

# Minebea's R&D and Intellectual Property Strategies

## Core Technologies and Businesses

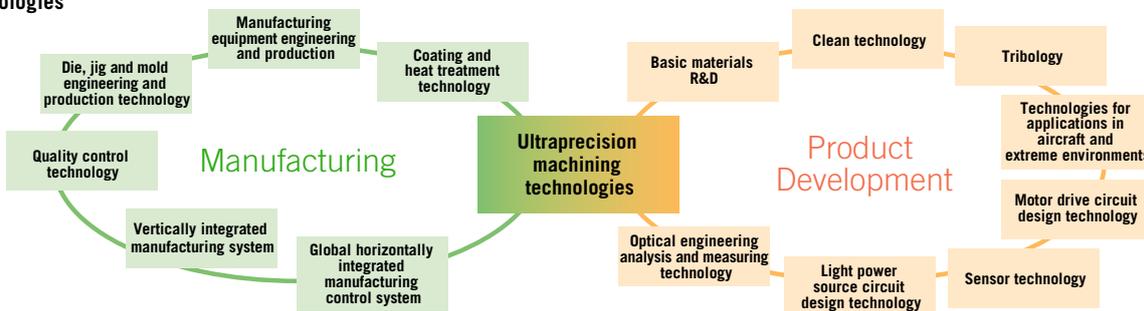
Minebea was established in 1951 as a specialized manufacturer of precision ball bearings for use in aircraft instruments. At that time, the market for ball bearings was still limited. In the following decades, however, the market expanded, spurred by the trend toward increasingly compact, high-performance video cassette recorders (VCRs) and other household electrical appliances, office automation (OA) equipment and PCs with high-precision ball bearings, and by our efforts to respond to emerging needs. The precision machining and other product development and manufacturing technologies accumulated over the past four decades are the core technologies of the Minebea Group today.

Since the 1960s, we have sought growth by establishing operations overseas and pursuing an aggressive expansion strategy, including several key merger and acquisition

(M&A) transactions. This has enabled us to amass additional core technologies, particularly in the motor and electronics fields, and build a diverse business portfolio that, in addition to ball bearings, includes precision small motors and electronic devices and components.

Minebea was one of the first Japanese companies to establish a manufacturing presence in Southeast Asia. In the process of setting up operations in the region, we perfected a unique, vertically integrated manufacturing system that gives Minebea a sharp competitive edge in terms of quality and cost. We achieved this by cultivating technologies needed to facilitate the in-house production of parts; the management of all production processes, from the production of parts through to assembly and testing; and the engineering, manufacture and maintenance of manufacturing equipment, jigs and tools. Today, this system continues to sustain our renowned manufacturing capabilities.

## Core Technologies



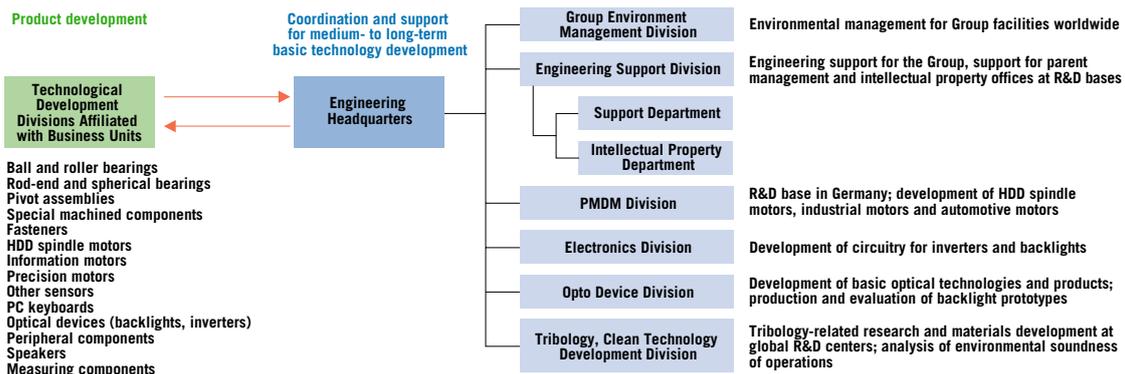
## Structural Support for R&D

One feature of our new management structure, which went into effect July 1, 2005, is the creation of the Engineering Headquarters. One of five headquarters, the Engineering Headquarters is charged with formulating R&D and intellectual property strategies for the entire Company and support for individual business units. The Engineering Headquarters is also positioned to provide cross-divisional support for individual business units. As stated in our new management policy, we have identified reinforcing R&D as a priority task, recognizing the crucial role it will play in future business expansion. A key goal of this new management structure is to strengthen our framework for developing basic technologies, an increasingly important consideration in this era of rapid technological advancement. By creating a system for redeveloping and redeploying human resources,

we will also seek to link various technologies together organically, enabling us to develop innovative products that anticipate future market demand. Such efforts will further reinforce our aforementioned core technologies.

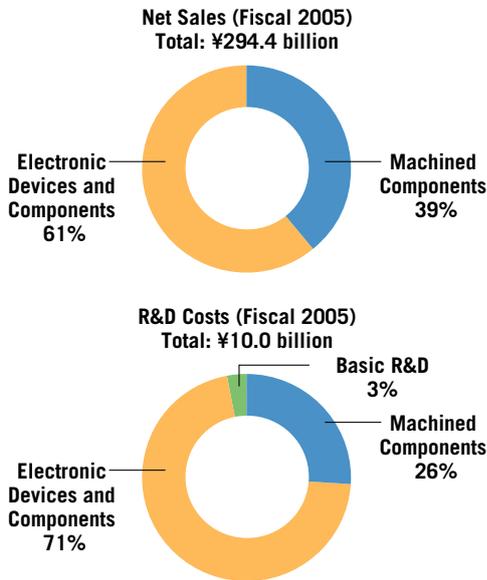
The Engineering Headquarters encompasses the following divisions: Group Environment Management; Engineering Support; PMDM; Electronics; Opto Device; and Tribology, Clean Technology Development, and is responsible for overall engineering support and basic technology development. The new management structure is designed to broaden interaction between the divisions and the R&D teams affiliated with individual business units, thereby facilitating dynamic, forward-looking R&D efforts in all businesses. (A chart showing the position of the Engineering Headquarters in the new management structure is shown on page 5.)

## Engineering Headquarters and Technology Development Divisions Affiliated with Business Units



**R&D Costs**

R&D costs in fiscal 2005 amounted to ¥10.0 billion. Of this total, 26% was allocated to R&D in the area of machined components, 71% to R&D for electronic devices and components and 3% to basic technological R&D. The heavy weighting in favor of electronic devices and components reflects the tremendous range of technologies required in this area.



By centralizing the administration of intellectual property to ensure the efficient management of corporate assets and setting forth a clear intellectual property strategy, we are striving to build a patent portfolio that maximizes our patents and rights. Patents and other rights are the most important index of the value of a company's intellectual property. We are currently enhancing our system of evaluating intellectual property to emphasize quality rather than quantity, with the aim of more accurately assessing the efficiency of our intellectual property management activities.

Regarding remuneration for employee inventions, we have prepared new internal regulations that comply with the revised Article 35 of Japan's Patent Law, which assigns greater legal weight to agreements between employers and employees in determining such remuneration. In preparing these regulations, our priorities were to establish procedures that placed due emphasis on such agreements and to increase motivation for engineers and product development staff.

**Going Forward**

The ultimate objective of R&D is to develop new products that will generate future profits. Currently, we are striving to reinforce our technological development capabilities to facilitate the development of new products and entry into new markets. These efforts focus on four key business areas: rod-end and spherical bearings, display peripheral components, measuring components and pivot assemblies.

**Example: Pivot Assemblies**

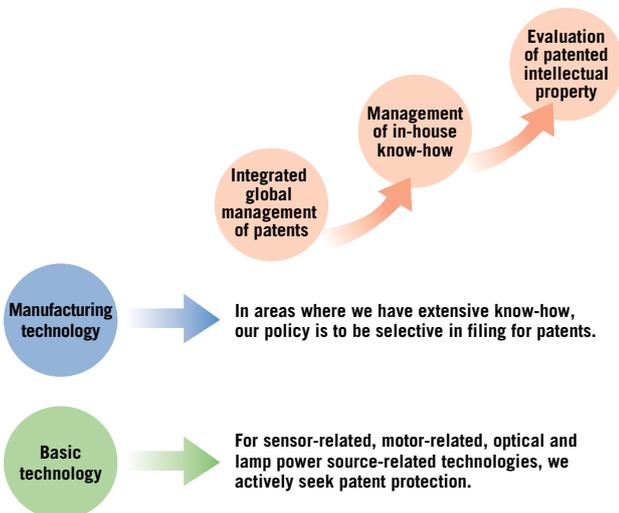
Pivot assemblies are fitted into the base of actuators to position HDD magnetic heads. Accordingly, outstanding precision and torque specifications are essential. With demand expected to rise sharply for pivot assemblies for use in mobile digital devices, user requirements are expanding to include smaller sizes and greater durability. Combining our proprietary ultraprecision machining and other technologies, we have succeeded in commencing mass production of such pivot assemblies ahead of our competitors.



Pivot assembly for use in HDDs with a 0.85-inch diameter

**Intellectual Property Policy**

Protecting intellectual property rights is a crucial aspect of the activities of any company. In 2003, Minebea established the Intellectual Property Department to coordinate patent applications on a Companywide basis. Since then, we have stepped up efforts to file for and obtain patent protection. We actively seek patents for technological achievements eligible for the exclusive rights guaranteed by patent protection. We do not, however, assert such rights by disclosing achievements in the public domain. In particular, we view manufacturing and production-related technological achievements as knowledge that must be kept in-house.

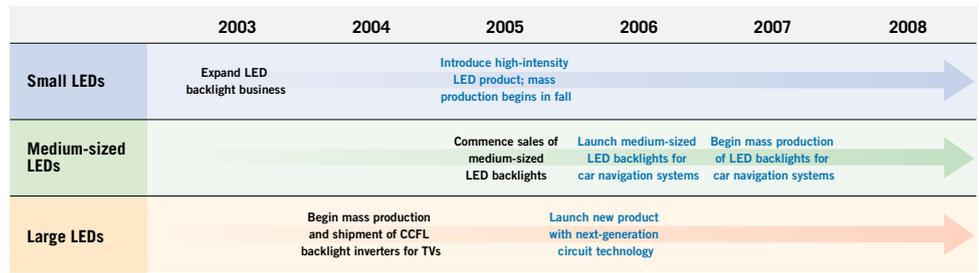


Example: Display peripheral components

Minebea's increasingly broad range of display peripheral components includes backlights illuminated by white LEDs and inverters illuminated by cold cathode fluorescent lamps (CCFLs). Our backlights, which are used in small and medium-sized LEDs and deliver outstanding luminance and low power consumption, are a reflection of our optical engineering technologies, as well as our circuit design and ultraprecision machining technologies. Backlights are one area in which we are actively pursuing patent protection, and we have thus filed numerous applications in recent years.

In autumn 2005, we will begin mass production of a new high-luminance, high-efficiency LED backlight, which we are confident will reinforce our reputation as a leading manufacturer of high-precision backlights. Our new medium-sized LED backlight, introduced in 2004, targets the market for car navigation system displays, which is expected to begin using LEDs, rather than CCFLs, as their light source. We are proceeding with a view to manufacturers adopting these backlights for 2007-model cars. In the LCDs that use CCFLs, we are introducing next-generation inverters and expanding the scope of our inverter business.

Business Development Roadmap



Display Market

