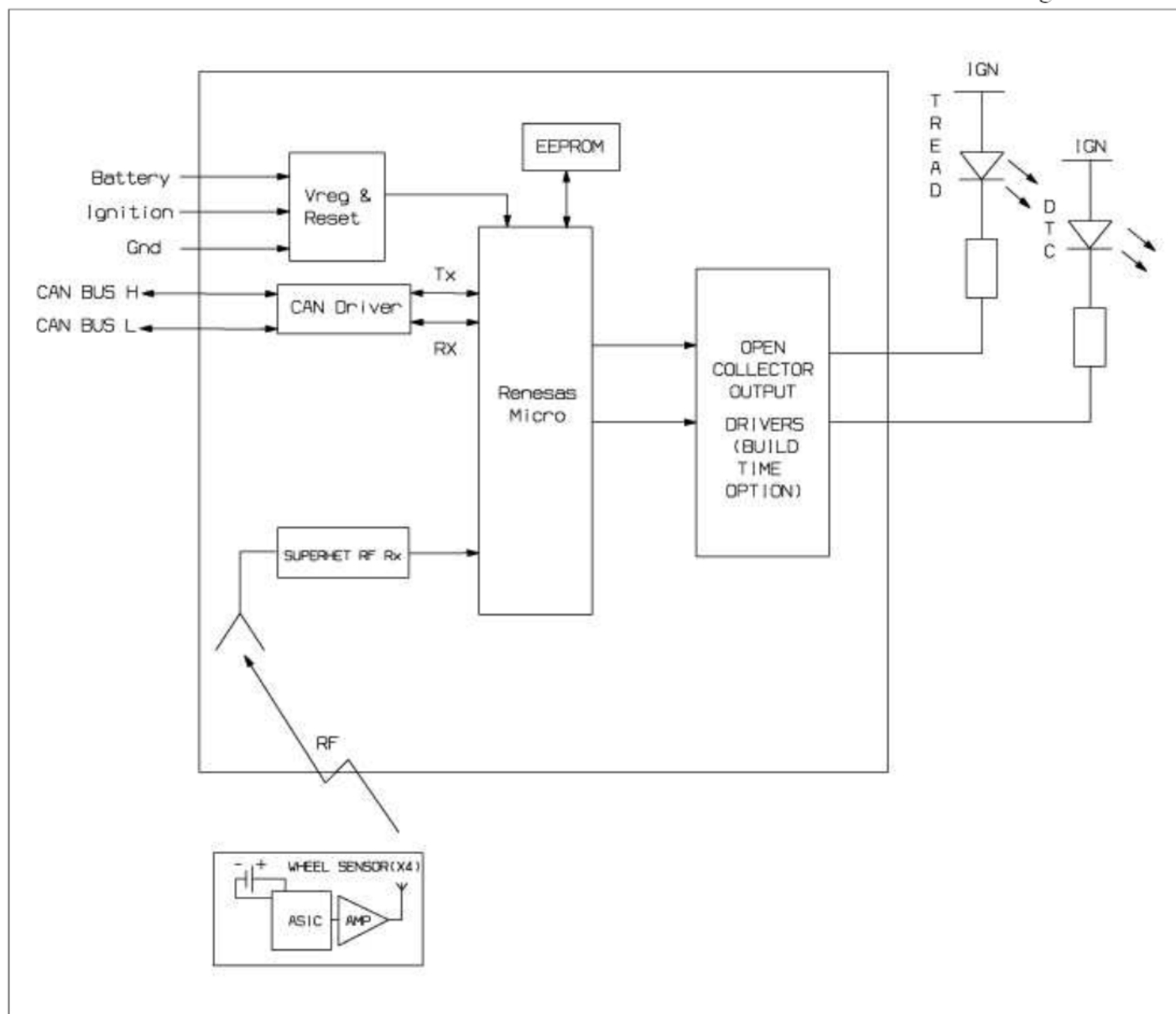
3. General Conditions to Un-Learn a sensor that is removed:

- A. It takes less than 20 minutes at 12.4 ~ 18.6 mph(20 ~ 30kph).
- B. Confidence reduction is dependent on time which vehicle is driven at speed greater than or equal to 12.4 mph(20 kph).

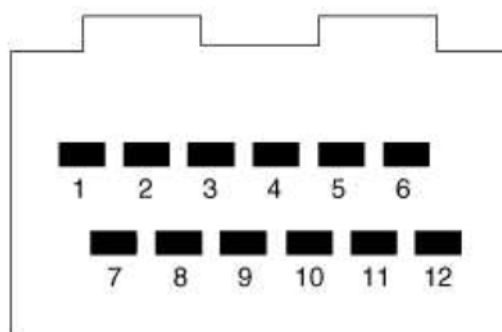
Suspension System > Tire Pressure Monitoring System > TPMS Receiver > Schematic Diagrams

Schematic Diagrams

TPMS Receiver Circuit Diagram



Harness Connector



Pin	Description
1	Battery
2	CAN_High
3	GND
4	-
5	-
6	-
7	IGN
8	CAN_Low
9	-
10	-
11	-
12	-

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

Replacement

NOTE

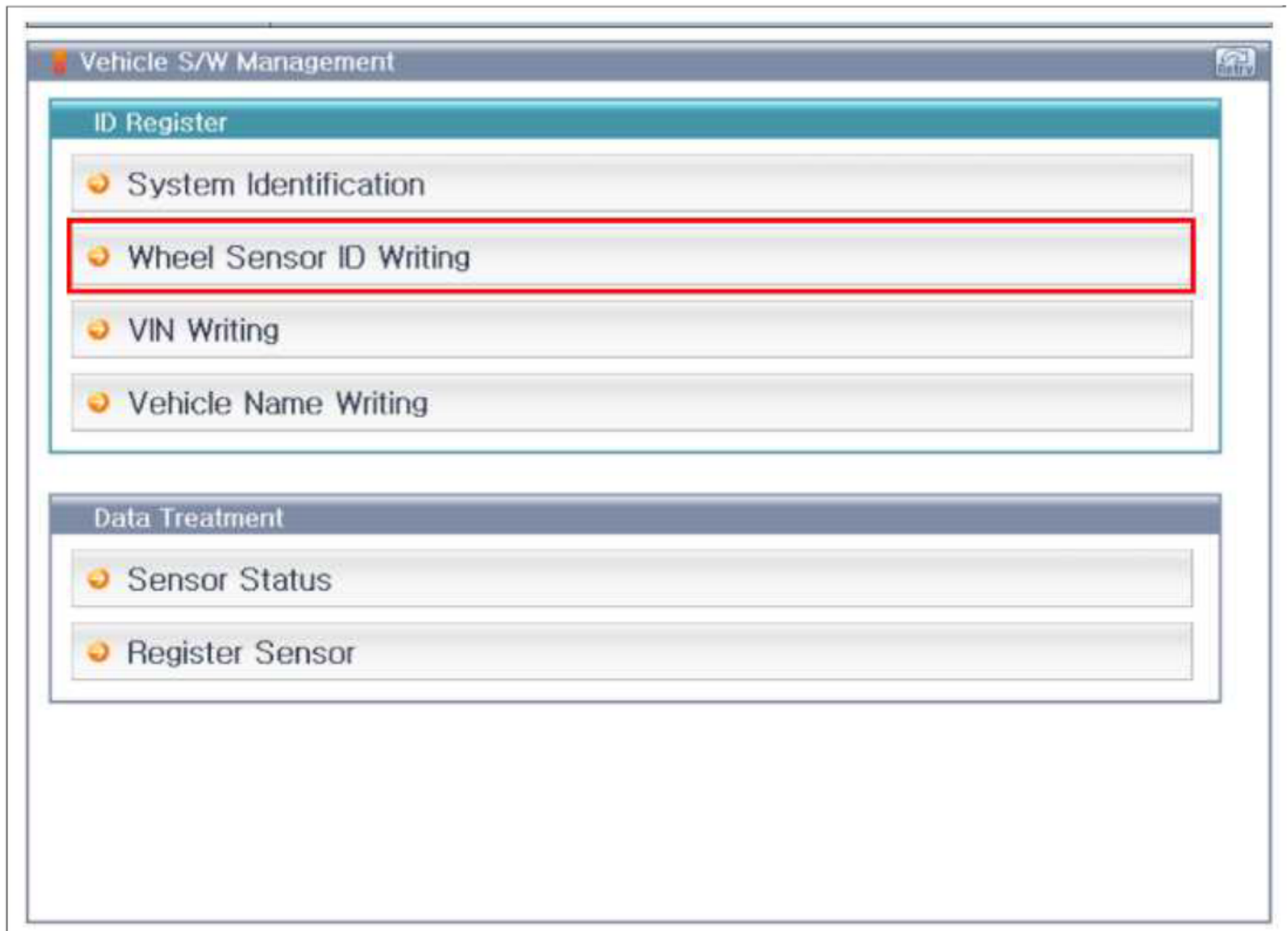
When the receiver first arrives for replacement:

- 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.

1. Disconnect vehicle battery.
2. Remove the crash pad garnish.
(Refer to BD group - "Crash Pad")
3. Remove faulty part and fit bracket assembly to new part.

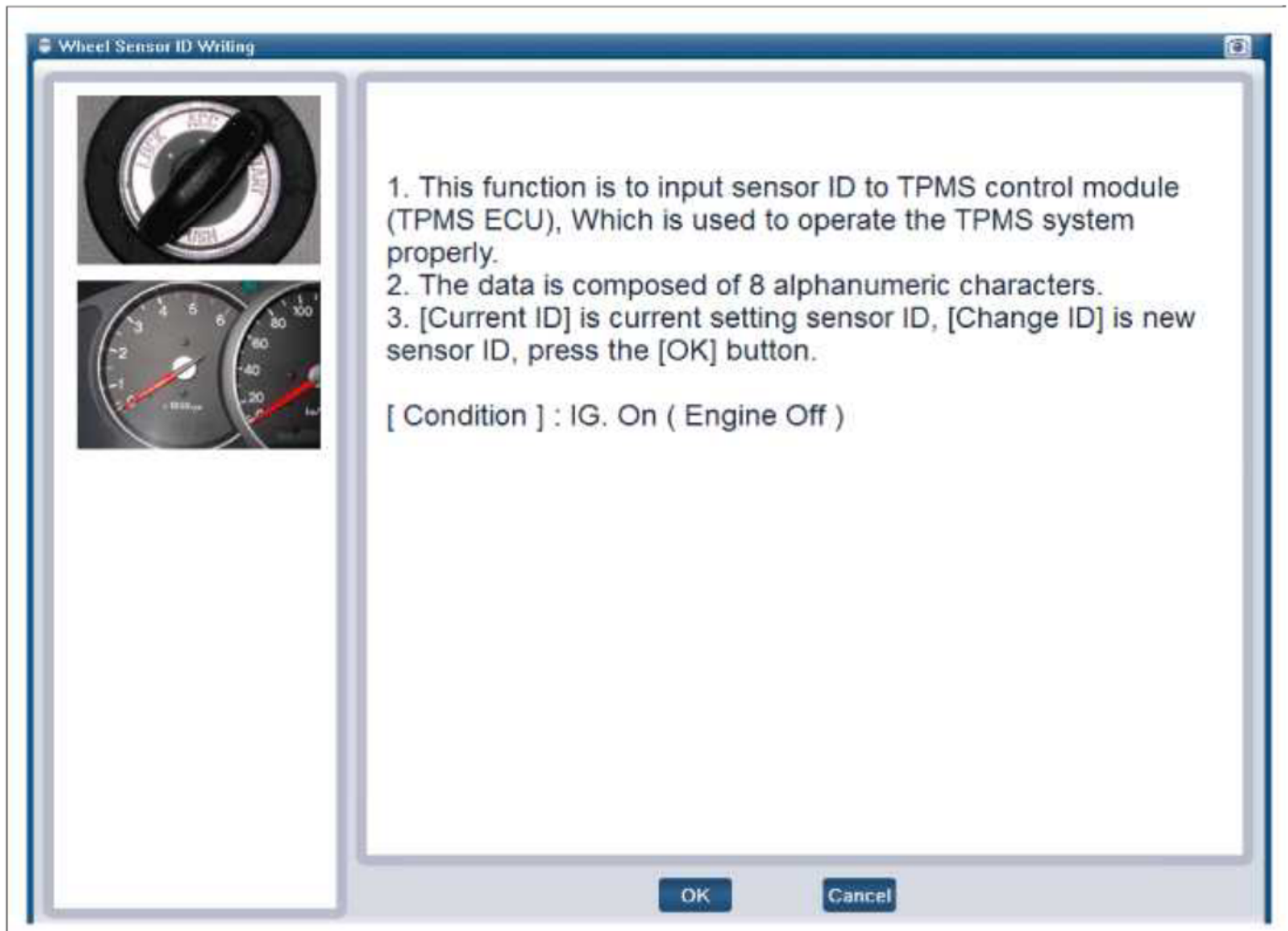


4. Secure new part to vehicle and fit connector.
5. Re-connect battery and turn Ignition on.
6. After replacing the receiver, learn by using self-diagnosis device(GDS).
[Wheel Sensor ID Writing (Wireless) initialization]

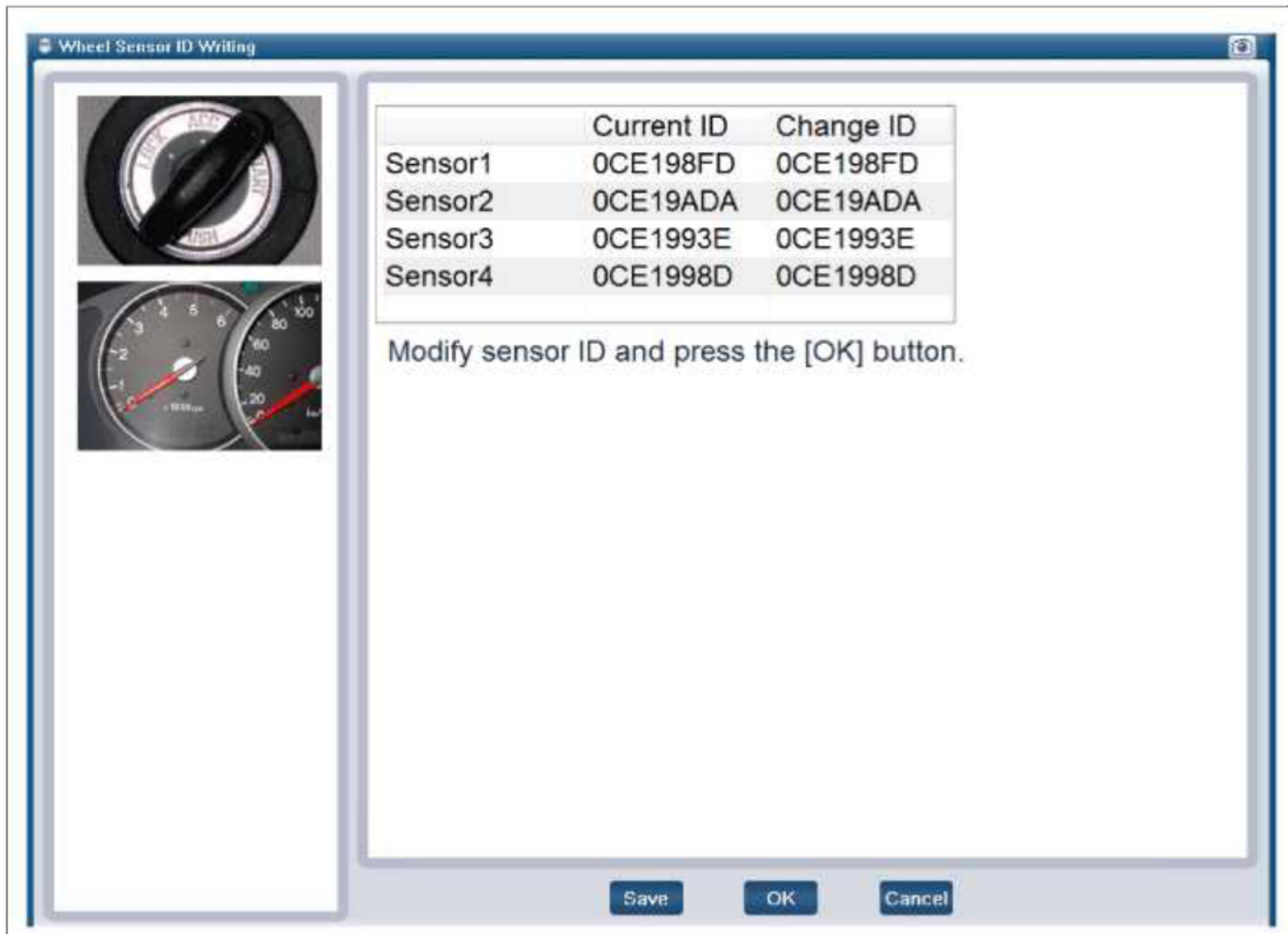


[Wheel Sensor ID Writing (Wireless) 1]

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[Wheel Sensor ID Writing (Wireless) 2]

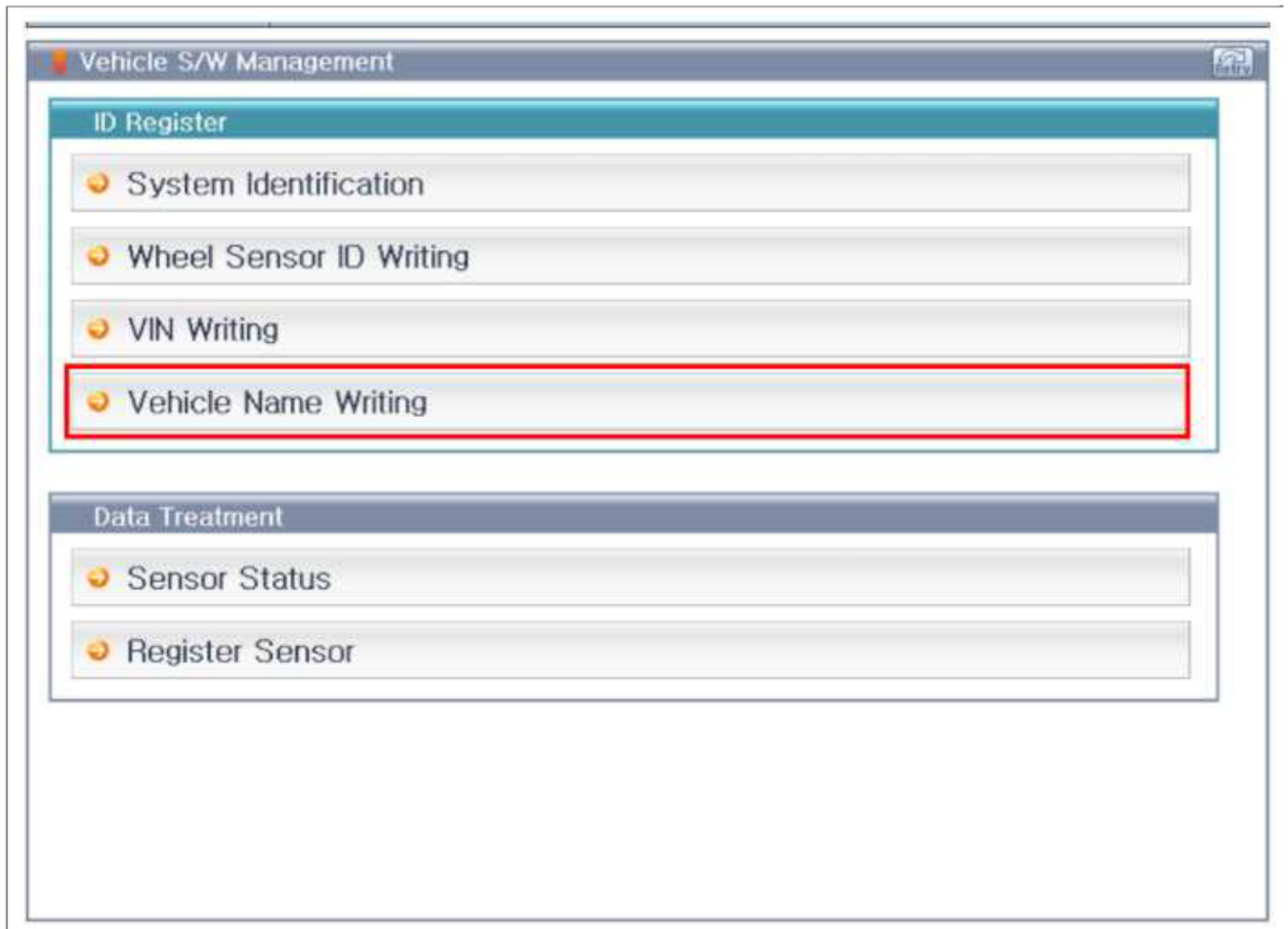


Diagnosis procedure by using diagnostic device

As manual for diagnosis methods by using diagnosis device, the main contents are as follows:

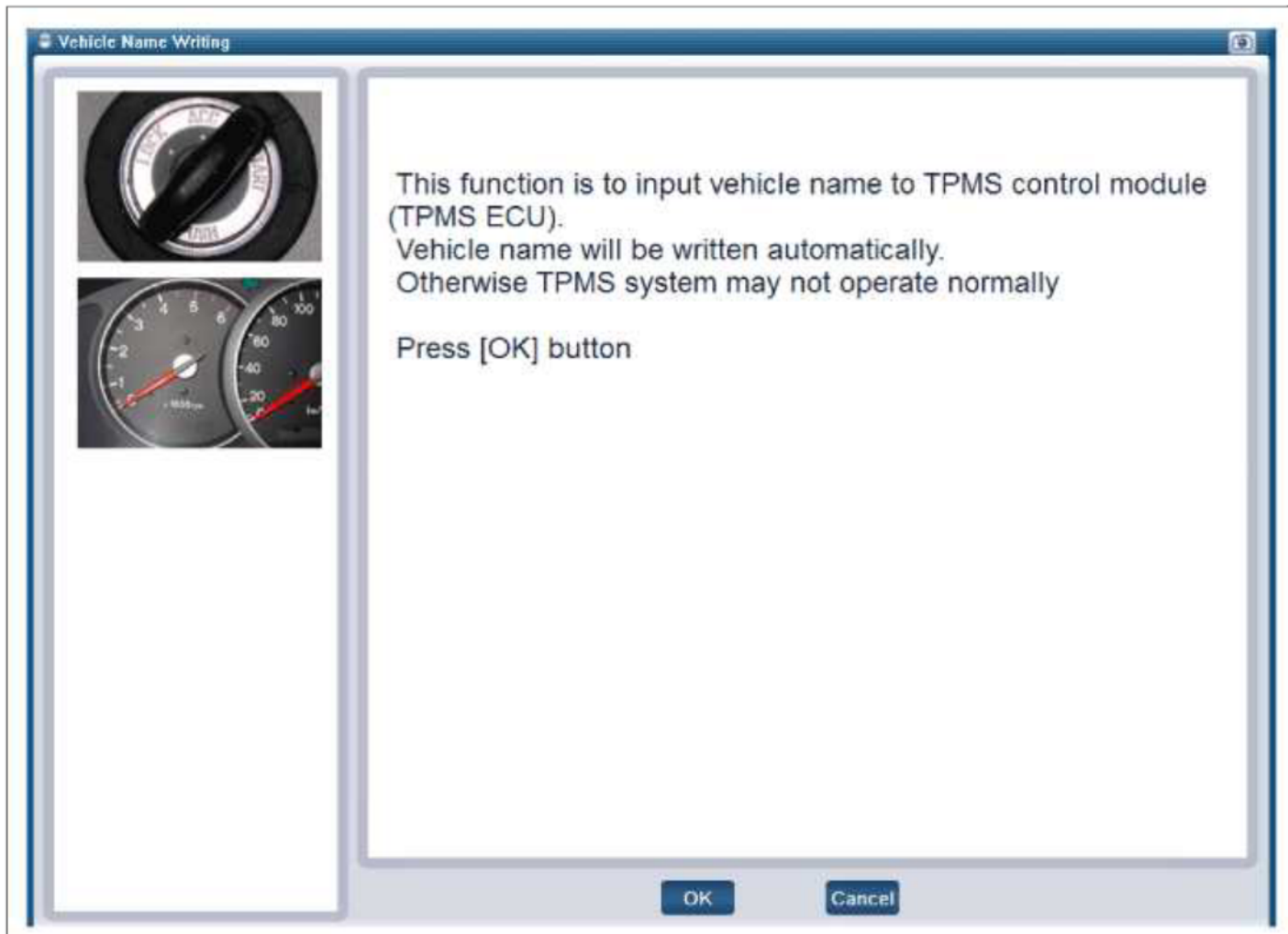
1. Connect self-diagnosis connector(16pins) located in the lower of driver side crash pad to self-diagnosis device, and then turn the self-diagnosis device after key is ON.
2. Select the "vehicle model" and "TPMS" on GDS vehicle selection screen, then select OK.

[Vehicle name input initialization]

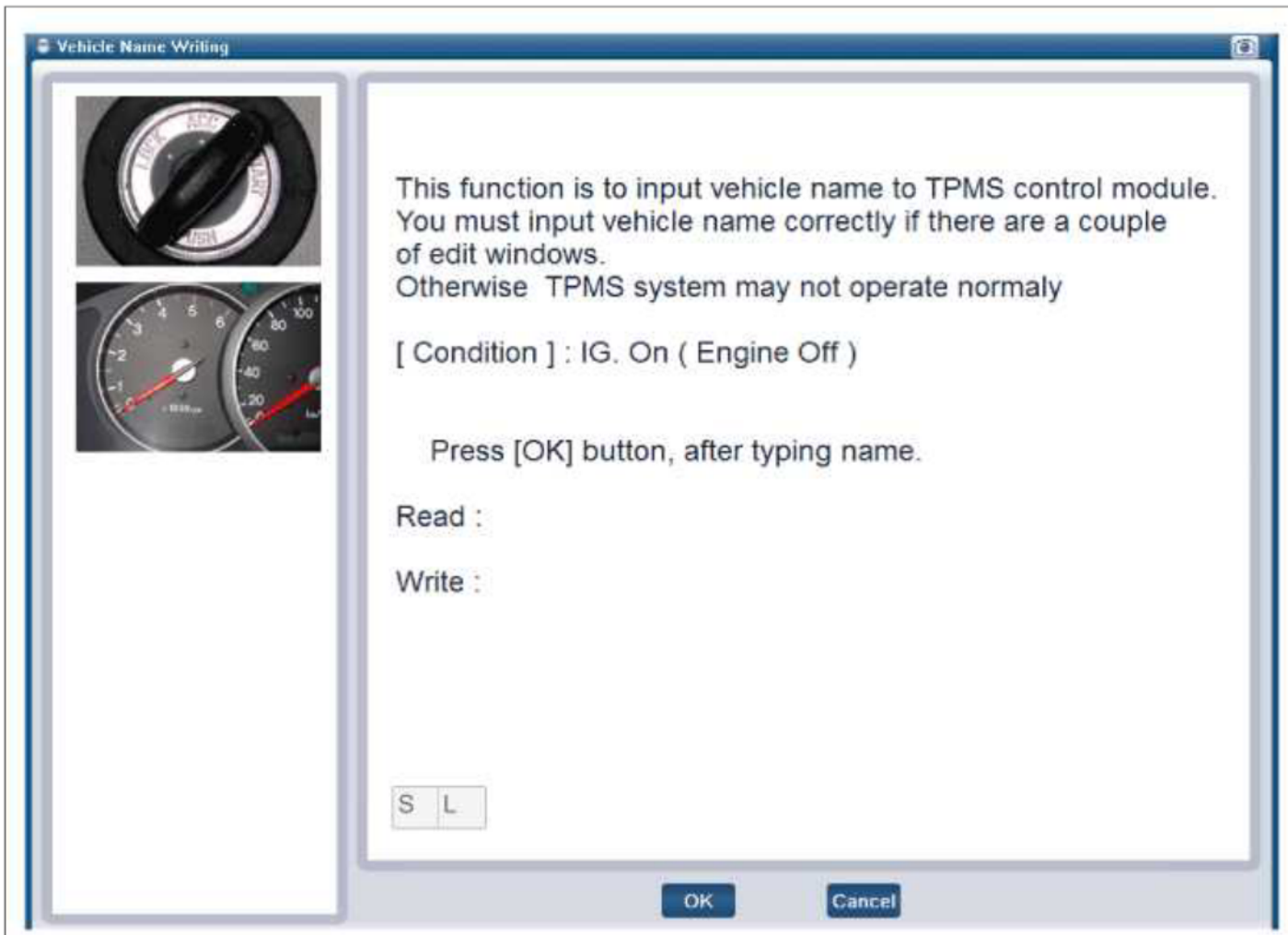


[Vehicle Name Writing 1]

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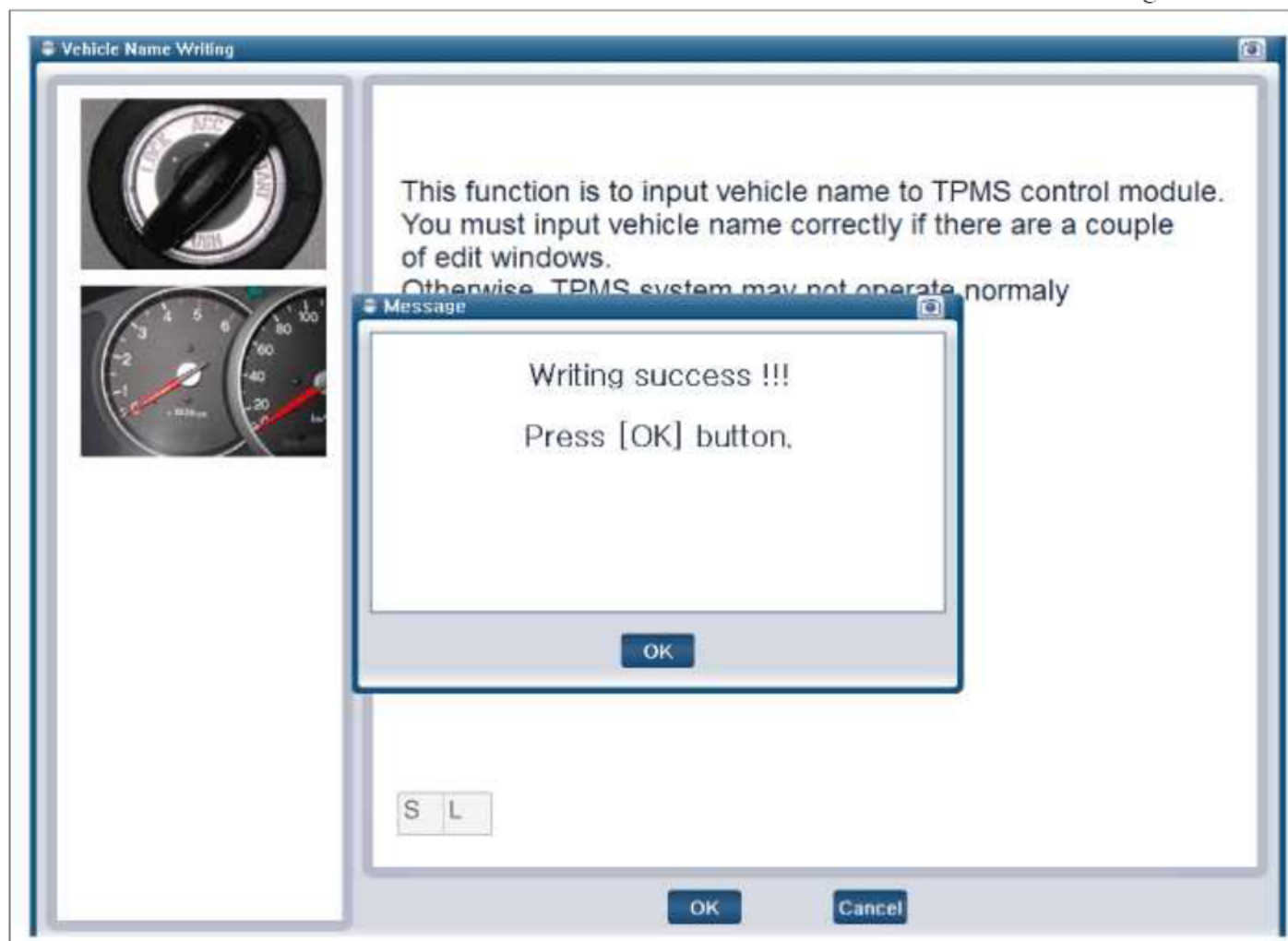


[Vehicle Name Writing 2]

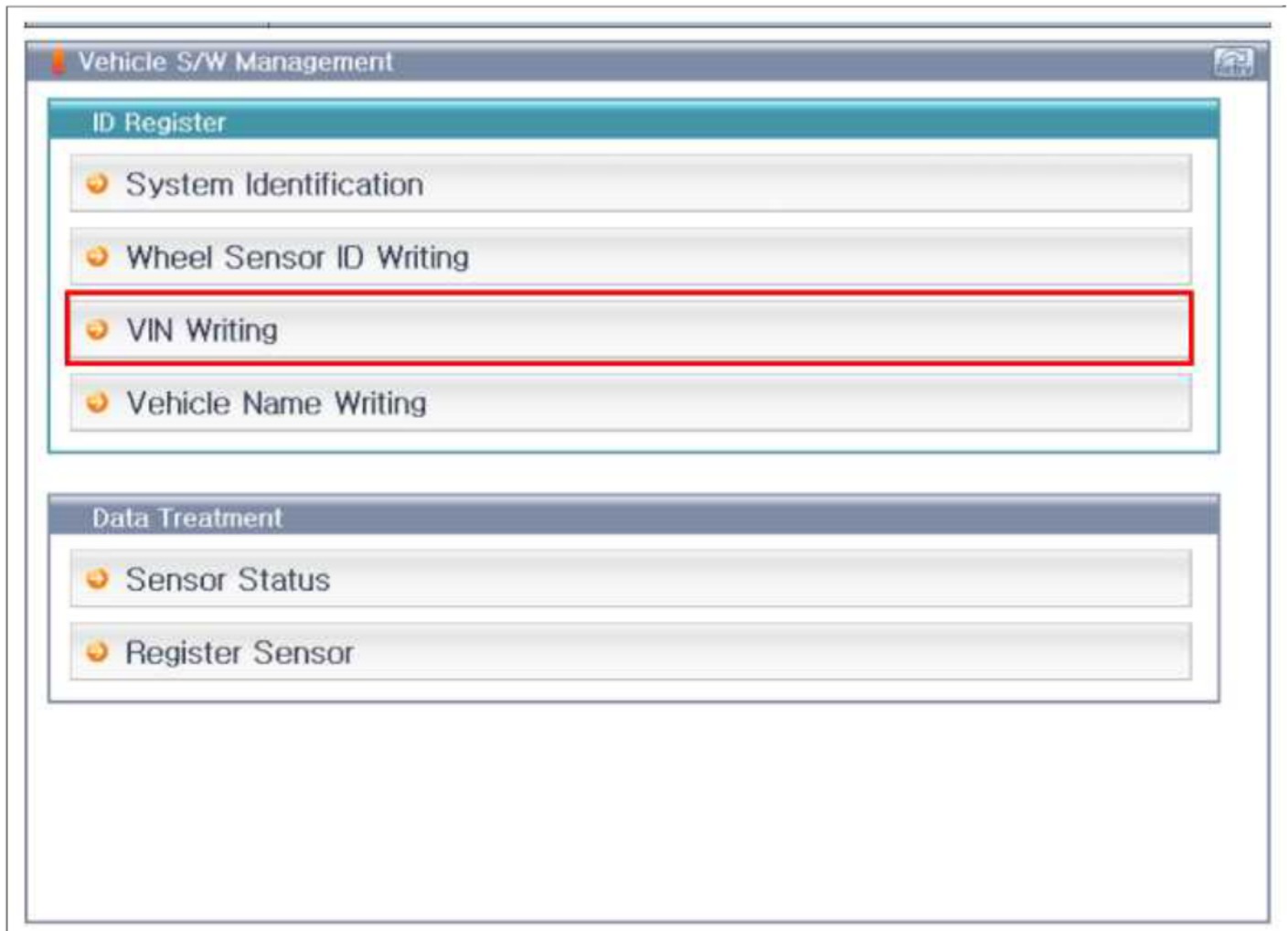
**NOTE**

- Check the specifications for the vehicle and the selected item option, press the OK button and enter is completed.
- When you input the vehicle name, check the tire inch and exactly input inch option to device.

[Vehicle Name Writing 3]

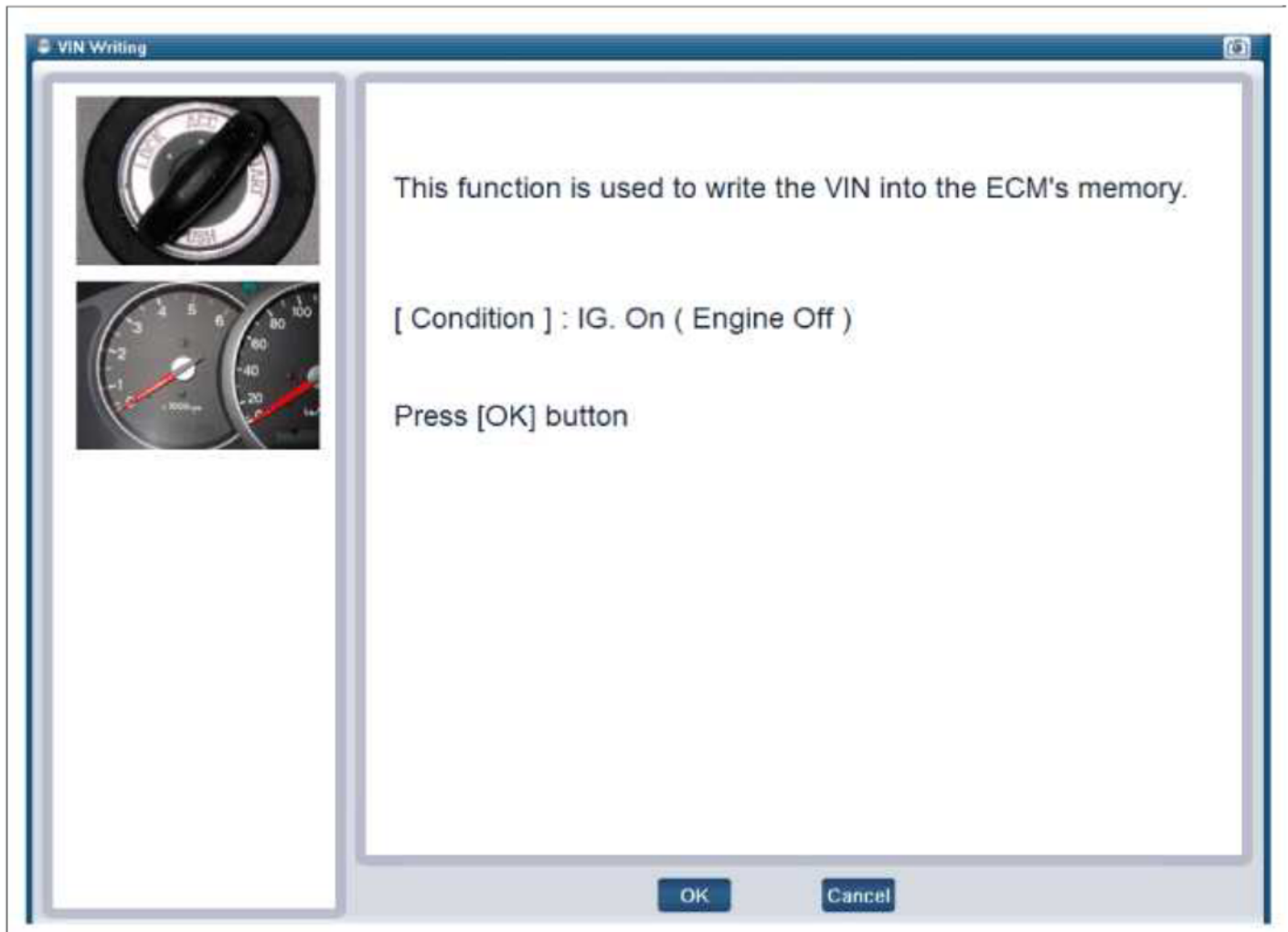


[VIN input initialization]

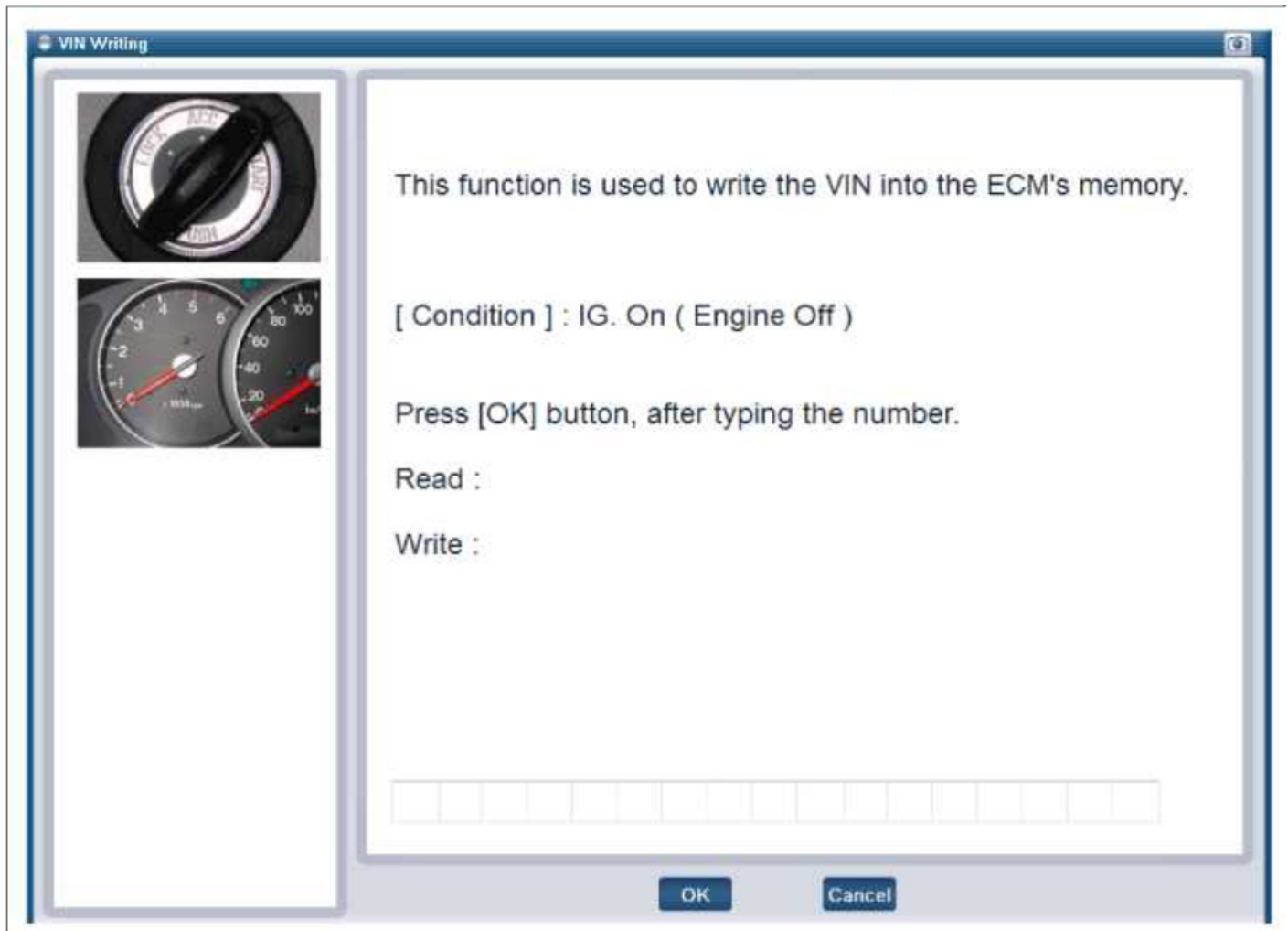


[VIN Writing 1]

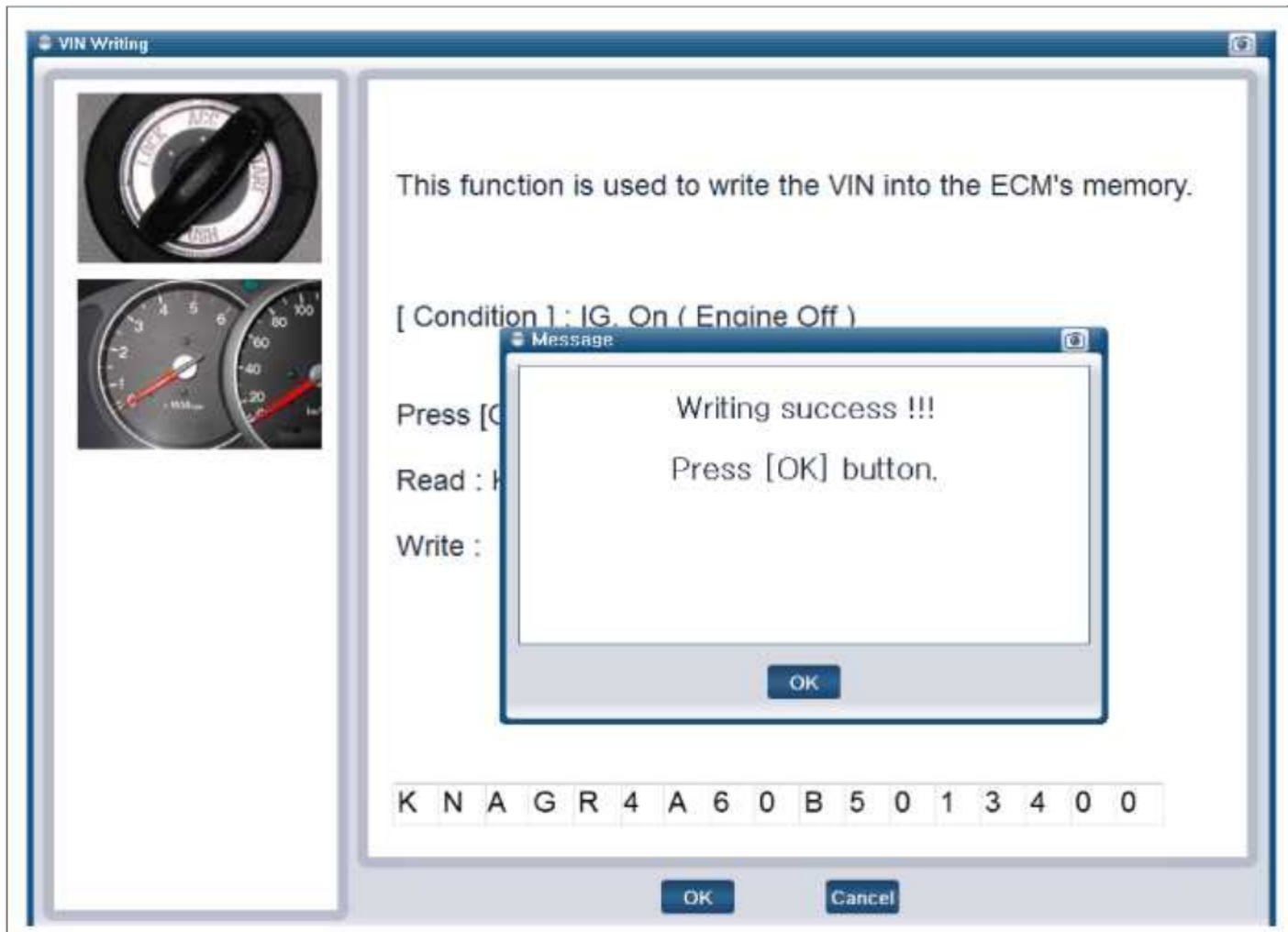
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[VIN Writing 2]



[VIN Writing 3]



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