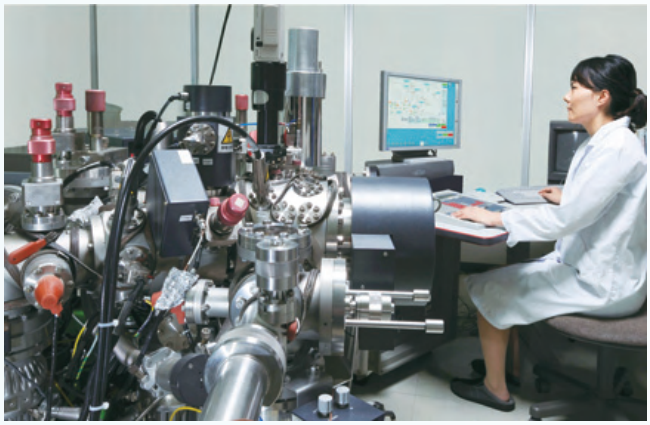
Research and Development

With its core technologies in power semiconductors and power electronics, Fuji Electric is focusing R&D on products and systems that effectively and stably provide and use electricity and thermal energy.



R&D Policies

- Expand and strengthen core technologies through synergies between our main fields of power semiconductors and power electronics
- Expand solution technologies that utilize distinctive sensor, control, information, and communications technologies
- Globalize R&D activities and promote open innovation

Primary Initiatives

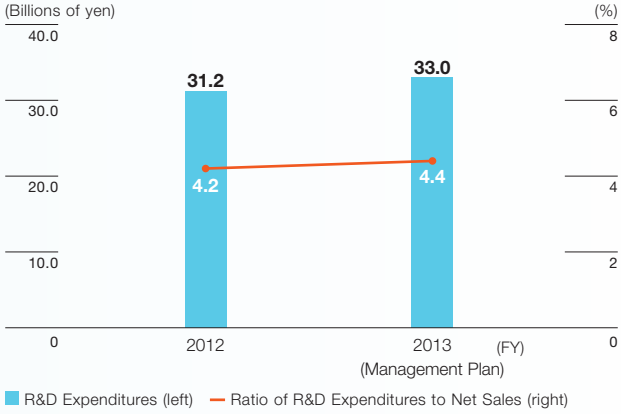
Strengthen Core Technologies in all Aspects and Develop New Products and Materials

In addition to bolstering our core technologies, such as power semiconductors and power electronics, and developing distinctive components and systems, Fuji Electric is working to develop new products that generate Company-wide synergies (thermal, machinery, control).

As an example, we have developed a next-generation power semiconductor SiC (silicon carbide) device which will reduce energy use in a wide range of industrial sectors. We are also accelerating the development of power electronics equipment that apply this SiC device, such as power conditioners and uninterruptible power supply devices.

Furthermore, in addition to thoroughly enhancing our control and sensor technologies, we are pursuing synergies in the research and development of energy management technologies and heat-related technologies.

R&D Expenditures/ Ratio of R&D Expenditures to Net Sales



Promote Open Innovation and Globalization

Fuji Electric is speeding up product development through joint research with research institutions and universities. In Japan, the development of the SiC device has been a joint effort with the National Institute of Advanced Industrial Science and Technology (AIST). Meanwhile, we have partnered with a number of key Japanese universities to work on R&D that will lead to next-generation technologies.

In the U.S., Europe, and China, we are establishing research centers and developing partnerships between academia and industry. We have worked with China's Zhejiang University to establish the Fuji Electric Innovation Center, where new businesses are being created and new products developed.

We are working to develop products that meet local needs, with a view to rolling them out in global markets, particularly in China and other parts of Asia. We are strengthening our initiatives to develop power electronics equipment and other key products, with the aim of having local design, parts procurement, and production functions in Thailand, China, and other overseas production sites.

R&D Results in Fiscal 2012

Results of Trial Demonstration in Kitakyushu Smart Community

Fuji Electric is a participant in the Kitakyushu Smart Community Creation Project, and is testing the optimal control of energy with a cluster energy management system (CEMS). From fiscal 2012, we conducted the first test in Japan of a system that changes the unit price of electric power according to demand, and found that the amount of electricity used declined by more than 16% (figures released by Kitakyushu City).

FRENIC-Ace Series Inverters for Overseas Markets

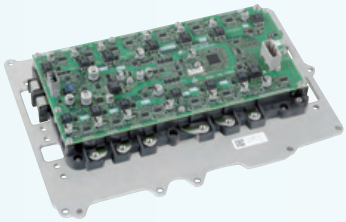
Fuji Electric developed a new series standard class inverter for markets in Asia, China, and Europe. Customers can select the optimal capacity specification from four types (there were previously one or two types) depending on the conditions of use. Among other features, these high-performance, multifunctional inverters can have customized software built in and can drive synchronized motors to adapt them for special applications such as wire drawing machines or hoisting cranes.

SPH3000MG Controller Achieves Both High-Speed and High-Precision

Fuji Electric developed a controller device that allows for high-speed, high-precision control of large amounts of data, centering on the area of steel plant control. The controller delivers high-speed communication processing performance, and can control multiple production line devices. By increasing the production line control accuracy for steel plant equipment, it contributes to improved productivity.

Intelligent Power Module for Plug-in Hybrid Vehicles

Fuji Electric developed an intelligent power module (IPM) which helps make plug-in hybrid and full hybrid vehicles more efficient and use less fuel. By raising the heat radiation efficiency of power semiconductors, we packaged two inverter parts and one converter part together to achieve a module that is smaller, and delivers up to 400 kVA of output.



* Please see the Fuji Electric Journal on our corporate website for more information on our latest technological developments.

Voice Word from a Joint Development Partner: The National Institute of Advanced Industrial Science and Technology

Hajime Okumura
Director
Advanced Power Electronics Research Center of the National Institute of Advanced Industrial Science and Technology

The National Institute of Advanced Industrial Science and Technology (AIST) conducts research in a variety of fields that support Japanese industry. To industrialize basic research achievements, we conduct joint research with companies that have experience in manufacturing. We have positioned the utilization of the next-generation power semiconductor SiC as an important theme, and in 2009 we began joint research with Fuji Electric based on the achievements of prior basic research. We are currently working to bring it to practical use, and in 2012 we developed the practical low-loss SiC-MOSFET. Going forward, we want to apply this technology to power electronics equipment, and use it to help conserve energy around the world.