



SNS COLLEGE OF TECHNOLOGY

COIMBATORE-35



DEPARTMENT OF MECHATRONICS ENGINEERING

19MCT402-APPLIED MECHATRONICS ENGG.

UNIT-1 INFOTRONICS

Vehicle support systems:

The system will operate on microcontroller which will monitor the vehicle's surrounding. Each vehicle unit will be loaded with the receiver as well as transmitter which will make the desired functions. This system will help to prevent damage to the car, saving life of driver and passenger etc.

Collision avoidance system:

A collision avoidance system is a safety system designed to warn, alert, or assist drivers to avoid imminent collisions and reduce the risk of incidents. Collision avoidance systems use a variety of technologies and sensors, such as radar, lasers, cameras, GPS, and artificial intelligence. Not all collision avoidance systems are created equally—some warn or alert, while others override the driver to assist them in avoiding collisions and mitigating risk.

Types of Collision Avoidance Alert Systems:

- Forward Collision Warning (FCW)
- Blind-spot Warning (BSW)
- Lane Departure Warning (LDW)
- Cross Traffic Warning
- Pedestrian Detection System

Types of Collision Avoidance Assist Systems:

- Automatic Emergency Braking (AEB)
- Adaptive Cruise Control
- Electronic Stability Control (ESC)
- Parking Assist

Seat belt tightening system:

A seat belt is a vehicle safety device designed to secure the driver or a passenger of a vehicle against harmful movement that may result during a collision or a sudden stop. A seat belt reduces the likelihood of death or serious injury in a traffic collision by reducing the force of secondary impacts with interior strike hazards, by keeping occupants positioned correctly for maximum effectiveness of the airbag (if equipped), and by preventing occupants being ejected from the vehicle in a crash or if the vehicle rolls over.

When in motion, the driver and passengers are traveling at the same speed as the vehicle. If the vehicle suddenly stops or crashes, the occupants continue at the same speed the vehicle was going before it stopped. A seatbelt applies an opposing force to the driver and passengers to prevent them from falling out or making contact with the interior of the car (especially preventing contact with, or going through, the windshield). Seatbelts are considered primary restraint systems (PRSs), because of their vital role in occupant safety. Your vehicle is equipped with pre-tensioner seat belts at the front seating positions.

The purpose of the pre-tensioner is to make sure that the seat belts fit tightly against the occupant's body in certain collisions. The pre-tensioner seat belts may be activated in crashes where the collision is severe enough.

When the vehicle stops suddenly, or if the occupant tries to lean forward too quickly, the seat belt retractor will lock into position. In certain frontal collisions, the pre-tensioner will activate and pull the seat belt into tighter contact against the occupant's body.

If the system senses excessive tension on the driver or passenger's seat belt when the pre-tensioner activates, the load limiter inside the pre-tensioner will release some of the pressure on the affected seat belt.

The pre-tensioner will activate not only in a frontal collision but also in a side collision, if the vehicle is equipped with a side or curtain air bag.

The seat belt pre-tensioner system consists mainly of the following components. Their locations are shown in the illustration:

1. SRS air bag warning light
2. Retractor pre-tensioner assembly
3. SRS control module

To obtain maximum benefit from a pre-tensioner seat belt:

1. The seatbelt must be working correctly and adjusted to the proper position. Please read and follow all of the important information and precautions about your vehicle's occupant safety features – including seat belts and air bags – that are provided in this manual.
2. Be sure you and your passengers always wear seat belts properly.
3. When the pre-tensioner seat belts are activated, a loud noise may be heard and fine dust, which may appear to be smoke, may be visible in the passenger compartment. These are normal operating conditions and are not hazardous.
4. Although it is harmless, the fine dust may cause skin irritation and should not be breathed for prolonged periods. Wash all exposed skin areas thoroughly after an accident in which the pre-tensioner seat belts were activated.
5. Because the sensor that activates the SRS air bag is connected with the pre-tensioner seat belt, the SRS air bag warning light on the instrument panel will illuminate for approximately 6 seconds after the ignition switch has been turned to the "ON" position, and then it should turn off.

If the pre-tensioner seat belt is not working properly, the SRS air bag warning light will illuminate even if there is no malfunction of the SRS air bag. If the SRS air bag warning light does not illuminate when the ignition key is turned to ON, or if it remains illuminated after illuminating for approximately 6 seconds, or if it illuminates while the vehicle is being driven, have the system inspected by a professional workshop.

- Pre-tensioner seat belts systems are designed to operate only one time. After activation, pre-tensioner seat belts must be replaced. All seat belts, of any type, should always be replaced after they have been worn during a collision.
- The pre-tensioner seat belt assembly mechanisms become hot during activation. Do not touch the pre-tensioner seat belt assemblies for several minutes after they have been activated.
- Do not attempt to inspect or replace the pre-tensioner seat belts yourself. Have the system inspected by a professional workshop. Kia recommends to visit an authorized Kia dealer/service partner.
- Do not attempt to service or repair the pre-tensioner seat belt system in any manner.
- Improper handling of the pre-tensioner seat belt assemblies, and failure to heed the warnings not to strike, modify, inspect, replace, service or repair the pre-tensioner seat belt assemblies may lead to improper operation or inadvertent activation and serious injury.
- Always wear the seat belts when driving or riding in a motor vehicle.

A seat belt tightening system adapted to be used in conjunction with a vehicle seat whose position can be adjusted, comprising: a deceleration sensor mounted on a vehicle body; a drive unit mounted on the vehicle body for producing drive power in response to detection of acceleration exceeding the threshold level by the deceleration sensor; a seat belt tightening unit mounted on the vehicle seat for applying tension to a seat belt with the drive power supplied from the drive unit; and drive power transmitting mechanisms for transmitting the drive power from the drive unit to the seat belt tightening unit, the drive power transmitting means being provided with coupling means for not interfering with adjustment movement of the seat. Since the seat belt tightening unit is mounted on the seat and the deceleration sensor is mounted on the vehicle body, an optimum position of the seat belt can be ensured irrespective of the adjustable position of the seat and the deceleration sensor is free from erroneous activation due to deceleration arising from the movement of the seat. Since the drive unit and the deceleration sensor may be formed as a single sub assembly, a fast response can be obtained, and the assembly work is simplified.