

WHEEL TIRE**4170-09****INDEX****WHEEL AND TIRE****GENERAL INFORMATION**

1. SPECIFICATIONS.....	3
2. TROUBLE DIAGNOSIS.....	4
3. INSPECTION.....	5
4. COMPONENTS.....	10

**OVERVIEW AND OPERATING
PROCESS**

1. OVERVIEW.....	11
2. ABNORMAL TIRE SYMPTOM.....	15
3. WHEEL BALANCE.....	17

CONFIGURATION AND FUNCTION

4170-09 CONFIGURATION.....	18
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REMOVAL AND INSTALLATION

4170-09 WHEEL AND TIRE.....	20
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دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



WHEEL TIRE

4170-01

GENERAL INFORMATION

1. SPECIFICATIONS

Description		Specification
Tire	16 inch	225/75R 16
	18 inch	255/60R 18
Temporary tire		175/90R 16
Tire inflation pressure		Full Size : 32psi,2.21bar Temporary : 60psi,4.13bar
Wheel	16 inch	6.5J x 16
	18 inch	7.5J x 18
Balance weight	16 inch	Inner: Attachment type Outer: Clip type
	18 inch	Inner: Attachment type Outer: Attachment type
Tightening torquese of wheel bolt		120 ~ 140 Nm

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Modification basis	
Application basis	
Allocated VIN	

WHEEL TIRE

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2. TROUBLE DIAGNOSIS

Problem	Possible Cause	Action
Uneven tire wear	Incorrect tire pressure	Adjust
	Unbalanced wheel	Adjust
	Improper location change of tire	Change tire location in specified interval
	Incorrect toe adjustment	Adjust
	Incorrect wheel bearing preload adjustment	Adjust
	Malfunction of brake system	Adjust
Tire squeal, vibration	Too low tire pressure	Adjust
	Unbalanced wheel or tire	Adjust
	Heavy vibration of wheel or tire	Uneven tire wear
	Uneven tire wear	Check and adjust
Premature tire wear	Too high tire pressure	Adjust
	Fast driving with low pressure tire	Adjust
	Overload	Adjust

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3. INSPECTION

1) Appearance Check

Symptom		Possible Cause
<p>Wear at tread edge</p> 		<p>Insufficient tire inflation pressure or overload</p>
<p>Wear at tread center</p> 		<p>Excessive tire inflation pressure</p>
<p>Excessive wear in the outer side of the tread than in the inner side</p> 		<p>Excessive camber or deflection of knuckle arm</p>
<p>Excessive wear in the inner side of the tread than in the outer side</p> 		<p>Insufficient camber or deflection of knuckle arm</p>

Modification basis	
Application basis	
Allocated VIN	

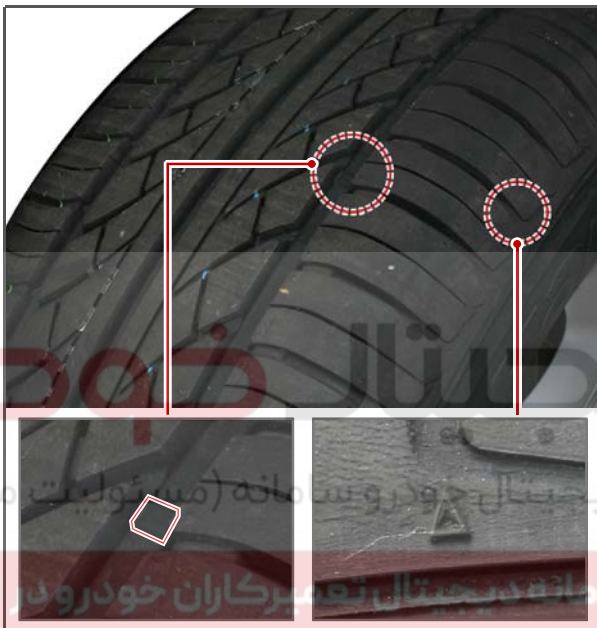
Symptom		Possible Cause
<p>Blade type wear from outer side toward inner side of the tread</p> 		<p>Excessive toe-in, Deflection of knuckle arm, Difference in tie rod length between left and right sides</p>
<p>Blade type wear from inner side toward outer side of the tread</p> 		<p>Excessive toe-in, Deflection of knuckle arm, Difference in tie rod length between left and right sides</p>
<p>Corrugation wear of tread</p> 		<p>Poor wheel balance, Loose wheel bearing, poor wheel alignment</p>

2) Typical Inspection



1. Tread

Inspect the tread condition on the tire surface and various damages resulting from the foreign materials, crack, stone or nail etc. If there is any damage in the tire, repair or replace it.



2. Wear limit

- Measure the depth of the tire tread. If the depth of the tread is below the specified value, replace the tire

Wear limit	1.6 mm
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- You can see the protruded part in the groove at the point with mark "▲", which is the indicator of the tread wear limit.
- The limit of the tread wear for all season tires are 1.6 mm, which is the same as the general tires, but the wear limit mark is indicated as '↓'.

⚠ CAUTION

- Higher than recommended pressure can cause hard ride, tire bruising or damage and rapid tread wear at the center of the tire.
- Excessive tire wear over the limit of the tread wear (1.6 mm) can cause lower sliding friction due to longer braking distance, easy tire burst by foreign materials, tire hydroplaning, and tough brake and steering wheel handling.

Modification basis	
Application basis	
Allocated VIN	

WHEEL TIRE

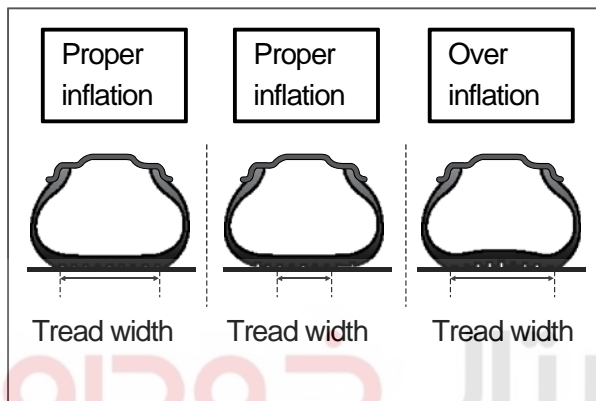
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3. Tire inflation pressure

- Tire inflation pressure

Specified value	32 psi, 2.21 bar
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- Check the tire inflation pressure by inspecting the tread width.

CAUTION

Maintaining the specified tire pressure is essential for comfortable riding, driving safety, and long tire life. Incorrect inflation pressures will increase tire wear and will impair safety, vehicle handling, comfortable driving and fuel economy. Always make sure that the tire inflation pressure is correct.

4. Wheel runout

If wheel runout or tire runout is excessive, it could result in abnormal wear of the tire.

Measure the runout with a dial gauge.

- Measure the dial runout and lateral runout on both the inboard and outboard rim flanges.

Specified value	2.66 mm
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- Measure free radial runout on the tire tread.

Specified value	2.03 mm
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CAUTION

- If any measurement exceeds the above specifications, replace the applicable tires or wheels



5. Wheel balance

- Check the wheel balance when the wheel is unbalanced or the tire is repaired.
The total weight of the wheel weight should not exceed 150 g.
Ensure that the balance weight installed is not projected over 3mm from the wheel surface.
Use the specified aluminum wheel balance weights for aluminum wheels.
Weight balance can be added by 5 g.
- There are two types of weight balance, tape type and adhesion type.



NOTE

- Make sure to read the manual of the manufacturer thoroughly before using wheel balance tester.

6. Change tire location

To avoid uneven wear of tires and to prolong tire life, inspect and rotate your tires every 5,000 km.



CAUTION

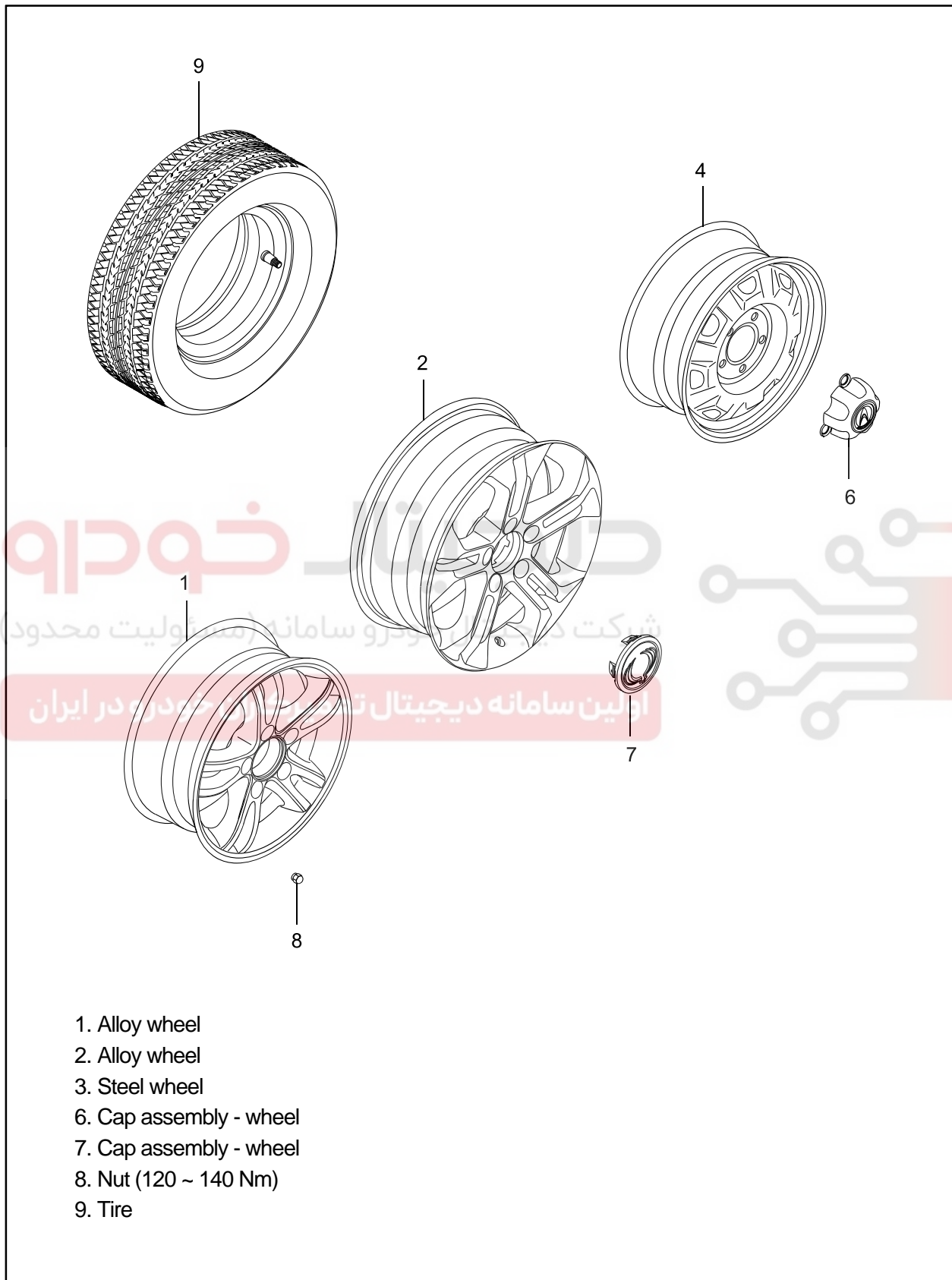
- Mixing tires could cause to lose control while driving. Be sure to use the same size and type tires of the same manufacturer on all wheels.

Modification basis	
Application basis	
Allocated VIN	

WHEEL TIRE

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4. COMPONENTS



WHEEL TIRE

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Modification basis	
Application basis	
Affected VIN	021 62 99 92 92

OVERVIEW AND OPERATING PROCESS

1. OVERVIEW

A radial tire uses a cord angle of 90 degrees. That is, the cord material runs in a radial or direct line from one bead to the other across the tread. In addition, a radial tire has a belt overwrap under the tread surface to provide greater structural stability. The belt overwrap of a radial tire distortion while the radial structure enables high speed driving.

Tire supports the weight of the vehicle, reduces the impact from the road and at the same time, transmits the power to propel, brake and steer on the road. It also functions to maintain a vehicle's movement. In order to complete such tasks, a tire must be structured to be a resilient vessel of air.

There is wear limit mark on the tire, which protrudes as a strip shape located approximately 1.6 mm from the groove bottom. This wear limit mark is not seen from the outside so there is additional "▲" mark on the shoulder to let the driver find the wear mark easily. To measure the tire groove depth, measure at any point other than the point which has a wear limit mark.

The tire is worn unevenly according to the driver's driving habit, improper servicing, low tire inflation pressure, changed tire location, etc.

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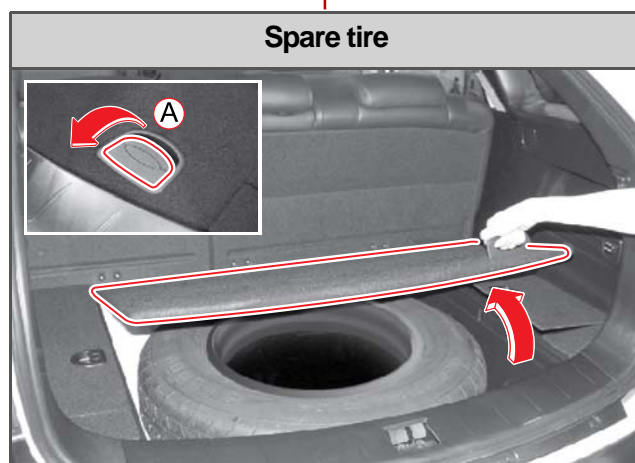


Modification basis	
Application basis	
Allocated VIN	

WHEEL TIRE

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► Location

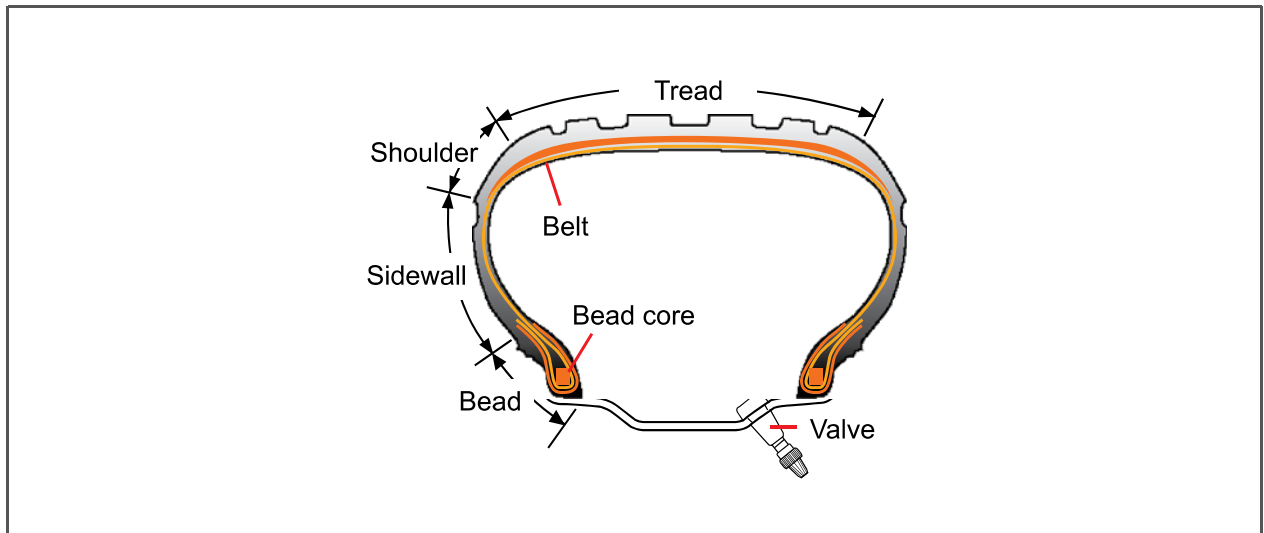


WHEEL TIRE

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Modification basis	
Application basis	
Affected VIN	021 62 99 92 92

► Structure of Tire



Tread

This thick layer of rubber provides the interface between the tire and the road. Wear-resistant rubber is used to protect the carcass and belt against fractures and impacts and to deliver a long driving life.

Shoulder

Located between the tread and sidewall, the shoulder rubber is the thickest so that the design must allow for the easy diffusion of heat generated within the tire while driving.

Sidewall

The part between the shoulder and bead, the flexible sidewall protects the carcass and enhances the ride. A tire's type, size, structure, pattern, manufacturing company, product name and various characters are indicated here.

Bead

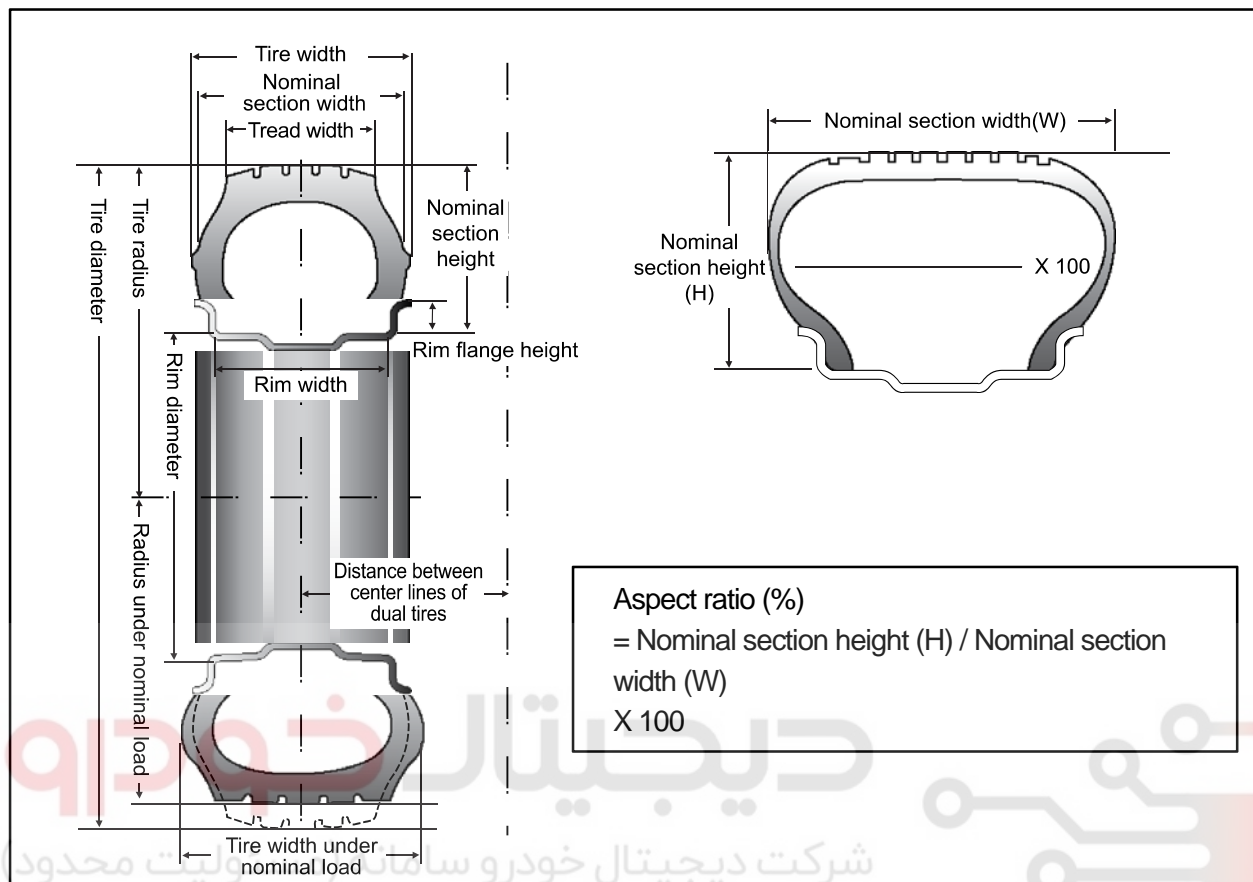
The bead attaches the tire to the rim and wraps the end of the cord fabric. Comprised of the bead wire, core, flipper and other parts, the bead is generally designed to be slightly tight around the rim so that in the case of a sudden drop in inflation pressure, the tire will not fall off the rim.

Carcass

As the most important framework of a tire, the entire inner layer of cord fabric is called the carcass. The carcass acts to support air pressure, vertical load and absorb shocks.

Modification basis	
Application basis	
Allocated VIN	

► Tire Unit Indication

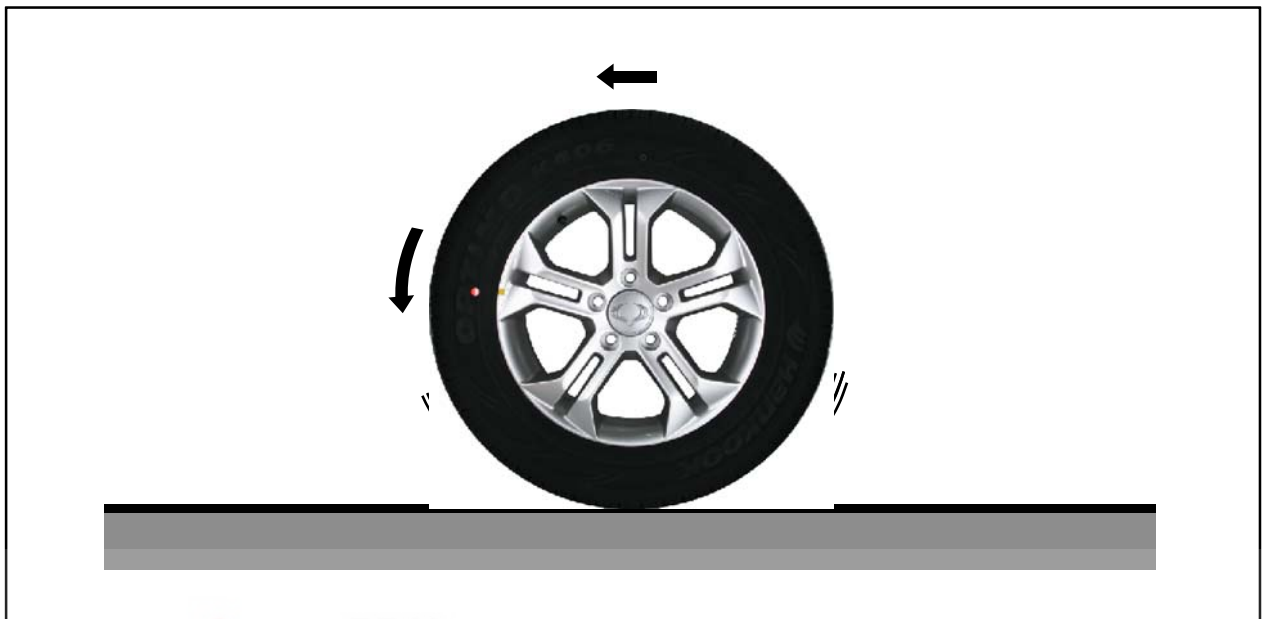


► Tire Inflation Pressure (32 psi, 2.21 bar)

Proper inflation pressure	Excessive inflation pressure	Low inflation pressure
<p>Tread width</p> <p>The contact area between the ground and tire faces the tread layer completely. Thus the driving force and the braking force are optimized, and the tire is worn out evenly resulting in increased life.</p>	<p>Tread width</p> <p>The contact area between the ground and tire is not enough, so the tire is worn out unevenly and the tire is vulnerability to outside influence.</p>	<p>Tread width</p> <p>The contact area between the ground and tire is excessive, so a lot of heat is generated and the tire is worn out unevenly and abnormally.</p>

2. ABNORMAL TIRE SYMPTOM

► Standing Wave



Specified tire inflation pressure

32psi, 2.21bar

During driving, the rotating tire repeats deformation and restoring movement in its tread. This happens when the tire pressure is low in high speed driving.

However, when the wheel rotating speed is fast, the tire is deformed even before it is restored to its original shape and the trembling wave appears on the tread portion. If this symptom lasts for an extended period of time, the tire can be blown out in a short period of time.

If the standing wave symptom occurs on the tire, rubber on the tread comes off and eventually the tire can be blown out which is very dangerous. When driving at high speed, the inflation pressure should be increased to decrease heat generation due to extension and contraction motion, to decrease hydroplaning and to prevent standing wave.

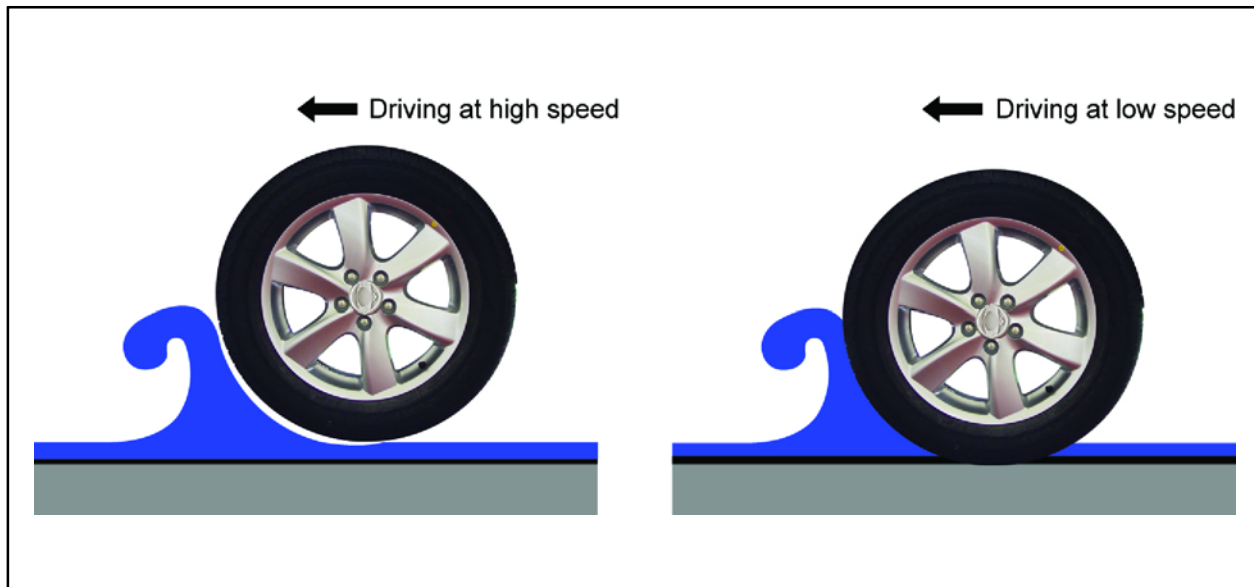
To prevent this symptom, it is recommended to increase the tire pressure 10 ~ 30 % higher than the specified pressure value in high speed driving.

Modification basis	
Application basis	
Allocated VIN	

WHEEL TIRE

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► Hydro Planing



When the vehicle is driven on a road surface covered with water at high speed, tires do not contact with the road surface but rotate floating on a thin film of water.

It causes brake failure, lower traction force and losing the steering performance.

To prevent this, increase the tire inflation pressure, use tires with leaf shape tread which is not worn.

However, it is a best measure to drive slowly.

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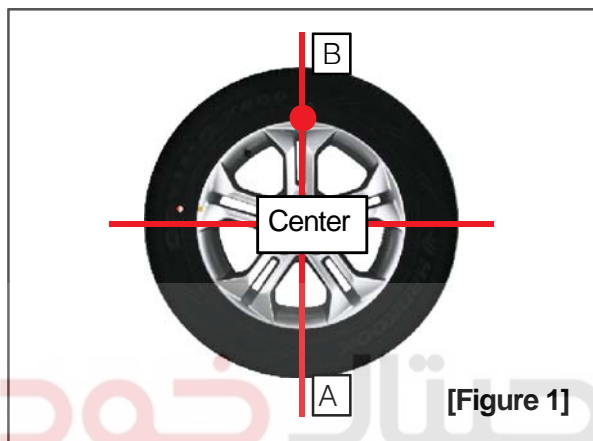
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3. WHEEL BALANCE

If weight is not equally distributed around the wheel, unbalance centrifugal force by the wheel rotation produces vibration. As the centrifugal force is produced proportional to the square of the rotating speed, the wheel weight should be balanced even at high speed. There are two types of the tire and wheel balancing: static and dynamic. Abnormal vibration may also occur due to unbalanced rigidity or size of tires.

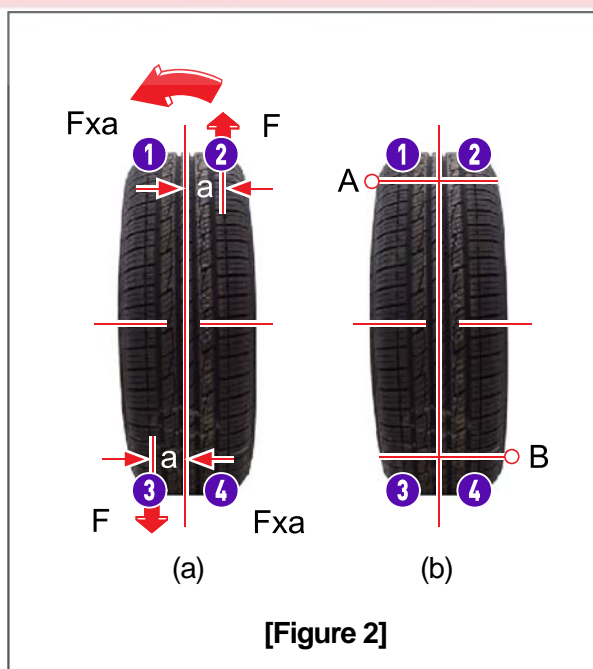
► Static Balance



[Figure 1]

When the free rotation of the wheel is allowed, the heavier part is stopped on the bottom if the wheel weight is unbalanced and this is called "Static Unbalance". Also, the state at which tire's stop position is not same is called "Static Balance" when the wheel is rotated again. If the part A is heavier as shown in the figure 1, add the balance weight of a weight corresponding to unbalanced weight from B to A to maintain the static balance. If the static balance is not maintained, tramping, up and down vibration of the wheels, occurs.

► Dynamic Balance



[Figure 2]

The static unbalance of the wheel creates the vibration in the vertical direction, but the dynamic unbalance creates the vibration in the lateral direction. As shown in the figure 2 (a), if two parts, (2) and (3), are heavier when the wheels are under the static balance condition, dynamic unbalance is created, resulting in shimmy, left and right vibration of the wheels, and the torque F_{xa} is applied in the axial direction. To correct the dynamic unbalance, add the balance weight of a same weight for two points of the circumference of the rim, A and B, as shown in the figure 2 (b), and apply the torque in the opposite direction to the torque F_{xa} to offset in order to ensure smooth rotation of the wheel.

Modification basis	
Application basis	
Allocated VIN	

CONFIGURATION AND FUNCTION

S.G.N.

4170-09 CONFIGURATION



1. Tire size



2. Load index



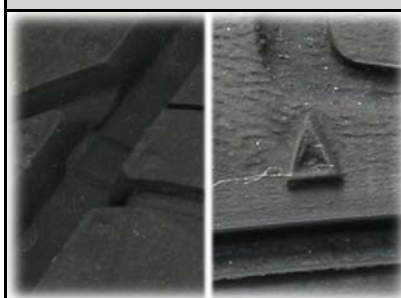
3. Speed rating symbol



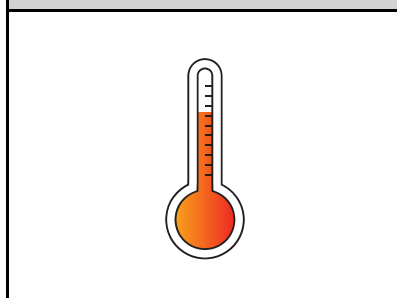
4. DOT number



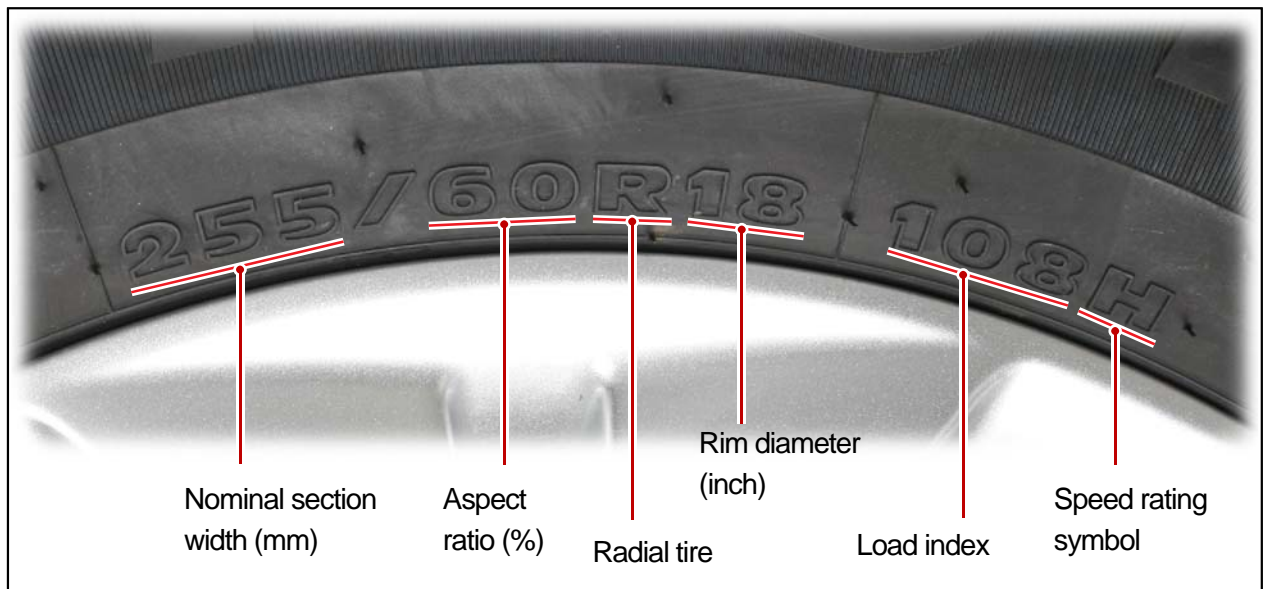
5. Wear limit indicator



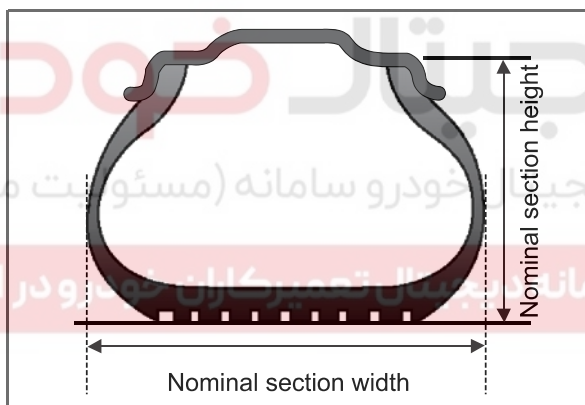
6. Temperature limit



1) Tire specification code (for radial tire)



► Aspect ratio (%)



$$\text{Aspect ratio (\%)} = \frac{\text{Nominal section height}}{\text{Nominal section width}} \times 100$$

► Load index

Load Index	100	101	102	103	104
Load in kg	800	825	850	875	900

Load Index	105	106	107	108	109
Load in kg	925	950	975	1000	1030

Load Index	110	111	112	113	114
Load in kg	1060	1090	1120	1150	1180

► Speed rating symbol

Q	S	T	H	V	W
160 km/h	180km/h	190km/h	210km/h	240km/h	270km/h

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Application basis	
Allocated VIN	

WHEEL TIRE

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REMOVAL AND INSTALLATION

4170-09 WHEEL AND TIRE



1. Support the vehicle with safety jack and loosen the wheel nuts, then jack up the vehicle. Remove all of the wheel nuts.
2. Install the tire in the reverse order of removal.
- 3.

CAUTION

Tighten up the wheel nuts in the diagonal sequence as shown in the picture. Each nut should be turned a couple of times at a time.

Tightening torque 120 ~ 140Nm

CAUTION

- Tighten up the wheel nuts in the diagonal sequence as shown in the picture. Each nut should be turned a couple of times at a time.
- After changing the tire and driving the vehicle about 1,000 km, retighten the wheel nuts.
- Never apply oil or grease to either wheel studs or nuts as it will cause them to overtighten.
- If over tightened, the wheel nuts could be damaged. Do not overtighten the wheel nuts by pressing the wheel nut wrench by foot or using an assist pipe.