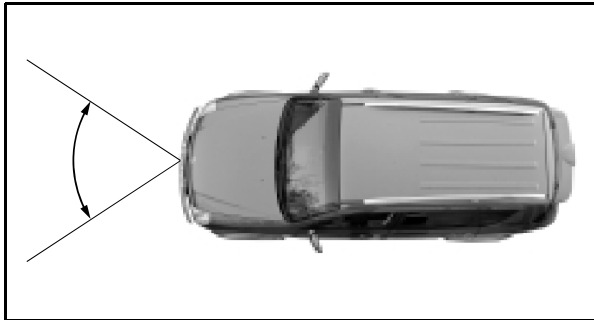


# AIR BAG AND SEAT BELT

**8810-05**

## GENERAL

### 1. CAUTIONS WITH THE AIR BAG



#### 1) Side Airbag Operation

The air bag inflates when:

- Vertical side impact is over 25 km/h of vehicle speed

The air bag does not inflate when:

- Impact speed is very low
- Rear impact

The air bag seldom inflates when:

- Oblique impact (diagonal direction)
- Impact at engine compartment or trunk
- Partial impact at side of the front seat such as telegraph pole
- Vertical impact against a motorcycle
- Rollover

#### 2) Front Airbag Operation (Driver's and Passenger's)

The air bag inflates when:

- Frontal impact against a solid concrete wall at over 25 km/h or near-frontal impact within 30 degrees from the center of the vehicle at both corners

The air bag can inflate when:

- Underbody impact from the road surface; impact against the curb at a very high speed; dropping impact onto the road surface with a large angle

The air bag does not inflate when:

- Rollover, side impact or rear impact

The air bag seldom inflates when:

- Oblique impact, rollover
- Weak impact in which the sensor is unable to detect (under the inflation requirements)
- Impact against narrow objects such as a telegraph pole or a tree
- The vehicle falls into a drainage or a puddle
- The front of the vehicle crashes into high impact point vehicle such as a truck
- Impact on the hood by falling stones
- The air bag warning lamp is on

Modification basis	
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### 3) Warnings for Airbag

- Do not diagnose the circuit with a circuit tester. Do not attempt to modify any air bag components including the steering wheel, air bag mounting area, and harness.
- Do not impact any air bag components including the steering wheel, air bag mounting area, and harness by hand or tools. You may get injured by sudden deployment.
- The air bag components will be very hot after deployment. Do not touch them.
- Once the air bag system is triggered, the triggered air bag assembly should be removed from the vehicle and replaced with new one.
- The air bag contains explosive materials, so contact Ssangyong Dealer or Ssangyong Authorized Service Operation when trashing or replacing it.
- Incorrect air bag inspection can be dangerous and cause injuries. The air bag system must be disposed only by Ssangyong Dealer or Ssangyong Authorized Service Operation.
- Replace the steering wheel with only Ssangyong genuine part.
- When the engine starts, the air bag warning lamp comes on for a system check. It goes out after 3 to 7 seconds when the system is normal. If this warning lamp stays ON, then the system may be defective. Have the air bag system checked immediately by Ssangyong Dealer or Ssangyong Authorized Service Operation.
- The seat belt and air the bags are the most effective when you are sitting well back and upright in the seat.
- A child restraint system must not be placed on the front seat. The infant or child can be severely injured by an air bag inflation in case of an accident.
- Do not carry your child on your lap while driving. You cannot resist against the impact pressure in an accident.  
The child could be crushed between you and the parts of the vehicle.
- Do not place any objects on the air bag inflation location. You may get injured by those objects during deployment.
- Do not attach any objects such as a sticker, scent bottle, or phone holder on the steering wheel pad and to the dashboard.
- Do not put the seat cover on the front seatbacks. It may interfere with the side air bag inflation.
- When sitting in the rear seat, do not hold onto the seatback of the front seat. If the side air bag inflates, the occupant may get seriously injured.
- Do not lean on the door. When the side air bag inflates, the occupant may get seriously injured.
- Do not place any objects such as an umbrella or a bag between the side air bag and the door. Do not place the part of your body near the side air bag. You may obstruct the side air bag or get injured by the inflation impact.

Modification basis	
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- Do not slam the front doors. It may lead to an unintended inflation of the side air bag.
- Do not move your seat too close to the steering wheel or dashboard. If you lower your head, the air bag can hit your head during inflation and can cause severe injury or even death.
- Hold only the outer rim of the steering so that the air bag can inflate without any hinderances.
- Do not place your face or chest near the steering wheel and dashboard. Also, do not allow anyone to place their hands, leg or face on the dashboard. The air bag cannot work properly.
- Do not hold and operate the steering wheel by crossing your arms. You could get seriously injured when the air bag deploys.
- When the air bag inflates, it makes a loud noise and smoke. However, the smoke is a non-toxic nitrogen gas.
- When the air bag is deployed, non-toxic gas will come out. This gas may cause skin, eyes or nose irritation.  
Wash it out with cold and clean water and consult the doctor if irritation continues.
- When any repairs are needed for the steering wheel, or when an accident occurred without the air bag deployment, have the air bag system checked by Ssangyong Dealer or Ssangyong Authorized Service Operation.
- The windshield glass may be broken when the passenger's air bag is deployed.
- The air bag deployment can cause abrasion on your hands and face.

#### 4) Airbag Module Discard

##### ▶ Airbag module deployment (inside vehicle)

Deploy the airbag before disposing of them. If a vehicle to be scraped, the airbag may be deployed inside the vehicle.

- Before deploying the airbags, remove all loose objects from the airbag's expansion area.
- Deploy the airbags with the vehicle doors closed and the side windows open.
- Deploy the airbags only in an evacuated area. Service personnel who must be present during the deployment should be at least 10 meters (33 feet) in front of the vehicle.
- Do not connect the voltage source until after having completed all other preparations for the deployment of the airbags.
- Allow a deployed airbag module or pretensioner to cool for at least 30 minutes before handling.
- If the deployment fails, disconnect the voltage source and wait 5 minutes before approaching the vehicle.

Modification basis	
Application basis	
Affected VIN	

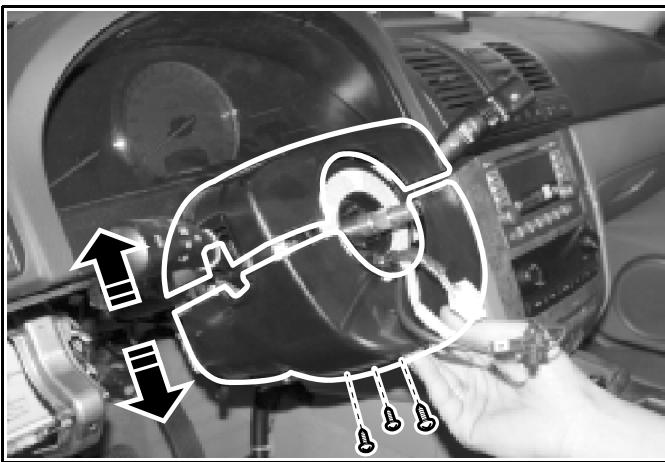
## 5) Airbag Module Discard (Driver)

1. Disconnect the battery cable and place the vehicle battery at least 10 meters (33 feet) away from the airbag module.

### **⚠ CAUTION**

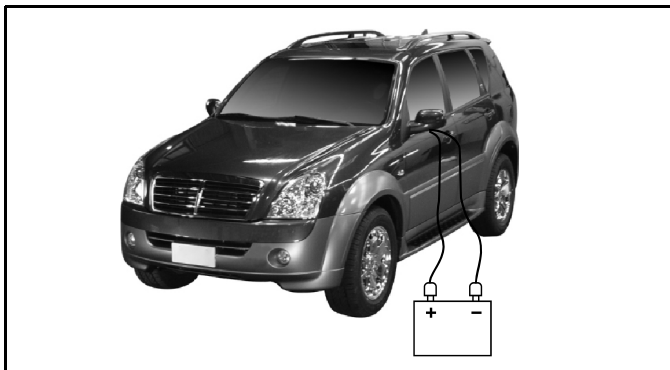
- If the airbags are not disconnected, service cannot begin until one minute has passed after disconnecting power to the SDM. If the airbags are disconnected, service can begin immediately without waiting for one-minute time period to expire. Failure to temporarily disable the SRS during service result in unexpected deployment, personal injury and otherwise unneeded SRS repair.

2. Remove the lower cover of the steering column.



3. Cut two wires between the airbag and the contact coil.
4. Strip 13 mm (0.5 inch) of the insulation from the end of the wires leading to the contact coil.
5. Use two additional wires, each at least 10 meters (33 feet) long, to reach from the deployment battery to the airbag module.
6. Strip 13 mm (0.5 inch) of the insulation from the ends of these two additional wires.
7. Twist the two wires together at one end.
8. Place the twisted ends of the two wires near the deployment battery. Do not connect the wires to the battery at this time.
9. Using the free ends of the 10 meters (33 feet) wires leading to the airbag module, make two splices, one at each wires from the airbag module.
10. Wrap the splices with insulating tape.
11. Now that the free ends of the 10 meters (33 feet) wires are spliced to the airbag module wires and the ends that are twisted together are near the deployment battery, clear the area.
12. Untwist the wires that near the deployment battery.

Modification basis	
Application basis	
Affected VIN	



13. Touch one wire to the positive battery terminal and touch the other wire to the negative battery terminal.

The airbag module will deploy.

14. Refer to "DEPLOYED AIRBAG MODULE DISPOSAL PROCEDURE" in this section.

► **Airbag module discard (passenger)**

The passenger airbag deployment is the same procedure of the driver's. Remove the glove box instead of the contact coil and cut two passenger airbag wires.

Refer to "AIRBAG MODULE DISCARD (DRIVER)" in this section for more information.

► **Airbag module deployment (outside vehicle)**

**Deploy airbag modules in following situations:**

- If the airbag module is removed in the discarded vehicle.
- If the airbag module is replaced due to any fault.
- If an airbag module is damaged during transfer, storage or servicing.

**Observe following precaution if the airbag is deployed:**

- Deploy the airbags only in an evacuated area. Service mechanics should be at least 10 meters (33 feet).
- Do not connect the voltage source until after having completed all other preparations for the deployment of the airbags.
- Allow a deployed airbag module or pretensioner to cool for at least 30 minutes before handling.
- If the deployment fails, disconnect the voltage source and wait 5 minutes before approaching the vehicle.

1. Position the airbag module face up, on flat ground outdoors, at least 10 meters (33 feet) from any obstacle or people.
2. Place a vehicle battery at least 10 meters (33 feet) away from the airbag module.
3. Deploy the airbag module using the deployment tool. If you do not have deployment tool, cut the two additional wires to the airbag module and strip 13 mm (0.5 inch) of the insulation from the end of the wires leading to the airbag module.
4. Refer to "DEPLOYED AIRBAG MODULE DISPOSAL PROCEDURE" in this section.

Modification basis	
Application basis	
Affected VIN	

## 6) Deployed Airbag Module Disposal Procedure

After deployment, a powdery residue may be on the surface of the airbag. The powder consists primarily of cornstarch (used to lubricate the bag as it inflates) and by-products of the chemical reaction. Sodium hydroxide dust (similar to lye soap) is produced as a by-product of the deployment reaction. The sodium hydroxide then quickly reacts with atmospheric moisture and is converted to sodium carbonate and sodium bicarbonate also known as baking soda}. Therefore, it is unlikely that sodium hydroxide will be present after deployment. Wear gloves and eye protection during the disposal procedure.

After deployment, the metal surfaces of the airbag module will be hot. In order to avoid the risk of an injury or a fire, do not place the deployed airbag module near any flammable objects, and allow the airbag module to cool for 30 minutes before handling. Deploy an airbag or pretensioner before disposing of it.

This includes those in a whole vehicle being scrapped. If the vehicle is still within the warranty period contact the SsangYong regional service manager for approval or special instructions before deploying an airbag module or pretensioner.

Modification basis	
Application basis	
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## OVERVIEW AND OPERATION PROCESS

### 1. OVERVIEW

When the ignition is switched ON, the supplemental inflatable restraints (SIR) warning lamp must blink at six times for 6 seconds and then turn off.

There is a fault in the airbag system if the warning lamp does not turn OFF or the warning lamp illuminates while the vehicle is in operation. If the warning lamp indicates there is a fault in the airbag system, assume that the SIR system may not be functional.

#### CAUTION

Failure to follow all service procedures in the correct sequence can cause the airbag system to deploy unexpectedly and possibly cause a serious injury.

- Only trained personnel at franchised SsangYong dealers and authorized SsangYong service dealerships may service the airbag system.
- Never attempt to disassemble, repair or reuse the following component;
  - Airbag modules
  - Clock spring
  - Sensing and diagnostic module
  - Wiring harness
- When repairing SIR component, follow the service notice;
  - Inspect any SIR part before it is installed.
  - Use only new parts.
  - Do not install used SIR parts from other vehicles.
  - Do not install any part that has been dropped or that has dents, cracks or other defects.
- Before testing, disconnect the negative battery cable.

Wait one minute for the SDM capacitor to discharge.

The capacitor supplies reserve power to deploy the airbags, even if the battery is disconnected.

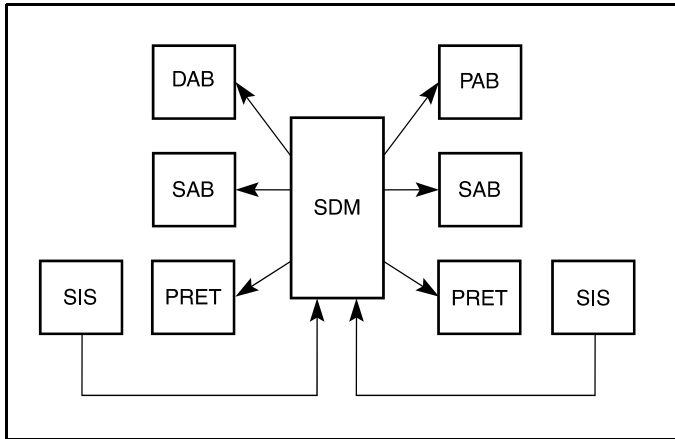
Unintentional deployment of the airbags can cause injury.

Modification basis	
Application basis	
Affected VIN	

## 1) SIR System

SIR system consists of 6-Loop (DAB, PAB, 2\*SAB, 2\*PRET) fully and the block diagram is as shown below.

On this diagram, SDM sends the output signal to DAB, PAB, 2\*SAB, 2\*PRET and receives the input of side impact from 2\*SIS (Side Impact Sensor).



### Abbreviation

1	SDM	Sensing and Diagnostic Module
2	DAB	Driver-side Airbag Module
3	PAB	Passenger-side Airbag Module
4	SAB	Side Airbag Module (Driver, Passenger)
5	PRET	Seatbelt Pretensioner (Driver, Passenger)
6	SIS	Side Impact Sensor (Driver, Passenger)



## 2. FUNCTION DESCRIPTION

### 1) Back (Cushion)

- The airbag system performance is influenced on the cushion size, shape and position.
- The cushion strength is a important parameter on the impact absorb effect.
- Therefore, the control of the airbag performance depends on cushion size, shape, inflator characteristic and vent hole size for the gas discharge.
- The cushion's material and folding function to control the cushion deployment direction and the performance to protect passenger's face.

### 2) Module cover/housing

- It is a type of a container that includes the cushion and the inflator.
- The module housing functions to deliver the reaction force between the body structure and the airbag (The airbag reaction is absorbed generally to the steering wheel or instrument panel).
- The module cover must be considered in a viewpoint of protection between exterior, internal units and cushion. Also the module cover should be designed not to cause any personal injury for deployment.

### 3) Inflator

- The inflator is a type of the direct gas generated device.
- The inflator with initial low pressure provides negative restraint effect regarding passengers moving and time.

On the contrary, the inflator with initial high pressure allows other components of the airbag to make a excessive impact resulting in any personal injury.

Thus, the inflator output must be optimized according to the characteristic of the vehicle and passenger moving.

- The discharge gas has no toxicity or inflammability and also it is the important parameter to control the high temperature for gas firing.

Modification basis	
Application basis	
Affected VIN	

## 4) Airbag Module

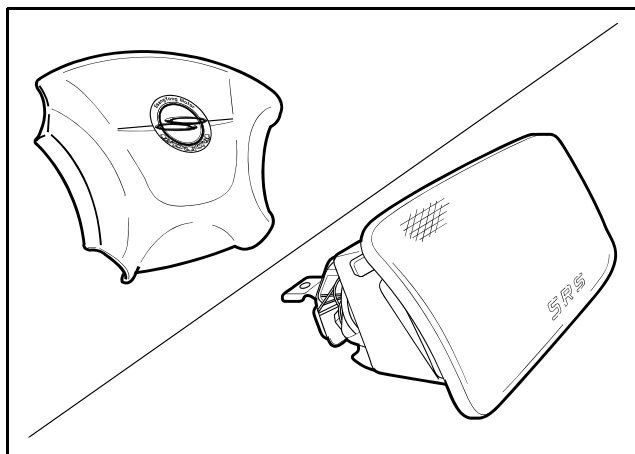
The driver airbag module is under the center pad of the steering wheel.

The passenger airbag module is installed in the instrument panel at passenger side.

The driver and passenger side airbag is inside each seat.

### CAUTION

- Do not disassemble the airbag module because unintentional deployment of the airbags resulting from any damage or interference of the module can cause injury.



Modification basis	
Application basis	
Affected VIN	

## 5) SDM (Sensing and Diagnostic Module)

1. The airbag system consists of the module section (driver, passenger and side), seat belt section and SDM.
2. The SDM has no user-serviceable parts and monitors the system components continuously. The SDM also records any faults which are discovered.
3. The SDM allows the fault codes to be retrieved with a scan tool and illuminates a warning lamp that alerts the driver to any faults.

The SDM located on floor beneath the floor console assembly. The SDM performs the following functions:

- Impact decision processor function.  
Determine the airbag deployment through the impact signal of the accelerometer sensor and the safety sensor.
- Malfunction detection and recording any faults that are detected.  
Monitor the supplemental restrain system electrical components and set a diagnostic trouble code when malfunction is detected.
- Display airbag fault codes Display airbag fault codes and system status information when connected to a scan tool.
- Self-diagnosis function Illuminate the AIRBAG indicator to alert the driver to any fault.
- Power supply function Provide a reserve power source to deploy the airbags and pretensioners if an accident has disabled the normal power source.

## 6) Accelerometer sensor

The accelerometer sensor electronically represents the acceleration or deceleration of the vehicle during a frontal impact.

In this electronic representation, the electrical signal is proportional to the acceleration or deceleration of the vehicle.

## 7) Safety sensor

The safety sensor is safety device made up of a dualcontact, electro-mechanical switch that:

1. Acts independently of the electronic components.
2. Connects the acceleration sensor in series in order to make up for the weak points in the current electronic sensor.

## 8) Micro controller

This device receives the impact signal from the sensor for vehicle impact and identifies whether the current condition is necessary for airbag deployment or not. And then the controller sends the specified currents to the airbag ignition circuit as needed.

This device always monitors the airbag system in conduction with the diagnostic circuit. When it is detected any problem, it illuminates the airbag warning indicator to inform driver of the fault and stores the fault information.

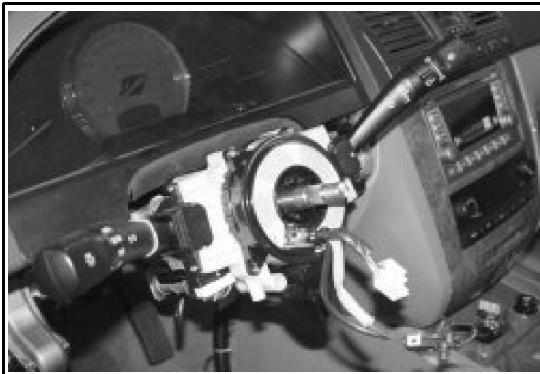
Modification basis	
Application basis	
Affected VIN	

## 9) Contact coil

The contact coil is installed between the steering wheel and the steering column and contains a coil that enables to contact electrically between the airbag wiring harness, the driver airbag module and the horn switch.

### CAUTION

- Turning the steering wheel more than three and onequarter turns may damage the clock spring. The contact coil should never be disassembled and must be replaced if the airbag have been deployed.



### CAUTION

- Turn the label of the clock spring clockwise to lock and turn the clock spring counterclockwise approximately  $2.9 \pm 0.2$  turns to the neutral positions with the front wheels ahead.  
Align the pointed marks "▶ ◀".

Modification basis	
Application basis	
Affected VIN	

## 10) Airbag Warning Lamp

The instrument cluster contains an airbag warning indicator bulb to verify the operation of the AIRBAG indicator and sensing and diagnostic module (SDM).

The SDM performs a turn-on test when the ignition is turned ON. The SDM flashes the AIRBAG indicator seven times by supplying an intermittent ground to the indicator lamp circuit. After flashing seven times, the AIRBAG indicator will turn off if no more malfunctions have been detected.



Warning Lamp Status	Fault Contents
Flash at seven times for 7 seconds and then turn off	System OK
Warning lamp stays ON	System fault
	Internal SDM fault
No turn on	Power supply circuit open and fuse open
	Warning lamp circuit open
	SDM fault

Modification basis	
Application basis	
Affected VIN	

## 11) Wiring Harness Connectors

If the sensing and diagnostic module (SDM) electrical connector is not attached properly, a built in shorting bar will connect the wire from airbag warning lamp with the SDM ground wire. This turns on the AIRBAG indicator.

To prevent deployment during servicing, additional shorting bars are located in following locations:

- Driver airbag module connector
- Passenger airbag module connector
- Driver and passenger side airbag module connector
- SDM wiring harness connector
- Contact coil connector to airbag wiring harness

The shorting bar is only a backup safety device. Always disable the supplemental restraints system (SRS) before beginning any service procedure.

## 12) Belt Pretensioner

The belt pretensioner enables to retract the driver and the passenger seat belt webbing to reduce any personal impact when accounted a frontal collision.

Modification basis	
Application basis	
Affected VIN	