DC-DC Converter Components and Materials

A DC-DC converter converts DC voltage to ensure efficient delivery of voltage from batteries and/or fuel cells to various electrical components and drive motors inside a car. Higher efficiency, more energy conservation and compact size are strongly requested for DC-DC converters, requiring material manufacturers to furnish more efficient materials with lower power loss.

Soft Ferrite
[Information System Components Company]

Soft ferrite is an iron-oxide-based soft magnetic material. Different from FINEMET® and other soft magnetic materials such as amorphous, this material features high electrical resistance and outstanding magnetic properties in the high-frequency range although saturation magnetic flux density is slightly low.

* FINEMET® is a registered trademark of Hitachi Metals, Ltd.

Transformers for DC-DC Converters
[Information System Components Company]

These transformers are specially developed for DC-DC converters that convert DC voltage from a battery according to the needs of various electronic devices. Soft Magnetic Materials Company supplies high-performance transformers that efficiently conduct voltage conversion under severe car body environments against heat and vibration. These transformers are also used for the lighting circuits of metal halide lamps.*

* Metal halide lamp

This type of lamp is increasingly popular with such features as high luminance, energy-saving, long life and easy-to-see light with colors similar to those of solar light.

Cut Cores for Power Choke (FINEMET® F3CC series and Metglas® AMCC series “POWERLITE®”)
[Information System Components Company]

Compared with conventional silicon steel cut cores, these cut cores can largely reduce core loss. Two series of cut cores are available. One is “POWERLITE®,” which uses a Fe-based amorphous material that excels in superimposed DC characteristics due to high saturation flux density and is advantageous for compactness. The other is “FINEMET® F3CC series,” which features low audible noise and low core loss due to smaller magnetostriction. These cut cores are easily manufactured in large sizes, which makes them suitable for applications that require large output capacity, such as power chokes for pressurizing DC-DC converters to be used between a battery and an inverter. (The maximum continuous operating temperature is 150°C.)

“NMX Series” Nd-Fe-B Sintered Magnets (Nd-Fe-B radial oriented Ring Magnets)
[NEOMAX Company]

Due to their ring shape, these NMX Series Nd-Fe-B Sintered Magnets with radial anisotropic ring magnetic field orientation can be easily assembled into rotors. In addition, the ring magnets allow skew magnetization, reducing cogging torque.

We also have segment-formed magnets that ensure high magnetic properties and design flexibility, allowing users to select optimum shapes and materials according to application.

These magnets are suitable for electric power steering motors, automatic shift gears and electric brake motors.

“MICROLITE®” Normal Mode Choke Cores
[Information System Components Company]

The MICROLITE® Normal Mode Choke Cores use Fe-based amorphous materials of high saturation flux density and low core loss. They are available in three degrees of permeability: 100, 245 and 270. They can be used in environments that are exposed to considerable vibrations and/or temperature change as normal-mode choke coils in the EMC-compliant filters of various ECUs (Electric Control Units). In addition, they are suitable for manufacturing more compact coils with lower core loss.
The Hitachi Metals Group places a high priority on being able to enact weight reduction actions to your current vehicle by optimizing the part design as well as utilizing lightweight material substitutions. In addition, the group aggressively responds to auto manufacturers’ requests by maximizing our leading-edge casting and surface treatment technologies.

By adopting die castings, the number of component items at the front frame has been considerably reduced and vehicle mass has decreased by approximately 30% compared with traditional component manufacturing methods. The HIVAC-V, an improved method of vacuum die casting, and the development of high-strength, high-toughness materials for die casting have made possible the use of die castings for suspension and frame components that require maximum strength and toughness.

By converting to high strength/toughness HIVAC-V die castings, the number of individual components making up the snowmobile frame has been dramatically reduced as well as realizing a 30% weight reduction versus conventional stamped steel/welded components.