

DENSO Exhibits World firsts at the IAA show

The Environment is DENSO's Top Priority

DENSO continues to safeguard the global environment. The company is a trailblazer in innovative environmental technology. At the 2001 IAA Show, it will introduce several of these important environmental products and technologies. They include:

- **Two-Layer Flow HVAC Systems** : DENSO is the only company in the world that supplies high efficiency HVAC systems equipped with a two-layer flow function.
- **Radiator-Condenser Cooling Module**: DENSO has saved space and reduced weight by combining an engine-cooling radiator and an air conditioning condenser.
- **Diesel Common Rail Systems**: Common rail technology is a prerequisite for the continuing viability of diesel-powered passenger cars in Europe and elsewhere in the world. DENSO is the world's first company that has commercialized common rail injection systems.
- **Starter Generator for Hybrid Vehicles**: DENSO's new Starter Generator provides idle stop function for reduced fuel consumption and exhaust emissions. DENSO's Starter Generator is world's first belt-driven version allowing for quieter operation than a gear-driven starter.
- **Intelligent Transport Systems (ITS)**: DENSO provides a wide range of ITS products, including vehicle navigation systems, creating a safer, more comfortable and more environmentally-friendly society.

DENSO Corporation, a global supplier of advanced automotive technology, systems and components, employs 85,000 people in 27 countries. Consolidated sales for the fiscal year

DENSO Exhibits World firsts at the IAA show
The Environment is DENSO's Top Priority

2000/2001 (April 1, 2000 to March 31, 2001) totaled \$16.2 billion.

In Europe, DENSO operates 20 companies in 11 countries with European consolidated sales for the fiscal year 2000/2001 (April 1, 2000 to March 31, 2001) totaling \$1.3 billion.

Automotive Air Conditioning Systems

DENSO is the global leader in car air conditioning systems with the world's top market share of 24 percent. DENSO's developing and manufacturing products that pursue more comfortable driving and environmentally-consciousness range from heating, ventilating and air-conditioning (HVAC) systems, neural-network control, sub-cooling systems, heat cores, evaporators and compressors to integrated radiator-condenser cooling modules.

Two-Layer Flow HVAC Systems

DENSO is the only company in the world that supplies HVAC systems equipped with a two-layer flow function.

The two-layer system can fulfill peak heating requirements in vehicles without increasing

fuel consumption by routing outside fresh air through the upper level of the passenger compartment and circulating warm air in the lower half. This system halves the 60 percent ventilation loss in a conventional system. It also eliminates window fogging while keeping the compartment warm. As a result, the two-layer flow HVAC system provides more comfortable and environmentally-friendly driving environment.

Such high-efficiency heating systems are needed as automakers introduce hybrid cars and other vehicles of which engines emit little heat.

Neural Network Control

Neural network control is also an advanced technology that only DENSO applies to automotive air conditioning.

Automotive Air Conditioning Systems

Air conditioning systems with neural network control provides left-right multizone temperature control and airflow control for each seat by sensing the set temperature, the passenger compartment temperature and the amount of sunlight and simulating operation of the biological nervous systems.

DENSO introduced the system in 1998. Currently, it supplies them to three vehicle models.

DENSO expects automakers to adopt this control technology in nearly all luxury passenger vehicles by 2005, and further incorporate it in a growing number of medium-priced vehicle models

Radiator-Condenser Cooling Modules

Modularization is reducing size and weight in a growing range of automotive systems.

DENSO has saved space and reduced weight by combining an engine-cooling radiator and an air conditioning condenser. DENSO's a radiator-condenser cooling module achieves a 40 percent reduction in thickness, which offers greater space savings and improves installation in vehicles.

Also, the cooling module improves cooling performance of both the engine coolant and air conditioner refrigerant by roughly 10 percent.

The condenser and radiator share a set of cooling fins to route their separate circuitry. Heat transfer from the radiator to the condenser through the shared cooling fins has been an industry-wide issue. Radiator coolant generally rises to a temperature of about 90 degrees celsius, which is higher than the 60 degrees celsius of condenser refrigerant.

DENSO has solved the issue of heat transfer by incorporating an insulating slit in each fin, which optimizes radiator and condenser's performance.

For easy-of-disassembly for recycling, DENSO eliminates the conventional resin radiator tank and adopted all-aluminum materials.

The Prius, Toyota's hybrid car, is sold in Europe and North America and utilizes DENSO's cooling module. It is the first mass-produced cooling module in the world.

Radiator-Condenser Cooling Modules

Modularization is a key concept in DENSO's product development. DENSO will continue to work together with automakers to develop modules that deliver new value to DENSO and its customers.

Diesel Common Rail Systems

Common rail technology is a prerequisite for the continuing viability of diesel-powered passenger cars in Europe and elsewhere in the world. To comply with Europe's upcoming

EURO-4 emissions regulations, DENSO is working to optimize diesel performance while minimizing output of particulate matter (PM) and nitrogen oxides (NOx).

DENSO's common rail system has two advantages. First, DENSO's system uses five injections during each combustion stroke to control combustion rate, which results in reduced emissions.

For example, a pre-injection that happens a split-second before each main injection shortens ignition delay in the main injection and thereby reduces generation of NOx, noise and vibration. An "after" injection that happens a split-second after the main injection reburns any remaining PM. Then a "post" injection helps manage the temperature of the exhaust gas, which makes the catalytic exhaust processing more effective. The post injection also provides hydrocarbon as a reduction agent to NOx.

The interval between the end of the pre-injection and the start of the main injection—0.4 milliseconds—is the industry's shortest. DENSO plans to further reduce the span with piezo injectors, a next generation technology.

The second strong advantage is that DENSO's system can inject at 180 megapascals, irrespective of engine speed. The higher the injection pressure becomes, the more PM reduces and the higher engine performs. The 180-megapascal-pressure common rail system will be launched in 2002 in the European market.

The common rail system comprises of a supply pump, a common rail, injectors, an electronic control unit and an electronic driver unit. It also equips the system with a diesel particulate filter.

DENSO is the world's first company that has commercialized common rail injection systems. It currently provides two types of common rail injection systems: one for passenger cars and the other for trucks. Its customers for the systems include Toyota, Hino, Isuzu, Mitsubishi, Nissan and Nissan Diesel.

Some industry analysts predict demand for 12 million diesel-powered vehicles annually in Europe by 2010. DENSO aims for a production volume of more than one million common rail systems a year by 2005.

Starter Generator for Hybrid Vehicles

Needs for idle stop function are heightening as environmental preservation has been increasing global concerns.

DENSO's new starter generator provides idle stop function for reduced fuel consumption and exhaust emissions. The starter generator integrates the starter with the alternator allowing the car engine to turn off when it is not moving. Then, the starter generator instantly restarts the engine when the car begins to move.

DENSO's starter generator is world's first belt-driven, which allows for quieter operation than a gear-driven starter.

The Estima hybrid car that Toyota sells in Japan utilizes the new starter generator.

DENSO will continue to make technological advancements in its starter generator for hybrid cars, as well as conventional starters and alternators, to help protect the global environment.

Vehicle Navigation Systems as Key to Intelligent Transport Systems

DENSO's intelligent transport systems (ITS) products and services represent the three aspects of technology: sensing and communication between vehicles—adaptive cruise control; communication between vehicles and the highway infrastructure—electronic toll collection (ETC) system; and communication between vehicles and the global telecommunications grid—telematics car navigation, fleet management system and Mayday system for emergency notification.

Vehicle navigation systems will play an increasingly important role as multipurpose information terminals in vehicles as they meld with entertainment, ETC, Mayday capability, mobile telephone and other new functions. DENSO enables such multifunctional vehicle navigation by integrating a range of its technologies and expertise in car navigation, body electronics and telecommunications.

The rapid growth in mobile multimedia functions heightens the need for software standards. Automakers are moving to adopt software platforms. DENSO is in the vanguard of the push for software standards. Microsoft Corporation and DENSO, along with four other companies, are promoting a software platform for mobile multimedia through the Windows CE for Automotive Forum. DENSO will introduce vehicle navigation system that runs on WinCE for Automotive.

DENSO launched its first navigation system in 1987. The company is one of the few companies in the world that develops global vehicle navigation systems and supplies them to automakers in Japan, Europe and North America. DaimlerChrysler, Jaguar, General Motors and Toyota all buy navigation systems from DENSO for factory installation. DENSO has sold navigation systems in the Japanese market since 1995.

Vehicle Navigation Systems as Key to intelligent transport Systems

DENSO's vehicle navigation features most advanced functions including the most extensive Japanese vocabulary voice recognition function (other language will follow), industry's fastest display scrolling and route searching, three-dimensional displays and built-in Web browser.

Some 11 million navigation systems were on the road worldwide at the end of 2000, which is nearly double the 1998 figure of 6 million systems. Japan accounted for about 60 percent of the world market in 2000, but demands are increasing in Europe and North America. As vehicle navigation is becoming a common feature in automobiles, the market focus is shifting from aftermarket installation to factory installation.

About DENSO

DENSO is a global supplier of advanced technology, systems and components and the fourth largest automotive component supplier in the world. Worldwide, DENSO employs 85,000 people in 27 countries and regions. Headquartered in Kariya City, Aichi Prefecture, Japan, DENSO's six divisions, Powertrain Control, Electric, Electronic, Thermal, Small Motors and Diversified Products, develop and manufacture an extensive range of important systems and components for the auto industry.

Established
December 16, 1949

Corporate Headquarters
DENSO CORPORATION, Kariya, Aichi, Japan

Employees (total worldwide)
85,000 (As of March 31, 2001)

Management
Akira Takahashi, chairman, DENSO CORPORATION
Hiromu Okabe, president and CEO, DENSO CORPORATION

Financial (consolidated)
Net Sales: US\$16.2 billion for the fiscal year 2000/2001 (April 1, 2000 to March 31, 2001)
Capital Expenditures: US\$1.1 billion for fiscal year 2000/2001 (April 1, 2000 to March 31, 2001)

Management Principles
Customer satisfaction through quality products and services

Global growth through anticipation of change

Environmental preservation and harmony with society

Corporate vitality and respect for individuality

Products Worldwide
Thermal Systems (34.3 percent of global net sales)
Automotive air-conditioning systems, bus air conditioning systems, evaporators, condensers, compressors, air purifiers, radiators, electric motor fans, cooling modules, automatic transmission oil coolers, CPU coolers.

Powertrain Control Systems (20.0 percent of global net sales)
Injection pumps, supply pumps, injectors for diesel engines, fuel injectors, fuel pumps, oxygen sensors, spark plugs, ignition coils, throttle bodies, air flow meters, AT variable force solenoids, oil filters, air cleaners, variable cam timing

Electronic Systems (17.6 percent of global net sales)

Instrument clusters, integrated climate control panels, door lock controllers, relays, car navigation systems, onboard equipment for electronic toll collection systems, car phones, engine electronic control units (ECUs), integrated circuits (IC) and sensors

Electric Systems (12.4 percent of global net sales)

Starters, alternators, Starter Generator, airbag systems, antilock braking systems

Small Motors (7.8 percent of global net sales)

Windshield washer systems, windshield wiper systems, power window motors

Other Automotive (0.8 percent of global net sales)

Other products

Telecommunications (4.3 percent of global net sales)

Mobile phones

Industrial Systems, Environmental Systems, etc. (2.8 percent of global net sales)

Bar-code hand-held scanners and terminals, QR code hand-held scanners and terminals, contactless IC cards and readers/writers, heat exchangers for wireless networks, radio frequency (RF) IDs, industrial robots, programmable logic controllers, kerosene engine heat pumps, spot coolers/heaters.

DENSO Eco Vision 2005

DENSO's Eco Vision is a comprehensive program for minimizing the environmental impact of the company's products and operations and for commercializing environmental technologies in new products and services. The company announced Eco Vision in June 2000 as the third in a series of long-term environmental programs.

Eco Vision centers on four emphases:

One, tackling environmental issues through a coordinated effort that involves active participation by all DENSO operations around the world.

Two, making the environment an overriding consideration in the ways that DENSO develops and designs products.

Three, working systematically at all DENSO plants in the world to minimize output of substances that affect the environment adversely in any way.

Four, working actively with third parties in identifying ways to safeguard the environment better and disclosing thorough information about the environmental effects of DENSO products and operations.

DENSO's work in addressing environmental concerns in product development and design furnishes an especially clear snapshot of its commitment to the spirit of EcoVision.

That work encompasses seven themes:

One, evaluating potential environmental impact thoroughly in the earliest stages of product development and design.

That effort focuses on five criteria: fuel economy, exhaust emissions, materials, recyclability, and—in air-conditioning systems—refrigerant.

Two, working closely with suppliers in evaluating and reducing the environmental impact of products.

DENSO is calling on all its suppliers to put in place environmental management frameworks by 2003.

Three, contributing to improvements in fuel economy.

DENSO helps improve fuel economy by reducing size and weight in all DENSO automotive products, and by developing technologies for intelligent transport systems that will route traffic more smoothly.

Four, contributing to reductions in emissions of noxious gases.

DENSO develops engine management technologies to help attain the emission levels specified by regulations in each market and even more ambitious targets established by individual automakers.

Five, making products more recyclable.

DENSO participates actively in industry efforts in Japan to raise the recycling rate for end-of-life vehicles to 95 percent by 2015. As part of that effort, the company is working to raise the recyclability of automotive components to 95 percent by 2005.

That includes designing products to be easier to disassemble and recycle and adopting materials that are conducive to DENSO Eco Vision 2005

recycling. It also includes developing commercially viable technologies for recycling products.

Six, monitoring and reducing the amount of materials contained in DENSO products that affect the environment adversely in any way.

DENSO has developed a system for managing information about the chemical content of all its products and will put that system to work next year.

Seven, adopting refrigerants in car air-conditioners that do not contribute to global warming.

DENSO already has switched to refrigerants that are harmless to the ozone layer.

Now, it is developing air-conditioners that will work efficiently with refrigerants, such as carbon dioxide, that do not aggravate the problem of global warming. (The carbon dioxide refrigerant is gas that is recovered from industrial processes. Thus, DENSO's new air-conditioning technology will not entail increasing the amount of carbon dioxide in the atmosphere.)

Note: Specific targets stated above are DENSO Corporation's. Other DENSO companies around the world are pursuing similar targets.

DENSO in 50 Years

1949

Nippondenso Co., Ltd., now DENSO Corporation, established following the spin-off of Toyota Motor Co., Ltd.'s electrical component plant

1953

Formed technical alliance with Robert Bosch GmbH of Germany

1954

Established the Technician Training School (would later evolve into the DENSO Technical College)

1959

Launched sales of DENSO's first spark plug

1961

Awarded the Deming Prize, the world's most prestigious award for quality control, testifying to efforts to enhance quality

1967

Developed the company's first air-conditioning system

1968

Established the IC Research Laboratories to conduct research on electronic control units (ECUs)

1970

Completed construction of a hybrid IC plant, enabling the company to carry out in-house all IC processes from development and design through production

Began manufacturing industrial robots for in-house use, and launched commercial sales later

1971

Established Nippondenso of Los Angeles, Inc., the company's first overseas operation

1972

Applied electronic technologies to develop the electronic fuel injection (EFI) system

Established first overseas production center in Thailand. Set up 11 production and marketing centers in eight countries in the 1970s.

1973

Established first European operation, Nippondenso (Europe) B.V. (now DENSO Europe B.V.) in The Netherlands

1977

Developed the oxygen sensor together with Toyota Motor to comply with gas emission regulations

Captured first ever gold medal at the international competition of the Youth Skill Olympics.

A total of 14 DENSO associates have since won gold

1981

Developed integrated ignition assembly (IAA), which marked the launch of electronic components, including the development of the world's first digital instrument cluster

1984

Established the company's first production center in North America, heralding the start of the company's full-fledged expansion of production overseas

1985

Developed the antilock braking system (ABS)

1987

Launched sales of vehicle navigation system, pioneering the introduction of information technologies to vehicles

1989

Developed airbag ECUs and sensors

Established first production company in Europe, Nippondenso Manufacturing (Barcelona), S.A. (now DENSO Barcelona S.A.) in Spain. Currently, DENSO operates 20 companies including 10 manufacturing companies in 11 European countries

1991

Opened DENSO Research Laboratories to develop leading-edge technologies for automobiles and other areas of business

DENSO in 50 Years

Began participating in the MITI (now the Ministry of Economy, Trade and Industry) project called R&D of Micromachine Technology

1995

Developed vehicle stability control (VSC)

Succeeded in mass producing the ECD-U2 unit, the world's first electronically controlled fuel injection common rail system

Developed fleet management systems with GPS and satellite communications, followed later by other intelligent transport systems (ITS) products including electronic toll collection (ETC) systems, intelligent parking systems (IPS) and the Mayday system for emergency notification.

1996

Changed name to DENSO Corporation as part of a move to create a new image as a leading global company

Obtained the company's first ISO 14001 certification at the Ikeda Plant, Japan. Currently, 42 operations are granted the certification and other companies will acquire it

1997

Developed powertrains, climate control systems and other components for hybrid cars

Developed the two-dimensional QR code, capable of storing nearly 100 times more information than the conventional bar code.

DENSO in 50 Years

1999

Acquired the Rotating Machines Division of Italian component manufacturer Magneti Marelli S.p.A., thereby expanding DENSO's production centers and sales channels in Europe

2000

Developed the world's first cooling module, installed in the Prius hybrid car, as part of concerted efforts to modularize components

Formulated DENSO EcoVision 2005 to articulate DENSO's efforts to strike a balance with the environment in R&D activities, and to help sustain the environment for future generations

2001

Currently expanding European operations, including the purchase of Magneti Marelli's Thermal Systems Division and the establishment of a car air-conditioner manufacturing company in the Czech Republic

DENSO in Europe

European Headquarters

DENSO EUROPE B.V., Weesp, The Netherlands

Management

Michio Fukuzaki, president, DENSO EUROPE B.V. and member of the Board of Directors, DENSO CORPORATION

European Employees

8,000

European Financial (consolidated)

Net Sales: US\$1.3 billion in the fiscal year 2000/2001 (April 1, 2000 to March 31, 2001)

Capital Expenditures: US\$44.0 million in the fiscal year 2000/2001 (April 1, 2000 to March 31, 2001)

European Facilities

Total Companies: 20

Manufacturing Facilities: 10

Sales Office: 7

Engineering Centers: 2

European History

European Headquarters established in February 1973

First European manufacturing location, NIPPONDENSO MANUFACTURING BARCELONA, S.A. (now DENSO BARCELONA S.A.) established in June 1989

European DENSO Group

The Netherlands

DENSO INTERNATIONAL EUROPE B.V.

DENSO EUROPE B.V.,

DENSO FINANCE HOLLAND B.V.

United Kingdom

DENSO INTERNATIONAL (UK) LTD.

DENSO SALES UK LTD.

DENSO MARSTON LTD.

DENSO MANUFACTURING UK LTD.

DENSO MANUFACTURING MIDLANDS LTD.

Germany

DENSO AUTOMOTIVE Deutschland GmbH

TD Deutsche Klimakompressor GmbH

Spain

DENSO BARCELONA S.A.

Italy

DENSO SALES ITALIA S.R.L.

DENSO MANUFACTURING ITALIA S.p.A.

DENSO THERMAL SYSTEMS S.p.A.

France

DENSO SALES FRANCE S.A.R.L.

Hungary

DENSO MANUFACTURING HUNGARY LTD.

Sweden

DENSO SALES SWEDEN AB

Poland

DENSO MANUFACTURING POLSKA Sp.z.o.o.

Belgium

DENSO SALES BELGIUM N.V.

Czech Republic

DENSO MANUFACTURING CZECH s.r.o.

Websites

www.denso-europe.com

www.globaldenso.com

Biography

Hiromu Okabe

President and Chief Executive Officer
DENSO CORPORATION

Hiromu Okabe serves as president of DENSO Corporation, headquartered in Kariya, Aichi Prefecture, Japan. The Kariya location is the Worldwide Headquarters of DENSO operations.

Okabe was named president in June, 1996.

In 1995, he was named Managing Director on the Board of Directors where he was in charge of Electronic Products. Okabe had first been appointed to the Board of Directors in 1989 in charge of Corporate Planning.

Hiromu Okabe joined DENSO Corporation in April, 1960. His first position was in the Accounting Department. Later, he moved to the Corporate Planning Department. He eventually rose to general manager of that department.

Okabe also served as head of Engine Electrical Product Division.

His significant accomplishments include introducing annual and long-term planning systems by product and contributing to the establishment of a long-term company policy.

In addition to his corporate activities, Okabe is famous for his strong reading habits (200 to 300 books per year), his writing abilities (he won Japan's Prime Minister's Award in 1971 for a treatise on economics), and his near-professional skill at "Go" (a traditional board game that in Biography Hiromu Okabe

Japan attracts as much public interest as baseball does in North America).

Okabe earned a Bachelor of Science degree in Economics from Nagoya University in Nagoya, Aichi, Japan, in 1960.

DENSO Corporation, a global supplier of advanced automotive technology, systems and components, employs 85,000 people in 27 countries. Consolidated sales for the fiscal year 2000/2001 (April 1, 2000 to March 31, 2001) totaled \$16.2 billion.

In Europe, DENSO operates 20 companies in 11 countries with European consolidated sales for the fiscal year 2000/2001 (April 1, 2000 to March 31, 2001) totaling \$1.3 billion.

Biography

Norio Omori

Senior Managing Director
Engineering Research & Development Center
Member, Board of Directors
DENSO CORPORATION

Norio Omori currently holds the position of the Senior Managing Director of the Engineering Research & Development Center, and, additionally, is a member of the Board of Directors for DENSO Corporation in Kariya, Aichi Prefecture, Japan.

Omori began his career in 1965 at Nippondenso Co., Ltd. (now DENSO Corporation). His work at DENSO has included the design and development of electronic fuel injection systems, electronic ignition control systems, emission control systems and engine management systems in the Powertrain Product Division.

In 1989, Omori moved to DENSO's Corporate Sector in charge of corporate technology planning and research and development.

He was appointed to the Board of Directors in 1994 and was later promoted to Executive Managing Director with responsibility for Corporate Research and Development.

Born in Mie Prefecture, Japan in 1942, Omori graduated from Yamanashi University in 1965 with a Bachelor of Engineering degree in Precision Engineering.

DENSO Corporation, a global supplier of advanced automotive technology, systems and components, employs 85,000 people in 27 countries. Consolidated sales for the fiscal year 2000/2001 (April 1, 2000 to March 31, 2001) totaled \$16.2 billion.

In Europe, DENSO operates 20 companies in 11 countries with European consolidated sales for the fiscal year 2000/2001 (April 1, 2000 to March 31, 2001) totaling \$1.3 billion.

Biography

Michio Fukuzaki

President, DENSO EUROPE B.V.

Member, Board of Directors, DENSO CORPORATION

Michio Fukuzaki serves as president of DENSO Europe B.V., DENSO's European headquarters located in Weesp, The Netherlands.

Fukuzaki began his career in 1967 at Nippondenso Co., Ltd. (now DENSO Corporation). His work at DENSO began in the Overseas Engineering Department. Later, he joined the Sales Engineering Department where he became general manager. Fukuzaki contributed to worldwide business expansion as an executive sales engineer.

In 1996, he was named to DENSO's Board of Directors responsible for the Sales and Marketing Department. He also became the head of the Engine Cooling Systems & Components Product Division.

Fukuzaki was named president of DENSO European headquarters in July 2000.

Born in Hyogo Prefecture, Japan, in 1944, Fukuzaki graduated from Kobe University in 1967 with a Bachelor of Science degree in Electrical Engineering. He is also a member of the Japan Society of Automotive Engineers and once served as the administrative officer for the central area of Japan.

DENSO Corporation, a global supplier of advanced automotive technology, systems and components, employs 85,000 people in 27 countries. Consolidated sales for the fiscal year 2000/2001 (April 1, 2000 to March 31, 2001) totaled \$16.2 billion.

In Europe, DENSO operates 20 companies in 11 countries with European consolidated sales for the fiscal year 2000/2001 (April 1, 2000 to March 31, 2001) totaling \$1.3 billion.