Chassis Systems Control

AB12 – New generation of airbag control units

Characteristics

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. There is also the option to expand the control units to trigger up to 48 firing loops and control up to 18 sensor interfaces.

High-g sensors and optional rollover sensors are already integrated into the control unit of the variant AB12 base. 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.

The AB12 control units evaluate the data from the pressure sensors to detect side crashes and from the acceleration sensors to detect side, front and rear-end crashes. In accordance with the PSI5 standard, the peripheral sensors can be operated either on a sensor bus or via a point-to-point connection.

The accuracy of the algorithms used to detect front, rear-end and side crashes as well as rollovers has been further improved in comparison with the previous version, partly as a result of the addition of a new algorithm based on the parameters of the kinetic energy absorption in crash (KEC).

Customer benefits

- Configurable for all markets, vehicle segments and platforms
- Flexibility in the use of connector systems
- Integration of inertial sensors possible
- Modular integration of both established and new algorithms
- Safety concept compliant with ISO 26262
- Use of Bosch electronic components

With AB12, Bosch offers airbag control units that are scalable for all markets, vehicle segments and platforms. These occupant protection electronic modules can be adapted for varying customer hardware and functionality requirements.
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, or to the braking control system, which can bring the vehicle to a standstill 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.

For the AB12 control units, the software functions can be put together in a flexible manner, including, for example, the integration of an occupant-classification system or an electronic pedestrian-protection system that uses the data from acceleration sensors or a Pressure Tube Sensor in the bumper. In addition, the airbag control units can be used as an event data recorder, if required.

All airbag control units from Bosch use the integrated safety controller (SCON). With its watchdog function, the SCON monitors the program flow in the microcontroller, preventing undesirable system behavior.

The new airbag control units are lead-free and have been developed compliant with ISO 26262. They are based on over 40 years of experience and expertise in the development of components for the automotive electronics industry.

**Peripheral Sensor Interface**

The Peripheral Sensor Interface (PSI5) is an interface for automotive sensor applications. PSI5 is an open standard based on existing sensor interfaces for peripheral airbag sensors, which has been validated already in millions of airbag systems. Main features of the PSI5 are high speed and high reliability data transfer at lowest possible implementation overhead. PSI5 covers the requirements of digital automotive interfaces and offers a universal and flexible solution for multiple sensor applications.

**Hardware and system concept**

The AB12 control units have a new mechanical design consisting of a metal base plate and a plastic housing. The platform design enables customerspecific design of the base plate, the connector system and the level of ingress protection (IP54; optionally up to IP58).