Driving innovation with unique technologies

The fact that the Japanese-made walkmans and digital cameras that we once carried around have largely been replaced by smartphones made by U.S., Chinese and Korean companies, serves as testament to the decline of Japan in the end-facing consumer electronics industry.

The Nippon nation, however, still excels in niche B2B fields, where lesser-known Japanese firms provide technologies, components and machinery, most notably in the fields of automotive, electronics, semiconductors, materials science and other high-tech manufacturing segments. Leveraging *monozukuri* – the Japanese manufacturing philosophy based on craftsmanship – these companies continue to surpass their regional competitors, delivering the high-quality with which the 'Made in Japan' brand has been synonymous for decades.

"'Made in Japan' has become a global brand that lays claim to high functionality and top-of-the-mark standards as a direct result of Japanese manufacturers forging an impressive level of technical capabilities," highlights Ryoichi Sugi, president and CEO of Tokyo Keiso, which manufactures flow control devices for several industries, including semiconductors. "Also, the Japanese ethos means the altruistic spirit of sincerely responding and making improvements to best cater to clients' requests. Most companies have continually strived to implement *kaizen*, which refers to continually improving their productivity and manufacturing processes and operations to ensure that products have a competitive edge over our global counterparts."

For Japan to retain its competitive edge over regional competitors, many companies shifted their focus towards developing cutting-edge technologies, as Shin-ichi Takahashi, president of industrial furnace manufacturer Kanto Yakin Kogyo (KYK), explains. "Japanese companies were famous for developing new products that were recognized worldwide for their quality, such as the Sony Walkman. However, during that time, Chinese liberation and other political changes took place which opened the way for cheaper labor costs. These emerging countries started to learn from Japanese manufacturing and it became impossible for us to compete in terms of pricing. Because of this, Japanese companies have shifted their strategy by developing and providing the market with new cutting-edge technologies."

In KYK's case, the company has focused on areas such as heat treatment technologies for carbon fiber. "Focusing on a niche field and providing unique technologies such as our ultra-high temperature treatment furnace helped us remain in business," adds Mr. Takahashi.

Kaizen, the concept of continuous improvement, is essential for Japanese companies in the face of stiff regional competition, agrees Kyotaro Ogura, president and CEO of Ogura Jewel Industry, a leading manufacturer of wire guides, coating dies and diamond styluses. "We need to continuously think about how we can improve our processes and prices to be more competitive, which requires us to conduct *kaizen*. We must eliminate any unnecessary or redundant aspects of the production process. Competitors are learning a lot in terms of technology and production capability and may catch up with Japanese companies. Therefore, it is important to always consider what we should do to have the edge over our competitors."

A pioneer in barrel finishing machines, Tipton is a so-called 'Urakata' (backstage) company supporting industry from behind the curtain thanks to unique and niche manufacturing technologies for which Japan is renowned. "The barrel finishing industry caters to a very wide range of companies. From parts that you don't usually see, such as engine parts and semiconductor parts, to consumer items such as coins and watches, barrel finishing is applied to various products. So in that sense, we're an Urakata company," explains Tipton president, Fumiaki Kobayashi. Leveraging its capacity for innovation, Tipton now seeks to grow internationally while diversifying into new fields such as the pharmaceutical and food industries, says Mr. Kobayashi. "As an innovative company, we're always making new changes and are not afraid to take on challenges."

The spirit of innovation also runs deep at Fujitsu and the well-known Japanese tech giant is leveraging that spirit to support the shift to Society 5.0 through development in key areas such as cloud computing, IoT, 5G networks, big data and artificial intelligence. "The concept of Society 5.0 advocates for more equality in society with systems that highly integrate artificial intelligence, for example," says Vivek Mahajan, corporate executive officer, SEVP and CTO of Fujitsu. "Fujitsu is fortunate to have the needed network of pipes for 4G and 5G, as well as technologies to utilize the data collected, including massive computing power, data centers, and the capacity to develop artificial intelligence (AI); these technologies come together to enable digitalization. I think digitalization will lead to changes that go beyond technology: it will affect how nations compete."

Getting faster, smaller and more powerful by the day, semiconductors, of course, are the building blocks for these new technologies. And while Japan's global market share in semiconductor production has dropped substantially in recent decades, it still holds a dominant position in the fields of semiconductor manufacturing equipment and related materials.

"Japan is still considered a strong player when it comes to auxiliary fields surrounding the sector," says Hitoshi Nara, president and CEO of Yokogawa Electric Corporation. "Japan still plays a firm and foundational role in the semiconductor field. Especially when it comes to factories, you need to incorporate a very flexible model to adapt to high-mix low-volume production. Yokogawa's competence in measurement, control, and inspection allows us to make a significant contribution in that respect."

Optical semiconductors – which are used in sensors, LED display screens and fiber optical communication – is another area where Japan remains strong, says Hideo Sakaki, president of Shinkoh Electronics, a leader in the field of photosensors. "A major Japanese company is still a world leader in optical semiconductors, and we often collaborate with them. We commission them to produce parts of our products and often work jointly. We have also been working with a Tokushima-based LED manufacturer that invented blue and white light LEDs and has a high market share in LEDs for over 20 years. Another world-leading Japanese company has a high share in optical devices. Therefore, Japan is still a global leader in optical semiconductors."

Vivek Mahajan, Corporate Executive Officer, SEVP, CTO, Fujitsu Limited

The role of trading companies has evolved over time in Japan, with firms like Takebishi and Tokyo Electron Device (TED) becoming full-fledged manufacturers and providers of high-tech solutions. "Our uniqueness is that we provide total embedded solutions or systems. We don't only sell the device, but we listen to the needs of the customers. We put them all together, so it becomes something that is one of a kind and is easy to use by our customers. That is our strength," says Isamu Ogura, president and CEO of Takebishi, which has developed products such as its DeviceXPlorer OPC Serve manufacturing software and DeviceGateway for IoT services.

TED, meanwhile, is "driving digital transformation" with its range of solutions in the fields of robotics and artificial intelligence with technologies such as TriMath, a 3D vision robot system, and the RAYSENS automatic semiconductor wafers inspection system. "We're emphasizing the development of *Monozukuri Systems*. Our development concept is 'the fusion of image processing, data science and robotics', and we will promote this through collaboration among group companies and with leading companies," explains TED president, Atsushi Tokushige. "We have been called a trading company that has manufacturing capabilities. In five years, we want to significantly change our business model and be a manufacturer with trading company capabilities."

A leader in the pursuit of sustainability and industrial autonomy

Industrial automation and control specialist Yokogawa Electric is focusing its business on three key sustainability goals as it spearheads the transition towards industrial autonomy.

> "We aim to realize a sustainable society in line with Yokogawa's Purpose: Utilizing our ability to measure and connect, we fulfill our responsibilities for the future of our planet."
>
> **Hitoshi Nara**,
> President and CEO,
> Yokogawa Electric Corporation

Yokogawa is a leading Japanese provider of industrial automation and control solutions, and testing and measurement equipment. A company that operates in 61 countries worldwide, it supplies systems that improve efficiency, safety, quality and reliability at production plants in a host of sectors.

Established in 1915, Yokogawa has been responding to the changing needs of industry and society for over a century: from its beginnings as an electric meter manufacturer, amid the rising everyday use of electricity, to its present as a driver of digital transformation (DX). "Since its foundation, Yokogawa has continued to adapt to the times and grow its business by being quick to identify shifts in the marketplace," says the company's president and CEO, Hitoshi Nara.

As its customers embrace DX, which Yokogawa explains as "the application of digital technologies to empower people, optimize processes and automate systems", the firm is working with companies not only to achieve greater automation, but to transition to industrial autonomy.

While automation requires humans to program and supervise tasks, autonomous technology has learning and adaptive abilities that allow it to control itself. With its OpreX™ products, services and other solutions, Yokogawa is helping its customers' systems to progress towards such self-governance. "The challenge to achieving industrial autonomy is to integrate hundreds of different technologies, devices and equipment," Mr. Nara says. "In a plant, all these different technologies are in play, so the key is to what extent we can integrate and connect them to create added value."

The potential benefits of moving towards autonomy include increased productivity by reducing downtime, energy optimization, and the de-manning of dangerous applications. "In this industry, younger workers consider safety a highly important issue, and they seldom work in high-risk environments," Mr. Nara says. "It's vital to ensure workers' safety on the factory floor and in the industry as a whole."

Considerations such as energy efficiency and human safety go hand in hand with the three goals Yokogawa set itself in 2017, reflecting the aspirations of the United Nations' Sustainable Development Goals. "The first objective is to achieve net-zero emissions to prevent climate change; the second is to transition to a circular economy; and the third is to ensure the well-being of all," Mr. Nara says.

Based on these goals, Yokogawa has organized around three chief business segments on which it is focusing its technology: 1) Energy and Sustainability, which promotes greener energy solutions; 2) Materials, which targets an economy in which resources are circulated without waste; and 3) Life, which supports people's health and prosperity in sectors such as pharmaceuticals and the food industry.

"We've been working on renewable energy for several years now," Mr. Nara explains. "Traditionally, Yokogawa has played an important role in the oil and gas sector. However, we're now looking to shift our focus to new energy sources, and are collaborating to create carbon capture, utilization and storage technologies that can be applied to reduce carbon emissions.

"Another example of our environmental energy services is found in batteries. More often than not, batteries used for industrial purposes are discarded too early. When the charging capacity of a battery stands at 70% or 80%, the battery will be thrown away. To address this issue, we created a solution that accurately measures and optimizes the remaining battery capacity, thus reducing waste."

Yokogawa's commitment to reducing waste is also evident by its collaboration with a specialist recycling company on a plant that collects and reuses polyester fibers. An example of the company's endeavors in the area of life sciences, meanwhile, is its support for customers' production of drugs and medicines through the development of "a bioreactor that automates lab-scale cell culture with highly accurate real-time monitoring and advanced process control".

Aside from the three key goals that it has established, Yokogawa is also targeting an evolution in its relationship with its customers. "Our company has been praised for thoroughly responding to client's requests and requirements, delivering solutions that improve their plant operations and supporting them to enrich the entire life cycle of their plant," Mr. Nara says. "We're very proactive in responding to our customers. Nevertheless, we aim to become a company that leads our customers instead of just responding to them. In the future, we want to predict and foresee the challenges that they may face."

TED: DRIVING DIGITAL TRANSFORMATION

Leveraging the synergy of a trading firm with manufacturing functions, Tokyo Electron Device (TED) provides total solutions that encompass leading-edge devices with a mission to drive digital transformation.

Although Japan is renowned for being a high-tech society, somewhat surprisingly it has been relatively slow in implementing digital transformation (DX) across its economy and industries in comparison to other OECD countries, and is ranked 28th in the World Digital Competitiveness Ranking 2021. However, there are a growing number of Japanese firms committed to advancing the technologically-driven transition in line with the Japanese Ministry of Economy, Trade, and Industry's campaign to promote DX in core sectors.

"Our mission statement is to drive digital transformation," says Atsushi Tokushige, President of Tokyo Electron Device (TED), a technical trading and development firm that provides semiconductor products and business solutions. "There are many different kinds of technologies in DX, but one of the key technologies is AI. We've opened the TED AI lab at our Engineering Center and installed two types of ultra-high speed AI accelerators for deep learning. We offer this AI environment to customers, and they then sell it as verification systems or time-based subscription services to their own clients. Through this experience, we have deepened our knowledge and understanding of AI and the customer requirements regarding it. This is our investment in the market.

"Our private brand business, which is one of our unique features, is based on the idea that we should make the products that our customers need and that cannot be found anywhere else in the world. Based on this idea, we established our design development center in 1985 and since then have been providing contract design and semiconductor substrate manufacturing services for over 35 years."

"In today's rapidly changing electronics industry, the TED Group is dedicated to delivering high-value-added solutions to meet the unique needs of each customer through collaboration and innovation," adds Mr. Tokushige. "Leveraging the synergy of our trading firm and manufacturer functions, we are committed to challenging convention to create new value together with our customers, through technology, products, information and services. In this way, our ultimate aim is to hone our customers' competitive edge in the international marketplace and foster sustainable growth along with all our stakeholders."

RAYSENS

TriMath

TED's current contract design and mass production services provide one-stop services for substrate design – leveraging the company's development capabilities – and are then manufactured by TED NAGASAKI, a subsidiary established in 2017. In addition, TED's FAST CORPORATION – another consolidated subsidiary set up in 2018 – develops products for the robot vision field using image processing technology.

"In this way, we have spent the past few years developing the infrastructure to become a manufacturer," explains Mr. Tokushige. "In our mid-term management plan we have set out to become a manufacturer with technology trading company functions as our corporate vision, and our private brand business will be the key division for achieving this objective."

One of TED's key product lines today is the CX series, which provides equipment abnormality detection and failure prediction systems, as well as TriMath, a work robot system that combines robots, hands, and system control with optical equipment and unique image processing, with AI technologies at its core. TriMath enables flexible transportation and sorting of a wide variety of irregularly shaped objects, which has traditionally proven difficult at manufacturing and distribution sites in the past. However, with TriMath a single operation can be easily constructed by combining the necessary functions from the three pre-defined operations: picking, recognition and sorting according to the target objects and on-site operations.

"This drastically reduces the amount of work that has to be designed and integrated at each site and enables quick introduction and efficient system operation," says Mr. Tokushige. "So far, it has been installed on manufacturing lines, but we want to expand this to agriculture, construction work and even the medical and nursing fields, to give just a few examples.

"The second is the RAYSENS macro inspection system. Instead of visual inspection, RAYSENS can automatically inspect compound semiconductor wafers. It is already in operation at a wafer manufacturer and, going forward, TED will continue to promote larger diameter wafers.

"Through TED's private brand business, the company is now targeting the manufacturing automation segment as an increasingly important field, with specific focus on the development of so-called Monozukuri Systems. Our development concept is a fusion of image processing, data science and robotics, and we will promote this through collaboration among group companies and with other leading companies."

TED is also focusing its foreign businesses on the international semiconductor market, with key clients in the industrial and automotive sectors. "In terms of overseas expansion, the challenge is to expand into Europe," says Mr. Tokushige. "As for our private brand business, we want to strengthen our position in China."

TOKYO ELECTRON DEVICE
www.teldevice.co.jp/eng

KANTO YAKIN KOGYO: The ultra-high temperature furnace specialists

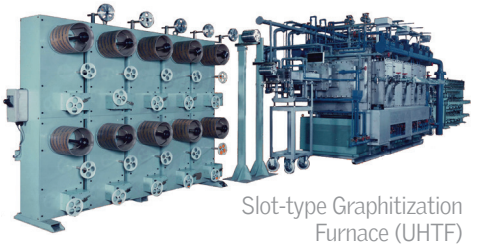
Since its foundation in 1948, KYK has developed technologies to precisely control furnace atmospheres and is now catering to the circular economy with its industrial furnaces for recycling.

> "KYK creates new fields in the world of industrial furnances through material revolution."
>
> **Shin-ichi Takahashi**,
> President and CEO,
> Kanto Yakin Kogyo Co., Ltd.

KANTO YAKIN KOGYO CO.,LTD. (KYK) (**関東冶金工業株式会社**) was established in 1957 and has developed into a company that designs, manufactures and sells industrial heat treatment furnaces. Starting with metal heat treatment furnaces, the company has been leading the market with its innovative technologies, such as aluminium brazing furnaces and carbon firing furnaces.

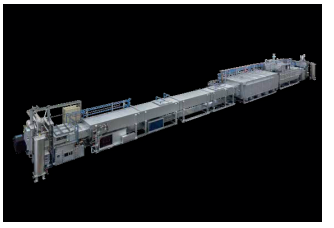
The ultra-high temperature furnaces that KYK began developing over 30 years ago are now actively used by the world's leading carbon fiber manufacturers as carbonizing and graphitizing furnaces. From the beginning, Mr. Shinichi Takahashi, President of KYK, has been working closely with major Japanese carbon fiber manufacturers to lead the technological development of ultra-high temperature furnaces. Carbon fiber was initially used as CFRP (Carbon-Fiber-Reinforced Plastics) for sports applications, such as golf shafts, fishing rods and tennis rackets, because of its most notable mechanical properties such as its specific gravity of one quarter that of iron and strength 10 times greater than it. Since the 1990s, carbon fiber has been used as a structural material for aircrafts and a wider range of applications, including automobiles and wind turbine blades. "From the very start of development, we have listened to the needs of the carbon fiber manufacturers who use our furnaces and have taken advice from them. This long-term partnership is what has enabled a Japanese SME like us to gain a dominant share of this global niche market," says Mr. Takahashi.

Another example of KYK's innovative industrial furnaces is its OXYNON® furnace. When heat treatment is carried out in the air, the material is exposed and oxidized or decarburized, forming an oxide scale phase on the surface of the material. To prevent this, the furnace can be mechanically evacuated, but KYK uses carbonaceous insulation instead of insulating bricks to chemically reduce the oxygen partial pressure inside the furnace to zero. KYK has also developed C/C composite belts that can be used at temperatures up to 2600℃. These belts are utilized in ultra-high temperature furnaces and for brazing various metals, including aluminium. In recent years, it has also focused on the visualization of the atmosphere, which is the most important aspect of an industrial furnace, and developed a system that allows the user to operate the furnace while checking the oxidation and reduction status on a panel screen.



Slot-type Graphitization Furnace (UHTF)

In this era of sustainability and carbon neutrality, KYK's furnaces are seeing increasing use in the heat treatment of EV motor parts and electrode materials for fuel cell vehicles. They are also now being adopted for recycling purposes as a heat treatment furnace for the reuse of silicon in photovoltaic panels and for extracting carbon fiber from CFRP and reusing it as a construction and civil engineering material. In Japan, KYK's furnaces are also used for sintering MOX fuel (spent uranium reprocessed into uranium and plutonium mixed oxide fuel) for nuclear power generation in order to reuse resources. Mr. Takahashi stresses that "environmentally friendly technology is the key to the future, and we will continue to focus on developing this technology".



OXYNON® stainless steel brazing furnace

Takebishi: The trader providing total technology solutions

By combining its innovative products with those of Japanese manufacturing giants such as Mitsubishi, Takebishi Corporation is pushing the trading world forward by providing total solutions.

> "Takebishi's corporate philosophy is 'creating a bright future by connecting people and technology with confidence'; that is one reason for our existence."
>
> **Isamu Ogura**,
> President and CEO,
> TAKEBISHI CORPORATION

Traders have always kept the global economy turning through logistics and financing, but in today's market they must be able to add value for their customers. Japanese trading company Takebishi Corporation is a great example of this development. Not simply content in transporting and financing the products it deals with, the company has gained expert knowledge of these products, which has enabled it to provide complete solutions for its clients.

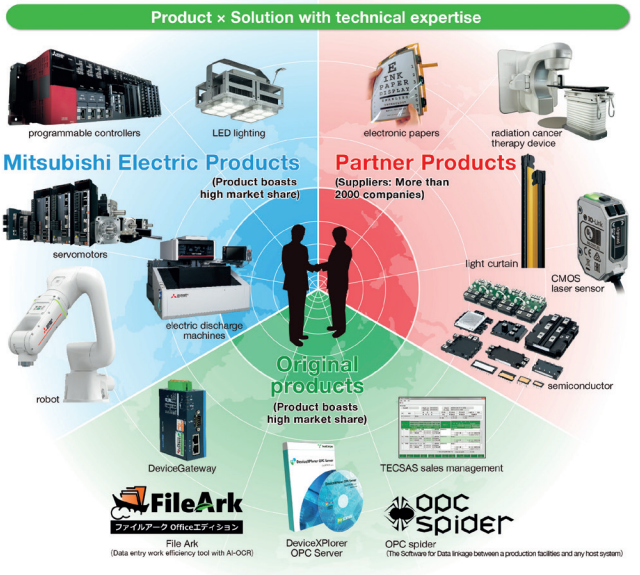
Founded in 1926, the company focuses on three main sectors: industrial equipment and systems; semiconductor and devices; and social/information communications. It has developed the ability to provide components from Japanese heavyweights like Mitsubishi and Omron and embed them into total solutions for its customers, essentially acting as the client's purchasing and design departments.

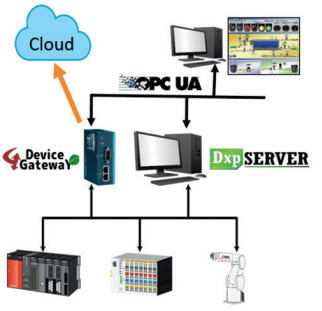
Company president Isamu Ogura explains: "To do that, we must have substantial knowledge in addition to the ability and capability. Takebishi's corporate philosophy is 'creating a bright future by connecting people and technology with confidence'; that is one reason for our existence."

The evolution of the trader's role in global economies saw Takebishi develop its own products in 1998 with the launch of its DeviceXPlorer OPC Server, an industry-standard piece of communication software for Windows used in manufacturing. The device provides connectivity with many industrial devices – such as PLCs, CNCs, machine tools and robots – at manufacturing sites, whilst Takebishi's DeviceGateway is an IoT gateway that bridges data in manufacturing sites with IoT services.

An international company with a presence in Singapore, Hong Kong, China, Thailand and Vietnam, Takebishi is set to expand with its own original product line up in the strategically important Southeast Asian market after acquiring Le Champ, a Singaporean trading company. "In the field of factory automation, the products of Mitsubishi and OMRON are representative of 'Made in Japan'. That's why the acquisition of Le Champ in Southeast Asia, which will start handling their world-class products, is the synergy we expect the most from," Mr. Ogura emphasizes.

This spirit of collaboration runs strong among Japanese companies. "In the Kyoto tradition, for example, there is a history of multiple craftsmen working on each step of making a single fan, a tradition that has been carried over into modern Japanese craftsmanship. There are many examples of companies cooperating with each other," says Mr. Ogura. Indeed, Takebishi is often the instigator or middleman of collaboration, something which has enabled it to develop business for many manufacturing companies in the Kyoto and Shiga areas where it is based.





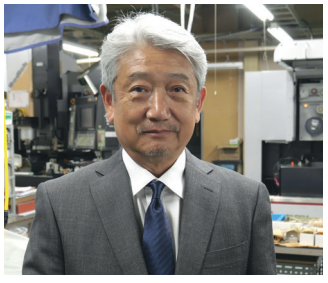
Bridging data at manufacturing site to upper system

As with all companies in the tech world, traders must be ahead of the curve within their niche. Takebishi's shift towards DX and renewable energy products demonstrates this, and Mr. Ogura reveals the company is set to enter the wind power generation sector, both as a trader and as a power generator. In the field of DX, Takebishi is already an active player, incorporating DX into every step of the manufacturing process to push itself forward in an area where some Japanese companies have fallen behind. The DeviceXplorer OPC Server illustrates this well, with its applicability to both equipment monitoring and production control at manufacturing sites.

The coronavirus pandemic has accelerated change across all industries, which is why Takebishi will continue to promote the automation business, supporting non-contact solutions at manufacturing sites. "We are showing the world what the next generation of traders should be like," concludes Mr. Ogura.

Ogura Jewel Industry: Over a century of excellence

Leveraging more than a century of experience in industrial jewel processing, Ogura Jewel Industry remains among the excellent SMEs in Japan today, maintaining an influential position as a precision manufacturer of wire guides, coating dies, diamond styluses, among other devices.



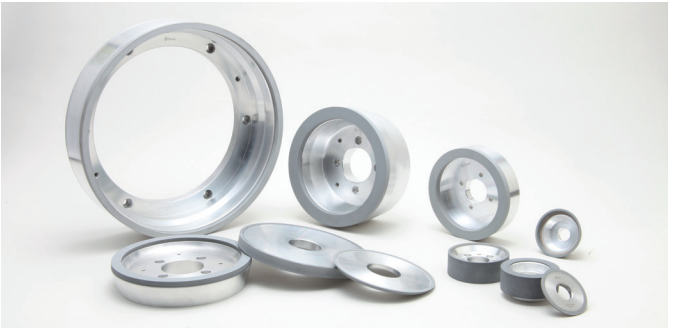
> "We supply products, including machine tools, industrial equipment and semiconductors, to all industries based upon our gemstone precision processing technology."
>
> **Kyotaro Ogura**,
> President & CEO,
> Ogura Jewel Industry Co., Ltd.

"I believe it is my mission to continue the legacy of *monozukuri* in Japanese manufacturing." That is how Kyotaro Ogura, the president and CEO of Ogura Jewel Industry, describes his leadership role, one that faces numerous challenges in a changing industry and society, but where exciting opportunities for growth exist, both at home and abroad.

Ogura Jewel Industry has been leading the way in precision machining and technology for the processing of diamonds, rubies,

Coating dies

sapphires, as well as other materials, for more than a century, with its advanced micro-machining and nanometer processing technology. From hole drilling, tip processing and surface processing to wire-cut guides for EDM, coating dies, and measurement styluses, Ogura Jewel Industry is a proven reputable supplier of choice for demanding clients operating across a wide range of sectors, including machine tools, semiconductors, telecommunications and automotive.



Vitrified bon diamond and CBN wheel

Drawing dies

With that experience comes an awareness that collaboration with customers is a fundamental requirement to understanding individual needs, a focus for Mr. Ogura. "We need to communicate closely with our customers," he says. "We send them design drawings which they return with comments to determine what we make. That is the basis of *monozukuri*. Our relationship with our customers is symbiotic, based on mutual flourishing. We have been doing business this way for a long time and that will not change."

Ogura Jewel Industry creates this 'mutual flourishing' by, for example, investing in a Korean company to source local products for that market; creating an alliance in China using a former employee's company there; and having a 100% subsidiary partner in Thailand. There are, though, no direct partnerships in the U.S. or Europe. "The American and European markets are full of potential," states Mr. Ogura. "We will take our time in identifying the right partners there."

Of course, as well as carefully managing demographic pressures (namely Japan's aging society and related issues such as know-how transfer and automation), maintaining a competitive advantage globally is key for Japanese firms in this regard and Mr. Ogura says that stems from efficiency, pointing to *kaizen* (continuous improvement), in efforts towards the company's survival.

"It is important for Japanese companies to try to be more competitive when it comes to cost," he remarks. "We need to continuously think about how we can improve our processes and prices, and eliminate unnecessary or redundant aspects of production. Competitors are

Wire guide

learning a lot in terms of technology and production capability and may catch up with Japanese companies. Therefore, it is important to always consider what we should do to have the edge over them.

"If we stop making progress then we will naturally lose ground on the competition, so we should not stop thinking how we can become a better company, or we will not be able to survive."

Automotive is one of the main industries that Ogura Jewel Industry features in, and the move to electric vehicles (EVs) is another opportunity for the company, says the president.

Special coil winding nozzle

"A lot of wires are used in EVs, especially around harnesses," he explains, "so we are trying to scale our business to accommodate this new demand." And with the need for thinner harness wires in EVs he adds, "this is where we come in and offer our technology to create more precise tools as part of a clear strategy to increase business in response to electrification."

Developing Ogura Jewel Industry's presence in China and India is a key focus but Africa, the U.S. and Europe are also front of mind, with the president wanting to hand over a strong company to the next generation when his time comes to an end.

As Mr. Ogura concludes, "we exist because of our clients. They are at the core of our business."

INDUSTRIAL JEWELS OGURA

OGURA JEWEL INDUSTRY CO., LTD.

www.ogura-indus.co.jp/en

Shinkoh Electronics: Where adapting is a way of life

Faced with a series of challenges, the industry leader is staging a recovery and looking to the future as it prepares to launch a new line of products to coincide with its 50th anniversary.

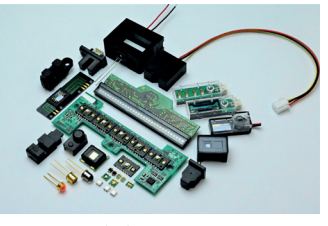
> "Our sales team works very closely with our customers' engineers, allowing us to grasp their needs instantly."
>
> **Hideo Sakaki**,
> President,
> Shinkoh Electronics Co., Ltd.

Founded in 1974, Shinkoh Electronics has been at the heart of the semiconductor industry for nearly half a century. In that time, a number of changes have occurred. Where companies such as Toshiba and Mitsubishi were once global leaders in semiconductor manufacturing, the last two decades have seen a shift in focus. Japanese companies are no longer making semiconductors themselves, but embedding semiconductors purchased overseas into their products. "This," says company president and CEO, Hideo Sakaki, "is the new standard."

Odawara Headquarters

The change in direction has coincided with various challenges to the industry, not least a shrinking of the domestic market and labor shortages. Resin material shortages have impacted on production capacity while COVID-19 has not only led to manufacturers halting operations, but also to a further decline in an already-low birth rate. Far from being cowed, the company is rising to the occasion by changing the way it operates. As well as hiring foreign workers to plug labor shortages, Shinkoh is turning increasingly to global markets, working in close partnership with China and the USA. Key to the company's continued survival: automation. According to Mr. Sakaki, in the face of Japan's declining population, "making human labor more efficient than ever is crucial, and automation is vital."

Zhuhai Nikka Shinkoh Electronics

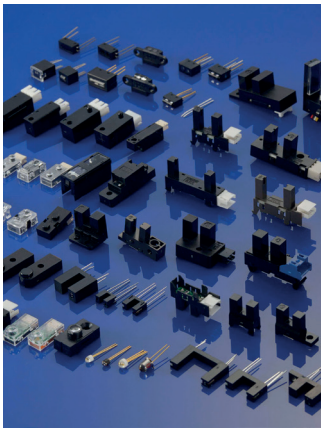


Customized photo sensors

Photo sensors, which are used in automated products such as ATMs, have been identified as having growth potential in the global market. As matters stand, industrial equipment which uses Shinkoh's sensors is already exported to countries such as the U.S., China, Germany, France and Italy. The presence of copycat companies that disassemble Japanese products in search of key components may be "inevitable", but Mr. Sakaki is keen to emphasize that competition leads to added value and "increasingly high-performance products."

One such product is new sensing technology that can be adapted for use in dusty conditions. "In Japan," Mr. Sakaki says, "ATMs are usually found indoors, but in other places such as Hong Kong, China and the U.S., they are often outdoors. To assume proper functionality, it is important to make units dust-proof." The company's pioneering technology has been replicated by manufacturers at home and overseas, and continues to be exported to places such as India and China where outdoor conditions can be dusty. By catering to customers' often highly specific quality assurance requirements, Shinkoh Electronics has, in the words of its president, shown its ability "to propose and provide solutions" and add value to its existing line of products.

Nor is banking machine manufacture the only sector in which the company is making its mark. Automation is increasingly important in the medical industry, for example, where efficient, low-cost testing is vital. This goes for preventative medicine in particular. Major developments are currently taking place in blood analysis and blood-testing equipment, a field in which Japan is already highly specialized. Mr. Sakaki notes that typical blood-testing equipment uses "30-40 photo sensors for analysis." Clearly, Shinkoh's technology and skills in "grasping customer needs" and "turning them into prototypes in a short period of time" bodes well for the future.



Various photo sensors lineup

Turning to the next few years, Mr. Sakaki has outlined his intention to work in partnership with other countries: "We are discussing the terms of collaboration with a Chinese company, who will be handling a part of our component manufacturing."

Zhuhai Nikka Shinkoh Electronics production line

As far as the European and U.S. markets are concerned, however, "we are looking for sales distributors rather than manufacturers."

With the company's 50th anniversary approaching, it was hoped that sales turnover, currently at 4 billion yen, might reach 5 billion yen. While the pandemic may have tempered this ambition, the launch of a new product line means it remains a possibility. The company has developed a new type of photo sensor, with two versions of it slated to appear this year.

As for Mr. Sakaki himself, who is not related to the company founder's family, his thoughts are on his legacy and successor. "We have invested heavily in the new products that will be launched this year, so we need to make them a success. We must also keep adding value to our products." For all his focus on automation, Mr. Sakaki also sounded a note of caution. Financial investments and new products are important but, he says, "the human element also plays a vital role." Shinkoh will need to recruit a new generation of talented, highly-skilled engineers if it is to thrive into its 50th year and beyond.

shinkoh electronics co., ltd.
www.shinkoh-elecs.jp/en

Flow instruments for growing industries

Since it was founded nearly 70 years ago, Tokyo Keiso has been producing flow control devices for use across the world.

Factory & Engineering Office

A firm that embraces *monozukuri*, the pursuit of perfection that's behind the success of Japanese manufacturing, Tokyo Keiso's interpretation of the concept is focused on technical prowess and meeting customers' precise needs, says President and CEO Ryoichi Sugi. "'Made in Japan' has become a global brand that lays claim to high functionality and top-of-the-mark standards as a direct result of Japanese manufacturers forging an impressive level of technical capabilities," Mr. Sugi explains. "Also, the Japanese ethos means the altruistic spirit of sincerely responding and making improvements to best cater to clients' requests."

A culture of continuous improvement, or *kaizen*, is another key part of Tokyo Keiso's commitment to *monozukuri*. In recent years, one way the company has pursued this is by assigning each employee on its assembly line a variety of roles. This has led to manufacturing that benefits directly from workers with a greater skillset, and has enabled staff to draw on their wider expertise to propose process enhancements. "Our shift to a knowledge capital-intensive strategy has allowed us to triple productivity," Mr. Sugi says. "In time, each of our workers has displayed greater awareness and initiative in suggesting new ideas to improve productivity and we have succeeded in changing our company's old *monozukuri* culture into a modern interpretation."

Tokyo Keiso has also increased productivity through automation. "We produce flow control devices that combine a flowmeter and a valve, and in that process, we calibrate the flowmeter and inspect the controllability of the valve," Mr. Sugi says. "There needs to be someone to move the products from assembly to the inspection stage, but we decided to use a robotic arm for that, enabling us to automate the inspection process and run it at night."

> "We're looking to fully take advantage of the 'Made in Japan' brand to expand in industries like semiconductor devices, where Japanese products are recognized for their high quality and advanced functionality."
>
> **Ryoichi Sugi**, President & CEO, Tokyo Keiso Co., Ltd.

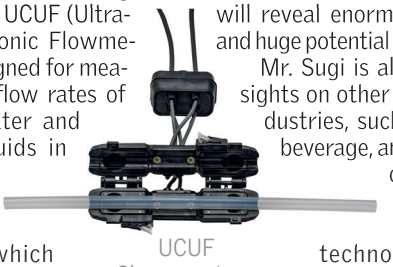
Robotic arm moving our CLFC product at night

A product that has a particularly important place in Tokyo Keiso's history is its AM7000 Series flowmeter. "It's been a part of our portfolio since we began our operations," Mr. Sugi notes. "Its measurement principles are based on tried-and-true mechanical technologies. It's a mechanical analog product, but it's durable, versatile, easy to maintain, and does not require any power supply.

"This product serves to be our emblem considering it was most useful during the Tohoku earthquake in Japan in 2011. To avoid the nuclear power plant explosion, they needed to keep pumping water into the tank to control the cooling; and this was the device used to measure the flow and the level of the water during that precarious and disastrous situation."

AM7000: no need for power supply; measures all fluids, even corrosive

Among the newest measurement devices developed by Tokyo Keiso, meanwhile, Mr. Sugi highlights the UCUF (Ultra-Clean, Ultrasonic Flowmeter). "It's designed for measuring small flow rates of ultrapure water and chemical liquids in semiconductor manufacturing processes, which are used by various semiconductor manufacturers throughout Japan, Asia and North America," he says.



UCUF
Clamp-on type

"Fluid flows through semiconductor-grade plastic tubing and is measured using ultrasonic waves. The transmission and receiving devices mounted at both ends of the tubing emit and receive ultrasonic waves alternately. The changes in ultrasonic waves are calculated to measure the flow rates with high accuracy. No mechanical sensors come into contact with the fluid, which makes our product ideal for the ultimate cleanliness required by semiconductor manufacturing."

Tokyo Keiso boasts a significant, and growing, international presence. It has sales companies and distributors throughout Asia, North America and Europe, as well as creative partnerships with overseas firms, most notably KROHNE in Germany, with whom the company has solidified a relationship based on trust over 40 years. "Despite Japan's shrinking market, the semiconductor market continues to expand globally," Mr. Sugi says. "We're therefore targeting Asia and the U.S., where we've already been supplying our products. I think Europe is also going to be a very strategic region for expansion. A joint approach of 'Made in Japan' together with 'Made in Germany' will reveal enormous synergies and huge potential for the future."

UCUF series Ultimate clean structure for Semiconductor

Mr. Sugi is also setting his sights on other expanding industries, such as the food, beverage, and biopharmaceutical markets, by using single-use technology. "We've heavily invested in the semiconductor market, which led us to our next important trigger of growth," he says. "As president, I hope I can identify what the next major arena with significant potential will be to invest our resources and set in motion another wave of growth."

Single-use BIOMAG
photo ©KROHNE

TOKYO KEISO CO., LTD.
www.tokyokeiso.co.jp/english/

The finishing touch of Tipton

Tipton has been a pioneer in the mass finishing industry, setting standards for over 80 years.

> "The strength of our company lies in having the diversified technologies required to be a comprehensive manufacturer of mass finishing solutions."
>
> **Fumiaki Kobayashi**, President, Tipton Corp.

An urakata – or backstage – company specializing in the highly specific mass finishing industry, Tipton was established in 1939.

Initially a manufacturer of grinding wheels and abrasive media, the corporation has since diversified into machinery and chemical compounds. "The ability to design, produce and sell all these factors – the machinery, the abrasive media and the chemical compounds – has given us a unique position in the market as an integrated solutions provider for mass finishing," says company president Fumiaki Kobayashi.

Mighty-Mild

Having pioneered the first centrifugal barrel finishing machine in 1961, Tipton is now departing from that model with its innovative new product, Mighty-Mild. The new machine can perform double the number of revolutions of traditional centrifugal barrel finishing machines, while reducing the number of rotations to one-quarter or less.

Abrasive media

Finishing takes place at low-speed high-pressure flow, a state achieved by increasing the pressure (revolution speed) and decreasing the flow speed (rotation speed). Hence the name: Mighty-Mild.

The technology, which significantly reduces cracking and chipping, is rated highly. "In 2019, it received the Minister of Economy, Trade and Industry Award at the 'National Invention Awards', one of Japan's largest patent-related awards," Mr. Kobayashi confirms.

HQ in Aichi, Japan

With the market cornered domestically, the focus is now on promoting the technology to overseas companies. To this end, the company recently secured a 100-million-yen government subsidy to perform research. According to Mr. Kobayashi, the subsidy will allow Tipton to tackle "the development of the world's smallest abrasive media, the world's largest ultra-high pressure barrel finishing machine, and the world's first mass finishing simulator."

Joint research members include Kanazawa University, Shin-Etsu Chemical and Murata Manufacturing.

Tipton Corp.
www.tipton.co.jp/english

Shizuoka Seigyo: Originality and strength for custom-made optimal solutions

In an ever changing business environment SHiZCON is proving that agility, precision and expertise can spur real growth in new markets, at home and abroad.

Founded in 1981, SHiZCON had long focused on factory automation devices for the automobile sector centered in the Shizuoka Prefecture, where its head office is located. But recently the company opened a sales office in Yokohama to serve the medical, food, semiconductor, and other sectors, which is its latest step towards diversification into various other fields. And with a view to expanding outside of Asia, Kazuhito Unno, the company's president and CEO, is living up to his own motto to live life with no regrets.

"We deal with many famous brands, including Mitsubishi, Idec, Panasonic and Fuji Electric, as well as niche companies," Mr. Unno says, "and we listen to our customers' needs before putting forward the best, most optimal solutions."

Kazuhito Unno, President and CEO, Shizuoka Seigyo Co., Ltd.

Shizuoka Seigyo Co., Ltd.
www.shizcon.com

These ideas of fully understanding the client's requirements and providing very personalized products run deep in the company, according to the president. Whereas some salespeople over-spec products for higher margins, SHiZCON "provides the optimal solution that is appropriate for the required specs. That is our company's strength," Mr. Unno explains, acutely aware of fresh challenges.

"With the global trend towards electrification there are new opportunities for those doing business in the areas of batteries, sensors, brakes and anti-collision systems. These are areas where we can expand, so we don't feel the threat of these changes."

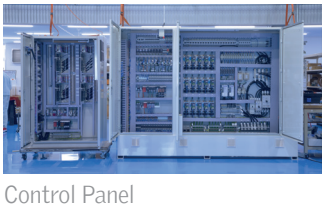
Building on the successes at home in Japan and elsewhere on the continent, however, is one of SHiZCON's key objectives.

"Although there may be language barriers, there is a common understanding when it comes to business and we are looking to expand beyond Asia to the North American and Mexican markets in the future," Mr. Unno says. "It is difficult for Japanese companies to compete with those in China, South Korea, Taiwan and Southeast Asia in terms of cost, but there are many possibilities in North America where adherence to delivery is valued more than discounts," he highlights.

And where SHiZCON really stands out, says Mr. Unno, is on its agility, stepping in where larger companies hesitate. "Thanks to our manufacturing ability, we can create unique, custom-made solutions."

Office

Factory



Control Panel

Warehouse

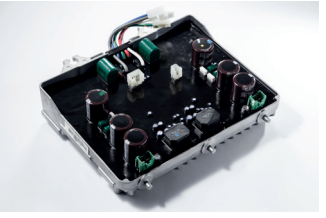
Nihon Gosei: Providing next generation molding materials

Ever since its foundation, Nihon Gosei has played an important role in the manufacturing supply chain, both domestically and internationally.

Established in 1952, Nihon Gosei specializes in the production and sale of synthetic resin and molding materials. As the market moves with the times, so too does the company, with a focus on the next generation of products.

Laboratory

"There are many products, such as digital cameras, where demand has been shrinking in recent years," highlights company president Hiroshi Tsukuemoto. "However, there are others with growing demand, such as smartphones, fiber cables, and 5G, 6G and electric vehicle (EV) related products."



Inverter

Insulated connector

As well as looking to sales growth in Japan, Nihon Gosei sees opportunities further afield. "We are continuously improving our products in response to the needs of individual customers," Mr. Tsukuemoto continues, "selling to domestic and overseas companies that manufacture electronic components such as condensers."

Factory in Chiba Prefecture

That need to adapt is demonstrated clearly when comparing products such as televisions, which are not exposed to environmental conditions, and electric vehicles, which, as Mr. Tsukuemoto explains, are "exposed to extreme temperatures, vibration and dust, demanding the sealing of the condensers."

> "We are continuously improving our products in response to the needs of individual customers."
>
> **Hiroshi Tsukuemoto**, President, Nihon Gosei Kako., Ltd

Of course, an evolving market means some products come to an end, such as those for digital cameras and combustion engines, as others take over. "A different type of molding material is now being used in smartphones," the president says, while on vehicles clarifying that "research and development is now mainly related to EV products."

NIHON GOSEI KAKO
www.nihon-gosei.co.jp/en

Silver Rod combines material manufacturing and parts processing to achieve the highest quality products

As a specialized material manufacturer of stainless-steel rods and precision shafts, Silver Rod is a great example of a Japanese "hidden champion" using its unique technologies to support customers from a wide range of industries, from automotive to medical equipment.

> "By combining our expertise in the fields of materials and parts processing, we can advise and help our customers achieve the best results."
>
> **Itsutoshi Shimada**, President, Silver Rod Co., Ltd.

Steel is synonymous with strength and resilience, and as such it is used to provide the backbone for everything from buildings to motors. Steel products must therefore be made to the highest specifications possible, and Japanese manufacturer Silver Rod is one of the companies leading the way in stainless-steel rods and shafts.

Factory

Founded in 1960, the company has two main business lines, working both as a processor of stainless-steel bars and manufacturer of components. By procuring high-quality raw materials, processing rods, and then selling directly to customers, Silver Rod ensures it works in tandem with its clients' needs and deadlines.

Company president Itsutoshi Shimada explains how Silver Rod's advanced polishing method allows it to make the best products possible: "We have a centerless grinder that we use to make the rods as circular as possible. It is so precise that the tolerance is only five microns."

Stainless-steel shaft

This focus on quality has enabled Silver Rod to move into the electric vehicle (EV) sector, producing motor shafts for EVs with brushless motors, something that can also provide value for the medical field. The company is present in Hong Kong and China, where it has had a factory for almost 30 years. Mr. Shimada reveals Silver Rod plans to grow its exports in the North American, EU, and Southeast Asian markets.

Stainless rod

Stainless-steel products must transmit one thing above all else: trust. Silver Rod provides this trust not only through its high-performance products, but with its close rapport with its clients and understanding of their needs.

シルバーロッド株式会社
SILVER ROD CO., LTD
www.silver-rod.co.jp