GENESIS COUPE(BK) > 2010 > G 3.8 DOHC > Suspension System

Suspension System > General Information > Specifications

Specifications

Front Suspension

Item		Specification
Suspension type		Multi link
Shock absorber	Type	Gas
		Strut tour bar
Coil spring	Free Height [I.D. color]	294.0mm (Blue - White)

Rear Suspension

Item		Specification
Suspension type		Multi link
Shock absorber	Type	Gas
Coil spring	Free Height [I.D. color]	321.6mm (Blue - 1)
		307.8mm (Green - 1)

Wheel & Tire

Item			Specification
Wheel			7.5J x 18 : 8.0J x 18
			8.0J x 19 : 8.5J x 19
Temporary Spare Wheel	Aluminum		4.0T x 18
	Steel		4.0T x 17
Tire			225/45 R18 : 245/45 R18
			225/40 R19 : 245/40 R19
Temporary Spare Tire	Aluminum		135/80 D18
	Steel		135/90 D17
Tire pressure	Front	P225/45R18	2.5+0.07kg/cm² (35+1.0psi)
		P225/40R19	2.5+0.07kg/cm² (35+1.0psi)
		T135/90D17	4.2+0.07kg/cm² (60+1.0psi)
	Rear	P245/45R18	2.5+0.07kg/cm² (35+1.0psi)
		P245/40R19	2.5+0.07kg/cm² (35+1.0psi)
		T135/80D18	4.2+0.07kg/cm² (60+1.0psi)

Wheel Alignment

Item	Specification	
	Front	Rear

Toe-in	Total	0.28°±0.16°	0.16°±0.2°
	Individual	0.14°±0.8°	0.8°±0.1°
Camber angle		-0.5°±0.5°	-1.5°±0.5°
Caster angle		7.45°±0.5°	-
King-pin angle		13.7°	-

Tightening Torques

Front Suspension

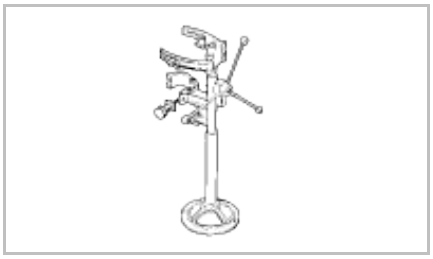
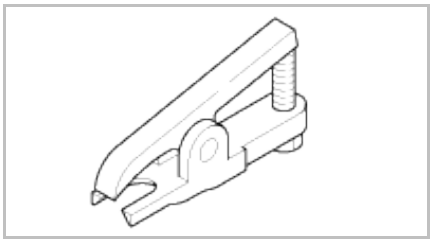
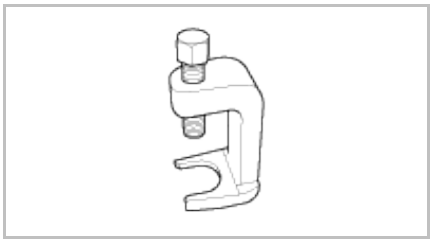
Item	Tightening torque (kgf.m)		
	N.m	Kgf.m	lb-ft
Hub nuts	90 ~ 110	9 ~ 11	65 ~ 80
Tension arm to sub frame	140 ~ 160	14 ~ 16	101 ~ 116
Tension arm to front axle	80 ~ 90	8 ~ 9	58 ~ 65
Tension arm to flexible hose	7 ~ 11	0.7 ~ 1.1	5 ~ 8
Lateral arm to sub frame	140 ~ 160	14 ~ 16	101 ~ 116
Lateral arm to front axle	80 ~ 90	8 ~ 9	58 ~ 65
Front stabilizer bar to sub frame	50 ~ 65	5 ~ 6.5	36 ~ 47
Front stabilizer bar to stabilizer link	100 ~ 120	10 ~ 12	72 ~ 87
Steering gear box to front axle	24 ~ 34	2.4 ~ 3.4	17 ~ 24

Rear Suspension

Item	Tightening torque (kgf.m)		
	N.m	Kgf.m	lb-ft
Hub nuts	90 ~110	9 ~ 11	65 ~ 80
Rear shock absorber to frame	45 ~ 60	4.5 ~ 6	33 ~ 43
Rear shock absorber to lower arm	140 ~ 160	14 ~ 16	101 ~ 116
Front upper arm to sub frame	100 ~ 120	10 ~ 12	72 ~ 87
Front upper arm to rear axle	100 ~ 120	10 ~ 12	72 ~ 87
Rear upper arm to sub frame	100 ~ 120	10 ~ 12	72 ~ 87
Rear upper arm to rear axle	140 ~ 160	14 ~ 16	101 ~ 116
Rear stabilizer bar to sub frame	50 ~ 65	5 ~ 6.5	36 ~ 47
Rear stabilizer link to lower arm	100 ~ 120	10 ~ 12	72 ~ 87
Rear stabilizer bar to stabilizer link	100 ~ 120	10 ~ 12	72 ~ 87
Rear lower arm to sub frame	140 ~ 160	14 ~ 16	101 ~ 116
Rear lower arm to rear axle	140 ~ 160	14 ~ 16	101 ~ 116
Assist arm to sub frame	140 ~ 160	14 ~ 16	101 ~ 116
Assist arm to rear axle	100 ~ 120	10 ~ 12	72 ~ 87
Trailing arm to sub frame	100 ~ 120	10 ~ 12	72 ~ 87
Trailing arm to rear axle	100 ~ 120	10 ~ 12	72 ~ 87

Suspension System > General Information > Special Service Tools

Special Service Tools

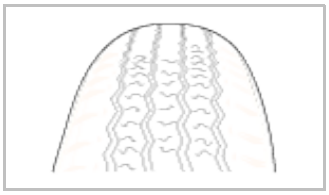
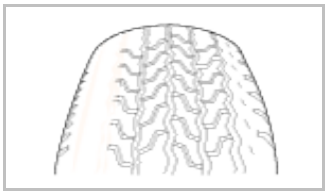
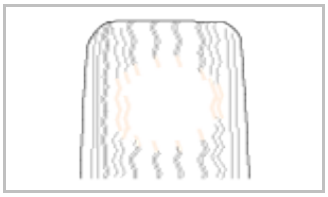
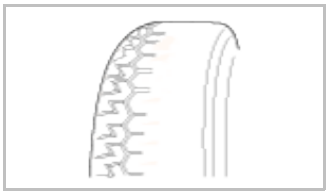
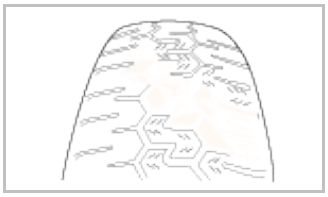
Tool (Number and Name)	Illustration	Use
09546-26000 Strut spring compressor		Compression of coil spring
09568-34000 Ball joint remover		Removal of Ball joint
09568-2J100 Ball joint remover		Removal of Ball joint

Suspension System > General Information > Troubleshooting

Troubleshooting

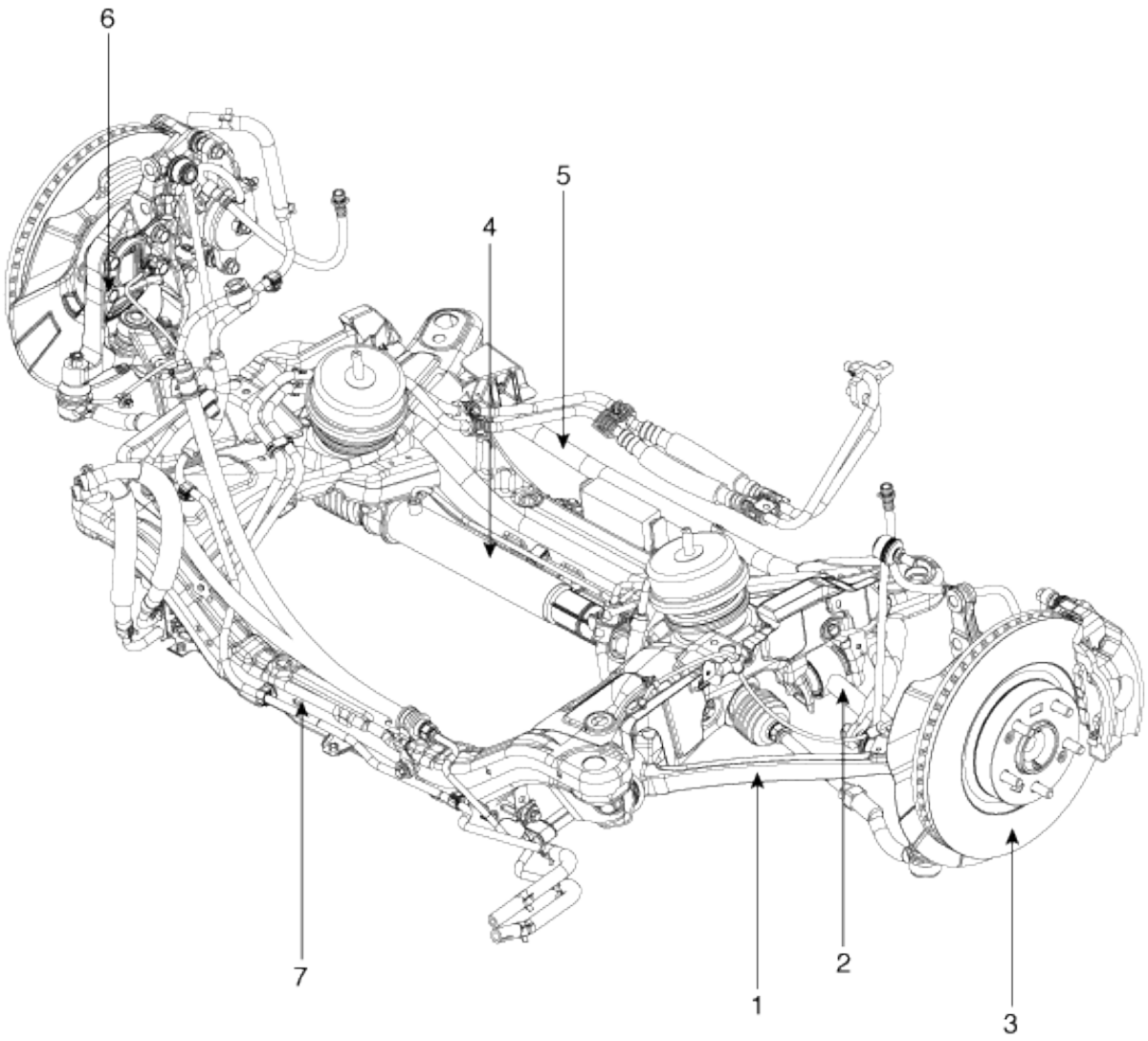
Trouble symptom	Probable cause	Remedy
Hard steering	Improper front wheel alignment	Repair
	Excessive turning resistance of lower arm ball joint	Replace
	Flat tire	Adjust
	No power assist	Repair or Replace
Poor return of steering wheel to center	Improper front wheel alignment	Repair
Poor ride quality	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
	Improper front wheel alignment	Repair

Abnormal tire wear	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
		
• 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 • Under-inflated tires
Partial wear	Feathered edge	Wear pattern
		
• Caused by irregular burrs on brake drums. • Under-inflated tires • Lack of rotation	• 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

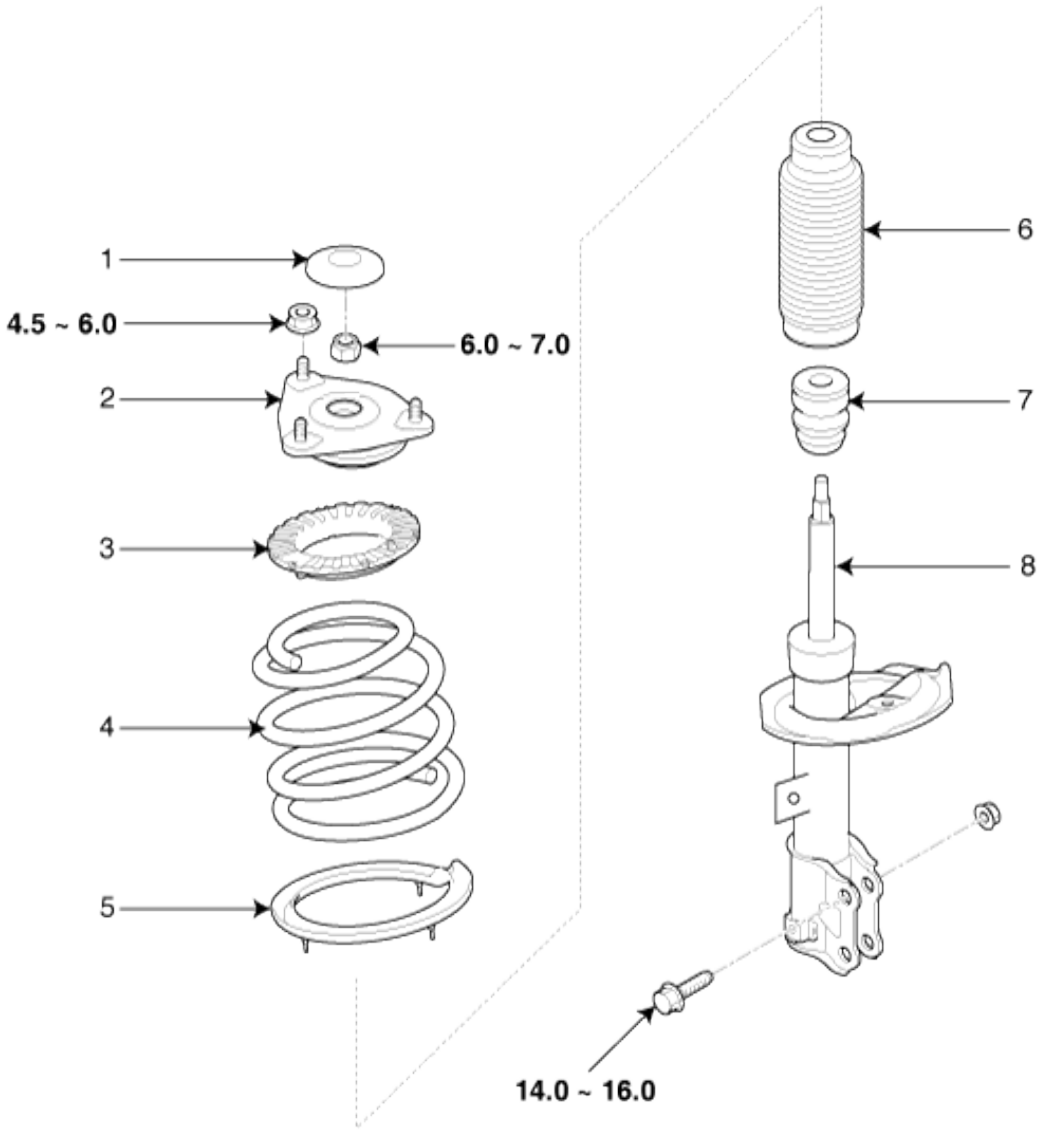
Components



1. Tension arm 2. Lateral arm 3. Front disk 4. Steering gearbox	5. Stabilizer bar 6. Front axle 7. Sub frame

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

Components



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

1. Insulator cap	5. Spring lower pad
2. Insulator assembly	6. Dust cover
3. Spring upper pad	7. Bumper rubber
4. Coil spring	8. Shock absorber

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

Replacement

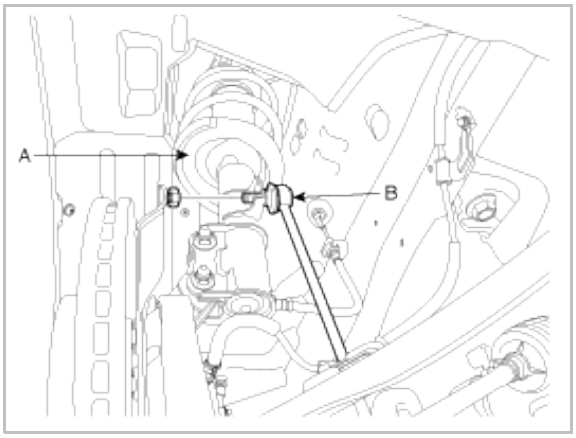
1. Remove the front wheel & tire.

Tightening torque :

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

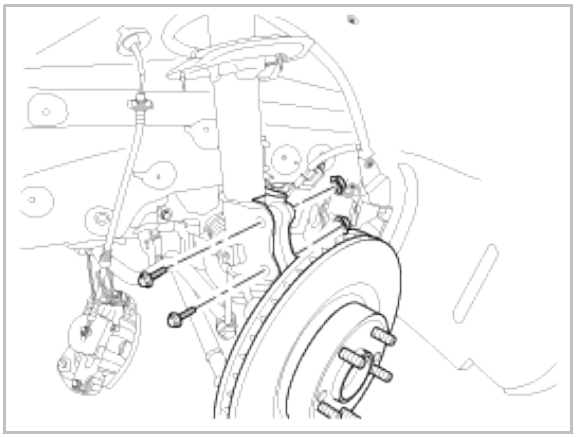
2. Disconnect the stabilizer link(B) with the front strut assembly(A) after loosening the nut.

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



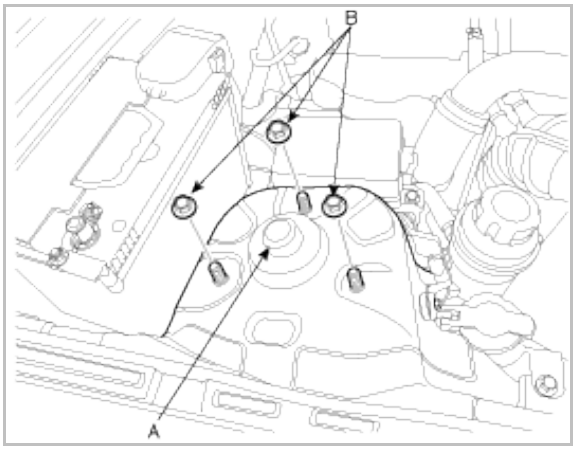
3. Disconnect the front strut assembly with the knuckle by loosening the bolt & nut.

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



4. Remove the strut cap(A).
5. Loosen the strut mounting nuts(B).

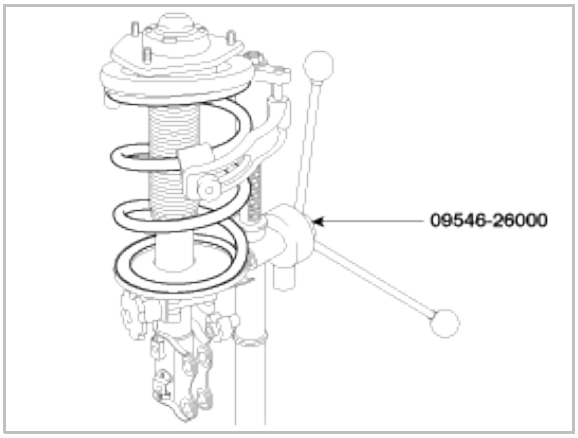
Tightening torque :
45 ~ 65 N.m(4.5 ~ 6.5 kgf.m, 32 ~ 47 lb-ft)



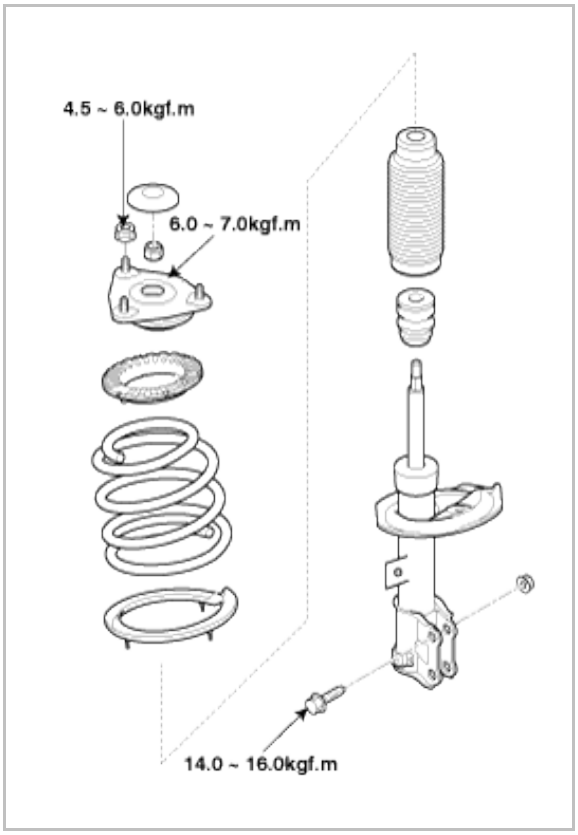
6. Installation is the reverse of removal.

Disassembly

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

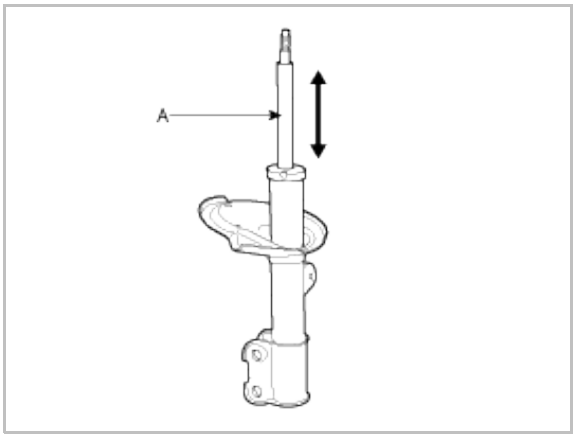


2. Remove the self-locking nut.
3. Remove the insulator, spring seat, coil spring and dust cover from the strut assembly.



Inspection

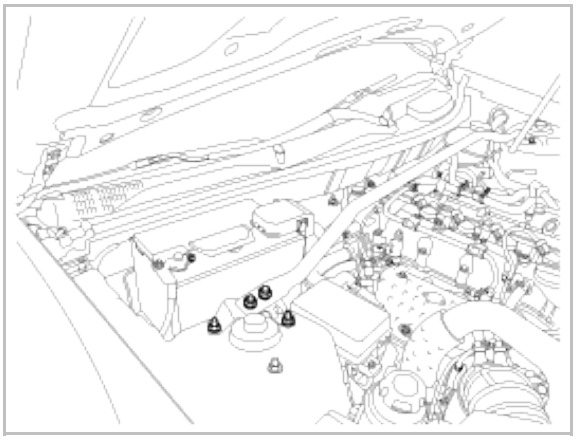
1. Check the strut insulator for wear or damage.
2. Check rubber parts for damage or deterioration.
3. Compress and extend the piston rod (A) and check that there is no abnormal resistance or unusual sound during operation.



Suspension System > Front Suspension System > Front Strut Bar > Repair procedures

Replacement

1. Loosen the strut bar nuts.



2. Installation is the reverse of removal.

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

Replacement

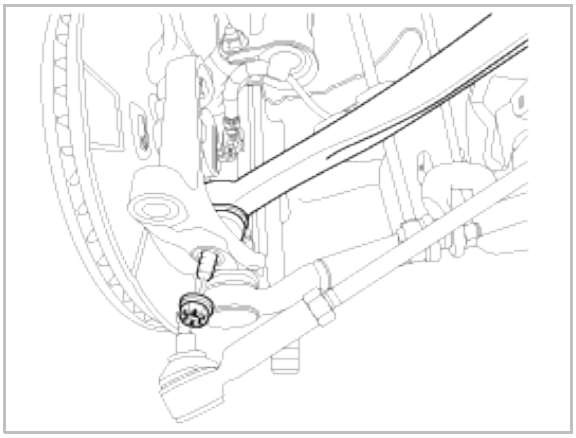
Tension arm

1. Remove the front wheel & tire.

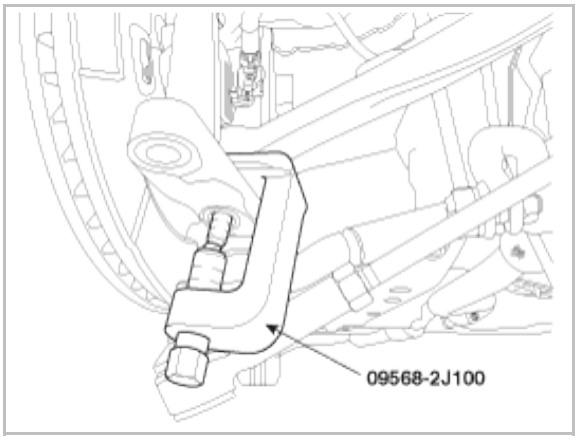
Tightening torque :
90 ~ 110 N.m(9.0 ~ 11.0 kgf.m, 65 ~ 80 lb-ft)

2. Remove the front wheel & tire.

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

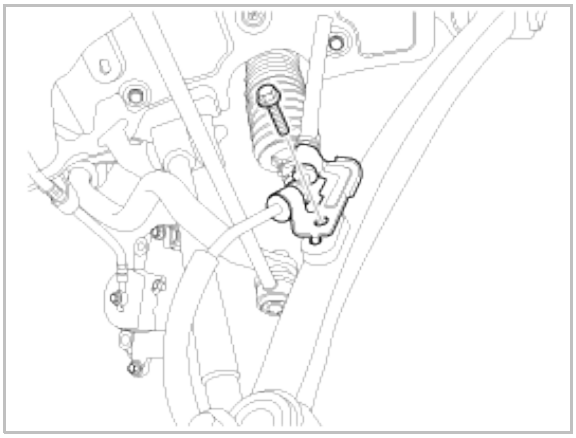


3. Separate the tension arm from the front axle ball joint by using SST (09568-2J100).



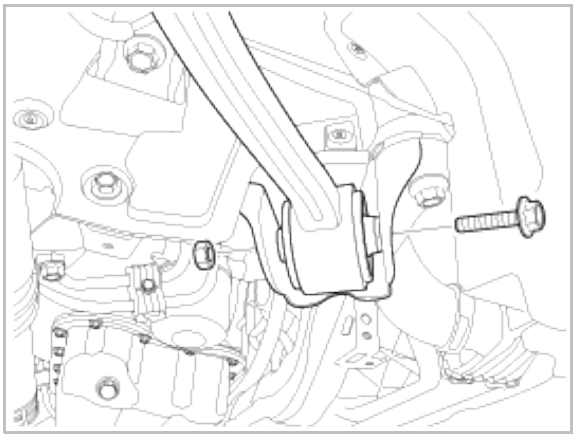
4. Remove the flexible hose.

Tightening torque :
7 ~ 11 N.m(0.7 ~ 1.1 kgf.m, 5 ~ 8 lb-ft)



5. Loosen the bolts and nuts and then remove the tension arm from the sub frame.

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



6. Installation is the reverse of removal.

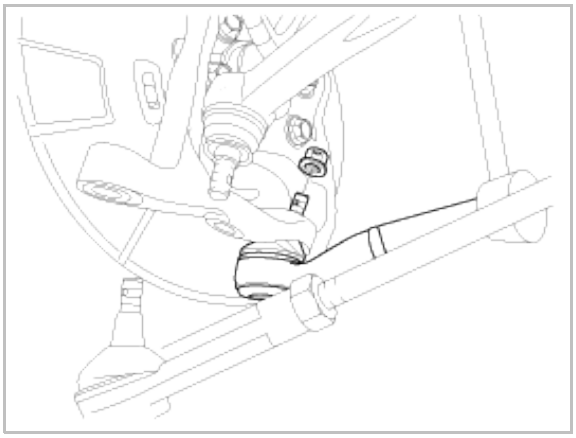
Lateral arm

1. Remove the front wheel & tire.

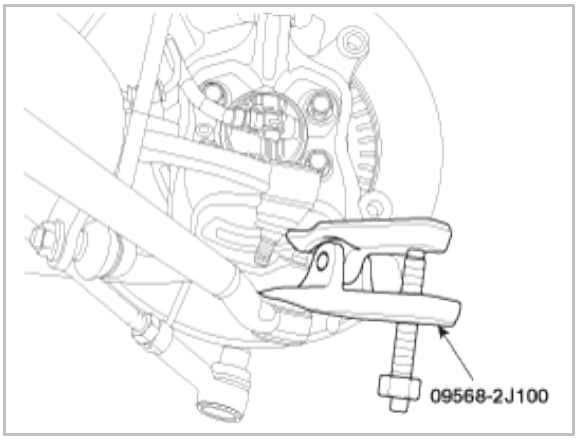
Tightening torque :
90 ~ 110 N.m(9.0 ~ 11.0 kgf.m, 65 ~ 80 lb-ft)

2. Remove the split pin and the castle nut.

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

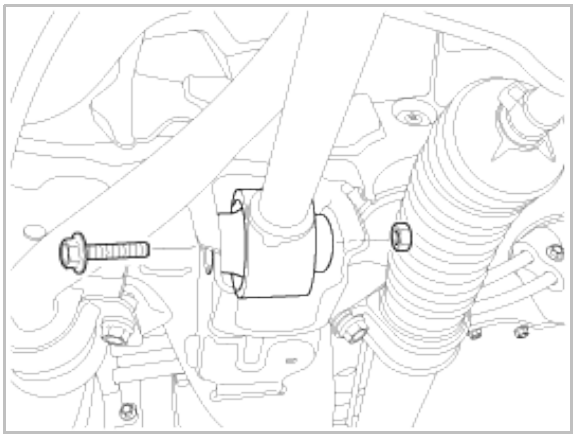


3. Separate the lateral arm from the front axle ball joint by using SST (09568-2J100).



4. Loosen the bolts and nuts and then remove the lateral arm from the sub frame.

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



5. Installation is the reverse of removal.

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

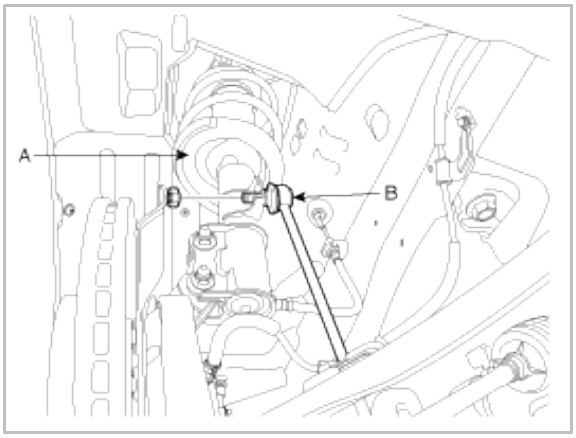
Replacement

1. Remove the front wheel & tire.

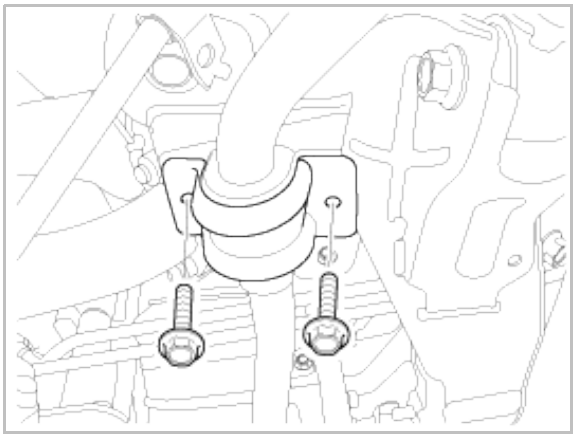
Tightening torque :
90 ~ 110 N.m(9.0 ~ 11.0 kgf.m, 65 ~ 80 lb-ft)

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

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



3. Remove stabilizer from the cross member by loosening the clamp mounting bolts.



4. 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

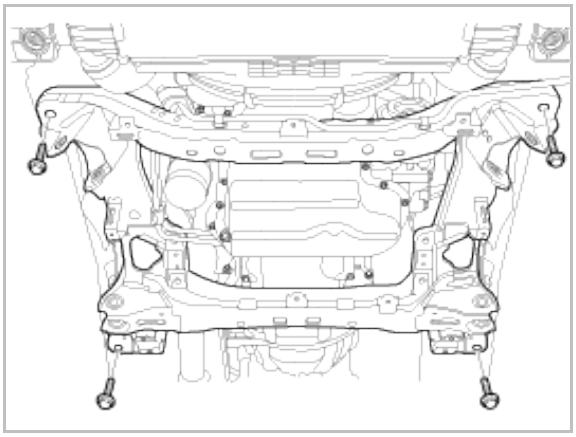
Replacement

1. Remove the front wheel & tire.

Tightening torque :

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

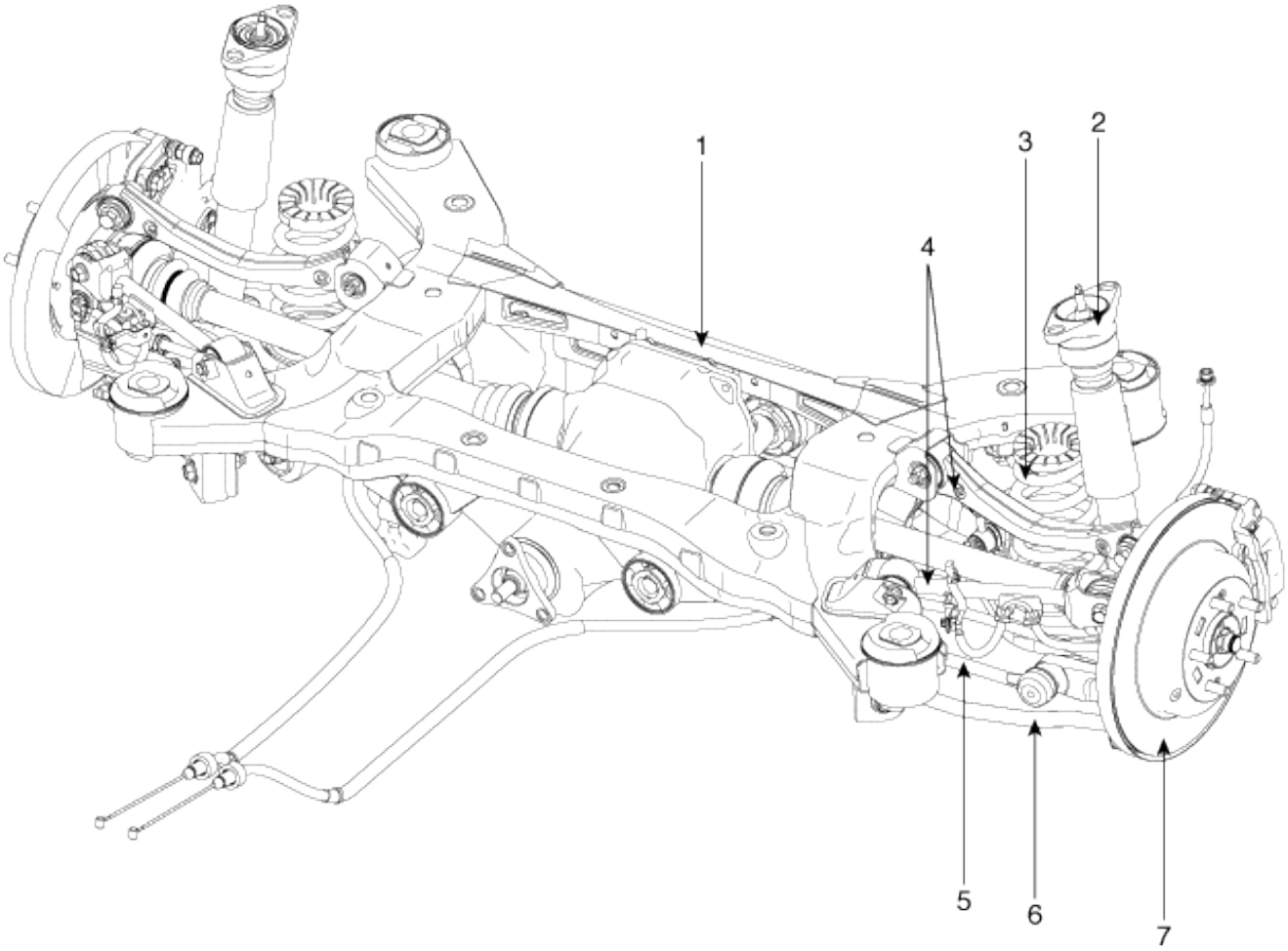
2. Remove the lower arm.
3. Remove the front strut assembly.
4. Remove the front stabilizer.
5. Remove the steering gear box.
6. Remove the cross member from the body by loosening the mounting bolts and nuts.



7. Installation is the reverse of removal.

Suspension System > Rear Suspension System > Components and Components Location

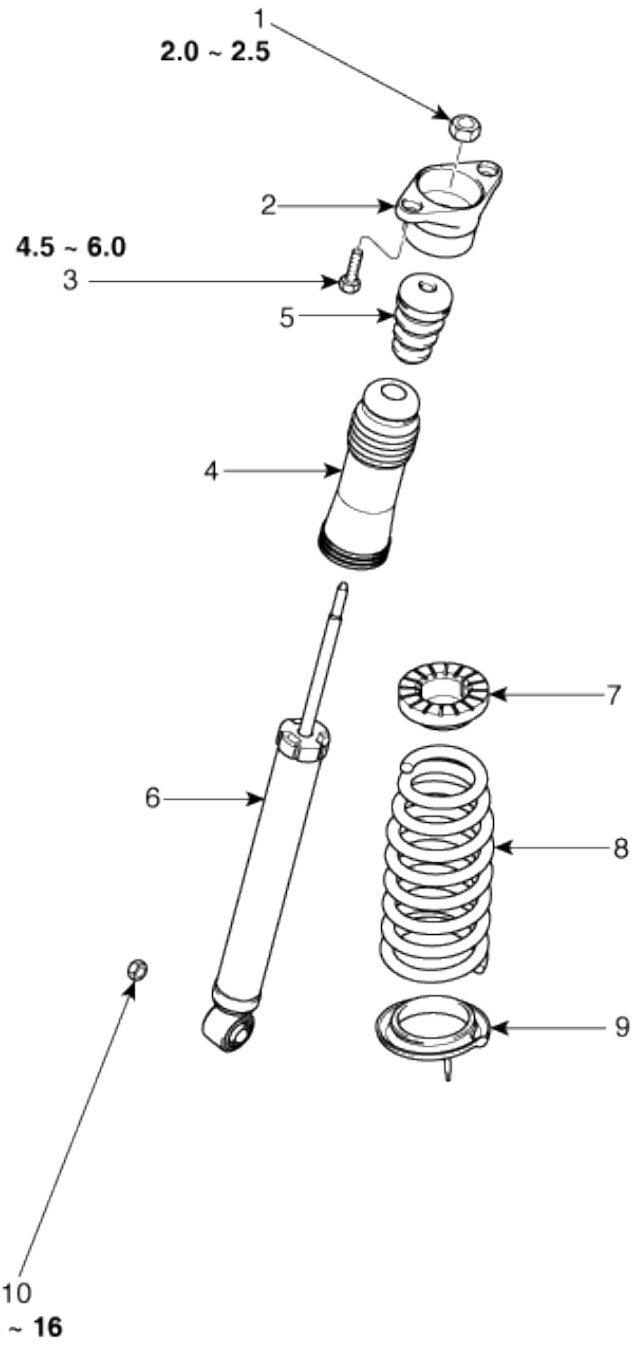
Components



1. Sub frame 2. Rear shock absorber 3. Spring 4. Rear upper arm	5. Assist arm 6. Trailing arm 7. Rear disc

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

Components



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

1. Lock nut	6. Shock absorber
2. Bracket	7. Upper pad
3. Bolt	8. Spring
4. Dust cover	9. Lower pad
5. Urethan bumper	10. Nut

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

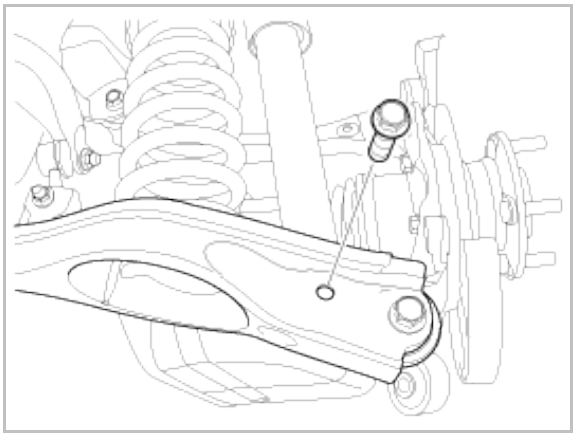
Replacement

1. Remove the rear wheel & tire.

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

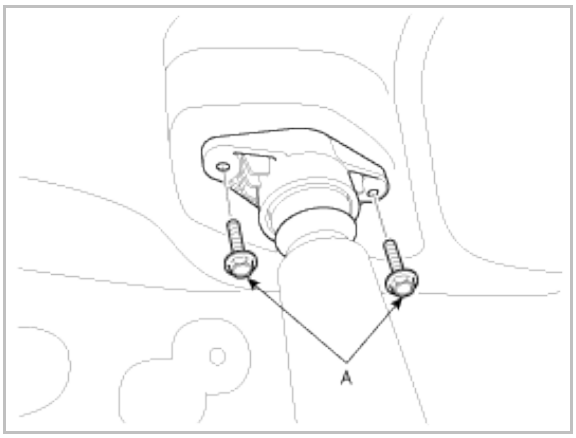
2. Loosen the bolts and nuts and then remove the rear shock absorber from the lower arm.

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



3. Loosen the mounting bolts(A).

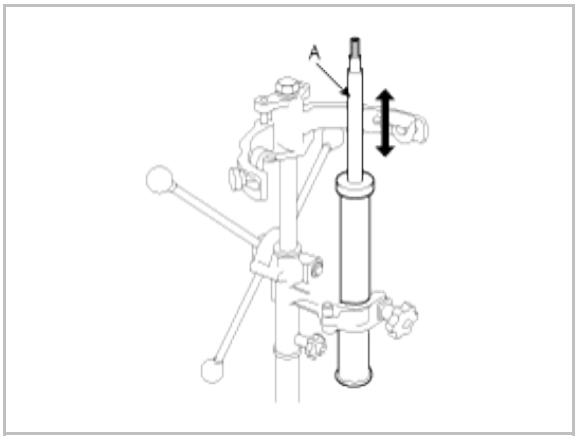
Tightening torque :
45 ~ 60 N.m(4.5 ~ 6.0 kgf.m, 32 ~ 43 lb-ft)



4. Installation is the reverse of removal.

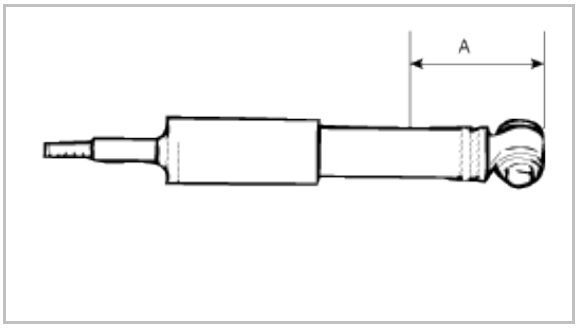
Inspection

1. Check the components for damage or deformation.
2. 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 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

Front Upper Arm

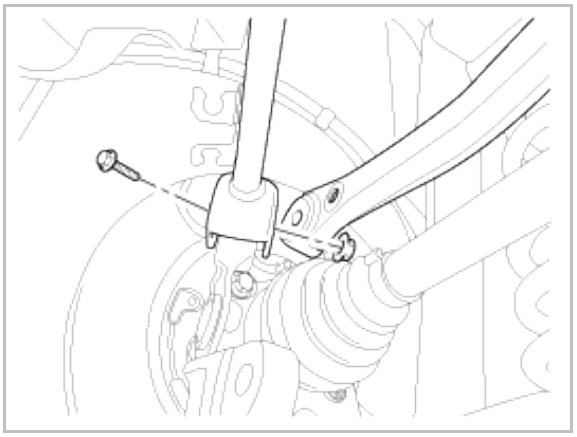
1. Remove the rear wheel & tire.

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

2. Remove the brake hose bracket.

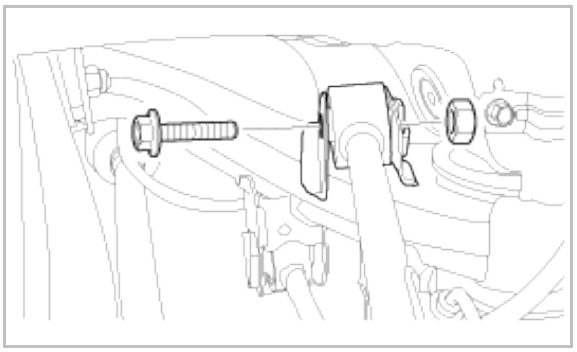
3. Loosen the bolts and nuts and then remove the front upper arm from rear axle.

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



4. Loosen the bolts and nuts and then remove the front upper arm from sub frame.

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



5. Installation is the reverse of removal.

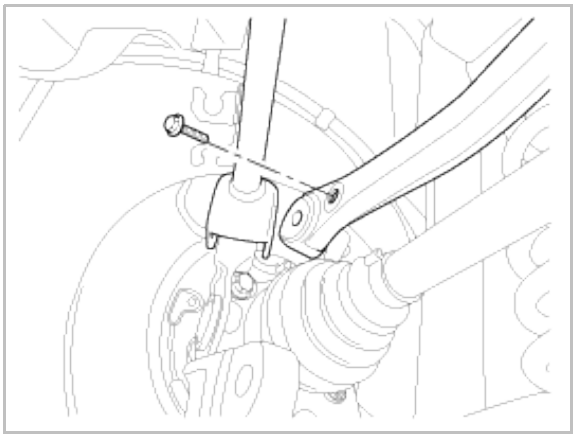
Rear Upper Arm

1. Remove the rear wheel & tire.

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

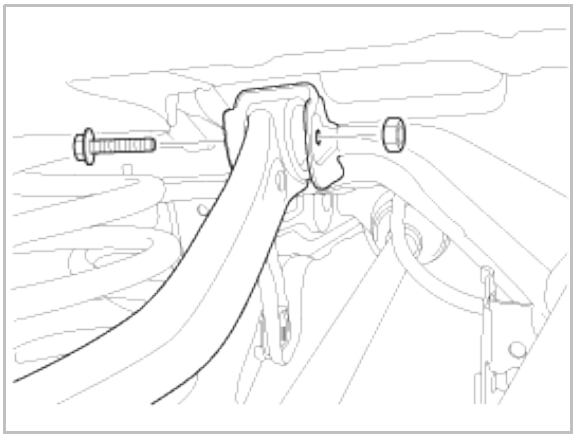
2. Loosen the bolts and nuts and then remove the rear upper arm from rear axle.

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



3. Loosen the bolts and nuts and then remove the rear upper arm from sub frame.

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



4. Installation is the reverse of removal.

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

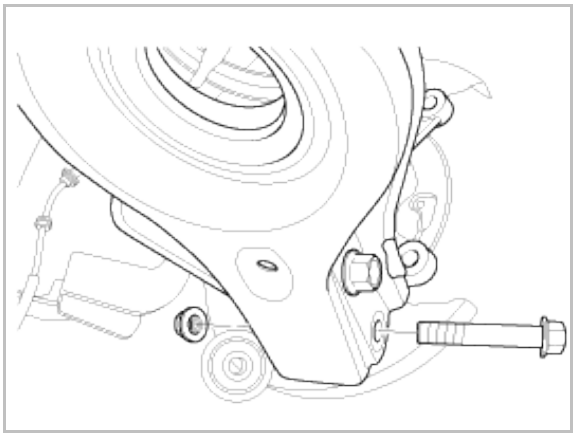
Replacement

1. Remove the rear wheel & tire.

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

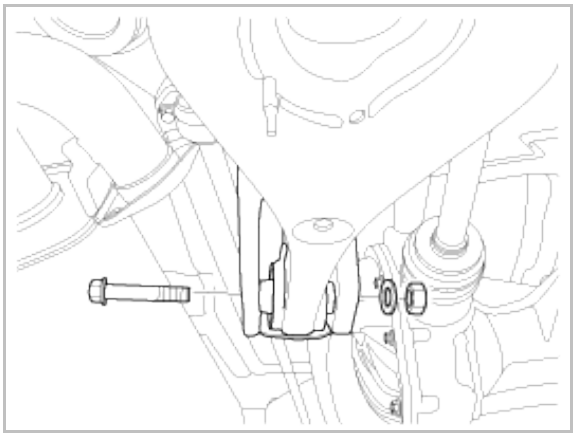
2. Remove the rear shock absorber.
3. Loosen the bolts and nuts and then remove the lower arm from rear axle.

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



4. Loosen the bolts and nuts and then remove the lower arm from sub frame.

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



5. Installation is the reverse of removal.

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

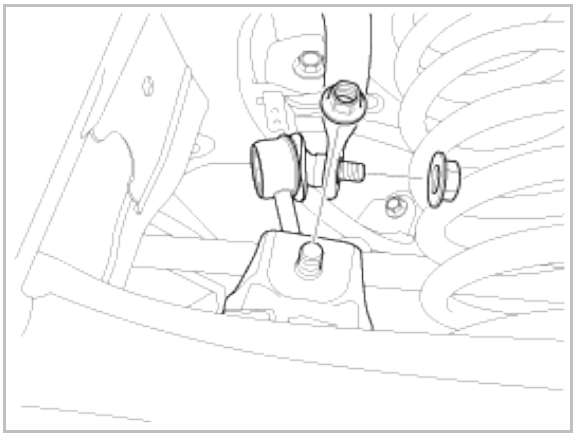
Replacement

1. Remove the rear wheel & tire.

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

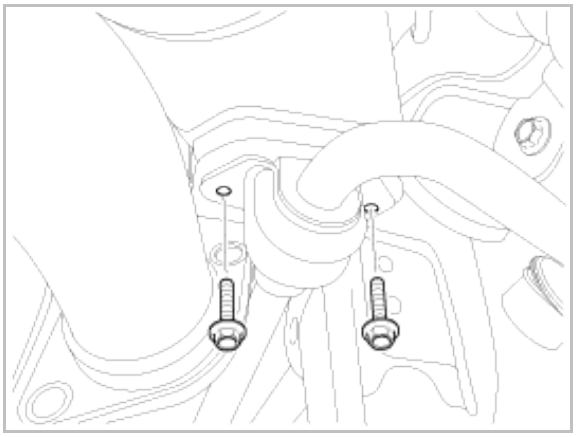
2. Loosen the nuts and then remove the stabilizer link from stabilizer bar and lower arm.

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



3. Loosen the mounting bolts.

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



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

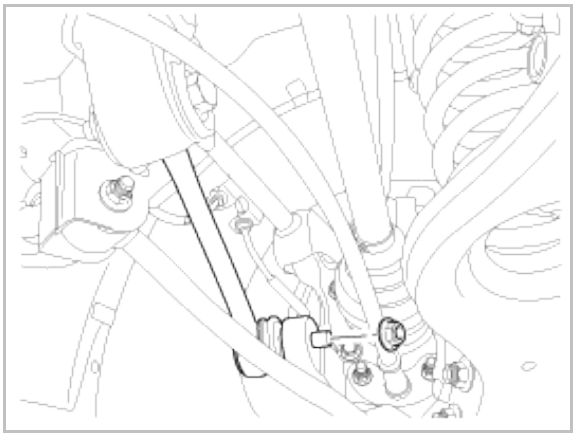
Replacement

1. Remove the rear wheel & tire.

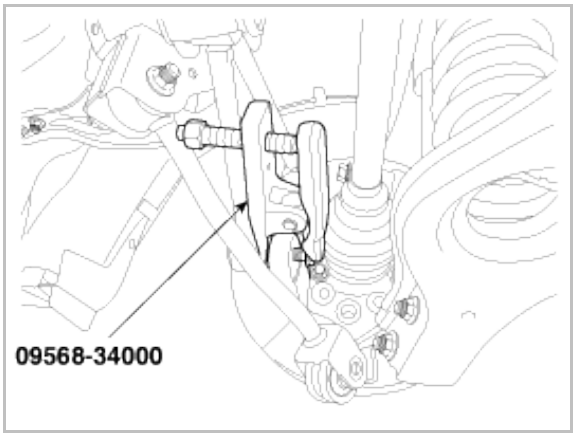
Tightening torque :
90 ~ 110 N.m(9.0 ~ 11.0 kgf.m, 65 ~ 80 lb-ft)

2. Loosen the nuts.

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

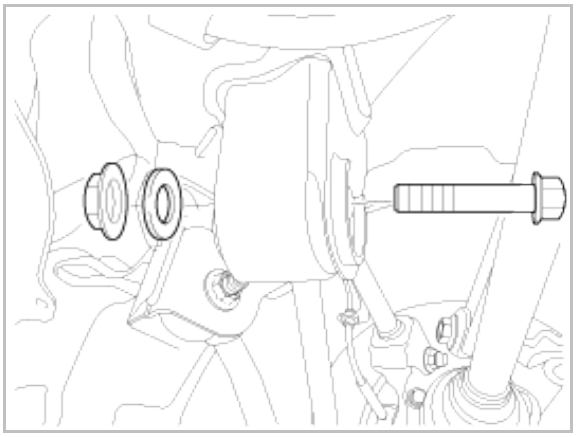


3. Separate the assist arm from the rear axle ball joint by using SST (09568-34000).



4. Loosen the bolts and nuts and then remove the assist arm from sub frame.

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



5. Installation is the reverse of removal.

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

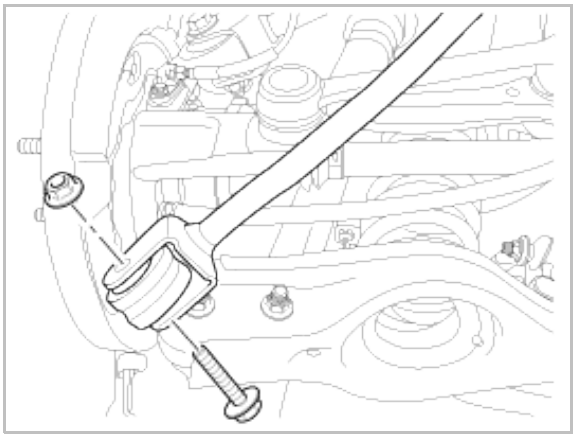
Replacement

1. Remove the rear wheel & tire.

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

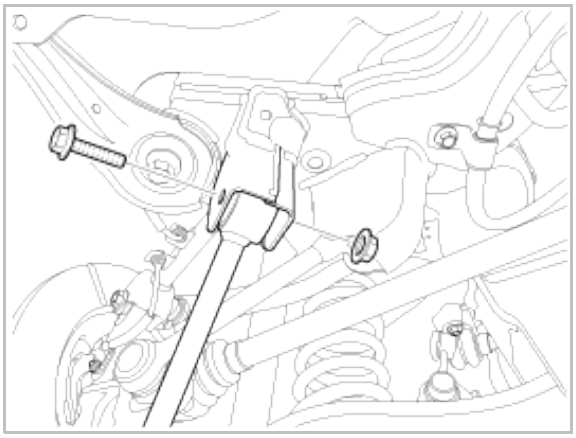
2. Loosen the bolts and nuts and then remove the trailing arm from rear axle.

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



3. Loosen the bolts and nuts and then remove the assist arm from sub frame.

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



4. Installation is the reverse of removal.

Suspension System > Rear Suspension System > Rear Sub Frame > Repair procedures

Replacement

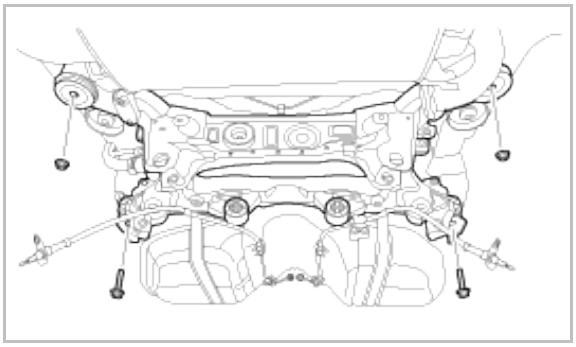
1. Remove the rear wheel & tire.

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

2. Remove the rear lower arm.
3. Remove the rear shock absorber.
4. Remove the rear upper arm.
5. Remove the trailing arm.
6. Remove the assist arm.
7. Remove the differential carrier.

8. Loosen the bolts and nuts and then remove the sub frame.

Tightening torque :
160 ~ 180 N.m(16.0 ~ 18.0 kgf.m, 115 ~ 130 lb-ft)



9. Installation is the reverse of removal.

Suspension System > Tires/Wheels > Tire > Repair procedures

Tire Wear

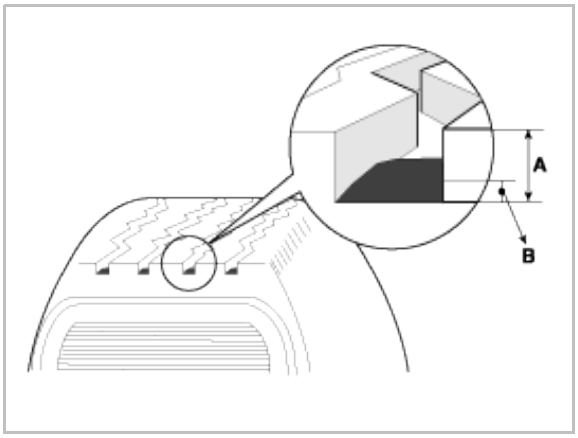
1. Measure the tread depth of the tires.

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.

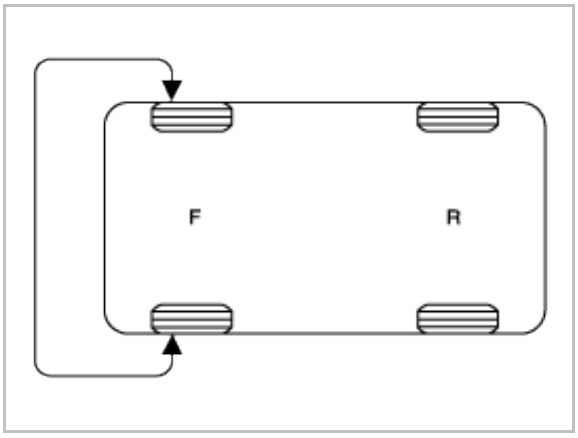


Tire Rotation

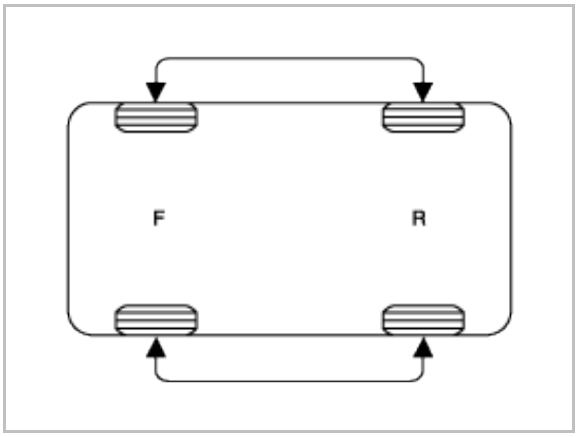
Checking For Pull And Wander

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

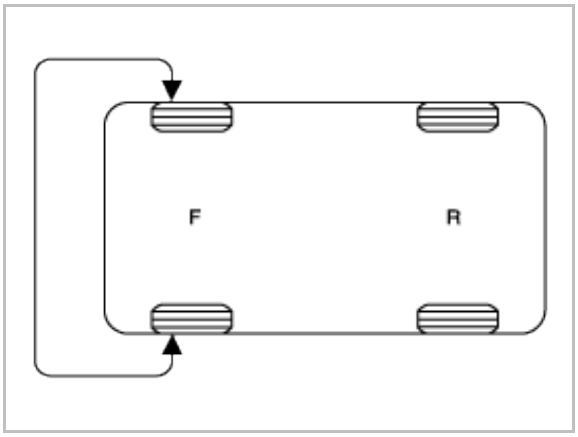
1. Rotate the front right and front left tires, and perform a road test in order to confirm vehicle stability.



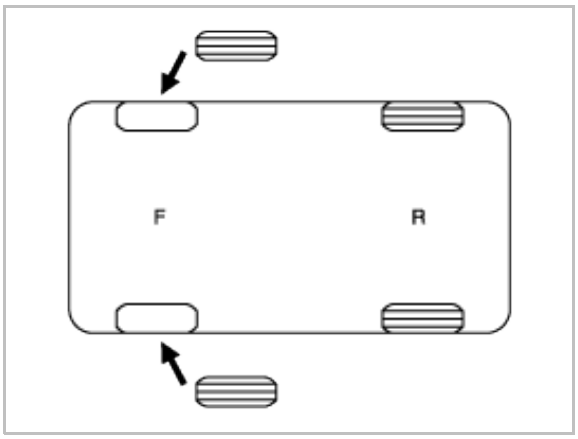
2. If the steering pulls to the opposite side, rotate the front and rear tires, and perform a road test again.



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.

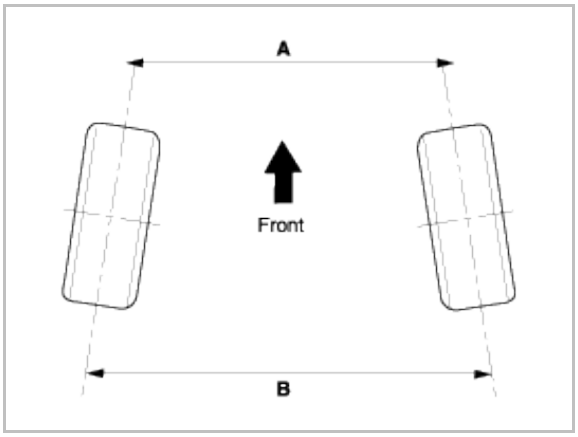


Wheel Alignment

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]

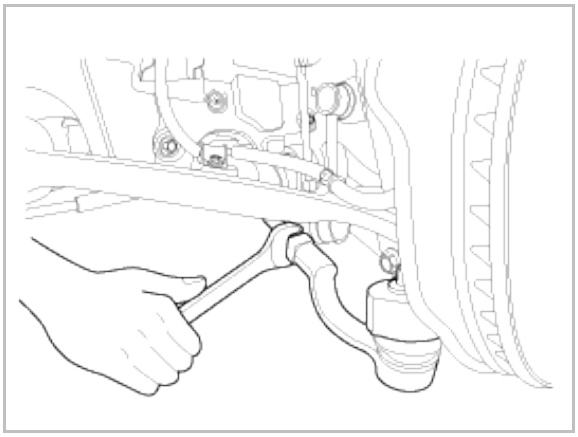
Toe-in(B-A or angle a+b) is adjusted by turning the tie rod turnbuckles. Toe-in on the left front wheel can be reduced by turning the tie rod toward the rear of the car. Toe- in change is adjusted by turning the tie rods for the right and left heels simultaneously at the same amount as follows.

Standard value :
Toe-in
Total : 0.28°±0.16°
Individual : 0.14°±0.8°

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 ±1°.

Tie rod(A) Specified torque :
50~55N.m (5~5.5kgf.m, 36.2~39.8lb-ft)



[Rear]

Standard value :
Toe-in
Total : 0.16°±0.2°
Individual : 0.8°±0.1°

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

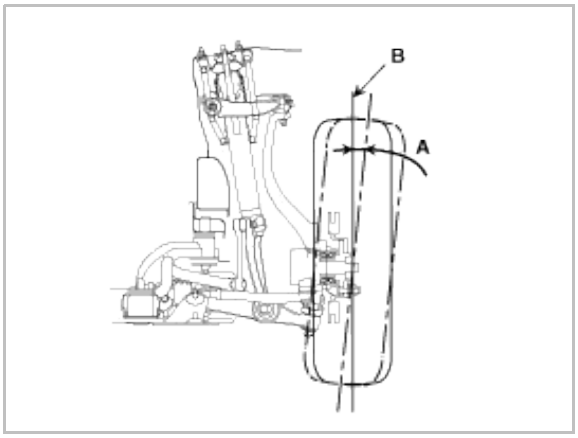
CAUTION

- Each toe should be within 0.1° ± 0.1°.
  If the difference between right and left is not within +0.2°, repeat adjustment.
- After adjusting the cambolt, tighten the nut to the specified torque.

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 : -0.5° ± 0.5°

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 : -1.5° ± 0.5°
Difference between right and left angle is within 0.5°

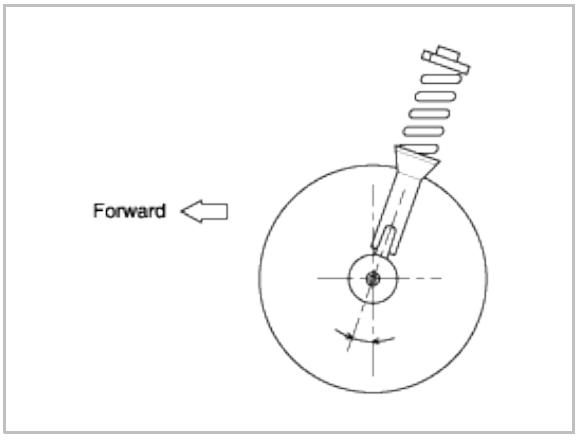
Adjust the camber by turning the cambolt of the rear lower arm.

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 : 7.45° ± 0.5°



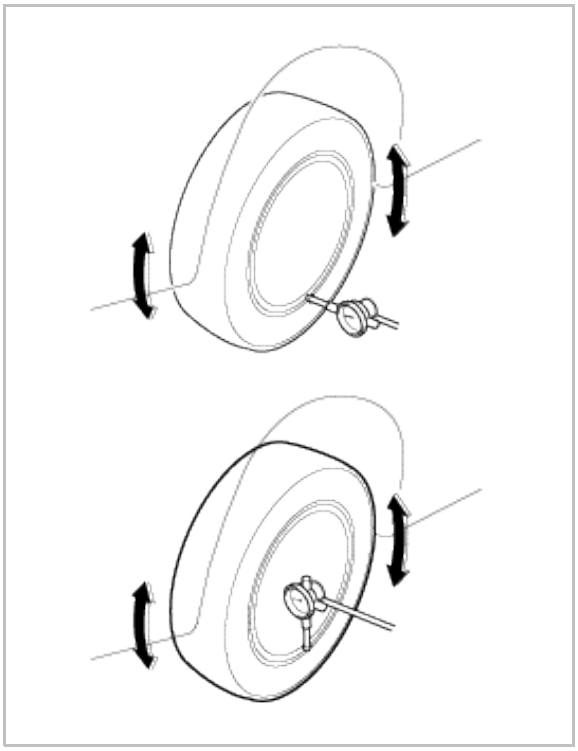
NOTE

- 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° ± 0.5°.

Wheel Runout

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

Limit		Radial	Axial
Runout mm	Aluminium	0.3	0.3



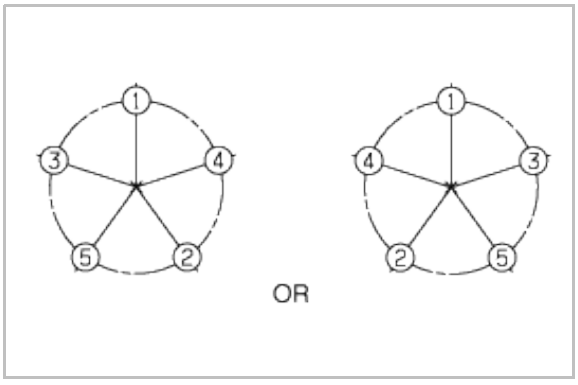
Wheel Nut Tightening

1. Tightening torque.

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

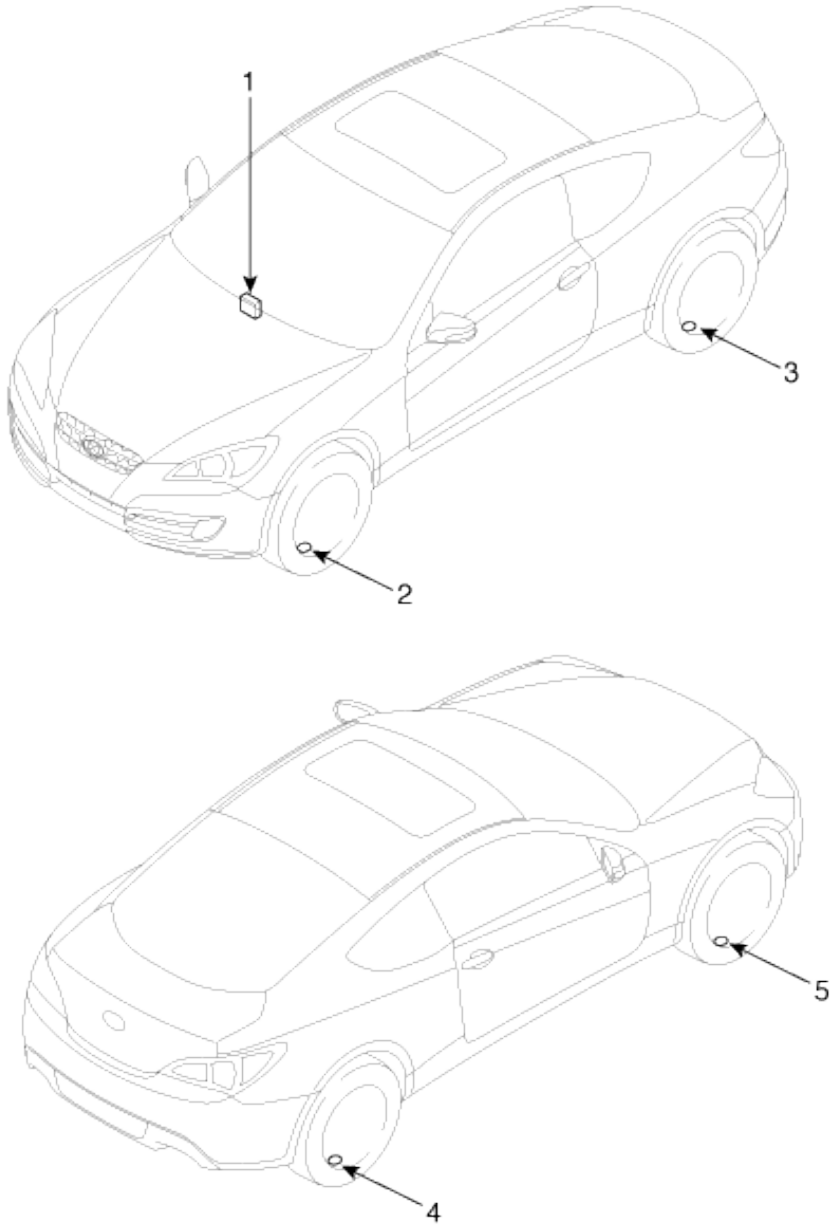
> CAUTION
>
> When using an impact gun, final tightening torque should be checked using a torque wrench.

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. TPMS Receiver 2. TPMS Sensor (FL) 3. TPMS Sensor (RL)	4. TPMS Sensor (FR) 5. TPMS Sensor (RR)

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).

> NOTE
>
> TPMS warning can be light on because the tire pressure declined by low temperature in the cold weather.

DTC Warning

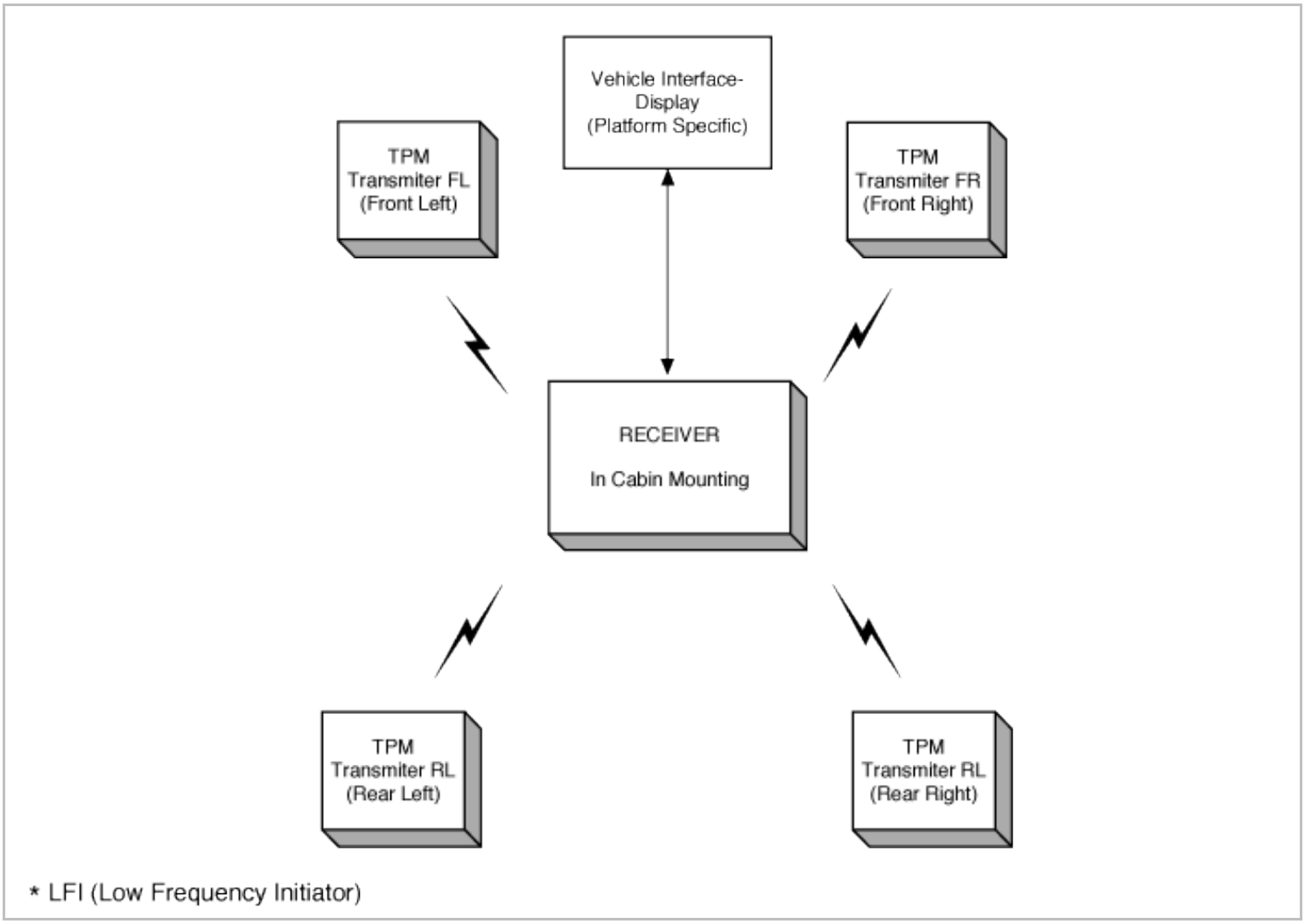
1. Turn on condition
   A. When the system detects a fault that is external to the receiver/ sensor.
   B. When the system detects a receiver fault.
   C. When the system detects a sensor fault.
2. Turn off condition
   A. If the fault is considered as 'critical', then the lamp is held on throughout the current Ignition cycle (even if the DTC has been 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. Certain faults are not covered through DTC. The main ones are:
      1) Control module 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 > Schematic Diagrams

Schematic Diagram

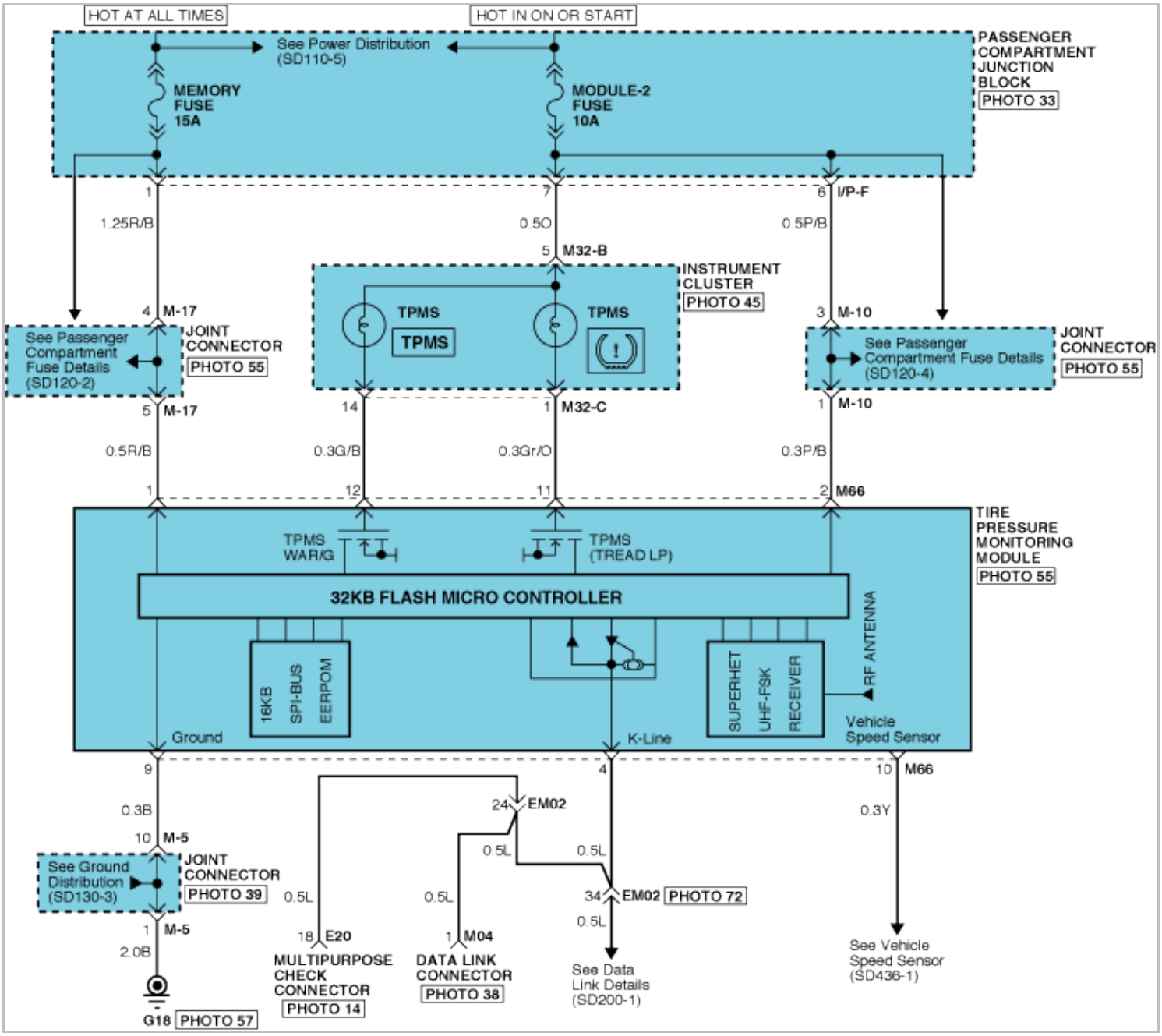


* LFI (Low Frequency Initiator)

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

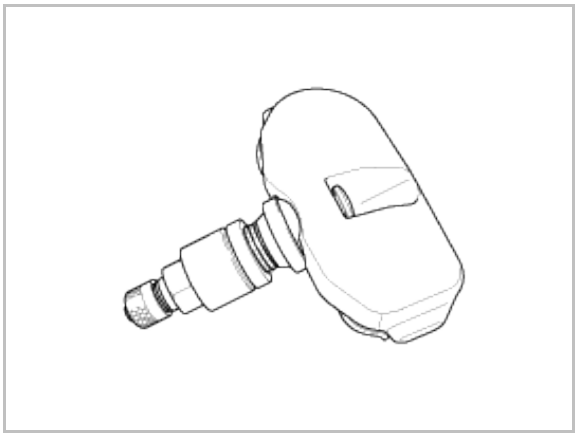
No	Pin-Out Assignment	No	Pin-Out Assignment
1	Battery	9	GROUND
2	IGN	10	N/C
3	N/C	11	TREAD
4	K-LINE	12	TPMS Warning

Circuit Diagram



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

Description



1. MODE
   (1) Stationary/Rolling mode
      A. Measure pressure and temperature every 4 seconds.
      B. Measure acceleration every 60 seconds.
      C. High line TPMS sensors transmit data every 60 seconds while awake.
   (2) Sleep mode
      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 or woken by acceleration > 20 mph.
      E. Measure acceleration every 60 seconds.
      F. High line sensors return to this state if no LFI signals and the tire remains stationary for ≥ 10 minutes to conserve battery power .

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

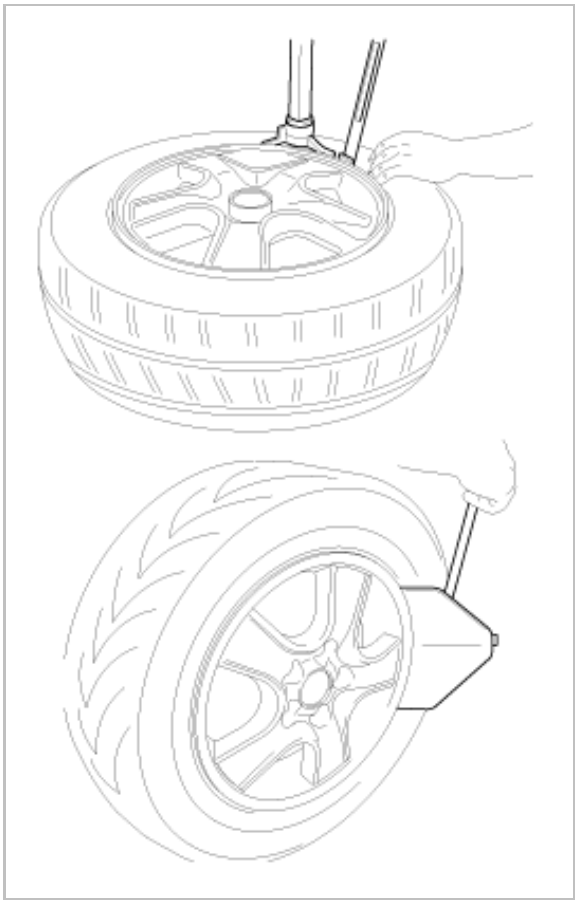
Removal

Tire Removal

1. Deflate tire & remove balance weights.

CAUTION

- The tire bead should be broken approx. 180° 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.

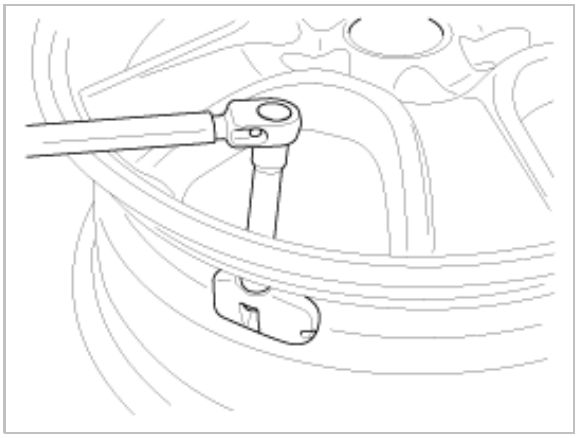


Sensor Removal

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.

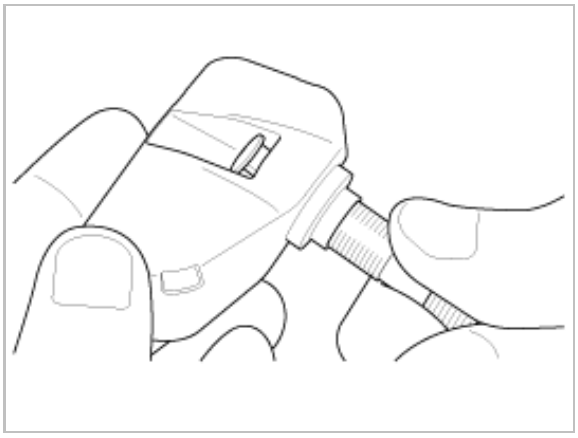
Installation

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.

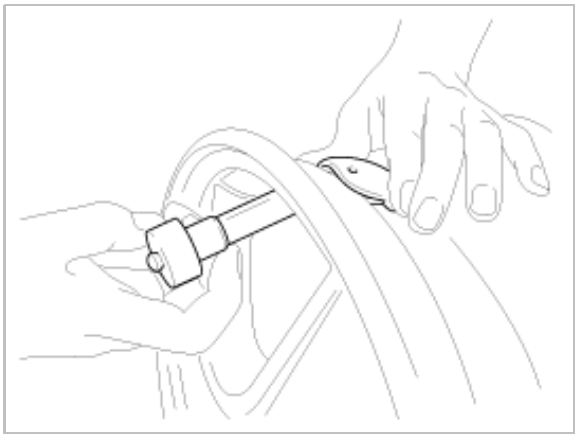
CAUTION

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

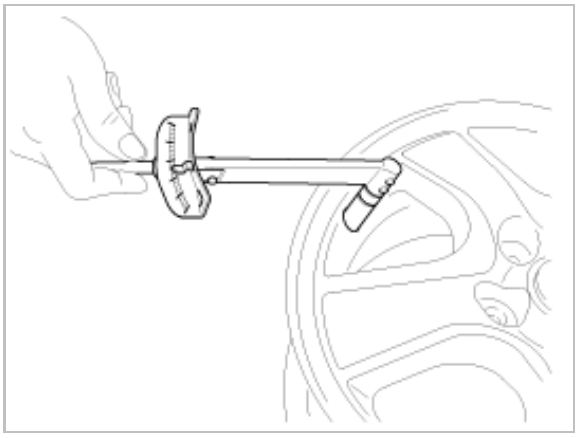
3. Tighten washer and nut by hand until the valve thread meets the nut built-in calibrated stop.

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

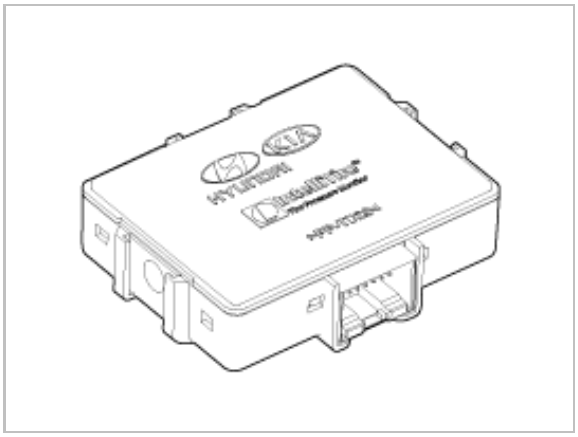
Avoid tire / tool contact with the valve.

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

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

Description

Receiver



1. Mode
   (1) Virgin State (No TPMS sensor id's learned)
      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.
      D. In unlearned state when connected in the vehicle with ignition key on the TPMS lamp will flash at one second intervals.
   (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 type 1, 2, or 3 sensor learning mode can be started.

2. Overview
   A. Receives RF data from sensor.
   B. Uses sensor data to decide whether to turn on TREAD Lamp.
   C. Uses sensor information, 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.
   D. Activates LFI for TPMS sensor location.

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

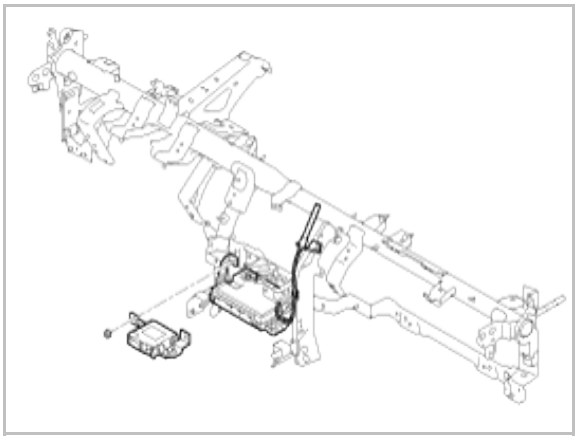
Replacement

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 malfunctioning part and fit bracket assembly to new part.

[Receiver]



3. Secure new part to vehicle and fit connector.
4. Re-connect battery and turn Ignition on.
5. Check that TPMS lamp flash rate matches Virgin State indication.

Suspension System > Tire Pressure Monitoring System > Troubleshooting

Troubleshooting

- the lamp check should occur and then all lamps / LED's should turn off.
- **If the lamp test does not occur :**
  - Check connectors and fuse/harnessing - open / short circuits.
  - Check DTC's.
  - If diagnostics cannot be entered, replace the receiver with a known good one (follow configuration & learning procedure).

TREAD Warnings

- **Information to ascertain (TREAD Lamp) :**
  - Was puncture repair fluid used (it should not be)?
    - This can cause the sensor pressure port to block and incorrect warning to occur.
  - What temperature were tires last inflated at?
    At what temperature did warnings occur?
    - Pressure change is approx. 1.5psi / 10 C increase.
  - Have the tires been checked / inflated since the lamp first came on?
- **If the TREAD Lamp is on :**
  - Check for short circuits.
  - Enter Diagnostics and read TREAD Warnings Local Identifier Data.
  - Check to see if warning type is under inflation or leak.
  - If the warning is for under inflation, then:
    a. Re-inflate the wheel with the matching sensor ID to it's desired Placard pressure.
    b. Check to make sure that the TREAD lamp turns off (this may take up to 1 minutes if the tire is not rapidly re-inflated).
  - a. If the warning is for a leak, then:
    b. Fix any puncture and re-inflate the tire to the desired Placard pressure.
    Wait up to 1 minutes and make sure that the TREAD lamp turns off and the lamp does not turn on again.
    c. If lamp comes on again:
    d. Re-check pressure for signs of a puncture and Re-Check TREAD Warnings Local Identifier Data.
- **If the Placard pressure is OK and the TREAD lamp still does not turn off :**
  - Turn wheel a quarter turn and again wait 1 minutes (the sensor may be in an RF null).
  - If the lamp still does not turn off :

check for loose receiver wiring and replace the receiver with a known good one if necessary (follow configuration & learning procedure).
- If the problem still exists, replace sensor.
- Ensure that all tires are inflated to their correct Placard pressures.
- Clear TREAD warnings.
- Test drive the vehicle and ensure that the TREAD lamp does not come back on.

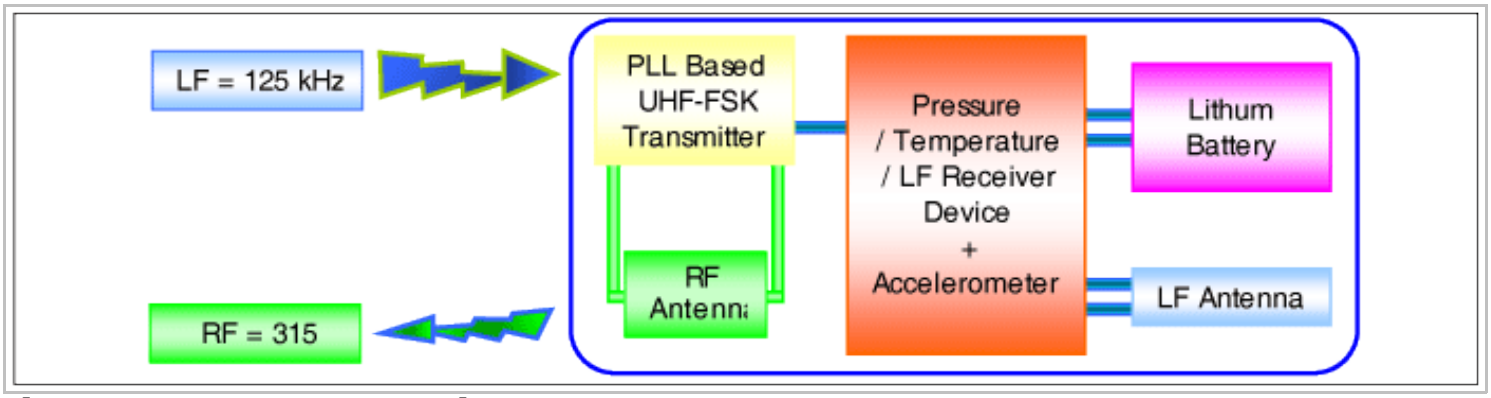
DTC'S

- Information to ascertain (DTC Lamp) :
  - At what temperature did the DTC occur? Under certain conditions (approx.-40 C/F), a RF channel missing / hardware failure DTC may occur. This is due to the battery behavior.
- DTC's should be retrieved by using Hi-Scan diagnostic tool.
- The fault should then be diagnosed and rectified.
- DTC's should then be cleared.

Suspension System > Tire Pressure Monitoring System > C1121 Sensor 1, Front Left Sensor Battery Voltage Low

Component Location

General Description



【Wheel Electronic (WE) sensor unit】- TPMS sensor

Each vehicle wheel is fitted with a Wheel Electronic (WE) sensor unit attached to the valve on the inside of the wheel. The WE unit is powered with a self-contained battery utilizing a high temperature rated CR (Manganese Dioxide Lithium) chemistry. The operating voltage range for the WE module is 1.8Vdc to 3.6Vdc, and the operating temperature range is -40°C ~120°C. The WE measures tire pressure, temperature, and acceleration periodically. The pressure, temperature, and acceleration information is converted to digital form within the MCU inside the WE sensor.

The WE sensor is equipped with a Radio Frequency (RF) transmitter circuit which is used to periodically broadcast

information from inside the tire. All WE sensor units operate on the same RF channel frequency, and each broadcast message includes pressure and temperature data, a unique ID code, operating state data, status information, and digital error-detection data.
The pressure measured by the WE sensor is an absolute pressure value. The pressure measurement range is 100kPa to 450kPa. The acceleration data is used within the WE sensor to determine whether the vehicle is moving or stationary. The acceleration status is the decision maker within the WE module that determines if the tire is moving or stationary. This measurement is used within the WE module to enable different operating modes depending on the status of the acceleration value. Over the fully specified operating temperature range, if the acceleration measurement is greater than or equal to 5G, the WE module assumes the tire is moving.
The basic function of the WE Sensor is to transmit frame every minute when WE is in mode MD(mode driving) mode. During MD mode,The WE sensor transmits RF messages every 1 minute if the acceleration measurement is greater than 5G.The WE sensor enters mode MP(Mode Parking) where it transmits RF messages once every 13 hours if acceleration is lower than 5g for 15 mimutes. When the WE sensor is in mode MFB(Mode First Burst : mode for Auto Location and Auto Learning), it transmits RF message once every 15 seconds.

DTC Description

This DTC indicates that the Sensor 1 battery voltage is below 2.2Vdc. The most likely cause is battery passing it's expected life / sensor failure.

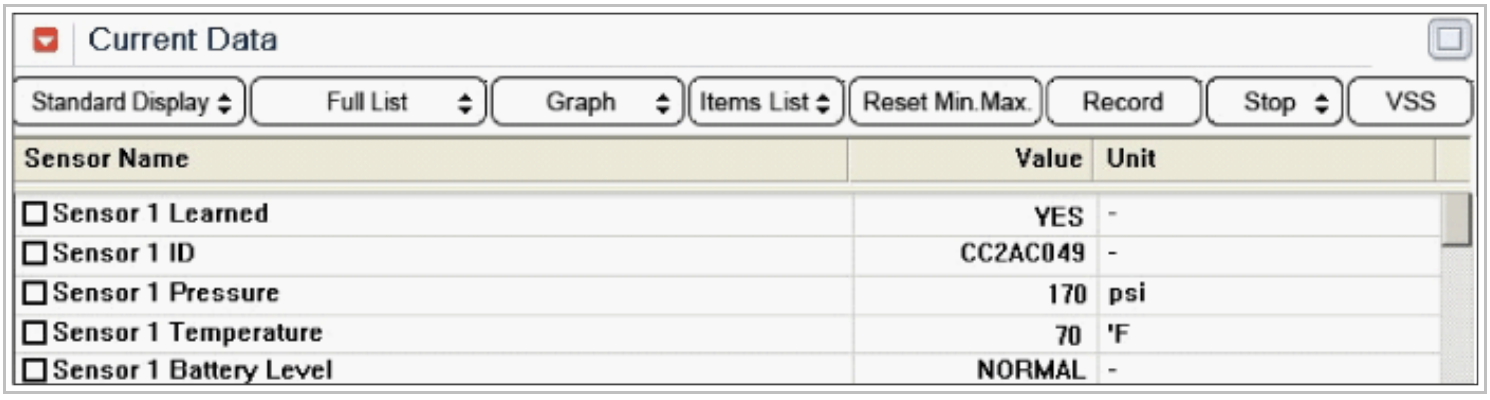
DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Check RF message from Sensor 1	• Sensor 1 battery low • Faulty Sensor 1
Enable Conditions	• IGN ON	
Threshold value	• Sensor 1 battery voltage < 2.2V for 20 consecutive bursts at temperatures above -10 °C	
Mil On conditon	• Not applicable	

Monitor GDS Data

1. Park the vehicle on an even ground.
2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the "BATTERY VOLTAGE" of TPMS sensor on the GDS.

Specification: The value of Sensor 1 battery is 'Normal'.



5. Is the sensor battery normal?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Replace Sensor 1 and register sensor ID with 'GDS TPMS'. ▶ Go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

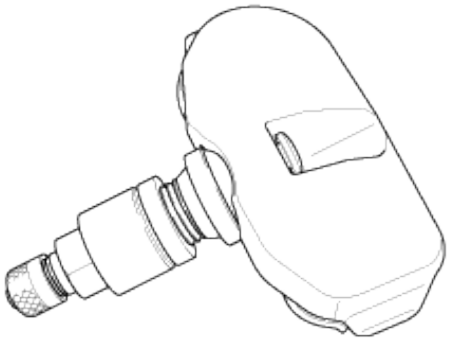
After a repair, it is essential to verify that the fault has been corrected.

1. Connect GDS and select "Diagnostic Trouble Codes(DTCs)" mode.
2. Using GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

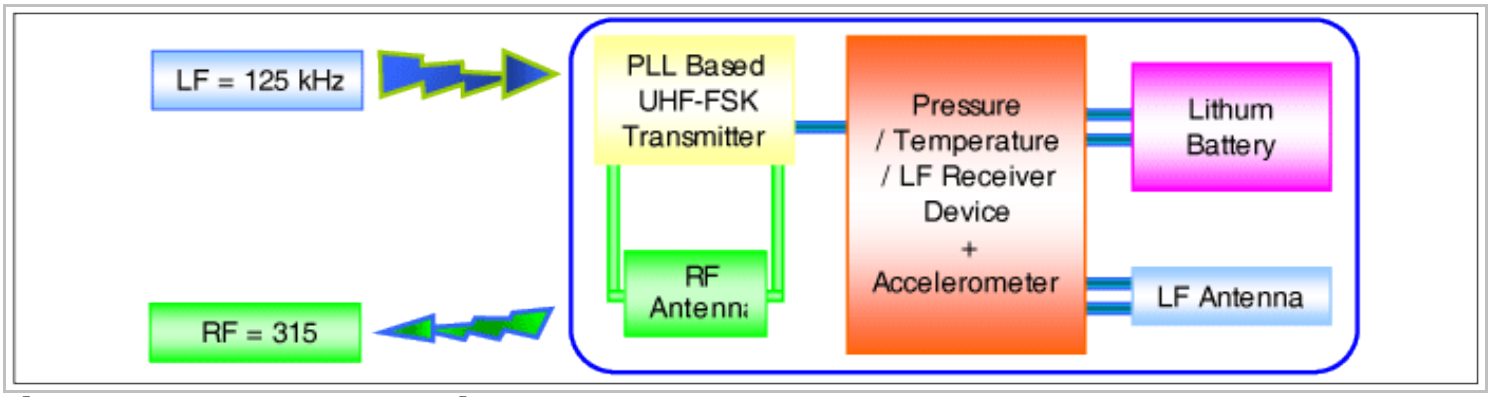
YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1122 Sensor 2, Front Right Sensor Battery Voltage Low

Component Location



General Description



【Wheel Electronic (WE) sensor unit】- TPMS sensor

Each vehicle wheel is fitted with a Wheel Electronic (WE) sensor unit attached to the valve on the inside of the wheel. The WE unit is powered with a self-contained battery utilizing a high temperature rated CR (Manganese Dioxide Lithium) chemistry. The operating voltage range for the WE module is 1.8Vdc to 3.6Vdc, and the operating temperature range is -40°C ~120°C. The WE measures tire pressure, temperature, and acceleration periodically. The pressure, temperature, and acceleration information is converted to digital form within the MCU inside the WE sensor.

The WE sensor is equipped with a Radio Frequency (RF) transmitter circuit which is used to periodically broadcast information from inside the tire. All WE sensor units operate on the same RF channel frequency, and each broadcast message includes pressure and temperature data, a unique ID code, operating state data, status information, and digital error-detection data.

The pressure measured by the WE sensor is an absolute pressure value. The pressure measurement range is 100kPa to 450kPa. The acceleration data is used within the WE sensor to determine whether the vehicle is moving or stationary. The acceleration status is the decision maker within the WE module that determines if the tire is moving or stationary. This measurement is used within the WE module to enable different operating modes depending on the status of the acceleration value. Over the fully specified operating temperature range, if the acceleration measurement is greater than or equal to 5G, the WE module assumes the tire is moving.

The basic function of the WE Sensor is to transmit frame every minute when WE is in mode MD(mode driving) mode. During MD mode,The WE sensor transmits RF messages every 1 minute if the acceleration measurement is greater than 5G.The WE sensor enters mode MP(Mode Parking) where it transmits RF messages once every 13 hours if acceleration is lower than 5g for 15 mimutes. When the WE sensor is in mode MFB(Mode First Burst : mode for Auto Location and Auto Learning), it transmits RF message once every 15 seconds.

DTC Description

This DTC indicates that the Sensor 2 battery voltage is below 2.2Vdc. The most likely cause is battery passing it's expected life / sensor failure.

DTC Detecting Condition

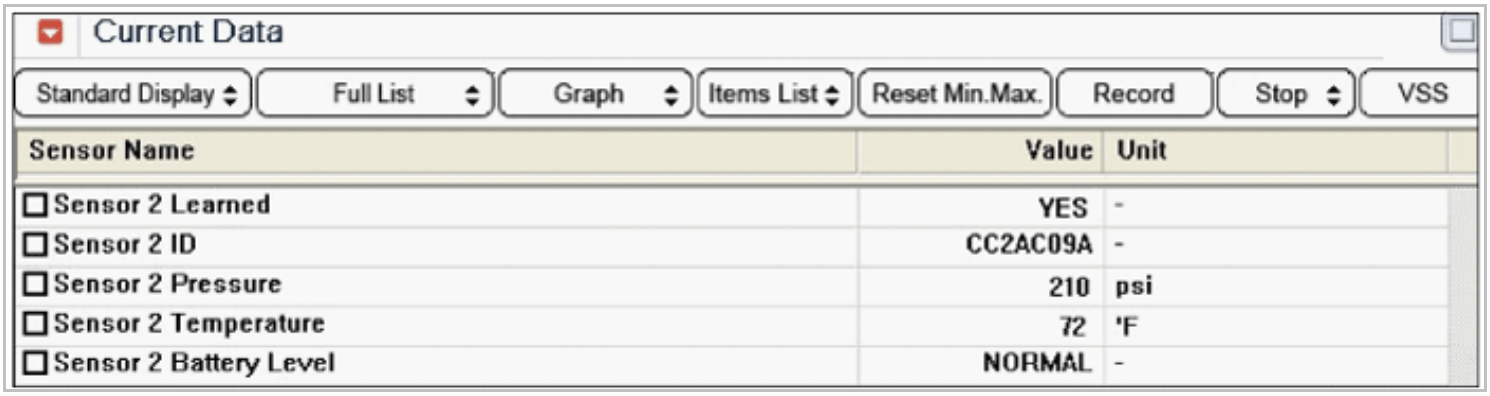
Item	Detecting Condition	Possible Cause
DTC Strategy	• Check RF message from Sensor 2	• Sensor 2 battery low • Faulty Sensor 2
Enable Conditions	• IGN ON	
Threshold value	• Sensor 2 battery voltage < 2.2V for 20 consecutive bursts at temperatures above -10 °C	
Mil On conditon	• Not applicable	

Monitor GDS Data

1. Park the vehicle on an even ground.

2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the "BATTERY VOLTAGE" of TPMS sensor on the GDS.

Specification: The value of Sensor 2 battery is 'Normal'.



5. Is the sensor battery normal?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Replace Sensor 2 and register sensor ID with 'GDS TPMS'. ▶ Go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

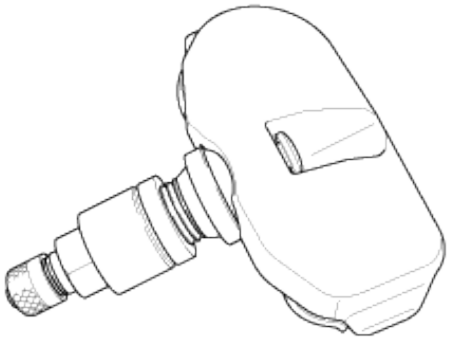
After a repair, it is essential to verify that the fault has been corrected.

1. Connect TPMS exciter or GDS and select "Diagnostic Trouble Codes(DTCs)" mode
2. Using a TPMS exciter or GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

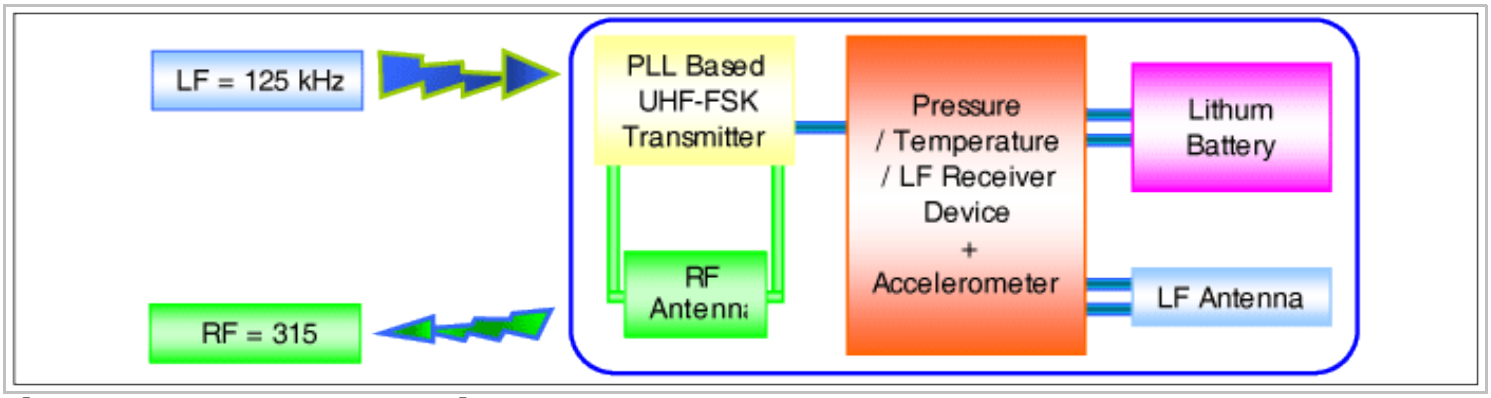
YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1123 Sensor 3, Rear Left Sensor Battery Voltage Low

Component Location



General Description



【Wheel Electronic (WE) sensor unit】- TPMS sensor

Each vehicle wheel is fitted with a Wheel Electronic (WE) sensor unit attached to the valve on the inside of the wheel. The WE unit is powered with a self-contained battery utilizing a high temperature rated CR (Manganese Dioxide Lithium) chemistry. The operating voltage range for the WE module is 1.8Vdc to 3.6Vdc, and the operating temperature range is -40°C ~120°C. The WE measures tire pressure, temperature, and acceleration periodically. The pressure, temperature, and acceleration information is converted to digital form within the MCU inside the WE sensor.

The WE sensor is equipped with a Radio Frequency (RF) transmitter circuit which is used to periodically broadcast information from inside the tire. All WE sensor units operate on the same RF channel frequency, and each broadcast message includes pressure and temperature data, a unique ID code, operating state data, status information, and digital error-detection data.

The pressure measured by the WE sensor is an absolute pressure value. The pressure measurement range is 100kPa to 450kPa. The acceleration data is used within the WE sensor to determine whether the vehicle is moving or stationary. The acceleration status is the decision maker within the WE module that determines if the tire is moving or stationary. This measurement is used within the WE module to enable different operating modes depending on the status of the acceleration value. Over the fully specified operating temperature range, if the acceleration measurement is greater than or equal to 5G, the WE module assumes the tire is moving.

The basic function of the WE Sensor is to transmit frame every minute when WE is in mode MD(mode driving) mode. During MD mode,The WE sensor transmits RF messages every 1 minute if the acceleration measurement is greater than 5G.The WE sensor enters mode MP(Mode Parking) where it transmits RF messages once every 13 hours if acceleration is lower than 5g for 15 mimutes. When the WE sensor is in mode MFB(Mode First Burst : mode for Auto Location and Auto Learning), it transmits RF message once every 15 seconds.

DTC Description

This DTC indicates that the Sensor 3 battery voltage is below 2.2Vdc. The most likely cause is battery passing it's expected life / sensor failure.

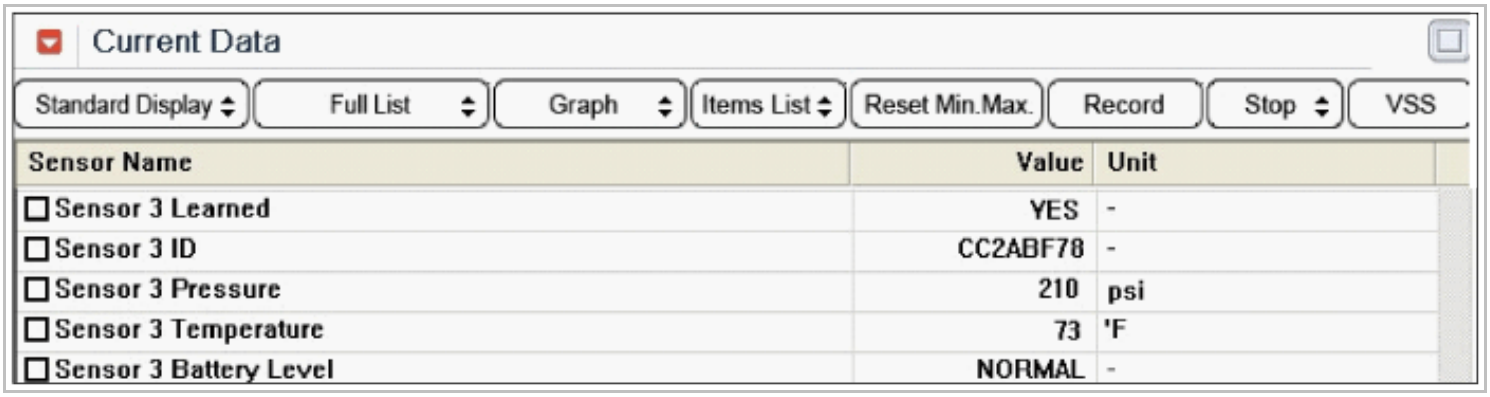
DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Check RF message from Sensor 3	• Sensor 3 battery low • Faulty Sensor 3
Enable Conditions	• IGN ON	
Threshold value	• Sensor 3 battery voltage < 2.2V for 20 consecutive bursts at temperatures above -10 °C	
Mil On conditon	• Not applicable	

Monitor GDS Data

1. Park the vehicle on an even ground.
2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the "BATTERY VOLTAGE" of TPMS sensor on the GDS.

Specification: The value of Sensor 3 battery is 'Normal'.



5. Is the sensor battery normal?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Replace Sensor 3 and register sensor ID with 'GDS TPMS'. ▶ Go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

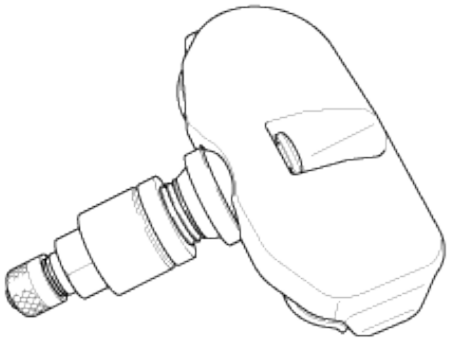
1. Connect TPMS exciter or GDS and select "Diagnostic Trouble Codes(DTCs)" mode
2. Using a TPMS exciter or GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

YES	▶ Go to the applicable troubleshooting procedure.

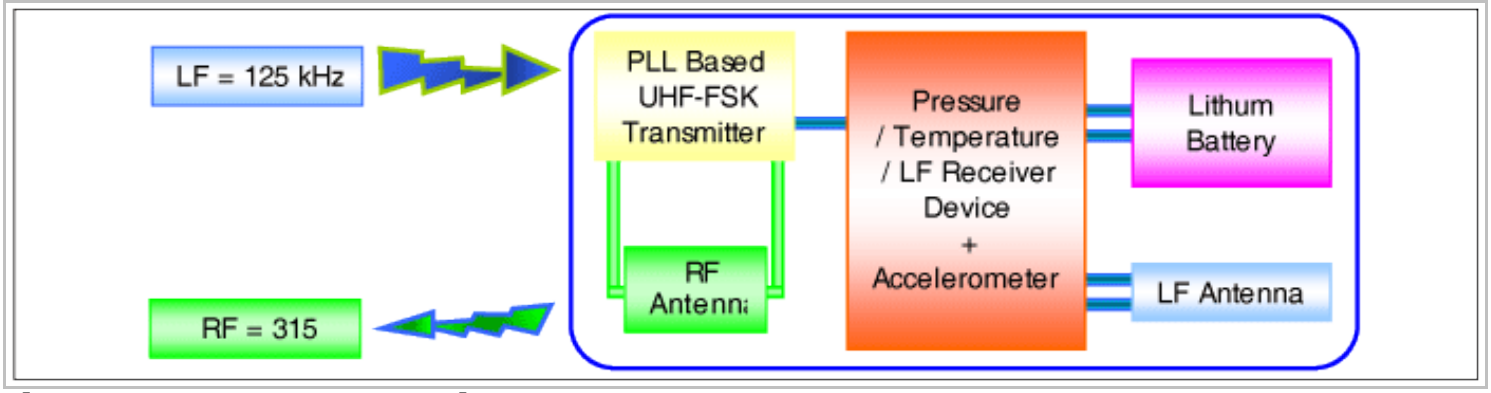
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1124 Sensor 4, Rear Right Sensor Battery Voltage Low

Component Location



General Description



【Wheel Electronic (WE) sensor unit】- TPMS sensor

Each vehicle wheel is fitted with a Wheel Electronic (WE) sensor unit attached to the valve on the inside of the wheel. The WE unit is powered with a self-contained battery utilizing a high temperature rated CR (Manganese Dioxide Lithium) chemistry. The operating voltage range for the WE module is 1.8Vdc to 3.6Vdc, and the operating temperature range is -40°C ~120°C. The WE measures tire pressure, temperature, and acceleration periodically. The pressure, temperature, and acceleration information is converted to digital form within the MCU inside the WE sensor.

The WE sensor is equipped with a Radio Frequency (RF) transmitter circuit which is used to periodically broadcast information from inside the tire. All WE sensor units operate on the same RF channel frequency, and each broadcast message includes pressure and temperature data, a unique ID code, operating state data, status information, and digital error-detection data.

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The basic function of the WE Sensor is to transmit frame every minute when WE is in mode MD(mode driving) mode. During MD mode,The WE sensor transmits RF messages every 1 minute if the acceleration measurement is greater

than 5G.The WE sensor enters mode MP(Mode Parking) where it transmits RF messages once every 13 hours if acceleration is lower than 5g for 15 mimutes. When the WE sensor is in mode MFB(Mode First Burst : mode for Auto Location and Auto Learning), it transmits RF message once every 15 seconds.

DTC Description

This DTC indicates that the Sensor 4 battery voltage is below 2.2Vdc. The most likely cause is battery passing it's expected life / sensor failure.

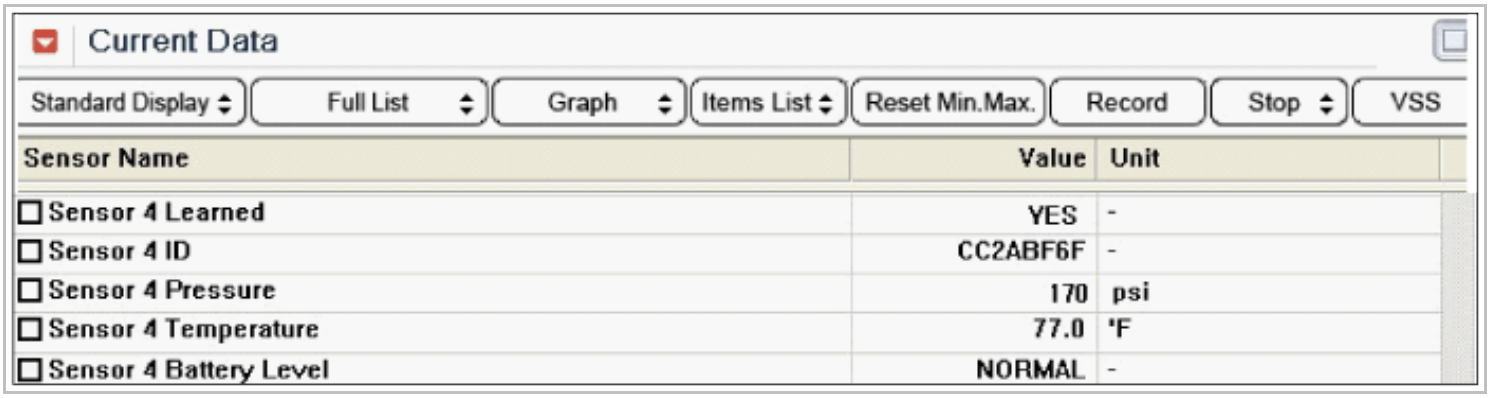
DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Check RF message from Sensor 4	• Sensor 4 battery low • Faulty Sensor 4
Enable Conditions	• IGN ON	
Threshold value	• Sensor 4 battery voltage < 2.2V for 20 consecutive bursts at temperatures above -10 °C	
Mil On conditon	• Not applicable	

Monitor GDS Data

1. Park the vehicle on an even ground.
2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the "BATTERY VOLTAGE" of TPMS sensor on the GDS.

Specification: The value of Sensor 4 battery is 'Normal'.



5. Is the sensor battery normal?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Replace Sensor 4 and register sensor ID with 'GDS TPMS'. ▶ Go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

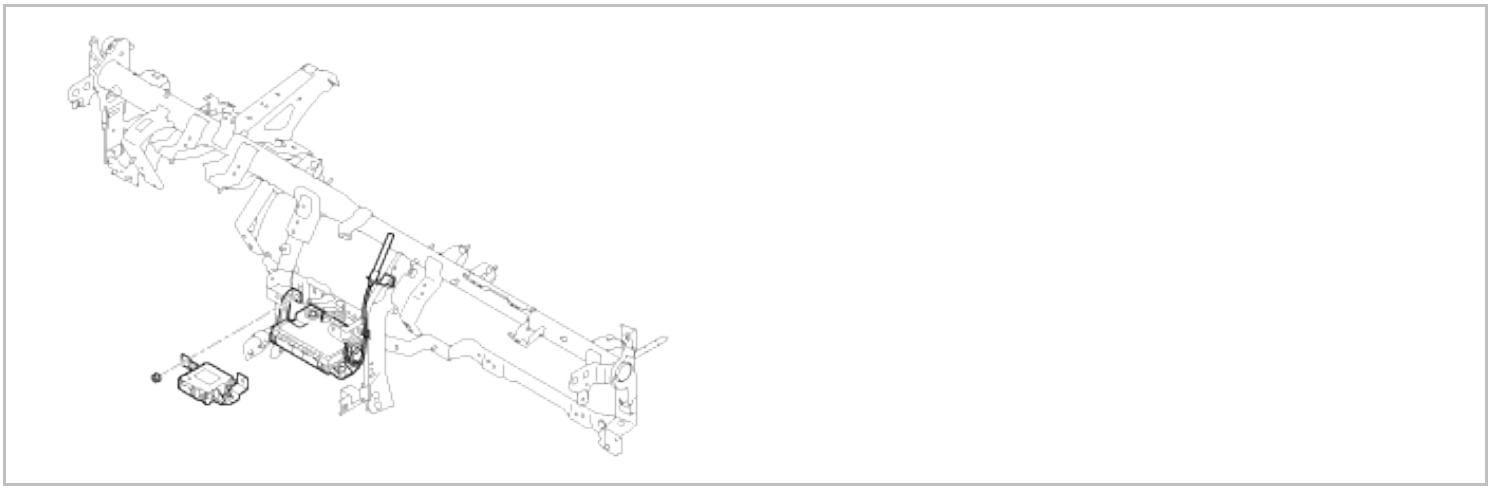
After a repair, it is essential to verify that the fault has been corrected.

1. Connect TPMS exciter or GDS and select "Diagnostic Trouble Codes(DTCs)" mode
2. Using a TPMS exciter or GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1126 TPMS ECU Battery Voltage Low

Component Location



General Description

The operating battery of TPM module is supplied from the vehicle battery. Upon reception of the broadcast from the WE sensor, the TPMS receiver is able to associate the unique WE ID code with the wheel's position on the vehicle. The TPMS Warning Algorithm continues to evaluate the pressure and temperature of each tire, and is responsible for making the decision to alert the driver to a potentially dangerous tire inflation condition via a visible 'TREAD' indicator.

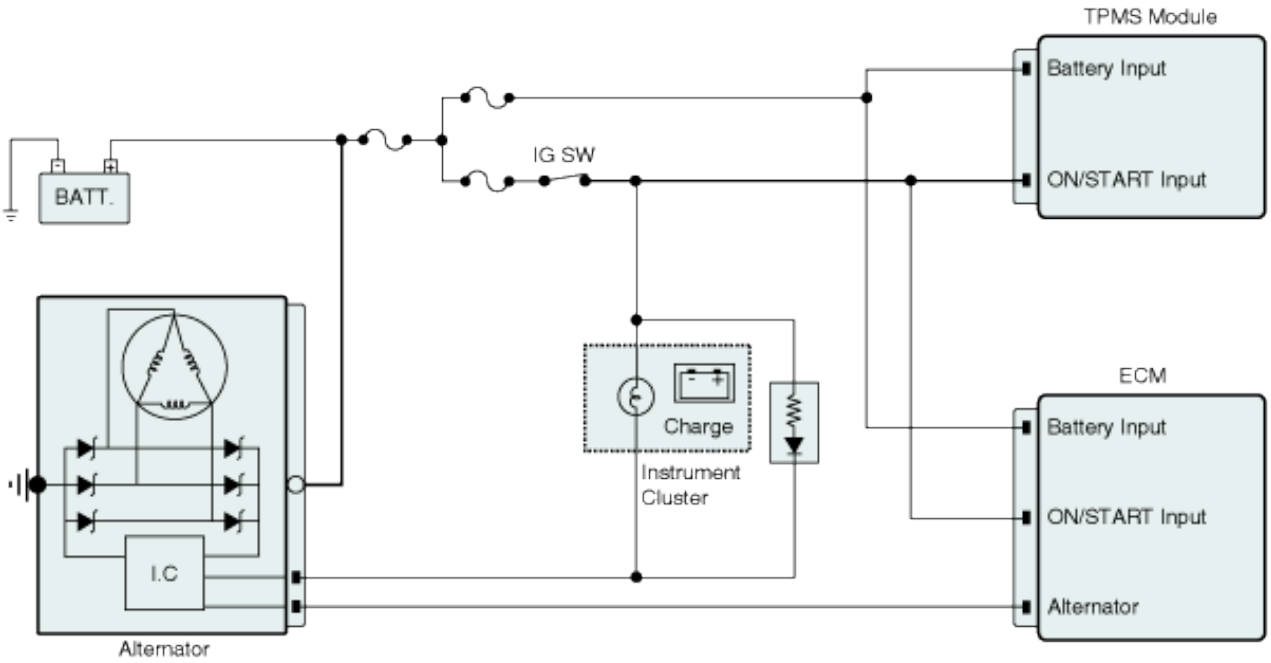
DTC Description

This DTC indicates that the Vehicle/receiver battery level is Low.

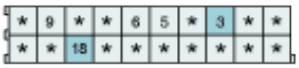
DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Check vehicle battery voltage	• Faulty charging system • Vehicle battery low • Faulty TPMS Receiver
Enable Conditions	• IGN ON	
Threshold value	• Battery voltage < 9.0 V • Consecutive over 5 sec.	
Mil On conditon	• TPMS waring lamp ON.	

Diagnostic Circuit Diagram



<TPMS>

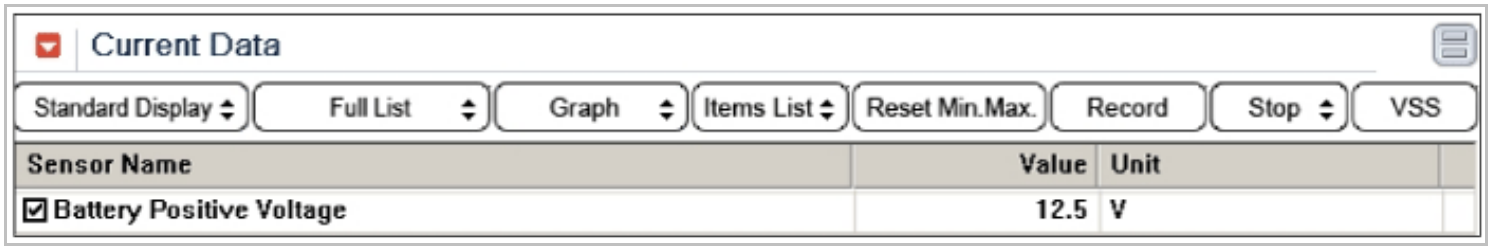


3. Battery Power
18. ON/START Input

Monitor GDS Data

1. Park the vehicle on an even ground.
2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the "BATTERY VOLTAGE" of TPMS sensor on the GDS.
5. Maintaining ENG. RPM at 2,500RPM(idle) over 2 minutes.
6. Monitor the parameter of 'Battery Positive Voltage' on the screen.

Specification :
'Battery Positive Voltage' is more than 9 V



7. Is parameter within specifications?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared

	yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Go to "Inspection/Repair" procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminal condition.
   Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check all connectors (and connections) for looseness, bending, corrosion, contamination, deterioration, and/or damage.
3. Has a problem been found?

YES	▶ Repair if necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▶ Go to "Charging System Inspection" procedure.

Charging System Inspection

1. Engine "ON"
2. Headight and rear defroster "ON".
3. Measure voltage between terminal (+) and (-) of battery maintaining ENG. RPM at 2,500RPM(idle) over 2 minutes.

   Specification : more than 9 V

4. Is the measured voltage within specifications?

YES	▶ Substitute with a known-good TPMS receiver and check for proper operation. ▶ If the problem is corrected, replace TPMS receiver and then go to "Verification of Vehicle Repair" procedure.
NO	▶ Check for fault in charging system and check for tension of alternator drive belt, ENG. idle rpm or open/short in harness from battery to generator. ▶ Repair if necessary and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

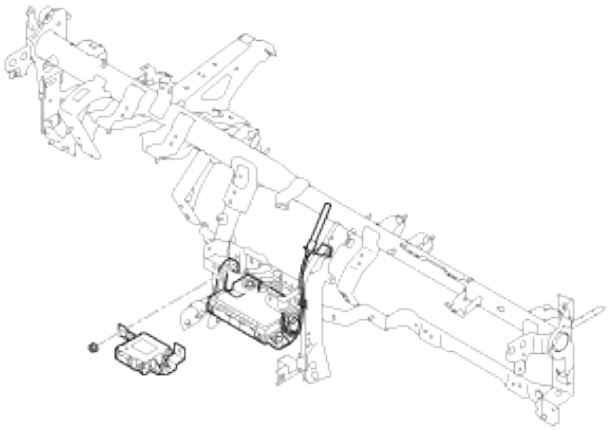
After a repair, it is essential to verify that the fault has been corrected.

1. Connect TPMS exciter or GDS and select "Diagnostic Trouble Codes(DTCs)" mode
2. Using a TPMS exciter or GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Voltage High

Component Location



General Description

The operating battery of TPM module is supplied from the vehicle battery. Upon reception of the broadcast from the WE sensor, the TPMS receiver is able to associate the unique WE ID code with the wheel's position on the vehicle. The TPMS Warning Algorithm continues to evaluate the pressure and temperature of each tire, and is responsible for making the decision to alert the driver to a potentially dangerous tire inflation condition via a visible 'TREAD' indicator.

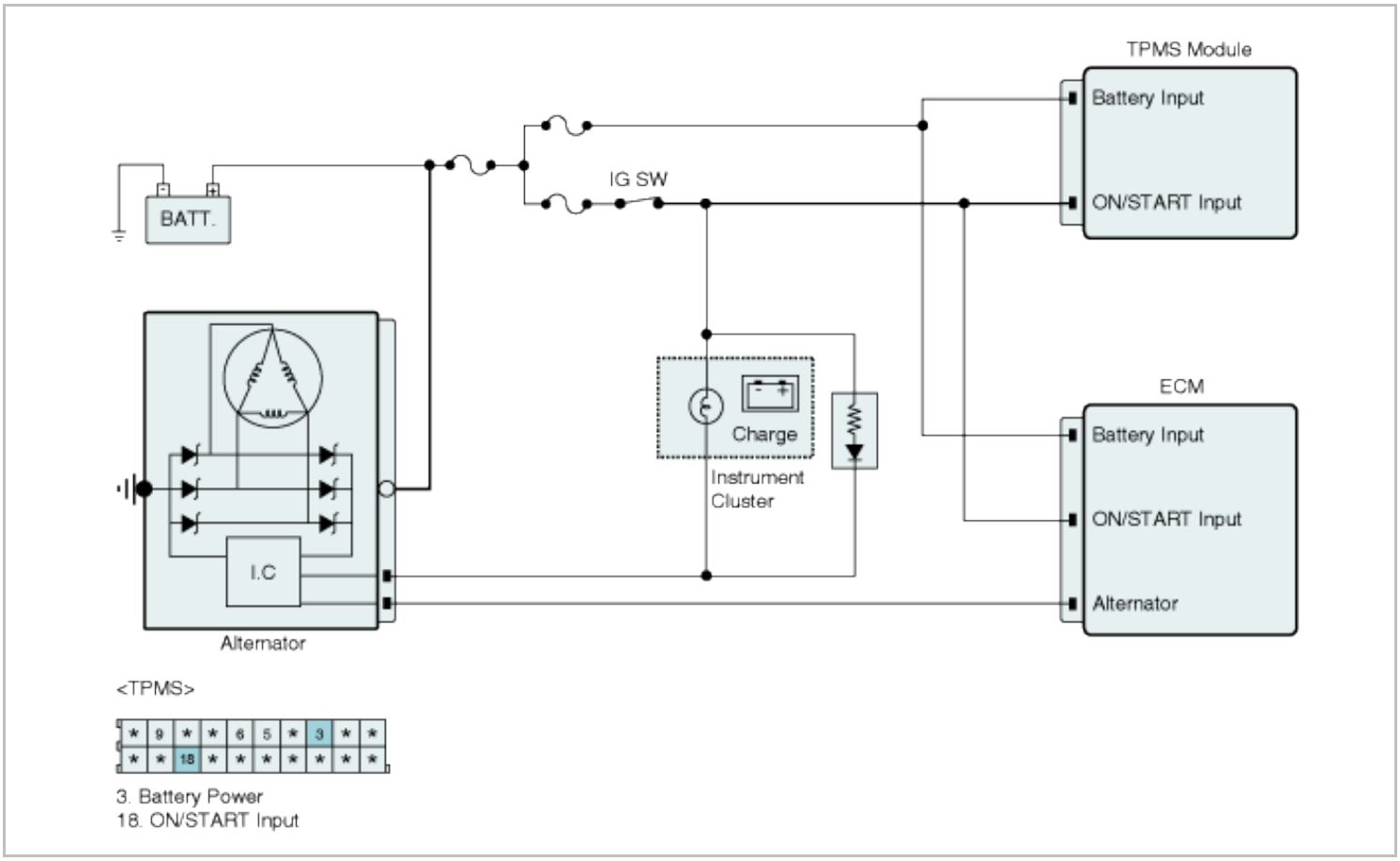
DTC Description

This DTC indicates that the Vehicle/receiver battery level is High.

DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Check vehicle battery voltage	• Faulty charging system • Vehicle battery high • Faulty TPMS Receiver
Enable Conditions	• IGN ON	
Threshold value	• Battery voltage > 16 V • Consecutive over 5 sec.	
Mil On conditon	• Active DTC is set	

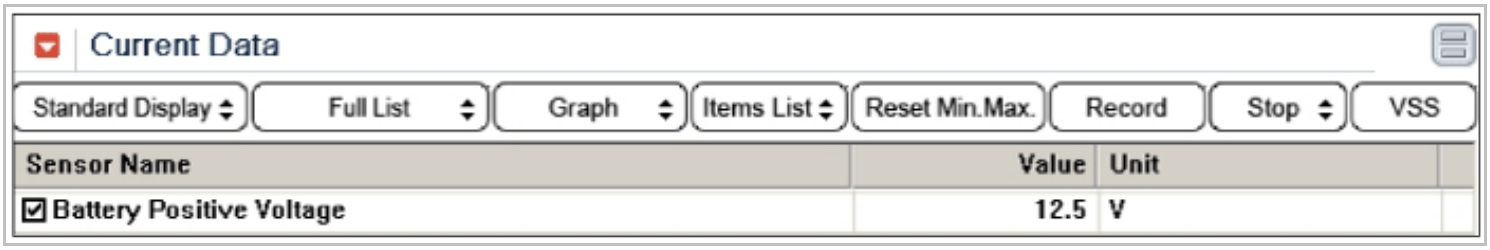
Diagnostic Circuit Diagram



Monitor GDS Data

1. Park the vehicle on an even ground.
2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the "BATTERY VOLTAGE" of TPMS sensor on the GDS.
5. Maintaining ENG. RPM at 2,500RPM(idle) over 2 minutes.
6. Monitor the parameter of 'Battery Positive Voltage' on the screen.

Specification :
'Battery Positive Voltage' is more than 16 V



7. Is parameter within specifications?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Go to "Inspection/Repair" procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminal condition.
   Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check all connectors (and connections) for looseness, bending, corrosion, contamination, deterioration, and/or damage.
3. Has a problem been found?

YES	▶ Repair if necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▶ Go to "Charging System Inspection" procedure.

Charging System Inspection

1. Engine "ON"
2. Headight and rear defroster "ON".
3. Measure voltage between terminal (+) and (-) of battery maintaining ENG. RPM at 2,500RPM(idle) over 2 minutes.

   Specification : less than 16 V

4. Is the measured voltage within specifications?

YES	▶ Substitute with a known-good TPMS receiver and check for proper operation. ▶ If the problem is corrected, replace TPMS receiver and then go to "Verification of Vehicle Repair" procedure.
NO	▶ Check for fault in charging system and check for tension of alternator drive belt, ENG. idle rpm or open/short in harness from battery to generator. ▶ Repair if necessary and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect TPMS exciter or GDS and select "Diagnostic Trouble Codes(DTCs)" mode
2. Using a TPMS exciter or GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1300 LF/RF External Interference Failure

Component Location

General Description

TPMS Receiver is located in the back side of center console. The operating battery of TPMS module is supplied from the vehicle battery. Data such as Tire pressure, Temperature, Acceleration ,TPMS sensor battery status and TPMS sensor valve ID from TPMS sensors are transmitted to TPMS receiver in the form of RF signal. TPMS module accomplishes Tire Monitoring and Warning Logic with received data.

DTC Description

This DTC indicates that a commumication failure is occurred between micro controller and RF receiver in the TPMS ECU. In such a case no WE sensor data can be received/processed by the TPMS algorithm.

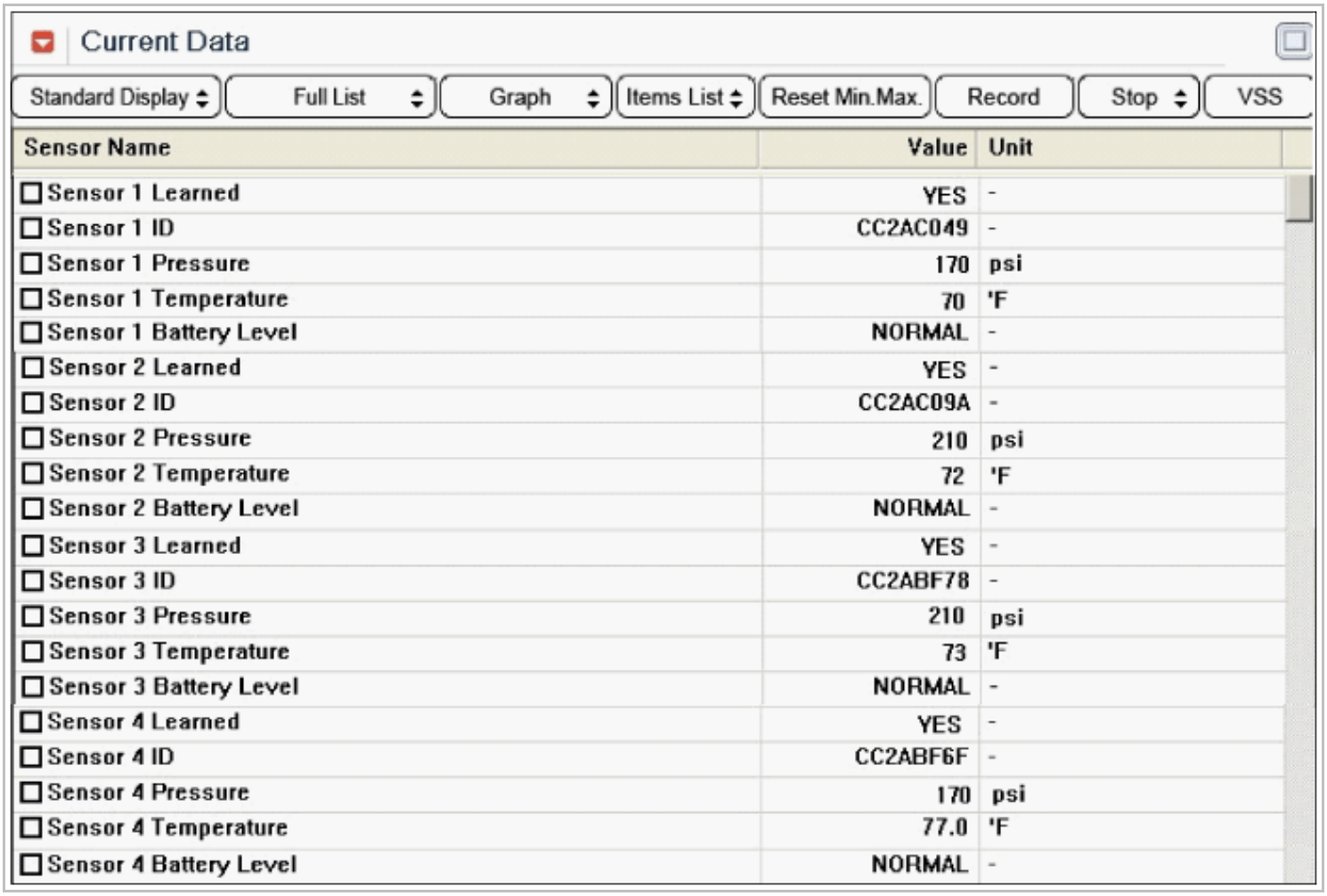
DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• RF check	• A RF Interference from external sources
Enable Conditions	• All 4 active WE sensors are mute	
Threshold value	• No telegrams received for the last scheduled 8 transmissions from all 4 active WE sensors. • The Innovative receiver (IRX) does not respond.	
Mil On conditon	• Active DTC is set	

Monitor GDS Data

1. Park the vehicle on an even ground.
2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the parameters of 4 active WE sensors data.

Specification : the parameters related to 4 active WE sensors are displayed normally.



Sensor Name	Value	Unit
Sensor 1 Learned	YES	-
Sensor 1 ID	CC2AC049	-
Sensor 1 Pressure	170	psi
Sensor 1 Temperature	70	'F
Sensor 1 Battery Level	NORMAL	-
Sensor 2 Learned	YES	-
Sensor 2 ID	CC2AC09A	-
Sensor 2 Pressure	210	psi
Sensor 2 Temperature	72	'F
Sensor 2 Battery Level	NORMAL	-
Sensor 3 Learned	YES	-
Sensor 3 ID	CC2ABF78	-
Sensor 3 Pressure	210	psi
Sensor 3 Temperature	73	'F
Sensor 3 Battery Level	NORMAL	-
Sensor 4 Learned	YES	-
Sensor 4 ID	CC2ABF6F	-
Sensor 4 Pressure	170	psi
Sensor 4 Temperature	77.0	'F
Sensor 4 Battery Level	NORMAL	-

5. Are the parameters normal?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Substitute with a known-good TPMS receiver module and check for proper operation. ▶ If the problem is corrected, replace TPMS receiver module and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

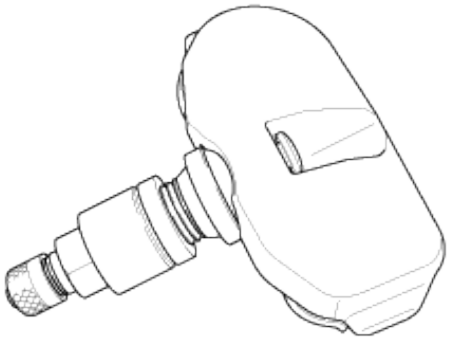
After a repair, it is essential to verify that the fault has been corrected.

1. Connect TPMS exciter or GDS and select "Diagnostic Trouble Codes(DTCs)" mode
2. Using a TPMS exciter or GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

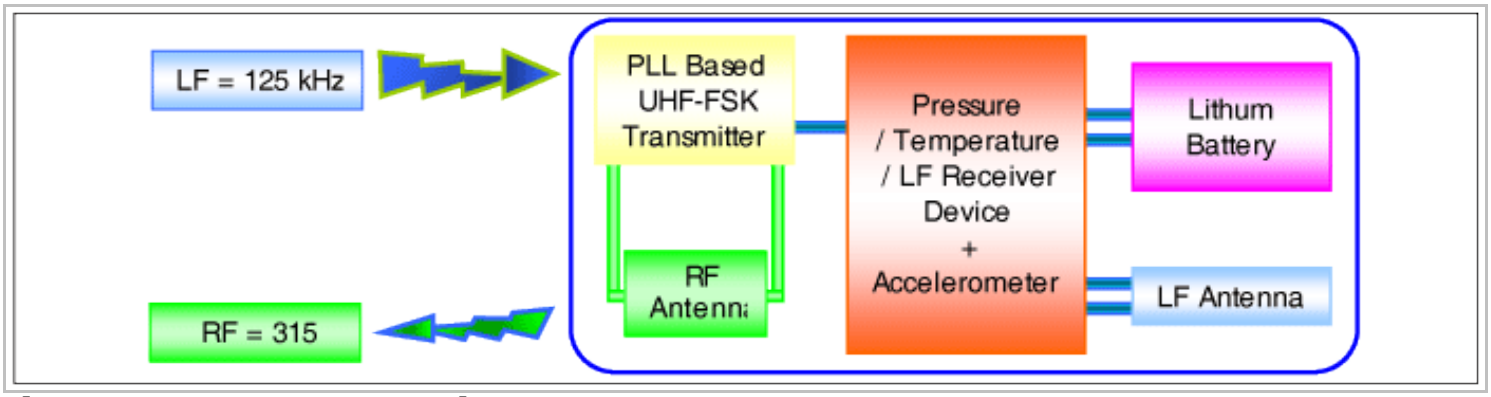
YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Channel Failure

Component Location



General Description



【Wheel Electronic (WE) sensor unit】- TPMS sensor

Each vehicle wheel is fitted with a Wheel Electronic (WE) sensor unit attached to the valve on the inside of the wheel. The WE unit is powered with a self-contained battery utilizing a high temperature rated CR (Manganese Dioxide Lithium) chemistry. The operating voltage range for the WE module is 1.8Vdc to 3.6Vdc, and the operating temperature range is -40°C ~120°C. The WE measures tire pressure, temperature, and acceleration periodically. The pressure, temperature, and acceleration information is converted to digital form within the MCU inside the WE sensor.

The WE sensor is equipped with a Radio Frequency (RF) transmitter circuit which is used to periodically broadcast information from inside the tire. All WE sensor units operate on the same RF channel frequency, and each broadcast message includes pressure and temperature data, a unique ID code, operating state data, status information, and digital error-detection data.

The pressure measured by the WE sensor is an absolute pressure value. The pressure measurement range is 100kPa to 450kPa. The acceleration data is used within the WE sensor to determine whether the vehicle is moving or stationary. The acceleration status is the decision maker within the WE module that determines if the tire is moving or stationary. This measurement is used within the WE module to enable different operating modes depending on the status of the acceleration value. Over the fully specified operating temperature range, if the acceleration measurement is greater than or equal to 5G, the WE module assumes the tire is moving.

The basic function of the WE Sensor is to transmit frame every minute when WE is in mode MD(mode driving) mode. During MD mode,The WE sensor transmits RF messages every 1 minute if the acceleration measurement is greater than 5G.The WE sensor enters mode MP(Mode Parking) where it transmits RF messages once every 13 hours if acceleration is lower than 5g for 15 mimutes. When the WE sensor is in mode MFB(Mode First Burst : mode for Auto Location and Auto Learning), it transmits RF message once every 15 seconds.

DTC Description

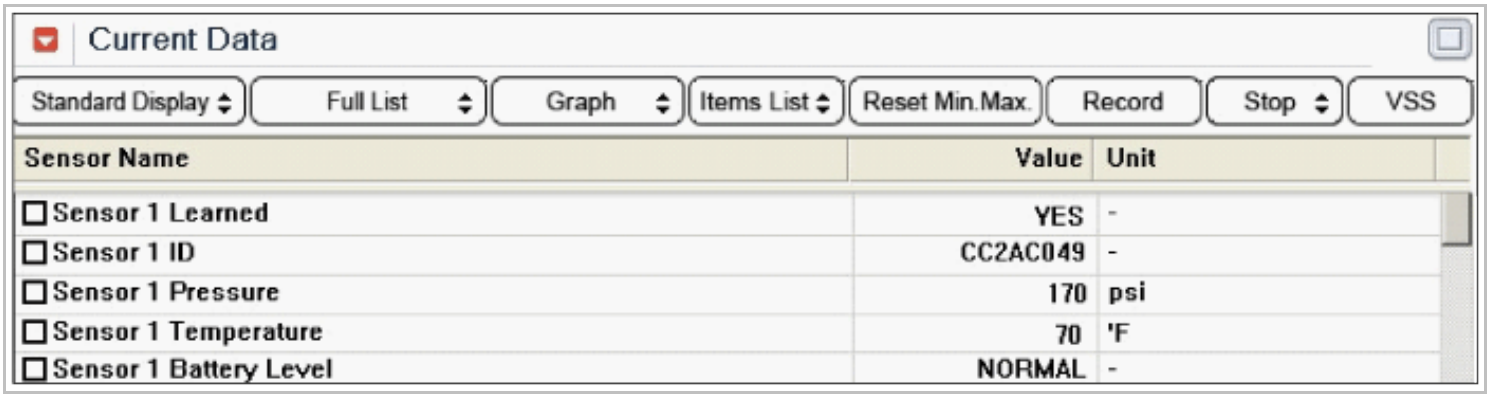
This DTC indicates that the Sensor 1 battery voltage is below 2.2Vdc. The most likely cause is battery passing it's expected life / sensor failure.

DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Check RF message from Sensor 1	• Sensor 1 fault. • Shielding in Sensor 1.
Enable Conditions	• Vehicle Speed is above 0km/h.	
Threshold value	• No RF message received from Sensor 1since driving for 540s	
Mil On conditon	• Active DTC is set	

Monitor GDS Data

1. Park the vehicle on an even ground.
2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the service data related to TPMS sensor on the GDS.



5. Are parameters normal?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Check for vehicle interference sources. ▶ Repair if necessary and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

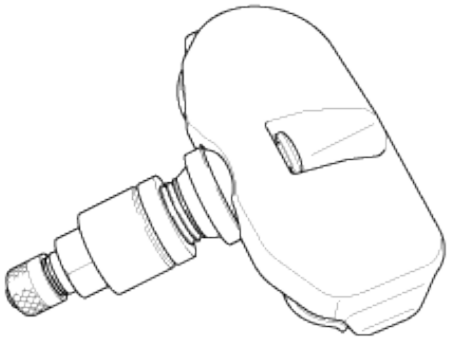
1. Connect TPMS exciter or GDS and select "Diagnostic Trouble Codes(DTCs)" mode
2. Using a TPMS exciter or GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

YES	▶ Go to the applicable troubleshooting procedure.

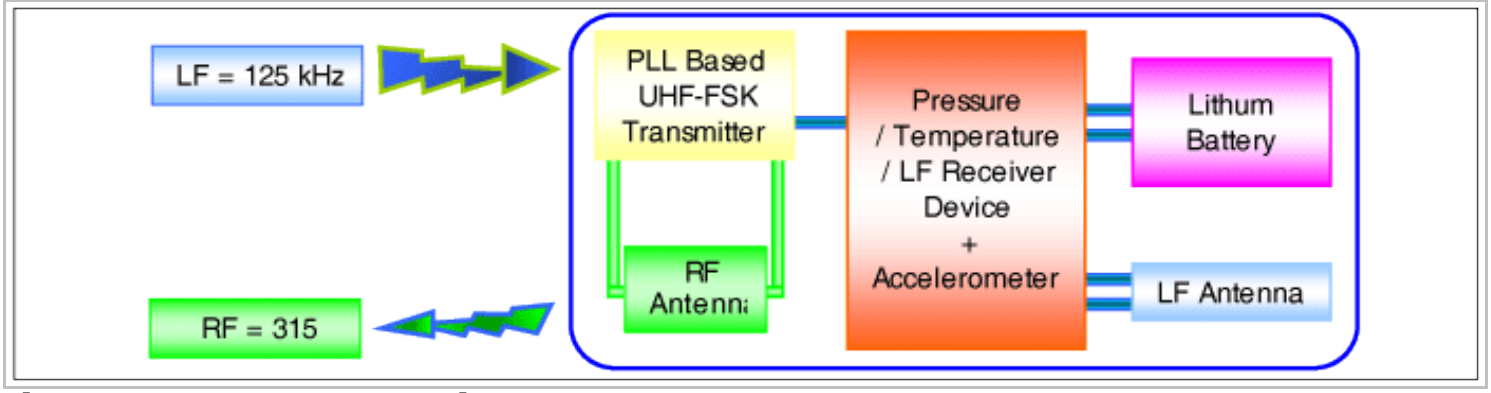
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1313 Front Right Sensor RF Channel Failure

Component Location



General Description



【Wheel Electronic (WE) sensor unit】- TPMS sensor

Each vehicle wheel is fitted with a Wheel Electronic (WE) sensor unit attached to the valve on the inside of the wheel. The WE unit is powered with a self-contained battery utilizing a high temperature rated CR (Manganese Dioxide Lithium) chemistry. The operating voltage range for the WE module is 1.8Vdc to 3.6Vdc, and the operating temperature range is -40°C ~120°C. The WE measures tire pressure, temperature, and acceleration periodically. The pressure, temperature, and acceleration information is converted to digital form within the MCU inside the WE sensor.

The WE sensor is equipped with a Radio Frequency (RF) transmitter circuit which is used to periodically broadcast information from inside the tire. All WE sensor units operate on the same RF channel frequency, and each broadcast message includes pressure and temperature data, a unique ID code, operating state data, status information, and digital error-detection data.

The pressure measured by the WE sensor is an absolute pressure value. The pressure measurement range is 100kPa to 450kPa. The acceleration data is used within the WE sensor to determine whether the vehicle is moving or stationary. The acceleration status is the decision maker within the WE module that determines if the tire is moving or stationary. This measurement is used within the WE module to enable different operating modes depending on the status of the acceleration value. Over the fully specified operating temperature range, if the acceleration measurement is greater than or equal to 5G, the WE module assumes the tire is moving.

The basic function of the WE Sensor is to transmit frame every minute when WE is in mode MD(mode driving) mode. During MD mode,The WE sensor transmits RF messages every 1 minute if the acceleration measurement is greater

than 5G.The WE sensor enters mode MP(Mode Parking) where it transmits RF messages once every 13 hours if acceleration is lower than 5g for 15 mimutes. When the WE sensor is in mode MFB(Mode First Burst : mode for Auto Location and Auto Learning), it transmits RF message once every 15 seconds.

DTC Description

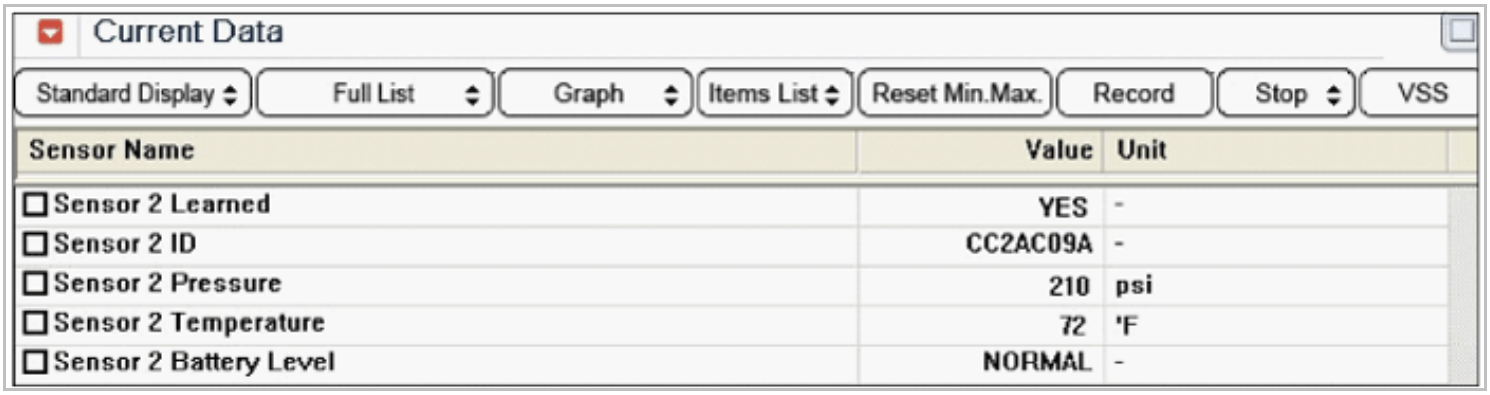
This DTC indicates that the Sensor 2 battery voltage is below 2.2Vdc. The most likely cause is battery passing it's expected life / sensor failure.

DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Check RF message from Sensor 2	• Sensor 2 in storage state. • Shielding in Sensor 2.
Enable Conditions	• Vehicle Speed is above 0km/h.	
Threshold value	• No RF message received from Sensor 2 since driving for 540s	
Mil On conditon	• Active DTC is set	

Monitor GDS Data

1. Park the vehicle on an even ground.
2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the service data related to TPMS sensor on the GDS.



5. Are parameters normal?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Check for vehicle interference sources. ▶ Repair if necessary and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

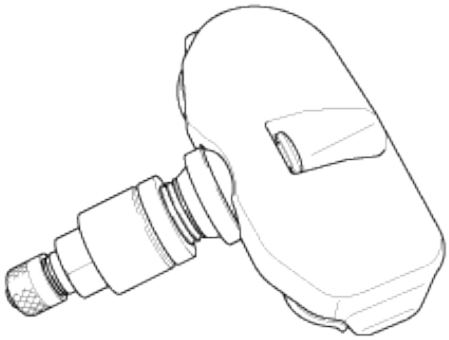
1. Connect TPMS exciter or GDS and select "Diagnostic Trouble Codes(DTCs)" mode

2. Using a TPMS exciter or GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

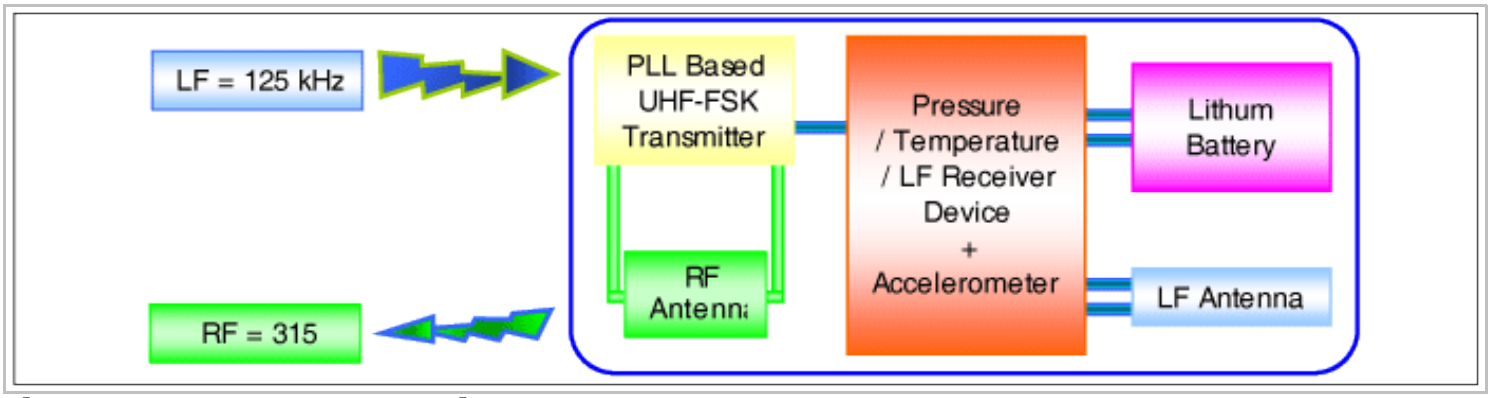
YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1314 Rear Left Sensor RF Channel Failure

Component Location



General Description



【Wheel Electronic (WE) sensor unit】 - TPMS sensor
Each vehicle wheel is fitted with a Wheel Electronic (WE) sensor unit attached to the valve on the inside of the wheel. The WE unit is powered with a self-contained battery utilizing a high temperature rated CR (Manganese Dioxide Lithium) chemistry. The operating voltage range for the WE module is 1.8Vdc to 3.6Vdc, and the operating temperature range is -40°C ~120°C. The WE measures tire pressure, temperature, and acceleration periodically. The pressure, temperature, and acceleration information is converted to digital form within the MCU inside the WE sensor.
The WE sensor is equipped with a Radio Frequency (RF) transmitter circuit which is used to periodically broadcast information from inside the tire. All WE sensor units operate on the same RF channel frequency, and each broadcast message includes pressure and temperature data, a unique ID code, operating state data, status information, and digital error-detection data.
The pressure measured by the WE sensor is an absolute pressure value. The pressure measurement range is 100kPa to 450kPa. The acceleration data is used within the WE sensor to determine whether the vehicle is moving or

stationary. The acceleration status is the decision maker within the WE module that determines if the tire is moving or stationary. This measurement is used within the WE module to enable different operating modes depending on the status of the acceleration value. Over the fully specified operating temperature range, if the acceleration measurement is greater than or equal to 5G, the WE module assumes the tire is moving.
The basic function of the WE Sensor is to transmit frame every minute when WE is in mode MD(mode driving) mode. During MD mode,The WE sensor transmits RF messages every 1 minute if the acceleration measurement is greater than 5G.The WE sensor enters mode MP(Mode Parking) where it transmits RF messages once every 13 hours if acceleration is lower than 5g for 15 mimutes. When the WE sensor is in mode MFB(Mode First Burst : mode for Auto Location and Auto Learning), it transmits RF message once every 15 seconds.

DTC Description

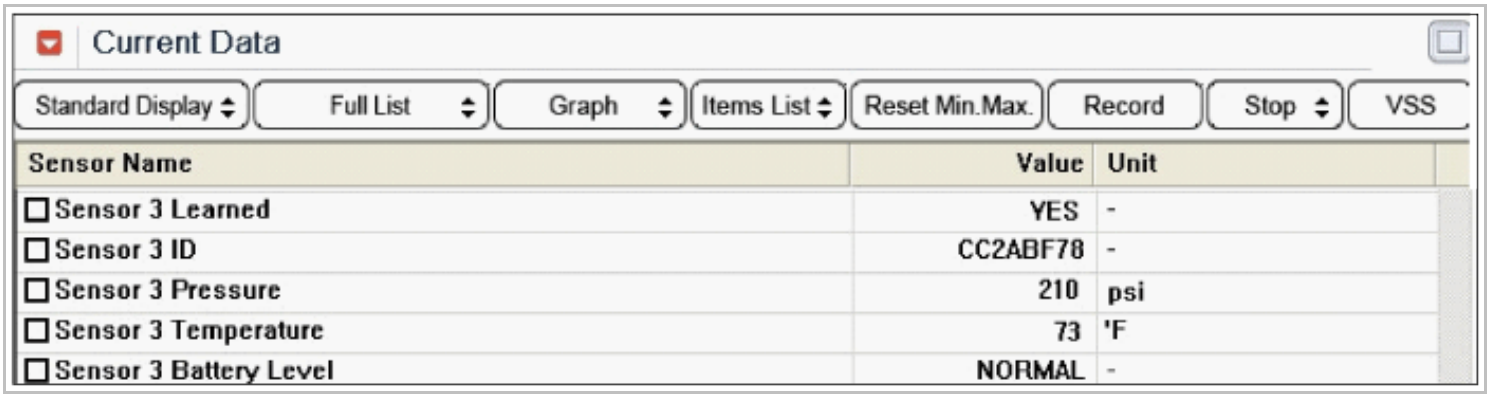
This DTC indicates that the Sensor 3 battery voltage is below 2.2Vdc. The most likely cause is battery passing it's expected life / sensor failure.

DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Check RF message from Sensor 3	• Sensor 3 in storage state. • Shielding in Sensor 3.
Enable Conditions	• Vehicle Speed is above 0km/h.	
Threshold value	• No RF message received from Sensor 3 since driving for 540s	
Mil On conditon	• Active DTC is set	

Monitor GDS Data

1. Park the vehicle on an even ground.
2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the service data related to TPMS sensor on the GDS.



5. Are parameters normal?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Check for vehicle interference sources. ▶ Repair if necessary and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

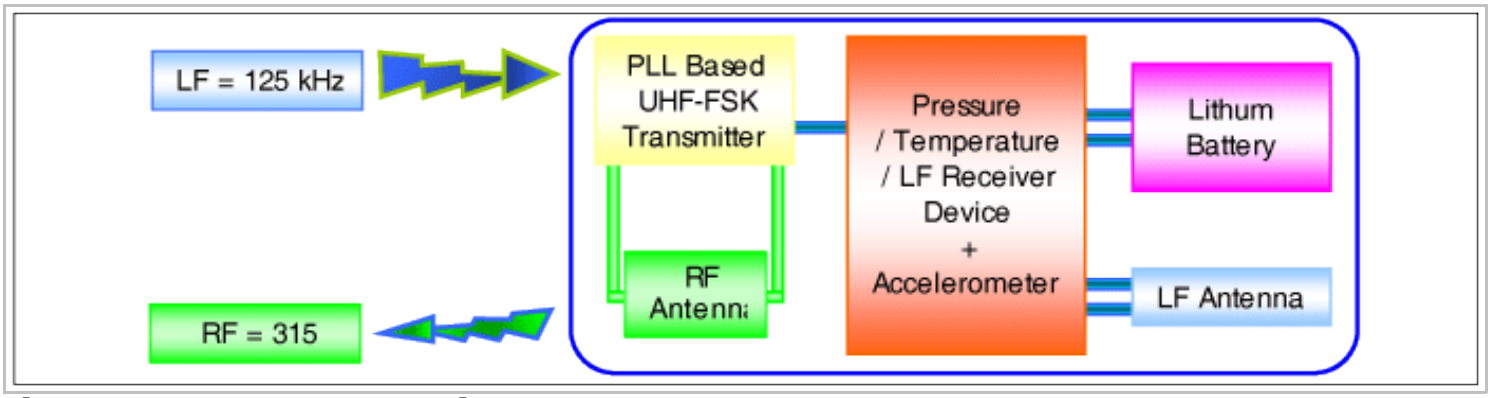
1. Connect GDS and select "Diagnostic Trouble Codes(DTCs)" mode.
2. Using GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1315 Rear Right Sensor RF Channel Failure

Component Location

General Description



【Wheel Electronic (WE) sensor unit】- TPMS sensor

Each vehicle wheel is fitted with a Wheel Electronic (WE) sensor unit attached to the valve on the inside of the wheel. The WE unit is powered with a self-contained battery utilizing a high temperature rated CR (Manganese Dioxide Lithium) chemistry. The operating voltage range for the WE module is 1.8Vdc to 3.6Vdc, and the operating temperature range is -40°C ~120°C. The WE measures tire pressure, temperature, and acceleration periodically. The pressure,

temperature, and acceleration information is converted to digital form within the MCU inside the WE sensor.
The WE sensor is equipped with a Radio Frequency (RF) transmitter circuit which is used to periodically broadcast information from inside the tire. All WE sensor units operate on the same RF channel frequency, and each broadcast message includes pressure and temperature data, a unique ID code, operating state data, status information, and digital error-detection data.
The pressure measured by the WE sensor is an absolute pressure value. The pressure measurement range is 100kPa to 450kPa. The acceleration data is used within the WE sensor to determine whether the vehicle is moving or stationary. The acceleration status is the decision maker within the WE module that determines if the tire is moving or stationary. This measurement is used within the WE module to enable different operating modes depending on the status of the acceleration value. Over the fully specified operating temperature range, if the acceleration measurement is greater than or equal to 5G, the WE module assumes the tire is moving.
The basic function of the WE Sensor is to transmit frame every minute when WE is in mode MD(mode driving) mode. During MD mode,The WE sensor transmits RF messages every 1 minute if the acceleration measurement is greater than 5G.The WE sensor enters mode MP(Mode Parking) where it transmits RF messages once every 13 hours if acceleration is lower than 5g for 15 mimutes. When the WE sensor is in mode MFB(Mode First Burst : mode for Auto Location and Auto Learning), it transmits RF message once every 15 seconds.

DTC Description

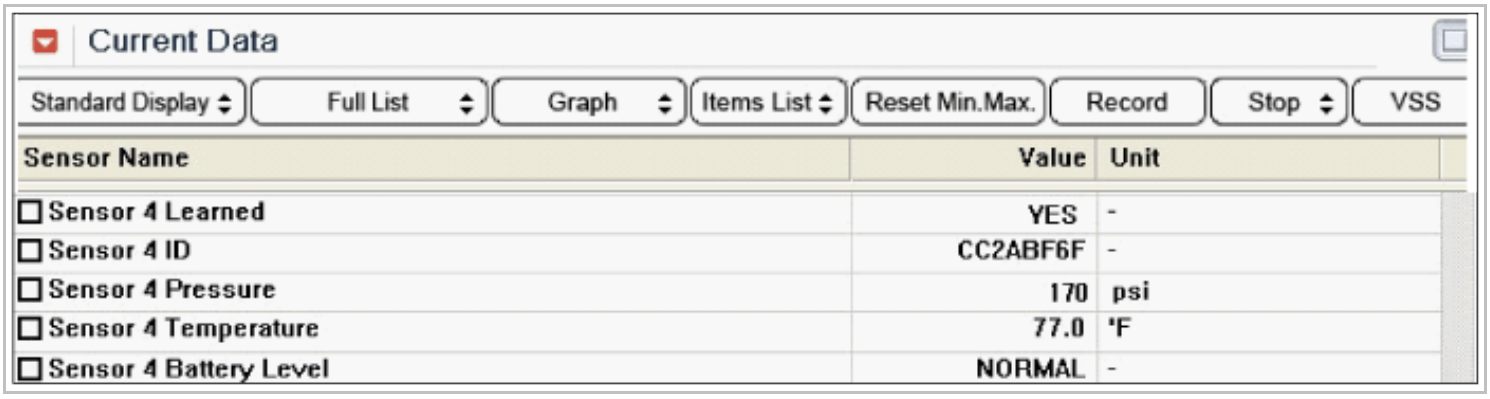
This DTC indicates that the Sensor 4 battery voltage is below 2.2Vdc. The most likely cause is battery passing it's expected life / sensor failure.

DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Check RF message from Sensor 4	• Sensor 4 in storage state. • Shielding in Sensor 4.
Enable Conditions	• Vehicle Speed is above 0km/h.	
Threshold value	• No RF message received from Sensor 4 since driving for 540s	
Mil On conditon	• Active DTC is set	

Monitor GDS Data

1. Park the vehicle on an even ground.
2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the service data related to TPMS sensor on the GDS.



5. Are parameters normal?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Check for vehicle interference sources. ▶ Repair if necessary and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

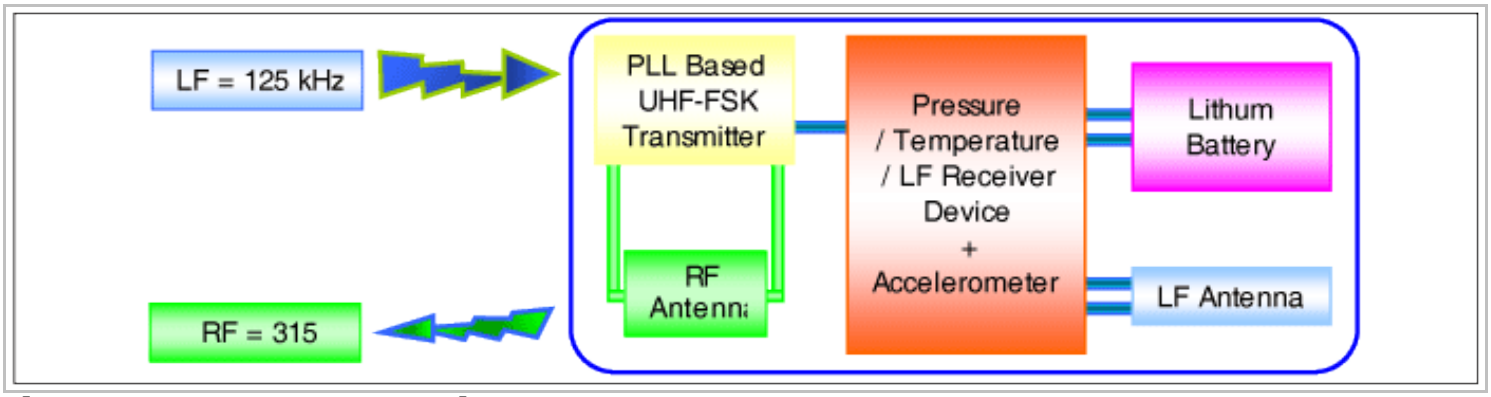
1. Connect GDS and select "Diagnostic Trouble Codes(DTCs)" mode.
2. Using GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1322 Front Left Sensor Over Temperature

Component Location

General Description



【Wheel Electronic (WE) sensor unit】- TPMS sensor

Each vehicle wheel is fitted with a Wheel Electronic (WE) sensor unit attached to the valve on the inside of the wheel. The WE unit is powered with a self-contained battery utilizing a high temperature rated CR (Manganese Dioxide Lithium) chemistry. The operating voltage range for the WE module is 1.8Vdc to 3.6Vdc, and the operating temperature range is -40°C ~120°C. The WE measures tire pressure, temperature, and acceleration periodically. The pressure, temperature, and acceleration information is converted to digital form within the MCU inside the WE sensor.

The WE sensor is equipped with a Radio Frequency (RF) transmitter circuit which is used to periodically broadcast information from inside the tire. All WE sensor units operate on the same RF channel frequency, and each broadcast message includes pressure and temperature data, a unique ID code, operating state data, status information, and digital error-detection data.

The pressure measured by the WE sensor is an absolute pressure value. The pressure measurement range is 100kPa to 450kPa. The acceleration data is used within the WE sensor to determine whether the vehicle is moving or stationary. The acceleration status is the decision maker within the WE module that determines if the tire is moving or stationary. This measurement is used within the WE module to enable different operating modes depending on the status of the acceleration value. Over the fully specified operating temperature range, if the acceleration measurement is greater than or equal to 5G, the WE module assumes the tire is moving.

The basic function of the WE Sensor is to transmit frame every minute when WE is in mode MD(mode driving) mode. During MD mode,The WE sensor transmits RF messages every 1 minute if the acceleration measurement is greater than 5G.The WE sensor enters mode MP(Mode Parking) where it transmits RF messages once every 13 hours if acceleration is lower than 5g for 15 mimutes. When the WE sensor is in mode MFB(Mode First Burst : mode for Auto Location and Auto Learning), it transmits RF message once every 15 seconds.

DTC Description

This DTC indicates that the Sensor 1 battery voltage is below 2.2Vdc. The most likely cause is battery passing it's expected life / sensor failure.

DTC Detecting Condition

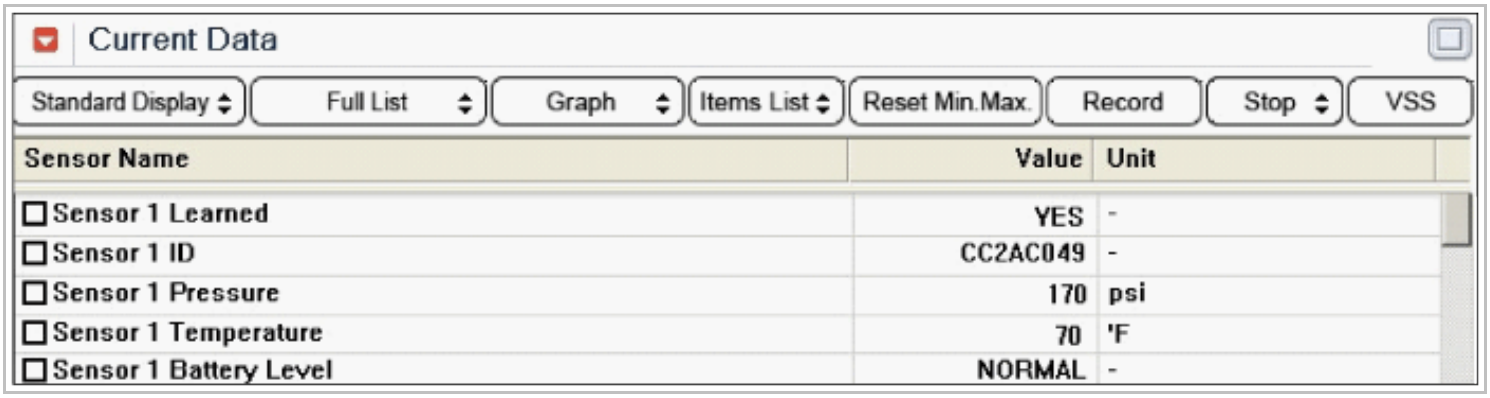
Item	Detecting Condition	Possible Cause
DTC Strategy	• Check RF message from Sensor 1	• Damaged tire • Excessive braking • Driving while the parking brake is on.
Enable Conditions	• IGN ON	
Threshold value	• Sensor 1 data is missing since 360s of driving & last received temperature > 239°F (115°C).	
Mil On conditon	• Not applicable	

Monitor GDS Data

1. Park the vehicle on an even ground.

2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the service data related to sensor's temperature on the GDS.

Specification: Below 239°F(115°C)



5. Is parameter within specifications?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Go to "Component Inspection" procedure.

Component Inspection

【Check wheel / tire】

1. Cool the heat of the Sensor 1's wheel / tire.
2. IG OFF & IG ON. And Wait for 1 minute.
3. Monitor the parameter related to 'Sensor 1 Temperature' on the GDS.

Specification : Below 239°F(115°C)

4. Is parameter within specifications?

YES	▶ Fault can be because of temporary overheating. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Check if there is a part to lead to overheated WE sensor. ▶ Replace Sensor 1 and register sensor ID with 'TPMS exciter'. ▶ Go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

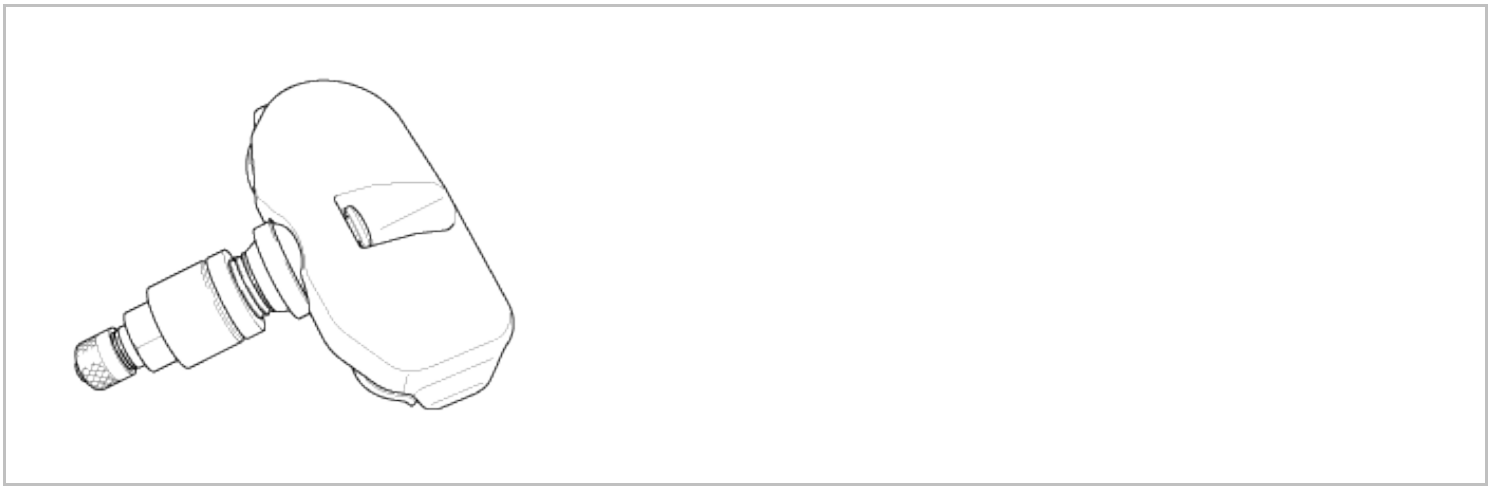
After a repair, it is essential to verify that the fault has been corrected.

1. Connect GDS and select "Diagnostic Trouble Codes(DTCs)" mode.
2. Using GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

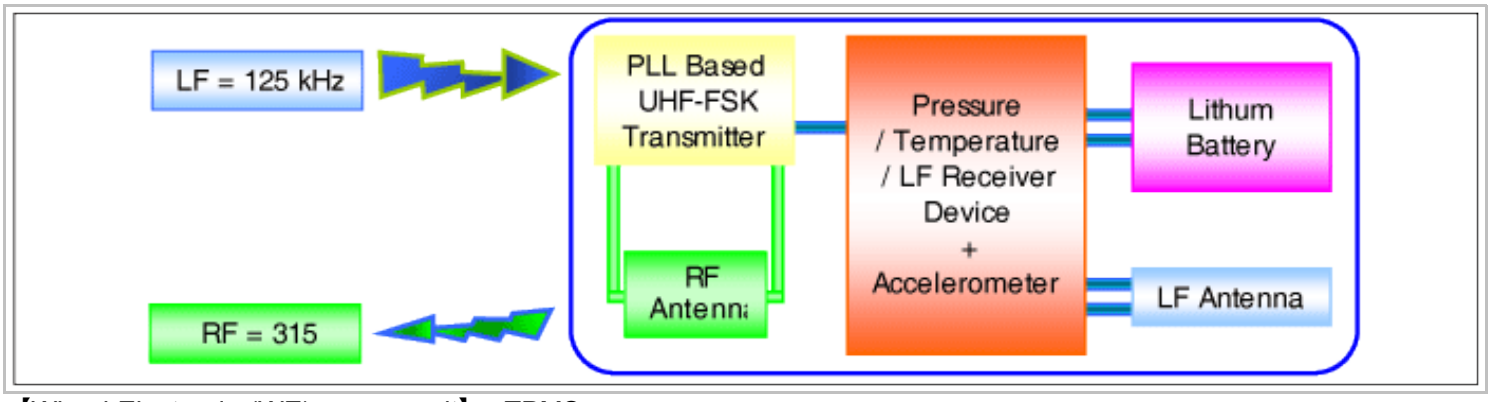
YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1323 Front Right Sensor Over Temperature

Component Location



General Description



【Wheel Electronic (WE) sensor unit】- TPMS sensor

Each vehicle wheel is fitted with a Wheel Electronic (WE) sensor unit attached to the valve on the inside of the wheel. The WE unit is powered with a self-contained battery utilizing a high temperature rated CR (Manganese Dioxide Lithium) chemistry. The operating voltage range for the WE module is 1.8Vdc to 3.6Vdc, and the operating temperature range is -40°C ~120°C. The WE measures tire pressure, temperature, and acceleration periodically. The pressure, temperature, and acceleration information is converted to digital form within the MCU inside the WE sensor.

The WE sensor is equipped with a Radio Frequency (RF) transmitter circuit which is used to periodically broadcast information from inside the tire. All WE sensor units operate on the same RF channel frequency, and each broadcast message includes pressure and temperature data, a unique ID code, operating state data, status information, and digital error-detection data.

The pressure measured by the WE sensor is an absolute pressure value. The pressure measurement range is 100kPa to 450kPa. The acceleration data is used within the WE sensor to determine whether the vehicle is moving or stationary. The acceleration status is the decision maker within the WE module that determines if the tire is moving or stationary. This measurement is used within the WE module to enable different operating modes depending on the status of the acceleration value. Over the fully specified operating temperature range, if the acceleration measurement is greater than or equal to 5G, the WE module assumes the tire is moving.

The basic function of the WE Sensor is to transmit frame every minute when WE is in mode MD(mode driving) mode. During MD mode,The WE sensor transmits RF messages every 1 minute if the acceleration measurement is greater than 5G.The WE sensor enters mode MP(Mode Parking) where it transmits RF messages once every 13 hours if acceleration is lower than 5g for 15 mimutes. When the WE sensor is in mode MFB(Mode First Burst : mode for Auto Location and Auto Learning), it transmits RF message once every 15 seconds.

DTC Description

This DTC indicates that the Sensor 2 battery voltage is below 2.2Vdc. The most likely cause is battery passing it's expected life / sensor failure.

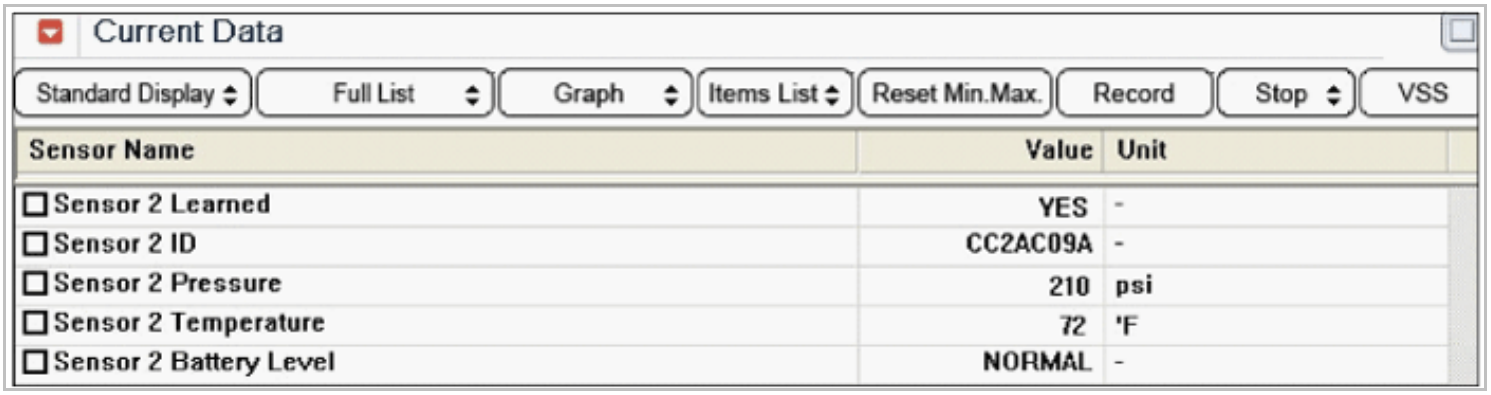
DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Check RF message from Sensor 2	• Damaged tire • Excessive braking • Driving while the parking brake is on.
Enable Conditions	• IGN ON	
Threshold value	• Sensor 2 data is missing since 360s of driving & last received temperature > 239°F(115°C).	
Mil On conditon	• Not applicable	

Monitor GDS Data

1. Park the vehicle on an even ground.
2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the service data related to sensor's temperature on the GDS.

Specification: Below 239°F(115°C)



5. Is parameter within specifications?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Go to "Component Inspection" procedure.

Component Inspection

【Check wheel / tire】

1. Cool the heat of the Sensor 2's wheel / tire.
2. IG OFF & IG ON. And Wait for 1 minute.
3. Monitor the parameter related to 'Sensor 2 Temperature' on the GDS.

Specification : Below 239°F(115°C)

4. Is parameter within specifications?

YES	▶ Fault can be because of temporary overheating. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Replace Sensor 2 and register sensor ID with 'TPMS exciter'. ▶ Go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

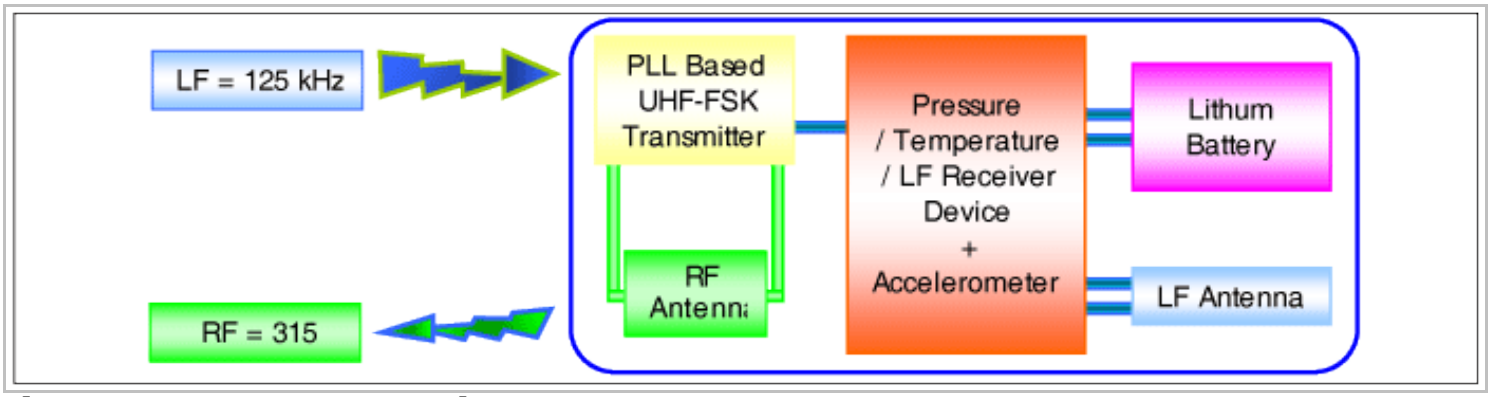
1. Connect GDS and select "Diagnostic Trouble Codes(DTCs)" mode.
2. Using GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1324 Rear Left Sensor Over Temperature

Component Location

General Description



【Wheel Electronic (WE) sensor unit】- TPMS sensor

Each vehicle wheel is fitted with a Wheel Electronic (WE) sensor unit attached to the valve on the inside of the wheel. The WE unit is powered with a self-contained battery utilizing a high temperature rated CR (Manganese Dioxide Lithium) chemistry. The operating voltage range for the WE module is 1.8Vdc to 3.6Vdc, and the operating temperature range is -40°C ~120°C. The WE measures tire pressure, temperature, and acceleration periodically. The pressure, temperature, and acceleration information is converted to digital form within the MCU inside the WE sensor.

The WE sensor is equipped with a Radio Frequency (RF) transmitter circuit which is used to periodically broadcast information from inside the tire. All WE sensor units operate on the same RF channel frequency, and each broadcast message includes pressure and temperature data, a unique ID code, operating state data, status information, and digital error-detection data.

The pressure measured by the WE sensor is an absolute pressure value. The pressure measurement range is 100kPa to 450kPa. The acceleration data is used within the WE sensor to determine whether the vehicle is moving or stationary. The acceleration status is the decision maker within the WE module that determines if the tire is moving or stationary. This measurement is used within the WE module to enable different operating modes depending on the status of the acceleration value. Over the fully specified operating temperature range, if the acceleration measurement is greater than or equal to 5G, the WE module assumes the tire is moving.

The basic function of the WE Sensor is to transmit frame every minute when WE is in mode MD(mode driving) mode. During MD mode,The WE sensor transmits RF messages every 1 minute if the acceleration measurement is greater than 5G.The WE sensor enters mode MP(Mode Parking) where it transmits RF messages once every 13 hours if acceleration is lower than 5g for 15 mimutes. When the WE sensor is in mode MFB(Mode First Burst : mode for Auto Location and Auto Learning), it transmits RF message once every 15 seconds.

DTC Description

This DTC indicates that the Sensor 3 battery voltage is below 2.2Vdc. The most likely cause is battery passing it's expected life / sensor failure.

DTC Detecting Condition

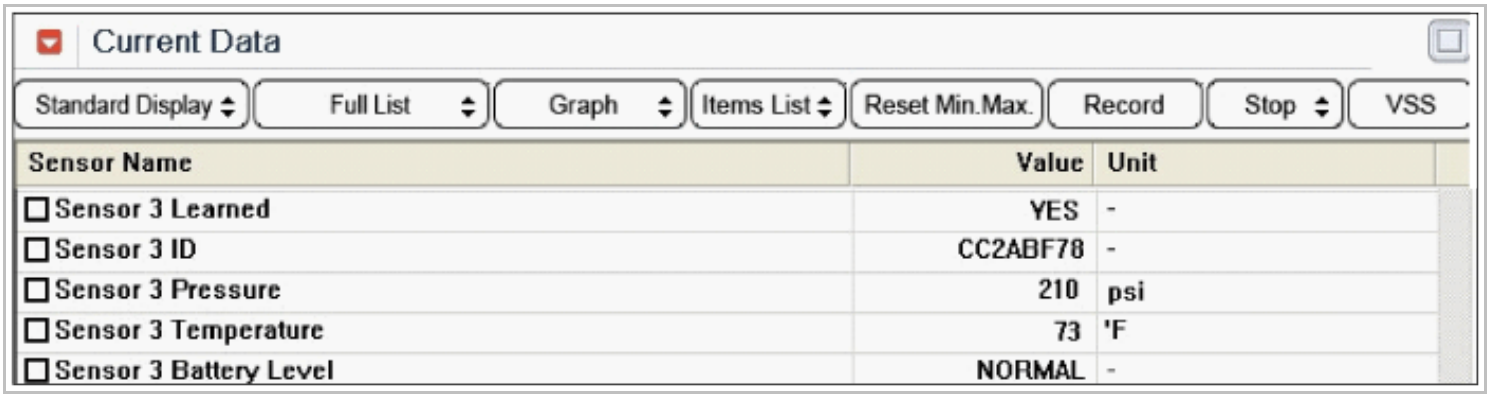
Item	Detecting Condition	Possible Cause
DTC Strategy	• Check RF message from Sensor 3	• Damaged tire • Excessive braking • Driving while the parking brake is on.
Enable Conditions	• IGN ON	
Threshold value	• Sensor 3 data is missing since 360s of driving & last received temperature > 239°F(115°C).	
Mil On conditon	• Not applicable	

Monitor GDS Data

1. Park the vehicle on an even ground.

2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the service data related to sensor's temperature on the GDS.

Specification: Below 239°F(115°C)



5. Is parameter within specifications?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Go to "Component Inspection" procedure.

Component Inspection

【Check wheel / tire】

1. Cool the heat of the Sensor 3's wheel / tire.
2. IG OFF & IG ON. And Wait for 1 minute.
3. Monitor the parameter related to 'Sensor 3 Temperature' on the GDS.

Specification : Below 239°F(115°C)

4. Is parameter within specifications?

YES	▶ Fault can be because of temporary overheating. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Check if there is a part to lead to overheated WE sensor. ▶ Replace Sensor 3 and register sensor ID with 'TPMS exciter'. ▶ Go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

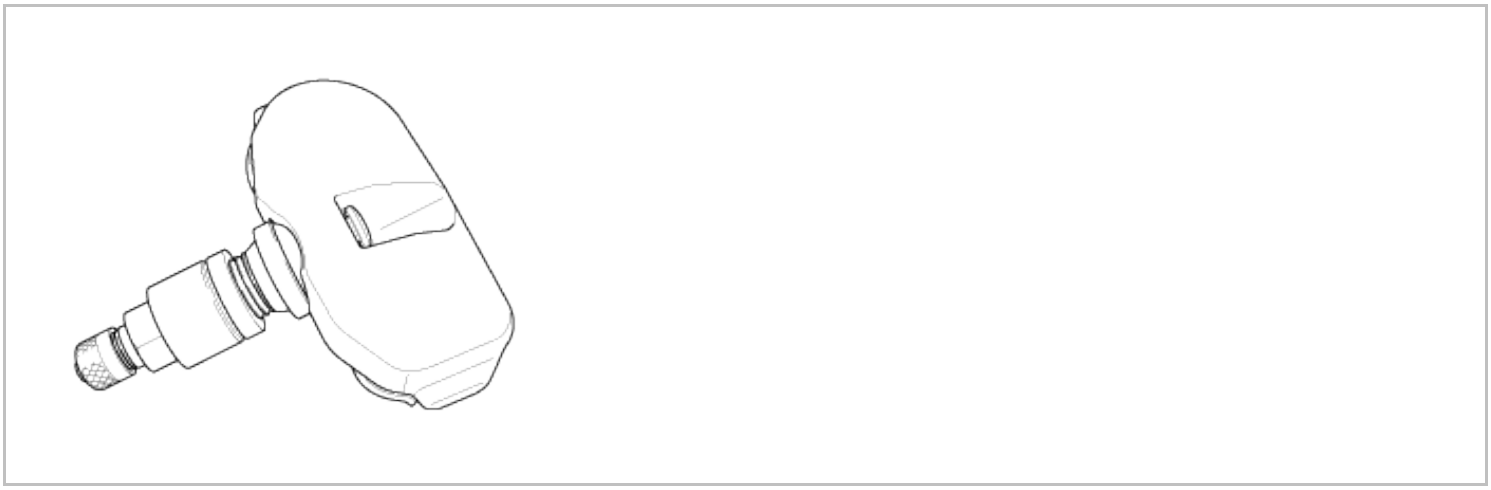
After a repair, it is essential to verify that the fault has been corrected.

1. Connect TPMS exciter or GDS and select "Diagnostic Trouble Codes(DTCs)" mode
2. Using a TPMS exciter or GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

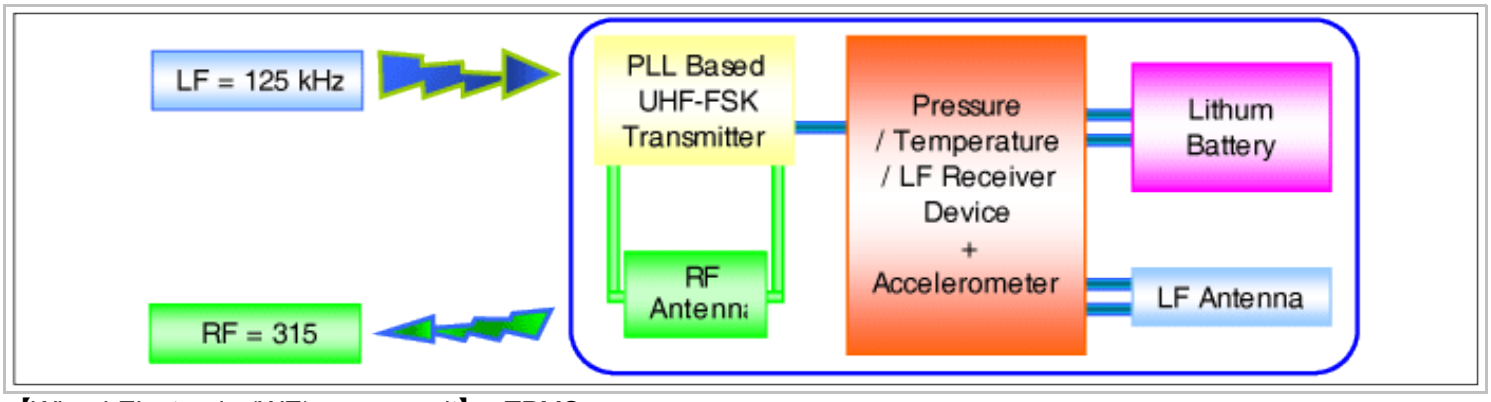
YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1325 Rear Right Sensor Over Temperature

Component Location



General Description



【Wheel Electronic (WE) sensor unit】- TPMS sensor

Each vehicle wheel is fitted with a Wheel Electronic (WE) sensor unit attached to the valve on the inside of the wheel. The WE unit is powered with a self-contained battery utilizing a high temperature rated CR (Manganese Dioxide Lithium) chemistry. The operating voltage range for the WE module is 1.8Vdc to 3.6Vdc, and the operating temperature range is -40°C ~120°C. The WE measures tire pressure, temperature, and acceleration periodically. The pressure, temperature, and acceleration information is converted to digital form within the MCU inside the WE sensor.

The WE sensor is equipped with a Radio Frequency (RF) transmitter circuit which is used to periodically broadcast information from inside the tire. All WE sensor units operate on the same RF channel frequency, and each broadcast message includes pressure and temperature data, a unique ID code, operating state data, status information, and digital error-detection data.

The pressure measured by the WE sensor is an absolute pressure value. The pressure measurement range is 100kPa to 450kPa. The acceleration data is used within the WE sensor to determine whether the vehicle is moving or stationary. The acceleration status is the decision maker within the WE module that determines if the tire is moving or stationary. This measurement is used within the WE module to enable different operating modes depending on the status of the acceleration value. Over the fully specified operating temperature range, if the acceleration measurement is greater than or equal to 5G, the WE module assumes the tire is moving.

The basic function of the WE Sensor is to transmit frame every minute when WE is in mode MD(mode driving) mode. During MD mode,The WE sensor transmits RF messages every 1 minute if the acceleration measurement is greater than 5G.The WE sensor enters mode MP(Mode Parking) where it transmits RF messages once every 13 hours if acceleration is lower than 5g for 15 mimutes. When the WE sensor is in mode MFB(Mode First Burst : mode for Auto Location and Auto Learning), it transmits RF message once every 15 seconds.

DTC Description

This DTC indicates that the Sensor 4 battery voltage is below 2.2Vdc. The most likely cause is battery passing it's expected life / sensor failure.

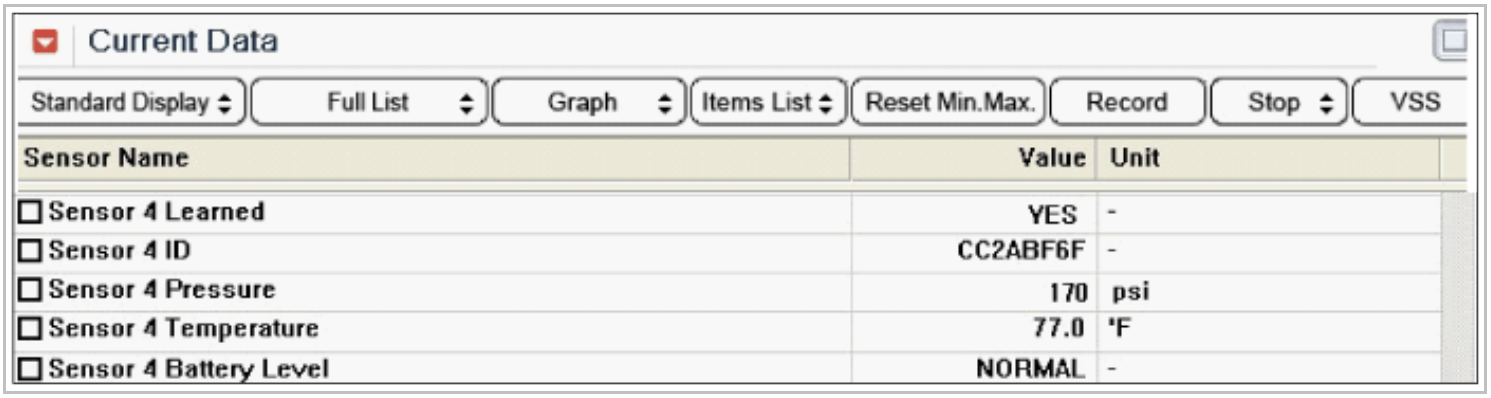
DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Check RF message from Sensor 4	• Damaged tire • Excessive braking • Driving while the parking brake is on.
Enable Conditions	• IGN ON	
Threshold value	• Sensor 4 data is missing since 360s of driving & last received temperature > 239°F(115°C).	
Mil On conditon	• Not applicable	

Monitor GDS Data

1. Park the vehicle on an even ground.
2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the service data related to sensor's temperature on the GDS.

Specification: Below 239°F(115°C)



5. Is parameter within specifications?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Go to "Component Inspection" procedure.

Component Inspection

【Check wheel / tire】

1. Cool the heat of the Sensor 4's wheel / tire.
2. IG OFF & IG ON. And Wait for 1 minute.
3. Monitor the parameter related to 'Sensor 4 Temperature' on the GDS.

Specification : Below 239°F(115°C)

4. Is parameter within specifications?

YES	▶ Fault can be because of temporary overheating. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Check if there is a part to lead to overheated WE sensor. ▶ Replace Sensor 4 and register sensor ID with 'TPMS exciter'. ▶ Go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

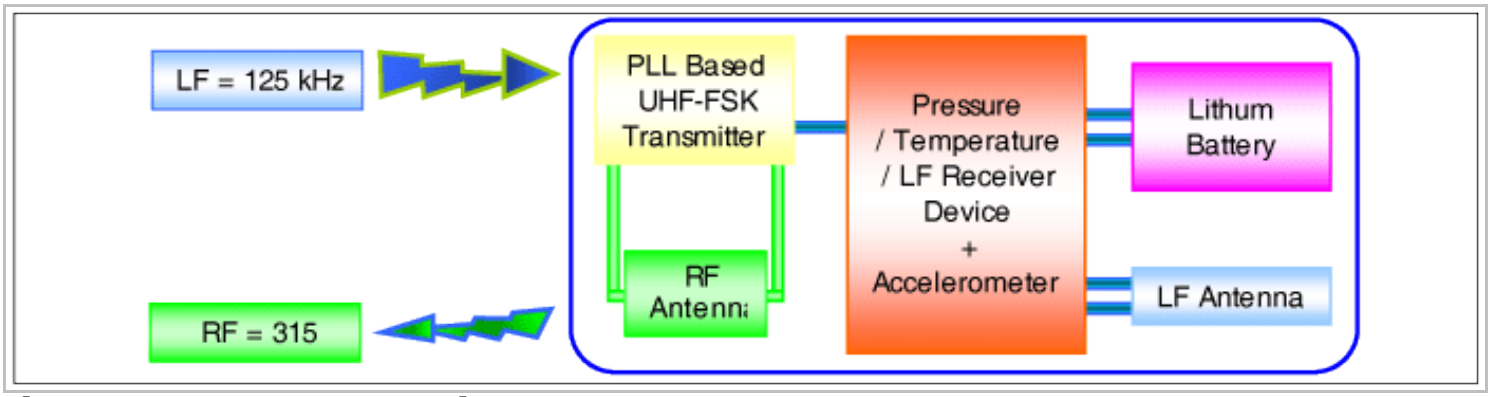
1. Connect TPMS exciter or GDS and select "Diagnostic Trouble Codes(DTCs)" mode
2. Using a TPMS exciter or GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1332 Front Left Sensor Fault

Component Location

General Description



【Wheel Electronic (WE) sensor unit】- TPMS sensor

Each vehicle wheel is fitted with a Wheel Electronic (WE) sensor unit attached to the valve on the inside of the wheel. The WE unit is powered with a self-contained battery utilizing a high temperature rated CR (Manganese Dioxide Lithium) chemistry. The operating voltage range for the WE module is 1.8Vdc to 3.6Vdc, and the operating temperature range is -40°C ~120°C. The WE measures tire pressure, temperature, and acceleration periodically. The pressure, temperature, and acceleration information is converted to digital form within the MCU inside the WE sensor.

The WE sensor is equipped with a Radio Frequency (RF) transmitter circuit which is used to periodically broadcast information from inside the tire. All WE sensor units operate on the same RF channel frequency, and each broadcast message includes pressure and temperature data, a unique ID code, operating state data, status information, and digital error-detection data.

The pressure measured by the WE sensor is an absolute pressure value. The pressure measurement range is 100kPa to 450kPa. The acceleration data is used within the WE sensor to determine whether the vehicle is moving or stationary. The acceleration status is the decision maker within the WE module that determines if the tire is moving or stationary. This measurement is used within the WE module to enable different operating modes depending on the status of the acceleration value. Over the fully specified operating temperature range, if the acceleration measurement is greater than or equal to 5G, the WE module assumes the tire is moving.

The basic function of the WE Sensor is to transmit frame every minute when WE is in mode MD(mode driving) mode. During MD mode,The WE sensor transmits RF messages every 1 minute if the acceleration measurement is greater than 5G.The WE sensor enters mode MP(Mode Parking) where it transmits RF messages once every 13 hours if acceleration is lower than 5g for 15 mimutes. When the WE sensor is in mode MFB(Mode First Burst : mode for Auto Location and Auto Learning), it transmits RF message once every 15 seconds.

DTC Description

This DTC indicates that the Sensor 1 battery voltage is below 2.2Vdc. The most likely cause is battery passing it's expected life / sensor failure.

DTC Detecting Condition

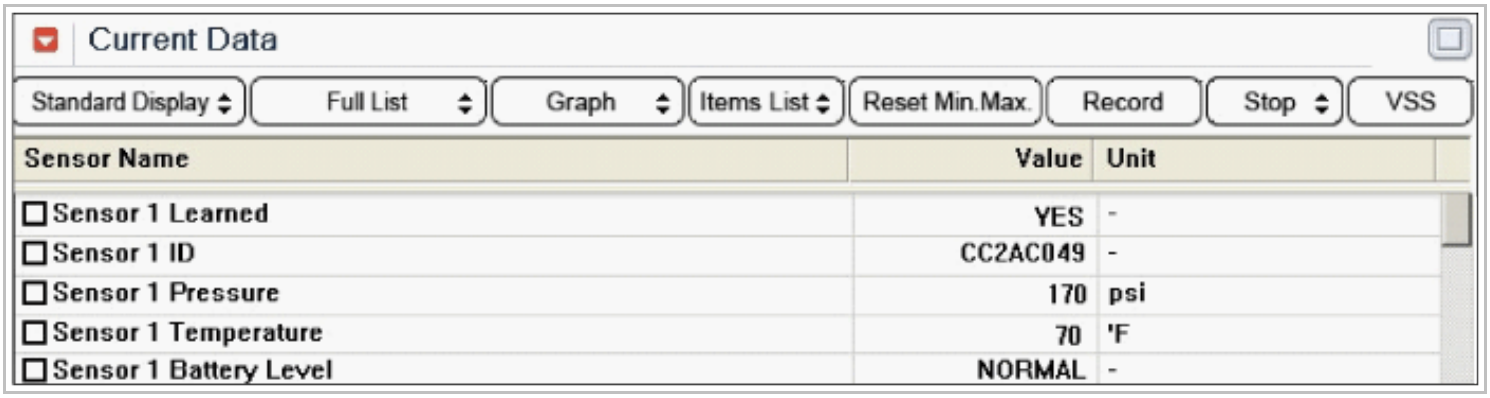
Item	Detecting Condition	Possible Cause
DTC Strategy	• Check RF message from Sensor 1	• Damage to Sensor 1 • Faulty Sensor 1
Enable Conditions	• IGN ON	
Threshold value	• After reception of a single frame from WE sensor with pressure, temperature or acc set to 00h. (The pressure, temperature and acceleration value of a WE sensor data frame indicates 00h when the WE detected a fault of its sensors). • Plausibility check detected a defect of temperature or pressure sensor or a defect of both sensors. (Pressure and temperature sensor are defect when they report irregular changes of pressure and	

	temperature)	
Mil On conditon	• Active DTC is set	

Monitor GDS Data

1. Park the vehicle on an even ground.
2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the service data related to TPMS sensor on the GDS.

Specification: the parameters related to Sensor 1 is displayed normally.



5. Are the parameters normal?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Replace Sensor 1 and register sensor ID with 'GDS TPMS'. ▶ Go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

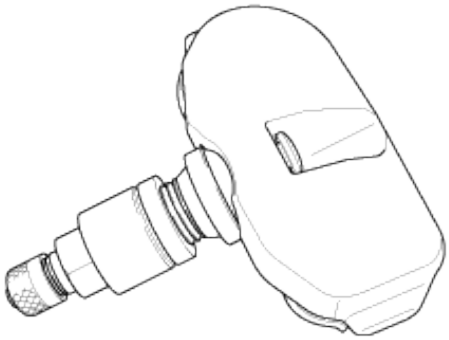
After a repair, it is essential to verify that the fault has been corrected.

1. Connect GDS and select "Diagnostic Trouble Codes(DTCs)" mode.
2. Using GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

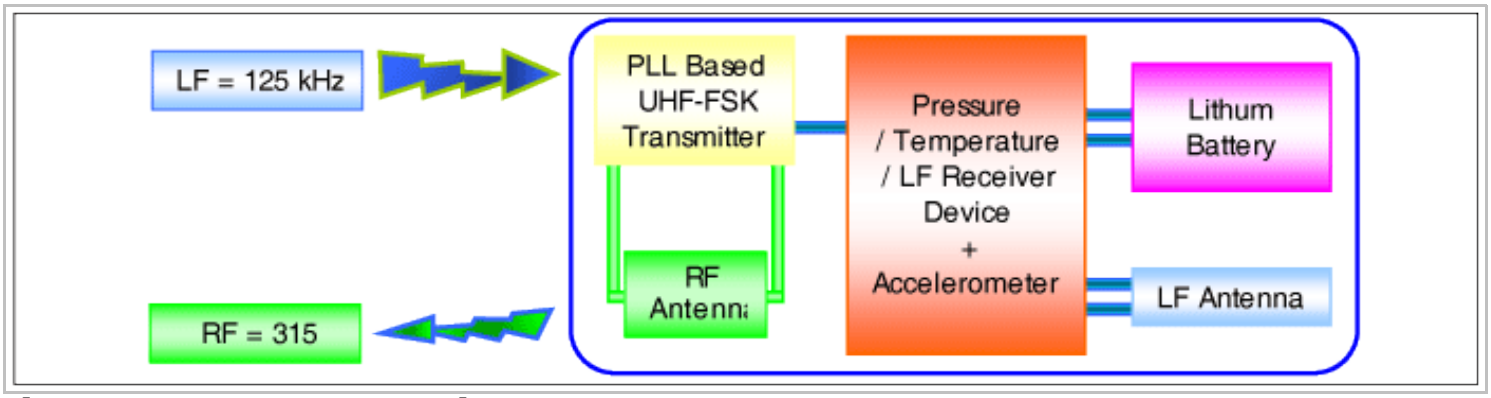
YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1333 Front Right Sensor Fault

Component Location



General Description



【Wheel Electronic (WE) sensor unit】- TPMS sensor

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The WE sensor is equipped with a Radio Frequency (RF) transmitter circuit which is used to periodically broadcast information from inside the tire. All WE sensor units operate on the same RF channel frequency, and each broadcast message includes pressure and temperature data, a unique ID code, operating state data, status information, and digital error-detection data.

The pressure measured by the WE sensor is an absolute pressure value. The pressure measurement range is 100kPa to 450kPa. The acceleration data is used within the WE sensor to determine whether the vehicle is moving or stationary. The acceleration status is the decision maker within the WE module that determines if the tire is moving or stationary. This measurement is used within the WE module to enable different operating modes depending on the status of the acceleration value. Over the fully specified operating temperature range, if the acceleration measurement is greater than or equal to 5G, the WE module assumes the tire is moving.

The basic function of the WE Sensor is to transmit frame every minute when WE is in mode MD(mode driving) mode. During MD mode,The WE sensor transmits RF messages every 1 minute if the acceleration measurement is greater than 5G.The WE sensor enters mode MP(Mode Parking) where it transmits RF messages once every 13 hours if acceleration is lower than 5g for 15 mimutes. When the WE sensor is in mode MFB(Mode First Burst : mode for Auto Location and Auto Learning), it transmits RF message once every 15 seconds.

DTC Description

This DTC indicates that the Sensor 2 battery voltage is below 2.2Vdc. The most likely cause is battery passing it's expected life / sensor failure.

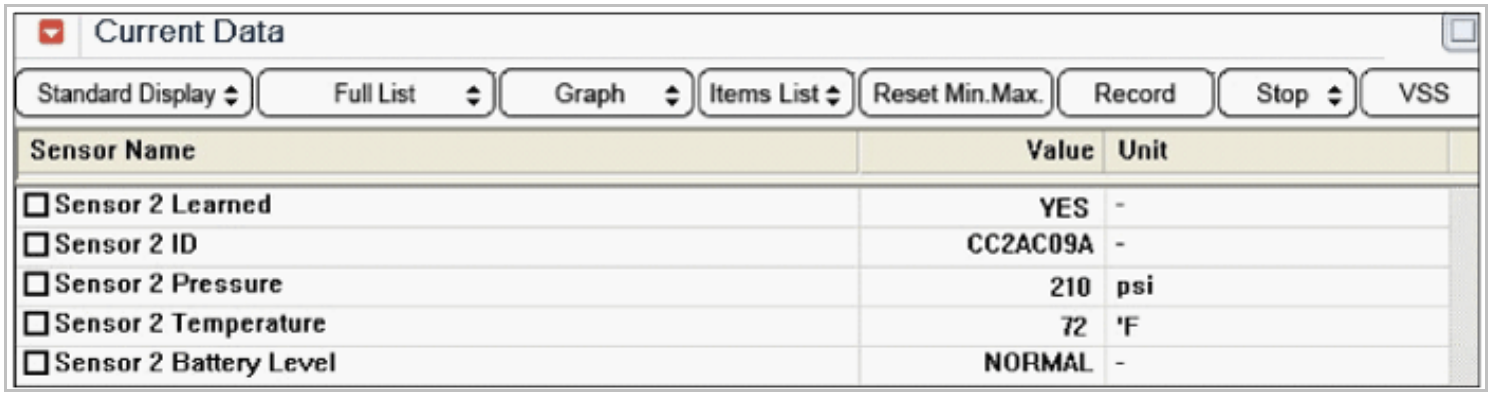
DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Check RF message from Sensor 2	• Damage to Sensor 2 • Faulty Sensor 2
Enable Conditions	• IGN ON	
Threshold value	• After reception of a single frame from WE sensor with pressure, temperature or acc set to 00h. (The pressure, temperature and acceleration value of a WE sensor data frame indicates 00h when the WE detected a fault of its sensors). • Plausibility check detected a defect of temperature or pressure sensor or a defect of both sensors. (Pressure and temperature sensor are defect when they report irregular changes of pressure and temperature)	
Mil On conditon	• Active DTC is set	

Monitor GDS Data

1. Park the vehicle on an even ground.
2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the service data related to TPMS sensor on the GDS.

Specification: the parameters related to Sensor 2 is displayed normally.



5. Are the parameters normal?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Replace Sensor 2 and register sensor ID with 'GDS TPMS'. ▶ Go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

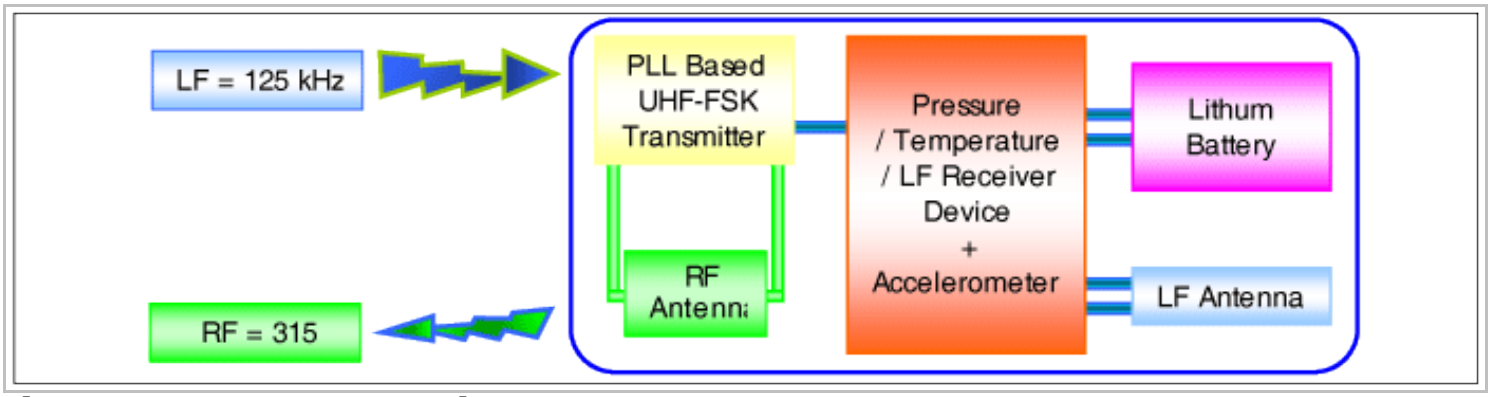
1. Connect GDS and select "Diagnostic Trouble Codes(DTCs)" mode.
2. Using GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1334 Left Rear Sensor Fault

Component Location

General Description



【Wheel Electronic (WE) sensor unit】- TPMS sensor

Each vehicle wheel is fitted with a Wheel Electronic (WE) sensor unit attached to the valve on the inside of the wheel. The WE unit is powered with a self-contained battery utilizing a high temperature rated CR (Manganese Dioxide Lithium) chemistry. The operating voltage range for the WE module is 1.8Vdc to 3.6Vdc, and the operating temperature range is -40°C ~120°C. The WE measures tire pressure, temperature, and acceleration periodically. The pressure, temperature, and acceleration information is converted to digital form within the MCU inside the WE sensor.

The WE sensor is equipped with a Radio Frequency (RF) transmitter circuit which is used to periodically broadcast information from inside the tire. All WE sensor units operate on the same RF channel frequency, and each broadcast message includes pressure and temperature data, a unique ID code, operating state data, status information, and digital error-detection data.

The pressure measured by the WE sensor is an absolute pressure value. The pressure measurement range is 100kPa

to 450kPa. The acceleration data is used within the WE sensor to determine whether the vehicle is moving or stationary. The acceleration status is the decision maker within the WE module that determines if the tire is moving or stationary. This measurement is used within the WE module to enable different operating modes depending on the status of the acceleration value. Over the fully specified operating temperature range, if the acceleration measurement is greater than or equal to 5G, the WE module assumes the tire is moving.
The basic function of the WE Sensor is to transmit frame every minute when WE is in mode MD(mode driving) mode. During MD mode,The WE sensor transmits RF messages every 1 minute if the acceleration measurement is greater than 5G.The WE sensor enters mode MP(Mode Parking) where it transmits RF messages once every 13 hours if acceleration is lower than 5g for 15 mimutes. When the WE sensor is in mode MFB(Mode First Burst : mode for Auto Location and Auto Learning), it transmits RF message once every 15 seconds.

DTC Description

This DTC indicates that the Sensor 3 battery voltage is below 2.2Vdc. The most likely cause is battery passing it's expected life / sensor failure.

DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Check RF message from Sensor 3	• Damage to Sensor 3 • Faulty Sensor 3
Enable Conditions	• IGN ON	
Threshold value	• After reception of a single frame from WE sensor with pressure, temperature or acc set to 00h. (The pressure, temperature and acceleration value of a WE sensor data frame indicates 00h when the WE detected a fault of its sensors). • Plausibility check detected a defect of temperature or pressure sensor or a defect of both sensors. (Pressure and temperature sensor are defect when they report irregular changes of pressure and temperature)	
Mil On conditon	• Active DTC is set	

Monitor GDS Data

1. Park the vehicle on an even ground.
2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the service data related to TPMS sensor on the GDS.

Specification: the parameters related to Sensor 3 is displayed normally.

Current Data

Standard Display | Full List | Graph | Items List | Reset Min.Max. | Record | Stop | VSS

Sensor Name	Value	Unit
Sensor 3 Learned	YES	-
Sensor 3 ID	CC2ABF78	-
Sensor 3 Pressure	210	psi
Sensor 3 Temperature	73	'F
Sensor 3 Battery Level	NORMAL	-

5. Are the parameters normal?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Replace Sensor 3 and register sensor ID with 'GDS TPMS'. ▶ Go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

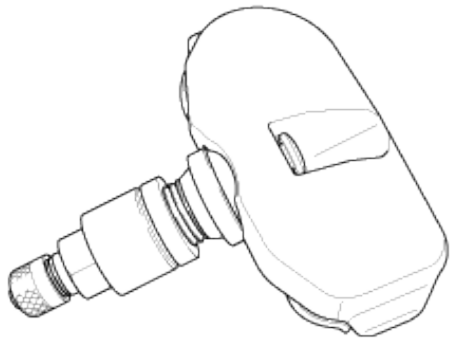
After a repair, it is essential to verify that the fault has been corrected.

1. Connect GDS and select "Diagnostic Trouble Codes(DTCs)" mode.
2. Using GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

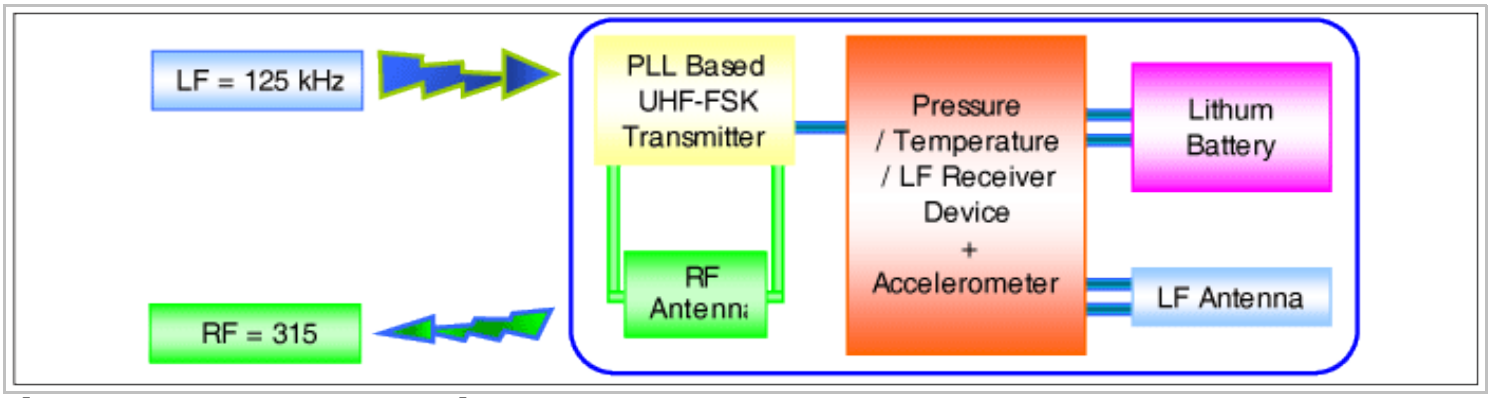
YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1335 Rear Right Sensor Fault

Component Location



General Description



【Wheel Electronic (WE) sensor unit】 - TPMS sensor

Each vehicle wheel is fitted with a Wheel Electronic (WE) sensor unit attached to the valve on the inside of the wheel. The WE unit is powered with a self-contained battery utilizing a high temperature rated CR (Manganese Dioxide Lithium) chemistry. The operating voltage range for the WE module is 1.8Vdc to 3.6Vdc, and the operating temperature range is -40°C ~120°C. The WE measures tire pressure, temperature, and acceleration periodically. The pressure, temperature, and acceleration information is converted to digital form within the MCU inside the WE sensor.

The WE sensor is equipped with a Radio Frequency (RF) transmitter circuit which is used to periodically broadcast information from inside the tire. All WE sensor units operate on the same RF channel frequency, and each broadcast message includes pressure and temperature data, a unique ID code, operating state data, status information, and digital error-detection data.

The pressure measured by the WE sensor is an absolute pressure value. The pressure measurement range is 100kPa to 450kPa. The acceleration data is used within the WE sensor to determine whether the vehicle is moving or stationary. The acceleration status is the decision maker within the WE module that determines if the tire is moving or stationary. This measurement is used within the WE module to enable different operating modes depending on the status of the acceleration value. Over the fully specified operating temperature range, if the acceleration measurement is greater than or equal to 5G, the WE module assumes the tire is moving.

The basic function of the WE Sensor is to transmit frame every minute when WE is in mode MD(mode driving) mode. During MD mode,The WE sensor transmits RF messages every 1 minute if the acceleration measurement is greater than 5G.The WE sensor enters mode MP(Mode Parking) where it transmits RF messages once every 13 hours if acceleration is lower than 5g for 15 mimutes. When the WE sensor is in mode MFB(Mode First Burst : mode for Auto Location and Auto Learning), it transmits RF message once every 15 seconds.

DTC Description

This DTC indicates that the Sensor 4 battery voltage is below 2.2Vdc. The most likely cause is battery passing it's expected life / sensor failure.

DTC Detecting Condition

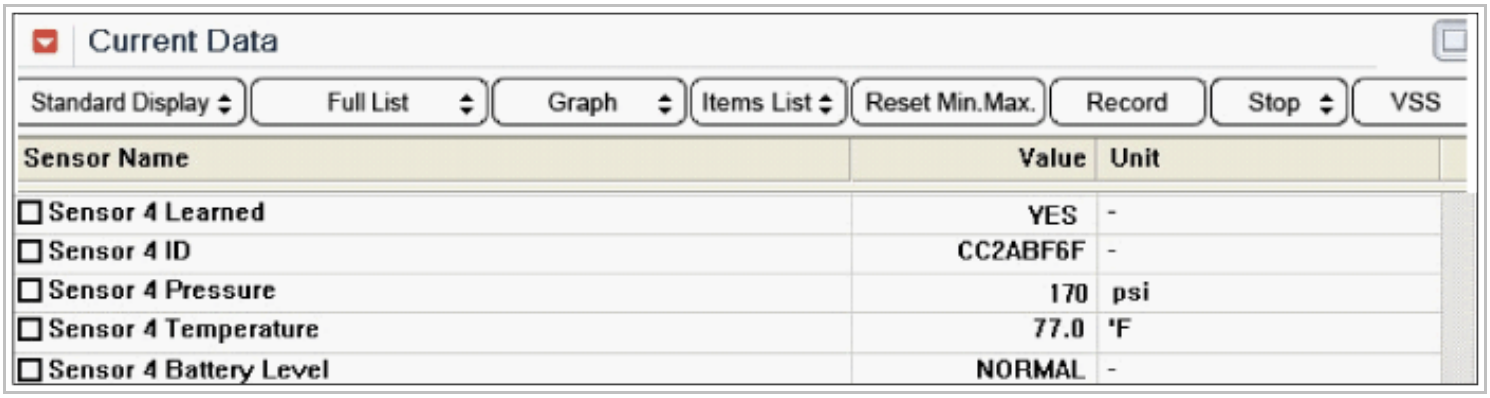
Item	Detecting Condition	Possible Cause
DTC Strategy	• Check RF message from Sensor 4	• Damage to Sensor 4 • Faulty Sensor 4
Enable Conditions	• IGN ON	
Threshold value	• After reception of a single frame from WE sensor with pressure, temperature or acc set to 00h. (The pressure, temperature and acceleration value of a WE sensor data frame indicates 00h when the WE detected a fault of its sensors). • Plausibility check detected a defect of temperature or pressure sensor or a defect of both sensors. (Pressure and temperature sensor are defect when	

	they report irregular changes of pressure and temperature)	
Mil On conditon	• Active DTC is set	

Monitor GDS Data

1. Park the vehicle on an even ground.
2. Connect GDS to Data Link Connector(DLC).
3. IG "ON"
4. Monitor the service data related to TPMS sensor on the GDS.

Specification: the parameters related to Sensor 4 is displayed normally.



5. Are the parameters normal?

YES	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.
NO	▶ Replace Sensor 4 and register sensor ID with 'GDS TPMS'. ▶ Go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect GDS and select "Diagnostic Trouble Codes(DTCs)" mode.
2. Using GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1613 CAN Wrong Message

General Description

Varous TPMS functions rely on a speed signal that reprots reliably actual vehicle speed. Three speed signals(ABS1 FR wheel, EMS1 speed signal, TCS5 FR wheel) campared since one signal alone may report incorrect vehicle speed which would go undetected. Three signals must report same vehicle speed. If not, a DTC shall be set to active, and TPMS Warning indicator shall turn on.

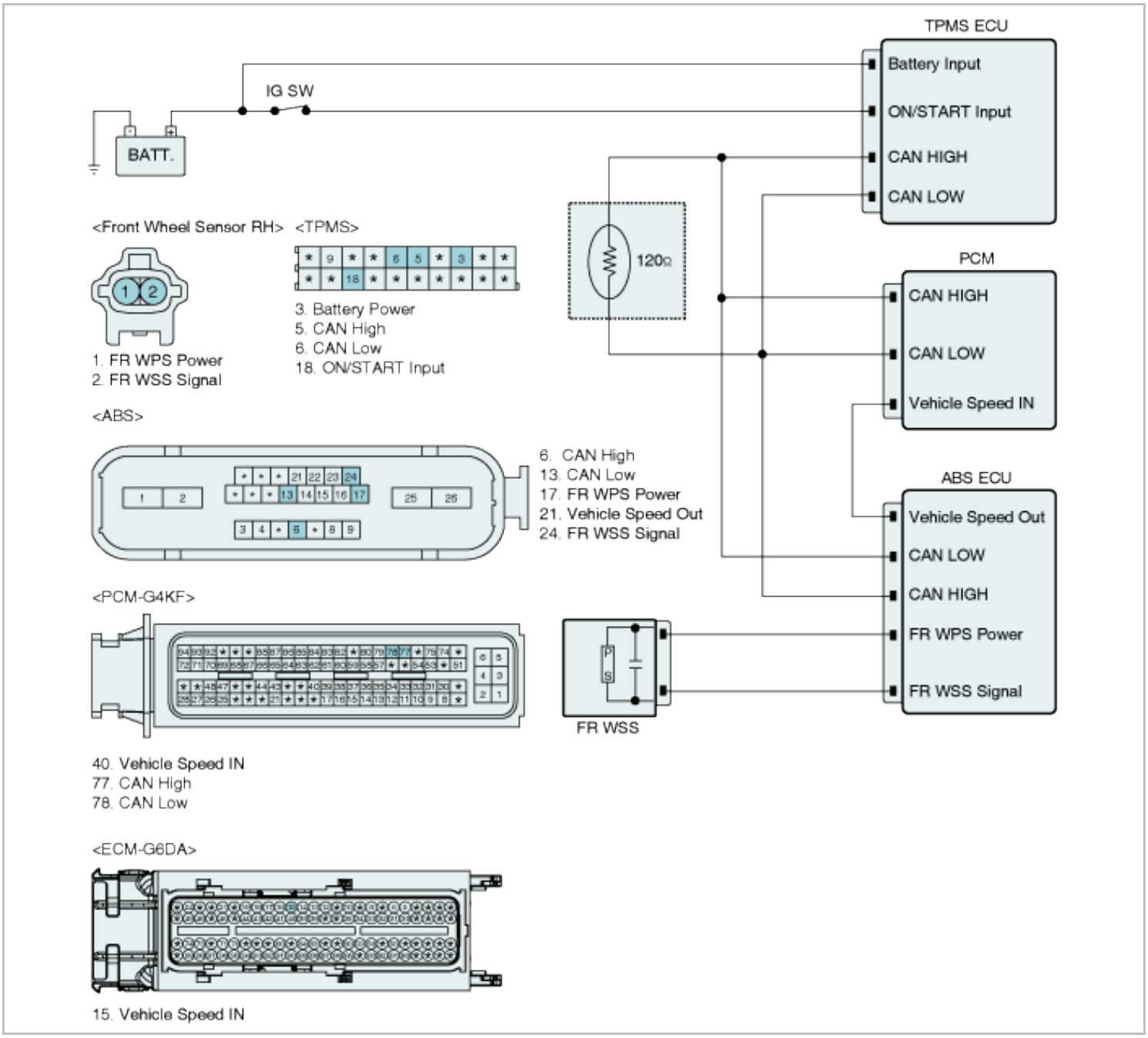
DTC Description

This DTC indicates that there is a fault in speed inputs to receiver failure. It can be caused by damage to speed sensor, receiver input failure, incorrectly wired harness & shorted or open pins.

DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Speed input signal check	• Faulty speed sensor • Shorted/open speed input
Enable Conditions	• Continuously (IG ON)	
Threshold value	• CAN signal vehicle speed by EMS not received for 2s. • CAN signal vehicle speed by EMS < 25Km/h and CAN signal wheel FR by ABS > vehicle speed +10Km/h for 4s. • CAN signal vehicle speed by EMS < 25Km/h and CAN signal wheel FR by TCS > vehicle speed +10Km/h for 4s.	
Mil On conditon	• Active DTC is set	

Diagnostic Circuit Diagram



Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminal condition.
   Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check all connectors (and connections) for looseness, bending, corrosion, contamination, deterioration, and/or damage.
3. Has a problem been found?

YES	▶ Repair if necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▶ Go to "Signal Circuit Inspection" procedure.

Signal Circuit Inspection

■ Open Check

1. Ignition "OFF" & Engine "OFF".
2. Disconnect TPMS ECU, PCM and ABS ECU connector.
3. Measure resistance between CAN HIGH, LOW terminal of the TPMS ECU harness connector and CAN HIGH, LOW terminal terminal of the PCM harness connector.
4. Measure resistance between CAN HIGH, LOW terminal of the TPMS ECU harness connector and CAN HIGH, LOW terminal terminal of the ABS ECU harness connector.
5. Measure resistance between Vehicle speed in terminal of the PCM harness connector and Vehicle speed out terminal of the ABS ECU harness connector.
6. Measure resistance between FR WSS Power terminal of the ABS ECU harness connector and FR WSS Power terminal of the FR WSS harness connector.
7. Measure resistance between FR WSS Signal terminal of the ABS ECU harness connector and FR WSS Signal terminal of the FR WSS harness connector.

Specification : 0 Ω

8. Is the measured resistance within specifications?

YES	▶ Faulty FR WSS, ABS ECU and PCM may cause this DTC. ▶ Substitute with a known-good component and check for proper operation. If problem is corrected, it's failure should cause this DTC. After doing an appropriate repair, Go to "Verification of Vehicle Repair" procedure.
NO	▶ Repair in speed signal circuit between each control unit harness connector and TPMS receiver harness connector and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect GDS and select "Diagnostic Trouble Codes(DTCs)" mode.
2. Using GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1616 CAN Bus Off

General Description

TPM Receiver uses CAN communication line for daignosis tool, receiving vehicle speed signal, sending signal to instrument cluster.
TPM Receiver receives tire imformation form WE sensor and it evaluates and analyzes the data. If it is necessary to inform driver about state of TPMS, the ECU sends messages to the instrument cluster via CAN.

DTC Description

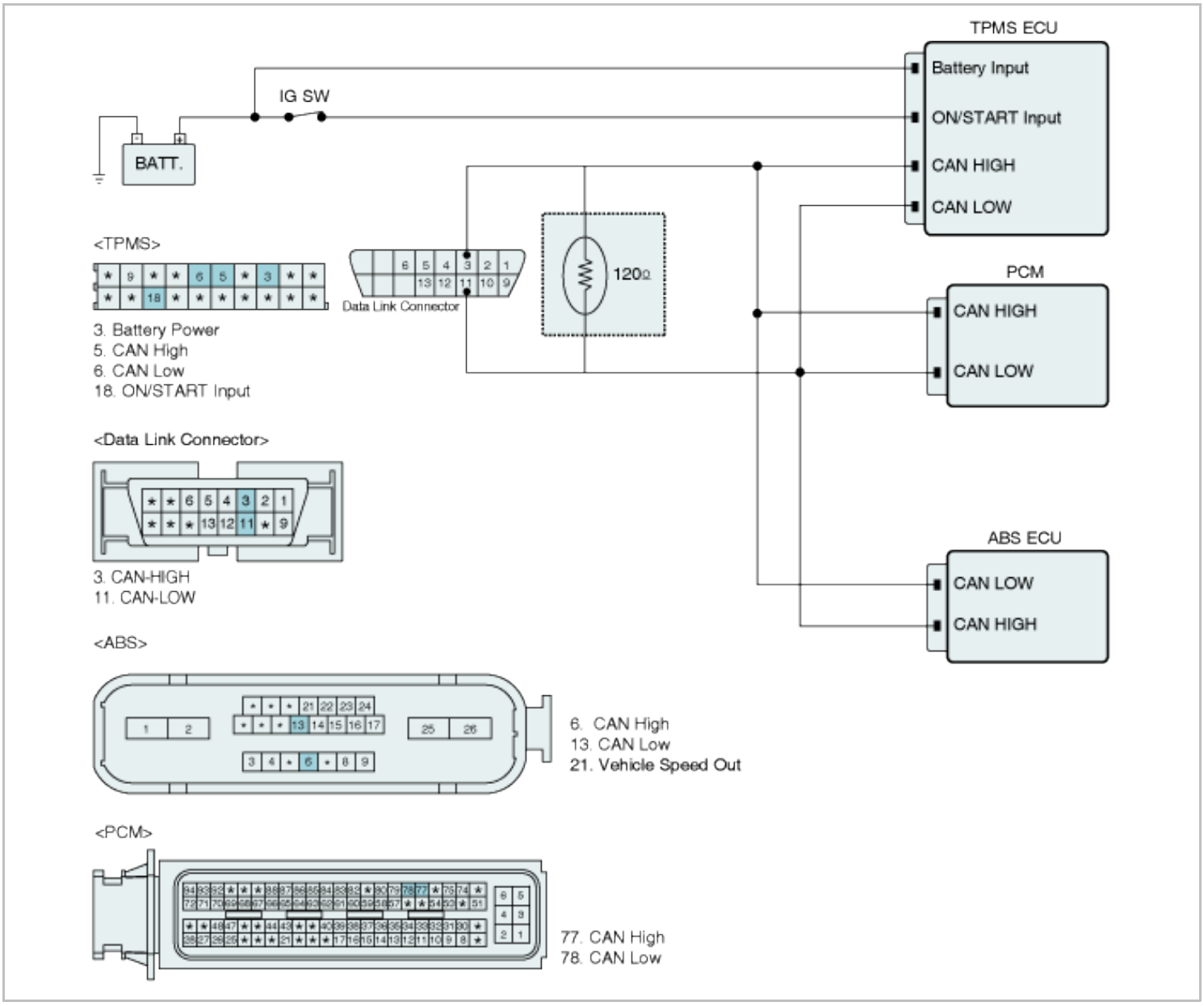
The TPMS ECU checks the CAN communication lines for normal control, and sets this code if CAN controller failed to

send or receive message.

DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Check Receiver module	• Open or Short CAN communication line
Enable Conditions	• IGN ON	
Threshold value	• CAN controller counted 10 times from 0 to 256 in 8 increments.	
Mil On conditon	• Not applicable (When the communication fails, MIL goes on by cluster)	

Diagnostic Circuit Diagram



Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminal condition.
   Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check all connectors (and connections) for looseness, bending, corrosion, contamination, deterioration, and/or damage.
3. Has a problem been found?

YES	▶ Repair if necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▶ Go to "CAN Signal Circuit Inspection" procedure.

CAN Signal Circuit Inspection

■ Short Check (to ground)

1. Ignition "OFF" & Engine "OFF".
2. Disconnect TPMS ECU, PCM and ABS ECU connector.
3. Measure resistance between CAN LOW terminal, CAN HIGH terminal of the TPMS ECU harness connector and chassis ground.

Specification : ∞ Ω

4. Is the measured resistance within specifications?

YES	▶ Go to next procedure.
NO	▶ If abnormal resistance is detected in CAN HIGH circuit, Repair short to ground in CAN HIGH circuit and then go to "Verification of vehicle Repair" procedure. ▶ If abnormal resistance is detected in CAN LOW circuit, Repair short to ground in CAN LOW circuit and then go to "Verification of vehicle Repair" procedure.

■ CAN BUS Resistance Check

1. Ignition "OFF" & Engine "OFF".
2. Disconnect TPMS ECU, PCM and ABS ECU connector.
3. Measure resistance between CAN LOW terminal and CAN HIGH terminal of the TPMS ECU harness connector.

Specification : Approx. 120Ω

4. Is the measured resistance within specifications?

YES	▶ Go to "Component Inspection" procedure.
NO	▶ In case of the resistance "approx. 1Ω" : Repair mutual short in CAN signal circuit of the TPMS ECU and then go to "Verification of vehicle Repair" procedure. ▶ In case of the resistance "∞ Ω" : Repair open in CAN signal circuit of the TPMS ECU and then go to "Verification of vehicle Repair" procedure. ▶ In case of the resistance "approx. 120 Ω" : Check the resistances(122Ω) in I/P junction box and ECM, repair as necessary and then go to "Verification of vehicle Repair" procedure.

Component Inspection

1. Set up 'GDS' with 'GDS TPMS'.
2. Select the "TPMS" system.
3. Execute "DTC Analysis" mode and clear DTC.
4. Check the present DTC.
5. Is 'C1616' present ?

YES	▶ Substitute with a known-good TPMS Receiver module and check for proper operation. ▶ If the problem is corrected, replace TPMS Receiver module and go to "Verification of vehicle Repair" procedure.
NO	▶ TPMS receiver complete successful Auto-location. ▶ System is OK.

Verification of Vehicle Repair

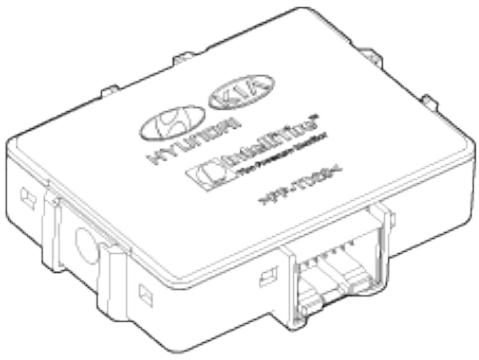
After a repair, it is essential to verify that the fault has been corrected.

1. Connect GDS and select "Diagnostic Trouble Codes(DTCs)" mode.
2. Using GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1661 Receiver EEPROM Failure

Component Location



General Description

TPM Receiver uses CAN communication line for daignosis tool, receiving vehicle speed signal, sending signal to instrument cluster.
TPM Receiver receives tire imformation form WE sensor and it evaluates and analyzes the data. If it is necessary to inform driver about state of TPMS, the ECU sends messages to the instrument cluster via CAN.

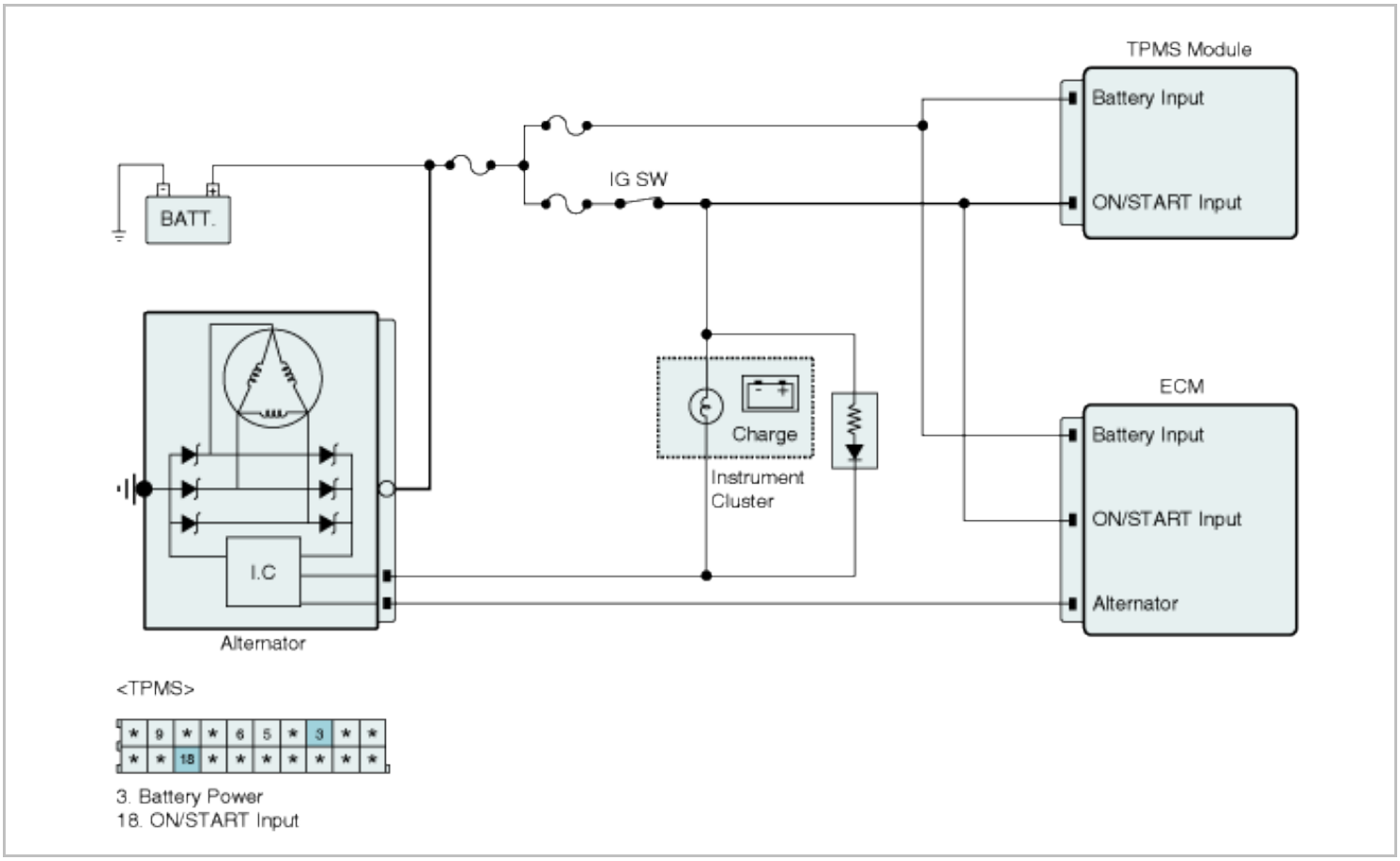
DTC Description

This DTC indicates that the receiver has a problem reading or writing to EEPROM. The most likely cause is TPMS Receiver failure.

DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Check Receiver module	• Faulty TPMS Receiver
Enable Conditions	• IGN ON	
Threshold value	• Writing in the EEPROM was unsuccessful.	
Mil On conditon	• Active DTC set	

Diagnostic Circuit Diagram



Component Inspection

1. Set up 'GDS' with 'GDS TPMS'.
2. Select the "TPMS" system.
3. Execute "DTC Analysis" mode and clear DTC.
4. Check the present DTC.

5. Is 'C1661' present ?

YES	▶ Substitute with a known-good TPMS Receiver module and check for proper operation. ▶ If the problem is corrected, replace TPMS Receiver module and go to "Verification of vehicle Repair" procedure.
NO	▶ System is OK.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect GDS and select "Diagnostic Trouble Codes(DTCs)" mode.
2. Using GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.

Suspension System > Tire Pressure Monitoring System > C1662 Auto Learning failure

General Description

Auto Learning

AL(Auto Learning) starts every time, the vehicle was parked long enough to change or permute wheels(19min), and i straveling again at a speed that ensures that the WE sensors are transmitting. AL is automatically considering all WE identifiers received and extracts, based on statistical evaluation, IDs belonging to the WEs mounted on the vehicle. If new IDs are detected their recurrence will be tracked by AL. When AL is in progress, tire pressure monitoring is running in parallel with the old set of identifiers known from the last run of AL.

DTC Description

This DTC indicates that A failure of Auto-learning happens when less than WE sensors were learned.

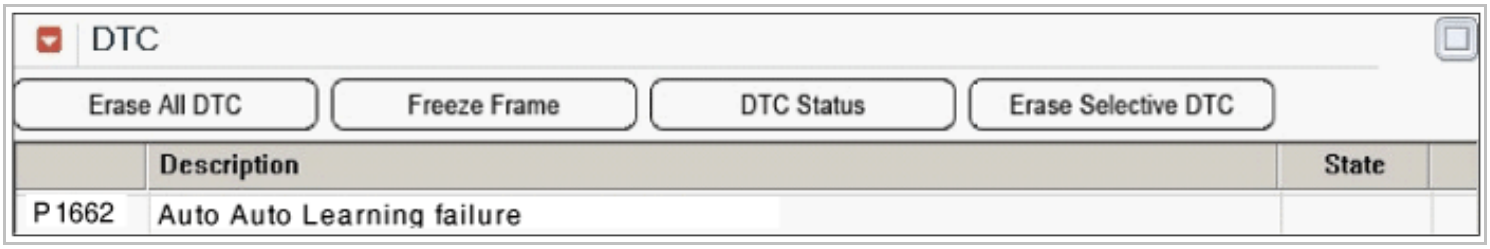
DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Check pulse	• Faulty WE sensor
Enable Conditions	• On start of driving after parking for more than 19min.	
Threshold value	• Auto learning failed and at least one WE sensor is missing.	
Mil On conditon	• Active DTC set	

Monitor GDS Data

1. Park the vehicle on a level surface.

2. Set up 'GDS' with 'GDS TPMS'.
3. Select the "TPMS" system.
4. Execute "DTC Analysis" mode.
5. Check the present DTC.



6. Are there any DTC's except for 'C1662'?

YES	▶ Do all repairs associated with detected DTC's.
NO	▶ Fault is intermittent. It has been repaired and TPMS receiver module memory is not cleared yet. ▶ Go to "Verification of vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect GDS and select "Diagnostic Trouble Codes(DTCs)" mode.
2. Using GDS, Clear DTC.
3. Operate the vehicle within DTC Enable conditions in General information.
4. Are any DTCs present ?

YES	▶ Go to the applicable troubleshooting procedure.
NO	▶ System performing to specification at this time.