

Ibaraki Prefecture

SHINKO DENSHI CO., LTD.
Tsukuba Plant (Shimotsuma City)

Development of the World's First Precision Tuning-fork force Sensor

NIHON EXCEED CORPORATION (Joso City)

A Leap with Worldwide Ultra-precise Polishing Technology

TNK SANWA PRECISION CO., LTD. (Tsukuba City)

The Nation's Largest Producer of Precision Shafts

STAR ENGINEERING CO., LTD. (Hitachi City)

Manufacturing High Precision IC Tags with Ultra-fine Winding Technology

TANGE Ltd. (Hitachinaka City)

Specializing in parts with socket holes by simultaneously processing dies of taps & presses

Development of the World's First Precision Tuning-fork force Sensor

SHINKO DENSHI CO., LTD. Tsukuba Plant

4219-71, Takasai,
Shimotsuma City
Ibaraki Prefecture

Established in 1963
TEL +81-296-43-2001

<http://www.vibra.co.jp>



Minoru Okazaki
President

We developed the world's first precision tuning-fork force sensor for balances.
This technology supports the world's largest astronomical telescope "SUBARU."

The World's Only Manufacturer of Electronic Balances with the Tuning-fork force Sensor

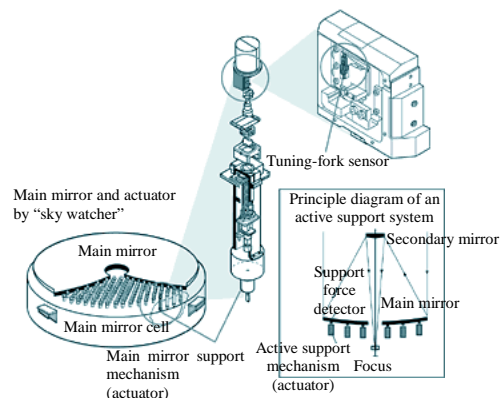
We developed highly accurate tuning-fork force sensors to measure the force and mass for serving precise measurement such as research, medicine, chemistry and industry. As a tuning-fork is standardized for a use in a musical instrument the frequency is extremely stable and accurate. Shinko Denshi is the only manufacturer of electronic balances with tuning-fork force sensors. The tuning-fork force sensors are highly admired of "high-precision", "durability", "energy-saving," and "cost performance."



General purpose electronic balance HJ Series
(capacity: 220g ~ 15kg, resolution: 0.001g~)

This Technology Supports the World's Largest Astronomical Telescope "SUBARU."

The tuning-fork force sensor developed by Shinko Denshi is used as a controlling sensor for the mirror surface of "SUBARU", the world's largest optical telescope on Hawaii Island, and it has shown successful results such as the discovery of a distant galaxy 128 billion of light years away from the Earth. There are 261 actuators of precision tuning-fork sensors that continuously control the main mirror, which has a diameter of 8.3m, 20cm thick and weighs 20t for ultra precise mirror control. Shinko Denshi received the first Japan grand-prix for manufacturing award for "the development of precision tuning-fork force sensor and its application."



A Leap with Worldwide Ultra-precise Polishing Technology

NIHON EXCEED CORPORATION

4382-4, Uchimoriya-machi,
Joso City
Ibaraki Prefecture

Established in 1961
TEL +81-297-27-1531

<http://www.nihon-exceed.co.jp/>



Hideo Hashimoto
President

We have always sought for technology beyond the boundaries. It has been achieved by polishing various single crystals and semi-conductor materials as the heart of electronics. We are the only company in the world that has the technology to comprehensively polish various materials of electronics.

Realization of Precision Polishing Using Any Materials

We have processed precision polishing such as single crystal silicon, compound semiconductor and oxide single crystal that are the heart of electronics. We have fully responded to user's specifications with our quality and precision for super lamellate and specific polishing, regardless of whether they are hard or soft materials. The president's belief is "Not only semiconductor materials but also all crystals can be revitalized by polishing and reborn to serve someone's needs."

Establishment of Unique polishing Techniques for Each Material

We have polished various materials since our establishment and have unique polishing techniques for each material, and also separated plants according to each material and provided outstanding quality and precision for our customers. We have achieved this polishing technology with five exceeding techniques and skills; super flat, super smooth, super parallel, super cleaning and super thinning.

Aiming to Be a Key Company in a Small Market

Cell-phones require devices to remove unnecessary frequencies and we have polished 30% of the world's share of its base material. We have also accumulated techniques to polish the most advanced materials such as blue laser boards and power device boards in hybrid cars.



<Lines of Business>

- Silicon Wafers
- Oxide Wafers
- Compound Wafers
- Metal Wafers
- Other Material Wafers

Photo (Right); 150mm
Silicon wafer polished
under 50um



The Nation's Largest Producer of Precision Micro Shafts

TNK SANWA PRECISION CO., LTD.

1904, kami-ooshima,
Tsukuba City
Ibaraki Prefecture

Established in 1946
TEL +81-29-866-0811

<http://www.tnksanwa.co.jp/>



Kenji Nakamura
President

The company established technology for precision grinding and achieved the nation's largest production of precision micro shafts for automobiles, appliances, and information and telecommunications.

Realization of High-precision and Low-cost Precision Shafts

High-precision at low-cost has been realized by precision grinding. The company produces the nation's largest number of precision micro shafts for automobile, appliances, and information and telecommunications. Particularly the lead screw for digital cameras amounts to 4 million per month which is the best.

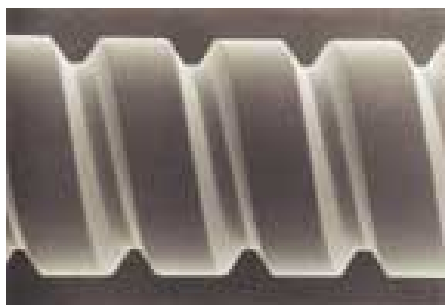
Wide Deployment of Production from Domestic to Overseas

We have expanded into Korea, China and Singapore at consumer electronics manufacturer's requests. The Tsukuba plant has sought consumers except in appliances due to the transfer of appliances and the production of automobiles, machine parts and information and telecommunications, which accounts for 60% of sales now. For a wider range of parts manufacturing, we are promoting the installation of large production facilities, such as vacuum carburizing furnaces.

Development of Our Production Facilities

We have worked to improve quality and cut costs by developing characteristic exclusive facilities to ensure our reliability that has grown, thanks to our collection of "creative technology," something we have consistently pursued since our establishment.

Example of High-precision Grind Processing



Lead Screw

Simple pitch error: under 0.005mm
Cumulative pitch error: under 0.008mm



XY Tables Rollers

Outer diameter size mutual error margin
: under 0.05 μ m
Edge squareness: under 1.0 μ m

Manufacturing High Precision IC Tags with Ultra-fine Winding Technology

STAR ENGINEERING CO., LTD.

1-28-10, Onuma-cho,
Hitachi City
Ibaraki Prefecture

Established in 1980
TEL +81-294-38-1212

<http://www.stareng.co.jp>



Katsuji Hoshi
President

We have realized miniaturization, high precision and low-cost of IC tags simultaneously by applying ultra-fine winding technology developed in the manufacturing of micromotors. We have received many inquiries from major manufacturers.

Development of IC Tags using Ultra-fine Winding Technology

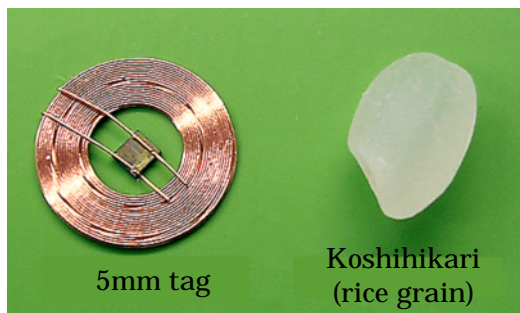
IC tags have been expected to apply too all areas of our daily lives, such as commuter passes, electronic moneys, logistics and security. STAR ENGINEERING has mainly manufactured micromotors since establishment. By using the ultra-fine winding technology developed in motor manufacturing, we developed miniaturized, high precision and low-cost IC tags.

Realizing Miniaturization, High Precision and Low-cost simultaneously and Many Inquiries from Major Manufacturers

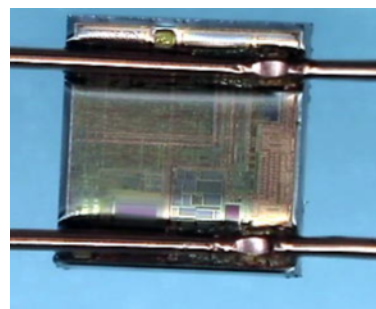
The norm for IC tags is usually to etch copper or aluminum foils and create coiled patterns, but we have established the system to wind copper wire in a spiral configuration. It is more durable than the existing system and works easily for laminating, resining and adhering. In addition, it realizes miniaturization, high precision and low-cost simultaneously by applying original technology to the joining method. It has been used in various areas, such as automatic reset and maintaining freshness in the revolving sushi restaurants and collection management in libraries, so that we have received many inquires from major manufacturers.

Development of the world's smallest micromini IC tag and Expectation of application to small products

We have achieved development of the world's smallest micromini IC tag (3.8mm diameter). They are expected to apply to small products such as bottle of drugs, jewelry and cosmetics and complex shaped products that are difficult to install existing IC tags.



5mm tag
Koshihikari (rice grain)
Micro-mini IC tag (5mm diameter)
Expected to apply for small products and complicated shapes products



IC chips (photo magnified about 40 times)
Durability is improved by alloying with direct interaction of copper wire and end terminal.

**Specializing in parts with
socket holes by
simultaneously processing
dies of taps & presses**

TANGE Ltd.

591, Tabiko, Hitachinaka City
Ibaraki Prefecture

Established in 1957
TEL +81-29-272-3909

<http://www.i-s-d.or.jp/TANGE>



Yasuaki Tange
President:

We have accomplished low-cost, high quality and no defects by simultaneously processing socket holes (tap processing) and press work in parts with necessary socket holes for all fields.

Parts with essential socket holes for all fields

Parts with socket holes that are used in all fields of life from high-tech products to commodities, such as electronics, automobiles and glasses, have been processed to make socket holes in a separate process (tap processing) after work with the press. Therefore, it takes more work so that it was limited with maintaining quality and reducing costs.

Accomplishing low-cost, high quality and no defects by simultaneously processing taps & presses

TANGE Ltd. was originally a subcontractor for major electronics manufacturers. We achieved development of a “progressive die with tap processing” that enables simultaneous processing of taps and presses in a die, based on the automation of press work and unique know-how from tap processing. We have achieved serious cost reduction, no defects and shortened the process with a progressive die and it enables mass-production of high quality parts with socket holes.

Only technology to support cell-phones and popular game consoles

We specialize in parts with socket holes based on the idea of, “How can we impress our users? This can be achieved by focusing on improving our technology.” We can produce socket holes of up to 1mm, which is impossible by working manually or simple press work. We have received high evaluations due to our low-cost and high quality parts and widely used in cell-phones and popular game consoles. We have also worked to improve our technology and develop original products.



An example of parts with socket holes



Pressing machine