

# TDK Products with Future Vision

The TDK Group is constantly developing new products that derive their strength from our original technology and know-how. Because our output is mostly electronic components, the end-user rarely encounters our products directly, but they are at the core of what makes many set products function. By extension, the set products embody our vision for the future. A few examples are shown below, highlighting sophisticated technology for effective use of energy and for a new generation of environment-conscious products.

### AC-DC, DC-DC Power Modules for High-Voltage DC Current Power Feeding Applications

Designed for HEMS (Home Energy Management Systems) to efficiently supply electrical energy inside the home.



### Two-Way AC/DC Converter for PHEVs\*

Used for converting AC from the commercial power network into DC for PHEVs, and also for supplying energy to the home in DC form.

\* PHEV: Plug-in Hybrid Electric Vehicle



### High-Capacity Lithium Ion Battery

Ideal for storing energy produced by solar power and wind power generators and supplied from outside the home.



### DC Electrification Eco Home

Normally, electrical power is supplied to residential homes in the form of AC (alternating current) by power companies or other providers. However, because many electrical appliances actually run on DC (direct current), AC adapters are needed to convert the alternating current into direct current. In the DC electrification eco home on the other hand, power is distributed as direct current. Power obtained from natural energy sources is stored in lithium-ion batteries, eliminating the need for the conversion stage with its inherent losses. Consequently, energy can be used more efficiently, which helps to reduce CO<sub>2</sub> emissions.

### Dye-Sensitized Solar Cells

Used in solar power generation that turn solar energy into electrical energy, for greatly reduced CO<sub>2</sub> emission levels.



### Soft Magnetic Metal Material for Generators and Motors

Utilized in generators and motors in wind power installations that turn wind energy into electrical energy.



### DC-DC Converter

Used in PCUs (Power Control Units) of hybrid electric vehicles to turn the high voltage from the batteries into the lower voltage required to drive the electronic equipment of the automobile. Featuring high conversion efficiency as well as compact dimensions and low weight, these TDK products contribute to better fuel economy.



### Battery Current Sensor

Designed for detecting input and output current levels in battery systems, so that overcharging and excessive discharging can be reliably prevented. This protection contributes to longer battery life. Accurate detection of remaining battery capacity is another important aspect for precise system control, which contributes to better fuel economy.



### Hybrid Electric Vehicle

Automobile that uses both an electric motor and a combustion engine to achieve much better fuel economy than a conventional automobile. Exhaust gas is cleaner, with significantly lower CO<sub>2</sub> emissions. This type of vehicle is currently attracting a lot of attention because of its overall lower environmental load.

### High-Performance Neodymium Magnet NEOREC 53 Series

Proprietary TDK technology has made it possible to build magnets with drastically improved magnetism. These are used in the electric motors of hybrid electric vehicles, providing assistive power to the engine and enabling the recycling of energy. The magnets have excellent heat resistance characteristics, which prevent a drop in motor output power at high temperatures, thereby contributing to better fuel economy.



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## The Technology Behind TDK's Environment-Conscious Products

TDK creates its range of environment-conscious products by fully utilizing its core technologies. There include

materials technology at the source, process technology to develop and optimize the characteristics of materials and apply them in products, as well as evaluation and simulation technology to sustain and accelerate our development and design activities.

Some examples of how technology is applied are shown below.

### Changes in environment-conscious design of chip components

1990

Size 2012

Raw material usage =  $\frac{1}{200}$

Electrical power used for sintering =  $\frac{1}{100}$

2008

Size 0402

Taping

Packaging material usage: 80% reduction

Transport related CO<sub>2</sub> emissions: 80% reduction

Storage space requirements: 80% reduction

More compact packaging format

1990

2008

Lead-based dielectric material	Complete elimination of harmful substances	Non-lead-based dielectric material
Precious metal (Pd) material	Reduction in use of precious metals Reduction in energy used for sintering	Base metal (Ni) material
Pb glass terminal electrode	Complete elimination of harmful substances	Non-Pb-glass terminal electrode
Sn-Pb terminal electrode	Complete elimination of harmful substances Response to lead-free soldering	Sn terminal electrode

## The Eco Love Logo and TDK Products

The Eco Love symbol is meant to indicate that a product is based on love for our global environment. Its design expresses our stance, awareness, and concern for environmental issues.

The logo is used widely, both for company-internal communications related to our drive for creating

environment-conscious products and in promotional material aimed at third parties. It serves to identify environment-conscious products that have special merits, and is found in catalogs, on our web site, and in other locations.

We intend to further increase the ratio of "Eco Love" and "Super Eco Love" products in our overall output in future. Together with our customers, we want to help protect the earth and achieve sustainable progress.

### TDK's Environment-Conscious Products Line-up

**SUPER ECO LOVE products**


**ECO LOVE products**
