



Doosan Machine Tools' VIP Customer Newsletter

OPTIMAL SOLUTION

FOCUS

- Industrial Trends

ZOOM IN

- Doosan Machine Tools' Top-Five Focus Areas

INSIDE

- Customer Success Stories
- Sungsan Corp. (Korea)
- Wuxi Zhengyao Machinery (China)
- Tutaryds (Sweden)

2019
DIMF
DOOSAN INTERNATIONAL MACHINE TOOL FAIR

**MACHINE
GREATNESS™**

2019
issue
no 11.

Doosan Machine Tools



Are You Ready to Grow?

Meet our ALL-NEW 5-Axis machining center for your continuous business growth.

Meet the DVF 5000! Doosan Machine Tools' new 5-axis machining center will empower you to machine your parts strongly and precisely 24/7/365 with its high-speed, high-precision and high-strength spindle combined with the most reliable automation solutions.

Specifically, the DVF 5000 is equipped with a maximum spindle speed of 18,000 rpm, a servo magazine capable of carrying up to 120 tools, and a rotary table boasting a maximum size of 630mm and a maximum workload of 400kg. This new model offers maximized rigidity while minimizing interference.

The DVF 5000 will take your business to the next level fast. Naturally, you can even achieve higher goals with the new model, too.

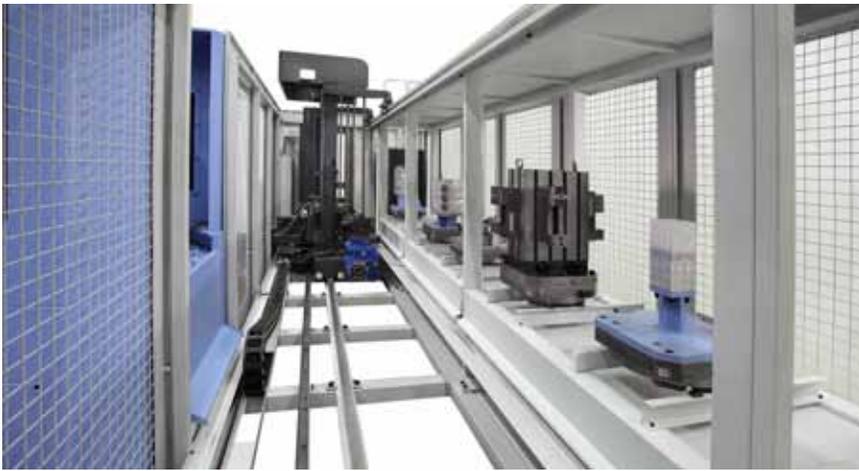
Please contact Doosan Machine Tools' Call Center at 1600-4522 for further details.



doosanmachinetools.com

CONTENTS

- 04 **DIMF 2019 Preview**
- 06 **FOCUS**
Introduction of Industrial Trends
- 08 **ZOOM IN**
Doosan Machine Tools' Top-Five Focus Areas
- 10 **INSIDE**
Customer Success Stories
 - Korea | Sungsan Corp.
 - China | Wuxi Zhengyao Machinery
 - Sweden | Tutaryds
- 16 **NEW PRODUCT**
Introduction of Doosan Machine Tools' New Products



In the manufacturing sector, the ongoing “Fourth Industrial Revolution” is focused on ‘promoting cost reduction, core competitiveness and customer value by preemptively tackling any issues that may arise in production and manufacturing processes.’

As such, machinery manufacturers are expanding their traditional roles and service areas: Now, they not only supply ‘high-capacity machine tools’ but they also provide manufacturing solutions for their customers’ entire production, operation and management processes. Emerging as a Total Solutions Provider in the fields of cutting and machining, Doosan Machine Tools offers ‘innovative frames and customized platforms incorporating digital technologies’ to make direct contributions to its customers’ efforts to generate profits and enhance their competitiveness.

In this newsletter, which features Industrial Trends, Doosan Machine Tools’ Top-Five Focus Areas, and Customer Success Stories, we have tried to convey to you the significance of ‘the manufacturing service platform’ designed to realize optimization, customization and high-efficiency and the ‘new technology trends for machining equipment’ designed for connected manufacturing from diverse perspectives.

We have placed particular emphasis on presenting the ‘absolutely unprecedented manufacturing services and machining solutions’ that we offer in terms of ‘Flexible Automation’ that meets customer needs in a flexible manner; ‘Smart Machines’ and ‘Customized Solutions’ that realize digital machining; and ‘Specialized Solutions’ and ‘User Optimization’ for each industry and machining workpiece.

Lastly, we hope that you will join us at the 12th DIMF 2019 in May 2019 where you can gain first-hand experience of all the technological breakthroughs that we have applied to our new models.

DIMF 2019 PREVIEW



Automation

The Smartest Hire You Can Make

Choose from bar feeders, gantry loaders, various pallet pools for high productivity, load/unload robots for material handling and unmanned machining and customized turnkey solutions. We have every automation option for you.



Complex Machining

Multi-Function. Infinite Possibilities

multi-tasking and full 5-axis is the answer for your most complex parts. Take a look at the PUMA SMX Series and DVF Series, our multi-function and full 5-axis game changers.



Customized Solutions

Looking for machines for aerospace, medical, electronics, semiconductor or oil/gas industries? Are you processing gears, bearings, aluminum wheels and cylinder heads? Experiencing difficulties in chip processing? Join us at DIMF 2019 to talk about your shop's needs.



CUFOS

Customized User-Friendly Operating System

With this PC-based control, you can conveniently operate all of your manufacturing processes, from setup to machining to maintenance. Maximize your machines' efficiency and harness open CNC architecture.

DIMF Display Models Equipped With CUFOS

PUMA SMX Series / PUMA TT Series / DVF Series

Doosan Machine Tools Opens the DIMF2019 on May 15 to Present the Dynamic 'HEART of BLUE' in Changwon

Doosan Machine Tools will launch the Doosan International Machine Tools Fair (DIMF) 2019 for three days from 15 May 2019 at its Namsan and Seongju plants in Changwon, Korea.

We chose 'HEART of BLUE' as the theme of our latest machine tools fair to express the idea that Doosan Machine Tools aims to serve you as 'HEART of BLUE' that will always be pumping away dynamically on behalf of your production activities. The fair will feature more than eighty of Doosan Machine Tools' cutting-edge machine tools, such as turning centers, machining centers, and large-sized machine tools, along with its 30 newest models.



- Period : May 15-17, 2019
- Opening hours : 10:00-15:30 daily
- Location : Doosan Machine Tools Factory
(601-3, Namsan-dong,
Seongsan-gu, Changwon-si,
Gyeongnam-do, Korea)
- Exhibits: More than 80 types of machine tools

Dates	Targets	Programs
May 15-17 (Wed – Fri)	Global customers	<ul style="list-style-type: none"> • Namsan & Seongju Factory Exhibitions • Factory Line Tour • Technology seminars • Smart Machine Solutions • Live Demo Cutting
May 16-17 (Thu – Fri)	Korean customers	

Enhancing Customers' Business Potential

Among the more than eighty products to be featured by the DIMF2019 are the PUMA SMX3100ST, which boasts enhanced multitasking capabilities; the two Y-axes PUMA series, which can realize even higher productivity due to the adoption of twin spindles and twin turrets; the PUMA AW560-MF II, which is optimized for aluminum wheel processes; the DVF series, a new concept of 5-axis machine tools; and the PUMA VTR1012F, a ram-type vertical turning center optimized for cutting aviation parts. The exhibits will include more than thirty new products such as the company's largest multitasking machine, the multipurpose double-column machining center No. 25 and a mold machining center boasting the highest level of machining precision.

Most notably, this year's fair will introduce the PUMA SMX series, PUMA TT series, and DVF series equipped with CUFOS, a customized operating system. The PC-based control system enables our customers to control all their machining processes, from setup to cutting to maintenance, with the utmost convenience by maximizing 'user convenience and machinery efficiency,' thereby bringing the future of smart machines much closer to our customers.

Doosan Machine Tools Has Solutions to Automation, Complex Cutting and Customized Solutions

Doosan Machine Tools will feature a variety of optimized machine tools and solutions at the DIMF2019 under the themes of its five main focus areas: 'automation,' 'smart machines,' 'multitasking,' 'high-speed' and 'customized solutions.' To realize 'automation' optimized for our small- to large-sized parts manufacturers, we provide a range of automation solutions including productivity improvements based on bar feeders, gantry loaders and diverse pallets linked to machine tools; robots that enable unmanned machining right from the workpiece supply stage; and turnkey solutions customized for customer needs.

In addition, we will prove the unlimited machining capabilities of our 5-axis and multitasking machine tools through demonstrations of our new 5-axis DVF series and our newly expanded PUMA SMX2600, 3100 and 5100 series, which are optimized to meet our customers' needs for high-precision, high-quality machining of parts with complex shapes. We will also introduce 'customized solutions' for different industries and different shapes of parts: We will demonstrate how our machine tools can be used in various cutting-edge industries such as the automotive, aviation, healthcare, electronic & semiconductor, and oil and gas industries, and how our machine tools maximize efficiency and productivity in the machining of diverse parts such as gears, bearings, aluminum wheels and cylinder blocks.

During the DIMF2019, we will stage a number of events including tours of the Namsan and Seongju plants, a technology seminar, and demonstrations of smart machine solutions and top-tier machine tools for visitors from both home and abroad.

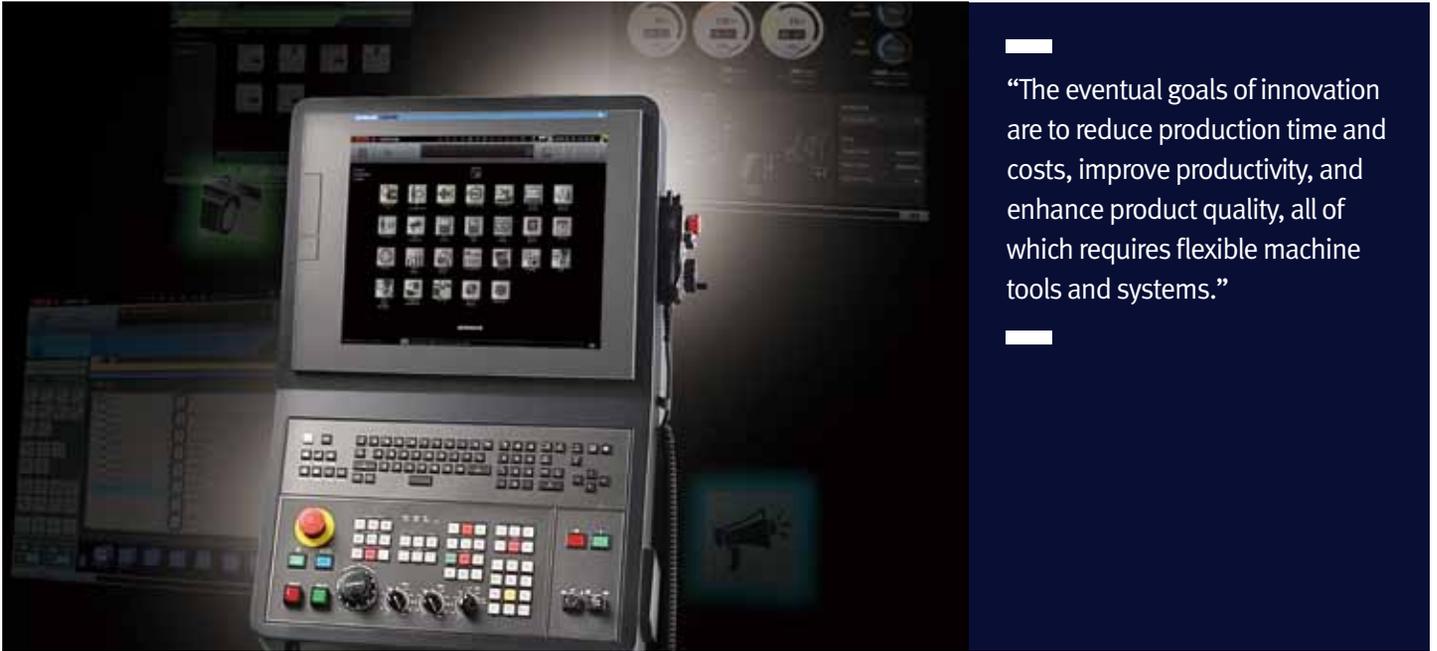
**HEART OF
BLUE**

Optimized, Customized and Highly Efficient Machine Tools and Manufacturing Services

Standing at the Heart of 'Connected Manufacturing'

In line with the development of ICT, the concept of manufacturing is gradually expanding from production to comprehensive solutions including product-related services. In other words, the manufacturing sector is now focusing on 'servitization' devoted to increasing customer value by preemptively responding to customer needs beyond the digitization of manufacturing processes through the convergence of production and service, as service is emerging as the most critical factor for the growth, competitiveness and satisfaction of our customers.





“The eventual goals of innovation are to reduce production time and costs, improve productivity, and enhance product quality, all of which requires flexible machine tools and systems.”

‘Automated Smart Machines’ for the Digitization of Production and Manufacturing Processes

The so-called servitization of the manufacturing industry refers to the provision of customized platforms optimized for production processes. It has been quite some time since the machine tool industry had to offer solutions that would enable its customers to achieve improvements in productivity based on machine tools while maximizing their process optimization and efficiency, rather than simply delivering machine tools to them.

The Fourth Industrial Revolution which fueled the servitization of the manufacturing industry is now also driving the industry’s automation movements. Machine tools are now able to monitor and control their working environments in real time. They can also keep track of logistics, work records, operational status and defect management on their own. Through big data and artificial intelligence, we can now control machine tools anytime anywhere. However, to realize such advanced automation, manufacturers need to secure ‘smart’ machine tools. In line with the latest trends in process automation and smart manufacturing, manufacturers are focusing on the development of ‘solutions to diverse complex needs’ when choosing new machine tools. In particular, they are paying increasingly keen attention to smart machines that meet their requirements in production planning, process management, production site control, and response to breakdowns and malfunctions.

Provision of Customized Solutions and Continuous Efforts for Higher Productivity and Greater Precision

The manufacturing industry is striving for process and product innovations through the digitization of manufacturing in the era of the Fourth Industrial Revolution in order to predict and preemptively respond to increasingly diverse customer needs including the production of multiple types of products in small quantities, the mass production of customized products, and the digitalized production of goods. The ultimate goals of such innovations are to reduce production time and costs, improve productivity and enhance product quality, all of which requires the adoption of flexible machine tools and systems. Given the issues of aging workers, a shrinking workforce, rising wages and deteriorating working conditions, manufacturers also need to secure customized solutions to realize unmanned machining and operational convenience.

The bottom line is that manufacturers can create new business and profit models through customer satisfaction only when they have acquired ‘solutions based on machine tools and manufacturing service platforms capable of realizing optimization, customization and high efficiency.’ Doosan Machine Tools has established ‘five key strategies’ to promote customer value and profitability while building a connected manufacturing environment based on its cutting-edge machine tools. Please refer to the next page for the details of the ‘Top-Five Focus Areas’ of Doosan Machine Tools.



ZOOM IN

—
Doosan Machine
Tools' Top-Five
Focus Areas

DMT's Top Five Focus Areas for Enhancing Customers' Profit Creation and Competitiveness

Amid a manufacturing crisis, cutting and machining companies are seeking to find new opportunities by preemptively responding to the rapid changes in manufacturing environments due to the ongoing Fourth Industrial Revolution. As such, they are paying keen attention to cutting-edge solutions that integrate innovative machine tools, systems, and devices. However, they generally hesitate to make an investment for various reasons including their unstable income structure, low growth, investment burden, and lack of understanding about automated, intelligent and smart operations. Isn't there a new way for SMEs to cope with changing trends more efficiently and actively?

Doosan Machine Tools proposes finding solutions to the situation through its 'Top-Five Core Strategies' as a company that is now emerging as a 'Total Solutions Provider' in the cutting and machining areas across the globe. The following are DMT's 'Top-Five Core Strategies' for coping with the mega trends of the global machine tool industry and preemptively responding to the needs of the industry, customers, and products.



The Fourth Industrial Revolution is not about where to use technologies; rather, it is about how to cut costs and maximize customer value by dealing with specific issues at production sites. Manufacturers want Flexible Automation that not only makes improvements in terms of quality, delivery and energy conservation but also realizes digitally-based mass customization.

To fulfill such customer needs, Doosan Machine Tools produces high-capacity, high-efficiency machine tools. In addition, to enable its customers to realize higher productivity and unmanned machining, we provide them with optimized, customized and smart manufacturing solutions through our advanced bar feeders, gantry loaders, pallets, and robot systems. Doosan Machine Tools also provides machine tools and flexible automation solutions under a turnkey contract designed to help its customers operate flexible production and manufacturing processes.



The concepts of smart factories and digital machining have emerged as key issues in the machining industry in recent years. Companies no longer depend on personal experience and manual records to compete with their rivals in terms of productivity. Instead they pursue intelligent machines, automation systems and smart robots for that purpose. In other words, a company's competitive edge is now determined by the excellence of its machine tools. To build a smart factory that minimizes workers' intervention and controls its operations on its own, it is important to secure production process stability through integrated, intelligent factory management and effective management of production processes in order to realize high-quality machining and maximize convenience.

Doosan Machine Tools has found the answer in the 'SMART MACHINE.' We have empowered our solutions to evolve according to our customers' needs over the years by securing 'high-precision control technologies' including LFV cutting technologies, turret cross-section error compensation functions, and gear calibration solutions, and by developing the PC-based open CNC 'CUFOS' and the smart factory solution 'iDOO Control.' We have also taken the lead in making machine tools smarter by launching 'Sketch Turn,' an interactive program that enables those who are not experts in chip processing solutions and parts machining skills to easily design processing programs and thereby maximize operational convenience.

“Doosan Machine Tools develops and produces high-performance high-efficiency machine tools to respond flexibly to its customers’ needs.”



DVF 5000

PUMA SMX 2600ST

PUMA TT1300SY

Optimized FOR YOU

In line with the emergence of electric and hydrogen cars, the digitalization of transport modes, and the development of smart home appliances, parts are becoming ever more diverse and complex, thus requiring an even higher level of quality and precision. Therefore, machine tools are even required to offer ‘customized solutions’ for different working conditions and ‘specialized solutions’ optimized for different industries and parts to cut.

Doosan Machine Tools has established ‘customized solutions’ as one of its top-five core strategies and provided customers with specialized solutions for different items and industrial needs with the aim of equipping them with optimized solutions. As item-specialized solutions, we provide hard-to-cut workpiece solutions for bearings & gears, aluminum wheels, cylinder blocks, and the processing of quartz, graphite (ceramic) and titanium. As industry-specialized solutions, we offer various solutions customized for the aviation, automotive, molding, semiconductor, and IT & electronic industries.

MORE Multi Multitasking/5-Axis/ Multi-Axis

Recently, machine tools have developed into multitasking machine tools to respond to demand for the production of multiple types of products in small quantities, digitally-based mass production systems, and the processing of hard-to-cut parts with complex shapes. In addition to requests for high productivity, high precision and high efficiency, machine tools are now required to realize smart manufacturing as the central axis of connected manufacturing.

Thus, Doosan Machine Tools has been expanding its lineup of multitasking, 5-axis or multi-axis machine tools, including the new DVF, PUMA SMX ST and PUMA TT SY series, with the aim of improving customers’ return on investment (ROI) and contributing to the creation of their new profit models. We help our customers actively cope with diverse production and manufacturing environments and maximize their profits through flexible production practices.

High Speed & High Precision

The main reason why Doosan Machine Tools develops high-performance, high-efficiency machine tools and builds platforms that can connect customers’ manufacturing and service venues through the IIoT (Industrial Internet of Things) and information and communications technologies is that it wants to help its customers to ‘achieve high productivity and quality manufacturing.’

Most notably, Doosan Machine Tools develops and supplies a wide range of cutting-edge machine tools to allow small machining companies experiencing difficulties building a smart manufacturing environment to realize high productivity and high quality machining and actively cope with rapidly changing manufacturing environments just through machine tools, such as the PUMA TW, T 4000HS and T 4000HP equipped with high speed solutions; the PUMA 2100 and 2600SY II equipped with thermal displacement error compensation technology; and machine tools equipped with IKC functions that enable operators to easily correct errors.

INSIDE

Sungsan Corp.



Meeting the Challenges of High-Quality, High Value-Added Machining, the Source of Sungsan's Unique Integrity and Standards



Sungsan Corp.

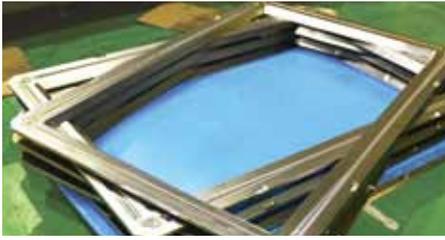
Established 1995

Head Office 392-6 Gajang-dong Osan-si, Gyeonggi-do, Korea

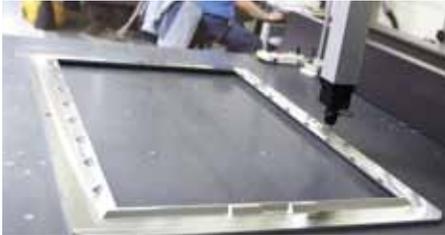
Business

Manufacturing of display mask frames

The mask frame process is one of the key elements that determine the quality of cellphones, laptops and TV sets. Securing desirable flatness requires not only high-speed, high-precision machining but also high-level grinding technology. When manufacturing large-scale mask frames, it is particularly hard to secure processing quality in terms of flatness, and machining and size tolerances, allowing only a few companies with substantial technological competencies to survive. Let's meet a company that produces high-precision, high-quality mask frames based on its outstanding technological competence, and is recognized as 'a critical supplier' by its key client.



⚙️ The production of mask frames requires high precision machining and grinding technologies.



⚙️ Sungsan Corp. takes flatness and precision measurements at more than 300 points on each product that it rolls out without exception.



⚙️ It is the overwhelming passion for technology of Kang Seung-bo, the CEO of Sungsan Corp. that has enabled Sungsan to succeed as a specialist in the machining of mask frames.

Challenge of Sungsan Corp.!

Opportunities Brought by High-Precision Mold Processing and Grinding Technology

Sungsan Corp., a supplier of Samsung Display Co., Ltd., specializes in the production of display mask frames. Established in 1995 as Sungsan Engineering, the company initially specialized in the machining of semiconductor equipment and LCD screen cleaning equipment parts. Fifteen years ago, Sungsan fixed Samsung's problem with its mask frame machining task, leading to a special relationship that has endured to this day. Korea was then about to apply OLEDs for a folder mobile phone for the first time. However, it was difficult to find a mask frame manufacturer that could meet the demand for an extremely high level of flatness and precision. The leading display manufacturer in the country sought a machining company that could meet its demand, leading to its encounter with Sungsan, which was already equipped with high-precision mold processing and grinding technology. Sungsan met the company's requirement by securing an OLED screen mask frame with a flatness of 0.15mm. Kang Seung-bo, the CEO of Sungsan, said, "We resolved the company's machining difficulties a number of times, presenting them with satisfactory machining results. By and large the company's trust in us grew, and large orders followed." He recalled that he had never imagined that his business would grow so big, though. "The larger the frame, the bigger the machining area becomes, making it harder to meet the requirement for flatness. So more precise machining technology is required," said Kang Seung-bo. "Most notably, mask frames go into vacuum chambers. Consideration must be given to their weight and material deformation risks." Currently, Sungsan supplies the company with not only small-sized mask frames but mid- and large-sized mask frames with a flatness of 0.025mm and 0.03mm, respectively, earning a great deal of trust from the firm.

The Solution is Doosan Machine Tools' VM950 Vertical Machining Center!

Increasing Machine Tool Investment to Meet Demand for Mask Frame Surfaces

In line with an increase in mask frame orders, Sungsan purchased twelve VM950s, Doosan Machine Tools' vertical machining center, and a BM 2035M model optimized for the production of large frames.

Out of a few domestic mask frame producers, Sungsan boasts the most prominent technological prowess and the highest production yield. "We start getting involved in the development stage. We make standards for production lines, and mass produce to meet our customer's diverse needs. As such, we have been able to stabilize both our product and our productivity," said CEO Kang Seung-bo. "At the beginning of mass production our production yield stood at 75%, but we have constantly upgraded our production processes, and the rate is now 95%." Such a high production yield can be realized only when a company is equipped with proper cutting technologies, machine tools and production infrastructure. It is impossible to achieve either without close communication, technological consensus and mutual trust with the customer.

Most notably, CEO Kang standardized not just the processes but also the machining technologies and cutting tools to minimize the company's defect rate. He stressed that the role of 'machine tools' is critical in stabilizing the production of goods. He says that his company used Doosan Machine Tools' NC lathes and Nos. 4, 5 and 6.5 to produce the parts required for semiconductor equipment and LCD cleaning equipment. To produce mask frames, he says that he has only ever used the products of Doosan Machine Tools. "Invar 36 is low in hardness, but it contains 36% nickel. Thus, it is not easy to cut. Proper tools must be used," said CEO Kang. "Doosan machinery meets all the requirements. It outperforms the competition in cutting speed and productivity, in particular, when it comes to mold

machining," stressing his satisfaction with his choice of Doosan Machine Tools.

Sungsan's Unique Criteria: 'Optimization, Process Simplification, Specialization'

"Reducing the machining time does not translate to a reduction of cutting time," said CEO Kang. "It takes 72 hours to machine a large-sized mask frame. Saving a few minutes in cutting does not affect productivity that much." He says that it is more effective to reduce the lead time by reducing the workpiece setting and operation time, adding, "It is important to simplify the processes and upgrade the programs so that we can optimize the processes that our workers have to adapt to. It is also critical to help our workers to continue enhancing their know-how and expertise in what they are doing." While referring to his company's unique customized production and manufacturing system, he emphasized the importance of sourcing machine tools from a single supplier to reduce operational confusion among workers and help them minimize their prep time.

CEO Kang said that as the display technology has evolved from LCD to PDP to OLED, the mask frame technology has also developed, with the demand for parts continuing to increase. "We are planning to purchase machine tools that are excellent in heavy cutting," he added. "We hear that Doosan Machine Tools has already tested our products in its lab and upgraded its machinery according to the test results," praising the efforts of Doosan Machine Tools to respond promptly to customer needs.

INSIDE

—
Wuxi Zhengyao
Machinery
(China)



Chinese Nut Molding Company ‘Wuxi Zhengyao Machinery’ Finds Answers to Need for High-Quality and Machining Stability

China is promoting ‘Made in China 2025’ to make the transition from the world’s ‘factory’ to ‘a manufacturing powerhouse.’ One of the ten key industries of ‘Made in China 2025’ is robotics, including NC (numerical control), which is a core technology for machining tools. China aims to secure technological competency in machine tools and industrial robots - areas where the country’s technological prowess remains low. China is also promoting a strategy for enhancing the quality competitiveness of its metal cutting and precision machining companies based on the core technology. Wuxi Zhengyao Machinery, a nut molding machine manufacturer, is one of the companies to have secured workpiece precision and machining stability while realizing quality innovations and productivity improvements through the products of Doosan Machine Tools.



Wuxi Zhengyao Machinery

“With their high precision and stability, the products of Doosan Machine Tools are greatly contributing to raising the product quality and brand recognition of our company’s nut and screw molding machines.”



⊕ Zhang Fengcheng, CEO of Wuxi Zhengyao Machinery, said, “The quality of Doosan Machine Tools’ machinery is so high not only in terms of cost-effectiveness but also quality stability and operational precision that we are more than satisfied with them.”



⊕ Wuxi Zhengyao Machinery machining a nut molding machine bed

Challenge of ‘Wuxi Zhengyao Machinery’

Choice of Precision and Quality Stability

Founded in 1992, Wuxi Zhengyao Machinery manufactures and supplies cost-effective nut and screw molding machines. In 2018, the company recorded sales of 200 million yuan. It supplies all its products to the domestic market, and is said to have won an increasing number of product orders recently. CEO Zhang Fengcheng of Wuxi Zhengyao Machinery said, “Mold and parts machining in China is shifting its focus to ‘stability of precision and quality,’ adding, “To cope with the trend and raise our competitiveness, we have increased our facility investment, including the deployment of Doosan Machine Tools’ machinery throughout our production line.” He went on to say, “The quality of Doosan Machine Tools’ machinery is so high in terms of machining precision and stability that it is making a great contribution to raising the quality of our nut and screw molding machines and our corporate brand image.”

“Doosan Machine Tools’ products are cost-effective. They have also turned out to be very satisfactory overall, including operational convenience, precision, productivity and machining quality.”

CEO Zhang Fengcheng

The solution is “Flexible Machining and Automation Work!”

Response to ‘Made in China 2025’

Launched in 2015, ‘Made in China 2025,’ the Chinese version of the Fourth Industrial Revolution, aims to promote a Chinese-style manufacturing revolution by incorporating ICT into the manufacturing sector. Centered on the economic goal of ‘boosting the domestic market’, the initiative was conceived to create a high value-added manufacturing sector and build the smart manufacturing infrastructure. Wuxi Zhengyao Machinery, which supplies 100% of its production to the domestic market, has also tried to automate its production processes and cope with the trends of ‘optimization, flexibilization, and multitasking.’ CEO Zhang said, “Our company has played a leading role in setting up an automated intelligent production system in the industry. We are proud to enjoy the leadership position in flexible machining and automation.” He went on to say, “Furthermore, to further raise the level of customer satisfaction, we are offering our prestigious customers special benefits in after-sales services and financial services, including monthly installment payment plans.”

He also stressed, “Behind our ability to preemptively respond to quality, manufacturing service and customer needs were the contributions of Doosan Machine Tools. Therefore, we plan to continue investing in optimized machine tools and production systems in line with future-oriented manufacturing trends.” Wuxi Zhengyao Machinery is using Doosan Machine Tools’ boring mills and HMC, HTC, VTC and LPS models throughout its production lines. “We are cutting all our parts, including screw

molding machine beds, with Doosan Machine Tools’ machinery,” said CEO Zhang. “The products are highly cost-effective. We have found them very satisfactory in all aspects including operational convenience, precision, productivity and machining quality,’ adding the caveat that the after-sales services could perhaps be a little faster.

Wuxi Zhengyao Machinery’s Plans and Efforts to Raise Its Market Share in Nut Molding Machines

To actively cope with increasing orders for its nut and screw molding machines, Wuxi Zhengyao Machinery began to expand its plant in 2018 and expects to complete the interior work by the end of 2019. Through the new plant, we will expand our overall production capacity and increase our market share in nut molding machines,” said CEO Zhang. “We will continue working on quality and productivity improvements and faster delivery to further consolidate our status as an innovative corporation in digital machining in China.”



⊕ DBC 130 / L

INSIDE

Tutaryds
(Sweden)



Small-Scale Production Site Creates New Opportunities for Efficient Production through Automation

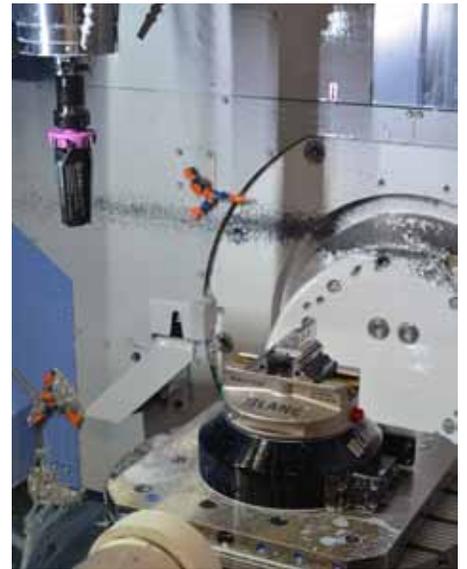
Tutaryds Mekaniska Verkstad AB is creating new opportunities to achieve effective production even at a small-scale production site through automation rendered possible by the DVF 5000. Founded by Bengt Gustafson in 1980, the company has been growing steadily ever since. After starting life as a producer of truck parts, the company moved to a larger site in 1992 to meet the increasing demand for them and to expand its business profile to the production of maintenance parts as well.



Tutaryds Mekaniska Verkstad AB



➤ Machine operator Prekret Djek in front of Doosan DNM 650 II



Tutaryd is a small town in the Ljungby Municipality of Kronoberg County, Sweden. Tutaryds Mekaniska Verkstad AB is located 8km east of Ljungby. In the machine parts factory of this ambitious company, Mr. Bengt sits with Mr. Kiutinen to talk about the cutting-edge machine tools that have been used in Mr. Bengt's factory.

Initially, Mr. Bengt used the machine tools of Johnford, for which Thomas and Michael of Vislanda Maskin AB served as agents. Mr. Bengt then shifted to Doosan Machine Tools' products and purchased the company's latest models, including three vertical DNM500 II models, a simultaneous DNM650 II model, and two PUMA 2600 lathes through Jimmy Kaukinen.

Recently, Duroc and Jimmy Kaukinen proudly presented Tutaryds with Doosan Machine Tools' DVF 5000, a 5-axis machining center equipped with Lang's automation solutions.

The DVF 5000 has attributes that are very favorable to automation, such as a probe capable of measuring up to 60 different locations, laser feed and brake control of tools, and an automatic door opener system.

"If we have to make a future-oriented decision about what machine tool we will have to invest in so as to meet the demand for 5-axis machining, the best choice will be a combination of LANG, Doosan and Duroc."

Bengt went on to say, "As it's integrated with LANG Eco-Compact 20 automation solutions, the model is ideally suited for the production of multiple types of products in small quantities. Despite its compact size of just 2 x 2 meters, it is equipped with 20 pallets. The model can quite easily be attached with a LANG micro-grip vise, a robot that can handle a load of up to 40kg for the machining center."

He added, "The outstanding edge of LANG's automation solutions is their simplicity. You don't need robot programming because you can easily control the robot when it uses pallets through M codes. So, you don't need a human-robot interface or pneumatic/hydraulic arrangements either from the machine workbench."

He explained, "When the robot moves on to make docking with the machine docking station, air connection is made between the two. A pallet is released, and another takes its place."

MD Bengt said, "Although we had long felt the need for automation, the solution we had was too complicated for the scope of our operations. More importantly, it was too costly. In retrospect, it is true that it was not so persuasive for us to try to automate our low-volume manufacturing processes. In the DVF 5000, Doosan Machine Tools has introduced a new structure with the stand installed on the side of its 5-axis machine tools. That was exactly what we'd been waiting for all along. There was so much demand for the automation of 5-axis machine tools."

MD Bengt explained, "The operators now have enough space in front of the machine tool, so they can work much more conveniently. The machine tool was first introduced to Europe at the EMO 2017. However, I'd seen it in Korea in the spring of 2017. I knew it was exactly what we needed. It was a solution that would fit our company perfectly."

He concluded, "Our decision to invest in automation solutions has generated positive results, increasing our demand for other similar solutions. Once you introduce automation, it generates practical results in production, though only in so far as you have adopted the "right" automation solutions. For our part, if we have to make a future-oriented decision about what machine tool we will have to invest in so as to meet the demand for 5-axis machining, the best choice will be a combination of LANG, Doosan and Duroc."



➤ DVF 5000

NEW PRODUCT

Introduction of
Doosan Machine
Tools' New Products

Introduction of New Products Equipped with the Core Technologies of Doosan Machine Tools

TURNING CENTER

Doosan's Medium to Large Turning Center with 2-axis to Y-axis Machining Capability



PUMA 5100XLY

As the successor to the PUMA 400/480 series, whose prominence was recognized throughout the global market including the Americas and Europe, the PUMA 4100/5100 series boasts the fastest and strongest cutting capability and stability in its class. It features markedly expanded user convenience thanks to user-centered performance enhancements and the addition of new features. The series lineup consists of 38 turning centers with chuck sizes of 12"/15"/21"/big-bore and a maximum machining distance of 1/2/3 m depending on the types of cutting parts required by the customers.

High-Performance Vertical Turning Center



PUMA VT1100M/ATC

The PUMA VT series is designed to maintain pinpoint accuracy even during long hours of machining and to realize powerful heavy cutting and fast tool replacement, while generating the least amount of noise and heat. The adoption of meehanite metal and a perfect box structure are the factors that have made the exceptional accuracy of the series possible. Most notably, the automatic tool changer (ATC), offered as an optional feature, is ideal for machining difficult-to-cut materials in the most efficient way.

Doosan Machine Tools has recently launched products equipped with its cutting-edge core technologies, including its high-speed spindle technology, high-rigidity guideway technology, thermal stability technology, easy operation technology, and smart monitoring technology.

High-Productivity Horizontal Multitasking Turning Center with Twin Y-Axis Turrets



PUMA *TT1300SY/TT1300SYY* ***TT2100SYY***

The PUMA TT2100SYY, 1300SY and SYY series are 5-10 inch class high-productivity horizontal turning centers with a twin-turret structure reinforced with bi-directional spindles and a Y-axis. As the left and right spindles can machine workpieces independently, the series boasts excellent productivity, offering a broad selection bar feeders automation with various chuck sizes of 5, 6, 8 and 10 inches. The left and right spindles roll out their products separately through automated devices by its new part unloaders. Through the feed system design optimized for high-rigidity and a fast feed rate, the series has adopted a high-rigidity roller guide with a maximum speed of 40m/min, boasting minimal thermal deformation proven by strict field tests.

High-Rigidity, High-Precision Large CNC Vertical Lathe



PUMA *VTR2025/2530 series*

The PUMA VTR2025/3000 is optimized for diverse machining operations with a maximum turning diameter of 2500-3000mm, C-axis control, and a milling spindle. With the ATC supplied as a standard feature, the model's operational efficiency has been maximized with the adoption of diverse accessories such as an APC, hydraulic chuck, and automatic texture. The saddle with an integrated sealed structure supports the ram more solidly, making power cutting easier, while automatic lubrication keeps the surface clean.

NEW PRODUCT

Introduction of
Doosan Machine
Tools' New Products

Introduction of New Products Equipped with Doosan Machine Tools' Core Technologies

MACHINING CENTER

Mynx II series, Powerful Heavy Duty Vertical Machining Center



MYNX II series

The Mynx II series boasts a diverse lineup with Y axes of 550-950mm and spindles of direct, belt, gear and built-in drive. In addition, the application of a box guideway enables the series to realize high durability, stable precision and powerful cutting. To boost productivity, the series is equipped with a fast tool changer. Doosan Machine Tool's unique EOP (easy operation package) has further enhanced customer convenience.

AEROSPACE SOLUTION HFP 1540



HFP 1540

The HFP 1540 is a simultaneous 5-axis horizontal machining center capable of providing optimized solutions for the machining of parts for aircraft fuselages and wings. It realizes powerful, dynamic, simultaneous 5-axis machining through the application of a high-capacity spindle and a high-speed feeder axis. It is customized for the elaborate machining of workpieces of complex shapes through its universal head capable of $\pm 105^\circ$ rotation, and can accommodate up to 3000kg of workpieces. The stable structure of the table gives it the largest machining area in its class. Also, the automatic pallet exchange device completes automation while maximizing productivity.

High-Productivity Tapping Center



T 4000HP

Thanks to improvements in its structure and frame rigidity, the T 4000HP boasts exceptionally stable machining performance. To further improve productivity, the acceleration/deceleration feature of the feeder system has been upgraded, and the tool change time has been reduced, with a 21-tool magazine offered as a standard feature. The application of D300, Doosan Machine Tools' own numerical control, realizes high-productivity by preventing waste of time and maximizing mechanical performance.

Premium Simultaneous 5-axis Machining Center with Rotary Table of Ø650/800mm



DVF 6500/8000/8000T

With their high-speed spindle of 12000 (option 18000) r/min, the DVF 6500/8000/8000T are premium simultaneous 5-axis machining centers equipped with a Ø650/800mm rotary table optimized for the machining of workpieces of complex shapes. They boast a highly rigid and stable structure due to the adoption of a direct axis feeder system. The application of diverse, directly built-in, high-speed spindles enables the models to offer stabilized machining capabilities. The inclusion of a high-speed servo magazine as a standard feature further improves productivity and machining stability.

Vertical Machining Center with 5m X-axis



DEM 4000

The DEM 4000 Vertical Machining Center for General Purposes, Doosan Machine Tools' latest product, secures efficiency and effective cutting capabilities with its exceptionally rigid structure. The 8000r/min spindle rotates at torque of 47.7N·m. To further increase efficiency, various types of magazines, from armless- to cam-type magazines, are available. The product boasts the largest machining area and load in its class.

Doosan Machine Tools



***WHAT WE PRODUCE
DEFINES US.***

MAKE IT GREAT.

WHAT WE PRODUCE DEFINE US!
WE MAKE YOUR PRODUCTION GREAT!

2019
DIMF
DOOSAN INTERNATIONAL MACHINE TOOL FAIR

**MACHINE
GREATNESS™**