



Nidec and Renesas Collaborate on Semiconductor Solutions for Next-Generation E-Axle for EVs

June 5, 2023 — Nidec Corporation (TSE: 6594; OTC US: NJDCY) and Renesas Electronics Corporation (TSE:6723) have agreed to join forces on the development of semiconductor solutions for a next-generation E-Axle (X-in-1 system) that integrates an EV drive motor and power electronics for electric vehicles (EVs).

Today's EVs are increasingly adopting the 3-in-1 unit called E-Axle, which integrates a motor, inverter, and gearbox (reduction gear). To realize high-performance and efficiency as well as smaller size, light weight and lower cost, and to accelerate vehicle development, EVs are also integrating power electronics controls such as DC-DC converters and on-board chargers (OBCs). EV manufacturers in advanced markets such as China have developed an X-in-1 platform that integrates multiple functions, accelerating the adoption in many vehicle models.

As X-in-1 integrates multiple functions and increases in complexity, maintaining a high-level of quality in vehicles becomes challenging. Thus, developing preventive safety technologies such as diagnostic functions and failure prediction is crucial for ensuring safety and security in vehicles. To address this challenge, the two companies agreed to combine Nidec's motor technology and Renesas' semiconductor technology to jointly develop a highly reliable and high-performance proof of concept (PoC) for the X-in-1 system. The PoC is designed to support the industry's highest performance and efficiency as well as smaller size, light weight and lower cost for the X-in-1 system.

The companies plan to launch the first PoC by the end of 2023, which will feature a 6-in-1 system with a DC-DC converter, OBC, and power distribution unit (PDU) as well as a motor, inverter, and gearbox. As a second phase in 2024, Nidec and Renesas plan to develop a highly integrated X-in-1 PoC that incorporates a battery management system (BMS) along with other components. The first PoC will include power devices based on SiC (silicon carbide), and the second PoC will replace the DC-DC and OBC power devices with GaN (gallium nitride), offering excellent performance in high-frequency operation, to further reduce size and cost.

Building on the PoC developed through this collaboration, Nidec plans to rapidly productize E-Axle systems to add to its portfolio and ramp up to mass production to lead the E-Axle market.

Renesas plans to develop and deliver turnkey solutions for increasingly complex X-in-1 systems by expanding the jointly developed PoC for E-Axle reference designs.

"As we celebrate Nidec's 50th anniversary, we take on a significant challenge of developing a world-class next-generation X-in-1 system, which goes back to our core principle of pioneering the world's best innovations," said **Mitsuya Kishida, Executive Vice President and Executive General manager of Automotive Motor & Electronic Control Business Unit at Nidec**. "By harnessing our strengths in automotive technology and developing PoCs



together with Renesas who is a leader in automotive semiconductor solutions, we aim to lead the market as a world-leading E-Axle provider.”

“We are very pleased to announce our collaboration with Nidec, who has an exceptional track record of success in E-Axle traction motors,” said **Vivek Bhan, Senior Vice President, Co-General Manager of High Performance Computing, Analog and Power Solutions Group at Renesas.** “Our contribution to this collaboration extends beyond hardware design, encompassing software development which is critical to enabling rapid development of PoCs for our customers.”



About Nidec Corporation

Nidec Corporation (TSE: 6594) (OTC US: NJDCY) specializes and handles motor application products based on "everything that spins and moves," centering around a motor business that comprises an expansive product line from small precision to supersized motors. These products are used in all kinds of objects and devices around us that are critical to our lives and society.
Web: <https://www.nidec.com/en/>

About Renesas Electronics Corporation

Renesas Electronics Corporation ([TSE: 6723](#)) empowers a safer, smarter and more sustainable future where technology helps make our lives easier. The leading [global](#) provider of microcontrollers, Renesas combines our expertise in embedded processing, analog, power and connectivity to deliver complete semiconductor solutions. These Winning Combinations accelerate time to market for automotive, industrial, infrastructure and IoT applications, enabling billions of connected, intelligent devices that enhance the way people work and live. Learn more at [renesas.com](https://www.renesas.com). Follow us on [LinkedIn](#), [Facebook](#), [Twitter](#), [YouTube](#) and [Instagram](#).

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