

MOBILITY ELECTRONICS

Realizing a society in which all people can access mobility conveniently and with peace of mind (enhancing the quality of mobility)

DENSO helps realize zero traffic fatalities and carbon neutrality by continuing to introduce products in tune with the times, using its software and electronics technologies (sensors, semiconductors, ECUs), while precisely understanding the needs of users and advances and developments in society brought about by the CASE revolution.



Hiroshi Kondo
Head of Business Group

Business Strengths

Ability to Create Large-scale Integrated Systems from an All-Vehicle Perspective

Needs for electronic systems in the CASE era are evolving into large-scale systems that integrate and coordinate powertrains, bodies, chassis, cockpits, advanced driver assistance systems (ADAS), and other single-domain control systems. DENSO has experience in all of these systems. We create compelling products from an all-vehicle perspective with a broad range of technological capabilities.

Product Development Capabilities with Reliability and Sophistication Accumulated in Automotive Products

Automotive products must realize high quality and performance in harsh environments and under operational restrictions. We have been engaged in the automotive electronic product business for many years, ever since vehicles began to become more electronic, and we have accumulated extensive knowledge of vehicles as a result. DENSO develops competitive products through a combination of this knowledge with the latest electronics and software technologies.

Global Network

DENSO has honed its human capital, intellectual assets, and a global production structure by overcoming numerous obstacles with automakers around the world. Using these strengths, we will refine our CASE-related technologies while providing various solutions to customers, thereby moving the world one step closer to safe mobility that provides peace of mind and is environmentally friendly.

Business Strategy

With the transition to software-defined vehicles (SDVs) and BEVs, electronic platforms are undergoing major renewal, and the mobility electronics market is polarizing into the traditional field of single-function electronic control units (ECUs)*¹ and the growth field of large-scale integrated ECUs.*² Using this shift as an opportunity, we will develop and grow our businesses through portfolio management that strengthens our presence in the growth field.

*¹ Engine ECUs, etc. *² ADAS ECUs, etc.

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| Creation of New Value | <p>We aim to sustain business growth by improving our electronic platform planning capabilities and elemental technologies, both of which contribute directly to heightening the product appeal of SDVs and BEVs.</p> <ul style="list-style-type: none"> Supported by our comprehensive knowledge of vehicle-related electronics and software, we will work very closely with customers and jointly develop electronic platforms with the aim of creating new added value. Further, increased sales of ECUs based on these optimized electronic platforms will enable us to further lower costs by taking advantage of the economies of scale resulting from mass procurement and production. Through the development of ECUs, we will hone our in-vehicle software, semiconductors, and manufacturing technologies and increase the automation and speed of software development. We will utilize these technological assets—which are our strengths—to contribute to the development of the automotive industry. |
| Business Portfolio Transformation | <p>With our sights set on further growth of the safety systems business, we will expand our lineup of products that cater to specific market segments and regions and move forward with global rollouts. We will also focus on the software business and the development of electronic platform products for BEVs with the aim of creating new value. At the same time, we will identify businesses that do not conform to the green and peace of mind principles as well as products that are becoming commoditized and replace them in our portfolio systematically and in close coordination with our customers.</p> |
| Realization of Carbon Neutrality | <p>We will help achieve carbon neutrality by advancing the formation of a circular economy through contributions to the increased introduction of BEVs, the utilization of F-IoT to visualize manufacturing issues, the sourcing of recycled materials, the development of repair technologies, and the development of products with structures that facilitate disassembly.</p> |
| Realization of Sustainability Management | <p>By establishing business foundations that are adaptable to change, we will achieve sustainability management.</p> <ul style="list-style-type: none"> Development system reinforcement: With the aim of achieving large-scale, cross-domain software development, DENSO will redeploy human resources through portfolio management while developing and enhancing the capabilities of globally competent personnel through the Company's distinctive training system. Manufacturing competitiveness: In anticipation of the mass production of large-scale integrated ECUs, we will further refine and combine our strengths, namely, in-vehicle quality, mass production, and adaptability. In addition, we will collaborate with external manufacturing partners to strengthen our global manufacturing foundations and increase their resilience in changing conditions. |

Specific Initiatives to Achieve Strategic Aims Initiatives Aimed at the Growth of the Safety Systems Business and New Value Creation

(1) Safety systems: To meet global customer needs, we will expand our lineup of products that cater to specific market segments and regions. In addition, through collaboration between initiatives for ADAS and human-machine interface (HMI), we aim to evolve recognition and estimation algorithms and grow cross-domain ECUs. (To this end, the AD & ADAS Business Unit and the Cockpit Systems Business Unit were integrated to form the Safety Systems Business Unit in January 2023.)

(2) Advancement of BEV electronic platform planning and development for individual vehicles: To respond to market evolution, we will evolve the Core & Customization design approach and cater to respective automakers and grades.

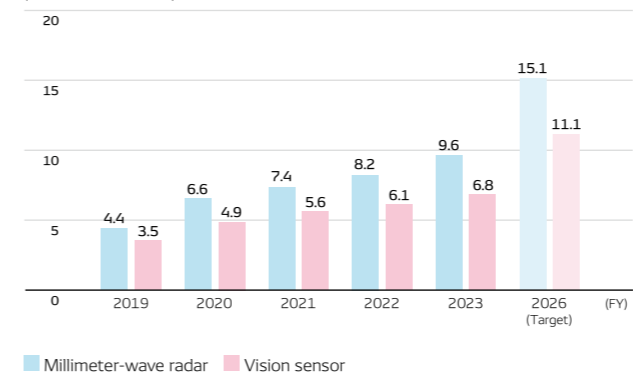
(3) Strengthening of software development capabilities: We will increase the percentage of automation and promote the use of AI. (Message from the Chief Software Officer [P85](#))

(4) Stable procurement of semiconductors and strengthening of competitiveness: The Company will promote stable procurement by standardizing components and sharing medium- to long-term strategies with partners. Also, we will achieve differentiation by using proprietary technologies to realize compact products that consume less power.

Outcome of Strategies for “Green” and “Peace of Mind”

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| Objective: | Popularize ADAS with a view to eliminating traffic accident fatalities |
| Results: | Increased the penetration of Global Safety Package 3 (GSP3),* featuring heightened safety performance * A system that uses millimeter-wave radar and vision sensors to assist driving |
| Objective: | Augment product lineup and develop electric, low-power consumption control systems with a view to carbon neutrality |
| Results: | As well as offering a lineup of hybrid electric vehicle (HEV), plug-in hybrid electric vehicle (PHEV), and BEV products, advanced the development of low-power ECUs and electronic control systems that help lower power consumption and electronic platforms that minimize energy usage by optimally integrating control of all vehicle systems |

Number of Millimeter-Wave Radar and Vision Sensors Produced (Millions of vehicles)



Vision sensor detection angle: 128 degrees (28-degree increase versus other companies)
Millimeter-wave radar detection angle: 103 degrees (13-degree increase versus other companies)
Note: Detection angles based on DENSO's measurements

Global Safety Package (GSP) is a system that assists driving by combining a millimeter-wave radar that detects the shape of objects on the road, such as vehicles and guardrails, and a vision sensor that uses a camera to detect the environment ahead of the vehicle. Widening the detection angles of the system enables it to provide assistance in a greater variety of situations that could lead to accidents, such as assisting in collision avoidance at intersections. Further, the GSP system has received the highest rating in the automobile safety tests conducted in Europe by the European New Car Assessment Programme (Euro NCAP).

Resolving Social Issues through Our Businesses



Technology Evolution and Product Rollouts Helping to Eliminate Traffic Accident Fatalities

To eliminate traffic accidents and realize unrestricted mobility, we must further evolve safety products and equip vehicles with leading-edge technologies. At the same time, we must promote the incorporation of these products and technologies into as many vehicles as possible by developing attractively priced products. In fiscal 2023, we began full-fledged mass production of third-generation GSP system GSP3, which equips vehicles with the leading-edge AI and sensor technologies that are our forte, thereby greatly increasing the range of accidents that this system can prevent. In this way, we are extending the areas in which we provide value in the form of peace of mind. As it realizes compactness and low cost, GSP3 is significantly contributing to the popularization of safety products. DENSO

will continue developing advanced driver assistance-related technologies with the objective of achieving a mobility society that ensures the comfort and peace of mind of drivers, pedestrians, and greater society.



GSP3 millimeter-wave radar



GSP3 vision sensor