

# Occupant safety

Airbag control unit, generation 12



**BOSCH**

Invented for life



## PRODUCT BENEFITS

- ▶ Scalable airbag control unit concepts for all markets, vehicle segments and vehicle platforms
- ▶ Flexibility in the use of connector systems and base plate
- ▶ Integration of inertial sensors possible
- ▶ Modular integration of both established and new algorithms
- ▶ Safety concept compliant with ISO 26262

- 1 Cover
- 2 Energy reserve
- 3 Printed circuit board with central sensors, microcontroller and system ASICs (Application Specific Integrated Circuit)
- 4 Base plate
- 5 Connector system



# up to 48 firing loops

for the controlled deployment of restraint systems

## TASK

With airbag control unit, generation 12 (AB12), Bosch offers airbag control units that are scalable for all markets, vehicle segments and platforms. The occupant protection electronic modules can be adapted for varying customer hardware and functionality requirements. The AB12 evaluates the data from the internal and external acceleration and pressure sensors to detect side, front and rear-end crashes. The external peripheral sensors are connected via a bus system or point to point in accordance with the peripheral sensor interface (PSI5) standard. Using firing loops, the AB12 controls the deployment of different restraint systems, such as airbags and seat belt tensioners. Data coming from an occupant sensing system is used to individually optimize the restraint system according to the size/weight of the occupants. Additionally, the AB12 sends acoustic and/or visual warning signals, if the passenger airbag is disabled and the system is not functional. For pedestrian protection, data from acceleration sensors or a pressure tube sensor integrated in the bumper can be used to lift up the hood. This reduces the injury level of the pedestrian's head, in case of an accident. In the airbag control unit, a memory element is integrated which stores relevant data right before and after a crash occurred.

## FUNCTION

The accuracy of the algorithms used to detect front, rear-end and side crashes as well as rollover crashes has been further improved as a result of the addition of a new algorithm based on the parameters of the kinetic energy absorption in crash (KEC). Following a crash, the airbag control not only sends a signal to interrupt the fuel supply. The crash information is also provided to other vehicle systems, such as to an eCall system, which automatically triggers an emergency call when an airbag is activated. A signal can also be sent to the braking control system, which can bring the vehicle to a stop to avoid further collisions (secondary collision mitigation). There is also the option to integrate advanced passive safety features such as the early pole crash detection or pre-crash functions. These functions use the vehicle dynamic sensors or surround sensors to provide optimum control of the restraint devices and other actuators if the vehicle is about to crash. Reversible and irreversible actuators are controlled by the AIDA algorithm (adaptive integrator-based displacement algorithm).

# up to 18 sensor interfaces

compliant with the PSI5 standard

## VARIANTS

### AB12 light

The central sensing airbag control unit AB12 light is one of the world's smallest and lightest airbag control units. It is designed to meet the basic occupant protection requirements of the low price vehicle segment. Despite the standardized product concept, AB12 light can be adapted to a variety of requirements. The scalable control unit design offers up to 16 firing loops and up to 6 interfaces to peripheral sensors.

### AB12 base/plus

The airbag control units AB12 base and AB12 plus are flexible and scalable with respect to the number of firing loops and sensor interfaces for peripheral crash sensors. The airbag control units can trigger up to 32 firing loops and control 12 PSI5 sensor interfaces. Sensors for rollover detection can also be integrated. With the AB12 plus variant Bosch has developed a concept which integrates the airbag control and the ESP® inertial sensors into one compact airbag control unit, saving both space and cost. There is also the option of extending the AB12 plus variant with a complete set of angular rate and acceleration sensors for all three dimensions (6D), meaning that chassis systems are also supported in addition to the ESP® and rollover-protection features.

### Integrated safety unit (ISU)

The ISU incorporates both the central crash sensors and the main passive safety features. The ISU can be modified to any customer specific requirements. It offers up to 48 firing loops and up to 18 PSI5 sensor interfaces. Like the AB12 plus, all spatial axes are measured (6D) via integrated sensors. Additionally, the ISU supports applications with redundancy requirements (8D).

