EV motor system is smallest of its kind, says Mitsubishi

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(PhysOrg.com) -- Mitsubishi Electric has announced it has a new motor system for electric vehicles with impressive gains in reduced size and efficiency. The EV motor system is the smallest of its kind, according to the company press release, measuring just half the dimensions of Mitsubishi Electric's existing motor system. The new motor system has a built-in silicon carbide inverter. Mitsubishi Electric's existing motor system uses an external inverter.

The smaller size of the system is intended to help auto makers turn out EVs with more passenger space and improved energy efficiency. The cylinder-shaped inverter matches the diameter of the motor, enabling it to be connected coaxially within a chassis, halving the size of the system, according to Semiconductor Today.

Consumer interest generally is shifting toward EVs and hybrid EVs (HEVs) with more information and public acceptance of the need to make buying choices that can contribute to a better environment, including reduced carbon dioxide emissions. At the same time, the EV future in the marketplace depends on overcoming some drawbacks including limited space for passenger comfort. EVs and hybrids namely require large spaces for their battery systems. The reduced size of the new system is promoted as an important move forward.

The material used for the inverter is another talking point from Mitsubishi. Its press release notes that the power chips in the inverter are silicon carbide-based. Silicon chips have been widely used in power

devices for inverter switching. Silicon carbide is seen as more suitable because of its electrical characteristics, including a breakdown electric field that is 10 times greater compared to silicon chips. This enables thinner chips, which reduces electrical resistance and lowers loss. Mitsubishi says the silicon carbide chip-based inverter results in over 50% reduction of loss compared to the company's silicon-based inverter system.

The permanent magnet motor uses a neodymium magnet.

The size and configuration of stator and rotator poles were optimized. The company says that it used a magnetic design technology that brought about improved magnetic efficiency and a five percent increase in power output compared to its previous motors.

The new system is in prototype stage. Once further work is completed on technologies for motor/inverter cooling, downsizing and efficiency, the motor system will be commercialized, says the company. According to reports in the Asahi Shimbun and House of Japan, the system, targeted for compact cars, will be commercialized in 2017.

More information: Press release