

## Automobiles and Motorcycles

The automobile industry of Japan started to operate on a full scale in the 1950s. TOYOTA MOTOR CORPORATION advanced development with focus on purely domestic passenger cars, and released the first generation Crown in 1955. Then, in the period of rapid growth in Japan, the automobile industry achieved outstanding development along with the progress of motorization.

Central Japan has the headquarters and production plants of global automobile and motorcycle manufacturers such as SUZUKI MOTOR CORPORATION, Mitsubishi Motors Corporation, Honda Motor Co., Ltd. and Yamaha Motor Co., Ltd. in addition to TOYOTA MOTOR CORPORATION. No other region in Japan produces more automobiles and motorcycles than Central Japan. Those automobile and motorcycle manufacturers are supported by a wide variety of sectors, and world-class parts manufacturers that create various technologies such as DENSO Corporation, Aisin Seiki Co., Ltd. and Toyota Industries Corporation are also based in Central Japan.

These companies are now committed to the development of next-generation cars with lower emissions of air pollutants and superior environmental properties, such as hybrid, electric and fuel-cell vehicles. In the meantime, private-public initiatives to improve the safety of car driving have been launched to develop safe driving support systems and automatic driving systems.



Automobile Pavilion

### Toyota Commemorative Museum of Industry and Technology

4-1-35 Noritake Shinmachi, Nishi-ku, Nagoya-shi, Aichi TEL: 052-551-6115 [www.tcm.it.org/](http://www.tcm.it.org/)

This museum was opened in 1994, using the buildings that remain in the old site of the headquarter plant of Toyoda Boshoku (Tyoda Spinning & Weaving CO., Ltd.) which is the birthplace of the Toyota Group. Under the basic philosophy of communicating to society the importance of "monozukuri" ("making things") and the "spirit of being studious and creative," the museum introduces the history of the Toyota Group and the evolution of textile machineries and automobile engineering in a comprehensible manner with the demonstration of real machines and videos for explanation.



## Machine Tools

Machine tools, which are called machines that produce machines (mother machines), are used in all industrial sectors including automobiles, home appliances and precision equipment. Very high precision and efficiency are required in machine tools, and the technology and production level is therefore considered as an important indicator of the technical power and international competitiveness of a country.

The machine tool industry of Japan started to work for applied development of numerical control (NC) technology as early as the first half of the 1950s, and the performance of Japanese NC machine tools has been highly valued in the global market since the 1970s. In 1982, the country became the largest producer in the world, and maintained that rank for the next 27 years. Japan still keeps a 30% share in the global market, and leads the world along with Germany.

Central Japan has a variety of manufacturing sectors involving machining and assembly, including automobiles, motorcycles and other transportation equipment, and has grown as the largest market for machine tools in Japan. Accordingly, many machine tool manufacturers have been located in the region since the early years of heavy industrialization of the country. World-class companies such as YAMAZAKI MAZAK CORPORATION, Okuma Corporation, DMG MORI SEIKI Co., Ltd. and JTEKT Corporation have their headquarters in Central Japan.

In recent years, the shift to the equipment for more complicated machining combined with computers, such as an interactive control device that allows anyone to conduct complicated machining just by entering numbers in response to questions from the machine tool, has been accelerated.



Machine tools displayed in the gallery

### Mazak Machine Tool Gallery

1-19-30 Aoi, Higashi-ku, Nagoya-shi, Aichi TEL: 052-937-3737 [www.mazak-artplaza.jp/gallery/](http://www.mazak-artplaza.jp/gallery/)  
(located on the 1st floor of the office tower next to The Yamazaki Mazak Museum of Art)

This gallery introduces the history of machine tools, demonstrates machining of parts with the latest machine tools and exhibits car engines and wine glasses produced with machine tools as well as artificial bones and other machined parts and sample parts (including the vessel used to bring particulates from asteroid Itokawa by Asteroid Explorer "HAYABUSA" (MUSES-C)).



Parts processed with machine tools



## Aviation and Space

The production of airplanes in Central Japan started in 1920. Aichi Tokei Denki Co., Ltd. launched the manufacturing of military aircraft in commission for its high precision technology. Mitsubishi Internal Combustion Engine Mfg. Co., Ltd. (now Mitsubishi Heavy Industries, Ltd.) also constructed a factory for its production in Minato-ku, Nagoya. Trial flights were conducted at the Kakamigahara Airport in Gifu Prefecture. While the companies in Central Japan entered the market later, they developed abilities to design completely independently in the 1930s and expanded their factories to establish a system to boost the production capacity. With the establishment of many parts factories of subcontractors, as well as the concentration of production bases of Japan's major aircraft manufacturers, Central Japan grew to be a hub of the aircraft industry.

While manufacturing related to aircraft was banned in Japan for a while after World War II, the production of domestic jet engines was started in the 1950s. In 1962, aircraft manufacturers in the country cooperated and succeeded in the joint development of YS-11, Japan's first domestic turboprop engine passenger airplane. At present, 35% of the airframe structures of the Boeing 787, which is a main model of civil aircraft, are manufactured in Central Japan. This is realized by leveraging the region's largest advantage of having ports and airports to its fullest. Parts produced by various companies in Japan are delivered in the "Sea & Air" method; they are assembled in plants near the Port of Nagoya, transported from the port to Chubu Centrair International Airport by ship and transshipped to dedicated transport planes for shipment by air to Seattle, USA. The technologies are also developed in the defense and other industries, and used to enter various other sectors such as development and manufacturing of launch vehicles. Central Japan currently produces as much as 50% of the aerospace parts manufactured in Japan.



Exhibition hall of actual machines to trace the history of the development of airplanes in Japan

### Kakamigahara Aerospace Science Museum

5-1 Shimogiri-cho, Kakamigahara-shi, Gifu TEL: 058-386-8500 [www.city.kakamigahara.lg.jp/museum/](http://www.city.kakamigahara.lg.jp/museum/)

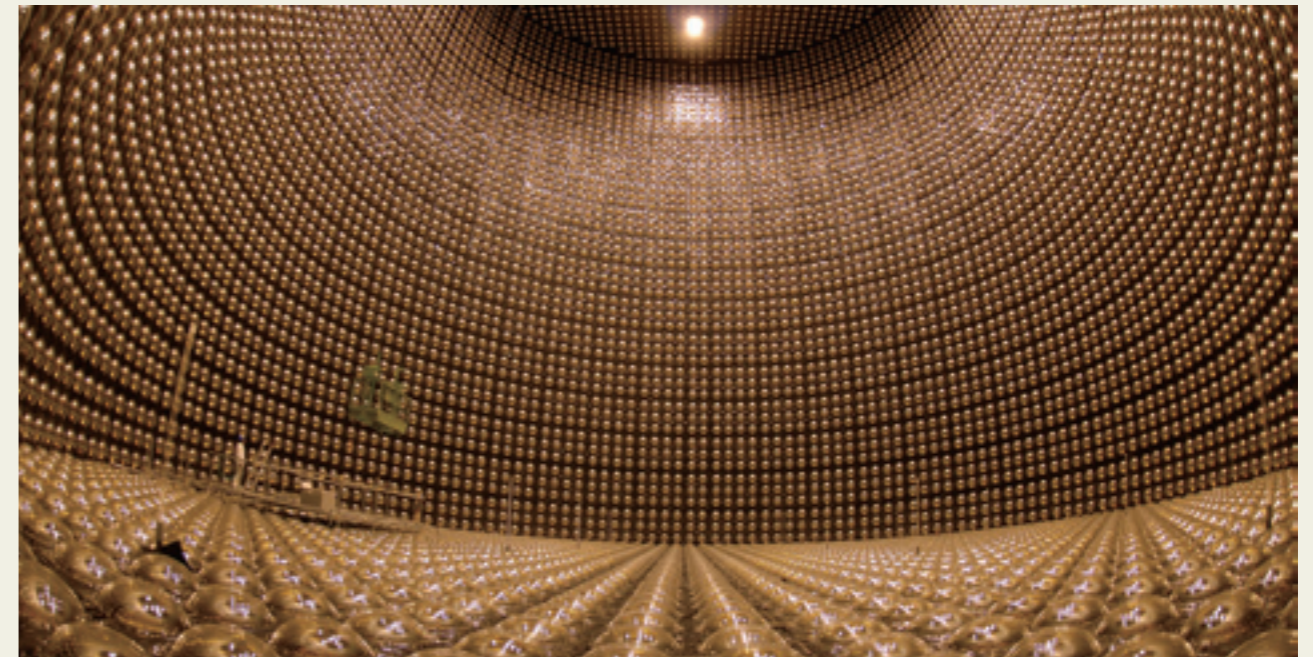
This museum exhibits a large number of airplanes and test planes and materials related to aviation, as well as rockets, space equipment and materials related to space development, to introduce the outcomes of the development of airplanes by the national government and private companies and the progress of the development of aerospace technology in Japan. The location is near the Kakamigahara Airport, which is Japan's oldest existing airport.



## Electronic Equipment

The sectors of electric and electronic equipment, electronic parts and devices and information communication equipment cover a wide range of fields including home appliances, semiconductors, sensors, mobile phones, fax machines, printers, advanced medical instruments and various other analysis and measurement equipment. They are among the main industries of Japan, and Central Japan represents a major cluster with more than 25% share of the total value of product shipments in 2008. In addition to the production bases of the country's leading general electronics and home appliances manufacturers, excellent companies that lead the world in their respective fields such as IBIDEN CO., LTD. and SEIKO EPSON CORPORATION are located in the region.

In recent years, Central Japan has also had a large number of unique companies that use excellent original technologies cultivated for many years in their areas of specialty to contribute to the development of industrial technologies. For example, TAMAGAWA Seiki CO., LTD. in Nagano Prefecture has succeeded in the development and mass production of groundbreaking rotation angle sensors for driving motors of hybrid vehicles based on its precision machining technology cultivated through the manufacturing of aircraft instruments. Hamamatsu Photonics K.K. supplied photomultiplier tubes, which are optical sensors, to Super-Kamiokande, an observation device constructed in Gifu, and contributed to the receipt of the Nobel Prize in physics in 2015.



The inside of Super-Kamiokande

©Kamioka Observatory, ICRR (Institute for Cosmic Ray Research), The University of Tokyo

### Super-Kamiokande

Located 1,000 meters underground in Kamioka mine in Hida City, Gifu, Super-Kamiokande is the world's largest underground observation device to mainly study neutrinos generated from cosmic rays, the sun, supernovas and other astronomical bodies. This is where Professor Takaaki Kajita, who won the Nobel Prize in Physics in 2015, discovered that neutrinos have mass, for which he won the prize. The detector consists of a cylindrical water tank of 39.3 m in diameter and 41.4 m tall, which is filled with 50,000 tons of ultra-pure water, as well as about 13,000 optical sensors called photo-multipliers installed on the tank wall. The photo-multipliers, which serve as the eyes of the detector, were produced by Hamamatsu Photonics K.K., an electronic parts manufacturer in Hamamatsu, Shizuoka.

※Visit for sightseeing is not accepted.



## Ceramics

Ichizaemon Morimura (1839-1919), who founded the global Western-style dinnerware manufacturer NORITAKE CO., LIMITED, built a pottery factory with advanced technology from Europe in Nishi-ku, Nagoya. In 1914, the company released Japan's first dinner set. That is why this place is regarded as the birthplace of Japan's modern ceramic industry.

One of the ceramic companies in Central Japan is NGK Insulators, Ltd., which is an insulator manufacturer originally established as a spin-off of Noritake. IBIDEN Co., Ltd., which has developed ceramic products as part of its operation in the electronic equipment field, is also located in the region.

These companies have recently evolved their technologies to enter the area of fine ceramics, and created highly functional products in such fields as DPF, which contributes to cleaning of exhaust gas from diesel powered vehicles, as well as IC substrates, artificial joints and other electronic members and components, members for semiconductor manufacturing systems, machine parts, automobile parts, aerospace materials and medical materials. In addition, they are committed to diverse research and development activities for different materials such as metal, polymers and composite materials with a focus on fine ceramics.



Noritake Museum

### Noritake Garden

3-1-36 Noritake Shinmachi, Nishi-ku, Nagoya-shi, Aichi TEL: 052-561-7290 [www.noritake.co.jp/mori/](http://www.noritake.co.jp/mori/)

This complex featuring ceramics was built in the birthplace of the modern ceramic industry. Visitors can observe the history of Noritake, many items of beautiful Western-style dinnerware, as well as the technologies and products cultivated through the production of dinnerware. In the greenery site, red brick factories from the Meiji period (1868-1912) and monuments of old chimneys create a historic atmosphere.



Fountain Plaza

## High-speed Railway

The Shinkansen (bullet train), which is globally known as a representative high-speed railway system, began operation in 1964 and was the first train in the world to reach speeds exceeding 200 km per hour. Central Japan is the home for several companies related to the Shinkansen, such as the Central Japan Railway Company, which operates and manages the Tokaido Shinkansen line that connects Tokyo and Osaka, and Nippon Sharyo, Ltd., which developed prototypes of the Shinkansen in cooperation with then Japan National Railways before the start of the operation and has manufactured the trains ever since then.

Since the start of its operation, the Tokaido Shinkansen line introduced the world's first tracks exclusively dedicated to the high-speed railway with no at-grade crossings, as well as "Automatic Train Control" (ATC) system, which prevents collision of trains and excessive speed. As a result, no passenger has died or has been injured due to a train accident during a ride in its entire 51 year history, and the average delay per train, including delays due to uncontrollable causes such as natural disasters, is just 0.6 minutes (results in fiscal 2014). This high-speed railway is thus safe and accurate.

The maximum speed of the Tokaido Shinkansen, which was 210 km per hour at the time of the start of the operation, has been increased to 285 km per hour during operation with constant introduction of advanced technologies including the improvement of the output and efficiency of motors, the use of aluminum train car-bodies to reduce the weight and the "Body Inclining System" to allow trains to pass through curve sections without slowing down.

Further improvement of train cars of the Tokaido Shinkansen is currently in progress. In addition, the construction work for the Linear Chuo Shinkansen, a railway using the Superconducting Maglev System, which can be operated at a higher speed than the Shinkansen, has been started for the inauguration scheduled in 2027 (between Tokyo (Shinagawa) and Nagoya).



Rolling Stock Displays



Greatest Railway Diorama Room

### SCMAGLEV and Railway Park

3-2-2 Kinjofuto, Minato-ku, Nagoya-shi, Aichi TEL: 052-389-6100 [museum.jr-central.co.jp/](http://museum.jr-central.co.jp/)

This railway museum of Central Japan Railway Company displays 39 units of rolling stock ranging from locomotives to the Shinkansen series and train-cars on conventional lines, as well as the Superconducting Maglev. Progress in the high-speed railway technology is introduced through various exhibits including a railway diorama, which is one of the largest in Japan, and driving simulators.

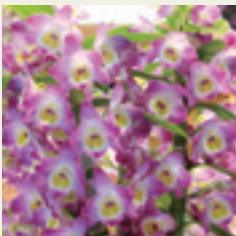
# Agricultural and Fishery Products cultivated in the productive climate of Central Japan

The five prefectures in Central Japan have diverse terrains ranging from flat land at sea level to mountain ranges at an elevation of over 3,000 meters, as well as diverse climates ranging from warm areas to inland cold areas. With such diversity, a wide variety of crops are cultivated, which differ from area to area.

The recent global Japanese food boom has enhanced the popularity of Matsusaka beef in Mie and Hida beef in Gifu. In addition, many of Japan's representative brands of agricultural products, such as Japanese tea in Shizuoka and powdered green tea in Aichi, have been born in Central Japan.

## Specialty goods in the five Prefectures of Central Japan

### Aichi Prefecture



Powdered green tea of Nishio, which is one of the largest producers in Japan.

Aichi leads Japan in the production of flowers including chrysanthemums, roses and western orchids.

### Gifu Prefecture



Hida beef, which has recently become popular as a top Japanese beef brand.

Local sake made of clear stream water and local rice in Gifu Prefecture.

### Mie Prefecture



Matsusaka beef, a representative luxury beef brand of Japan.

Ise-ebi, or spiny lobster, representative seafood of Mie.

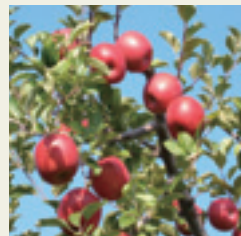
### Shizuoka Prefecture



Tea is a symbol of Shizuoka. Its green tea attracts global attention.

Wasabi, or horse-radish, is a spice indigenous to Japan, and grows in clear streams in Shizuoka.

### Nagano Prefecture



Thanks to the large difference in air temperature between day and night, quality soba is produced.

Shinshu apples have a large number of tastes and varieties. Efforts are also made to export them.

### Hida Local Sake Tourism Council and declaration of friendship with Alsace Wine Route

In 2014, the Hida Local Sake Tourism Council, which is composed of sake breweries in the Hida area in the north of Gifu Prefecture, signed the declaration of friendship with Alsace Wine Route, which is composed of wine producers in Alsace, France. From the declaration, the two organizations actively cooperate in such activities as presentation at exhibitions on tourism and products held in each other's regions and distribution of pamphlets in order to improve the name recognition of their Japanese sake and Alsace wine.

#### Topics

