

Only One Airbag Deployed-Did The System Malfunction?

You're inspecting a vehicle that has a deployed passenger airbag and an undeployed driver airbag. The driver is concerned that the airbag didn't deploy when it should have. Why didn't it deploy with the passenger-side airbag? Is there a problem with the airbag or airbag system? The I-CAR Tech Centre has received several calls from collision repair technicians and insurance adjusters asking these very questions.

To respond to these questions, it is necessary to understand the type of vehicle passive restraint system. Some vehicles are equipped with sensors that determine if the passenger and driver seat belts are fastened. At low speed collisions, the restraint system will only deploy the seat belt tensioner on fastened seat belts, not the airbag. However, if the restraint system detects that the seat belt is not fastened, the airbag will deploy to protect that occupant. The airbag will also deploy if the seat is not occupied. Therefore, it is becoming more common to see vehicles with the driver's seat belt tensioner and passenger side airbag deployed. During a more severe collision, both the seat belt tensioner and airbag are designed to deploy.

Ford has distributed a bulletin (Article No. 02-17-5) that addresses this issue

and lists its vehicles with this design. Hyundai also has vehicles where only one airbag will deploy if the seat belt is not buckled.

Some vehicles use occupant sensors to determine if the passenger seat is in use (see Figure 1). This may cause only the driver airbag to deploy instead of both airbags. The occupant sensor measures the passenger's weight, height, and proximity with respect to the airbag module. The sensor interfaces with the control module, which will either disable the airbag or, if it is a two-stage inflator, reduce the force of the deployment. If the passenger seat is empty or if the system determines that the passenger seat occupant, typically a child or small adult, may be subject to an airbag-induced injury, it will not deploy the airbag.

It is important to note that there is always a possibility that an airbag system has malfunctioned. However, before replacing the airbag and related parts, be sure you are familiar with the type of restraint system that is used on the vehicle. Read the system operation description in the vehicle-specific service manual. It is very likely that the passive restraint system has worked properly.



Figure 1—The seat occupant sensor, as shown on this 2003 Jaguar XJ, monitors the position and height of the passenger to help the control module determine if the airbag should deploy.