The hidden champions of Japanese *monozukuri*

While Japan has faced increasingly larger competition from the likes of China, South Korea and Southeast Asia in recent decades, many Japanese SME manufacturers have maintained large global market shares in B2B markets and niche fields characterized by high-mix, low-volume production. Working behind the scenes supplying high-quality parts, materials and machinery, these niche companies are the so-called 'hidden champions' of Japanese manufacturing.

Japan may no longer rule the roost when it comes to end-user electronics products. Nevertheless, materials and components made by Japanese companies can still be found in popular electronics devices we use every day. Take, for example, engineering plastics firm Polyplastics, which supplies liquid crystal polymer (LCP) used in the iPhone's connectors and camera modules. "We supply the materials that form the frames and skeletons of electronic components in the upcoming iPhone 13 and 14," says Polyplastics CEO Toshio Shiwaku. "As you know, these phones are starting to support 5G. LCP is used to build the flexible circuit for 5G, and the LCP is almost 100% supplied by our company."

When it comes to the manufacturing and assembly of end-user products, the "winners will be in China or in other emerging countries that can do it at a low cost," says Mr. Shiwaku. "Japan would not win in that kind of battle because we are not trying to win using manufacturing of scale, but instead we are trying to be winners in dealing with this kind of special or highly functional material used in innovative products."

Backing up this point, Mototaka Tei, President of SANTEC Corporation – which manufactures turntable lasers and optical devices – says Japanese companies must focus on quality and cannot compete on price with regional peers. "When it comes to quality, I think it is important and we at Santec do not want to compete on price, so we have to find other differentiating factors. We are confident that we cannot win a price war. We have to go for quality and customer support, especially in B2B, as customer relationships are important. We also have imagination and innovation. We differentiate ourselves with our vision and invention, not with price."

Another hidden champion playing a backstage role, INOAC supplies polyurethane, an insulation material, to clients in the construction, automobiles and clothing industries. "For example, a famous fashion brand utilizes our technology. To a large extent, one could say that while INOAC is not visible, it is playing an important role from behind the scenes," says chairman Soichi Inoue, also highlighting the important role INOAC plays in housing and the development of electric vehicles (EVs).

"While EVs require less mechanical and engine-related parts, they demand a greater diversity of materials. For example, for batteries to be safe, protective, heat insulation and sound insulation materials are required. Even tires require more insulation. To answer these new market demands, we are developing more and more items for the EV market."

Monozukuri – the Japanese manufacturing philosophy centered around craftsmanship – continues to set Japanese companies apart from regional competitors that have emerged in recent decades. Nobuyuki Soga, President of Fuji Corporation, explains that *monozukuri* stems from the nature and traditions of the Japanese people, as well as the nation's innate scarcity of natural resources.

"The basis behind the philosophy of Japanese *monozukuri* is to create a product that would not bring feelings of shame when others use that product, rather than creating something that satisfies your own ego. So that is why Japanese companies are so particular about making high-quality products, even small parts that are not visible from the outside. That is how Japanese-quality products are created. It is not a type of quality that lasts for a short time, it lasts for a long time and has the user in mind.

"The natural environment in Japan is harsh, with many earthquakes and a lack of natural resources, so Japanese people have collaborated with each other and placed high value on those resources. Making the best use of scarce resources is the essence of Japanese *monozukuri*."

Japan also holds a competitive edge thanks to its unrivaled expertise in machinery and equipment, a field where *monozukuri* principles ensure the superiority of Nippon companies. This is particularly the case in the semiconductor industry. "The semiconductor industry is growing very rapidly, and Japan is still considered a strong player when it comes to auxiliary fields surrounding the sector," says Hitoshi Nara, president of Yokogawa, which manufactures measurement and control systems. "Although the semiconductor industry is centered around Taiwanese and Korean manufacturers, Japanese firms are responsible for supplying materials and equipment critical to semiconductor production."

Mitsukuni Tsukihara, President of Sumitomo Heavy Industries Ion Technology – which works in the highly specialized field of ion implanters – shares a similar perspective. "The Japanese are still prevailing in the machinery for semiconductor production and material field because compared to device production, these two fields are more applicable to the Japanese business culture that focuses on *monozukuri*. Although the price of machinery may stay the same, the required features become more advanced and more high-performance products are demanded at a rapid pace. Nevertheless, Japanese engineers are excellent at adapting and being flexible to those changes in demands and advancements in technology."

The leading innovator of vacuum technology, ULVAC, meanwhile, has moved in line with market demands, shifting focus from manufacturing equipment for memory semiconductors, such as NAND and DRAM, to newly emerging fields. "We have succeeded in entering the logic semiconductor market with the Metal Hard Mask process. There are only two companies that can provide semiconductor sputtering equipment. One is a major American company and the other is us," says president and CEO Setsuo Iwashita. "In the electronics business, we offer manufacturing equipment in five areas: communications devices, opto-devices, packaging, electronic components such as MEMS, and power devices. One of our strengths is that we have a wide range of products."

For Kohoku Kogyo, possessing its proprietary, in-house-developed machinery and equipment serves as a major advantage for the manufacturer of lead terminals and optical devices. "We produce all the equipment and machines to produce lead terminals by ourselves. No company in the world can do this, and we are a very unique presence in that sense," says president Futoshi Ishii. "Our ability to develop and manufacture not only the lead terminals but also the equipment and machinery needed to produce lead terminals puts us in a very dominant position. We do have competitors in China, Taiwan, and Malaysia, but obviously, we are a major player in this market, and those competitors use equipment and machinery that are duplicates and copies of our older and more obsolete machinery."

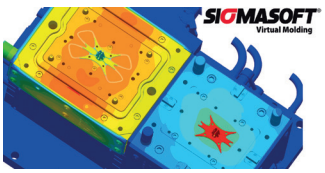
After-sales service is another strong feature of Nippon manufacturers that stems from the Japanese spirit of *omotenashi*, which means hospitality and describes the Japanese attitude of being caring and attentive toward guests. "What is important in manufacturing is providing the products and service, and there has to be a balance between the quality of the product and the after-sales services added on top. We wish to keep our business growing by providing this comprehensive solution to our customers," says Yasushi Kitade, President of Komatsu Industries Corporation, which makes pressing machines for the automotive, construction and home appliance industries.

Komatsu's commitment to after-sales service has seen it lead the charge in predictive maintenance solutions using IoT technology. "Once a customer buys from us, we are in for the long haul. Our mission is to keep the machines that we are providing for our customers operating," adds Mr. Kitade.

While much has been said about the competition Japan faces from China, Korea and Southeast Asia, it is important to remember that fruitful collaboration does also exist between Japanese companies and their neighboring counterparts, as highlighted by Hiroki Tatematsu, President of TMW. "We understand that we have competitors in China or Korea in our tooling business. I think each company's philosophy depends on whether they consider them competitors or partners. Many in our industry would always try to compete with China and Korea or Southeast Asian countries like Vietnam, Indonesia or Thailand. On the contrary, TMW looks at them as partners in order to stay in global business."

Heisen Yoko: The global chemicals trader with sustainability in its sights

An expert distributor of raw materials for rubber, polyurethane and plastics, Heisen Yoko is targeting SDGs as it expands its product portfolio.



SIGMASOFT (software)

Heisen Yoko is a major Japanese trading company that specializes in distributing chemicals used to manufacture rubber, polyurethane and plastics. An importer and exporter with over a century of experience, the firm works as a sales agent for partner companies worldwide.

"We were founded in 1920 and first started importing chemicals for rubber from Bayer in Germany," President Denjiro Tobari says. "At that time, Japanese companies were using inorganic chemicals to make rubber, and it took hours. However, with Bayer's organic chemical, it only took five or ten minutes – so many companies started to shift to it, and we were the supplier."

Heisen Yoko – which supplies chemicals used by industries including electronics, automobile manufacturing, and construction – also sells products such as rubber-testing equipment and molding-simulation software by SIGMA Engineering.

Food sample (urethane)

What's more, the company has a 100%-owned manufacturing subsidiary, H&K, which produces polyurethane materials.

JELLYFISHBOT

As is typical in Japan, a key factor in Heisen Yoko's success is its devotion to the principle of *kaizen*, or continuous improvement. "Japanese companies are always required to go through *kaizen* – they're reliable and provide the best quality every time," Mr. Tobari explains.

Heisen Yoko is also dedicated to achieving a greener future, with the company now operating an SDG-focused business that sells environmental equipment. For example, it is the Japanese distributor of the JELLYFISHBOT, a marine-depollution drone created by IADYS, a French robotics company.

> "We want to provide what is required by each company with the best of our capabilities as a trading firm."
>
> **Denjiro Tobari**, President, Heisen Yoko Co., Ltd.

Heisen Yoko's environmental commitment is illustrative of its socially-conscious philosophy – one that Mr. Tobari aims to pass on to the firm's next generation of managers. "Our principles are: goodness to the company; goodness to our customers and business partners; and goodness to society," he says.

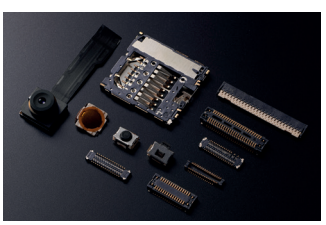
HEISEN

www.heisengp.co.jp

Engineering plastics for the products of the future

Utilizing its expertise in specialized plastics, Polyplastics has its eye on American and European expansion.

We are living in a knowledge economy where complex products are made using the specific know-how of a range of companies. Japan's specialized engineering plastics



Narrow pitch connector

supplier Polyplastics is one of the companies using its expertise to ensure everyday technology, from iPhones to cars, run smoothly.

Founded in 1962, the company has grown to become one of the world's most reliable engineering

Fuel pump

plastics producers, providing specialized solutions for its customers' needs. An example of this is Polyplastics' liquid crystal polymer (LCP) which is used in the iPhone's connectors and camera modules and will also be used in future iPhone models due to its ability to support 5G connectivity.

The company's specialized POM thermoplastic resin, which is both self-lubricating and oil resistant, is being used in a wide range of industries, including in fuel sender modules in automobiles. Company president Toshio Shiwaku says Polyplastics' expert engineers understand the rigorous testing procedure POM must undergo for specific uses, and reveals it was developed through working with its customers.

Engineering plastics (POM pellet)

As Dr. Shiwaku says: "To continue to understand customers' needs is crucial to find new applications and markets for our engineering plastics."

> "We are positioning our company to offer a broader variety of engineering plastics solutions."
>
> **Toshio Shiwaku**, CEO, Polyplastics Co., Ltd.

Since expanding into Taiwan and China, the company has plans to grow into the European and North American markets, and is always on the lookout for potential partners, be that in product development and molding or geographical expansion.

Polyplastics
DAICEL Group

www.polyplastics-global.com/en

INOAC: The indispensable supporter of the automotive, housing and lifestyle industries

With its high-performance polyurethane materials, INOAC has become a worldwide leader contributing to the success of the automotive, housing and lifestyle industries.

Founded in 1926, INOAC plays a critical role in the housing construction sector, supplying insulation materials across Japan and beyond. The journey to today has been an interesting one, including the creation of a factory in the north of the country to support those workers previously in the coal industry, and growth continues, as explained by the company chairman, Soichi Inoue.

One of the representative consumer products: polyurethane cleaning sponges

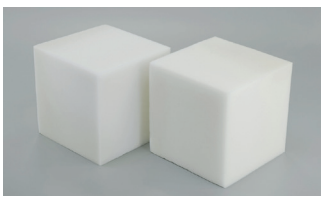
"Today, INOAC has many factories, from Okinawa to Hokkaido, and because our material is bulky and transportation costs are high, we have to make our products locally, helping the development of local businesses.

"Hakuba, for example, is a popular winter skiing destination, and as well as supplying a large amount of insulation boards, we also produce special mattresses for local homes and establishments. We have a plan to set up a factory there that manufactures our newly branded 'Color Foam Hakuba' mattresses."

Beautiful mountains in Hakuba Village

The focus of these bedding products is proving to be a real driver for the chairman.

"This new brand has become like a personal hobby of mine," Mr. Inoue continues. "I started doing business in Hakuba after conversations with a local school manager and now we are expanding further. We are able to produce both mattresses for sleeping and insulation material in the same company thanks to the wide range of uses of polyurethane."



Plant-based polyurethane foam "ECOLOCEL"

Another field that is being developed at INOAC is in the automotive industry and changes to electric vehicles (EV) are opening new doors. "EVs must be lighter than their gasoline-powered counterparts, which represents an opportunity for us," says Mr. Inoue. "INOAC makes products that can reduce the weight of vehicles and to deal with these new market demands, we are developing more and more EV components. At the moment, about 40% of our business comes from the automotive industry — which has become more international, with the U.S. being the biggest market for us — while 60% remains with construction as well as living goods, such as mattresses.

One particular success has been the development of CALMFLEX, a unique sound absorption and damping material utilized in various applications, from near-silencing car engines to preventing neighbor disputes upon the arrival of a child's new piano.

"Our R&D activities are conducted on a global level, not only in Japan but in China, New Jersey, Singapore and elsewhere," explains the chairman. "We employ young chemists and dispatch them to the U.S. and Germany so that they can study new technologies, working as assistants.

Ken Miwa, Representative Director (left); **Soichi Inoue**, Chairman (center) and **Yasushi Nomura**, President & COO (right), INOAC Corporation

And when it comes to the environment, research is also evolving. "The creation of environmentally-friendly products and production processes is a key focus of our R&D. We actively conduct chemical recycling operations and have signed various partnerships to develop eco-friendly products, such as our bio-foam used for eco-sponges. While inconspicuous, foam is a material utilized across many applications, including in women's bras and underwear. As brands become more eco-friendly, the demand for our product increases, including with a famous fashion brand. One could say that while INOAC is not visible, it is playing an important role from behind the scenes."

With almost a century behind the company, Mr. Inoue continues to look ahead with a clear plan and a global vision. "My policy is that in every country, be it the U.S., China or across Southeast Asia, we always make partnerships with local people. At INOAC, we create a work environment that is conducive to the location, respecting local cultures and the people. We always employ local managers overseas, just as in the U.S. where they are all American.

"Today, our international business is growing faster than our Japanese operation, and the U.S. is our largest overseas market. We began in Canada before opening a factory in Kentucky.

> "Today, our international business is growing faster than our Japanese operation, and the U.S. is our largest overseas market."
>
> **Soichi Inoue**, Chairman, INOAC Corporation

Then, due to their good relationship with the U.S., we opened a large factory in Mexico and moved a sizable part of our business there, allowing us to be more competitive in the North American market.

Mattress for comfortable sleep

"INOAC's policy is to create a business environment that benefits our employees, clients and the areas where we conduct business, contributing to the local society. No matter the location, no matter the country, growing with the local region and the local people is our goal."

INOAC

www.inoac.co.jp/en

The chemical trader overcoming cultural obstacles

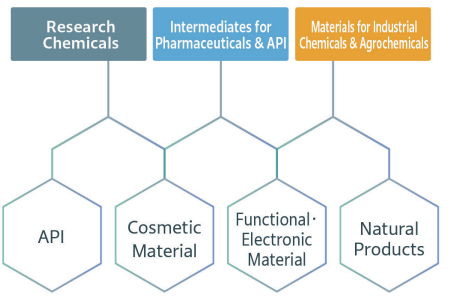
ATTO, which specializes in supply chain consultancy between Japanese customers and Chinese manufacturers, has had to surmount numerous cultural challenges to succeed.

In its role as a supply chain advisor for the chemical industry, ATTO Co., Ltd. imports raw chemicals and intermediates to Japan and provides related client services, such as helping customers identify manufacturers and suppliers within the Chinese market. Acting as a go-between for Japanese and Chinese companies brings with it a number of distinct challenges, including differences in quality control measures, regulatory considerations and cultural norms.

> "In our line of work, responding to high quality demands is an eternal challenge and a constant undertaking."
>
> **Imako Aoyama**, President and CEO, ATTO Co., Ltd.

"Ninety percent of our clients are Japan's largest chemical and pharmaceutical industries, and their demands for quality and control measures are very strict," says Imako Aoyama, President and CEO of ATTO. "As traders, it is our role to be able to fully respond to their needs and cater to their requests. Although it can be a challenge, we consider it an opportunity to make progress.

"In our line of work, responding to high quality demands is an eternal challenge and a constant undertaking. Our Japanese clients always require accurate and sufficient information before signing the supply agreement. That is the cultural environment here in Japan. In China, there is not as much of a perfectionist-type of requirement. Our role is to bridge the differences in thinking, mindset and ways of doing things."



Variety and category of products covered by ATTO

Being a Chinese woman, running a Japanese trading business in a male-dominated industry means Ms. Aoyama has also had to personally overcome obstacles and cultural norms to succeed, as well.

"Chemical manufacturing is a man's world," she says. "To be a foreign woman in this field has been challenging. To begin with, it was just me and a part-time female staff member in ATTO. In 2010 when I opened the office in China, I recruited another woman to head up the office there. That made three women taking care of everything. We slowly built the foundations to where we are today."

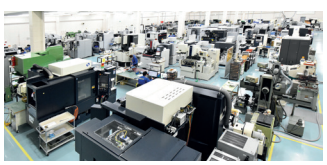
Ms. Imako Aoyama, President of ATTO (right), with the Governor of Tokyo, **Ms. Yuriko Koike** (left), at the TOKYO Women CEO Award 2020

With ATTO having grown at an average rate of 20% annually and Ms. Aoyama's sights set on the company becoming a ¥10 billion business within the next decade, such ambition saw her honored with the TOKYO Women CEO Award in 2020, and plenty of future accolades are certain to follow.

ATTO
www.attoinfo.com

Precision parts for next generation industries

Since its foundation in 1969, Nakayama Precision has supplied a wide range of products that contribute to society.



Factory in Kumamoto

With over half a century of experience, Nakayama Precision technology and parts can be found in anything from Apple iPhones and mini-LEDs to electric cars.

"Nakayama Precision is one of those SMEs with unique technologies that support industry," explains president Shinichi Nakayama, "and we aim to fully capitalize on our strength as a high-quality company with production capability in Japan. Our current focus is on the semiconductor and automotive industries."

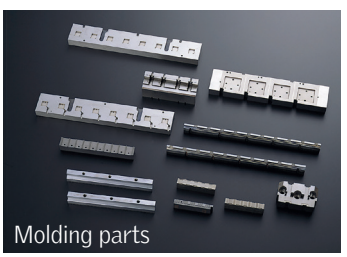
For continued growth, though, there is a need to broaden synergies.

> "We will continue to refine our comprehensive technical capabilities, and pursue even higher technologies."
>
> **Shinichi Nakayama**, President, Nakayama Precision Co., Ltd.

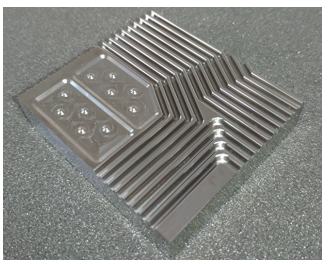
"Engineering collaboration amongst companies is crucial," he says. "I have high expectations of establishing R&D departments, developing new technologies and finding fresh ways of making machinery. We provide our applications, technologies and know-how and want to continue working cooperatively, building globally competitive Japanese products and machinery."

While some company's push ahead to venture overseas, Nakayama has a strong argument for its chosen path in Japan.

"We are not actively seeking to go or partner overseas," explains the president, "and this is for the sake of our employees. Even though the company needs to grow, assuring security and a stable life for our employees and their families is vital. However, if we get contacted or receive any order from overseas companies, we *are* willing to provide our manufacturing technologies."



Molding parts



FCV separator sample

With new factories being established and opportunities to enter the medical and aviation fields being explored, Mr. Nakayama is already preparing the company for the long term.

"The credo of Japanese companies is to always create sustainable corporate operations for them to continue for 50, 60 or even 100 years. With that in mind, passing the baton to the next generation is important."

NAKAYAMA
www.nakayama-pre.co.jp

Venture Spirit: Santec's compass to attain 'Optopia'

"Optopia" is a word we created – optics technology plus utopia - to represent a global society supported by photonics technology.

"At Santec, our focus is to deliver new value to the world through innovations in photonics."

Mototaka Tei, President, Santec Corporation

Since developing the world's first "fully automated optical-fiber geometry inspection system" in 1984, Santec Corporation has supported the advancement of the fiber-optic communications industry. A recognized pioneer in its field of photonics, the Japanese firm released the world's first benchtop tunable laser – a popular instrument still used by researchers today – before going on to launch an advanced optical component product line that has been deployed globally in data centers, as well as metro, long-haul and submarine optical networks.

One of the company's latest products is the seventh generation model of the TSL range of wavelength tunable lasers. This is used in applications such as photonic integrated circuit testing, quantum photonics, spectroscopy and sensing.

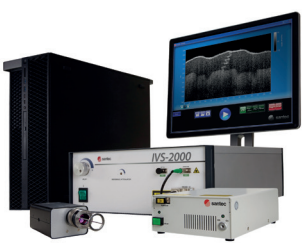
"We have almost 35 years' experience manufacturing our TSL series of tunable lasers," says Mototaka Tei, President of Santec. "It's a successful product and we have led the market since we first introduced the instrument in 1989. This is what we call a benchtop tunable laser, and 50-60% of its market is made up of researchers.

"We sell this to the top universities and scientists who are doing cutting-edge fiber optic and telecommunications research. Institutions like Harvard, MIT and Stanford; all the top researchers, have and use this instrument. We are very proud of that and pleased that many research papers have been published pushing the boundaries of science using our technology."

ARGOS®
SS-OCT BIOMETER

Santec's expertise in micro-optics, advanced optical devices, tunable lasers, and optical testing and measurement paved the way for the expansion of its product lines into applications outside of telecoms. For example, the bio-medical and optical metrology industries have benefited from the company's 3D sensing and imaging technology. This is based on Swept–Source Optical Coherence Tomography (SS-OCT), a technology which delivers incredibly detailed cross-sectional images of biological samples. This can benefit cancer diagnosis as well as image plaque in arteries for example. It can also be used to measure material thicknesses with unprecedented precision.

Launched in 2015, ARGOS is one of Santec's products based on this technology. It is the most accurate instrument of its type and measures the key parameters of the human eye. This information is used in selecting the most appropriate lens to implant in cataract surgery. ARGOS has really made a difference to the positive outcome of these operations and contributed to quality of life after cataract surgery, something which Mr. Tei is particularly proud of.



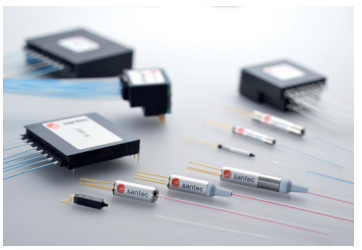
3D Optical Profiler

"For us, our engineers created an incredible instrument using our technology, but selling ophthalmic equipment was difficult. We partnered with Alcon, who are the world's largest manufacturer of ophthalmic lenses that are implanted in cataract surgery," he explains.

"They say that cataract surgery is simple, as it can take only 10-15 minutes for each eye, but measuring the length of the eye to find out which lens to put in is critical. Our instrument can do that accurately. Our competitors in this market are in Germany, with a global customer base, but after entering the market in partnership with Alcon, we have been able to gain significant market share."

Tunable Laser TSL Series

Moving forward, Mr. Tei hopes to build more strong partnerships with overseas firms and institutions while also pursuing M&A opportunities, for instance in 2021 two North American companies were acquired to enter the cable assembly testing market. "We are always looking for collaborative partnerships, and in fact even now we have about five in Japan. For example, we have some of our staff embedded in Tokyo University, Kyushu University and Tohoku University," adds Mr. Tei. "Overseas, we have one member of staff doing research in the University of Southern California as well as a successful factory partnership in Vietnam to manufacture some of our products."



Optical Components

In other areas, Santec's photonics technology supports the development of fiber-optic-dependent technologies such as cloud services, 5G communication and IoT. It is all part of the company's mission to advance the creation of 'OPTOPIA', using a unique blend of photonic solutions in tunable lasers, advanced optical components as well as testing systems for communication, medicine, and metrology.

"Optopia is a word we created – optical technology plus utopia – to represent a global society supported by photonics. A society that will be warm hearted and enlightened. We call it a 'Human Centric Information Society'. It is not machine centric, data centric, money centric or material centric. It is human centric," explains the Santec president. "Warm hearted people helping each other with the help of advanced optical technology. Technology must contribute to human society and maintain a better world where people are happier. If you develop technology and society advances but people are not happy, that is not a good society. We want to contribute to making the world a better place, using our fiber-optic technology."

LCOS-SLM

The Photonics Pioneer

Creating OPTOPIA

Innovative optical components, test instruments and imaging systems for telecom, biophotonics and metrology

santec since 1979

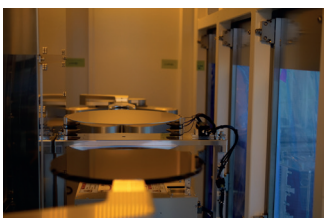
Pioneering the future with ion beams

SMIT develops and manufactures ion implanters, which are essential for the production of semiconductor devices.

Working in the highly specialized field of ion implanters, Sumitomo Heavy Industries Ion Technology Co., Ltd. (SMIT) was first established in 1983 and has forged an enviable international reputation in the years since with four different types of machine currently available in-house.

According to company president Mitsukuni Tsukihara, even if Japan is no longer so dominant in the manufacturing of semiconductors, the country continues to prevail in the development of equipment for semiconductor production. While semiconductor devices, he explains, are constantly evolving and the prices of high-quality products are declining even faster, manufacturing equipment is able to maintain its price through constant performance improvements and customization.

Ehime plant extended in 2022



Handling of wafers, which are implant objects

"One of the unique features of Japan's research and development," he continues, "is that the engineers work closely with the customers. The country's great strength is when the requirements of the customers, the demands of the market and technology of the engineer all match at the same time."

One of the group's most notable products is the SAion, an all-in-one implanter that can handle both medium- and high-current implants while achieving a mechanical throughput of 500 wafers an hour.

All-in-One ion implanter "SAion"

Mr. Tsukihara explains how the technology works: "Most other companies use a different structure for high-current and medium-current implanters, but we have established a commonality between these two types. It isn't simply a question of changing the power supply; rather, we have to provide a dynamic range that can reach up to six digits, and which requires a high level of precision when it comes to controlling the dose."

Medium-Current ion implanter "MC3-II/GP"

Drawing an analogy with the automotive industry, where vehicles can be classified in terms of speed and load capacity, Mr. Tsukihara outlines his vision for the SAion. If SUVs or vans are becoming popular, he says, because they combine speed and load, then the SAion can be seen as the SUV of ion implanters with technology that offers clients the best of both worlds.

Looking to the future, Mr. Tsukihara confirms that the company is "actively seeking collaboration", before outlining how such co-creation would function in practice.

First, there is collaboration within the Sumitomo Heavy Industries group, with ion implanters divided into the categories of ion beam technology and wafer handling technology respectively. Second is the study of ion sources, in which SMIT collaborates with universities and research institutes in pursuit of a common aim. And third is the work the company undertakes with customers, especially in the research and development phase, which enables it to create a "win-win situation from an early stage" of the process.

Mr. Tsukihara continues: "We are considering a sales agent, and we are trying to find a partner, specifically from North America and Europe, with whom we can collaborate to secure the supply chain and conduct research and development. Diversifying the supply chain has recently become important; hence, we are trying to create a stable supply chain."

The company has also identified certain countries and regions for further expansion. "Eleven years ago we could not sell our products overseas due to contractual issues with both of our parent companies. We have since been able to go abroad on our own, starting in Taiwan and moving to China and Korea. In 2022, we established a base in North America to support the TSMC fab in Arizona, and Europe will probably be next."

> "Our priority is customer demands and the technology required to cater to them."
>
> **Mitsukuni Tsukihara**, President, Sumitomo Heavy Industries Ion Technology Co., Ltd.

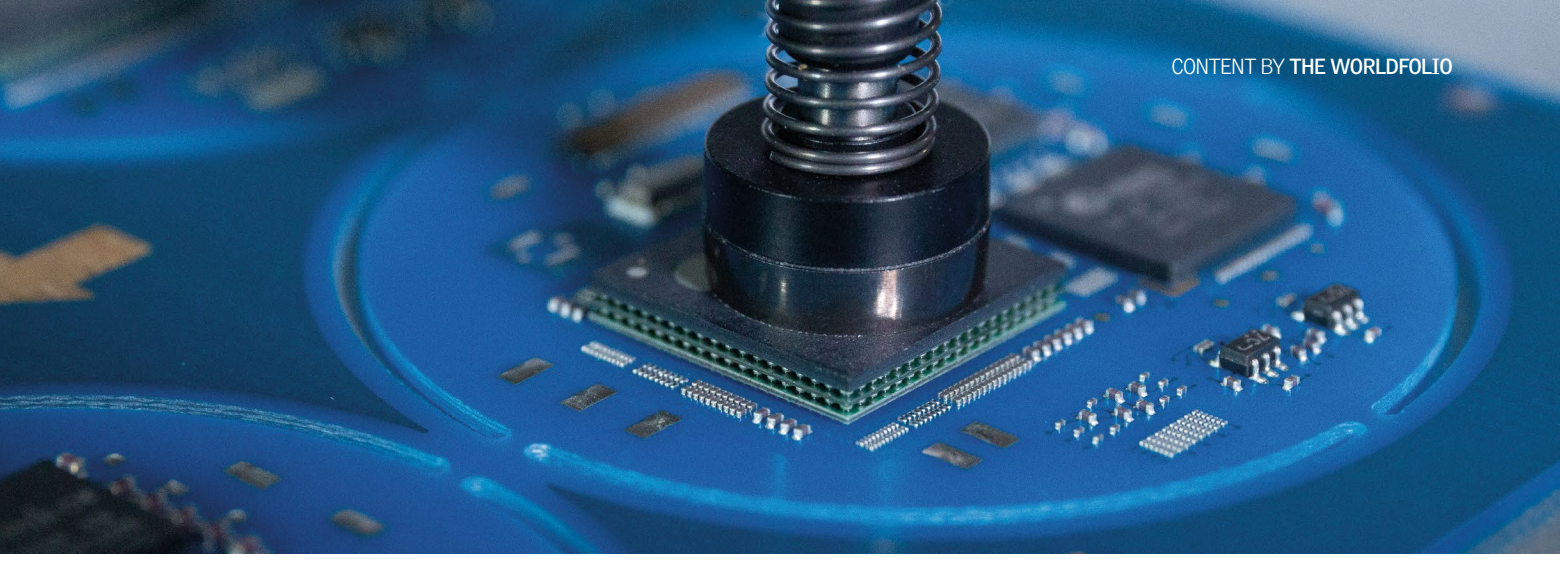
Amidst his plans for expansion, however, Mr. Tsukihara is keen to emphasize the company's human element. "The most essential component as company manager," he says, "is to focus on the company's sustainability, to meet the expectations of the graduates who enter the company after high school or university and stay for the next 40-50 years."

High-Energy ion implanter "S-UHE"

The company's responsibility, in other words, is to "lay out the foundation for the next generation and pass the baton to them."

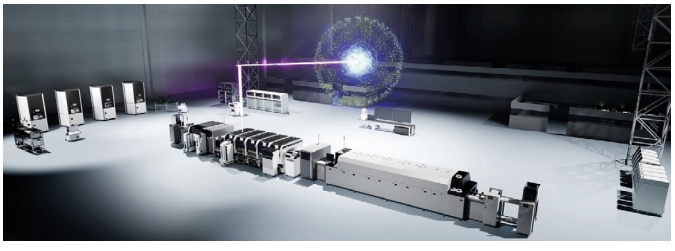
Sumitomo Heavy Industries Ion Technology Co., Ltd.

https://shi-ion.jp/english



It all begins with an innovative spirit

From the invention of a revolutionary hydraulic lathe to the development of leading-edge pick-and-place machines, Fuji's pursuit of innovation has been present throughout its history.



Fuji smart factory solutions

AIMEXR SMT pick & place machine

> "We strive for growth as a global leader in factory automation."
>
> **Nobuyuki Soga**, President, Fuji Corporation

A company guided by its corporate message "innovative spirit", Fuji Corporation is a major Japanese supplier of electronics manufacturing equipment, boasting locations across the globe. The 64-year-old firm specializes in robotic pick-and-place machines, which are used to mount electronic components on printed circuit boards – a process integral to the production of widely-used technology such as smartphones.

"Back in 1959, company founder Mamoru Sakagami invented a revolutionary hydraulic lathe suited to mass manufacturing, which contributed greatly to the growth of the Japanese automotive industry," says Fuji President Nobuyuki Soga. "At the time of development, he faced resistance from people who thought his idea was not applicable, but he continued to make efforts and completed the machinery. That spirit of pursuing innovation still remains in our company – it's a core value for our employees."

Among the leading-edge pick-and-place machines that Fuji supplies to the surface-mount technology (SMT) sector are the best-selling NXT and its successor, the NXTR, which is expected to be a big hit in 2023. Incorporating the latest advances in robotics, they guarantee high-speed, high-quality placement, and can mount electronic components for a wide range of products.

Electronics 3D Printer

The AIMEXR, a pick-and-place machine whose creation was announced at the end of 2022, also offers excellent versatility – a quality that's more and more important to electronics manufacturers. "Electronic circuit boards have been increasingly diversified," Fuji said in a statement in December. "In addition, globalization has brought instability in supply chains. These trends require more flexible production support at manufacturing sites."

Meanwhile, another example of Fuji's state-of-the-art manufacturing technology is the FPM-Trinity, a quick, efficient electronics 3D printer capable of resin printing, circuit printing and component mounting. Its development is illustrative of the firm's commitment to playing its part in a greener future. "We're out to reduce the environmental impact of our business activities and contribute to a sustainable society and environmental conservation," Mr. Soga explains. "The FPM-Trinity has near zero waste liquids, etc., and we believe it'll be a promising device in the future from the perspective of the Sustainable Development Goals."

In addition to supplying individual pieces of manufacturing equipment, Fuji offers technology that can optimize entire SMT production processes. Harnessing IoT, Fuji's smart factory solutions allow clients to maximize quality and productivity by linking up manufacturing machinery and systems so they can share data with each other. Armed with this information, companies can more easily complete tasks such as scheduling; part management; systems maintenance; defect assessment; and production analysis. And, thanks to automation, many such processes are carried out automatically.

"If you're a global company, you have to control the production system globally," Mr. Soga says. "Which products are made when, where and in what quantity – that's vital information. Increasing production efficiency is important. Our smart factory solutions combine all the latest technology to provide a solution for our customers. You have to be at the forefront of cutting-edge technology, or you will lose in this industry."

FUJI innovative spirit

www.fuji.co.jp/en

A small company playing a big role in shaping electronics

Having recently listed on the Tokyo Stock Exchange, Kohoku Kogyo is pioneering development in lead terminals and optical components and devices to support the global electronics and telecommunications industries.

> "We're calling on foreign investors to support the expansion of our global operations."
>
> **Futoshi Ishii**,
> President,
> Kohoku Kogyo Co., Ltd.

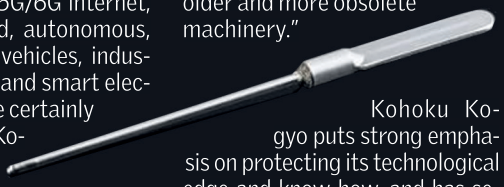
With the demand for aluminum electrolytic capacitors and fiber-optic devices driven by the needs of fields such as 5G/6G internet, CASE (connected, autonomous, shared, electric) vehicles, industrial automation, and smart electronics, the future certainly looks bright for Kohoku Kogyo.

Established in 1959, Kohoku Kogyo – now listed on the Tokyo stock exchange following its IPO in December 2021 – is a leading manufacturer of lead terminals for aluminum electrolytic capacitors as well as optical components and devices. Producing some 50 billion pieces annually through its seven production facilities worldwide, the Japanese enterprise boasts a 40% global market share for lead terminals for aluminum electrolytic capacitors and 50% global market share

for optical components and devices. This relatively small company, therefore, plays a hidden yet essential role in the growth and advancement of the aforementioned technologies.

In Japan's electronics heyday, there were up to seven companies producing lead terminals, however, Kohoku Kogyo is one of only two that have survived. What sets the company apart from its competitors at home and abroad is the fact that it produces all the machinery and equipment to manufacture its lead terminals independently.

"No company in the world can do this, and we are a very unique presence in that sense," president Futoshi Ishii proudly declares. "Our ability to develop and manufacture not only the lead terminals but also the equipment and machinery needed to produce lead terminals puts us in a very dominant position. We do have competitors in China, Taiwan, and Malaysia, but obviously, we are a major player in this market, and those competitors use equipment and machinery that are duplicates and copies of our older and more obsolete machinery."



Kohoku Kogyo puts strong emphasis on protecting its technological edge and know-how, and has secured an ever-growing number of patents over the years as part of its IP strategy. "In fact, we have more than 60 patents now and I think this is a key advantage of our business," adds Mr. Ishii.

When it comes to the Shiga-headquartered firm's competitive advantage in the field of optical components and devices, design technology is key. "We have a technology to design devices, and we are the only company in this industry to be successful in designing the key material composition as well as devices," the president explains. "I think that the strength of Japanese manufacturers is that they produce the materials themselves. It isn't a glamorous or fashionable job, but it is essential."

'Essential' is indeed the key word when describing the work of Kohoku Kogyo, whose optical components and devices are found at the backbone of the global fiber-optic communication network, particularly in undersea cables, which require especially high reliability.

The company's high-quality and highly reliable lead terminals are also essential to some of the world's biggest carmakers such as Toyota and Tesla. "What I have heard from our customers is that they only need Kohoku Kogyo terminals, and nothing can replace ours," says Mr. Ishii. "Even though we are a small company, it is gratifying that these massive companies consider us a vital part of their business."

Crucial to Kohoku Kogyo's reputation for high quality has been its ability to minimize defects through strict quality control measures. The company is in fact the only one in its field to hold IATF 16949 certification, a technical specification focused on "the development of a quality management system that provides for continual improvement, emphasizing defect prevention and the reduction of variation and waste in the automotive industry supply chain and assembly process," Mr. Ishii explains.

Following its successful introduction on the Tokyo Stock Exchange, Kohoku Kogyo hopes investment and collaboration with new partners will help to strengthen its continual product development, which is currently focused on areas such as high

purity quartz glass and multi-core optical fiber. Again, the company's proprietary equipment and machinery, and longstanding know-how, has seen it lead the way in these new fields. "In the lead terminal manufacturing process we use precision molds, and this precise shaping technology and know-how are used in the manufacturing of optical components. I think that is a great synergy we have realized."

While the company is currently seeking collaboration in the field of laser device manufacturing, it also aims to find partners to support its global expansion efforts, with the U.S. and Europe being top priorities in this regard. "We are trying to establish sales offices in both locations and may look to some forms of joint ventures to assist in penetrating those markets," Mr. Ishii reveals. "I can't disclose more information at this time, but needless to say, exciting things will be happening in the not-so-distant future."

KOHOKU

www.kohokukogyo.co.jp/en

TYO: 6524

Fujitsu Component: championing customer-centric design

A business partner with a customer-centric approach, Fujitsu Component provides state-of-the-art technology that supports various high-tech fields including IoT, wireless technologies and electric vehicles.

> "We can develop products based on the customers' requests. Having frequent conversations with customers keeps their voice relevant in the design and engineering process."
>
> **Masahiro Kinoshita**,
> President,
> Fujitsu Component Ltd.

Fujitsu Component is a technology-driven enterprise with over 100 years of experience in design and development. Today the company is world-renowned for supporting relays, wireless modules and IoT solutions, thermal printers, and touch panels, making it an indispensable partner for clients in the electronics and automotive industries.

While pursuing advances in cutting-edge technology at its R&D Centre in Japan, Fujitsu Component's quality department also ensures the highest possible standards of output while contributing to society and sustainability as well as reducing the impact on the environment. Indeed, it is this dedication to quality – backed by an acute understanding of customers' needs – that continues to set Japanese firms apart from regional competitors, as highlighted by Fujitsu Component president Masahiro Kinoshita.

"When it comes to cost, Chinese, Korean and Taiwanese manufacturers are much cheaper than us, but quality wise, Japanese companies may be the best providers globally." Kinoshita says. "Why is that? First, we can develop products based on the customers' requests. Having frequent conversations with customers keeps their voice relevant in the design and engineering process, so in a sense, our engineering capability is one of the key factors of our competitive advantage. The second reason is that every product is undergoing miniaturization, so we have to produce very small products on a mass production basis."

Mesh network products

He adds: "The balance between cost and quality is important, so for Japanese companies, quality is the priority, and then we look at cost. Japanese companies make better quality products to compete with. We also have strength in after-sales, so we can provide our product as the customers require."

Relays for EV/PHV

Miniaturization is of course a major requirement for the semiconductor industry, where Fujitsu supplies niche components such as its signal relays. Here, collaboration has been key. The company strives to offer the most optimum-performing products as semiconductors and their components get increasingly smaller. "We already had an advantage in design capability, but on top of that, we have recently been collaborating with some material manufacturers to make signal relays smaller," Kinoshita notes. "In reducing the size, we reduced the weight using material that came from the collaboration with the material manufacturer. Also, some clients need smaller chipsets with high specification, and we sometimes switch our core chips to more highly functional ones and reduce the overall product size at the same time."

Needless to say, when it comes to quality and performance, all automotive industry players, from parts suppliers to major car makers like Toyota and Nissan, need to be on the top of their game. Among the components Fujitsu supplies to these automotive behemoths is the FTR-K5 series of relays, which it developed in 2019. The FTR-K5 is the world's first 6.6-kilowatt power supply for EV (electric vehicle) and PHV (plug-in hybrid vehicle) onboard chargers, and with a high capacity, highly reliable board mounted relay, offers manufacturers the ability to extend the cruising range of EVs and PHVs.

Kinoshita explains: "The relay complies with the strict automotive standards concerning vibration resistance, operating temperatures, and insulation class – meeting IEC61810-1 277V enhanced insulation standards. The size of relays is a competitive arena. Other considerations are low energy consumption and resistance to high temperatures. When a product is delivered, it may have not only an onboard charger but also a charging station people can use at home."

There has been a major shift in the automotive sector with the advent of CASE (connected, autonomous, shared, electric) vehicles and it is estimated that the cost share of electronic components in the car will increase to about 35% by the year 2025, up from 16% today. It is a trend that bodes well for Fujitsu Component, which will have an ever-growing number of products supporting a range of functions in CASE vehicles. It is an area that serves as a "sweet spot" for the company, Kinoshita says.

"We have the FTR-K5 and the FTR-E1 series, which are more of a fit for EV relays and power control. Regarding CASE, this could be a gateway to opening the EV market. Our parts are also involved in cases of emergency. In connected cars, when an accident happens, the car automatically connects to an emergency center. We have already provided FTR-B3 and FTR-B4 relays for this. It is a signal relay inside of the car that is used for connectivity."

In addition to automotive, the Japanese enterprise's products have applications in various other fields, including FA (factory automation) equipment, mobile terminals and healthcare. In particular, Kinoshita highlights the company's mesh network products, which were born out of a collaboration with Wirepas, a Finnish company engaged in improving IoT connectivity solutions. "Our mesh network devices construct a scalable decentralized network and have autonomous network rerouting capacity," he states. "We have expanded our lineup since the release of the first product in 2020. They are the best for asset tracking and environmental sensor data collection in large hospitals, factories, offices and schools."

Moving forward following the company's move to become independent from parent company Fujitsu in 2019, Kinoshita aims to build even more successful partnerships like that formed with Wirepas. "We are very open to partnerships everywhere," he concludes. "We need to collaborate positively with universities or startups and all the big players to develop more advanced products, so we are open to joining forces with third parties."

FUJITSU

FUJITSU COMPONENT LIMITED

www.fcl.fujitsu.com/en

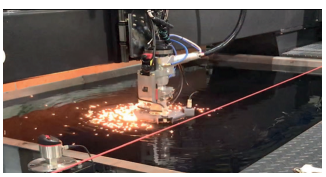
Komatsu Industries Corp. providing machinery for a new manufacturing era

Komatsu Industries Corp. provides its best-in-class machinery and after-sales services to automotive makers, while leveraging IoT to champion predictive maintenance technologies.

> "We stay connected with our customers by providing after-sales services in order to be a lasting partner."
>
> **Yasushi Kitade**,
> President,
> Komatsu Industries Corp.

Guided by its "Quality and Reliability" philosophy, Komatsu Industries Corp. serves as an indispensable partner for manufacturers in the automotive, construction and home appliance industries, supplying industrial machinery built to the highest quality and made to last. A pioneer of technologies such as its servo press, the Japanese company is today providing state-of-the-art machinery supporting the development of the automotive industry and manufacturing-based IoT applications.

Aside from press machines, the company has focused on laser technology, developing fiber-laser cutting processes that enable cutting to be done in water, which will result in reduced environmental impact and ensure energy savings for customers.

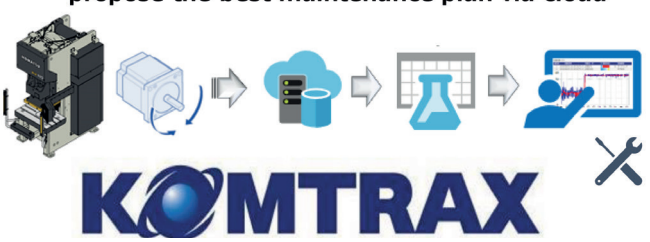


Fiber laser cutting in water

With the emergence of electric vehicles (EVs) that require lighter weight materials, high-tensile steel has been in high demand. In response, Komatsu has developed a laser cutting machine that trims the press-formed parts of high tensile steel. "Our TLH 3D laser cutting machine is the best solution for trimming hot-formed parts," says president Yasushi Kitade.

TLH: 3D-laser cutting machine

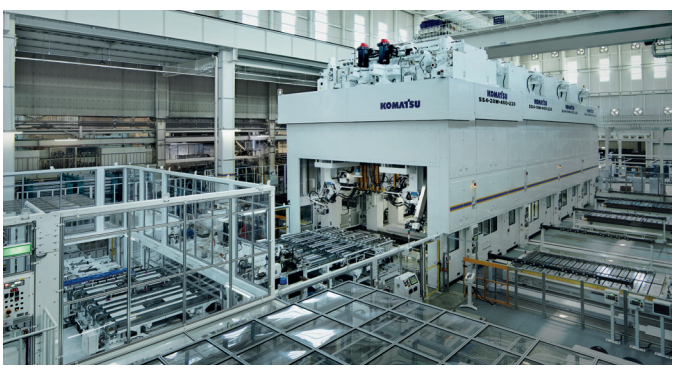
Meanwhile, the evolution of cold forming, which requires less energy consumption than hot forming, bodes well for an automotive industry looking to lower its carbon footprint. "Amid the carbon neutrality trend, product development has led to cold-formed high-tensile steel having gained almost the same strength as hot-formed without hot forming," explains Mr. Kitade. "Komatsu has been developing suitable press machines with our customers for cold-formed ultra-high-tensile steel."



He adds: "The quality of EV vehicles is oftentimes determined by the distance it can run and operate, but at the same time, the design aspect is crucial, so we are now talking with automotive companies about the strengths of our servo press, which can do so many things at once. Our products are long-lasting, so it is crucial that we provide long-lasting maintenance service and retain good relationships with our customers."

As it strives to provide long-lasting maintenance, Komatsu has leveraged the strength of IoT technology to develop its predictive maintenance services, which is helping clients to increase the productivity and efficiency of their manufacturing operations.

"We have a predictive maintenance system incorporated into each machine in order to keep staff up to date on the machine's health," says Mr. Kitade. "There are many components in each piece of our machinery, and each component has a prediction on its lifespan. We are analyzing and taking data on each component to determine its longevity. There are many different customers, and as such, each customer takes their approach to our machinery a little differently. Some customers keep spare parts for our machinery and do regular replacements, whereas some do not. We are trying to use this system to urge our customers to do predictive maintenance and parts replacements."



Large-sized Servo Press line for stamping automotive body panels

In terms of its global operations, Komatsu Industries Corp. has eight overseas subsidiaries located nearby automotive manufacturers' plants. In the U.S., it is approaching car makers buying up old Japanese automotive factories to transform them into EV plants. "We have been approaching these companies since we have experience providing services to these existing Japanese factories," says the Komatsu Industries Corp. president. "Globally, there are new emerging EV companies, so we are also approaching them so that we can increase our sales channels."

H1F-2: Small-sized Servo Press

As the company presses ahead with supporting a new era of manufacturing, Mr. Kitade stresses the importance of the company's commitment as a long-lasting partner. "What is important in manufacturing is providing the products and service, and there has to be a balance between the quality of the product and the after-services added on top. We wish to keep our business growing by providing this comprehensive solution to our customers."

KOMATSU

https://sanki.komatsu/en

High-speed stamping press machines for the future and happiness

Yamada Dobby is a global leader in the production of high-precision press machines for key industrial sectors.

Founded in 1919, Yamada Dobby started out producing textile machines, and since 1961, has specialized in the manufacture of high-speed press machines for the production of precision parts.

The company offers a variety of machines for a wide range of industries, from EVs to luxury watches, and is deeply involved in the electronics, automotive and medical sectors.

Yamada Dobby boasts world-class technologies, utilizing servo motors that offer an accuracy of 1 micron, and the world's fastest stamping press with a speed of 4000 SPM. The policy of accuracy is to build the machine as "a moving die". The manufacturing method involves

the use of top quality machinery, while the last stage of the process is always reserved for the craftsmanship elements.

In the EV industry, Yamada Dobby's precision machinery is utilized in the manufacturing of motor cores and explosion-proof valves for lithium-ion batteries. In the medical sector, it provides a complete stamping process for the production of painless micro-needles.

"Yamada Dobby's machinery contributes to the global environment and society, offering reduced power consumption and a zero defect production system. Our policy is 'Stamping Happiness' – bringing happiness to the world through stamping press technology."

Takeo Yamada, President, Yamada Dobby Co., Ltd.

The machine is designed rigid and through its micron controlled movement, it can achieve a longer die life which leads to significantly less production downtime. "The important point is to decide which direction to go, creating lighter weight, or improving the software and human friendly applications," says president Takeo Yamada.

NXT-50Wi

Yamada Dobby has offices worldwide to deliver local after-sales services and is especially focused on its expansion in Europe, India, and Southeast Asia. The company offers dedicated stamping turn-key lines to all customers according to their specific stamping processes.

YAMADA DOBBY
SINCE 1919

www.yamadadobby.co.jp

TMW: the integral and beyond

Since its foundation in 1949, TMW has become the go-to manufacturer of injection molds for automobile parts.

TMW uses "FCS Clamping" to manufacture molds and is a distributer of the "FCS System" for Asia

TMW is a specialist producer of plastic-injection molds for automobile parts such as instrument panels and bumpers. Founded in 1949, the Japanese company supplies a host of major vehicle manufacturers both at home and abroad.

TMW also sells hot runners – the tool used to inject molten plastic into a mold – and machine fixtures.

"Molds are our core business – it's something we're good at and famous for, because we've been doing it for more than 70 years," says TMW's president, Hiroki Tatematsu. "Our background allows us to go anywhere in the world and be viewed as a good company to collaborate with."

A firm with overseas subsidiaries in China, Mexico, South Korea, Thailand and the U.S., TMW also harnesses a global network of outside partner companies based in Asia, Africa, the Americas and Europe.

"Partnerships are crucial to us," Mr. Tatematsu explains. "We need the capacity of our subsidiaries in

"Safety always first" (TMW Group's head plant)

places like China and Korea, as well as our many partners, to remain a market-leading business."

Headquarters show room with a variety of specialized automotive parts

As the automobile industry transitions from internal-combustion engines to electric vehicles (EVs) and fuel-cell vehicles (FCVs), TMW is ready to keep pace with this historic shift.

"Our core business won't change so much," Mr. Tatematsu says. "Whether it's EV, FCV or gasoline engines, there's always an interior and exterior.

"Many in our industry would try to compete with China and Korea or ASEAN countries. On the contrary, TMW looks at them as partners in order to stay in global business."

Hiroki Tatematsu, President, TMW Co., Ltd.

"The design of many things we build will change, for example buttons will be changed to touch panels. The shape's going to be more complicated than it used to be."

TMW
Beyond the Integral

www.tmw-integral.com/en