Position Sensor Helps BLDC Motor in Transmission Control Unit Run Smoothly and Efficiently

ams AG announced that automotive systems manufacturer Continental is using its robust, accurate AS5134 angular position sensor.

The AS5134, as well as the newer AS5132, which are fully qualified to the AEC-Q100 automotive standard, are contactless magnetic position sensors optimized for use in high-speed brushless DC (BLDC) motors. The AS5134 is used to sense the position of the rotor in motors in transmission control units for new double-clutch transmissions (DCTs), providing angle measurements that sup-port an optimized, efficient commutation scheme. Requirements for the device included accuracy at high rotation speed and reliability.

A DCT is an advanced form of automatic gearbox for passenger cars. In some newly developed DCTs, BLDC motors are used to shift the gears and to control the dual clutch. As many as four BLDC motors may be used in one DCT.

An integrated module designed by Continental controls the motors through field-oriented commuta-tion, a technique in which the input current to each stator is determined by reference to the angular displacement of the rotor. More accurate measurement of the rotor’s angle results in lower torque jitter, smoother operation and higher power efficiency. A particular benefit of the AS5134’s high accuracy is that the start-up torque of the motor is increased. This enables the motor to reach its optimal operating speed faster, resulting in reduced energy consumption.

The AS5134 magnetic position sensor features a low propagation delay – the delay

between the input from the sense magnet and the angle calculation output leaving the chip – of just 22µs. This enables highly accurate measurement of rotors turning at high speed: the AS5134 is specified for angular measurements in 1° steps accurate to ±2° at rotation speeds up to 82,000rpm.

The control module in the Continental transmission is a complete integrated unit that cannot easily be accessed for repair or replacement, and so the reliability of components in the module, such as the position sensor, is very important. Like all magnetic position sensors from ams, the AS5134 features patented differential input technology developed by ams that renders it immune to stray magnetic fields. Position sensors from ams thus require no shielding, helping to keep bill-of-materials and assembly costs low.

The contactless magnetic sensing technology of the ams magnetic position sensors is also inher-ently more reliable than contacting and optical position sensing methods, which are prone to con-tamination by dust, grease and foreign objects.

Technical Support

Demonstration boards for the AS5134 and AS5132 position sensors are available. For further in-formation on the AS5132 and AS5134, or to request samples, please visit www.ams.com/Magnetic-Position-Sensors/AS5134 [1]. For pricing information please contact ams.

More information about ams can be found at www.ams.com [2].

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