

Protecto™

Protecto™ is a sensor for deployable hoods designed to protect pedestrians when hit by a vehicle. Such systems conform to new EU pedestrian protection legislation without compromising design freedom. The process for integrating Protecto™ into the front bumper is largely based on computer simulation. This virtual development chain reduces lead time and costs for the vehicle manufacturer.

Complying with stricter requirements

Severe head injury is the most common cause of death in accidents involving pedestrians. In recent years, legislators have placed pedestrian protection at the top of the road safety agenda. The 2005 European Directive on pedestrian protection standards has now been followed up with a European Regulation stipulating further requirements for pedestrian protection. This regulation comes into effect in early 2013 and is based on a Global Technical Regulation issued by the UN-ECE. Similar effective dates are likely for Korea and Japan.

A powerful solution: Protecto™

IEE's Protecto™ sensor system consists of a sensor installed in the front bumper that uses a proprietary algorithm to analyze multiple aspects of the impacting object. This system detects all human-like objects, transmitting an activation signal to the hood actuators within 10 to 15 milliseconds. In addition, the system features increased misuse discrimination to prevent unwanted activation of the hood. In the event of a collision with a pedestrian, the actuators lift the hood by a few centimeters within 45 milliseconds, drastically reducing the risk of suffering serious injury thanks to the comparably "soft" hood deforming to absorb the brunt of the impact.



Key Advantages



The Protecto™ sensor offers the following advantages:

- **Precision:** multiple sensor elements analyze different aspects of the impact and the impacting object, offering excellent human detection and a very good misuse discrimination.
- **Simulation-based integration:** sensor integration and the majority of algorithm calibration are based on virtual development.
- **Robustness:** ability to analyze and withstand very heavy impacts.
- **Ease of assembly:** integrated in the absorber or crossbeam, the sensor can be easily mounted or removed should the bumper need repairing.
- **Application range:** the sensor system can also be used for frontal crash sensing and activating occupant safety measures (side-, rear crash) as well as for other impact-sensing applications.

Reliable Sensing Technology

Sensor characteristics

The system uses a combination of different sensor cells that are evenly distributed along a sensor strip that covers the bumper width. The sensor measures impact location, geometric impact profile, impact strength and certain material characteristics, enabling:

- 100% identification of human impacts
- reliable classification of objects to avoid unnecessary activation (e.g. poles, footballs)
- immunity to external disturbances during driving (e.g. rough road)



Simulation-based integration and calibration

Sensor integration and the majority of algorithm calibration are based on a virtual development chain that significantly reduces development time and costs. Simulations based on CAD data and material behavior of the bumper configuration determine the optimum integration method by taking impact dynamics into account. It also provides the corresponding sensor signal data set. Thanks to this simulation, sensor behavior can be determined across the full spectrum of temperatures and at each position on the bumper. Moreover, the simulation can provide up to 70% of the sensor's calibration. Additional driving tests and impact tests using a pendulum or launcher finalize the fine-tuning of the system.



IEE's Protecto™ system offers outstanding performance with robust identification of vehicle collisions with humans, having successfully passed all OEM validation tests. An almost 100% misuse discrimination capacity ensures fast and reliable deployment of the hood.

The sensor can be integrated in the absorber (as shown in the picture) or in the crossbeam.

About Us

IEE is an innovative developer of specialized sensing systems. Our sensing technologies are dedicated to the following markets: Transportation & Automotive, Public & Commercial Infrastructure, Consumer Electronics, Automation & Logistics and Medical & Healthcare.

IEE was founded in 1989 and is headquartered in Luxembourg. We operate in Europe, the U.S. and Asia, and employ 1,200 people worldwide. 20% of our workforce is engaged in Research and Development.

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