

SUSPENSION

10

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FRONT SUSPENSION

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GENERAL INFORMATION

Description

The front suspension system incorporates a strut assembly that takes the place of the upper control arm and upper ball joint. The strut carries out the function of a shock absorber and is encompassed by a coil spring. The strut assembly supports the weight of the vehicle and is also the pivot point for the steering knuckle. This system uses a lower control arm and ball joint for the lower pivot point of the steering knuckle.

دیجیتال خودرو

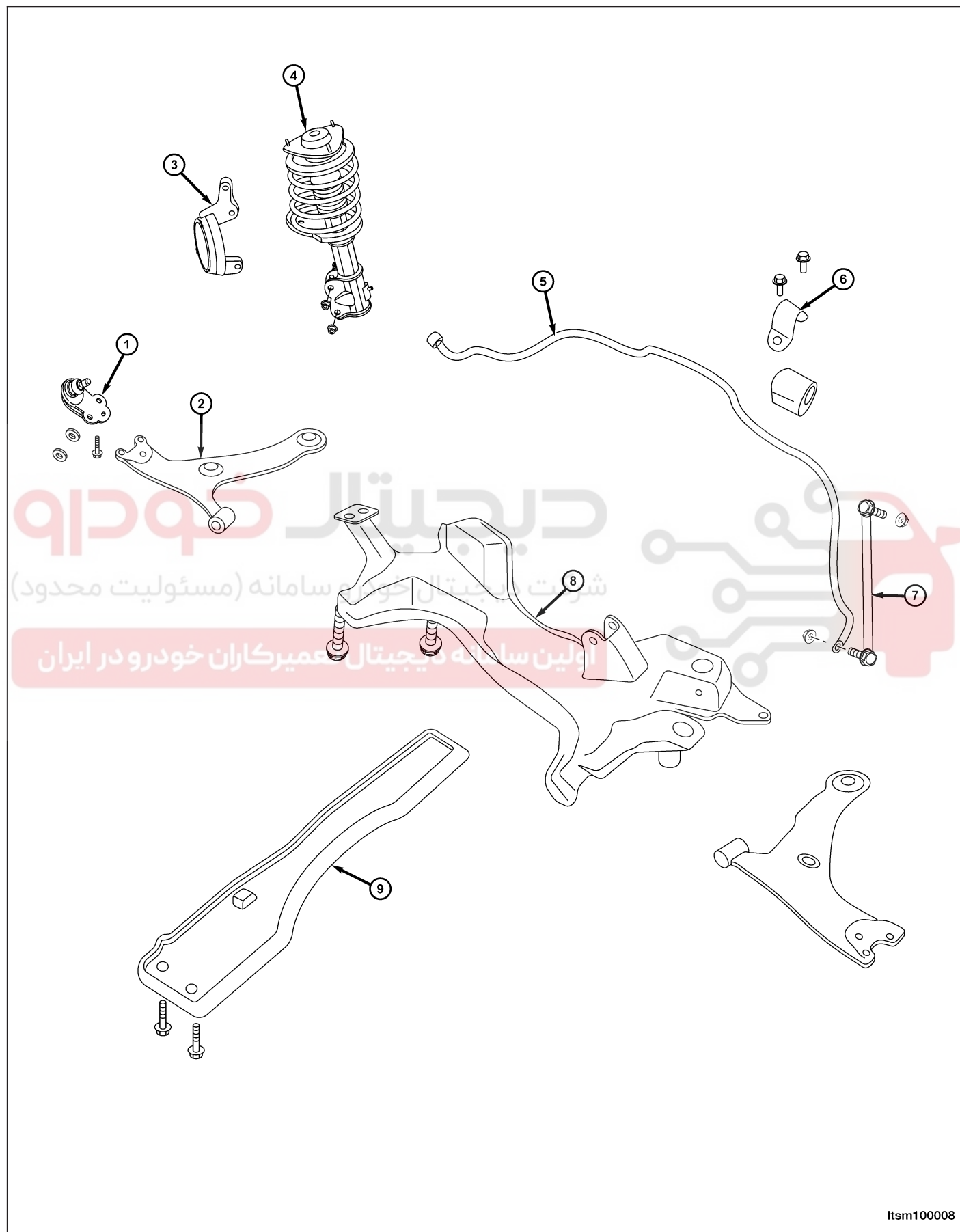
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



GENERAL INFORMATION

The front suspension consists of the following components:



GENERAL INFORMATION

1 - Front Lower Control Arm Ball Joint
2 - Front Lower Control Arm
3 - Steering Knuckle
4 - Front Strut Assembly
5 - Front Stabilizer Bar

6 - Front Stabilizer Bar Bracket
7 - Front Stabilizer Bar Link
8 - Front Sub-Frame Assembly
9 - Side Member Assembly

WARNING!

Do not remove the strut rod nut while the strut assembly is installed in the vehicle, or before the coil spring is compressed with a spring compressor. The spring is held under high pressure and must be compressed before the strut rod nut can be removed.

CAUTION:

At no time when servicing a vehicle can a sheet metal screw, bolt, or other metal fastener be installed in the shock tower to replace the original plastic clamp. It may come in contact with the strut or coil spring.

CAUTION:

The wheel bearing will be damaged if the vehicle is rolled with the axle shaft hub nut loose.

Operation

The front suspension utilizes a MacPherson strut system. This suspension system incorporates a strut assembly that takes the place of the upper arm and ball joint. The strut performs the function of a shock absorber and is encompassed by a coil spring.

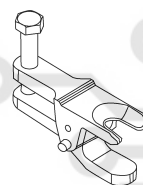
Specifications**Torque Specifications**

DESCRIPTION	TORQUE (N·m)
Connecting Rod And Front Stabilizer Bar	40 - 50
Connect The Right And Left Assembly Of Front Drive Shaft With Brake Disc	260 - 270
Control Arm And Sub-Frame	170 - 190
Connect Intermediate Propeller Shaft With Vehicle Body	58 - 68
Connecting Rod With Lower Suspension Lever	40 - 50
Connect Control Arm Knuckle Pin With Knuckle Assembly	110 - 130
Connect Control Arm Knuckle Pin With Control Arm	140 - 160
Front Connecting Rod And Front Shock Absorber	40 - 50
Front Axle Shaft Nut	135
Fix Stabilizer Bar Clamp To Sub-Frame	22 - 28
Front Shock Absorber and Coil Spring	100 - 120
Front Suspension Strut And Vehicle Body	45 - 55
Front Suspension And Bracket	75 - 85
Insert From The Lower Part Of Sub-Frame, And The Bolt Is On The Suspension. The Middle Part Shall Be Clamped To The Main Longitudinal Beam Of Engine	110 - 130

GENERAL INFORMATION

DESCRIPTION	TORQUE (N.m)
Longitudinal Beam And Flat Gasket Of Vehicle (Front) Body	74 - 86
One On Each Side To Connect Upper Link With Towing Arm	100 - 120
One On Each Side To Connect Lower Control Arm With Towing Arm	100 - 120
Steering Knuckle And Suspension Strut	110 - 130
Soft Gasket And Bracket Of Front Suspension	75 - 85
Steering Knuckle Tie Rod And Steering Knuckle	32 - 38
Sub-Frame And Gasket Of Vehicle (Front) Body	170 - 190
Sub-Frame And Longitudinal Beam Welding Assembly	75 - 85
Steering Gear And Sub-Frame	75 - 85
Wheel Mounting Nut	110

Special Tools

Ball Joint Separator CH-10002	 besm020086
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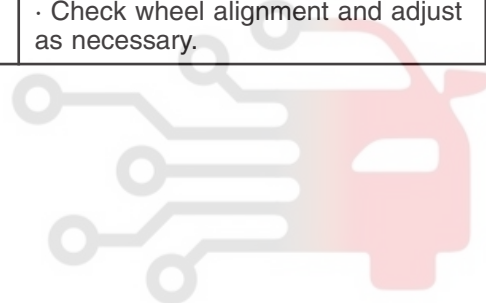
DIAGNOSIS & TESTING

Vehicle Suspension Troubleshooting Chart

CONDITION	POSSIBLE CAUSES	CORRECTION
Front End Whine On Turns	- Defective wheel bearing. - Incorrect wheel alignment. - Low power steering fluid level.	- Replace wheel bearing. - Check and reset wheel alignment. - Fill power steering fluid reservoir to proper level and check for leaks (make sure all air is bled from the system).
Road Wander	- Incorrect tire pressure. - Incorrect front or rear wheel Toe-in. - Worn wheel bearings. - Worn control arm bushings. - Excessive friction in strut upper bearing.	- Inflate tires to recommended pressure. - Correct front or rear wheel Toe-in. - Replace wheel bearing. - Replace control arm. - Replace strut bearing.
Lateral Pull	- Unequal tire pressure. - Incorrect front wheel camber. - Wheel braking. - Excessive cross-caster.	- Inflate all tires to recommended pressure. - Check and reset front wheel camber. - Correct braking condition causing lateral pull. - Check wheel alignment and adjust as necessary.

دیجیتال خودرو
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



ON-VEHICLE SERVICE

Front Steering Knuckle

Description

The steering knuckle is a single casting with legs machined for attachment to the front strut assembly on the top and steering linkage on the trailing leading end. The steering knuckle also has two machined, drilled legs on the end casting to support and align the front disc brake caliper adapter.

Operation

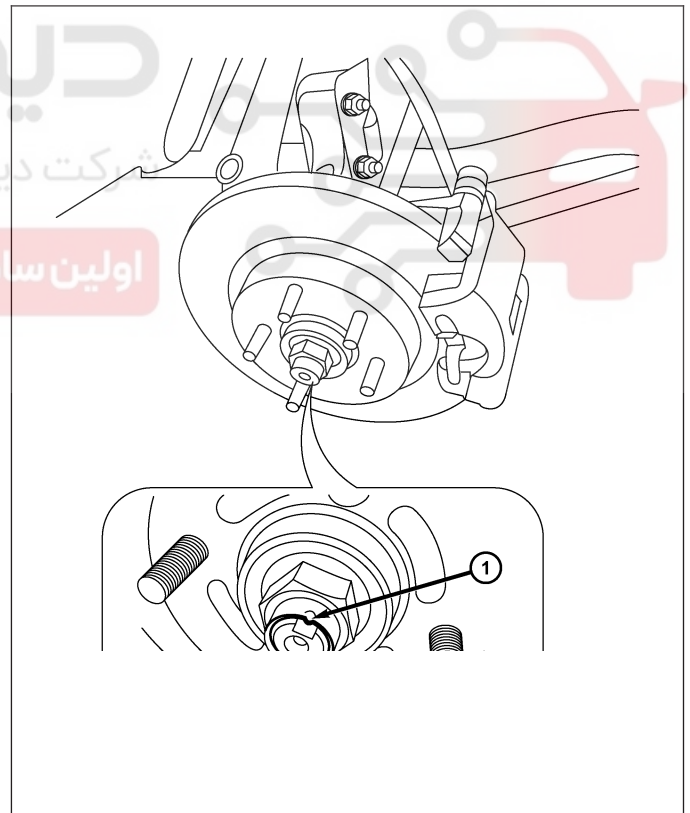
The steering knuckle supports the hub and bearing. The front suspension steering knuckle is not a repairable component of the front suspension. It must be replaced if damaged in any way. If it is determined that the steering knuckle is bent when servicing the vehicle, no attempt should be made to straighten the steering knuckle.

Removal & Installation

NOTE :

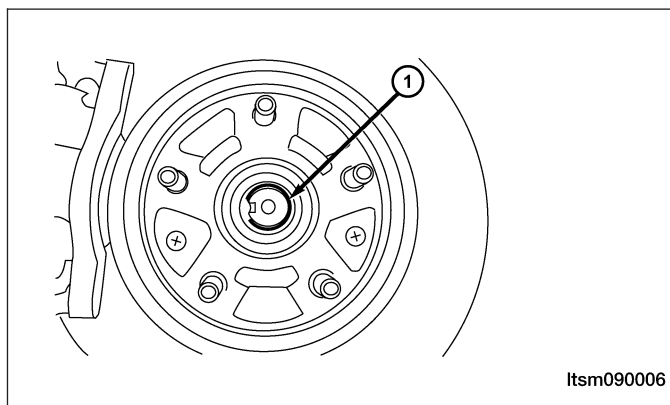
The following special tools are required to perform the repair procedure:

- CH-10002 - Ball Joint Separator
1. Raise and support the vehicle.
 2. Remove the wheel mounting nuts and the wheel assembly.
(Tighten: Wheel mounting nuts to 110 N·m)
 3. Use a suitable tool and un-stake the front axle shaft hub nut (1) from the groove in the front axle shaft.

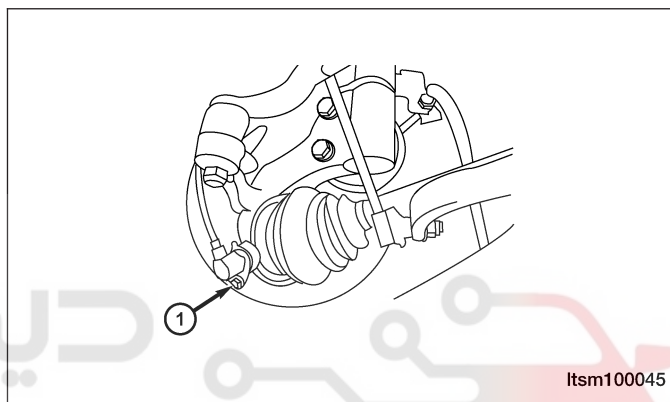


ON-VEHICLE SERVICE

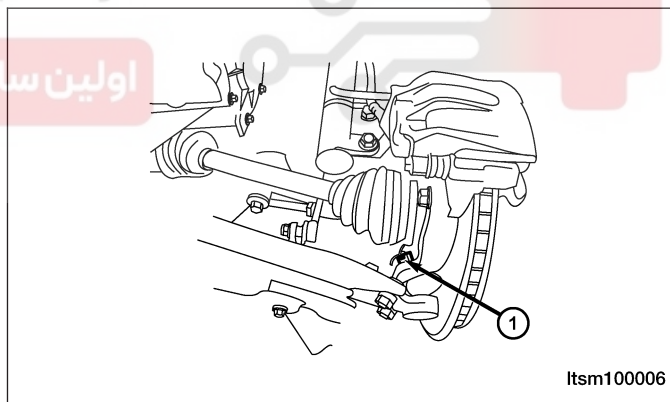
4. While a helper applies the brakes to keep the hub from rotating, remove the front axle shaft nut (1).
(Tighten: Front axle shaft nut to 135 N·m)



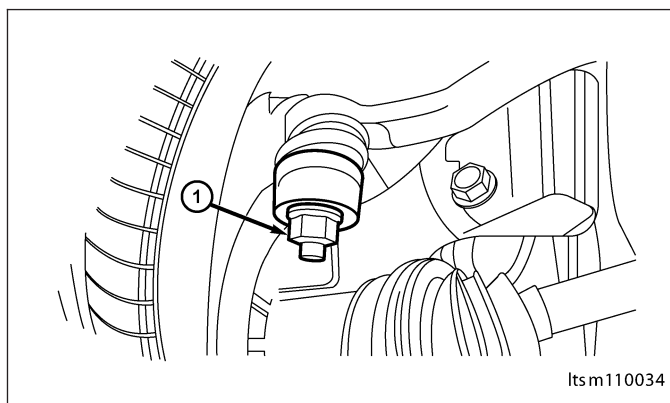
5. Access and remove the front brake rotor (See Front Brake Rotor Remove & Installation in Section 12 Brakes).
6. Remove the wheel speed sensor mounting bolt (1).
(Tighten: Wheel speed sensor mounting bolt to 10 ± 1 N·m)
7. Remove the wheel speed sensor and set it aside.



8. Remove the lower ball joint mounting nut (1) attaching the lower control arm to the knuckle.
(Tighten: Control arm to steering knuckle nut to 120 ± 10 N·m)

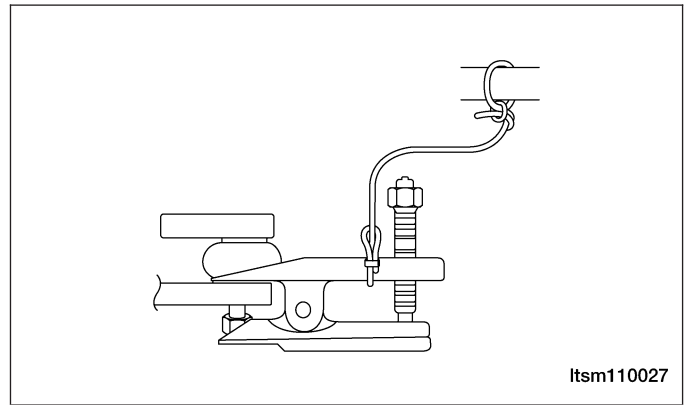


9. Remove the nut (1) attaching the outer tie rod end to the steering knuckle.
(Tighten: Outer tie rod end nut to 32 - 38 N·m)

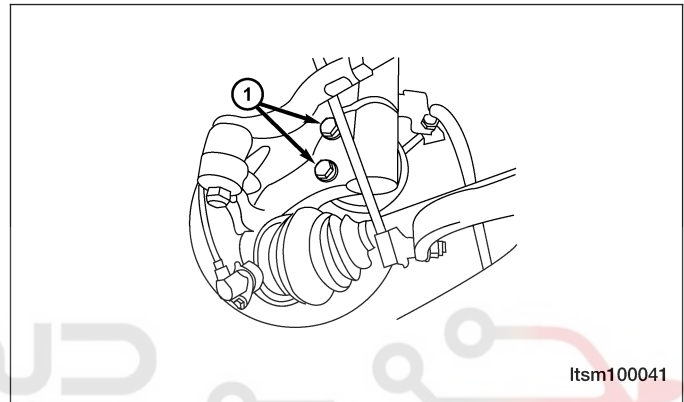


ON-VEHICLE SERVICE

10. Using special tool CH-10002, remove the outer tie rod end from the steering knuckle.



11. While holding the bolt heads stationary, remove the two nuts (1) from the bolts attaching the strut to the knuckle.
(Tighten: Strut to the knuckle nuts to 135 N·m)

**NOTE :**

Do not allow the half shaft to hang by the inner C/V joint. It must be supported to keep the joint from separating during this operation.

12. Pull the knuckle off the half shaft outer C/V joint splines and remove the knuckle from the vehicle.
13. If required, remove the screws fastening the shield to the knuckle.
14. If required, use a suitable tool to press the hub and bearing out of the knuckle.
15. Installation is in the reverse order of removal.

Installation Notes:

- After installing the front steering knuckle, perform a front end alignment (See Front Wheel Alignment in Section 10 Suspension).

Front Lower Control Arm**Description**

The lower control arm is located between the steering knuckle and the vehicle sub-frame. The lower control arm uses a lower ball joint on the outer end and two sub-frame mounts on the inner end.

Operation

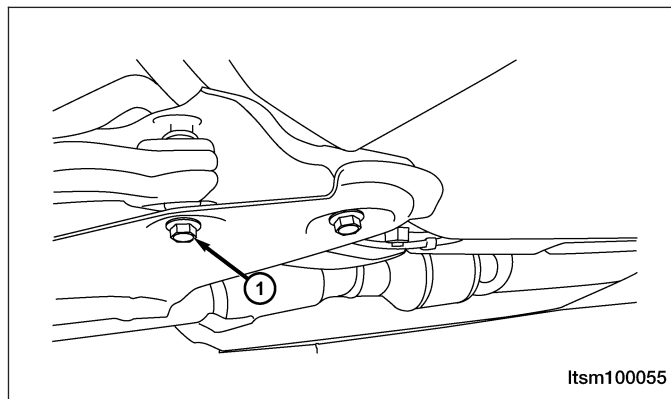
The front lower control arm supports the steering knuckle. The lower control arm controls the vehicle steering by maintaining the proper wheel alignment through all driving conditions.

Removal & Installation**NOTE :**

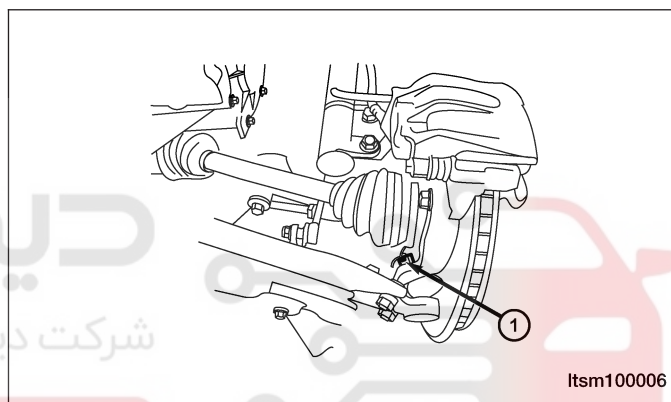
Inspect the lower control arm for signs of damage from contact with the ground or road debris. If the lower control arm shows any sign of damage, look for distortion. Do not attempt to repair or straighten a broken or bent lower control arm. If damaged, the lower control arm is serviced only as a complete component.

ON-VEHICLE SERVICE

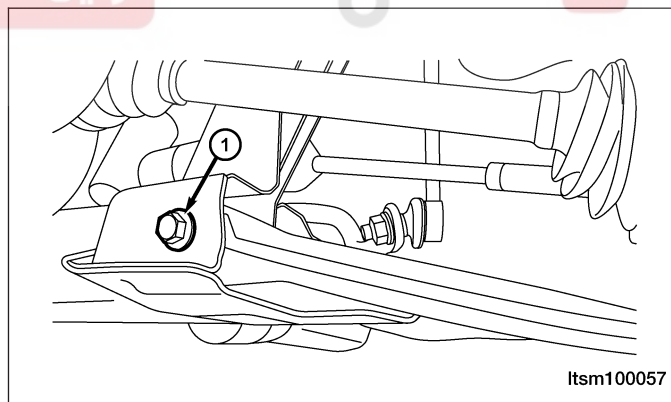
1. Raise and support the vehicle.
2. Remove the wheel mounting nuts and the wheel assembly.
(Tighten: Wheel mounting nuts to 110 N.m)
3. Remove the bolt (1) between the control arm and the sub-frame.
(Tighten: Control arm to sub-frame bolt to 180 ± 10 N.m)



4. Remove the nut (1) between the control arm and the steering knuckle.
(Tighten: Control arm to steering knuckle nut to 120 ± 10 N.m)



5. Remove the bolt (1) between the rear rubber sleeve of the control arm and the sub-frame.
(Tighten: Rear rubber sleeve control arm to sub-frame bolt to 180 ± 10 N.m)

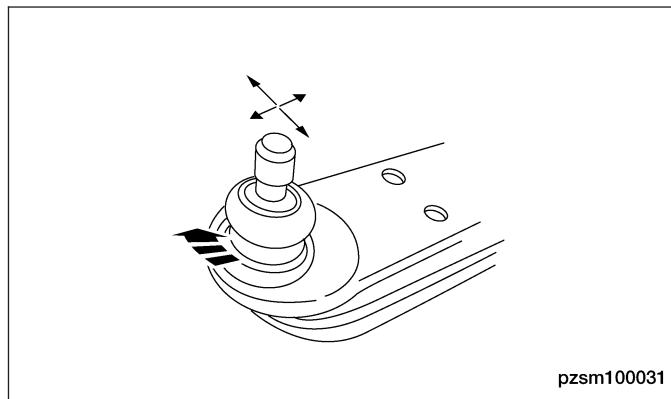


6. Remove the control arm from the vehicle.
7. Perform the following inspection procedure before installation.

Inspection

Lower control arm inspection:

- Check for smooth rotation.
- Inspect ball stud for damage.
- Inspect dust cover for damage or oil leak.
- Inspect for play in the ball joint, if defective, replace the ball joint.



- Installation is in the reverse order of removal.

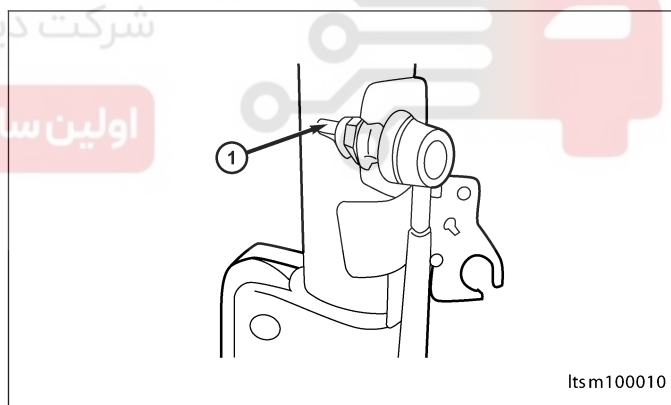
Installation Notes:

- After installation, each bolt must be tightened to the required tightening torque.

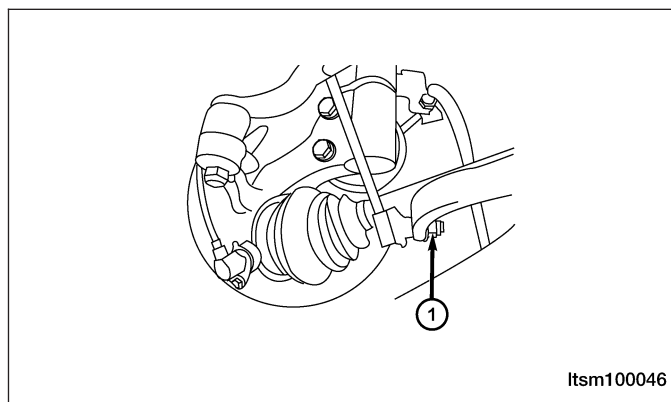
Front Stabilizer Bar Link

Removal & Installation

- Raise and support the vehicle.
- Remove the wheel mounting nuts and the wheel assembly.
(Tighten: Wheel mounting nuts to 110 N·m)
- Remove the nut (1) between the front stabilizer link and the mounting bracket on the front strut.
(Tighten: Front stabilizer link and the mounting bracket nut to 48 ± 6 N·m)



- Remove the nut (1) between the front stabilizer bar link and the front stabilizer bar.
(Tighten: Front stabilizer link and the front stabilizer bar nut to 48 ± 6 N·m)



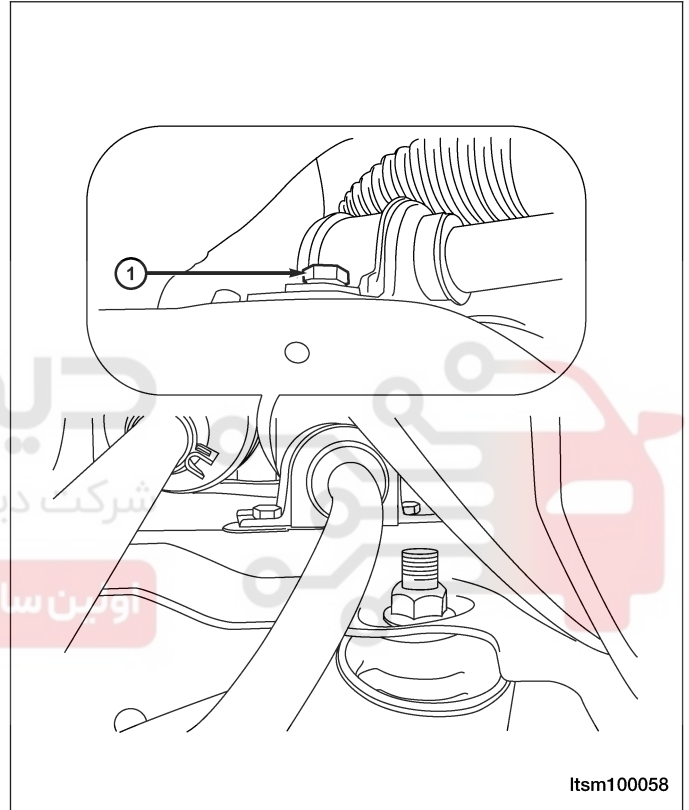
- Installation is in the reverse order of removal.

Installation Notes:

- After installation, each bolt must be tightened to the required tightening torque.

Front Stabilizer Bar**Removal & Installation**

1. Raise and support the vehicle.
2. Remove the wheel mounting nuts and the wheel assembly.
(Tighten: Wheel mounting nuts to 110 N·m)
3. Remove the front stabilizer bar link (See Front Stabilizer Bar Link Removal & Installation in Section 10 Suspension).
4. Remove the stabilizer bar mounting bolts (1)
(4 total).
(Tighten: Stabilizer bar mounting bolts to 19-24N·m)



5. Remove the front stabilizer bar mounting brackets and the rubber bushings.
6. Remove the front stabilizer bar.
7. Installation is in the reverse order of removal.

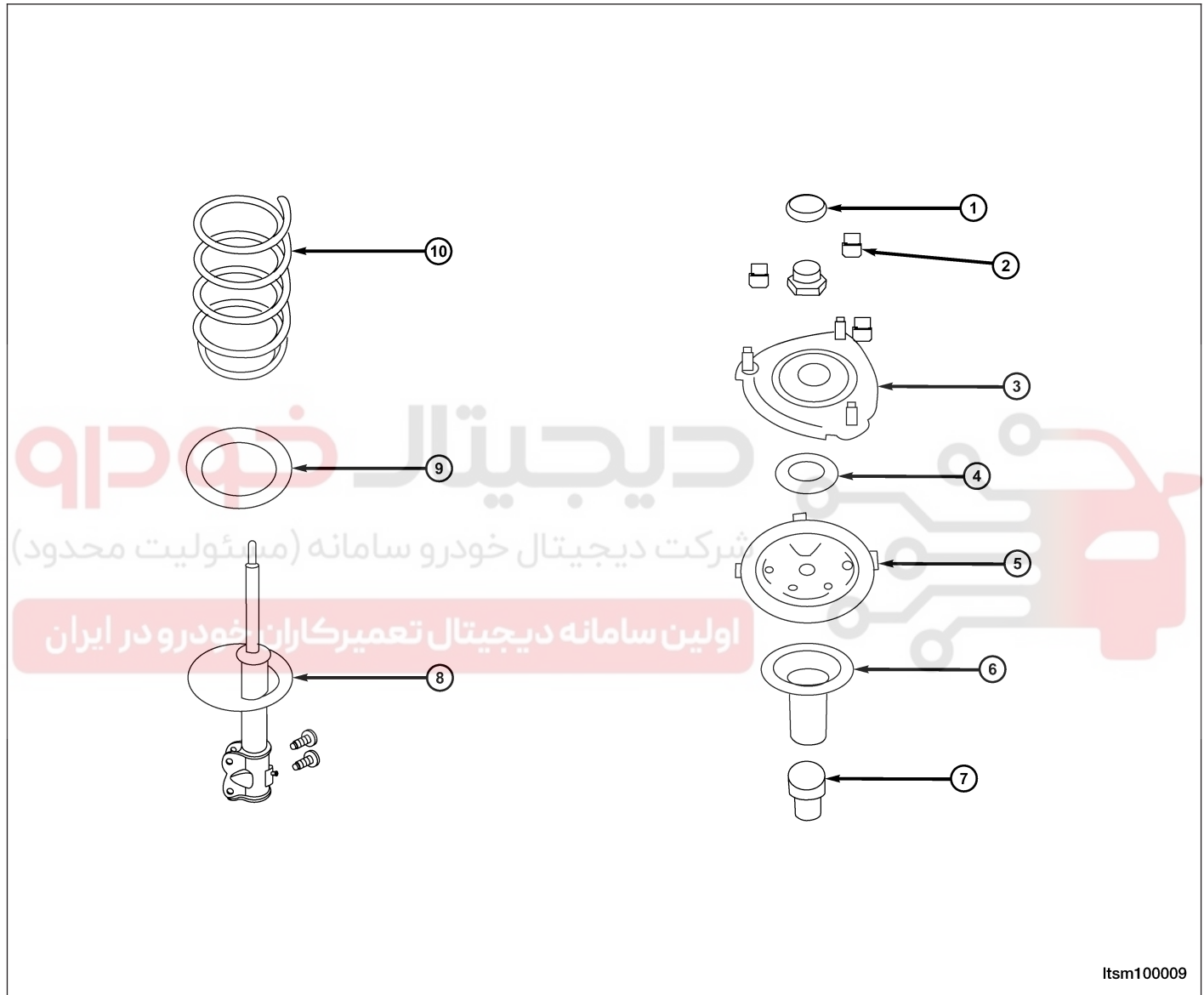
Installation Notes:

- After installation, each bolt must be tightened to the required tightening torque.

Front Strut Assembly

Description

A MacPherson type strut assembly is used in place of the traditional front suspension upper control arm and upper ball joint. The bottom of the strut mounts directly to the steering knuckle using two attaching bolts and nuts going through the strut clevis bracket and steering knuckle. The top of the strut mounts directly to the strut tower of the vehicle using the three threaded studs on the strut assembly's upper mount.



1 - Strut Cover

2 - Nut

3 - Upper Strut Mount

4 - Bearing Gasket

5 - Spring Upper Tray

6 - Dust Cover

7 - Cushion Block

8 - Shock Absorber Assembly

9 - Lower Rubber Ring

10 - Coil Spring

Operation

The strut assembly cushions the ride of the vehicle, controlling vibration, jounce and rebound of the suspension. The coil spring controls ride quality and maintains proper ride height. The spring isolators isolate the coil spring at the top and bottom from coming into metal-to-metal contact with the upper mounting seat and the strut. The strut dampens jounce and rebound motions of the coil spring and suspension.

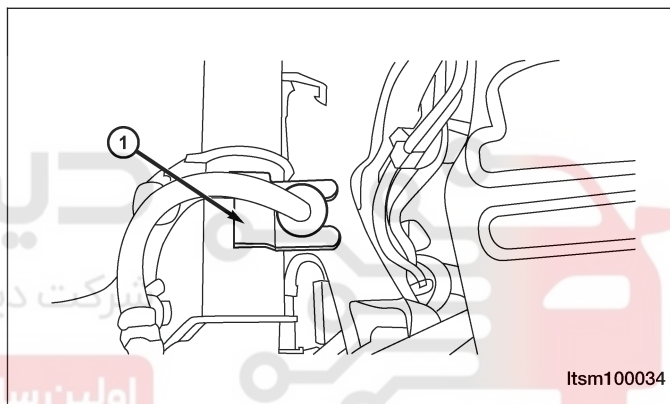
Diagnosis & Testing

Before removing the front strut, perform the following to test the front strut functionality:

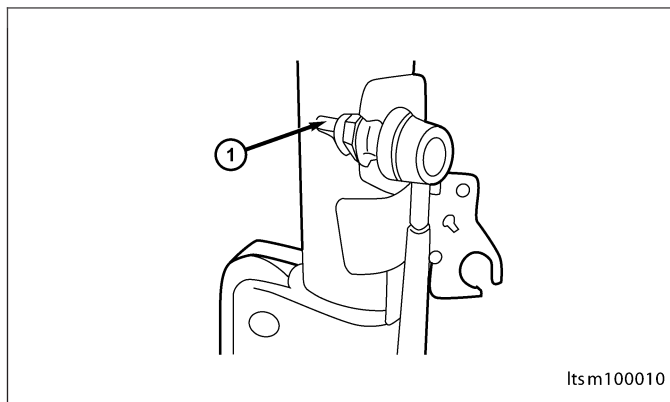
- Adjust the tire pressure to all tires to proper specifications.
- Push and shake the front of the vehicle three or four times with identical force every time
- During the pushing and recoiling, the resistance and recoil times of the vehicle should be equal.
- If the strut (shock absorber) functions properly, the vehicle will recoil several times and then stop recoiling after the pushing force is removed.

Removal & Installation

1. Raise and support the vehicle.
2. Remove the wheel mounting nuts and the wheel assembly.
(Tighten: Wheel mounting nuts to 110 N·m)
3. Disconnect the brake fluid hose clamp (1) from the brake fluid hose bracket on the front strut.
4. Remove the brake fluid hose from the bracket.

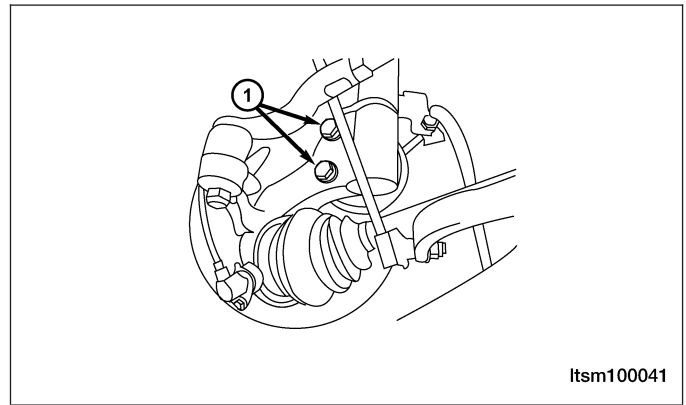


5. Remove the wheel speed sensor wire.
6. Remove the nut (1) from the front stabilizer bar link bracket on the front strut.
(Tighten: Front stabilizer bar link bracket nut to 48 ± 6 N·m)

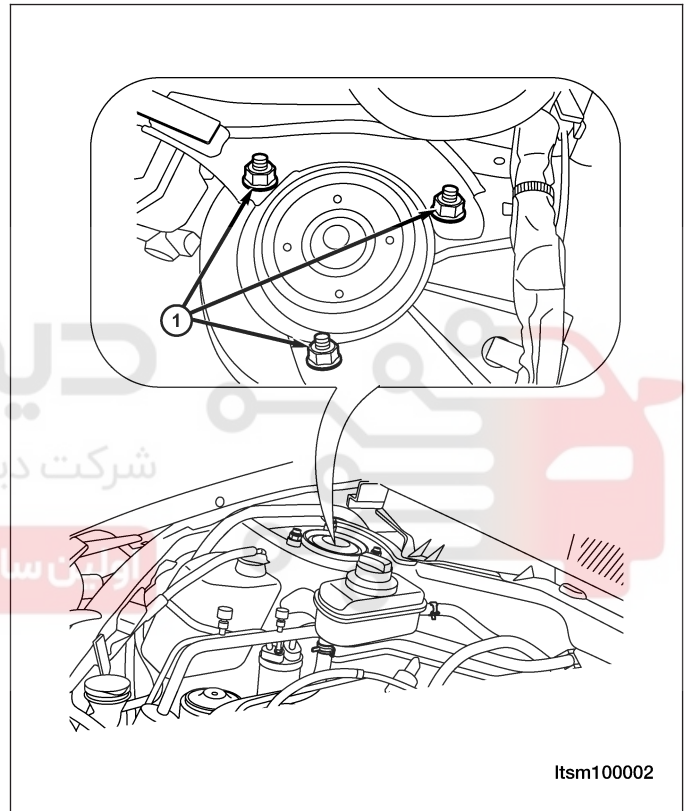


ON-VEHICLE SERVICE

7. Remove the two bolts (1) between the front strut and the steering knuckle.
(Tighten: Front strut to steering knuckle bolts to 120 ± 10 N·m)



8. Remove the three upper strut mounting nuts (1) from the strut tower.
(Tighten: Upper strut mounting nuts to 50 ± 10 N·m)



9. Remove the front strut assembly.
10. Installation is in the reverse order of removal.

Installation Notes:

- After installation, each bolt must be tightened to the required tightening torque.
- Four-wheel alignment inspection is required after the installation.

Front Coil Spring

Description

A coil-over front strut assembly supports each front coil spring. The top of the strut assembly mounts to the strut tower.

Operation

Coil springs are designed to store energy and subsequently release it and to absorb shock and maintain a force between contacting surfaces. Coil springs are rated for specific vehicle applications.

NOTE :

Each component is serviced by removing the strut assembly from the vehicle and disassembling it. Coil springs are rated separately for each corner or side of the vehicle depending on optional equipment and type of vehicle service. If a coil spring requires replacement, be sure that it is replaced with a spring meeting the correct load rating for the vehicle and its specific options.

Removal & Installation

CAUTION:

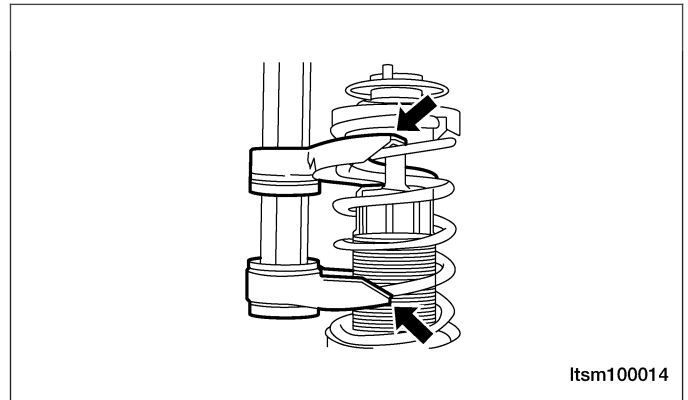
At no time when servicing a vehicle can a sheet metal screw, bolt or other metal fastener be installed into the strut tower to take the place of an original plastic clamp. Also, do not drill holes into the front strut tower for the installation of any metal fasteners into the strut tower area indicated.

1. Raise and support the vehicle.
2. Remove the front strut assembly (See Front Strut Removal & Installation in Section 10 Suspension).

WARNING!

Do not remove the strut rod nut before the coil spring is properly compressed. The coil spring is held under pressure. The coil spring must be compressed, removing spring tension from the upper mount and bearing, before the strut rod nut is removed.

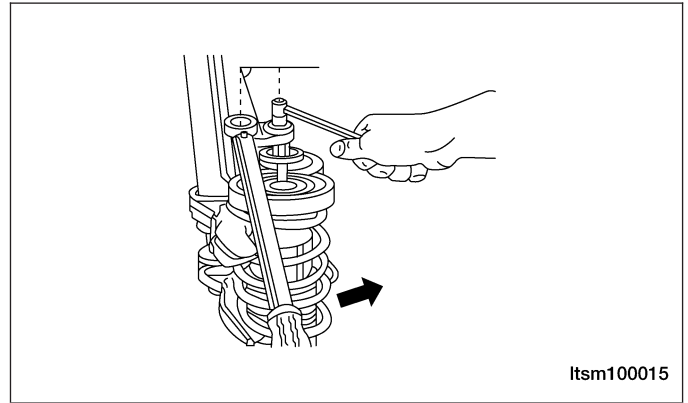
3. Position the strut assembly in the strut coil spring compressor following the manufacturer's instructions and set the lower and upper hooks of the compressor on the coil spring.
4. Compress the coil spring until all coil spring tension is removed from the upper mount and bearing.



5. Once the spring is sufficiently compressed, install the strut nut wrench on the strut rod nut.
6. Install a deep socket on the end of the strut rod.

ON-VEHICLE SERVICE

7. While holding the strut rod, remove the nut using the strut nut wrench.
(Tighten: Strut rod nut to 100 - 120 N·m)



8. Remove the lower spring isolator from the strut seat.
9. Remove the dust shield and jounce bumper.
10. Remove the upper mounting bracket.
11. Remove the upper spring seat and isolator.
12. Release the tension from the coil spring by backing off the compressor drive completely. Release the compressor hooks and remove the coil spring.
13. Assembly is in the reverse order of disassembly.

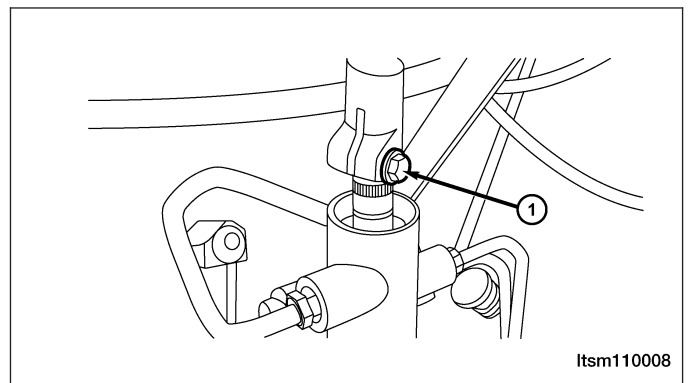
Front Sub-Frame Assembly

Removal & Installation

WARNING!

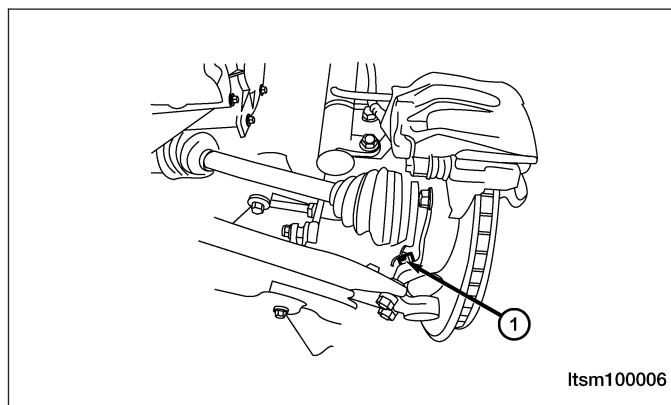
Before removing the sub-frame assembly, properly support the engine and transaxle assembly.

1. Raise and support the vehicle.
2. Remove the wheel mounting nuts and the wheel assembly.
(Tighten: Wheel mounting nuts to 110 N·m)
3. Support the engine using an engine support fixture or suitable jack.
4. Remove the engine undercover and splash shields.
5. Remove the intermediate shaft lock bolt (1) that connects to the steering gear.
(Tighten: Intermediate shaft lock nut to 25 - 30 N·m)

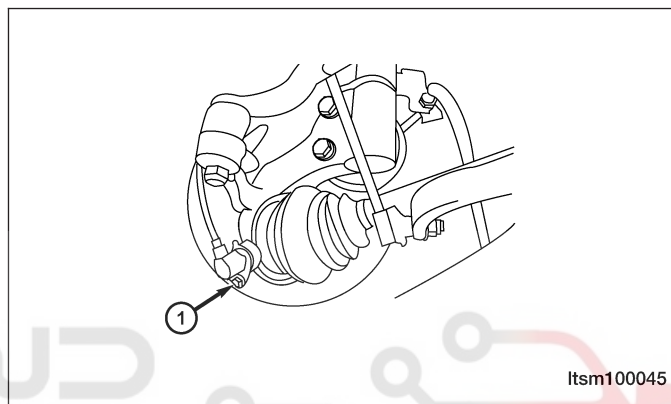


ON-VEHICLE SERVICE

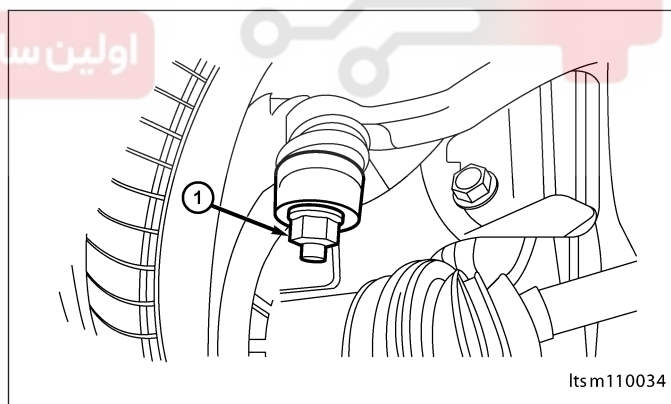
6. Remove the nut (1) between the control arm and the steering knuckle.
(Tighten: Control arm to steering knuckle nut to 120 ± 10 N·m)



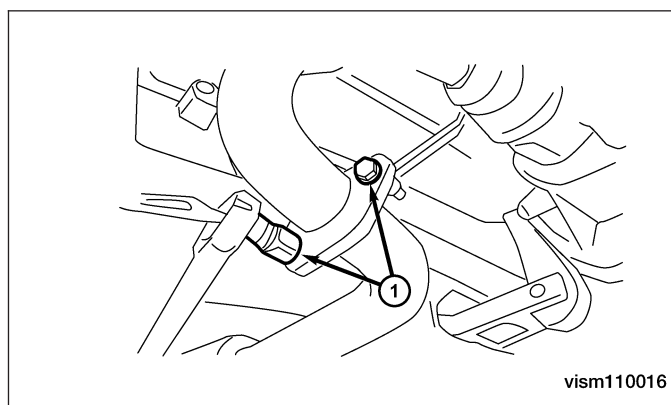
7. Remove the wheel speed sensor mounting bolt (1).
(Tighten: Wheel speed sensor mounting bolt to 10 ± 1 N·m)
8. Remove the wheel speed sensor and set it aside.



9. Remove the left and right front stabilizer bar links (See Front Stabilizer Bar Link Removal & Installation in Section 10 Suspension).
10. Remove the nut (1) attaching the outer tie rod ends to the steering knuckle on each side of the steering rack.
(Tighten: Outer tie rod end nut to 35 N·m)

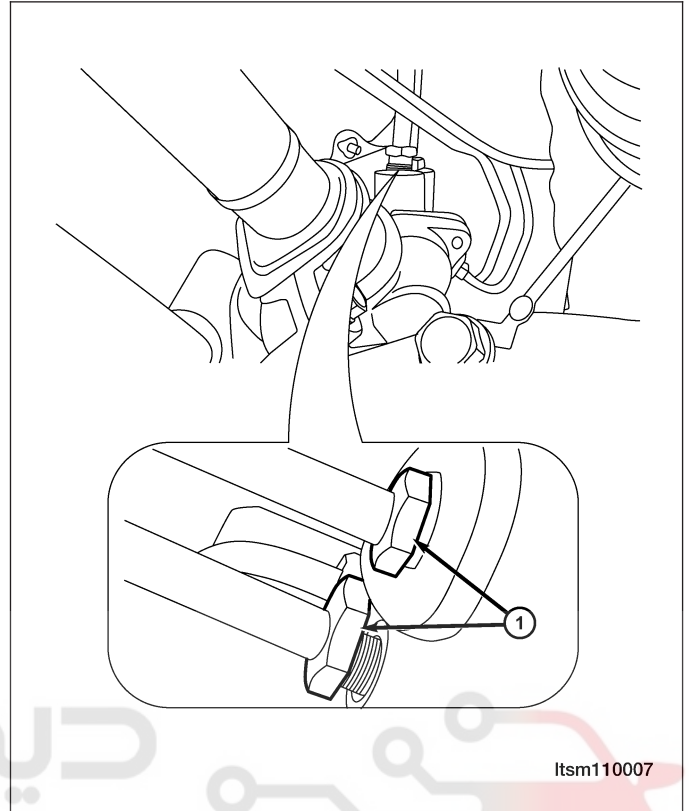


11. Remove the exhaust pipe assembly mounting bolts (1).
(Tighten: Exhaust pipe assembly mounting bolts to 25 ± 3 N·m)

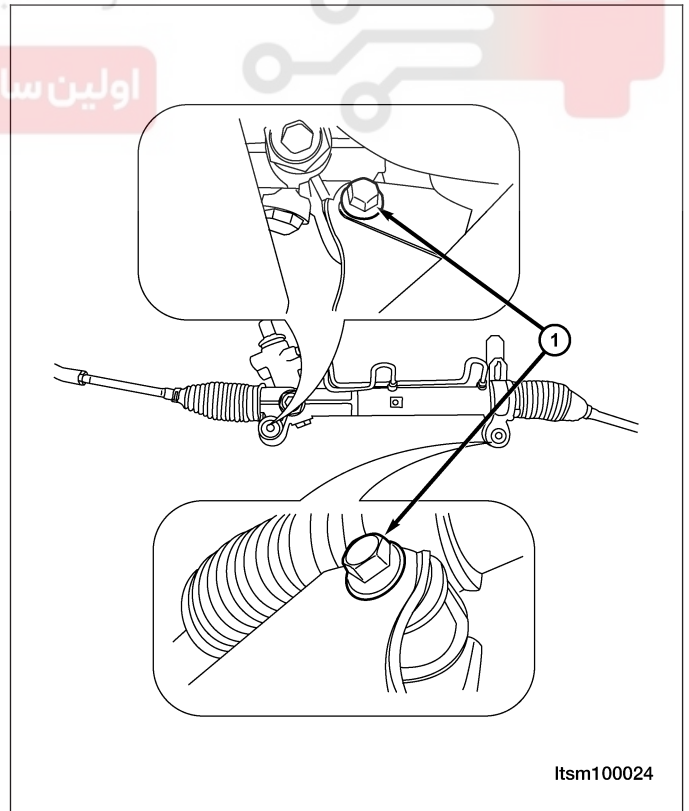


ON-VEHICLE SERVICE

12. Remove the exhaust pipe assembly (See Exhaust Pipe Removal & Installation in Section 07 Exhaust).
13. Remove the high pressure and low pressure lines (1) from the steering gear (drain steering fluid from lines).
 (Tighten: High pressure line to power steering pump 27 - 33 N·m)
 (Tighten: Low pressure line to power steering pump 27 - 33 N·m)

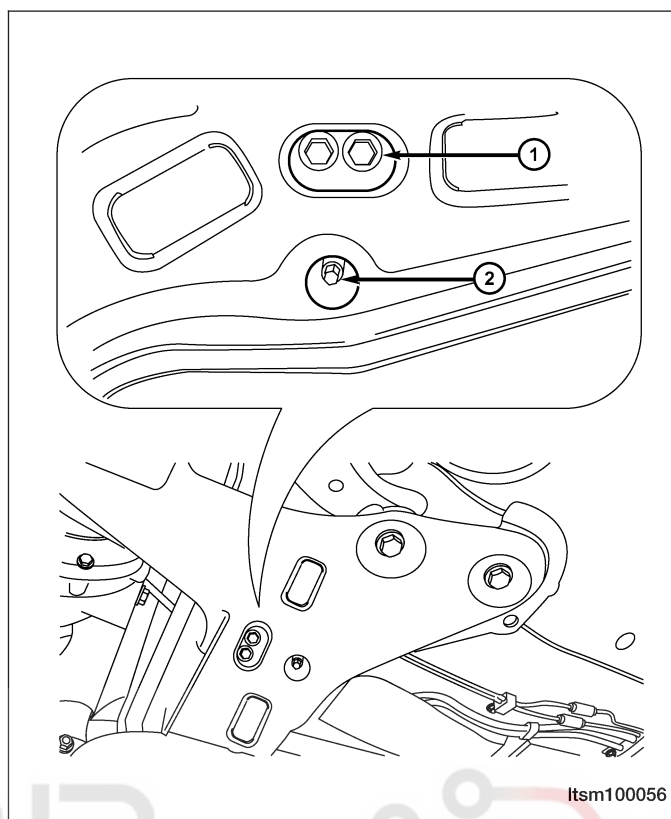


14. Remove the two bolts (1) between the steering gearing and the sub-frame.
 (Tighten: Steering gear to sub-frame bolts to 70 - 80 N·m)

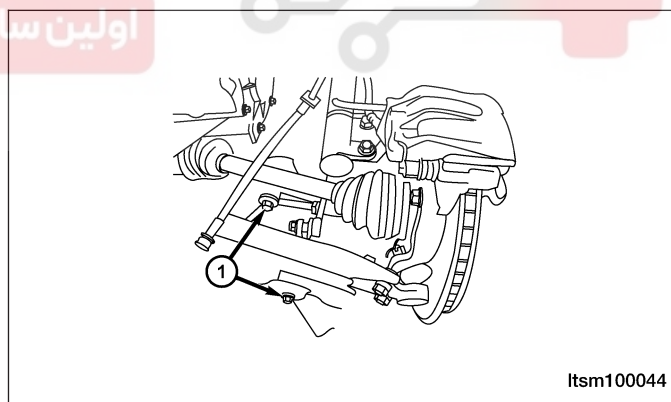


ON-VEHICLE SERVICE

15. Remove the bolts (1) and nut (2) between the sub-frame assembly and side member assembly.
(Tighten: Sub-frame assembly retaining bolts to 120 ± 5 N·m)



16. Remove the bolts between the radiator lower seat and side member assembly, then remove the side member assembly.
17. Remove the front engine mount and rear engine mount (See Engine Mounts Removal & Installation in Section 02 Engine).
18. Remove the bolts (1) between the sub-frame assembly and the vehicle body.
(Tighten: Sub-frame assembly to vehicle body bolts to 180 ± 15 N·m)



19. Remove the sub-frame assembly.
20. Separate the front lower control arm and the front stabilizer bar from the sub-frame assembly.
21. Installation is in the reverse order of removal.

UNIT REPAIR

Front Strut

Disassemble

NOTE :

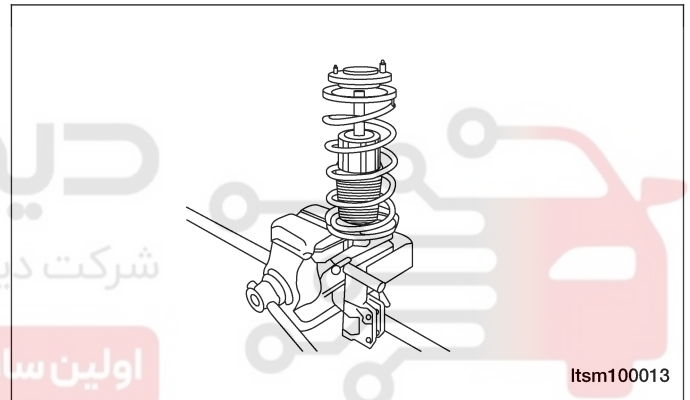
The strut assembly must be removed from the vehicle for it to be disassembled and assembled. For the disassembly and assembly of the strut assembly, use a strut spring compressor, or the equivalent, to compress the coil spring. Follow the manufacturer's instructions closely.

1. Remove the front strut assembly (See Front Strut Removal & Installation in Section 10 Suspension).
2. If both struts are being serviced at the same time, mark both the coil springs and strut assemblies according to which side of the vehicle the strut is being removed from.

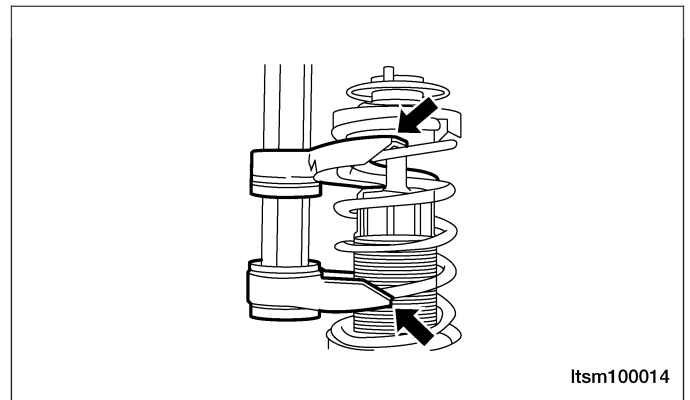
WARNING!

Do not remove the strut rod nut before the coil spring is properly compressed. The coil spring is held under pressure. The coil spring must be compressed, removing spring tension from the upper mount and bearing, before the strut rod nut is removed.

3. If the spring compressor fixture is unable to attach to a workbench, attach the spring compressor to a bench vise.



4. Position the strut assembly in the strut coil spring compressor following the manufacturer's instructions and set the lower and upper hooks of the compressor on the coil spring.
5. Loosen the spring compressor, then attach the clamps between the top and bottom of the spring.



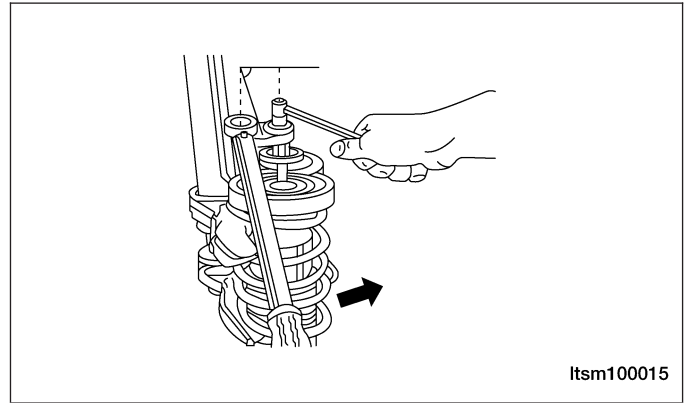
6. Compress the coil spring until all coil spring tension is removed from the upper mount and bearing.

CAUTION:

Never use impact or high speed tools to remove the strut rod nut. Damage to the strut internal bearings can occur.

UNIT REPAIR

7. Once the spring is sufficiently compressed, install the strut nut wrench on the strut rod nut.
8. Install a deep socket on the end of the strut rod. While holding the strut rod, remove the nut using the strut nut wrench.
(Tighten: Strut rod nut to 100 - 120 N·m)



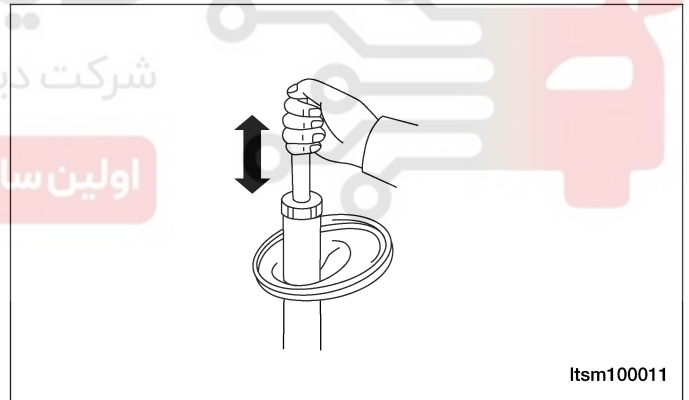
9. Remove the lower spring isolator from the strut seat.
10. Remove the dust shield and jounce bumper.
11. Remove the upper mounting bracket.
12. Remove the upper spring seat and isolator.
13. Release the tension from the coil spring by backing off the compressor drive completely. Release the compressor hooks and remove the coil spring.

Inspection

Inspect the strut assembly for damage and evidence of fluid running from the upper end of the fluid reservoir (actual leakage will be a stream of fluid running down the side of the reservoir tube and dripping off lower end of unit).

Inspect the strut assembly components for the following and replace as necessary:

- Inspect the strut (damper) for shaft binding over the full stroke of the shaft.
- Inspect the jounce bumper for cracks and signs of deterioration.
- Inspect the dust shield for cracks and tears.
- Check the upper mount for cracks and distortion and its retaining studs for any sign of damage.
- Check the bearing and upper spring seat for any binding.
- Inspect the upper and lower spring isolators for material deterioration and distortion.
- Inspect the coil spring for any sign of damage to the coating.



Strut Disposal Procedure

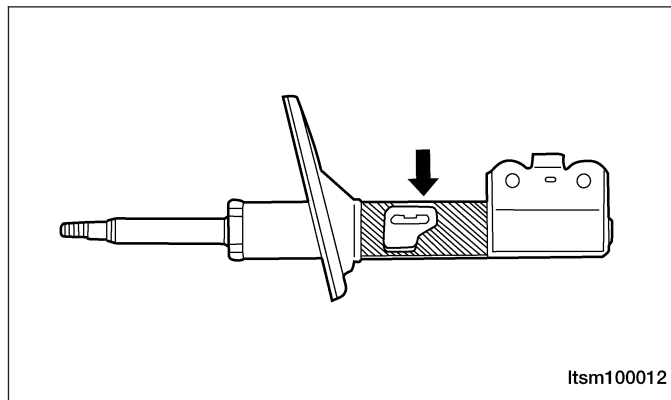
NOTE :

Follow the procedure below to properly dispose of the strut assembly.

- Pull the strut rod to extend the strut rod out as far as possible.

UNIT REPAIR

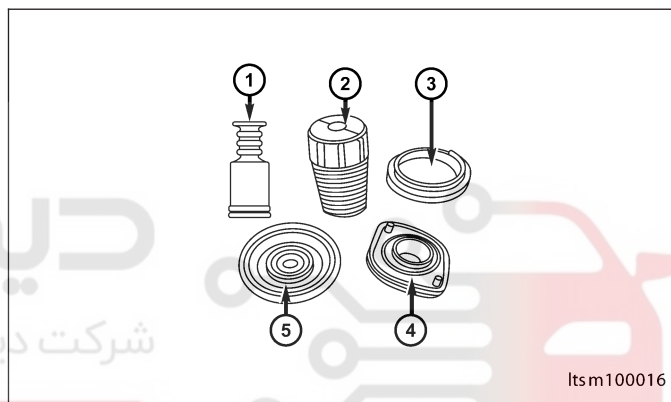
- Drill a hole to discharge the gas (fluid) in the strut assembly cylinder (Drill a hole in the cylinder body according to the figure to discharge the gas).



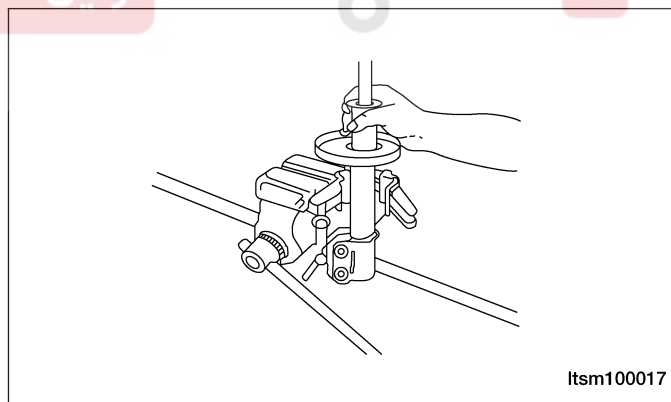
Assembly

1. Replace all necessary parts prior to reassembly:

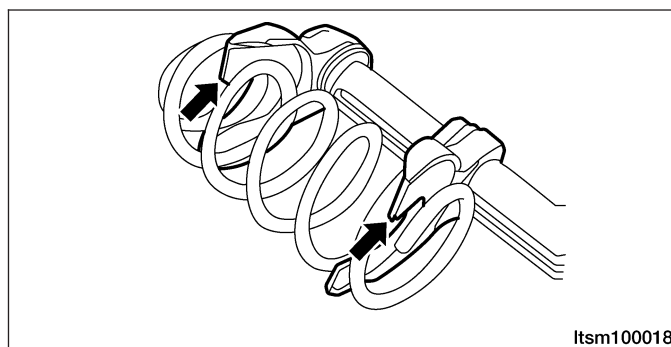
1. Cushion Pad
2. Dust Boot
3. Cushion Block
4. Upper Spring Seat
5. Upper Spring Mount



2. Mount the new strut assembly into the fixture.

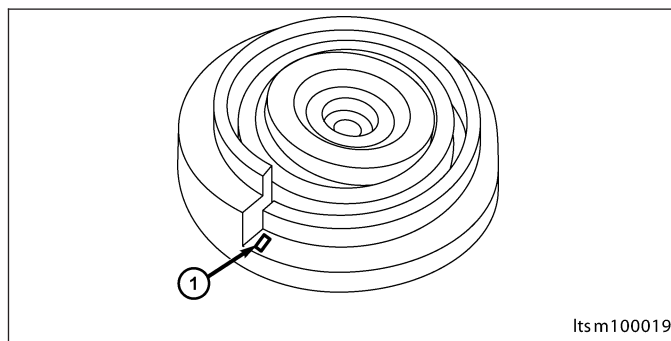


3. Insert the coil spring into the spring compressor.
4. Compress the coil spring to a distance of ≤ 120 mm between the two clamps.

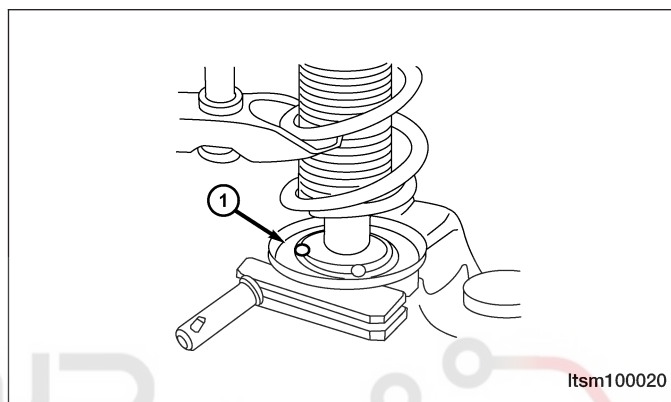


UNIT REPAIR

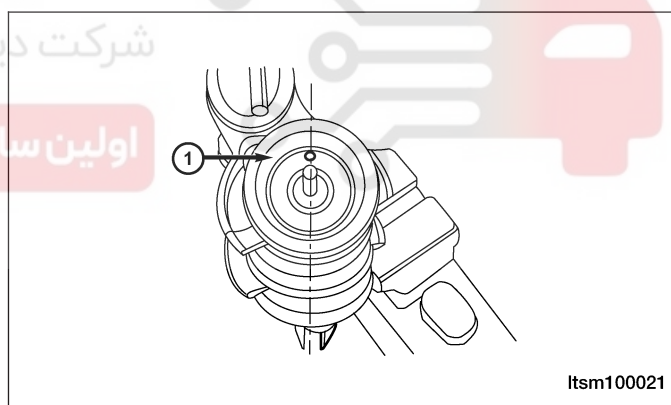
5. Ensure the cushion stopper mark (1) is in line with the mark on the strut.



6. Install the cushion block and pull the piston rod to the bottom.
7. Align the coil spring on the bottom spring holder (1) (the end of the spring should be indexed in the spring pocket).



8. Install the upper spring holder with the index position of 180° angle between the punched hole and the spring strut mounting position (1).



9. Install the upper spacer and bearing.
10. Install the strut rod nut to the strut rod.

REAR SUSPENSION

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دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

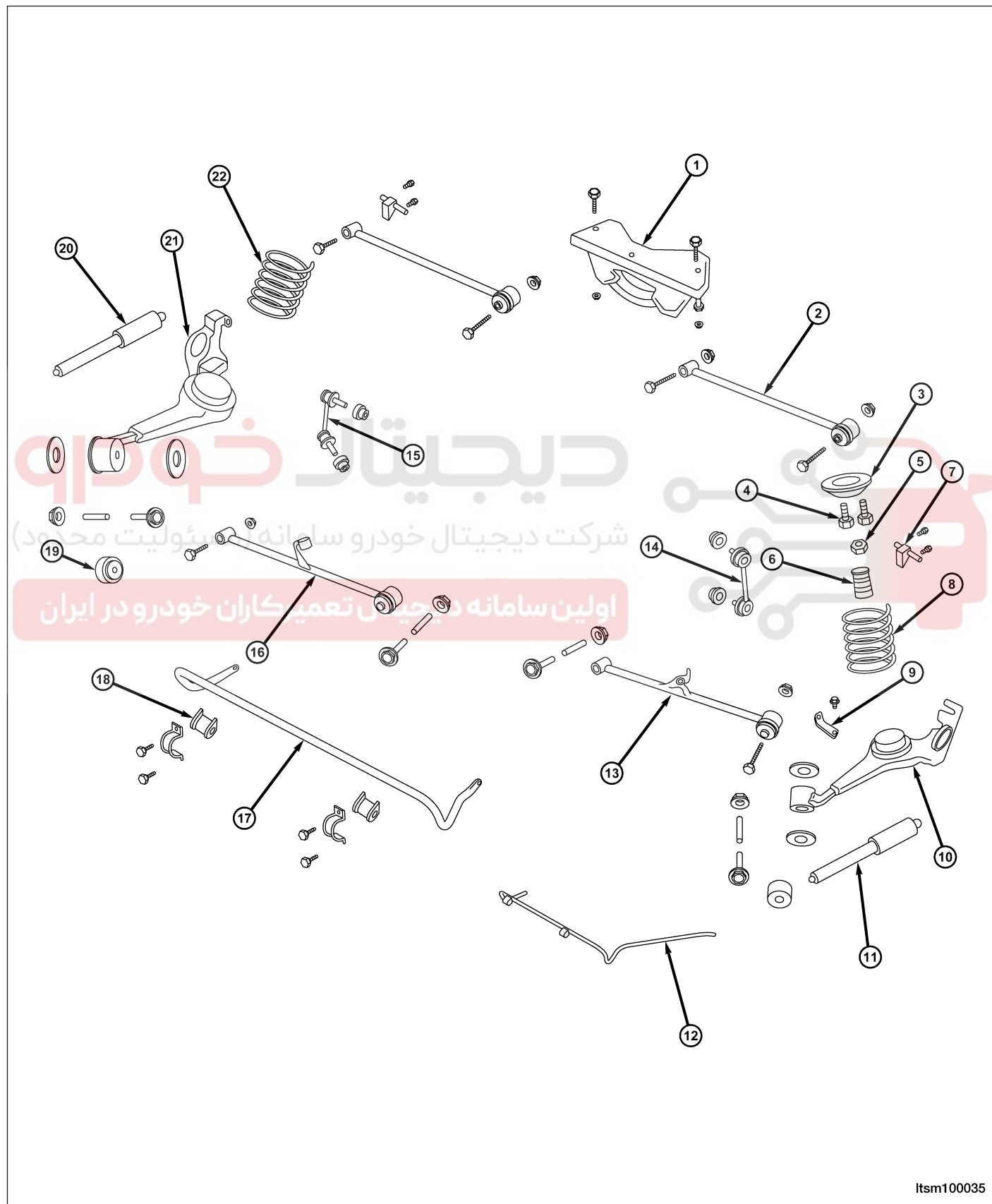
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



GENERAL INFORMATION

Description

The rear suspension consists of the following components:



Itsm100035

GENERAL INFORMATION

1 - Rear Sub-Frame Assembly
2 - Rear Suspension Upper Rocker Arm Assembly
3 - Rear Spring Pad
4 - Bolt
5 - Nut
6 - Washer
7 - Left Brake Line Bracket
8 - Rear Coil Spring
9 - Left Brake Line Support
10 - Left Rear Trailing Arm Assembly
11 - Left Rear Strut Assembly

12 - Rear Stabilizer Lever Assembly
13 - Rear Suspension Left Lower Rocker Arm Assembly
14 - Left Rear Stabilizer Bar Link
15 - Right Rear Stabilizer Bar Link
16 - Rear Suspension Right Lower Rocker Arm Assembly
17 - Rear Stabilizer Bar
18 - Rubber Support
19 - Rubber Bushing Assembly
20 - Right Rear Strut Assembly
21 - Right Rear Trailing Arm Assembly
22 - Rear Coil Spring

WARNING!

Only frame contact or wheel lift hoisting equipment can be used on this vehicle. It cannot be hoisted using equipment designed to lift a vehicle by the rear axle. If this type of hoisting equipment is used, damage to rear suspension components will occur.

CAUTION:

If a rear suspension component becomes bent, damaged or fails, no attempt should be made to straighten or repair it. Always replace it with a new component.

Operation

The rear suspension utilizes an independent multi-link arm design. This suspension system allows the wheels to react to road imperfections independent of each other. This independent action offers improved isolation from the effects of jounce and rebound.

GENERAL INFORMATION

Specifications

Torque Specifications

DESCRIPTION	TORQUE (N.m)
Rear Stabilizer Bar Link	40 - 50
Lower Suspension Lever	40 - 50
Rear Shock Absorber to Rear Shock Absorber Mounting Bracket	40 - 50
Control Arm Knuckle Pin to Control Arm	140 - 160
Rear Axle Front Suspension to Rear Sub-Frame	115 - 125
Rear Axle Front Suspension to Rear Driving Axle	75 - 85
Control Arm And Sub-Frame	170 - 190
Rear Rubber Buffer Assembly to Vehicle Body	22 - 28
Rear Axle Rear Suspension Cushion Assembly to Rear Axle	75 - 85
Upper Link to Rear Sub-Frame	100 - 120
Lower Control Arm to Rear Sub-Frame	100 - 120
Lower Control Arm to Trailing Arm	100 - 120
Upper Link to Trailing Arm	100 - 120
Rear Suspension to Bracket	115 - 125
Rear Suspension, Longitudinal Beam Of Engine And Sub-Frame	75 - 85
Rear Stabilizer Bar Clamp to Vehicle Body	22 - 28
Rear Trailing Arm to Vehicle Body	140 - 160
Soft Gasket And Bracket Of Rear Suspension	110 - 130
Sub-Frame And Gasket Of Vehicle (Rear) Body	170 - 190
Sub-Frame And Longitudinal Beam Assembly	75 - 85
Upper End Of Rear Shock Absorber to Vehicle Body	22 - 28
Wheel Mounting Nut	110

DIAGNOSIS & TESTING

Vehicle Inspection

Inspect the rear axle for the following:

- Check the rear axle for loose bearings.
- Check the rear axle hub for any damage or excessive runout.

Vibration At High Speed

This problem could be a result of the following:

- Foreign material (mud, etc.) packed on the backside of the wheel(s).
- Out of balance tires or wheels.
- Improper tire or wheel runout.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

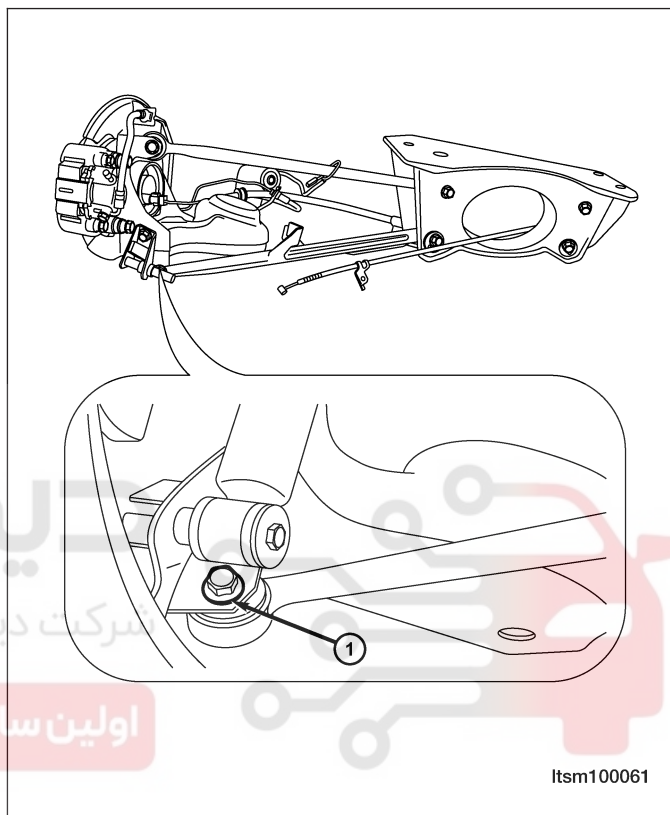


ON-VEHICLE SERVICE

Rear Lower Control Arm

Removal & Installation

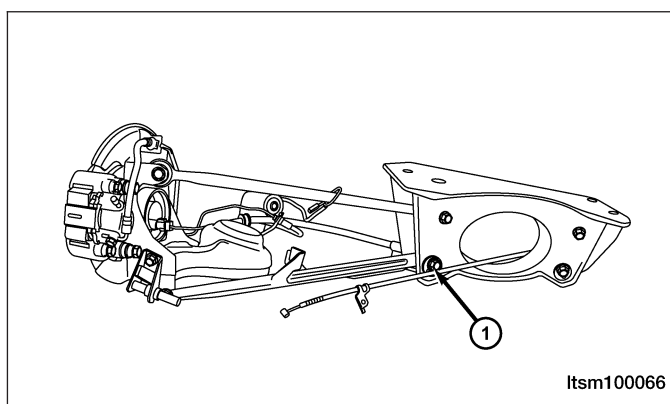
1. Raise and support the vehicle.
2. Remove the bolt that joins rear stabilizer bar and rear suspension lower control arm (See Rear Stabilizer Bar Link Removal & Installation in Section 10 Suspension).
3. Remove the retaining bolt (1) connecting the lower control arm and rear trailing arm.
(Tighten: Lower control arm to rear trailing arm bolt to 80 - 100 N·m)



4. Remove the retaining bolt (1) connecting the upper control arm and rear sub-frame assembly.
(Tighten: Upper control arm and rear sub-frame assembly bolt to 80 - 100 N·m)
5. Installation is in the reverse order of removal.

Installation Notes:

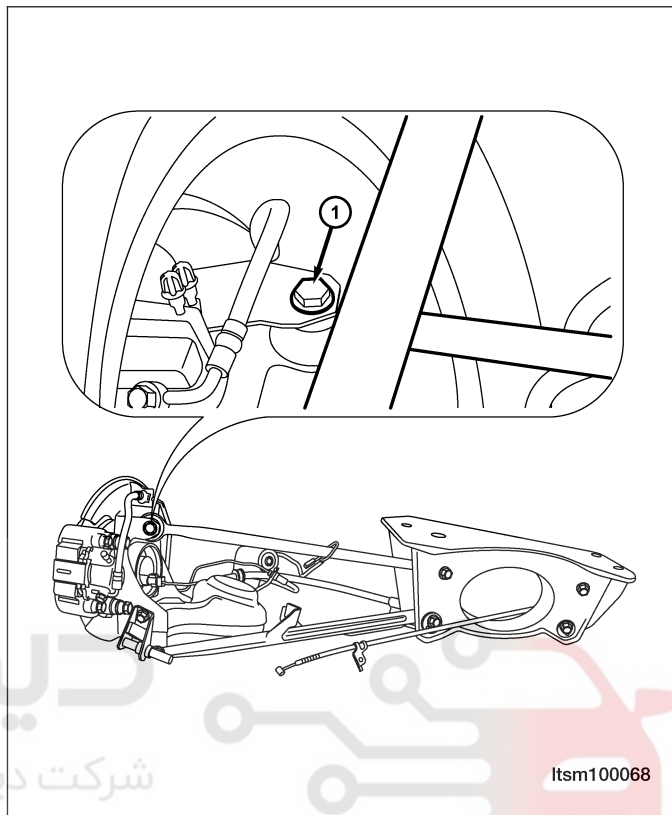
- After installation, each bolt must be tightened to the required tightening torque.



Rear Upper Control Arm

Removal & Installation

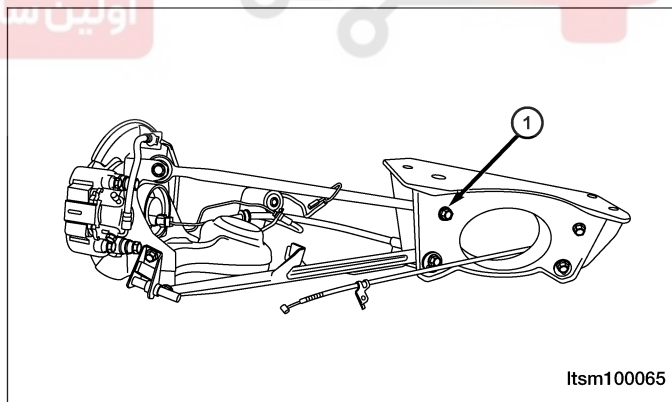
1. Raise and support the vehicle.
2. Remove the retaining bolt (1) connecting the upper control arm and rear trailing arm.
(Tighten: Upper control arm to rear trailing arm bolt to 80 - 100 N·m)



3. Remove the retaining bolt (1) connecting the upper control arm and rear sub-frame assembly.
(Tighten: Upper control arm to rear sub-frame assembly bolt to 80 - 100 N·m)
4. Installation is in the reverse order of removal.

Installation Notes:

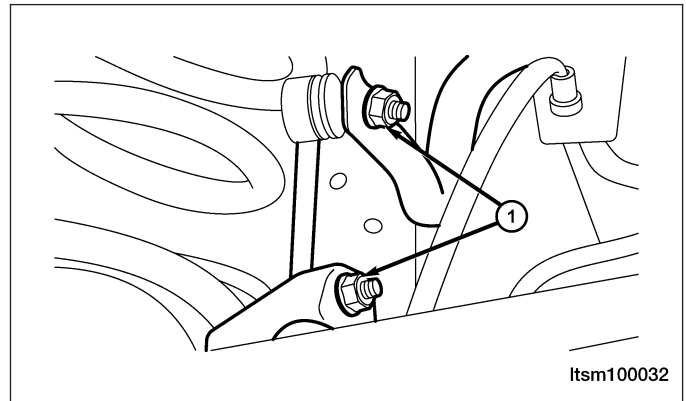
- After installation, each bolt must be tightened to the required tightening torque.



Rear Stabilizer Bar Link

Removal & Installation

1. Raise and support the vehicle.
2. Remove the nuts (1) connecting the rear stabilizer bar link to the rear suspension lower control arm.
(Tighten: Rear stabilizer bar link to rear suspension lower control arm nuts to 48 ± 6 N·m)



3. Remove the connecting bolt from the rear stabilizer bar link to the rear stabilizer bar.
4. Installation is in the reverse order of removal.

Installation Notes:

- After installation, each bolt must be tightened to the required tightening torque.

Rear Shock Absorber

Description

The bottom of the shock absorber assembly mounts to the rear trailing arm. The top of the shock absorber assembly mounts to the body.

Operation

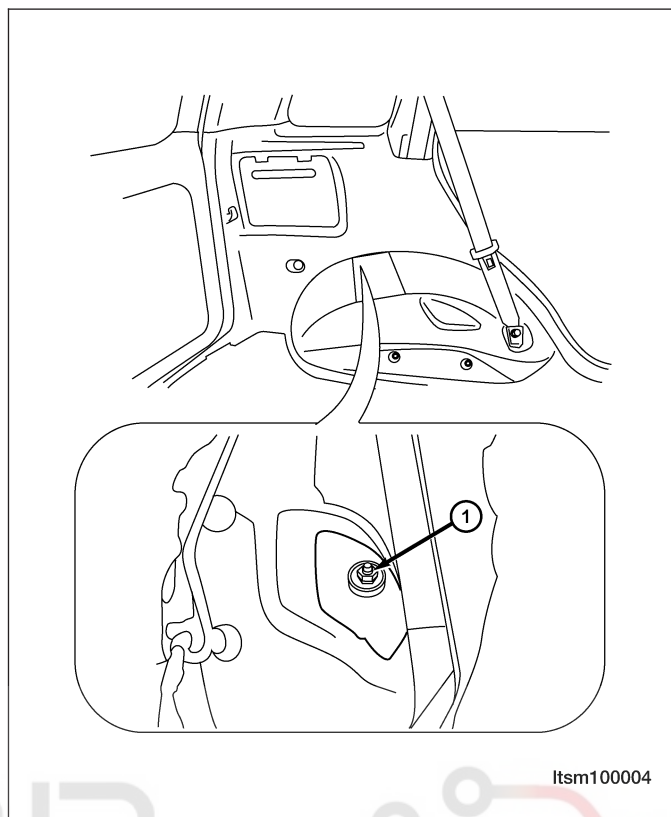
The shock absorber assembly cushions the ride of the vehicle, controls vibration, jounce and rebound of the suspension. The shock absorber dampens jounce and rebound motions of the coil spring and suspension.

Removal & Installation

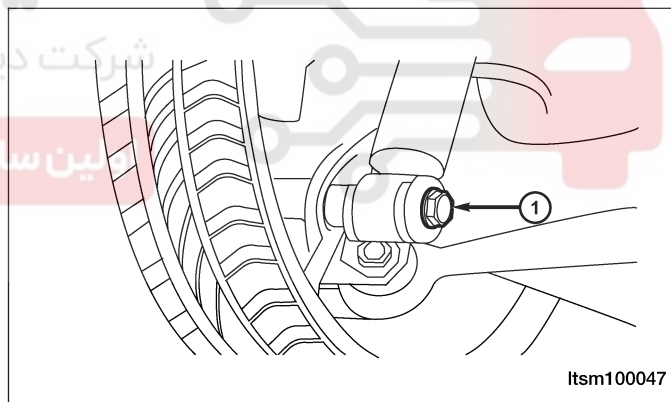
1. Remove the protective cover of the rear shock absorber on the C pillar lower trim panel in the luggage compartment.

ON-VEHICLE SERVICE

2. Remove the nut (1) connecting the rear shock absorber to the vehicle body.
(Tighten: Rear shock absorber to the vehicle body nut to 48 ± 6 N·m)



3. Raise and support the vehicle.
4. Remove the bolt (1) connecting the rear shock absorber to the rear trailing arm.



5. Remove the rear shock absorber.
6. Installation is in the reverse order of removal.

Rear Shock Absorber Inspection

1. Inspect the shock absorber for any fluid leaks, replace if necessary.
2. Inspect the damping force of the shock absorber, replace if not within specifications.
3. Inspect the thrust bearing to see if there is any excessive wear or abnormal noise, replace any worn parts.
4. Inspect the lower spring seat for cracks or deformation replace any worn parts.
5. Inspect limit stop for damage, replace any worn parts.
6. Inspect the stop pad for wear, cracks and deformation, replace any worn parts.

Rear Coil Spring

Description

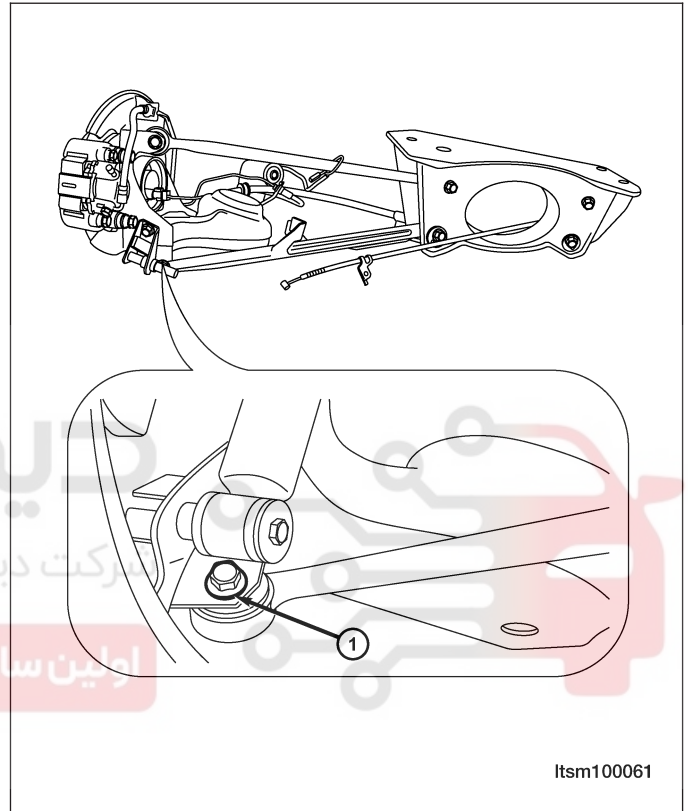
The rear coil spring is located between the vehicle body and the rear trailing arm assembly.

Operation

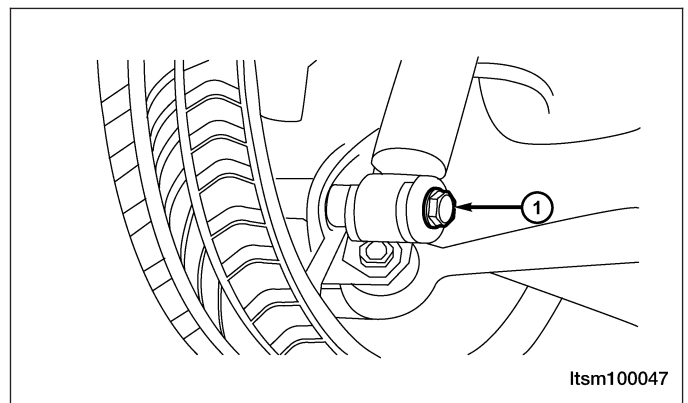
Coil springs are designed to store energy and subsequently release it, and to absorb shock and maintain a force between contacting surfaces. Coil springs are rated for specific vehicle applications.

Removal & Installation

1. Raise and support the vehicle.
2. Remove the wheel mounting nuts and the wheel assembly.
(Tighten: Wheel mounting nuts to 110 N·m)
3. Use a jack to support the rear trailing arm.
4. Remove the retaining bolt (1) that connects the lower control arm to rear trailing arm.
(Tighten: Lower control arm to rear trailing arm bolt to 80-100 N·m)



5. Remove the bolt (1) connecting the rear shock absorber to the rear trailing arm.

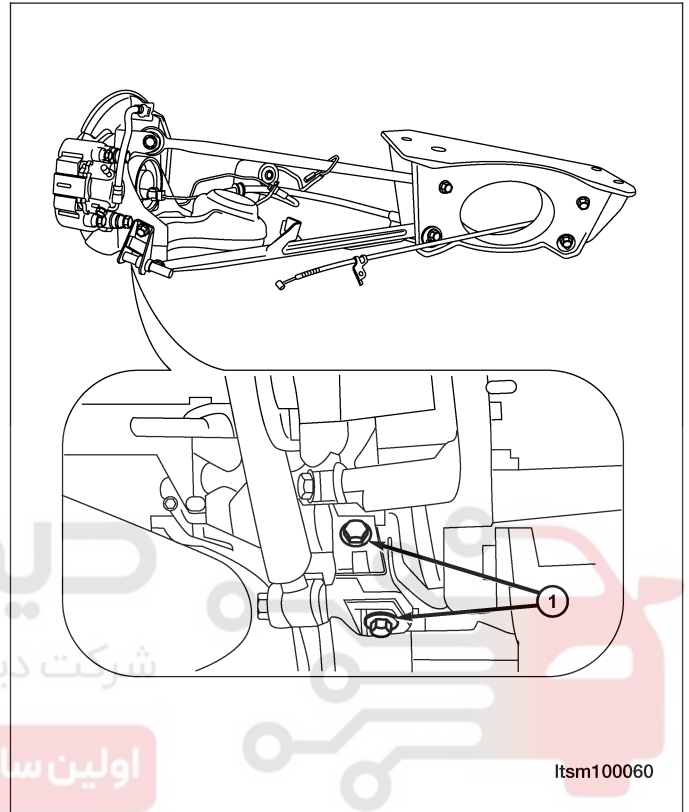


6. Release the jack slowly.
7. Remove the coil spring.
8. Installation is in the reverse order of removal.

Rear Trailing Arm Assembly

Removal & Installation

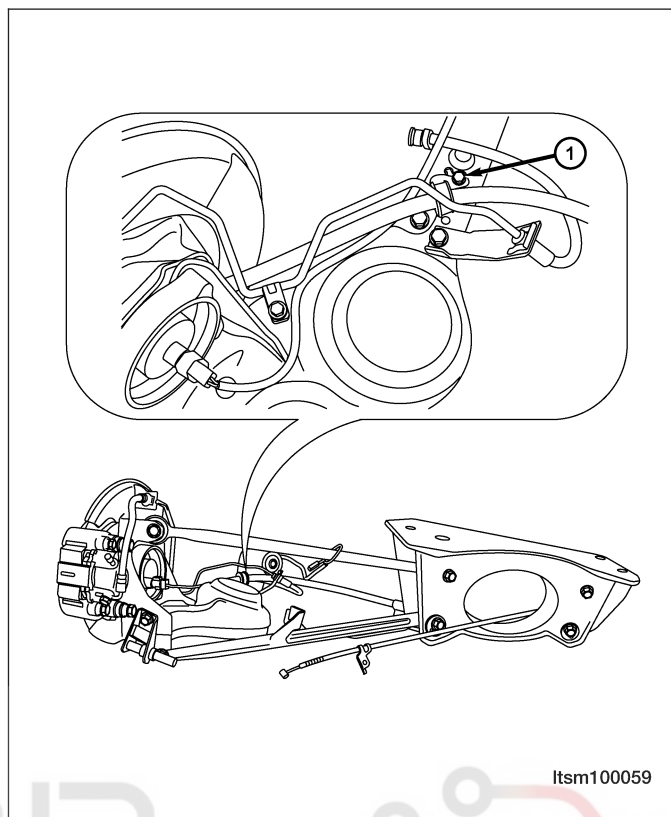
1. Raise and support the vehicle.
2. Remove the wheel mounting nuts and the wheel assembly.
(Tighten: Wheel mounting nuts to 110 N·m)
3. Use a jack to support the rear trailing arm.
4. Remove the connecting bolts (1) that joins the rear trailing arm and the shock absorber bracket.
(Tighten: Rear trailing arm to shock absorber bracket bolts to 80 - 100 N·m)



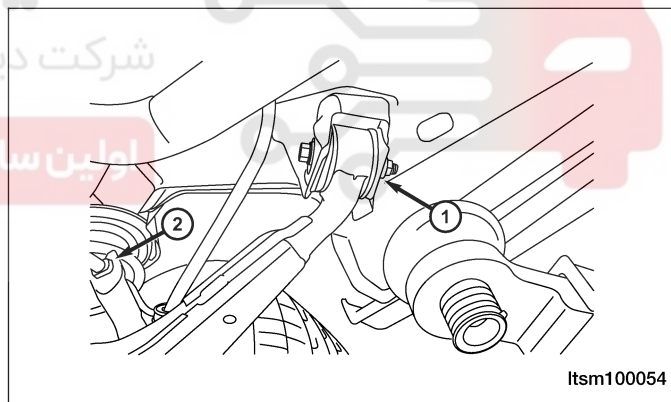
5. Lower the jack and remove the rear spring.
6. Remove the connecting bolt that joins the rear trailing arm to the upper control arm (See Rear Upper Control Arm Removal & installation in Section 10 Suspension).
7. Remove the connecting bolt that joins the rear trailing arm to the lower control arm (See Rear Lower Control Arm Removal & installation in Section 10 Suspension).

ON-VEHICLE SERVICE

8. Remove the connecting bolt (1) that joins the rear trailing arm to the hand brake cable bracket.
(Tighten: Hand brake cable bracket bolt to 25 - 35 N·m)

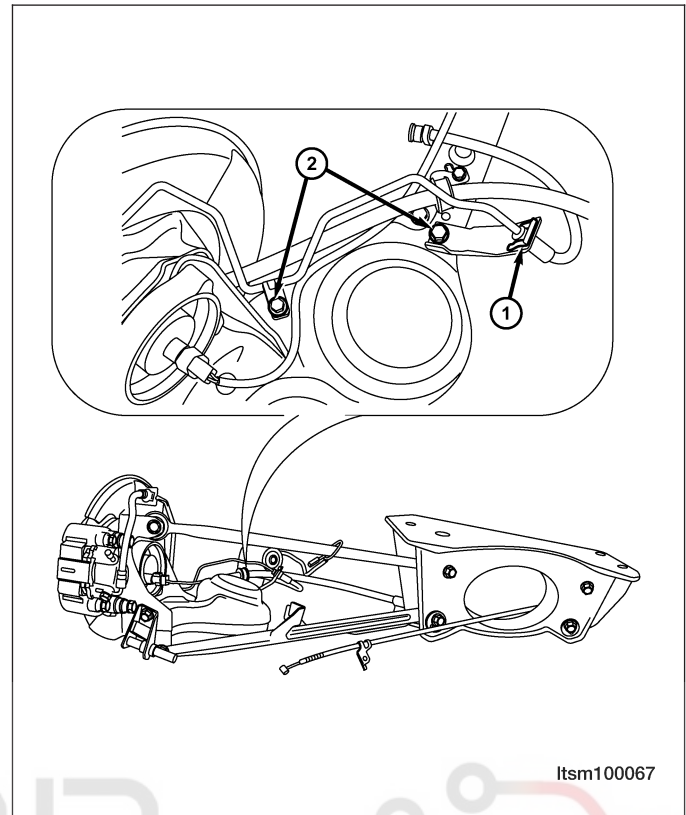


9. Remove the bolt (1) that joins the rear trailing arm to the vehicle body.
10. Remove the brake fluid pipe clamp (2).



ON-VEHICLE SERVICE

11. Remove the brake fluid pipe clamp (1) and bracket bolts (2) on the trailing arm.



12. Remove the rear brake rotor (See Rear Brake Rotor Removal & Installation in Section 10 Brakes).
13. Remove the rear hub and bearing (See Rear Hub and Bearing Removal & Installation in Section 09 Driveline & Axle).
14. Remove the rear trailing arm.
15. Installation is in the reverse order of removal.

Installation Notes:

- After installation, each bolt must be tightened to the required tightening torque.

ALIGNMENT

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ON-VEHICLE SERVICE

Front Wheel Alignment

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Rear Wheel Alignment

Rear Wheel Alignment Specifications	10-45
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دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



GENERAL INFORMATION

Description

Vehicle wheel alignment is the positioning of all interrelated front and rear suspension angles. These angles affect the handling and steering of the vehicle when it is in motion. Proper wheel alignment is essential for efficient steering, good directional stability, and proper tire wear.

The method of checking a vehicle's front and rear wheel alignment varies depending on the manufacturer and type of equipment used. The manufacturer's instructions should always be followed to ensure accuracy of the alignment. On this vehicle, the suspension angles that can be adjusted are as follows:

Front Axle

- Camber
- Caster
- Toe-in

Rear Axle

- Camber
- Toe-in

Check the wheel alignment and make all wheel alignment adjustments with the vehicle standing at its proper curb height specification. Curb height is the normal riding height of the vehicle. It is measured from a certain point on the vehicle to the ground or a designated area while the vehicle is sitting on a flat, level surface.

Operation

Curb Height Measurement

The wheel alignment is to be checked and all alignment adjustments made with the vehicle at its required curb height specification.

- Vehicle height is to be checked with the vehicle on a flat, level surface, preferably a vehicle alignment rack.
- The tires are to be inflated to the recommended pressure.
- All tires are to be the same size as standard equipment.
- Vehicle height is checked with the fuel tank full of fuel, and no passenger or luggage compartment load.
- Vehicle height is not adjustable.
- If the measurement is not within specifications, inspect the vehicle for bent or weak suspension components.
- Compare the parts tag on the suspect coil spring(s) to the parts book and the vehicle sales code, checking for a match.
- Once removed from the vehicle, compare the coil spring height to a new or known good coil spring. The heights should vary if the suspect spring is weak.

NOTE :

Prior to reading the curb height measurement, the front and rear of the vehicle must be jounced to settle the suspension. Induce jounce by pushing down on the center of the bumper (fascia), using care not to damage the vehicle, moving the vehicle up and down, gradually increasing the suspension travel with each stroke. Release the bumper at the bottom of each stroke, repeating this action several times. Perform this to both front and rear suspensions an equal number of times.

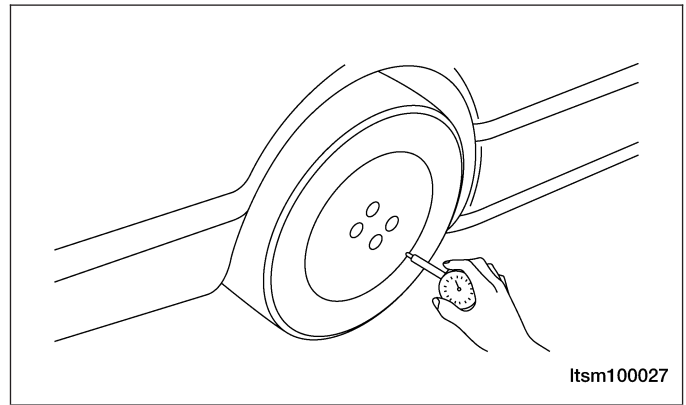
Pre-Wheel Alignment Inspection

Before any attempt is made to change or correct the wheel alignment, the following inspection and necessary corrections must be made to the vehicle to ensure proper alignment.

1. Verify the fuel tank is full of fuel. If the fuel tank is not full, the reduction in weight will affect the curb height of the vehicle and the alignment specifications.
2. The passenger and luggage compartments of the vehicle should be free of any load that is not factory equipment.

GENERAL INFORMATION

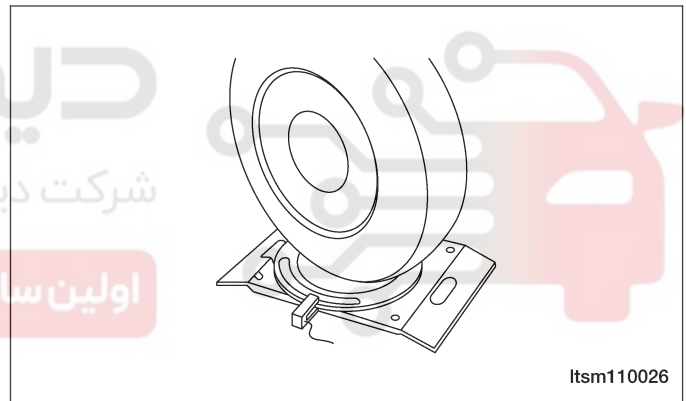
3. Check the tires on the vehicle. The tires are to be inflated to the recommended air pressure. All tires must be the same size and in good condition with approximately the same tread wear.



4. Check the front tire and wheel assemblies for excessive radial runout.
5. Inspect all suspension component fasteners for looseness and proper torque.
6. Inspect all ball joints and all steering linkage for looseness and any sign of wear or damage.
7. Inspect the rubber bushings on all the suspension components for signs of wear or deterioration. If any bushings show signs of wear or deterioration, they should be replaced prior to aligning the vehicle.
8. Check vehicle curb height.

Wheel Alignment Setup

1. Position the vehicle on an alignment rack.



2. Install all required alignment equipment on the vehicle, per the alignment equipment manufacturer's instructions. On this vehicle, a four-wheel alignment is recommended.
3. Read the vehicle's current front and rear alignment settings. Compare the vehicle's current alignment settings to the vehicle specifications for camber, caster and toe-in.

NOTE :

Prior to reading the vehicle's alignment readouts, the front and rear of vehicle should be jounced. Induce jounce (rear first, then front) by grasping the center of the bumper and jouncing each end of the vehicle an equal number of times. The bumper should always be released when vehicle is at the bottom of the jounce cycle.

Specifications

Torque Specifications

DESCRIPTION	TORQUE (N·m)
Camber Adjustment Bolts	100
Inner Tie Rod Adjuster Jam Nut	30
Rear Lower Control Arm Eccentric Cam Bolt	80 - 100
Rear Upper Control Arm Eccentric Cam Bolt	80 - 100
Wheel Mounting Nuts	110

GENERAL INFORMATION

Front Axle Alignment Specifications

FRONT WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
Camber	-51'	+9' to -1°51'
Caster	+2°50'	+3°30' to +2°5'
Inclination	+11°30'	+12°15' to +10°45'
Toe-Individual	0'	+5' to -5'

Rear Axle Alignment Specifications

REAR WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
Camber	-54'	+24' to -1°24'
Toe-Individual	-5'	+5' to -15'

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



DIAGNOSIS & TESTING

Vehicle Inspection

Inspect the following for damage:

- Inspect the tires.
- Inspect the rims.

Replace any tire or rim that is found to be damaged.

Tire Wear

Inspect the following for accurate tire wear:

- Check the depth of tire remaining tread.
- Standard tire: not less than 1.6 mm.
- Snow tire: 50% tire tread.

If the tread is below the specifications, the tire should be replaced.

Tire Wear Chart

1	(1)	(2)	(3)	(4)	(5)	(6)	(7)
2	1. 2.						
3	(8)	(9)	(10)	(11)	(12)	(13)	(15)
4		(16)		(17)	(18)	(19)	(20)

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1 Condition:	(1) Rapid Wear At Shoulders	(2) Rapid Wear At Center	(3) Cracked Treads	(4) Wear On One Side	(5) Feathered Edge	(6) Bald Spots	(7) Scalloped Wear
2 Effect:	(1) Excessive Tire Wear	(2) Excessive Tire Wear	(3) Tire Damage	(4) Vehicle Pulls	(2) Excessive Tire Wear	(6) Poor Traction	(7) Excessive Tire Wear
3 Cause:	(8) Under Inflation Or Lack Of Rotation	(9) Over Inflation Or Lack Of Rotation	(10) Under Inflation Or Excessive Speed	(11) Excessive Camber	(12) Incorrect Toe-in	(13) Unbalanced Wheel	(15) Lack Of Rotation / Tires Worn / Alignment / Suspension
4 Correction:	(16) Adjust Tire Pressure To Specifications / Rotate Tires	(16) Adjust Tire Pressure To Specifications / Rotate Tires	(16) Replace Tire	(17) Adjust Camber To Specifications	(18) Adjust Toe-In To Specifications	(19) Balance Wheels	(20) Rotate Tires / Replace Tires / Check Alignment / Suspension

DIAGNOSIS & TESTING

Alignment Troubleshooting Chart

CONDITION	POSSIBLE CAUSES	CORRECTIONS
Early Tire Wearing	- Incorrect tire pressure. - Incorrect wheel alignment.	- Adjust the tire pressure. - Check the wheel alignment and then adjust.
Tire Noise	- Incorrect tire pressure. - Tire wearing.	- Adjust the tire pressure. - Check the wheel alignment and then adjust.
Road Noise Or Vehicle Body Vibration	- Incorrect tire pressure. - Unbalanced tire. - Deformation of rim or tire. - Tire wearing.	- Adjust the tire pressure. - Check the wheel alignment and then adjust. - Repair or install new suspension component as necessary.
Up-Down Vibration Of The Steering Wheel	- Loose wheel nut or axle. - Unbalanced tire. - Crack or wearing of engine mounting rubber. - Crack or wearing of transmission bracket rubber.	- Fasten wheel nut. - Check the wheel alignment and then adjust. - Repair or install new suspension component as necessary. - Repair or install new engine or transmission mounting rubber as necessary.
Circular Vibration Of The Steering Wheel	- Loose wheel nut or axle. - Unbalanced tire. - Deficient tire pressure. - Damage or wearing of front wheel bearing. - Failure of steering system.	- Fasten wheel nut. - Adjust the tire pressure. - Check the wheel alignment and then adjust. - Repair or install new suspension component as necessary.
Steering Wheel Deflecting To Single Side	- Incorrect tire pressure. - Excessive tire wearing. - Failure of steering system. - Failure of suspension system.	- Adjust the tire pressure. - Check steering system. - Check the wheel alignment and then adjust. - Repair or install new suspension component as necessary.
Unstable Driving	- Loose wheel nut. - Failure of steering system. - Failure of suspension system.	- Adjust the tire pressure. - Check steering system. - Check the wheel alignment and then adjust. - Repair or install new suspension component as necessary.
Heavy Steering Wheel	- Incorrect tire pressure. - Failure of steering system. - Failure of suspension system. - Incorrect wheel alignment.	- Adjust the tire pressure. - Check steering system. - Check the wheel alignment and then adjust. - Repair or install new suspension component as necessary.
Bad Alignment Return Of Steering Wheel	- Incorrect tire pressure - Failure of steering system - Failure of suspension system	- Adjust the tire pressure. - Check steering system. - Check the wheel alignment and then adjust. - Repair or install new suspension component as necessary.

ON-VEHICLE SERVICE

Front Wheel Alignment

Front Wheel Alignment Specifications

NOTE :

If the vehicle has been in an accident causing the front axle components to be damaged, the damaged components must be replaced before performing a front wheel alignment.

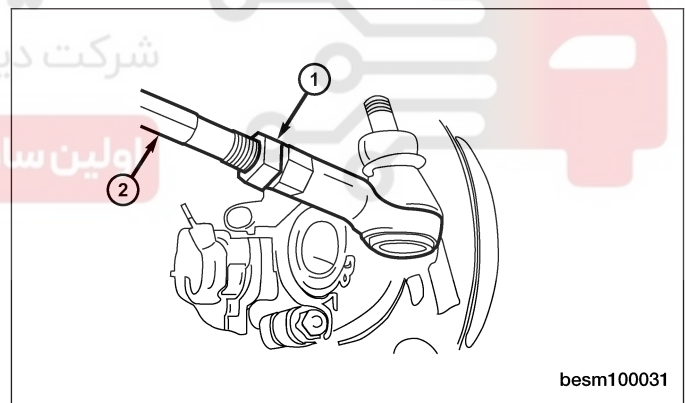
FRONT WHEEL ALIGNMENT		
FRONT WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
Camber	-51'	+9' to -1°51'
Caster	+2°50'	+3°30' to +2°5'
Inclination	+11°30'	+12°15' to +10°45'
Toe-Individual	0'	+5' to -5'

Front Axle Toe-In Adjustment

CAUTION:

Do not twist the inner tie rod steering gear boot (bellows) while turning the inner tie rod during front toe-in adjustment. It may be necessary to remove the clamp where the boot meets the inner tie rod.

1. Loosen the tie rod adjusting jam nut (1).
(Tighten: Tie rod adjusting jam nut to 35 ± 3 N·m)
2. Grasp the inner tie rod shaft (2) and adjust the tie rod end until the front toe-in is set to the proper specification.



3. Make sure the inner tie rod steering gear boot is not twisted. If removed, reinstall the clamp where the boot meets the inner tie rod.
4. Remove the alignment equipment.
5. Lower vehicle and jounce the front and rear of the vehicle.

Front Camber Adjustment

NOTE :

The front axle camber can not be adjusted. Replace the relative components if necessary.

Rear Wheel Alignment

Rear Wheel Alignment Specifications

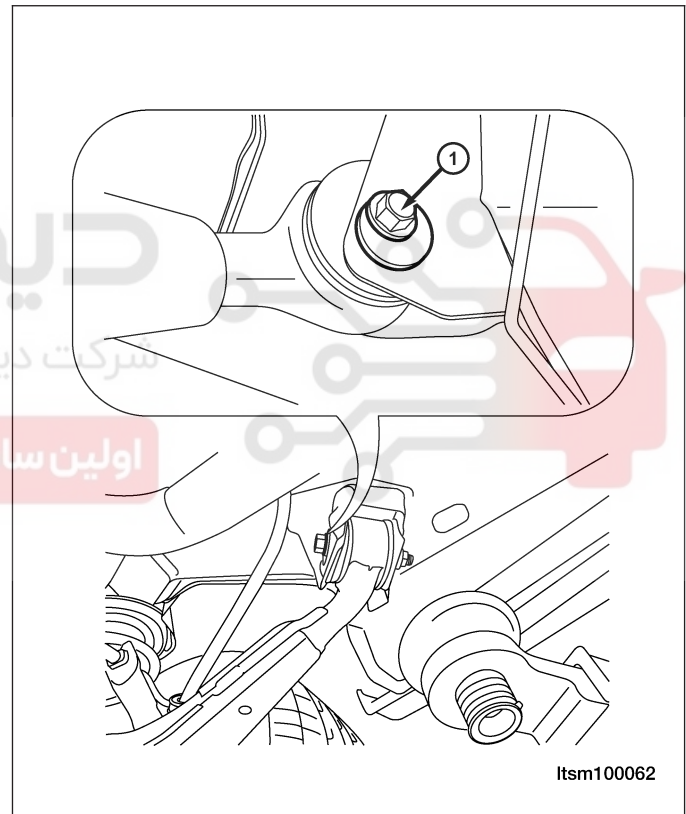
NOTE :

If the vehicle has been in an accident causing the rear axle components to be damaged, the damaged components must be replaced before performing a rear wheel alignment.

REAR WHEEL ALIGNMENT		
REAR WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
Camber	-54'	-24' to -1°24'
Toe-Individual	-5'	+5' to -15'

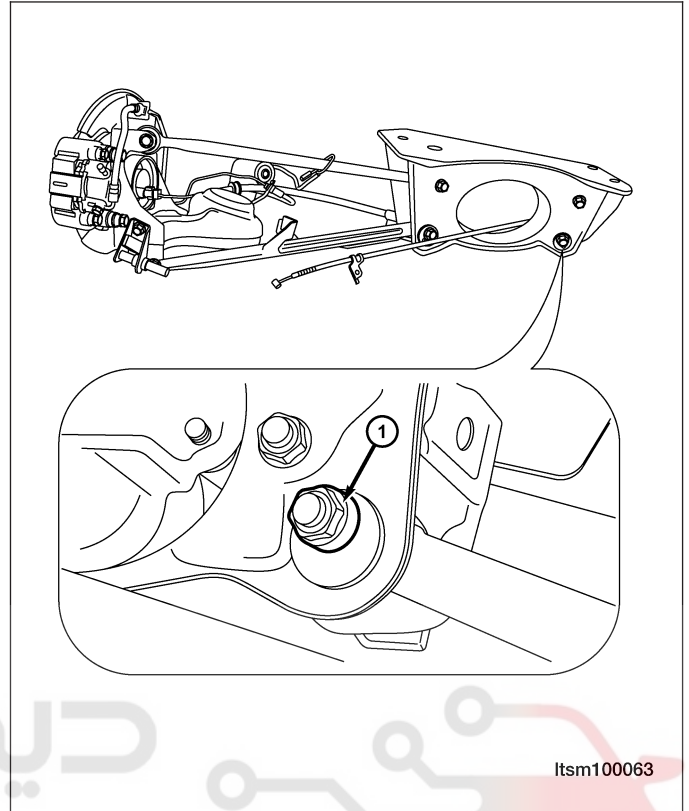
Rear Axle Toe-In Adjustment

1. While holding the cam bolt stationary, loosen the lower control arm mounting cam nut (1).
(Tighten: Lower control arm mounting cam nut to 80 - 100 N·m)
2. Rotate the cam bolt head left or right until the rear wheel Toe-in for that rear wheel is set to the preferred specification.
3. While holding the cam bolt head stationary, tighten the Toe-in link mounting cam bolt to the specified torque.



Rear Camber Adjustment

1. While holding the cam bolt stationary, loosen the upper control arm bolt (1).
(Tighten: Upper control arm bolt to 80 - 100 N·m)
2. Rotate the cam bolt head left or right until the rear wheel camber for that rear wheel is set to the preferred specification.
3. While holding the cam bolt head stationary, tighten the upper control arm bolt to the specified torque.



دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

WHEELS AND TIRES

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GENERAL INFORMATION

Description

Tires are designed and engineered for each specific vehicle. They provide the best overall performance for normal operation. The ride and handling characteristics match the vehicle's requirements. With proper care they will give excellent reliability, traction, skid resistance, and tread life.

Tire Identification

- Tire type, size, load index and speed rating are encoded in the letters and numbers imprinted on the side wall of the tire.

Spare Tire

- A full size spare tire and wheel assembly is standard equipment on this vehicle. The original tire should be repaired or replaced at the first opportunity, then reinstalled.

Operation

Driving habits have more effect on tire life than any other factor. Careful drivers will obtain, in most cases, much greater mileage than severe use or careless drivers. A few of the driving habits which will shorten the life of any tire are:

- Rapid acceleration
- Severe application of brakes
- High-speed driving
- Taking turns at excessive speeds
- Striking curbs and other obstacles
- Operating vehicle with over or under inflated tire pressures

Specifications

Torque Specifications

DESCRIPTION	TORQUE (N·m)
Wheel Mounting Nuts	110

Tire Specifications

TIRE SPECIFICATION	TIRE SIZE - 215	TIRE SIZE - 235
Sectional Width	215	235
Aspect Ratio	70	60
Wheel Radius	R16	R16
Speed Rating	97S	100H

GENERAL INFORMATION

Tire Pressure Specifications of Cold Tire (kPa)

TIRE (235/60 R16)	PRESSURE
Front Tires	200
Rear Tires	200
Spare Tire	250

Rim Out-Of-Round Specifications

DESCRIPTION	MAXIMUM RUN-OUT (mm)
Aluminum Rim	3

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DIAGNOSIS & TESTING

Vehicle Inspection

Visual inspection of the vehicle is recommended prior to road testing or performing any other procedure. Raise the vehicle on a suitable hoist.

Inspect the following:

- Inspect tires and wheels for damage, mud packing and unusual wear; correct as necessary.
- Check and adjust tire pressure to the pressure listed on the label attached to the driver's door opening.

Tire and Wheel Vibration

Tire and wheel imbalance, runout and force variation can cause vehicles to exhibit steering wheel vibration.

NOTE :

Balance equipment must be calibrated and maintained per equipment manufacturer's specifications.

Tire Wear Patterns

Tire wear patterns can be traced to the following tire conditions:

- Under inflation will cause wear on the shoulders of tire.
- Over inflation will cause wear at the center of tire.
- Excessive camber causes the tire to run at an angle to the road. One side of tread is then worn more than the other.
- Excessive toe-in or toe-out causes wear on the tread edges and a feathered effect across the tread.

NOTE :

Tread wear indicators are molded into the bottom of the tread grooves. When tread depth is 1.6 mm, the tread wear indicators will appear as a band. Tire replacement is necessary when indicators appear in two or more grooves, or if localized balding occurs.

Wheel Out-Of-Round Inspection

- Raise vehicle and securely support it.
- Attach a dial indicator on the edge of the rim and measure its unevenness.
- Replace the rim if necessary.

ON-VEHICLE SERVICE

Tire Repair

Description

Tires are designed and engineered for each specific vehicle. They provide the best overall performance for normal operation. The ride and handling characteristics match the vehicle's requirements. With proper care they will give excellent reliability, traction, skid resistance, and tread life.

WARNING!

Failure to equip the vehicle with tires having adequate speed capability can result in sudden tire failure. In order to maintain the speed capability of the vehicle, replacement tires must have speed ratings equal to or higher than those fitted to the vehicle as original equipment. If tires with lower speed ratings are fitted, the vehicle's handling may be affected and the speed capability of the vehicle may be lowered to the maximum speed capability of the replacement tires. To avoid an accident resulting in severe or fatal injury, consult the tire manufacturer in regards to maximum speed ratings.

Replacement Procedure

Note the following guidelines when replacing a tire:

- It is recommended that tires equivalent to the original equipment tires be used when replacement is needed.
- Failure to use equivalent replacement tires may adversely affect the safety and handling of the vehicle.
- The use of tires smaller than the minimum tire size approved for the vehicle can result in tire overloading and failure.
- Use tires that have the approved load rating for the vehicle and never overload them.
- Failure to equip the vehicle with tires having adequate speed capability can result in sudden tire failure and loss of vehicle control.
- The use of oversize tires may cause interference with vehicle components. Under extremes of suspension and steering travel, interference with vehicle components may cause tire damage.

Perform the following when replacing a tire:

1. Raise and support the vehicle.
2. Remove the wheel mounting nuts and the wheel assembly.
3. Deflate the tire completely before removing the tire from the wheel.
4. Use lubrication such as a mild soap solution when dismounting or mounting tire.
5. Replace the tire with a tire approved for the vehicle.
6. Use tools free of burrs or sharp edges which could damage the tire or wheel rim.
7. Before mounting tire on wheel, make sure all rust is removed from the rim bead and repaint if necessary.
8. Balance the wheel assembly.
9. Install the wheel assembly and install the wheel mounting nuts.
(Tighten: Wheel mounting nuts to 110 N·m)

Repair Procedure

Note the following guidelines when performing a tire repair:

- For proper repairing, a radial tire must be removed from the wheel.
- Repairs should only be made if the defect, or puncture, is in the tread area.
- The tire should be replaced if the puncture is located in the sidewall.

Perform the following when repairing a tire:

1. Raise and support the vehicle.
2. Remove the wheel mounting nuts and the wheel assembly.
3. Deflate the tire completely before removing the tire from the wheel.
4. Use lubrication such as a mild soap solution when dismounting or mounting tire.
5. Repair the tire only if the defect, or puncture, is in the tread area.
6. Use tools free of burrs or sharp edges which could damage the tire or wheel rim.
7. Before mounting tire on wheel, make sure all rust is removed from the rim bead and repaint if necessary.

ON-VEHICLE SERVICE

8. Install the wheel assembly and install the wheel mounting nuts.
(Tighten: Wheel mounting nuts to 110 N·m)

Wheel Assembly**Description**

Original equipment wheels are designed for operation up to the specified maximum vehicle capacity.

Inspect wheels for the following:

- Dents or cracks
- Damaged wheel bolt holes
- Air leaks from any area or surface of the rim
- Excessive run out

NOTE :

Do not attempt to repair a wheel by hammering, heating or welding.

NOTE :

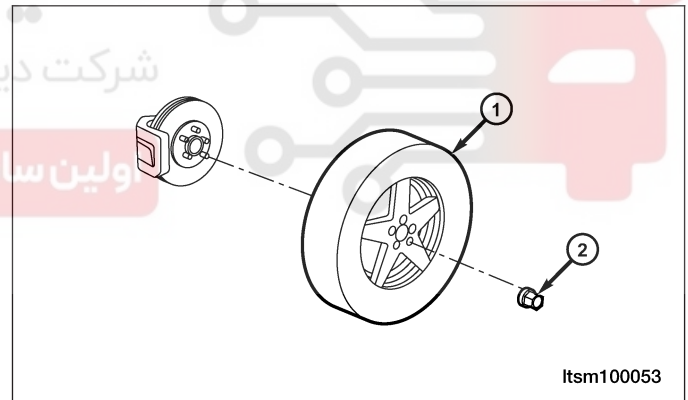
The wheel nuts are designed for specific applications. Do not use replacement bolts with a different design or lesser quality.

Removal & Installation

1. Raise and support the vehicle.
2. If the vehicle is equipped with wheel center caps that cover the wheel nuts, remove the cap with an appropriate removal tool utilizing the notch located between the wheel and the outer edge of the cap.

NOTE: Use care not to damage the finish on the wheel.

3. Remove the wheel mounting nuts (2) with a suitable tool and remove the wheel assembly (1).
(Tighten: Wheel mounting nuts to 110 N·m)
4. Installation is in the reverse order of removal.



10

Wheel Balance**Description**

Balance the wheel assembly as necessary following the wheel balancer manufacturer's instructions.

- Road test the vehicle for at least 5 miles.
- If the vibration persists, continue with Diagnosis & Testing procedure.

NOTE :

- Balance equipment must be calibrated and maintained per equipment manufacturer's specifications.
- Wheel weight must fit the rim.

Wheel Balance Procedure

1. Raise and support the vehicle.
2. Remove the wheel mounting nuts and the wheel assembly.
3. Perform a dynamic balance test.

NOTE :

A wheel requiring 5g or less of weight per side is considered to be within the proper specifications for a wheel balance.

4. Install the appropriate wheel weights on the inner (2) and outer (1) edges of the rim until the wheel is balanced within specifications.

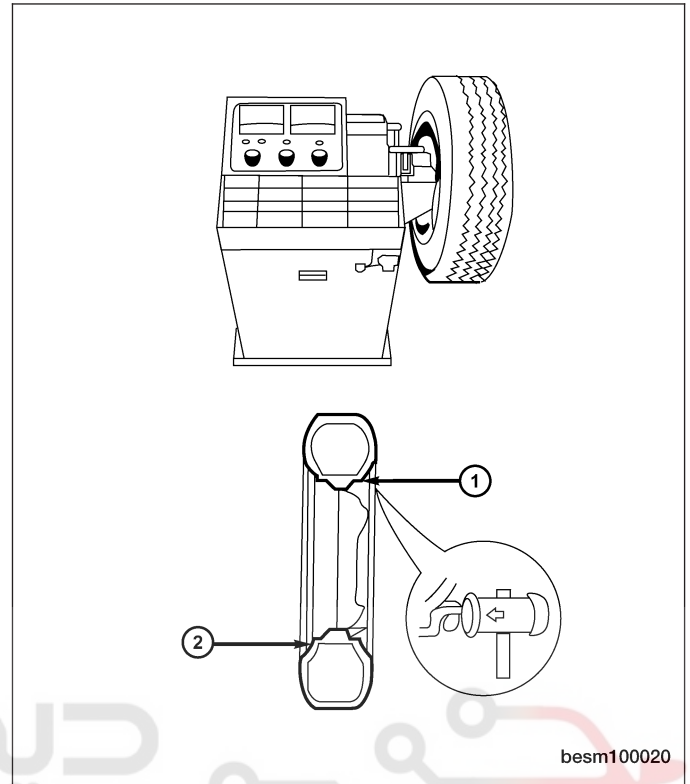
NOTE :

Not more than one wheel weight can be attached to each side of the wheel, with its maximum weight not exceeding 40g.

CAUTION:

Use caution not to damage wheel weights during tire and wheel installation.

5. Install the wheel assembly and install the wheel mounting nuts.
(Tighten: Wheel mounting nuts to 110 N·m)



Tire Rotation

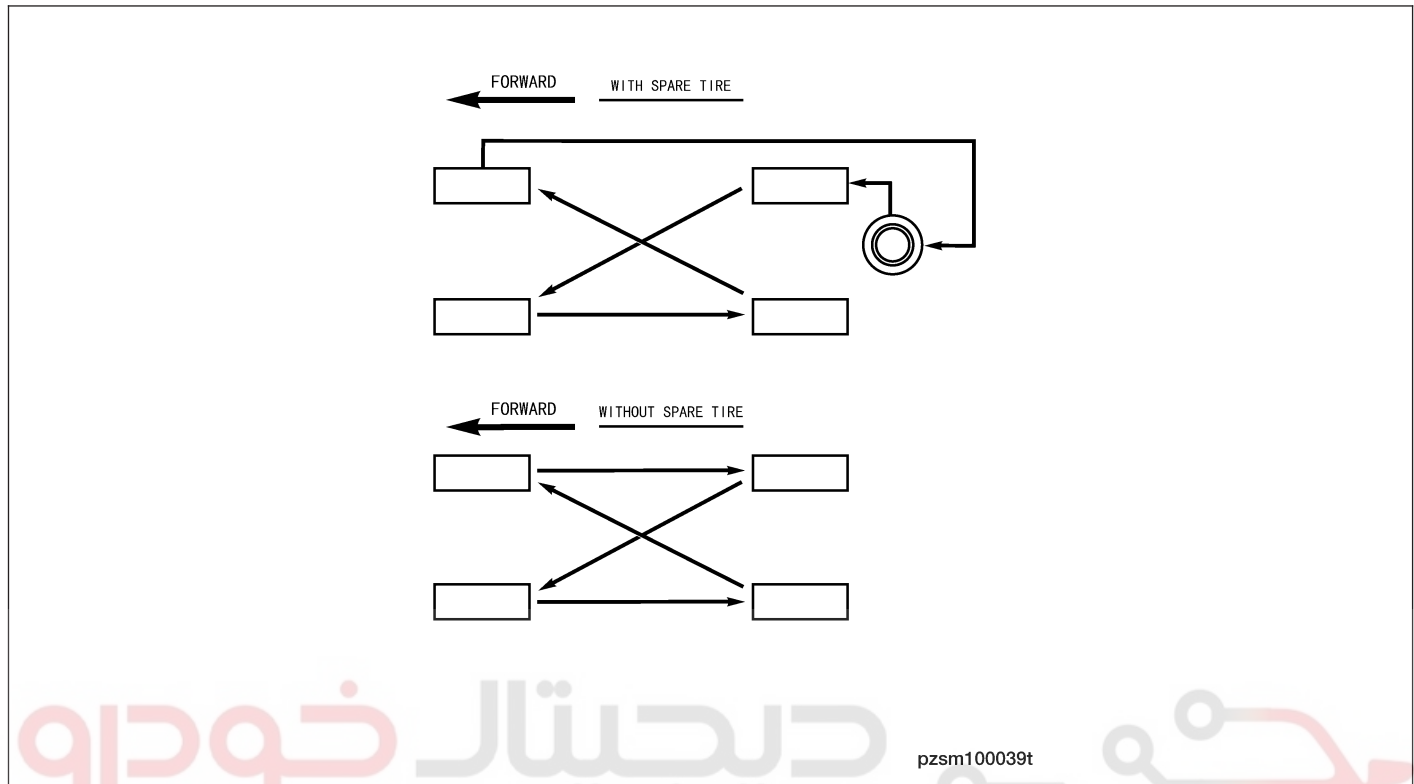
Description

Tires on the front and rear operate at different loads and perform different steering, driving, and braking functions. For these reasons they wear at unequal rates and tend to develop irregular wear patterns. These effects can be reduced by rotating the tires at regular intervals.

The benefits of tire rotation are:

- Increase tread life
- Maintain traction levels
- A smooth, quiet ride

Non-Directional Tires



The suggested method of tire rotation is shown. Other rotation methods can be used, but they will not provide all the tire longevity benefits.

NOTE :

Only the four-tire rotation method may be used if the vehicle is equipped with a compact or temporary spare tire.

1. Raise and support the vehicle.
2. Remove the wheel mounting nuts and the wheel assembly.
3. Rotate the tire to the desired location.

CAUTION:

Use caution not to damage wheel weights during tire and wheel installation.

4. Install the wheel assembly and install the wheel mounting nuts.
(Tighten: Wheel mounting nuts to 110 N·m)

Directional Tires

Some vehicles may be fitted with special high-performance tires having a directional tread pattern. These tires are designed to improve traction on wet pavement. To obtain the full benefits of this design, the tires must be installed so that they rotate in the correct direction. This is indicated by arrows on the tire sidewalls. When being installed, extra care is needed to ensure that this direction of rotation is maintained.

1. Remove the wheel mounting nuts and the wheel assembly.
2. Rotate the tire to the desired location.

CAUTION:

Use caution not to damage wheel weights during tire and wheel installation.

3. Install the wheel assembly and install the wheel mounting nuts.
(Tighten: Wheel mounting nuts to 110 N·m)