

SUSPENSION

4411-01/4420-01/4510-01/

INDEX

SUSPENSION

GENERAL

1. SPECIFICATIONS OF SUSPENSION	3
2. WHEEL ALIGNMENT	3

CONFIGURATION AND FUNCTION

4411-01 FRONT SUSPENSION (double wishbone)	4
4510-01 REAR SUSPENSION (5-LINK TYPE)	10



اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

REMOVAL AND INSTALLATION

4510-01 TROUBLE DIAGNOSIS OF REAR SUSPENSION	17
4410-01 FRONT SUSPENSION-UPPER ARM	18
4411-01 FRONT SUSPENSION- COIL SPRING & SHOCK ABSORBER ASSEMBLY	20
4420-01 FRONT SUSPENSION- STABILIZER BAR	22
4410-01 FRONT SUSPENSION- LOWER ARM	24
4510-01 REAR SUSPENSION (5 LINK TYPE)	28

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



SUSPENSION**4510-01****GENERAL****1. SPECIFICATIONS OF SUSPENSION**

Description		Specification
Suspension type	Front	Double wishbone
	Rear	5-Link
Spring type		Coil spring
Shock absorber type		Cylindrical double tube (gas type)
Stabilizer type		Torsion bar
Height "H" (When tightening upper arm/lower arm/shock absorber yoke nut)		86.5 ± 5 mm

2. WHEEL ALIGNMENT

Description	Specification	
Toe-in	2 ± 2 mm (0.13 ± 0.13 deg)	
Camber	-0.14 ± 0.25° (LH)	The difference between both ends is should be below 0.5°
	-0.34 ± 0.25° (RH)	
Caster	4.4 ± 0.4° (LH)	The difference between both ends is should be below 0.5°
	4.5 ± 0.4° (RH)	

Modification basis	
Application basis	
Affected VIN	

SUSPENSION

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CONFIGURATION AND FUNCTION

4411-01 FRONT SUSPENSION (DOUBLE WISHBONE)

1) System Overview

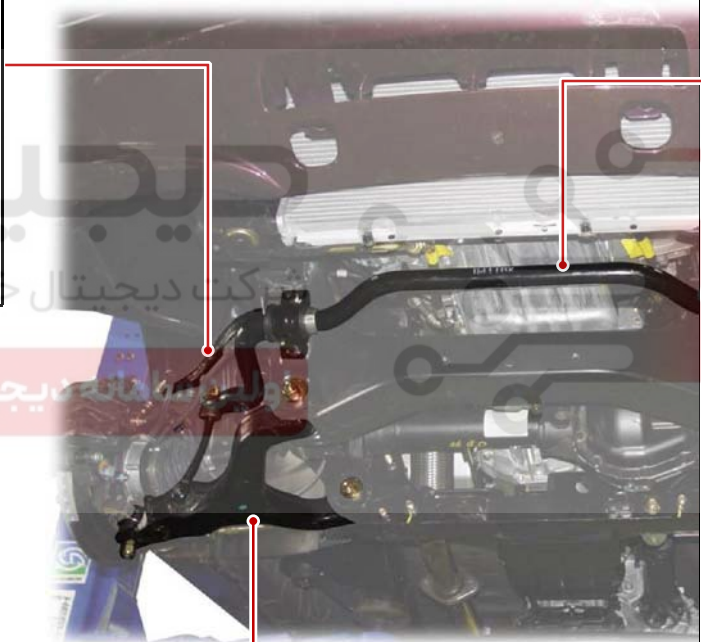
The suspension is the device to connect the axle and vehicle frame. It absorbs the vibrations and impacts from road surface, which enhances the comforts, driving force, braking force and drivability.

- 1. Suspension type: Double Wishbone
- 2. Components
Knuckle, upper arm assembly, lower arm assembly, coil spring, shock absorber assembly and stabilizer

Upper Arm Assembly



The upper arm is mounted to the frame and the knuckle and it relieves the load delivered from the tire to the knuckle. This enables to absorb the various impacts according to the load shapes and to ensure the drivability.

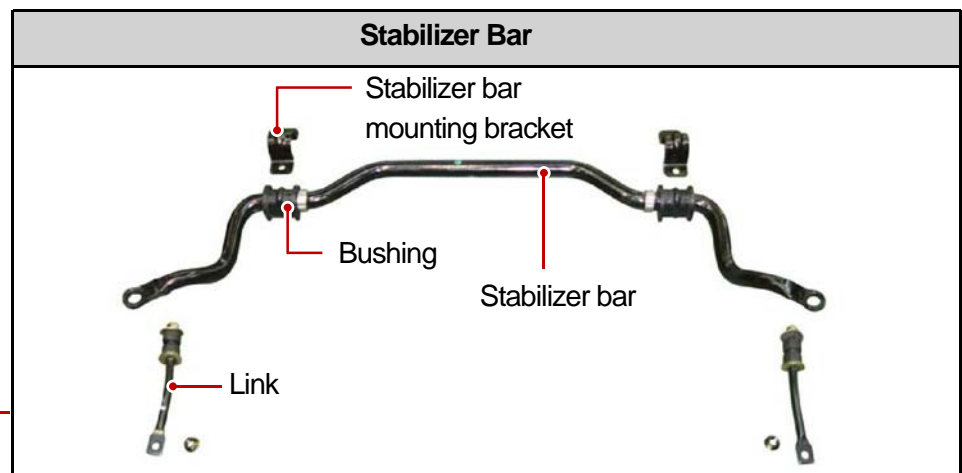


Lower Arm Assembly

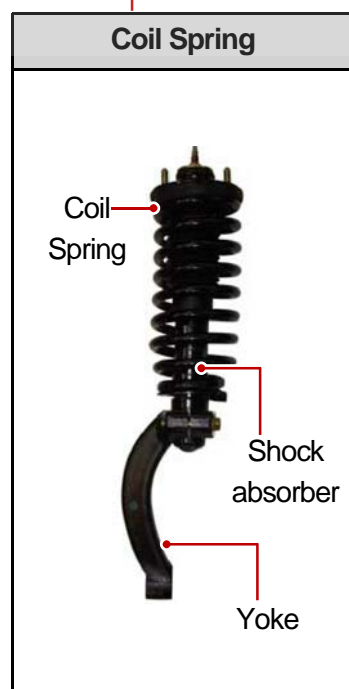


The lower arm is mounted to the knuckle, the shock absorber and the lower arm assembly. It relieves the load delivered from the tire to the knuckle. This enables to absorb the various impacts according to the load shapes and to ensure the drivability.

Modification basis	
Application basis	
Affected VIN	



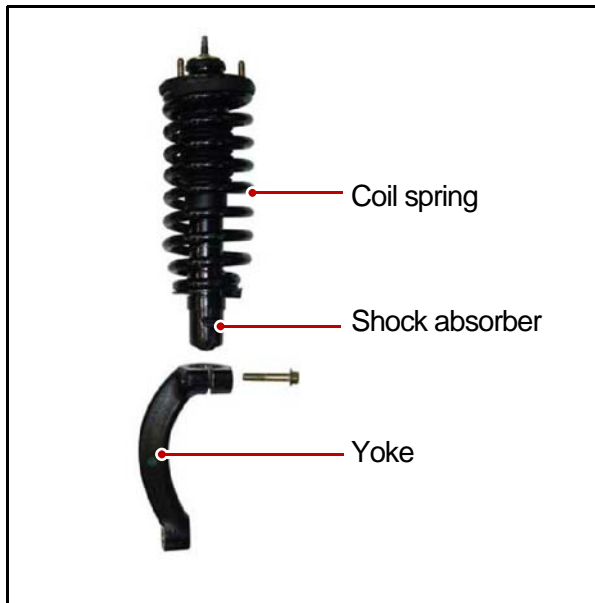
A transverse mounted spring steel bar controls and minimizes body lean or tipping on corners. This is a round bar which connects the left wheel suspension assembly with the right side. The main function is to keep both wheels rolling at the same rate when meeting bumps, but it also affects handling.



A section of spring steel rod is wound in a spiral pattern or shape coil provides a cushion to absorb road imperfections and returns the vehicle to a predetermined right height. It is a major contributor to a vehicle's handling balance and ride quality. Higher spring rates and shorter overall lengths are commonly used to lower the vehicle's ride height for enhanced appearance and improved handling.

Modification basis	
Application basis	
Affected VIN	

(1) Shock Absorber Assembly

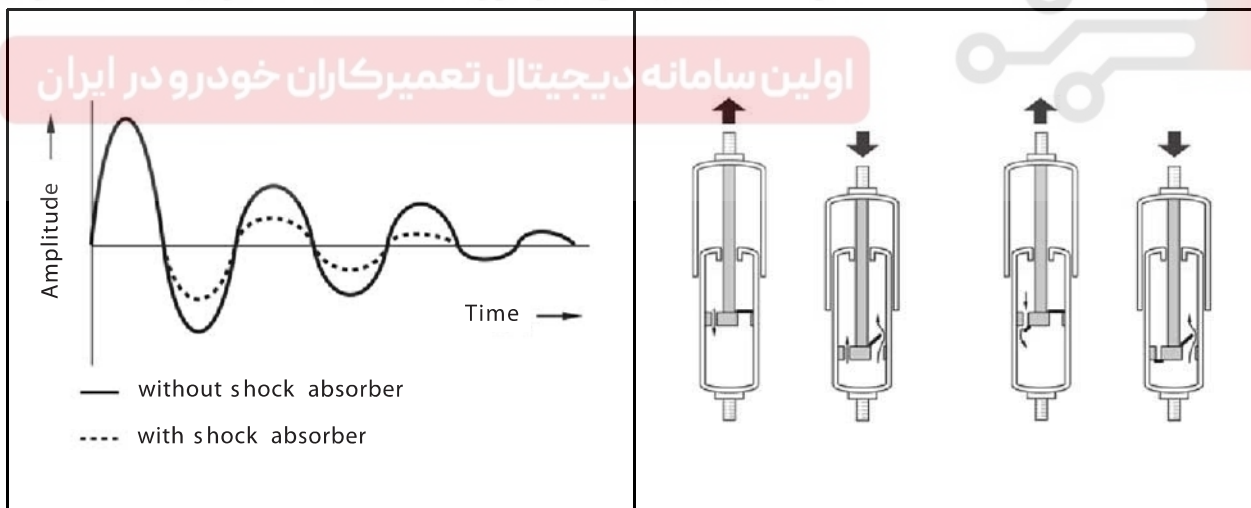


1. This vehicle uses the strut type shock absorber. This shock absorber is connected to the piston rod in the strut. This relieves the vertical vibrations of vehicle to provide ride comforts, prevents the spring break, enhances drivability, and extends the life span of steering components.

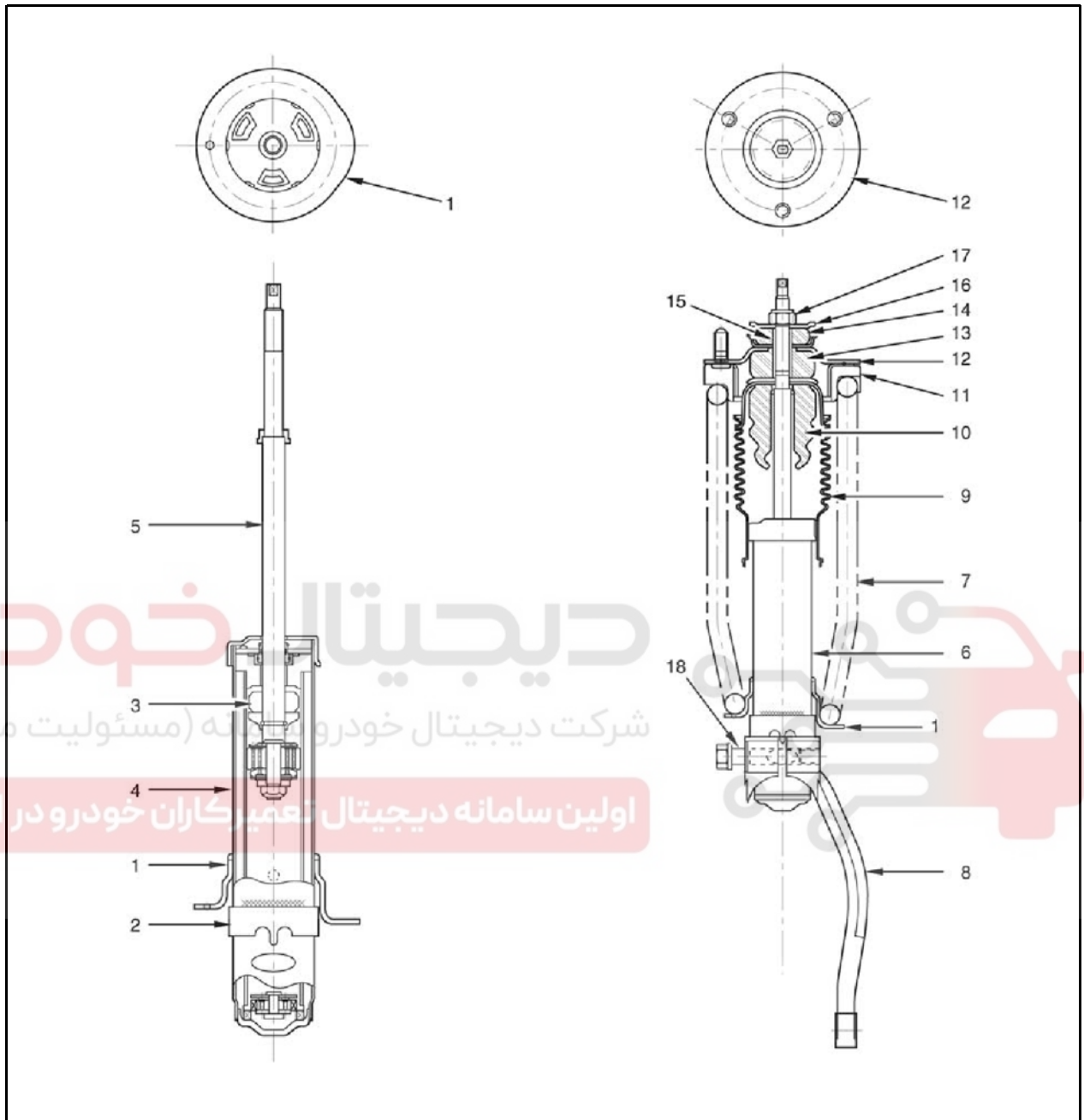
2. The shock absorber consists of a tube with piston and rod, and a cylinder tube. The piston has an orifice and valve and the cylinder is filled with oil.

This double tube type shock absorber restrains the vibrations by using oil resistance. This provides better drivability even though the structure is complicated.

This vehicle uses the gas shock absorber with cylindrical double tube.



(2) Sectional Drawing of Shock Absorber



1. Lower spring seat
2. Yoke bracket
3. Rebound stopper
4. Cylinder
5. Piston
6. Shock absorber assembly
7. Spring
8. Yoke
9. Boot

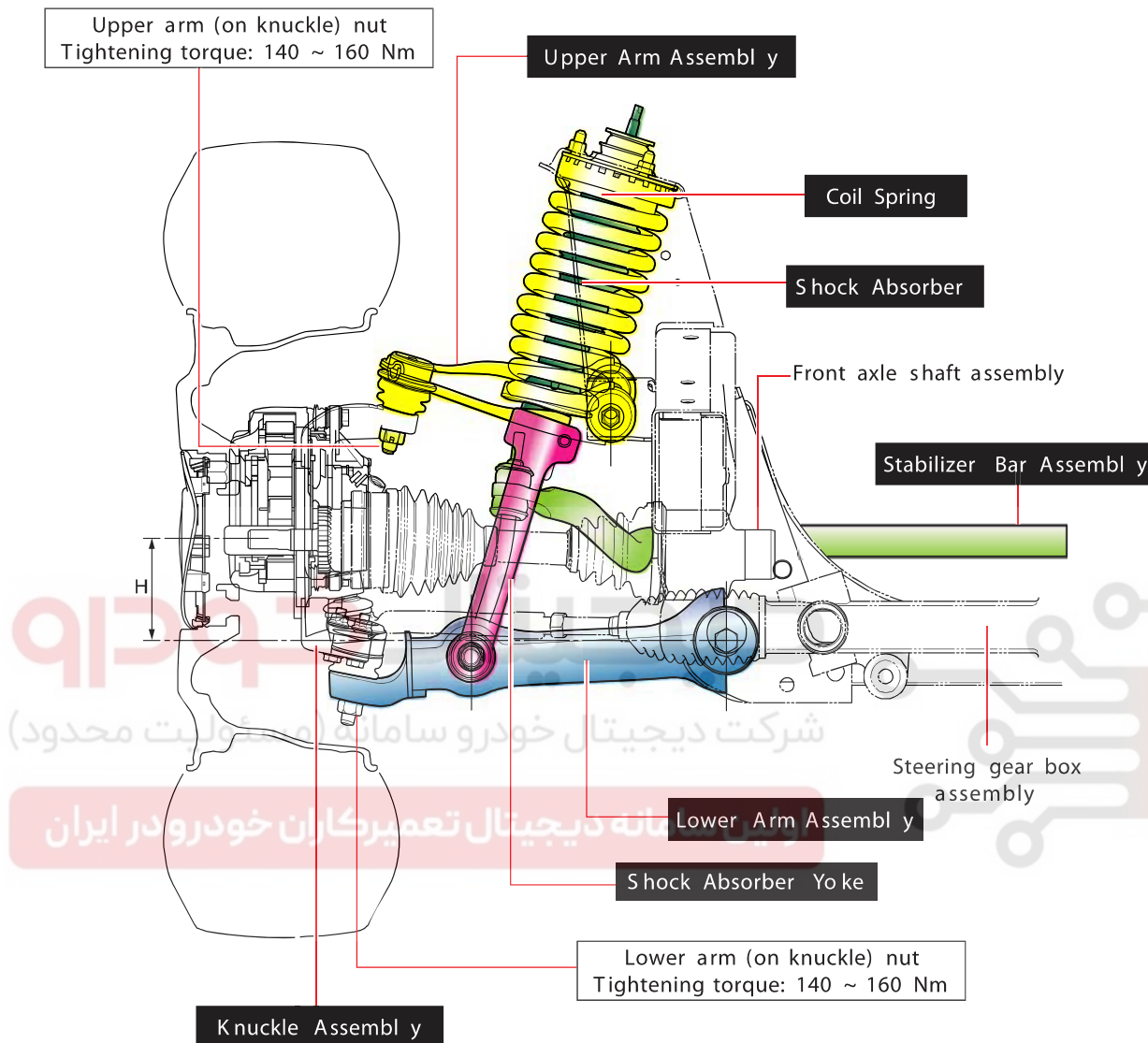
10. Bumper stopper
11. Spring seat rubber
12. Upper spring seat
13. Rubber
14. Rubber
15. Spacer
16. Washer
17. Nut
18. Bolt

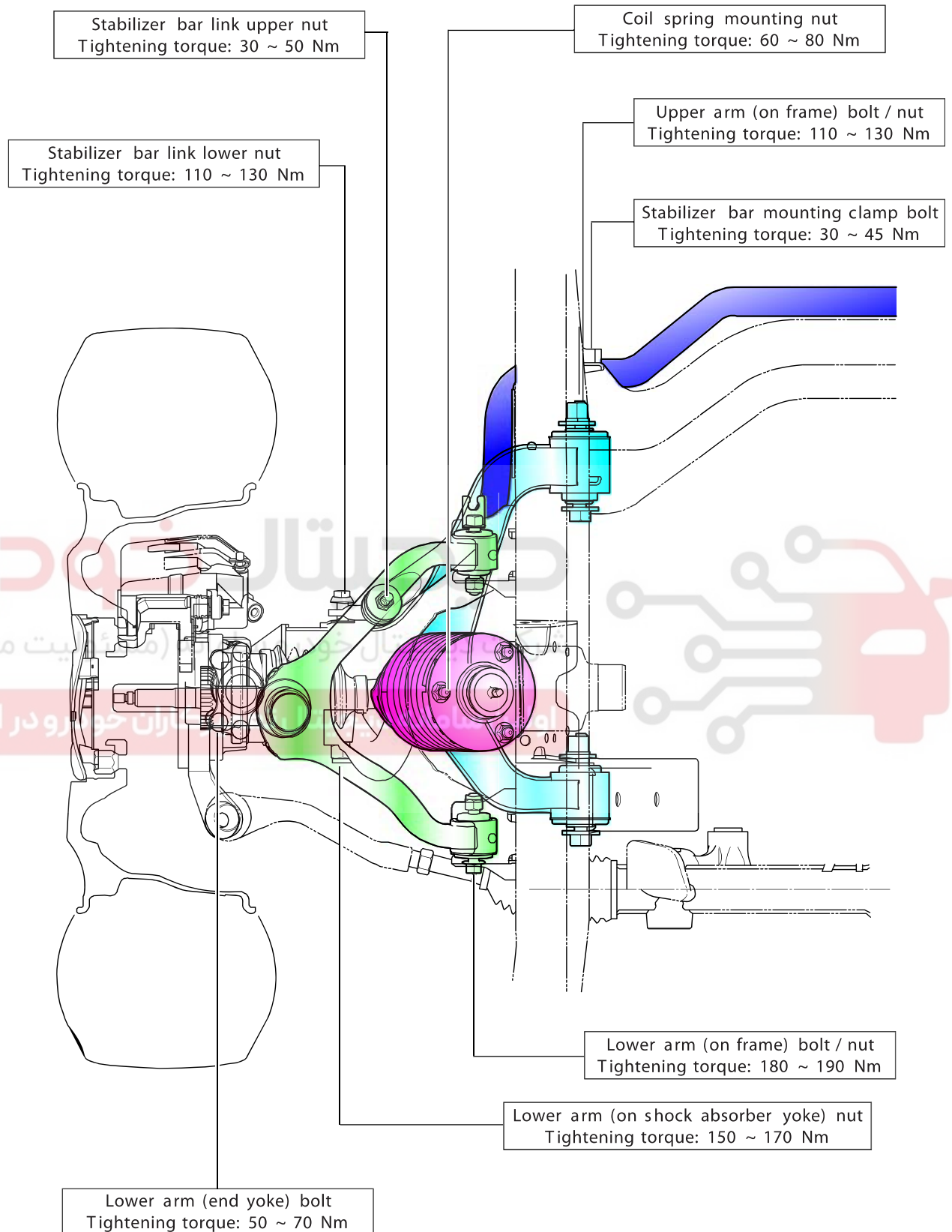
Modification basis	
Application basis	
Affected VIN	

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2) System Layout





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MANUAL
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TRANSMITGS
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PROPELL
ER

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SYSTEMESP &
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STEERING

WHEEL
TIRE

Modification basis	
Application basis	
Affected VIN	

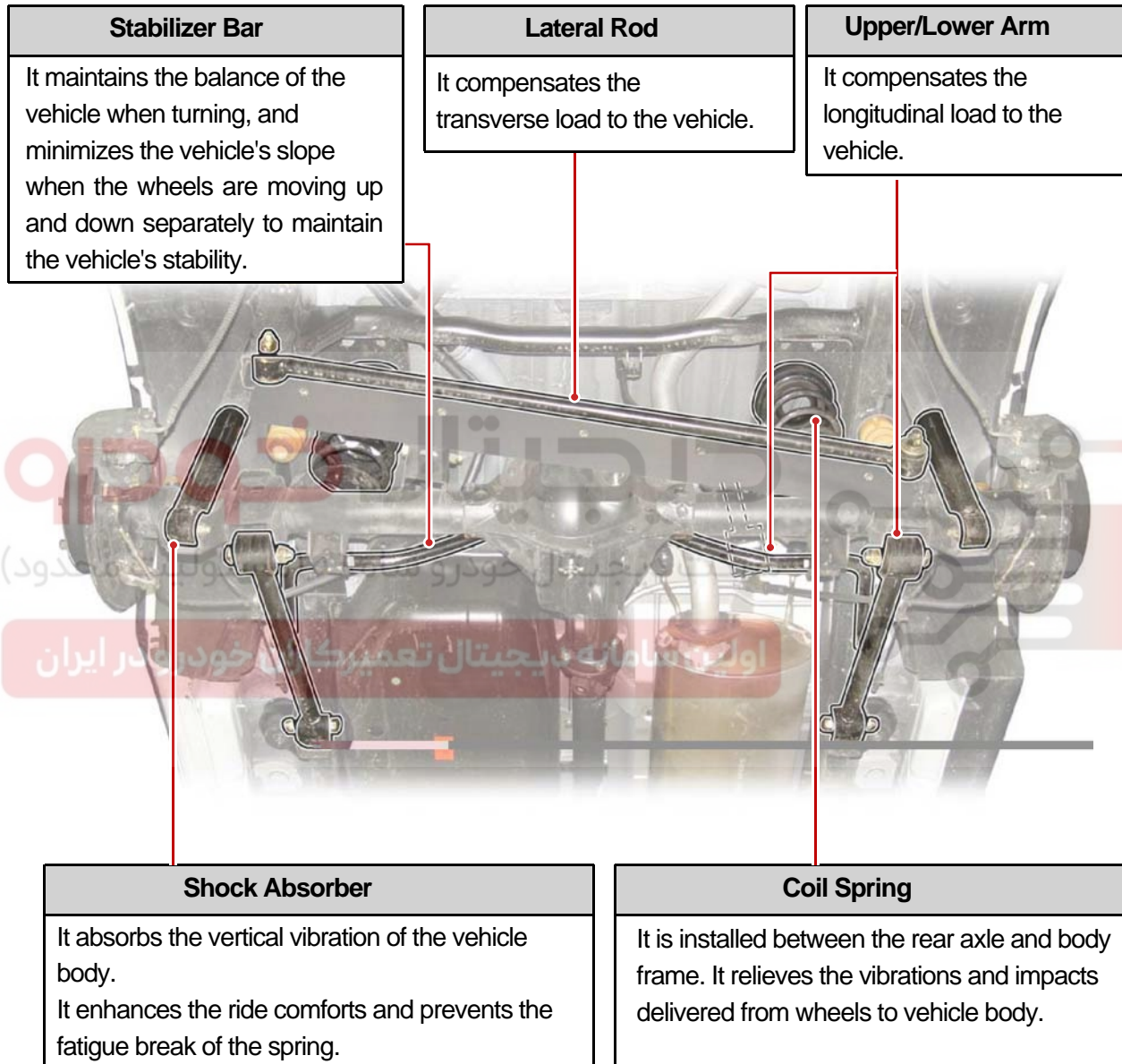
SUSPENSION

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4510-01 REAR SUSPENSION(5-LINK TYPE)**1) System Overview**

The rear suspension is to keep the ride comforts and drivability as the front suspension and this vehicle uses 5-link suspension system. It consists of coil springs on both sides, shock absorber, upper and lower arm, lateral rod and stabilizer bar.



Memo

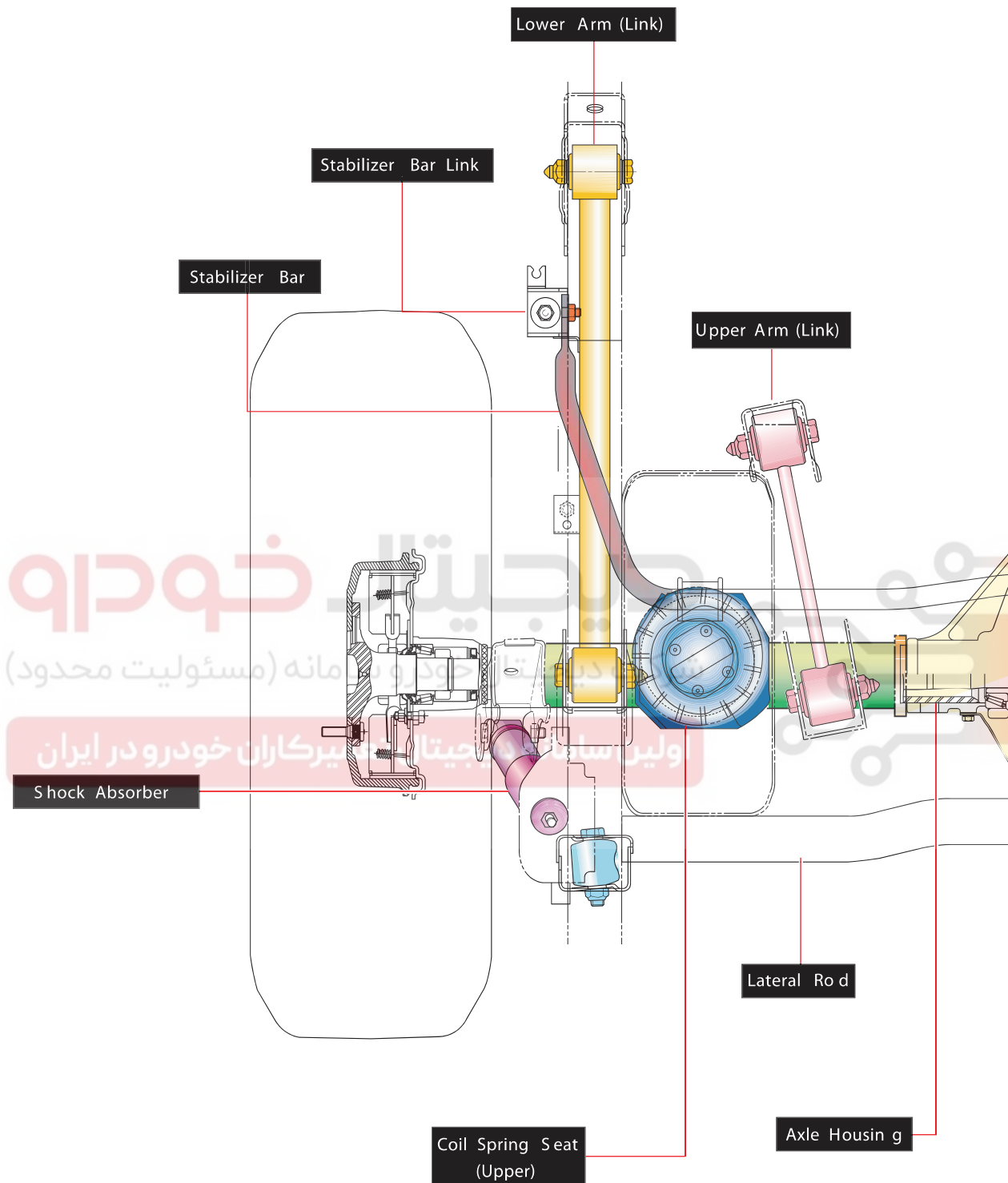
دیجیتال خودرو

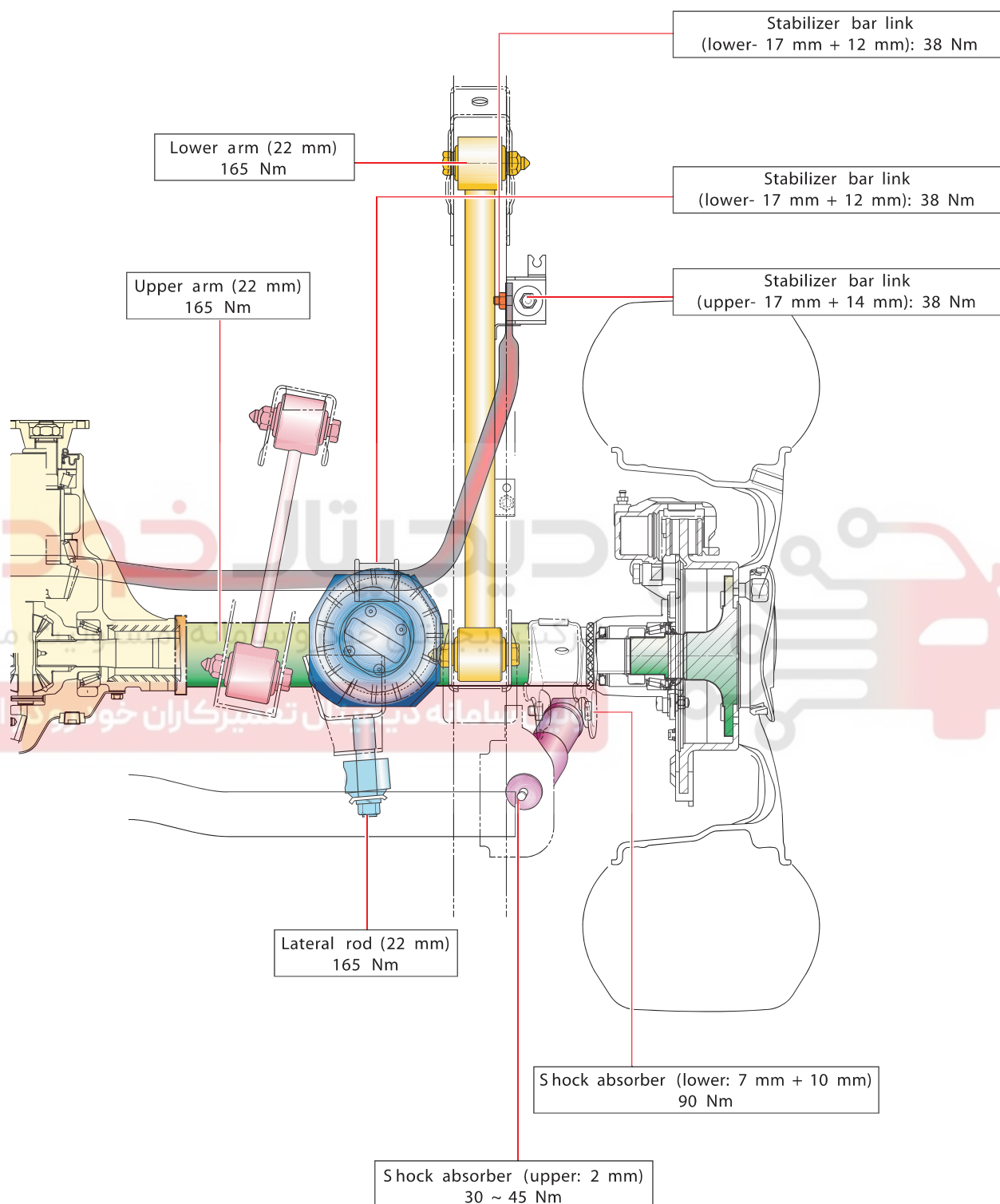
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2) System Layout





Modification basis	
Application basis	
Affected VIN	

SUSPENSION

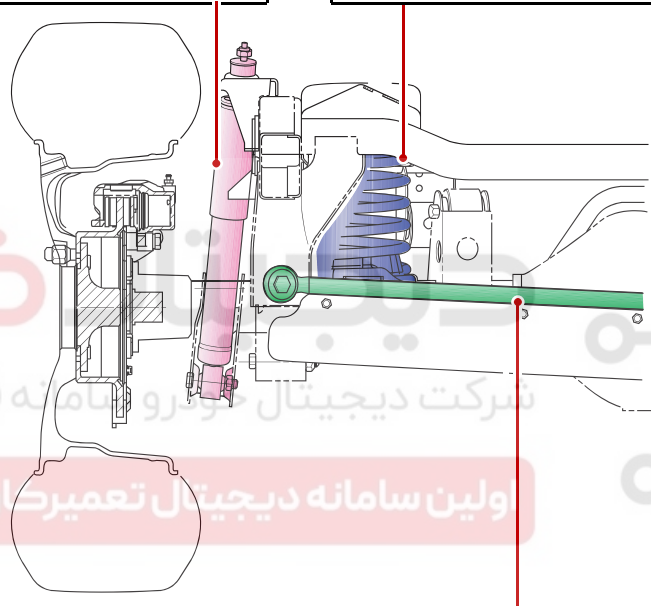
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3) Location

Shock Absorber Assembly



Coil Spring Assembly



Lateral Rod Assembly

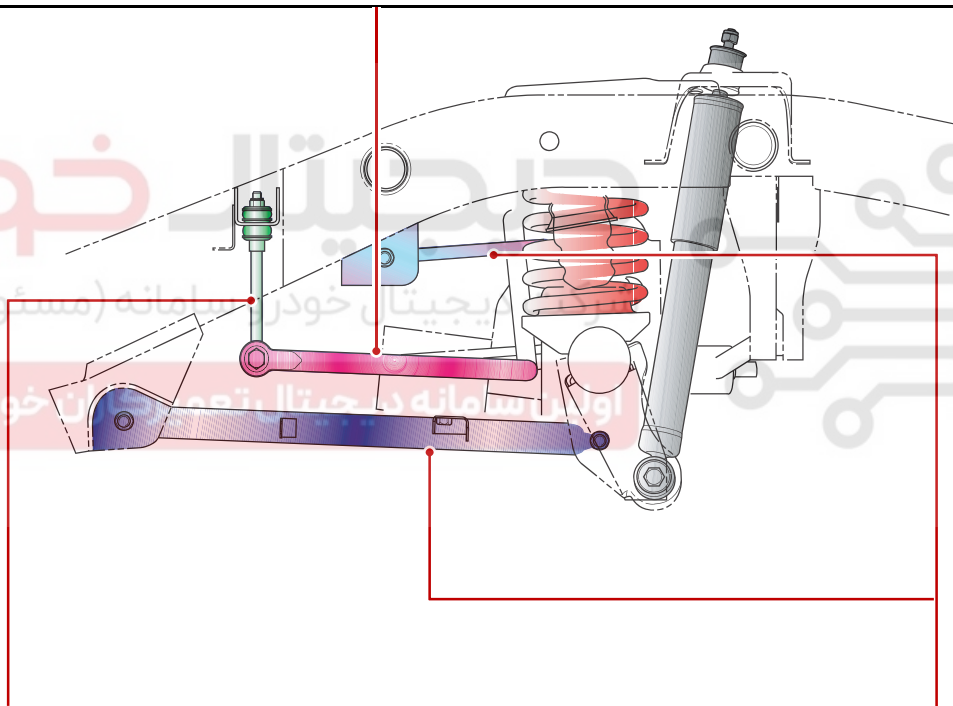


SUSPENSION

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Modification basis	
Application basis	
Affected VIN	

Stabilizer Assembly



Stabilizer Bar Link



Upper/Lower Arm Assembly



Modification basis	
Application basis	
Affected VIN	

SUSPENSION

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MANUAL
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LEVER

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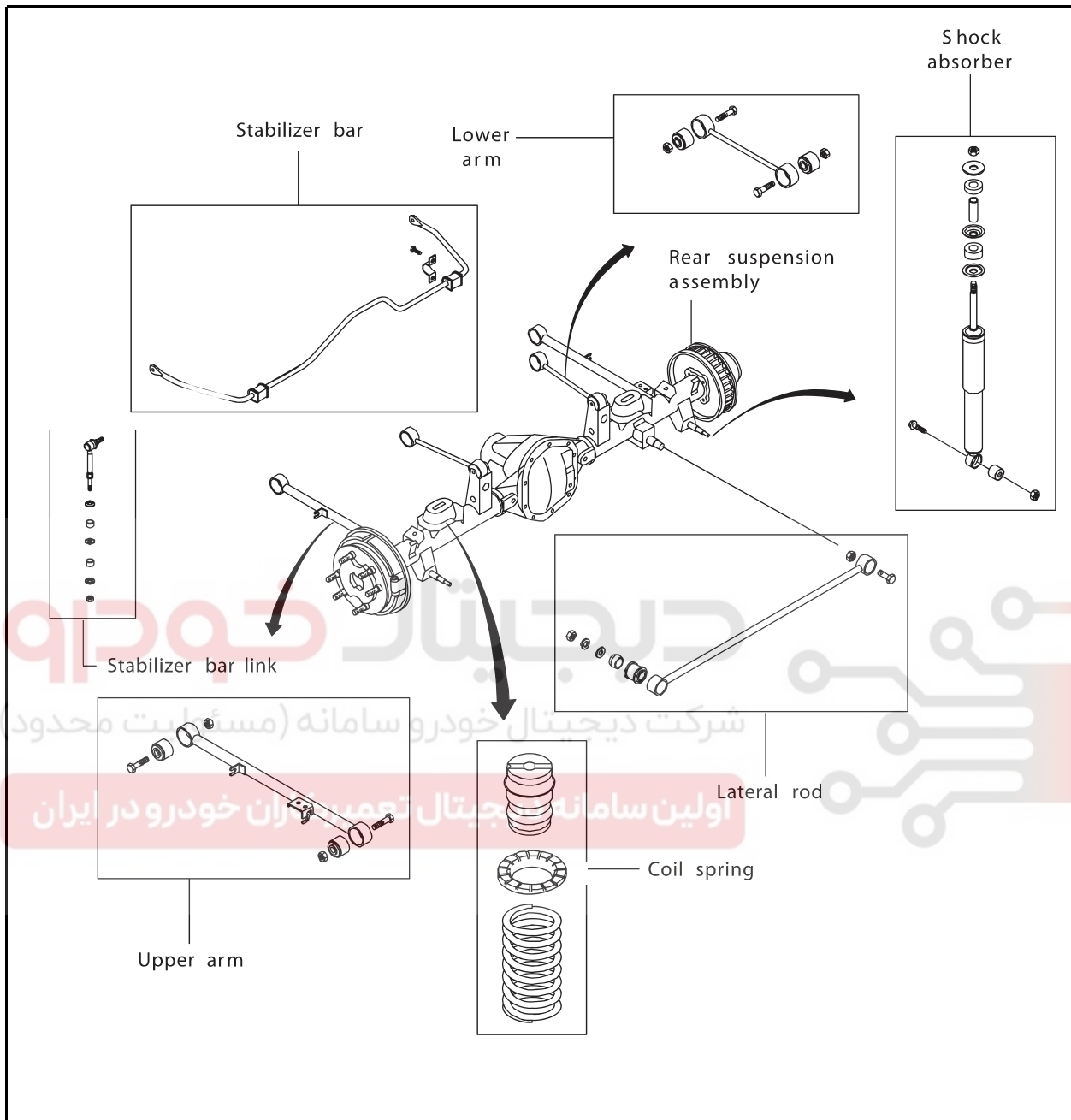
AXLE

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SYSTEMESP &
ABS

STEERING

WHEEL
TIRE

4) System Compsitons



REMOVAL AND INSTALLATION

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4510-01 TROUBLE DIAGNOSIS OF REAR SUSPENSION

Symptom	Cause	Action
Vehicle rolling	Broken stabilizer bar	Replace
	Faulty shock absorber	Replace
Abnormal noise	Loosened mountings	Re-tighten
	Damaged or worn wheel bearing	Replace
	Damaged shock absorber	Replace
	Damaged tire	Replace
Poor riding comfort	Over inflated tire	Adjust pressure
	Faulty shock absorber	Replace
	Loosened wheel nut	Tighten to specified torque
	Bent or broken coil spring	Replace
	Damaged tire	Replace
	Worn bushing	Replace
Vehicle pulls to right or left	Deformed arm assembly	Replace
	Worn bushing	Replace
	Bent or broken coil spring	Replace
Hard steering	Excessive resistance of lower arm ball joint	Replace
	Insufficient tire pressure	Replace
	Faulty power steering	Adjust
Steering instability	Worn or loosened lower arm bushing	Re-tighten or replace
Vehicle bottoming	Worn or broken coil spring	Replace

Modification basis	
Application basis	
Affected VIN	

SUSPENSION

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4410-01 FRONT SUSPENSION-UPPER ARM

⚠ CAUTION

Remove the upper arm assembly according to the sequences shown below and keep the specified tightening torque when reinstalling it.

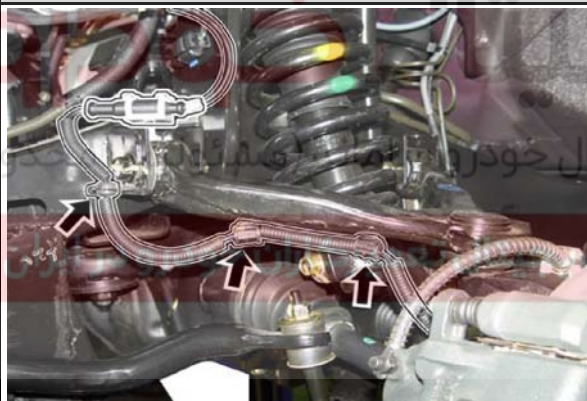
Preceding Works

1. Remove the tires.
Remove the wheel cap and loosen the wheel nuts in several steps.

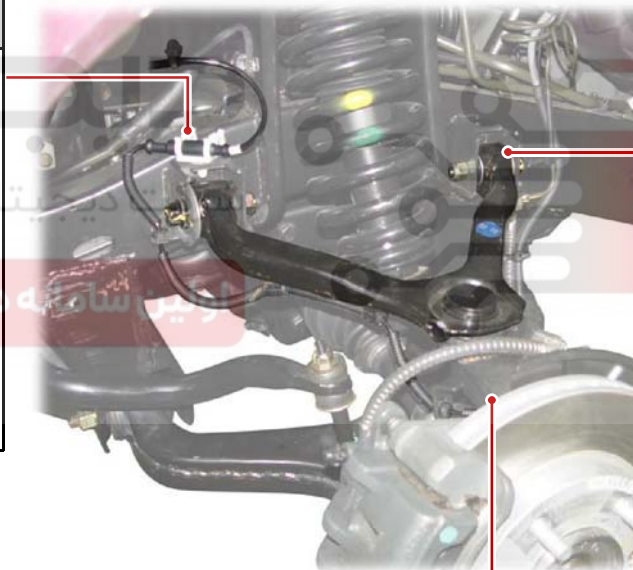
Tightening torque 120 ~ 140 Nm



Wheel speed sensor cable



1. Remove the wheel speed sensor cable and the connector from the upper arm.



Upper arm nut (19 mm, knuckle side)



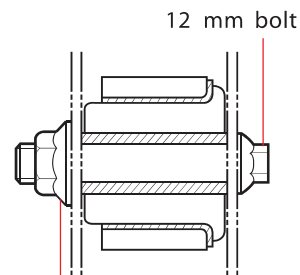
Tightening torque 140 ~ 160 Nm

2. Remove the cotter pin first and then remove the castle nut.

⚠ CAUTION

Replace the cotter pin with new one when installing.

Upper arm bolt/nut (frame side)



12 mm nut

Tightening torque:
110 ~ 130 Nm

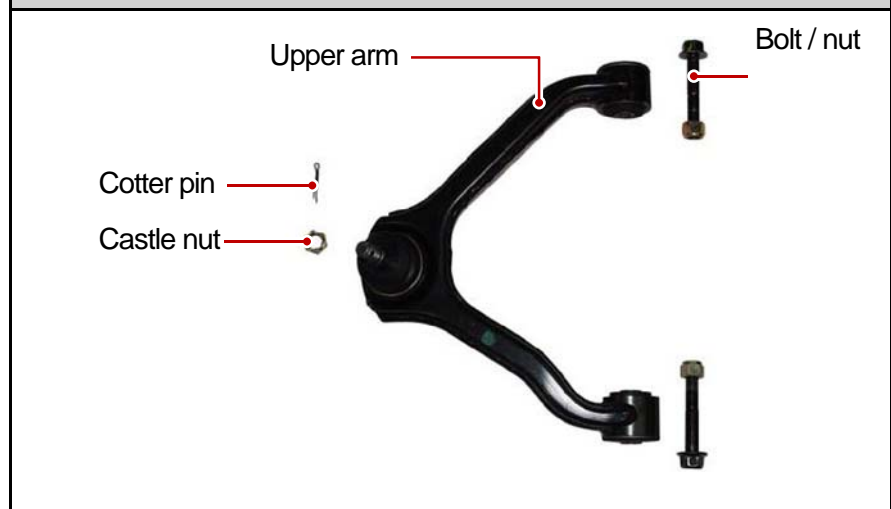
1. Remove the upper arm mounting bolts and nuts (LH/RH) from the frame.

Upper arm



4. Separate the upper arm from the frame first, and then separate it from the knuckle with a special tool.

Upper Arm Assembly



Modification basis	
Application basis	
Affected VIN	

SUSPENSION

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10-20

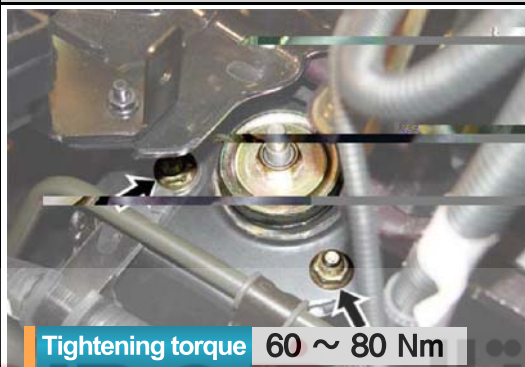
4411-01

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4411-01**FRONT SUSPENSION- COIL SPRING
& SHOCK ABSORBER ASSEMBLY****Preceding Work**

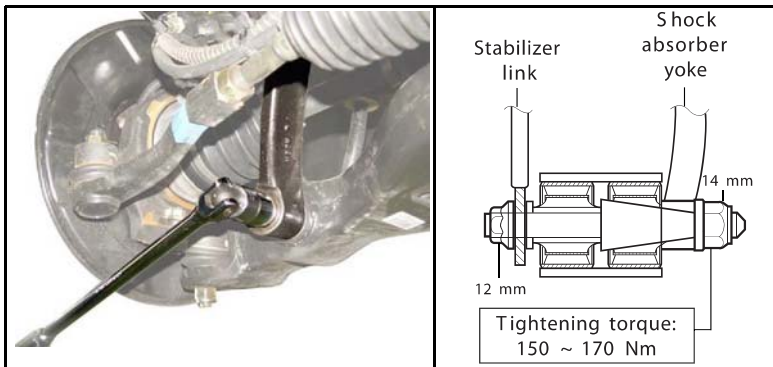
Remove the tire and the upper arm.

1. The upper mounting nuts of the coil spring/shock absorber assembly (14 mm - 3 EA)
: At first, unscrew the two upper mounting nuts in engine compartment.

Engine Compartment**Wheel House**

- : Unscrew the upper mounting nut (14 mm) of the coil spring shock absorber in wheel house cover.

2. The lower nut of the coil spring/shock absorber yoke (24 mm - 1 EA)



- : Unscrew the lower nut of coil spring/shock absorber yoke from the lower arm. Do not completely remove the nut.

SUSPENSION

ACTYON 2012.12

Modification basis	
Application basis	
Affected VIN	



3. Remove the coil spring/shock absorber.

: Unscrew all the mounting nuts on the coil spring/shock absorber and separate the coil spring/shock absorber.



Coil Spring Assembly

Coil spring

Shock absorber

When installing the yoke to the coil spring/shock absorber, make sure that slot B and protrusion A are aligned.

Lock bolt
Tightening torque:
100 ~ 120 Nm

Yoke

Modification basis	
Application basis	
Affected VIN	

SUSPENSION

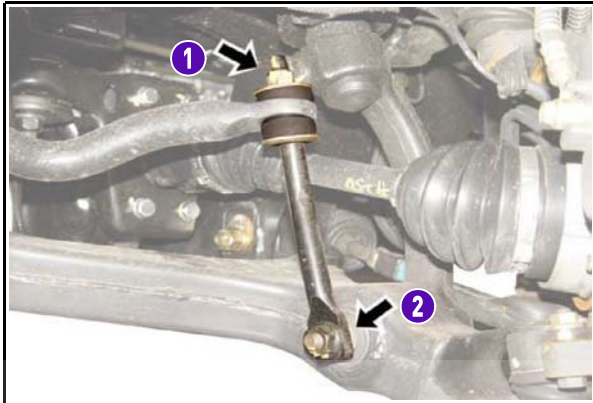
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4420-01 FRONT SUSPENSION-STABILIZER BAR**Preceding Work**

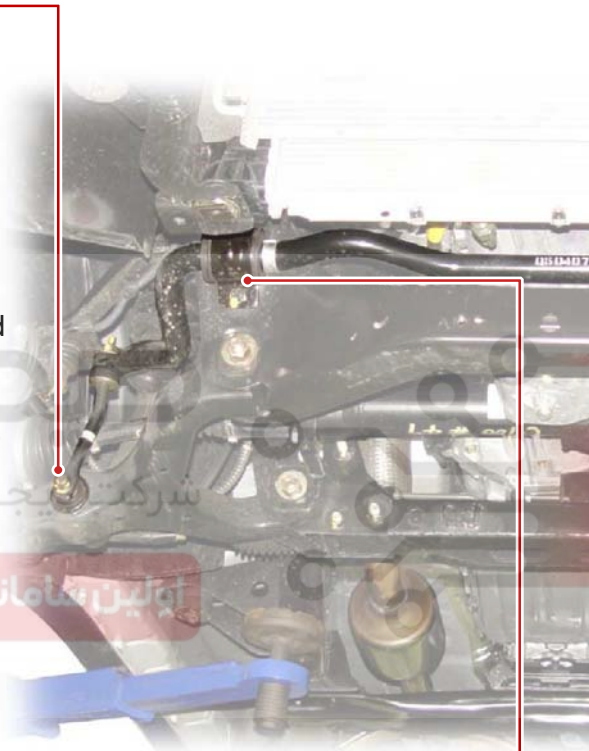
Remove the tires.

1. Remove the stabilizer bar link.

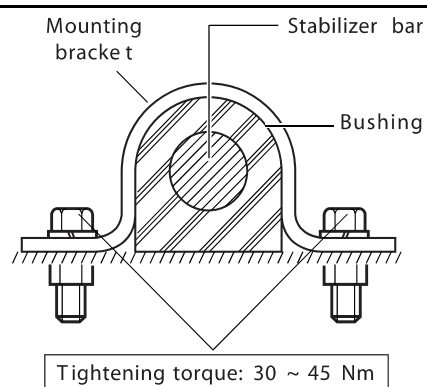


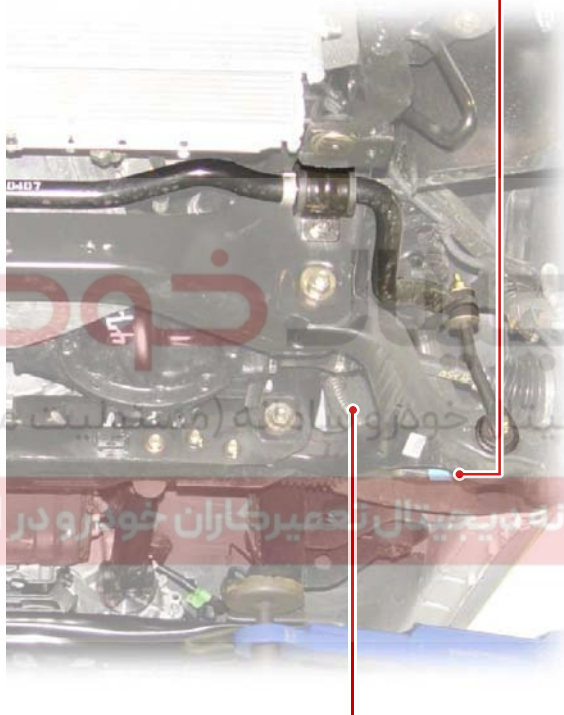
: Unscrew the lower mounting nut (1) (12 mm) and upper mounting nut (2) (10 mm) to remove the stabilizer bar link assembly.

- 1 Tightening torque 30 ~ 50 Nm
 2 Tightening torque 110 ~ 130 Nm

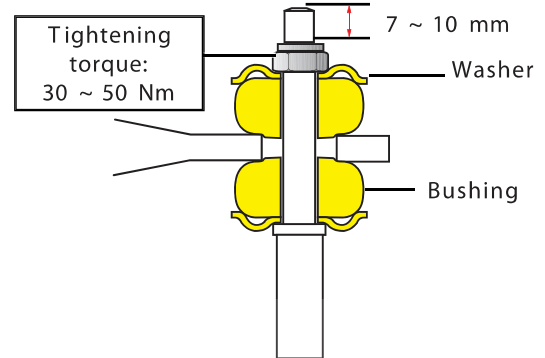
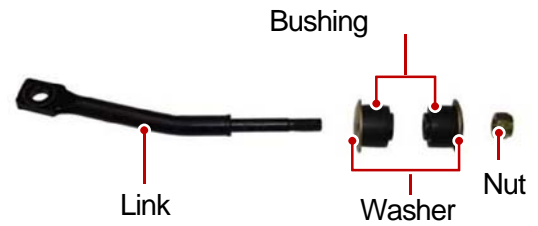


2. Unscrew two bracket mounting bolts (14 mm) and remove the stabilizer bar assembly.





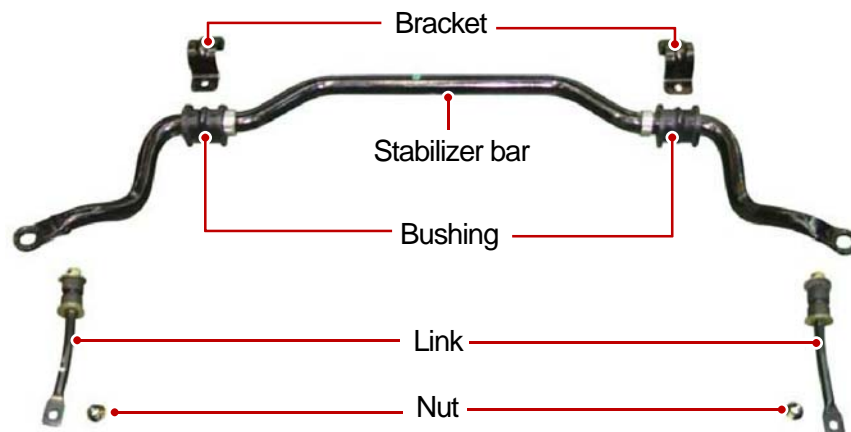
Components



CAUTION

1. Be cautious of the direction of the bushing and washer when installing.
2. Be cautious of the marks on the front stabilizer bar (LH/RH) when installing.
LH: yellow mark RH: white mark

Stabilizer Bar Assembly



Modification basis	
Application basis	
Affected VIN	

SUSPENSION

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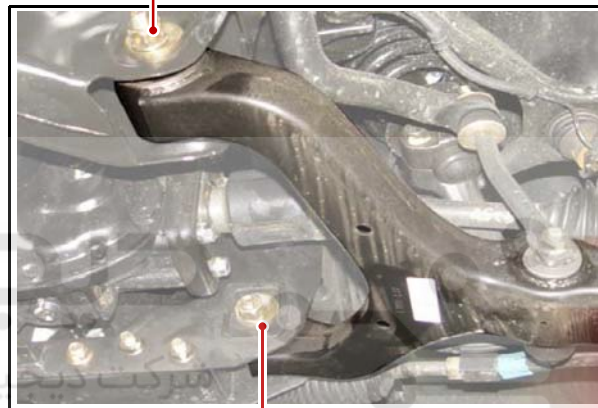
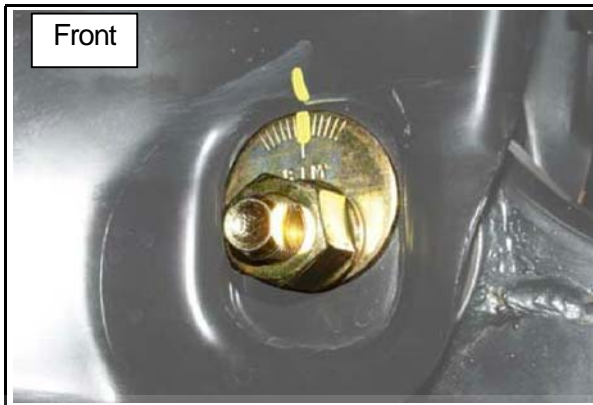
4410-01

FRONT SUSPENSION-LOWER ARM

Preceding work

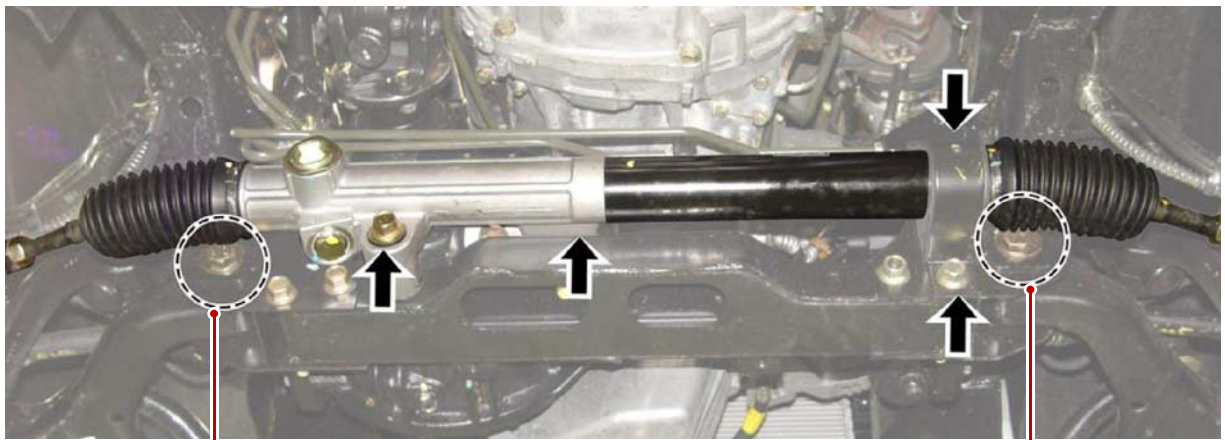
1. Remove the tires.
2. Make an alignment mark on the camber adjusting bolt of lower arm (frame side).

1) Wheel Alignment



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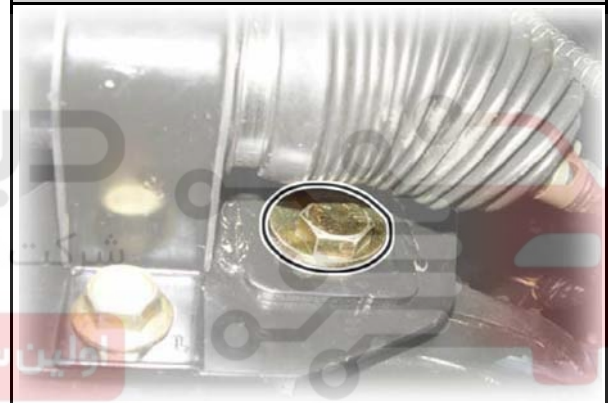
3. Loosen the steering gear box by unscrewing the steering gear box mounting bolts (arrows) and remove the camber adjusting bolts.



Interference between camber bolt and steering gear box



Interference between camber bolt and steering gear box



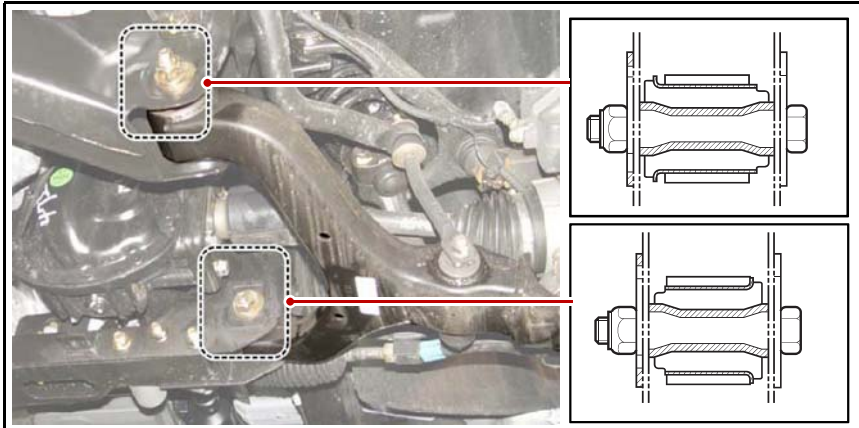
Modification basis	
Application basis	
Affected VIN	

SUSPENSION

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2) Front Suspension-Lower Arm

1. The lower arm mounting bolts/nuts on the frame (LH/RH)

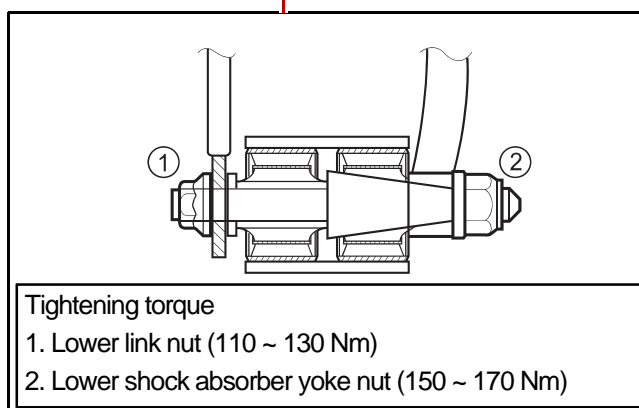
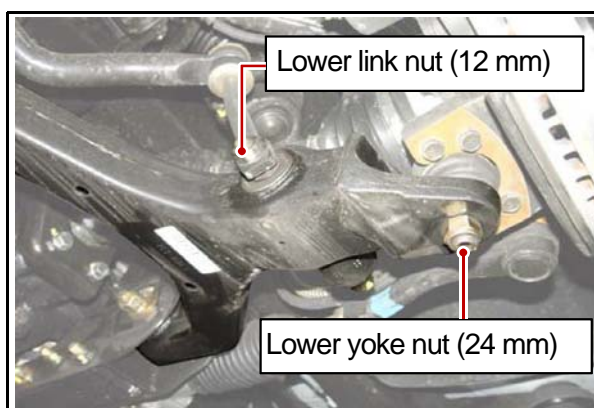


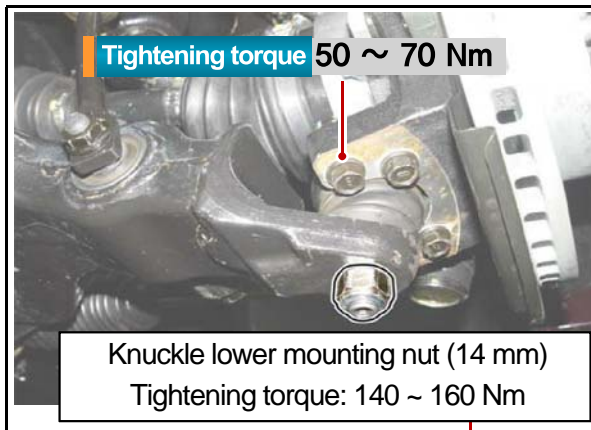
: Before removing nuts and bolts of lower arm assembly, make the alignment marks on the mounting nuts (14 mm, LH/RH) and the camber adjusting bolts (14 mm, LH/ RH).

CAUTION

Always perform the wheel alignment procedures after removing and reinstalling the lower arm assembly.

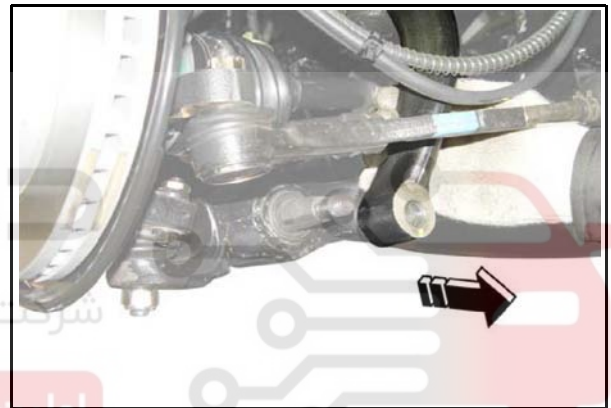
2. Unscrew the lower nut of stabilizer bar link and the lower nut of coil spring/shock absorber yoke.





3. Unscrew the lower mounting nut (14 mm) and remove the lower arm from knuckle end bolt with special tool.

4. Place a safety jack under the lower arm and unscrew the lower shock absorber yoke bolt. Remove the yoke while raising the lower arm with the safety jack.



5. Remove the lower arm assembly from the body.

Components



Modification basis	
Application basis	
Affected VIN	

SUSPENSION

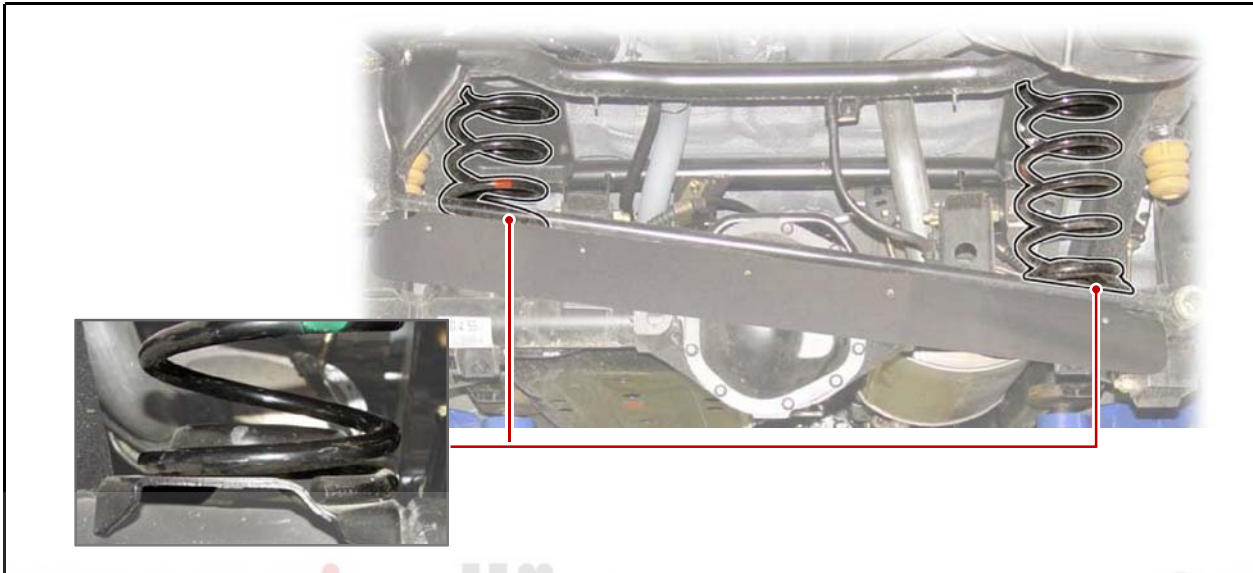
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4510-01 REAR SUSPENSION(5 - LINK TYPE)

Remove the rear suspension components in order.

1. Remove the coil spring using a special tool (Be careful of the installation direction).



2. Remove the lateral rod.

1) Unscrew the lateral rod mounting nut (22 mm) on axle.

Tightening torque 150 ~ 200 Nm



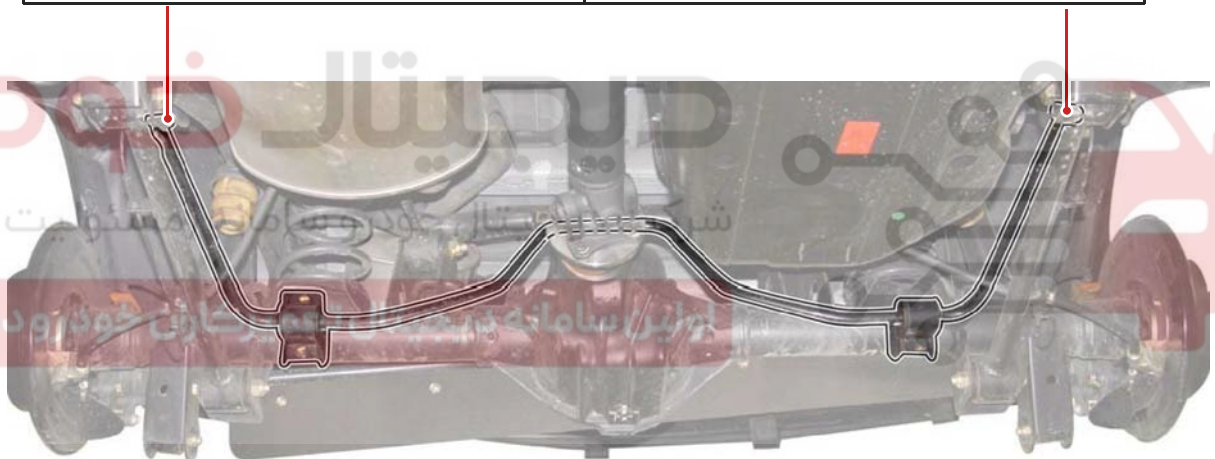
2) Unscrew the lateral rod mounting bolt/nut (22 mm) on frame.

Tightening torque 150 ~ 180 Nm

3. Disconnect the link and the bracket from the stabilizer bar to remove the stabilizer bar.

1) Unscrew the stabilizer bar link mounting nuts (upper/lower) and remove the link.

Tightening torque	38 Nm
Protrusion of upper bolt	7 ~ 12 mm



2) Remove the mounting cap bracket and bushing from the stabilizer bar (LH/RH).

Tightening torque 30 ~ 45 Nm

Modification basis	
Application basis	
Affected VIN	

SUSPENSION

ACTYON 2012.12



4. Remove the shock absorber between the frame and the axle.



1) Remove the upper mounting nut (17 mm) and the shock absorber bolt (6 mm) as shown in the figure.

Tightening torque	30 ~ 45 Nm
Protrusion of upper bolt	6 ~ 9 mm



2) Remove the lower bolt/nut (17 mm).

Tightening torque 80 ~ 100 Nm

5. Remove the upper arm from frame and axle.



A. Unscrew upper arm mounting bolt/nut (22 mm) on axle.



Tightening torque 150 ~ 180 Nm

B. Unscrew upper arm mounting bolt/nut (22 mm) on frame.



Tightening torque 150 ~ 180 Nm



CAUTION

The fuel tank should be removed before removing the rear left bolts (upper arm and lower arm).

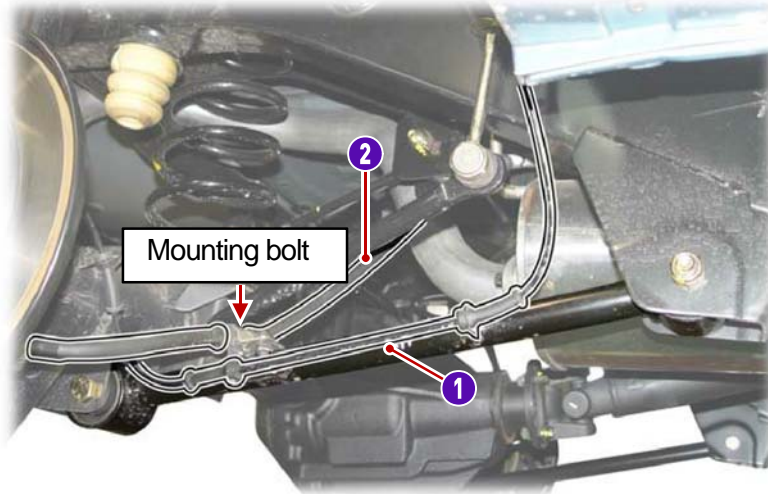
Modification basis	
Application basis	
Affected VIN	

SUSPENSION

ACTYON 2012.12

6. Remove the lower arm from the frame and the axle.

- 1) Remove the wheel speed sensor cable (1) and the parking cable (2) mounting bolt (12 mm) when removing the lower arm.



- 2) Unscrew lower arm mounting bolt/nut (22 mm) on frame.

Tightening torque 150 ~ 180 Nm



- 3) Unscrew lower arm mounting bolt/nut (22 mm) on axle.

Tightening torque 150 ~ 180 Nm