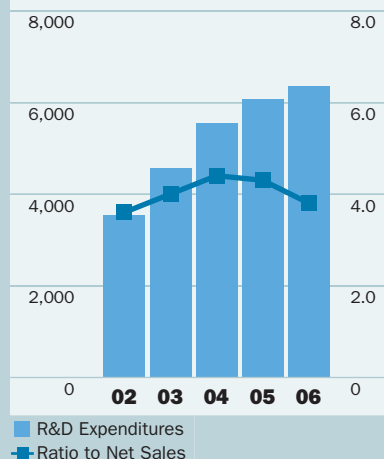


# STRENGTHENING R&D TO SAFETY AND ENVIRONMENT

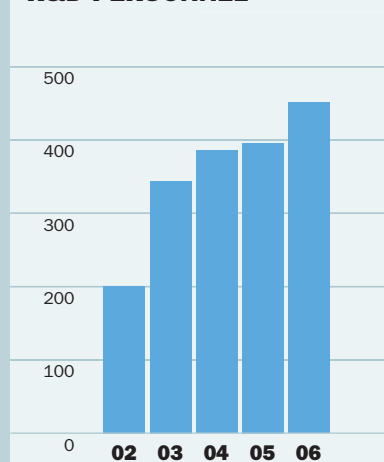
Nissin Kogyo conducts research and development (R&D) with the aim of reducing its impact on the environment and improving safety. Lowering the weight of vehicles and motorcycles holds the key to lessening their impact on the environment, and Nissin Kogyo's aluminum casting and processing technologies provide many examples of this being achieved. For instance, we have developed calipers and knuckles made out of aluminum instead of steel. Furthermore, our brake system technologies include VSA (vehicle stability assists) and other systems as well as the ABS system. The operational functions of automobiles include the three elements of running, stopping and turning. We are using the VSA and other systems to develop safer integrated brake systems in which the elements of running and turning are controlled, as well as stopping. Looking ahead, we will further strengthen these type of initiatives to contribute even more to the environment and safety.

## R&D EXPENDITURES/ RATIO TO NET SALES

(¥ millions/%)



## R&D PERSONNEL



## LOCATION AND OVERVIEW OF DEVELOPMENT BASES



### 1. Nissin R&D Europe S.L.

Surveys trends in the European motorcycle and four-wheeled vehicle markets, and wins new customers.

### 2. Nissin R&D Asia

Surveys trends in the Thailand and other Southeast Asian motorcycle and four-wheeled vehicle markets, and wins new customers.

### 3. Nissin R&D China

Surveys trends in the Chinese four-wheeled vehicle markets, and wins new customers.

### 4. Nagano R&D Center

Develops basic brake products, and designs and manufactures production technologies (casting, processing and assembly) and production facilities, including dies and jigs.

### 5. Tochigi R&D Center

Conducts full-scale test runs of ABS, VSA and ECU systems under development.

# COMPLY COMPLETELY SATISFY ENVIRONMENTAL REQUIREMENTS



## 6. Nissin R&D USA — Detroit

Develops brake products used in motorcycles and four-wheeled vehicles for the U.S. market.

## 7. Nissin R&D USA — East Liberty

Conducts brake settings and full-scale tests to ensure products are rapidly suited to American highway information and weather conditions, and to vehicle usage.

## NEW PRODUCTS AND EQUIPMENT



### NK15 series

As well as being safe and comfortable, customers want vehicles to have low fuel costs. Hence, hybrid vehicles are becoming popular. To provide brake systems for hybrid vehicles, Nissin Kogyo has developed the NK15 series. Based on the development of the conventional ABS and VSA systems, this is a regenerative coordinated brake system that adjusts the hydraulic brake volume according to the change in the regenerative brake volume when the brake is operated. The NK15 series has been adopted for use in Honda Motor's new Civic Hybrid vehicle.



### NK12 series (ABS, VSA)

With the NK12 series, we have succeeded in reducing both size and weight by approximately 10% from conventional models by improving the motors and ECUs in both the ABS and VSA. We have upgraded the control program for the ABS to improve stability during operation. The TCS and VSA functions have been improved by upgrading the control program and the pump performance.



### Aluminum rear disc brake

Nissin Kogyo's rear disc brake made from aluminum has been adopted for Mazda's new Roadster sports car. This product leverages Nissin Kogyo's core aluminum and brake technologies.



### Drum brake

Produced by Nissin Brake Thailand, our drum brake has been adopted for Mitsubishi Motors' Triton pickup truck, which is sold in Thailand.



### Cogeneration system

Nissin Kogyo's cogeneration system installed in the Naoetsu No. 2 Factory will improve energy efficiency up to 70%, with a projected generated electricity output of 2,100 kWh, equivalent to about 60% of the electricity needed by the No. 2 Factory, and is projected to reduce carbon dioxide emissions by 3,000 tons per annum.