PRINCIPLE OF OPERATION

Introduction

In the event of a collision the air bag control unit monitors the rate of deceleration caused by the collision. This information is then used to determine whether air bags should be deployed.

Air bag deployment is dependent on the rate at which the passenger compartment changes speed following the collision. The circumstances affecting different collisions (vehicle speed, angle of impact, type and size of object hit etc) vary considerably, and will affect the rate of deceleration accordingly.

The Supplementary Restraint System (SRS) components include :-

- SRS warning indicator.
- Rotary coupler.
- Air bag modules.
- Seat belt pre-tensioners.
- Air bag diagnostic control unit.
- Crash sensors.
- Air bag wiring harnesses.
- Seat occupancy sensor.

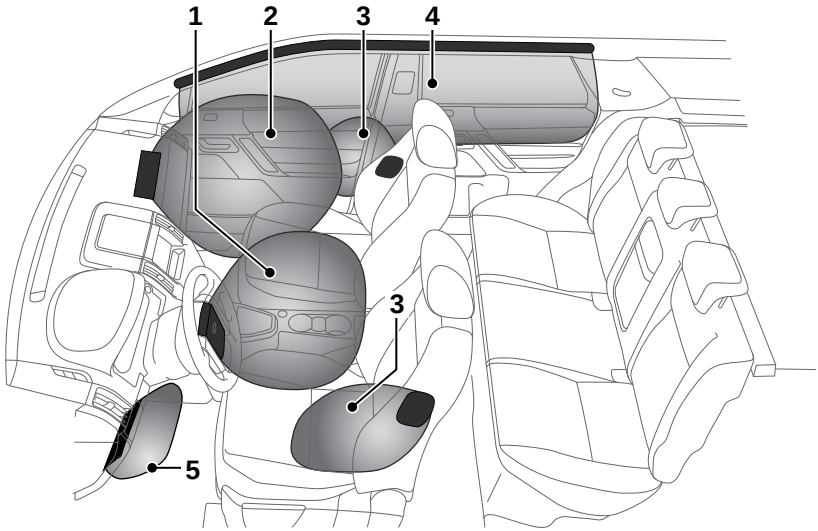
Note: *The SRS is not designed to operate as a result of:*

- Rear impacts.
- Minor front impacts.
- Minor side impacts.
- Heavy braking.
- Driving over bumps and pot holes.

Therefore, it follows that considerable superficial damage to the vehicle can occur without causing the air bags to deploy.

Supplementary restraints system

Air bags



1. Driver's air bag.
2. Front passenger air bag.
3. Seat mounted side air bags.
4. Curtain air bags.
5. Knee-bolster air bag.

WARNINGS

National Highway Traffic Safety Administration (NHTSA) recommends a minimum distance of 25 cm (10 inches) between an occupant's chest and the driver's air bag module.

High speed impacts may cause serious injury or death irrespective of safety features fitted to a vehicle. Always drive with caution and consideration for the vehicle's characteristics, road and weather conditions, and do not exceed any speed limits in force.

WARNINGS

Seat belts should be worn at all times, by the driver and passengers in all seating positions. The air bag SRS cannot provide protection in some types of impact. Under these circumstances the only protection will be provided by a correctly worn seat belt.

Air bags inflate at high speeds, and can cause injuries. To minimise the risk of injury, ensure that all vehicle occupants wear correctly positioned seat belts, sit correctly in the seats, and position the seats as far back as practical.

Ensure that a gap is maintained between the side of the vehicle, and the head and torso. This will enable unobstructed inflation of the curtain and seat mounted side air bags.

WARNINGS

Air bag inflation takes place instantaneously and cannot protect against the effects of secondary impacts. Under these circumstances the only protection will be provided by a correctly worn seat belt.

Phone systems should only be installed by qualified persons familiar with the operation of, and requirements for, vehicles fitted with SRS. If you are in any doubt seek advice from your Land Rover Dealer.

Note: *The location points of air bags fitted to the vehicle are marked by the words AIR BAG embossed into the trim.*

Always contact your Land Rover Dealer if :-

- An air bag inflates.
- The front or sides of the vehicle are damaged.
- Any part of the SRS shows signs of cracking or damage, including trim covering air bags.

Air bag operation

WARNINGS

For the air bags to operate correctly the roof lining and door post trims must be in good condition, correctly fitted, and free from obstruction. Any damage, wear, or incorrect fitment should be referred to your Land Rover Dealer as soon as possible for examination and repair.

WARNINGS

Do not allow passengers to obstruct the operation of the air bags by placing any part of their person, or any objects, in contact with, or close to, an air bag module. Air bags deploy at very high speeds, and can cause serious injury or death if objects or occupants are within the area of deployment.

Air bags cannot deploy correctly if they are obstructed. Examples of obstructions are :-

- Any part of an occupants body in contact with, or close to, an air bag cover.
- Objects placed on, or close to, an air bag cover.
- Clothing, sun screens, or other material hanging from grab handles.
- Clothing, cushions, or other material, covering seat mounted air bags.
- Seat covers which are not approved by Land Rover, or specifically designed for use with seat mounted air bags.

This list is not exhaustive, and it remains the responsibility of the driver and passengers to ensure that the air bags are not obstructed in any way.

Deployment and deflation

In the event of a collision the air bag control system monitors the rate, and direction of deceleration. If required to supplement the seat belts, air bags will be deployed as appropriate.

Front air bags

The front passenger's, and driver's air bags are able to deploy in two stages depending on the severity of the frontal impact. In a severe impact the air bags inflate fully to offer maximum protection. In a lesser impact full deployment is not required, so the air bags are partially inflated.

Side and curtain air bags

Side and curtain air bags are designed to offer increased protection for the torso and head in a side impact. The curtain air bags deflate at a slower rate than the front, or side air bags to afford greater protection from serious head injuries.

Air bag deployment effects

WARNINGS

When an air bag inflates a fine powder is released. This is normal, and not an indication of a malfunction. However, the powder may cause irritation to the skin, and should be throughly flushed from eyes, and any cuts or abrasions.

After inflation some air bag components are at high temperatures. To prevent injury, do no touch the air bag components until they have cooled.

In order to react with sufficient speed, air bags are deployed by an explosive charge. Consequently air bag deployment is accompanied by a very loud noise which may cause discomfort and temporary loss of hearing.

OCCUPANT SENSING

The front passenger seat is fitted with an occupancy detection system that determines if the seat is unoccupied, occupied by a person of low weight, a child seat or object, or is occupied by a heavier person or object.

The system consists of:

- A weight sensing pressure pad is fitted under the front passenger seat cushion. The sensor measures downwards pressure/weight on the seat cushion.
- A seat belt tension sensor integrated into the anchor point of the front passenger seat belt.
- A control unit installed under the front passenger seat.
- An air bag status indicator lamp, mounted on the passenger's side of instrument panel.

The system will adjust the passenger air bag status and operate the status indicator as follows:

Seat occupancy status	passenger air bag status	Status indicator active
Completely empty	Deactivated	No*
Low weight occupant/child seat/object	Deactivated	Yes
Heavy occupant/object	Activated	No

*It is possible to receive an intermittent indicator with an empty seat condition. This is part of the system's adaptive behaviour and does not affect the status of the passenger air bag. However, if the indicator remains illuminated when the seat is unoccupied or an adult occupant is seated, contact your Land Rover Dealer immediately.

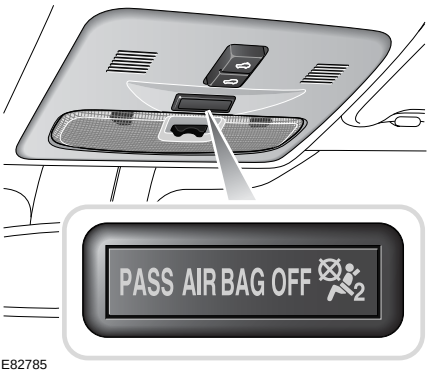
WARNINGS

Do not use a child restraint on a seat protected by an operational air bag in front of it. There is a risk of death or serious injury when the air bag deploys.

The safest place for children is properly restrained in the rear seats.

Note: *In some cases a small child placed in a child seat will not activate the* ***PASS AIR BAG OFF*** *lamp. If this occurs the passenger airbag status will be as described above for an empty seat, i.e. passenger seat airbag deactivated but the* ***PASS AIR BAG OFF*** *lamp will not illuminate.*

Operational status indicator



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WARNING

When checking the operational status of the front passenger airbag, ensure that the ignition is switched on.

The passenger airbag operational status indicator illuminates yellow when the airbag has been disabled.

Note: *The indicator will only illuminate when the ignition is turned on, or the engine is running.*

AIR BAG WARNING LAMP

The air bag warning indicator is mounted in the instrument pack, and will illuminate as a bulb check when the ignition is turned on.

If any of the following warning indicator conditions occur, the vehicle should be checked by your Land Rover Dealer immediately.

- The warning indicator fails to illuminate when the ignition is turned on.
- The warning indicator fails to extinguish within six seconds of the ignition being turned on.
- The warning indicator illuminates at any time other than the bulb check, when the ignition is turned on.

WARNING

If the warning indicator signals that a fault is present in the system, do not use a child restraint on the front passenger seat. Doing so will increase the risk of death or serious injury to the child.

AIR BAG SERVICE INFORMATION

WARNINGS

Do not attempt to service, repair, replace, modify, or tamper with, any part of the SRS. This includes wiring or components in the vicinity of SRS components. Doing so may cause the system to trigger, or render the system inoperative, either of which may result in death or serious injuries.

Do not use any electrical test equipment, or devices in the vicinity of SRS components or wiring. Doing so may cause the system to trigger, or render the system inoperative, either of which may result in death or serious injuries.

All of the following operations should only be carried out by a Land Rover Dealer, or suitably qualified person :-

- Removal or repair of any wiring or component in the vicinity of any SRS components.
- Installation of electrical, or electronic, equipment and accessories.
- Modification to the front or sides of the vehicle exterior.
- Attachment of accessories to the front or sides of the vehicle.