

Lean-angle sensors for motorcycles

Ever more often, motorcycles are coming off the assembly line with additional high-performance functions. These make riding a motorcycle not only safer and more comfortable, but also more dynamic. The SU-MM3.10 lean-angle sensor by Bosch (Germany) delivers the information required to do this.

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ALREADY INSTALLED IN A NUMBER OF MODELS, it provides information on the motorcycle's current side-incline status. "More than 100 times per second, the sensor measures the status of the motorcycle's driving dynamics," says Matthias Mörbe, vice president Sensors and Sensor Systems at Bosch Engineering. To do this, the sensor measures longitudinal and lateral acceleration as well as yaw and roll rates. "An external control unit then uses the data to determine the motorcycle's lean angle. The result can then be used for model-specific safety and comfort functions," says Mörbe. Traction control for motorcycles is one important feature, as are curve lighting, launch control, and wheelie limiting functions. At present, a number of models are already equipped with the sensor: BMW's S 1000 RR, K 1600 GT, and K 1600 GTL, as well as Aprilia's RSV4 Factory APRC, RSV4 R, and Tuono 1000 R.

Bosch engineers are already working on the next generation of the sensor. In the future, the SU-MM5.10 lean-angle sensor will also be able to measure the motorcycle's vertical acceleration. An algorithm developed by Bosch, which is integrated into the sensor itself, uses what are known as 5D-inertial signals to determine the motorcycle's lean and pitch angles. It then communicates the results on the CAN interface. This data is needed for a number of future motorcycle safety and comfort functions. These include corner ABS, fall detection, wheelie control, and semi-active suspension. Moreover, the CAN-connectable sensor will be smaller and lighter, which will give motorcycle manufacturers even more flexibility with regard to vehicle design. Thanks to micro-mechanical components built using MEMS technology (micro-electro-mechanical systems), the sensor consumes just 65 mA - less than 50% of the consumption of its predecessor model. The SU-MM3.10 and the future SU-MM5.10 sensors can be combined with motorcycle ABS from different suppliers.

As systems development partner, Bosch Engineering can also adapt proven Bosch technology from large-scale series production to motorcycles. These include motorcycle-specific software development for engine management systems as well as the adaptation of fuel-injection technologies and sensors for engines and driving dynamics. The activities of the automotive supplier also include the development and application of functions related to driving dynamics.