By

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NOTICE

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Important Safety Notice

Proper service methods and repair procedures are essential for safe, reliable operation of all motor vehicles as well as personal safety of the operator. The service procedures and descriptions in this shop manual provide general direction for a service and repair.

Procedure, techniques, tools, and parts for service including the skill of the technician vary. It is impossible to provide advice or caution as to each case in this manual.

Accordingly, anyone who intends to use a replacement part, service procedure, or tool, which is not recommended by the vehicle manufacturer, must first assure thoroughly that neither their personal safety nor the safe operation of the vehicle will be first jeopardized by the replacement part, service procedure, or tool they select.

⚠ DANGER

Reminds you to be especially careful in those areas where carelessness will cause death or serious injury.

⚠ WARNING

Reminds you to be especially careful in those areas where carelessness may cause death or serious injury.

⚠ CAUTION

Reminds you to be especially careful in those areas where carelessness may cause personal injury.

NOTICE

Gives you information that will prevent you from making errors that could damage the vehicle.

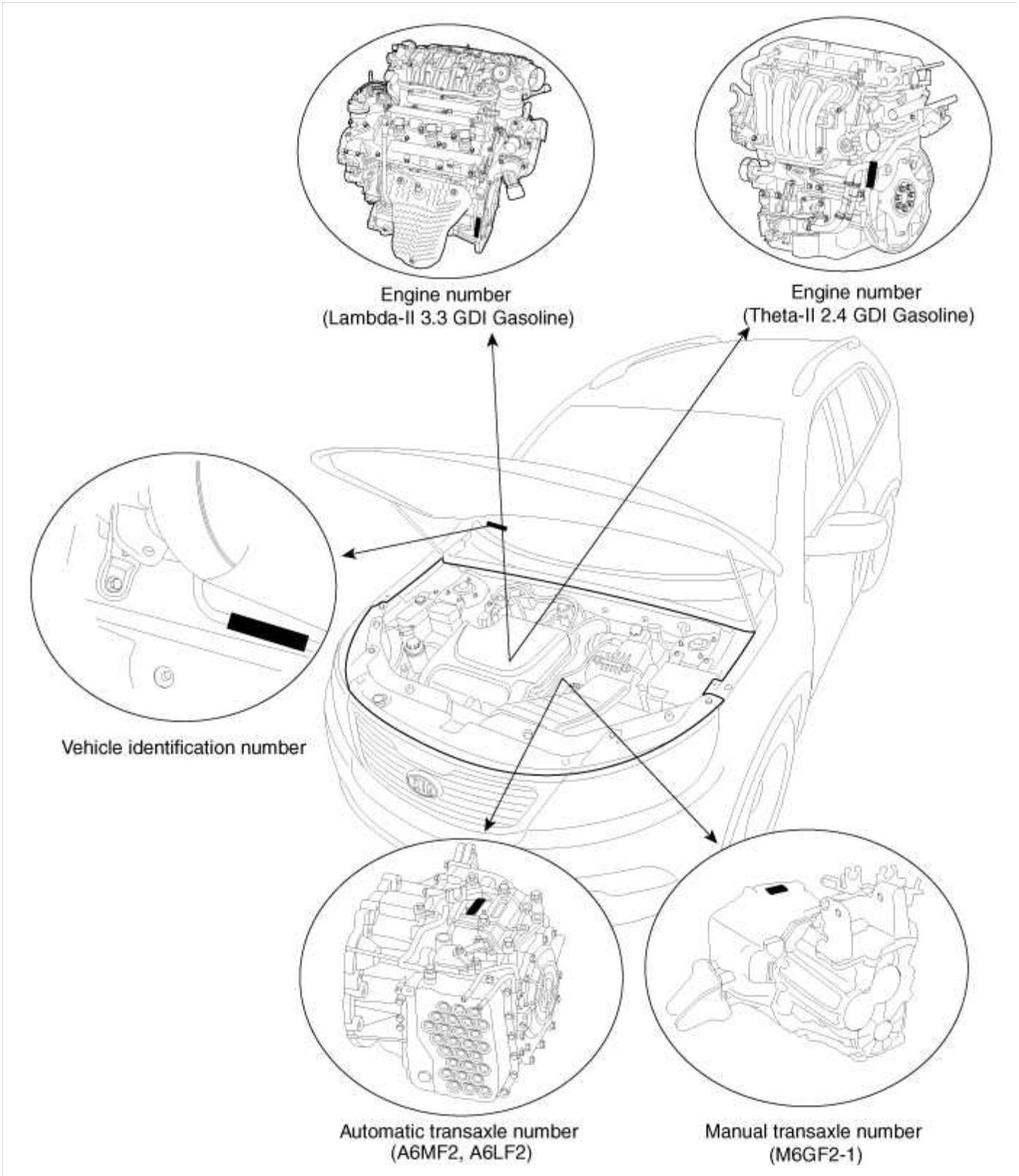
Information

Gives you added information that will help you complete a particular procedure.

The following list contains some general WARNINGS that you should follow while working on a vehicle.

- Always wear safety glasses for eye protection.
- Use safety stands whenever a procedure requires you to be under the vehicle.
- Make sure that the ignition switch is always in the OFF position, unless otherwise required by the procedure.
- Set the parking brake when working on the vehicle. If you have an automatic transaxle, set in park unless instructed otherwise for a specific operation.
- Place supporters against the front and rear surfaces of the tires to help prevent the vehicle from moving.
- Operate the engine only in a well-ventilated area to avoid the danger of carbon monoxide poisoning.
- Keep yourself and your clothing away from moving parts when the engine is running, especially the drive belts.
- To prevent serious burns, avoid contact with hot metal parts such as the radiator, exhaust manifold, tail pipe, catalytic converter and muffler.
- Do not smoke while working on a vehicle.
- To avoid injury, always remove rings, watches, loose hanging jewelry, and loose clothing before beginning to work on a vehicle.
- When it is necessary to work under the hood, keep hands and other objects clear of the radiator fan blades! Your vehicle may be equipped with a cooling fan that may turn on, even though the ignition switch is in the OFF position. For this reason care should be taken to ensure that the radiator fan electric motor is completely disconnected when working under the hood and the engine is not running.

Identification Number Locations



Identification Number Description
Vehicle Identification Number

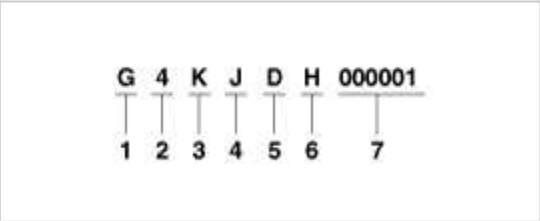
1. World Manufacturer Identifier (WMI)
   - 5XY : MPV(Multipurpose Passenger Vehicle)/SUV(Sports Utility Vehicle)/RV(Recreational Vehicle)
2. Vehicle line
   - K : SORENTO
3. Model & Series
   - S : Low grade (L)
   - T : Middle-Low grade (GL)
   - U : Middle grade (GLS, JSL, TAX)
   - V : Middle-High grade (HGS)
   - W : High grade (TOP)
4. Body/Cabin type, Gross Vehicle Weight Rating
   5XY
   - 1 : Wagon 4×2 Class-A
   - 2 : Wagon 4×2 Class-B
   - 3 : Wagon 4×2 Class-C
   - 4 : Wagon 4×2 Class-D
   - 5 : Wagon 4×2 Class-E
   - 6 : Wagon 4×2 Class-F
   - 7 : Wagon 4×2 Class-G
   - A : Wagon 4×4 Class-A
   - B : Wagon 4×4 Class-B
   - C : Wagon 4×4 Class-C
   - D : Wagon 4×4 Class-D
   - E : Wagon 4×4 Class-E
   - F : Wagon 4×4 Class-F
   - G : Wagon 4×4 Class-G
5. Restraint system, Brake system
   5XY

Code	Seat belt	Front air bag		Knee air bag		Side air bag			Curtain air bag		
		Driver's	Passenger's	Driver's	Passenger's	1st row	2nd row	3rd row	1st row	2nd row	3rd r
A	○	○	○	×	×	○	×	×	○	○	×
B	○	○	○	×	×	×	×	×	×	×	×
C	○	○	○	×	×	○	×	×	○	○	○
D	○	○	○	×	×	○	○	×	○	○	×
E	○	○	×	×	×	×	×	×	×	×	×
F	○	○	○	×	×	○	×	×	×	×	×
N	○	×	×	×	×	×	×	×	×	×	×
H	○	○	○	○	×	○	×	×	○	○	○

6. Engine type
   - 6 : Gasoline engine 2.4 (Theta-II GDI)
   - 7 : Gasoline engine 3.3 (Lambda-II GDI)
7. Check digit or Driver’s side & Transmission
   - Check digit : 0 ~ 9, ×

8. Model year
   - D : 2013, E : 2014, F : 2015, G : 2016 …
9. Plant of production
   - G : Georgia (U.S.A)
10. Vehicle production sequence number
    - 000001 ~ 999999

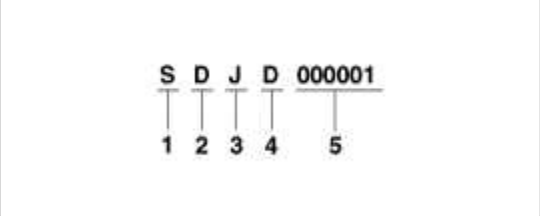
Engine Number



1. Engine fuel
   - G : Gasoline
2. Engine range
   - 4 : 4 cycle 4 cylinder
   - 6 : 4 cycle 6 cylinder
3. Engine development order and capacity
   - D : Lambda engine (Gasoline)
   - K : Theta engine (Gasoline)
4. Engine Capacity
   - H : 3342cc (Lambda-II GDI engine)
   - J : 2359cc (Theta- GDI engine)
5. Production year
   - D : 2013, E : 2014, F : 2015, G : 2016 …
6. Plant of production
   - A : Asan (Korea)
   - B : Beijing (China)
   - H : Hwasung (Korea)
   - K : Montgomery (U.S.A)
   - M : Chennai (India)
   - P : Poseung (Korea)
   - S : Sohari (Korea)
   - T : Izmit (Turkey)
   - U : Ulsan (Korea)
   - W : Shandong (China)
   - Z : Zilina (Slovakia)
   - 1 : Yancheng (China)
7. Engine production sequence number
   - 000001 ~ 999999

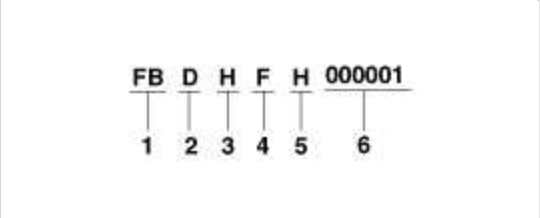
Transaxle Number

Manual



1. Model
   - S : M6GF2
2. Production year
   - D : 2013, E : 2014, F : 2015, G : 2016 …
3. Plant of production
   - J : Hwasung (Korea)
4. Final gear ratio
   - D : 5.071 / 3.737
5. Transaxle production sequence number
   - 000001 ~ 999999

Automatic



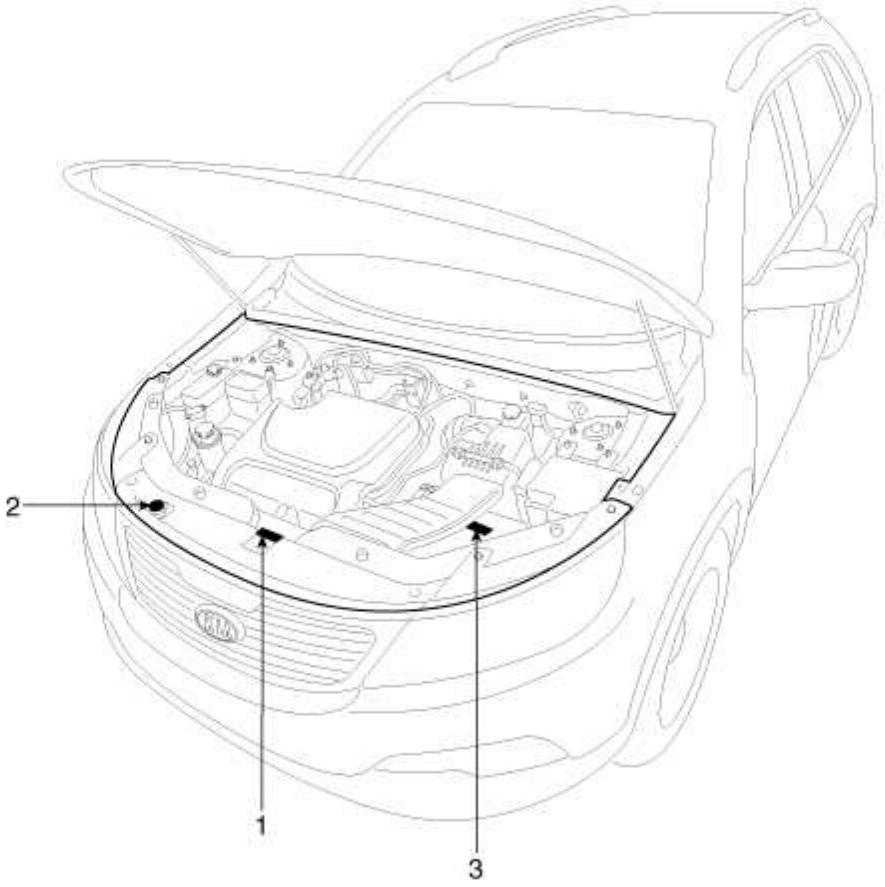
1. Model
   - FB: A6MF2 (Theta-II 2.4 GDI, 2WD, water cooling)
   - FD: A6MF2 (Theta-II 2.4 GDI, 4WD, water cooling)
   - BB: A6LF2 (Lambda-II 3.3 GDI, 2WD, water cooling)
   - BD: A6LF2 (Lambda-II 3.3 GDI, 4WD, water cooling)
2. Production year
   - D : 2013, E : 2014, F : 2015, G : 2016 …
3. Gear ratio
   - H : 3.648
   - C : 3.041
4. Detailed classification
   - F : Theta-II 2.4 GDI (A6MF2, 2WD)
   - C : Theta-II 2.4 GDI (A6MF2, 4WD)
   - B : Lambda-II 3.3 GDI (A6LF2, 2WD/4WD)
5. Plant of production
   - 2 : HPT Plant 2
   - 4 : HPT Plant 4
   - U : Ulsan Plant 1
   - S : Ulsan Plant 2
   - H : Hwasung
6. Transaxle production sequence number
   - 000001 ~ 999999

Paint Code

Code	Color
UD	Clear White
SWP	Snow White Pearl
3D	Bright Silver
K3G	Glittering Metal
EAB	Sage Green
K3N	Golden Beat
NBM	Mahogany Brown
K3R	Temptation Red
UAA	Cosmic Blue
ABP	Aurora Black

General Information

Warning And Caution Labels



1. Fan caution 2. Radiator cap caution	3. Battery caution

Battery Caution Label Description

Warning / Caution Label (Cont'd)

A.
Keep lighted cigarettes and all other flames or sparks away from the battery.

B.
Wear eye protection when charging or working near a battery. Always provide ventilation when working in an enclo space.

- When lifting a plastic-cased battery, excessive pressure on acid to leak resulting in personal injury. Lift with a batt carrier or with your hands on opposite corners.
- Never attempt to change the battery when the battery cables are connected.
- The electrical ignition system works with high voltage.
  Never touch these components with the engine running or the ignition switched on.

C.
Keep batteries out of the reach of children because batteries contain highly corrosive SULFURIC ACID. Do not all battery acid to contact your skin, eyes, clothing or paint finish.

D.
If any electrolyte gets into your eyes, flush your eyes with clean water for at least 15 minutes and get immediate medi attention. If possible, continue to apply water with a sponge or cloth until medical attention is received.
If electrolyte gets on your skin, throughly wash the contacted area. If you feel a pain or a burning sensation, get medi attention immediately.

E.
Always read the following instructions carefully when handing a battery.

F. Hydrogen, which is a highly combustible gas, is always presents in battery cells and may explode if ignited.

G. An improperly disposed battery can be harmful to the environment and human health. Always confirm local regulations for battery disposal.

Handling And Storage The Battery

Battery Itself	• Batteries should be stored in cool, dry (27 degrees Celsius) places and out o direct sunlight. • MF batteries are tightly sealed to prevent acid leakage. However, tilting the battery to an angle of 45 degrees can cause acid to leak through the vents on the sides. Therefore, batteries should always be stored i their upright positions. Prevent placing any aqueous or solid (i.e. conductors) bodies on top of the battery. • It is extremely dangerous to use tools, such as hammers, on the battery termi when connecting cables to the mounted battery.
Battery on Vehicle	• When storing the vehicle for long periods of time, make sure to remove the memory fuse at junction box to prevent natural discharging. • Also, run the engine for battery charging within 1 month if the memory fuse wasn't removed from the start of vehicle storing. If the memory fuse was removed, run the engine for battery charging within 3 months from the start of vehicle storing.

NOTICE

After reconnecting or recharging a discharged battery, the ESC OFF indicator may illuminate.
In this case, turn the handle half way to the left and right whilst the ignition switch is in the ON position.
Then, restart the engine after the ignition is OFF.
The ESC OFF indicator may turn OFF.
If the ESC OFF indicator does not turn OFF, have the system checked refering to DTC.

General Information

Lift And Support Points

⚠ WARNING

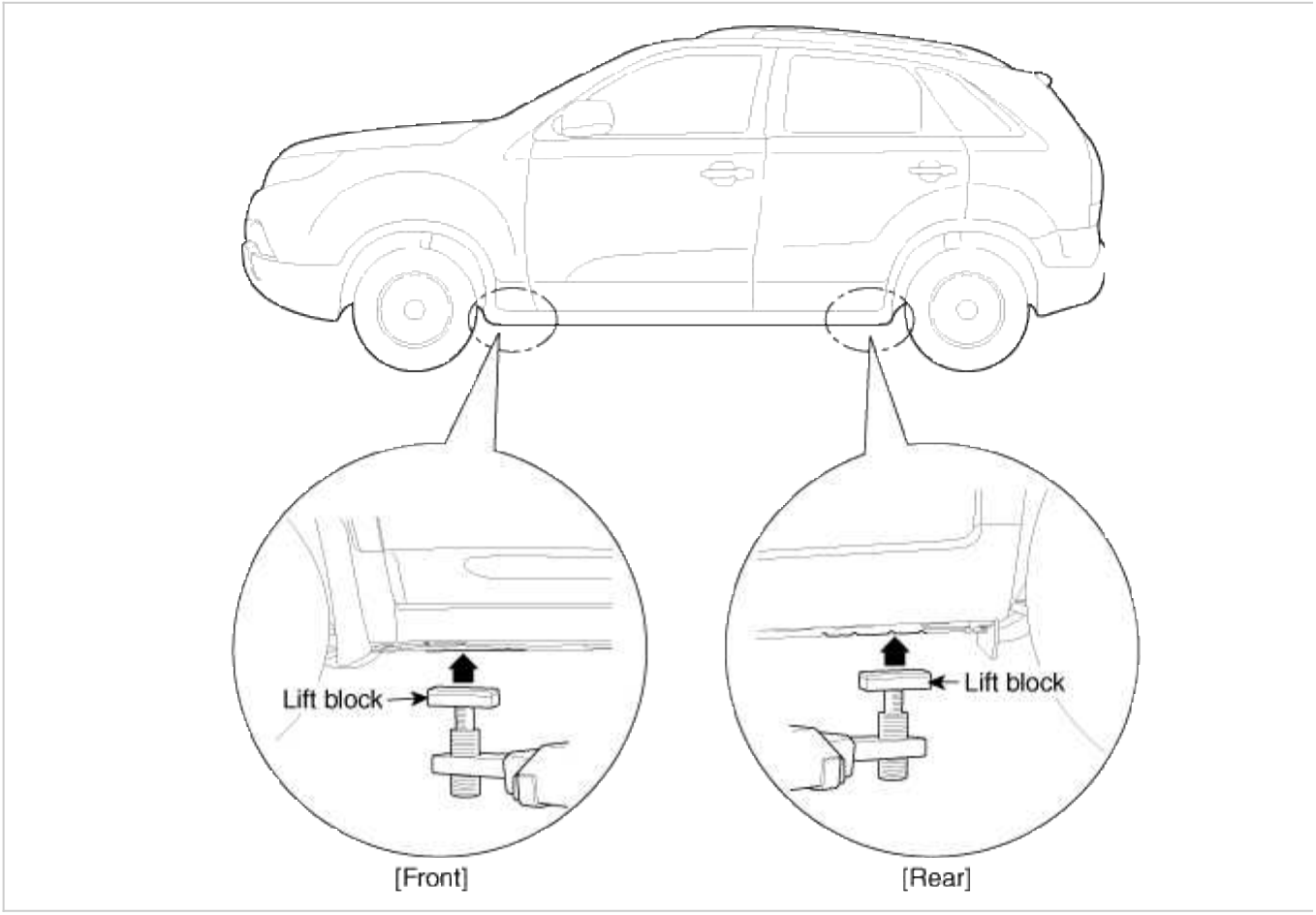
When heavy rear components such as suspension, fuel tank, spare tire, tailgate and trunk lid are to be removed, pla additional weight in the luggage area before hoisting. When substantial weight is removed from the rear of the vehicl the center of gravity may change and can cause the vehicle to tip forward on the hoist.

NOTICE

- Since each tire/wheel assembly weights approximately 14kg (30lbs), placing the front wheels in the luggage area can assist with the weight distribution.
- Use the same support points to support the vehicle on safety stands.

1. Place the lift blocks under the support points as shown in the illustration.
2. Raise the hoist a few inches (centimeters) and rock the vehicle to be sure it is firmly supported.

3. Raise the hoist to full height to inspect the lift points for secure support.



General Information

Towing

If the vehicle needs to be towed, call a professional towing service. Never tow vehicle with just a rope or chain. It is v
dangerous.

[Front]

[Rear]

Emergency Towing

There are three popular methods of towing a vehicle :

- The operator loads the vehicle on the back of truck. This is best way of transporting the vehicle.
- The tow truck uses two pivoting arms that go under the tires of the driving axle and lift them off the ground. The o two wheels remain on the ground.
- The tow truck uses metal cables with hooks on the ends. These hooks go around parts of the frame or suspensio and the cables lift that end of the vehicle off the ground. The vehicle's suspension and body can be seriously dama if this method of towing is attempted.

If the vehicle cannot be transported by flat-bed, should be towed with the wheels of the driving axle off the ground an do the following :

Manual Transaxle

- Release the parking brake.
- Shift the Transaxle to neutral

Automatic Transaxle

- Release the parking brake.
- Start the engine.
- Shift to [D] position, then [N] position.
- Turn off the engine.

⚠ CAUTION

- The vehicle equipped with full-time 4WD should be only transported on a flat-bed.
- Improper towing preparation will damage the transaxle. follow the above procedure exactly. If you cannot shift th transaxle or start the engine(automatic transaxle), your vehicle must be transported on a flatbed.
- It is the best to tow vehicle no farther than 30km (19miles), and keep the speed below 50km/h (30mph). (For th full-time 4WD vehicle, limit the towing to 1.5km (1mile) and 15km/h (10mph)
- Trying to lift or tow your vehicle by the bumpers will cause serious damage. The bumpers are not designed to support the vehicle's weight.

General Information

Basic Service Symbols

There are five primary symbols used to complement illustrations. These symbols indicate the part to apply such materi during service.

Symbol	Meaning
	Do not reuse the part. Replace a new one.
	Apply engine oil or transmission oil to the part.
	Apply automatic transmission fluid (ATF) to the part.
	Apply grease to the part.
	Apply sealant to the part.

General Information

General Service Information

Protection Of The Vehicle

Always be sure to cover fenders, seats, and floor areas before starting work.

⚠ CAUTION

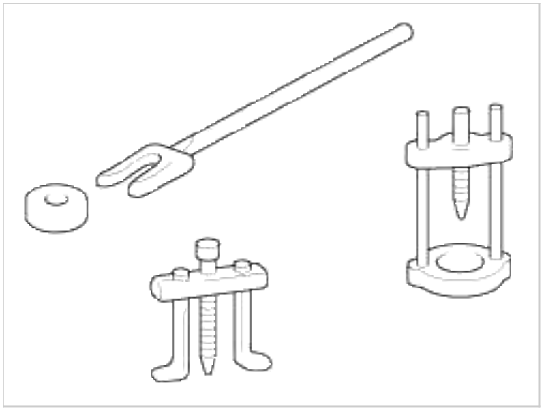
The support rod must be inserted into the hole near the edge of the hood whenever you inspect the engine compartment to prevent the hood from falling and causing possible injury.
Make sure that the support rod has been released prior to closing the hood. Always check to be sure the hood is firı latched before driving the vehicle.

Preparation Of Tools And Measuring Equipment

Be sure that all necessary tools and measuring equipment are available starting work.

Special Tools

Use special tools when they are required.



Removal Of Parts

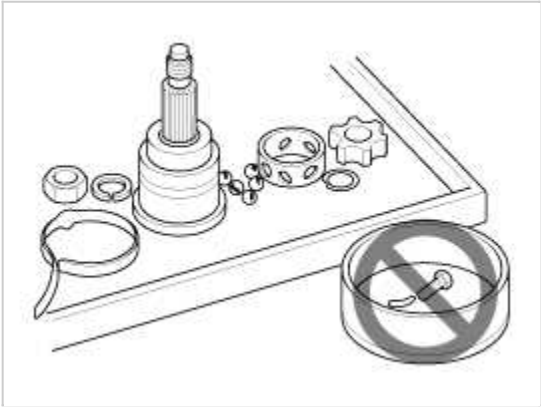
First find the cause of the problem and then determine whether removal or disassembly before starting the job.

Disassembly

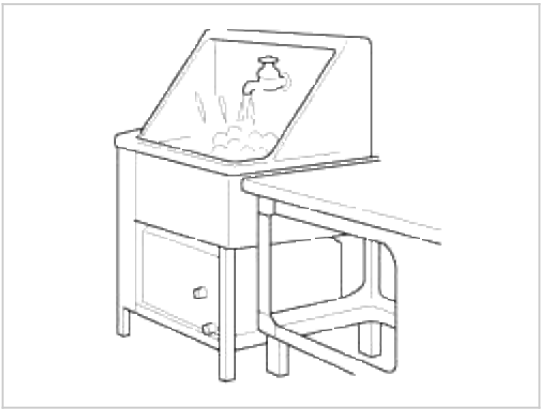
If the disassembly procedure is complex, requiring many parts to be disassembled, all parts should be disassembled i way that will not affect their performance or external appearance.

1. **Inspection of parts**
   Each part, when removed, should be carefully on suspected for malfunction, deformation, damage, and other problems.

2. **Arrangement of parts**
   All disassembled parts should be carefully arranged for effective reassembly.
   Be sure to separate and correctly identify the parts to be replaced from those that will be used again.



3. **Cleaning parts for reuse**
   All parts to be used again should be carefully and thoroughly cleaned by an appropriate method.

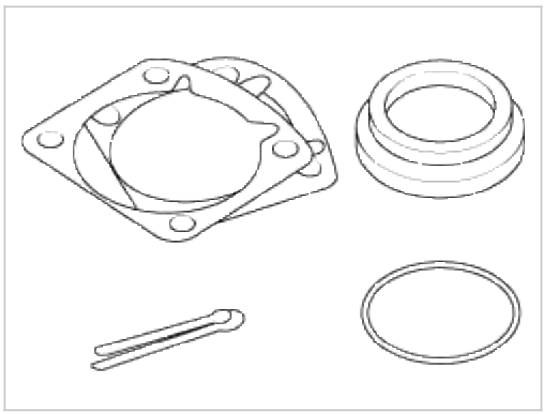


Parts
When replacing parts, use KIA MOTORS genuine parts.

Replacement
Standard values, such as torques and certain adjustments, must be strictly observed in the reassembly of all parts.
If removed, the following parts should always be replaced with new ones.

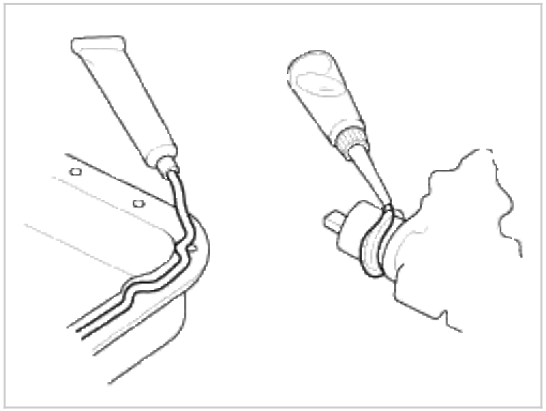
1. Oil seals
2. Gaskets

3. O-rings
4. Lock washers
5. Cotter pins (split pins)
6. Plastic nuts



Depending on their location.

7. Sealant should be applied to gaskets.
8. Oil should be applied to the moving components of parts.
9. Specified oil or grease should be applied to the prescribed locations (oil seals, etc) before assembly.

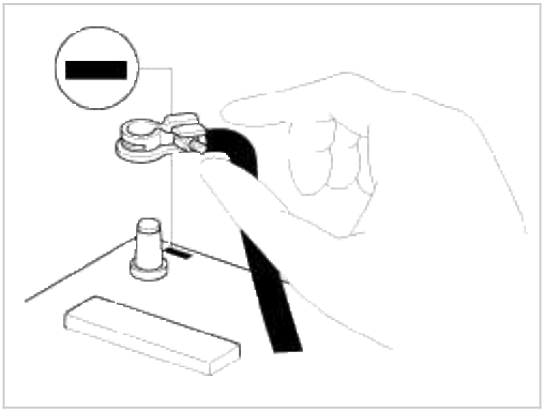


Adjustment

Use gauges and testers to adjust correctly the parts to standard values correctly.

Electrical System

1. Be sure to disconnect the battery cable from the negative (-) terminal of the battery.
2. Never pull on the wires when disconnecting connectors.
3. Locking connectors will click when the connector is secure.
4. Handle sensors and relays carefully. Be careful not to drop them against other parts.



Rubber Parts And Tubes

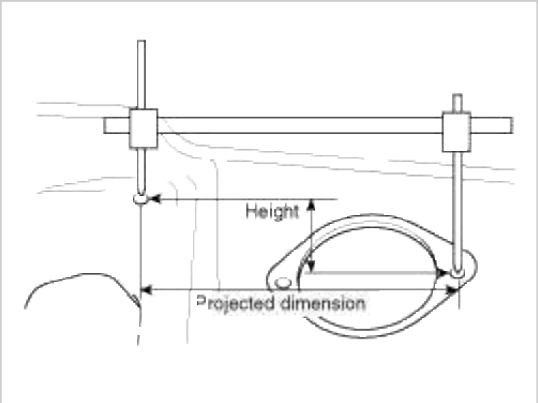
Always prevent gasoline or from touching rubber parts or tubing.

Measuring Body Dimensions

1. Basically, all measurements in this manual are taken with a tracking gauge.
2. When a measuring tape is used, check to be sure there is no elongation, twisting or bending.
3. For measuring dimensions, both projected dimensions and actual - measurement dimensions are used in this manu

Dimensions Projected

1. These are the dimensions measured when the measurement points are projected from the vehicle's surface, and a the reference dimensions used for used for body alterations.
2. If the length of the tracking gauge probes is adjustable, measure it by lengthening one of two probes as long as the different value in height of the two surface.

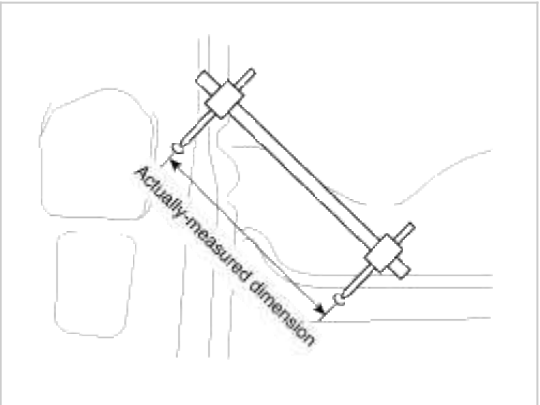


Measuring Actual Dimensions

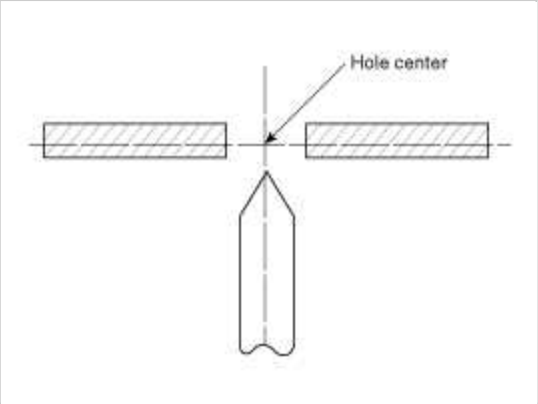
1. These dimensions indicate the actual linear distance between measurement points, and are used as the reference dimensions when a tracking gauge is used for measurement.

2. First adjust both probes to the same length (A=A') before measurement.

> **NOTICE**
> Check the probes and gauge itself to make sure there is no free play.



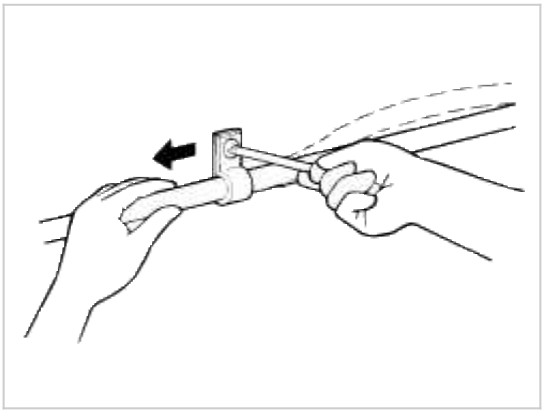
Measurement Point
Measurements should be taken at the center of the hole.



Checking Cables And Wires

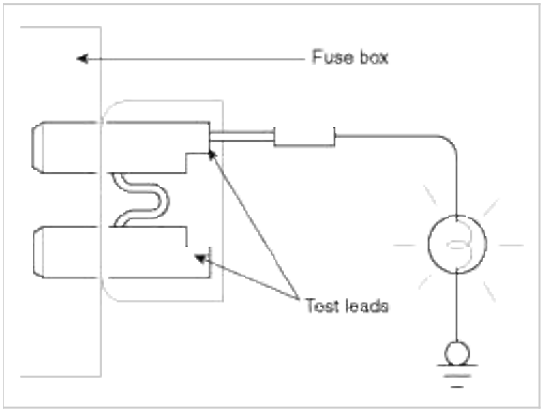
1. Check the terminal for tightness.
2. Check terminals and wires for corrosion from battery electrolyte, etc.
3. Check terminals and wires for open circuits.
4. Check wire insulation and coating for damage, cracks and degrading.
5. Check the conductive parts of terminals for contact with other metallic parts (vehicle body and other parts).
6. Check grounded parts to verify that there is complete continuity between their attaching bolt(s) and the vehicle's body.
7. Check for incorrect wiring.
8. Check that the wiring is so clamped to the prevent contact with sharp corners of the vehicle body, etc. or hot par (exhaust manifold, etc.)
9. Check that the wiring is clamped firmly to provide enough clearance from the fan pulley, fan belt and other rotatin moving parts.

10. Check that the wiring has a little space so that it can vibrate between fixed and moving parts such as the vehicle body and the engine.



Check Fuses

A blade type fuse test taps provided to allow checking the fuse itself without removing if from the fuse box. The fuse i good if the test lamp lights up when one lead is connected to the test taps (one at a time) and the other lead is ground (Turn the ignition switch so that the fuse circuit becomes operative)



Servicing The Electrical System

1. Prior to servicing the electrical system, be sure to turn off the ignition switch and disconnect the battery ground ca

> **NOTICE**
> In the course of MFI or ELC system diagnosis, when the battery cable is removed, any diagnostic trouble code retained by the computer will be cleared. There fore, if necessary, record the diagnostic data before removing the battery cable.