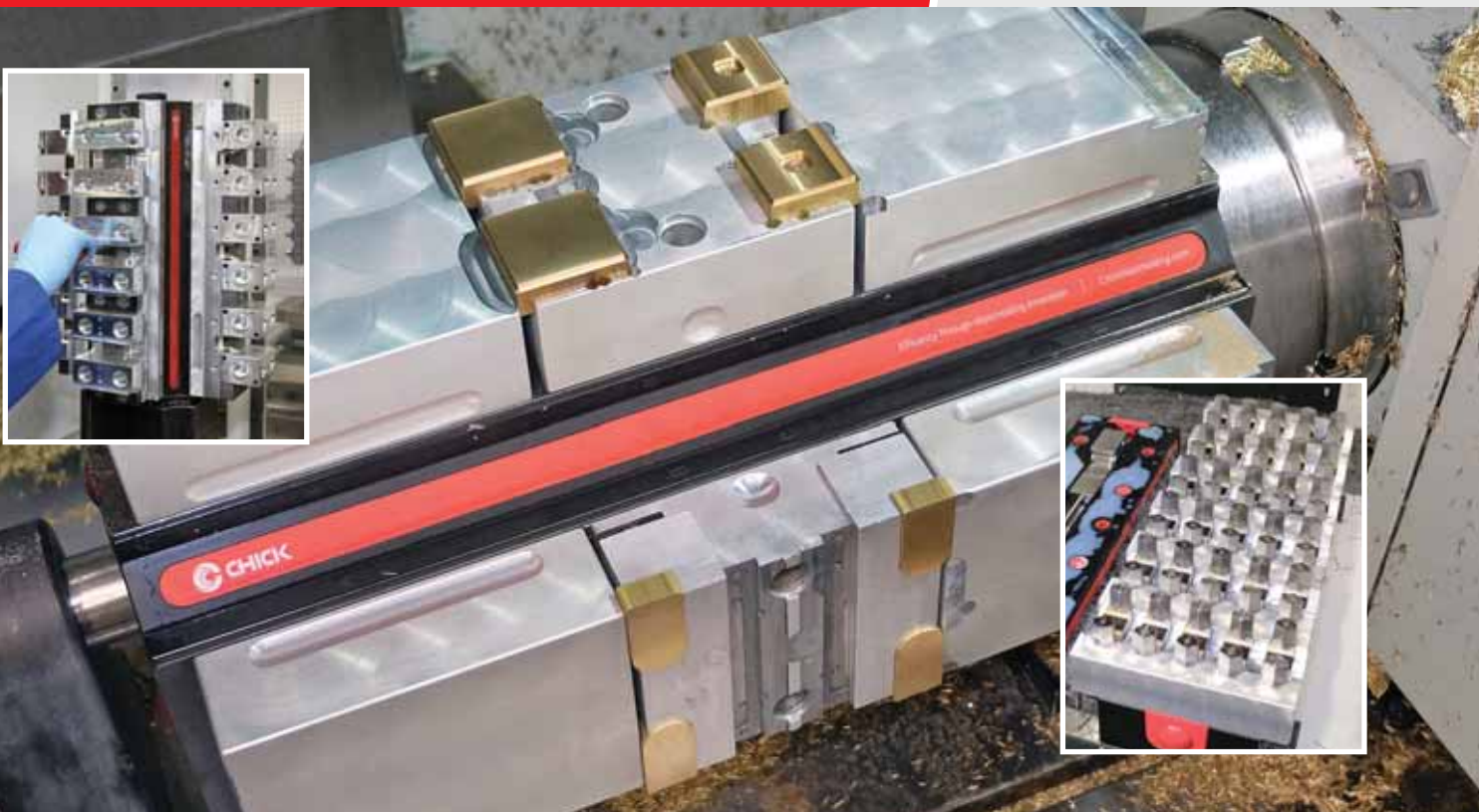


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Reap the benefits of horizontal milling on a vertical machining centre

Machinists have long recognised the benefits of higher productivity and more efficient swarf clearance resulting from fixturing multiple parts on a column mounted on the rotary table of a Horizontal Machining Centre (HMC). What many Vertical Machining Centre (VMC) users do not realise is that similar functionality is available on their machines using an Indexer Sub-System (ISS) from CHICK. Manufactured in the US, it is available in the UK and Ireland through sole agent 1st Machine Tool Accessories, Salisbury.

A CHICK MultiLOK column, often found on an HMC table, can be rotated through 90 degrees and mounted horizontally between a 4th axis indexer and a tailstock on the table of a VMC. As the machine runs unattended for longer, operator walk-away time is increased, enabling other machines tools to be attended more efficiently.



Another benefit of an ISS is that cost per part machined is lower. One reason is that a cutting cycle can be programmed that optimises the number of tool changes and MultiLOK indexings according to the type of component being machined, the production mix and whether it involves an Op 10/Op 20 strategy. Additionally, the use of a rotating column to fixture multiple parts on a VMC means there are opportunities within a cutting cycle to machine the edges of components, avoiding having to either exchange an angle head into the spindle or perform a second operation.

A four-sided MultiLOK ISS has all the benefits of CHICK's QwikLOK workholding unit, including the same snap on/snap off interface that allows hard and soft jaw sets and other accessories to be interchanged between the systems. One large part can be clamped between two jaws, but to allow more parts to be loaded at a time, more usually a pair or multiples of components are held securely in two adjacent stations. Turning a single handle advances two movable jaws simultaneously towards a fixed central jaw to clamp the parts, which also has the effect of cancelling the opposing forces and creating a reliable reference point for machining.

Find out more by telephoning 01725 512517 or emailing enquiries@1mta.com and asking for a demonstration.

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Renishaw invests in a sustainable future with new facility in Brazil

As part of its commitment to servicing its growing customer base in South America, global engineering technologies company, Renishaw, has opened a new, sustainable facility in Sao Paulo, Brazil. The new multipurpose facility, formally opened in March 2024, features an industrial metrology showroom, areas that support additive manufacturing systems, events and conferencing facilities and space for retrofitting and service activities.

The facility contains a 550 m² warehouse, a 260 m² showroom for Renishaw's industrial metrology solutions, along with more than 200 m² for retrofitting and service centre activities, plus areas to support the company's metal Additive Manufacturing (AM) systems. The facility also features areas for hosting conferences and customer events and has capacity for machine tools and robots to demonstrate Renishaw's products and its AGILITY® range of Coordinate Measuring Machines (CMMs).

As part of its commitment to meet Net Zero by 2050 at the latest, Renishaw designed and constructed the facility with sustainability in mind. Material choice and facility design resulted in a 48 percent reduction in power needed for interior lights. Combined with high efficiency air conditioning, this contributes to a 35 percent reduction of power consumption when compared to a standard building. The facility has 180 solar panels, with the capacity to generate 120,000 KWh of electricity per year, along with three vehicle charging stations



and roofs and terrace with high reflectance ratio that will reduce heat inside the building. As a result, the building will be certified to the Leadership in Energy and Environmental Design (LEED) green building rating system. BD+C NCv4 and LEED level Gold certification should be obtained once the building is fully commissioned.

"This facility illustrates our commitment to sustainability and enables Renishaw to demonstrate our extensive range of metrology, spectroscopy and additive manufacturing products to customers in South America," says Fernando Tachikawa, director at Renishaw Brazil.

"We want to ensure our customers that attend this facility have access to the best solutions for their manufacturing and productivity challenges, as well as showcase

how we can all make improvements to reduce the carbon footprint of the manufacturing industry."

At the opening event, 200 customers and partners attended presentations on industrial metrology, position encoders and Raman spectroscopy. Guests included officials from the British Consulate-General in Sao Paulo, including Jonathan Knott, His Majesty's trade commissioner for Latin America and Caribbean and British Consul general in Sao Paulo; Martin Whalley, executive country director for trade and investment in Brazil; Gabriela Meucci, industry and consumables commercial sector lead and Beatriz Ozaki, advanced engineering and automotive sector manager.

Located with easy access to public transportation and support for employees, the new building uses 60 percent less water with efficient systems and the reuse of rainwater which is stored in a 15 m³ reservoir. An automated irrigation systems using rainwater also contributes to the preservation of green areas.

For further information on how Renishaw is working in partnership with its customers, suppliers and local communities to create a sustainable future, visit:

<https://www.renishaw.com/en/sustainability--6717>

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Yamazaki Mazak honoured with fire service award

Yamazaki Mazak has been recognised for its ongoing work in the community as one of the inaugural recipients of the Hereford & Worcester Fire and Rescue Service's Chief Fire Officer's Employer Award.



The honour is given to businesses in the Worcester and Hereford areas for releasing their employees to work as on-call firefighters. Christian Leatherdale, technical support engineer at the company's Worcester-based European Manufacturing Plant, is a watch commander for the fire service and is responsible for a crew of 17.

He has worked for Hereford & Worcester Fire and Rescue Service for seven years and must live and work within five minutes of a fire station. His role as an on-call firefighter has coincided with his decade working at Mazak, having joined as an apprentice in the maintenance department before progressing to his current position. Balancing his duties has sometimes presented challenges, yet Christian Leatherdale expresses deep gratitude for Mazak's unwavering support enabling him to combine his professional commitments with his on-call firefighting duties.

He says: "If I'm on duty and my pager goes, I have to be at the fire station within five minutes. That's regardless of whether I'm at home or at work, so there's been a few meetings cut short while I've been at the office.

"The company's been very understanding and supportive though. I have a space in the visitors' car park to reduce any delay in responding which makes it easier to access when I get a call out. I'm very thankful to the business for helping me continue as an on-call firefighter and rise to crew commander and then watch commander. They're definitely worthy recipients of this award."

He was involved with the Young Fire Fighters Association now known as Fire Cadets for 13 years, progressing to instructor level before being retained as an on-call firefighter. As part of his duties, he has to attend training every Monday evening and is now highly skilled in health and safety, risk assessments, first response emergency care, alongside responding to fires and road traffic collisions.

Richard Smith, European group managing director at Yamazaki Mazak UK Ltd, says: "As one of Worcester's largest manufacturers and employers, it is important that we support the local community. We are honoured to receive the Fire Officer's Employer Award and will continue to support Christian as he performs his vital duties as a Watch Commander."

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We have recently developed a dedicated manufacturing equipment funding team. They are responsible for working with SME owners like you, to help discover the funding options we offer. If you're looking to purchase new or used machinery or would like to release the funds locked away in your existing equipment, our refinancing solution may offer the support you've been seeking.

How we have helped business owners just like you

As a manufacturer we are acutely aware of the challenges your business faces as a manufacturer. Late payments and an uncertain economic landscape continue to give business owners sleepless nights.

One of the more underrated and unknown finance solutions available to business owners who have already purchased their equipment is the option to refinance. We

help businesses to utilise the assets they already have to fund new machinery, release cash into the business or help fund a new project.

- We recently assisted a business based in the North West with the refinance of a grinding machine built in 2017 for £100,000. The funds from the refinance helped them to fund the deposit for another machine they wished to purchase, ultimately helping them to expand their order book.

- We've also financed a second hand 2019 DMG MORI machining centre, for £204,000 + VAT. It was supplied in excellent condition by Charter Auctions to a company based in the West Midlands. We were able to arrange finance to fit the auction timings and help our client acquire the vital machinery they needed.

- We have also supported a customer to help with the purchase of a new grinding machine which had a cost of circa £260k. The customer required a large deposit for the new machine and we were able to structure the deal in a way that meant the customer has been able to pay the deposit without disrupting the business's cashflow.

The machine was a vital purchase for the growth of the business, and it is already paying dividends, as it has enabled them to take on two additional new contracts. The

machine has the capability to run overnight without the need for manual support, saving them around £2.5k per month in overtime costs.

This has all been achieved as we make sure we develop excellent customer relationships. We attend meetings with you if required and we support you through the purchasing process in order to ensure you are comfortable with the terms and structure of the deal.

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Large travelling-column machining centre introduced by DMG MORI

DMG MORI has added a 4/5-axis, travelling-column machining centre with a working volume of more than 4.6 cubic metres to the upper end of its swivelling-spindle-head DMF range. It can be integrated into a user's digital infrastructure and is compatible with the manufacturer's exclusive technology cycles, such as in-cycle gear skiving or grinding, which run in either the CELOS with Siemens or HEIDENHAIN control.

Compared to the previous machine model that has been superseded, the DMF 400 | 11 is nearly one-third larger in capacity as well as being 20 percent stiffer to enable more precise, vibration-free operation. An optional partition wall creates two separate workspaces for pendulum machining, allowing setup of the next workpiece while the previous part is being produced.

Stable machining performance is largely a result of a massive cast iron bed and three cooled linear guideways in the X-axis over which the column moves. In a double ballbar test, the DMF 400 | 11 achieves an accuracy of 5 µm, making the machine ideal for producing large moulds, dies and tools, as well as precision structural parts within the machine's 4,000 x 1,100 x 1,050 mm working envelope.

The fixed table accepts components weighing

up to eight tonnes for 3- or 4-axis machining of large components. One or two flush rotary C-axis tables may be integrated for fully interpolative 5-axis machining, each capable of supporting components weighing 1,200 kg, while a torque table option is offered for demanding mill-turn applications. An add-on table as an A-axis with a load capacity of 500 kg is also available.

The ±120-degree B-axis houses an integrated, 15,000 rpm speedMASTER spindle as standard, but is available in a 20,000 rpm version, or as a 12,000 rpm powerMASTER spindle having higher torque at 288 Nm. All carry a 36-month warranty, irrespective of the hours the spindle has run. The standard tool magazine accommodates 40 HSK-A63 cutters up to 400 mm long, 540 mm for the optional HSK-A100 interface, although the number of pockets can be extended to 120.

Tool change is now carried out in an enclosed area behind the worktable, which is a special feature of the latest DMF generation. It gives the machines a high level of process reliability by eliminating the risk of collision and allowing workpieces to be placed on the table without restriction. The linear guideways are similarly located outside the work area, protecting them from abrasive materials and contributing to the

longevity of the components. A highlight of the cantilevered design of the spindle head is that the distance between the column casting and the centre of the spindle is always the same, irrespective of the position in the Y-axis, improving stiffness and machined surface quality. The constant overhang ensures consistent rigidity over the entire travel, allowing users to program maximum power at any time, regardless of the transverse position of the spindle.

As standard, the DMF 400 | 11 is supplied with ballscrew drives in Y and Z but a linear drive in X having a rapid traverse rate up to 80 m/min for elevated levels of productivity, which becomes even higher if optional linear drives are fitted to the other orthogonal axes.

Automation options also raise production output and DMG Mori has pre-installed appropriate interfaces, for example for the integration of robotic handling. All solutions for autonomous running are manufactured in-house, so the user has a single point of contact for the entire installation.

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ETG offers the right solution

It's often the impulsive decisions in life that create an impact and this was certainly the case for Chris Smedley of Malvern Engineering Ltd. When he was made redundant over 15 years ago, he walked out of his employment and 45 minutes later, he signed a contract for an industrial unit and started Malvern Engineering. This entrepreneurial spirit and level of determination have served the company well since its inception and are still imbued in the ethos of the small business to this very day. So, when his regular machine tool dealer couldn't offer the solution the business required, Chris Smedley approached the Engineering Technology Group (ETG) and bought his first 4-axis machining centre, a Quaser MV184 EV.

The journey for Malvern Engineering has seen the company manufacture everything from motorsport parts to military components and much more. The company works with prestigious manufacturers in the automotive, aerospace, food and pharmaceutical sectors to the toolmaking and extrusion die industry. Like a typical subcontract manufacturer, Malvern Engineering will take on virtually anything that is thrown its way. This is why the company that is nestled under the shadow of the beautiful Malvern Hills has invested in a 4-axis Quaser machining centre from ETG.

Recalling why the seven-employee manufacturer opted for the Quaser MV184 EV machine from ETG, managing director at Malvern Engineering, Chris Smedley says:



The spacious and easily accessible work area of the Quaser machine at Malvern Engineering.

"We are typically loyal to our suppliers, providing the quality and service is to the levels we require. However, we were on the cusp of winning a large contract that required a 4th axis machine for producing complex components and our vendor didn't have the solution we

needed. We investigated the market and found a couple of suppliers, but it was ETG and the Quaser that won our business."

Delivered in Autumn 2023, the new Quaser MV184 EV was purchased for several reasons, as Chris Smedley continues: "We looked at a couple of machines, but when we visited the ETG technical centre and demonstration facility in Wellesbourne, we were flabbergasted by the quality, service and the set up of the company. The Quaser MV184 EV offers us greater flexibility than our existing machine tools and it enables us to reduce the number of required setups on complex parts. This is subsequently improving our quality, our throughput and creating greater efficiencies throughout the business."

As a subcontract manufacturer with four 3-axis machining centres and two turning centres, the latest Quaser addition opens the door to new types of work that wouldn't have previously been possible. Regarding the benefits of the Quaser, Chris Smedley continues: "The Quaser has a much more compact footprint than our existing machines, which is invaluable to a small business where space is at a premium. Like our existing machines, the Quaser was supplied with a HEIDENHAIN CNC system which creates



The robust and sturdy Quaser has improved productivity at Malvern Engineering.



The Quaser machine being set up at Malvern Engineering.

familiarity for our team to interchange between machines. With the latest generation of control, we are finding a lot of new features that will help create even greater efficiencies as and when we gain familiarity with the system."

The MV184EV incorporates a 1,200 by 600 mm table with X, Y and Z-axis travel of 1,020 by 610 by 610 mm with a maximum table load of 500 kg, which accommodates a wide variety of parts. With 40 m/min rapids and a positional accuracy of ± 0.003 and repeatability of ± 0.002 mm, the MV184EV is a fast and robust workhorse with impressive precision that meets the high demands of Malvern Engineering. The BT40 spindle taper and 30 position ATC enable Malvern Engineering to undertake robust machining cycles of all the diverse materials it processes.

The Worcestershire manufacturer machines everything from 304 and 316 stainless steel, mild steel, aluminium, titanium and many more challenging materials in quantities that range from a one-off prototype to small production runs. Commenting on how the attributes of the compact Quaser machining centre are enhancing component quality, Chris Smedley continues: "As a new machine, the Quaser is certainly more energy efficient whilst the kinematic movements of the machine and the 4th axis are also reducing cycle times and removing non-cutting time from component production. Added to this, the speed, efficiency and robust build quality are extending our tool life, improving our surface finishes and enabling us to essentially manufacture better quality parts with more aesthetically attractive surface finishes. We also do the majority of our programming offline with One CNC and the post-processors were readily available for the Quaser, making the integration of the machine into our business completely seamless."

Describing the level of service the company has received from ETG, Chris Smedley concludes: "The machine has been a fantastic addition to our business and we haven't had to lean on the ETG team that much so far. When we have needed their support, an engineer is available to resolve our queries almost immediately and as a subcontract manufacturer that needs to get parts out of the door, that level of service will prove invaluable."

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Everything's going according to plan

Mills CNC, the exclusive distributor of DN Solutions' and Zayer machine tools in the UK and Ireland, has recently supplied Tufcot Engineering Ltd with a new, large-capacity, multi-tasking lathe.

The machine, a 24" chuck DN Solutions' Puma 700LM II equipped with driven tooling and the advanced FANUC 0iTP control with 15" touchscreen capability, is one of the largest CNC machine tools acquired by Tufcot in its 43-year history and was installed at the company's 50,000 sq. ft. facility in Sheffield in April 2024.

Tufcot's relationship with Mills CNC first began in 2005 with the purchase of its first Doosan lathe, a Puma 240LC.

Over the last 19 years more investments with Mills have followed and, in early 2024, the company, as part of a significant drive to both consolidate its supply chain position with existing customers and acquire new business from new customers, placed the order for the new Puma 700LM II as well as for a new 21" chuck Puma 4100MC lathe, which is due to be installed in August 2024.

These latest investments will take the number of CNC lathes Tufcot has acquired from Mills CNC to 11 in total. "We have a good relationship with Mills CNC and DN Solutions, previously Doosan, lathes are our preferred

turning technology choice", says Tufcot's managing director, Greg Majchrzak.

"The high-performance lathes Mills sells and supports are real workhorses. They are reliable and deliver the fast processing speeds and high accuracies we need to meet our customers' quality requirements and stringent lead time demands."

Since being installed, the new Puma 700LM II has been and is being used to machine, in relatively small batches, a range of high-precision, large diameter Tufcot® composite bushes and bearings for customers primarily, but not exclusively, in the UK and European marine sectors.

These parts, machined to tight tied-up tolerances, often have long cycle times, hours as opposed to minutes and a range of intricate milled features.

The marine sector is important to Tufcot's future growth ambitions and the company has invested significant resources over the years into developing application-specific Tufcot composite grades for a growing number of domestic and international customers operating in the sector.

For example, the company's specially-formulated Tufcot T100 Marine grade for pintle and pintle rudder bearings, with its

high-strength-to-weight ratio, low friction and self-lubricating properties, is now type-approved by an increasing number of global marine classification and certification organisations and associations.

Lead body recognition and endorsement of Tufcot composites is a real gamechanger and is helping the company grow its marine business.

Justin Krebs, Tufcot's operations manager says: "Our own knowledge of composites and their application in the marine sector combined with expert insight from our international distributor network and from existing customers, helped highlight significant new business opportunities that we could exploit if we had larger and more sophisticated in-house turning capabilities."

Tufcot always had the capacity to machine large parts on its existing lathes, but the processes involved were more labour intensive and required more work handling. This had a knock-on and detrimental effect on the cost-per-part and lead time fulfilment. The investment in a large multi-tasking lathe, it was anticipated, would address these issues making large component machining a more viable and profitable exercise.

Justin Krebs continues: "Owing to the increased demand for Tufcot composites from



new and existing marine customers, it made perfect sense to strengthen our turning operation by investing, in the first instance, in a new large-capacity, high-specification lathe to machine these larger parts.

"As a consequence, we approached a number of machine tool suppliers with our plans and asked them to recommend their preferred machine tool solution and to provide costs. We crunched the numbers and, ultimately, made the decision to invest in a new machine."

Having gone through what was a comprehensive and detailed decision-making process, Tufcot ultimately opted to go for the Puma 700LM II from Mills CNC.

The Puma 700LM II is a rigidly designed and built, large-capacity lathe with a 900 mm maximum turning diameter and a 3,200 mm maximum turning length. It is equipped with a powerful, high-torque 55 kW/1,500 rpm main spindle, a 12-station BMT 85P turret with 11 kW/3,000 rpm driven tooling capabilities that enables milling/drilling operations to be completed in a single setup and a programmable, dead centre tailstock for the fast and reliable processing of longer, tube, rod and shaft-type, parts.

To improve in-process efficiencies, the Puma 700LM II supplied to Tufcot also featured an



automatic tool setter and a heavy-duty swarf conveyor.

Greg Majchrzak says: "The Puma 700LM II can handle large and small parts and the driven tooling capability enables complex, high-precision features to be machined in a single setup."

Delivering fast part cycle times and eliminating the need to transfer components between machines has helped improve productivity and process efficiencies and has enabled Tufcot to win new machining contracts for larger components from new and existing marine customers that, prior to the Puma 700LM II investment, would have been out of its reach.

Greg Majchrzak adds: "To protect the new business won on the back of the Puma 700LM II acquisition, we also made the decision, at the

same time, to duplicate the investment by ordering a new, similarly specified 21" chuck Puma 4100MC lathe.

Tufcot is an innovative company committed to continuous improvement and regularly invests in its people, in its plant and equipment and in its processes and systems.

Justin Krebs explains: "We regularly monitor and benchmark our performance, quality, lead time fulfilment, profitability, against KPIs to help identify potential production capacity issues and bottlenecks before they become a problem."

In addition to investing in the two new lathes from Mills CNC, the company has also recently acquired two, new state-of-the-art CNC routers in 2022 and, in a major development completed at the tail end of 2023, increased the size of its facility with the purchase of additional premises adjacent to its current site. The extra space will enable the company to reconfigure its manufacturing, machining and assembly, stock holding and dispatch operations to meet the anticipated and continuing high demand for its products and services.

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Smaller F-series horizontal machining centre

Following the launch by Heller of the F 6000 travelling-column, 5-axis, Horizontal-Spindle Machining Centre (HMC) at the EMO trade show in Hannover last September, the German manufacturer has introduced another new model, the F 5000, with a smaller working volume of



800 x 850 x 1,100 mm. As with the larger machine, which has 1,000 x 1,000 x 1,400 mm axis travels, it is offered with many different types of in-house developed, integrated motor spindles.

A speed cutting unit in combination with the HSK-A 100 tool shank, HSK-A 63 optional, reaches speeds of 15,000 rpm. As an alternative, a dynamic cutting unit is designed for universal use at up to 400 Nm and 12,000 rpm. For heavy-duty machining, a power cutting unit with a gear spindle and 1,146 Nm is available.

The redesigned spindle head is of compact design and high rigidity thanks to the robust, 45-degree, backlash-free kinematics and short distance between the bearing and tool shank. Swivel range is 350 degrees for highly flexible five-sided machining. Either a chain-type magazine for up to 150 cutters or a rack-type magazine with 425 positions for HSK-A 100 tools, 489 for HSK-A 63, may be specified by the customer.

With a cast iron structure, modular design and narrow width at 3.7 m, the high-performance machining centre can be configured to suit a variety of small to medium batch size production applications, ranging from general mechanical engineering through powertrain component machining to aerospace. The production platform is just as efficient for the manufacture of single parts as it is for series runs. Highlights include linear encoders in the orthogonal axes, steep covers for efficient chip evacuation via a wide central chip conveyor to the rear of the machine, and compatibility with Heller H and FP series HMCs.

As with the F 6000, the F 5000's capabilities can be expanded to include technologies such as turning at up to 700 rpm, interpolation turning, gear cutting, grinding, power skiving and even friction stir welding. Another key element of the machine is the revised linear axis drive system, with twin ballscrews in the Z-axis and a reinforced X-axis, offering significantly increased dynamics. Comprehensive cooling circuits throughout ensure thermal stability. A fork-type, lift-swivel pallet changer is included as standard for first-level automation.

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Email: sales.uk@heller.biz www.heller.biz/en

Farnborough International Airshow returns

2024 event to demonstrate the future of the industry and represent the apex of aviation

The Farnborough International Airshow 2024 will take place from 22nd-26th June. Global aerospace and defence leaders will return to the trailblazing event in Hampshire for five days of unrivalled opportunities to discover the latest pioneering technology and engineering, announce historic partnerships and collaboratively work towards the cumulative sustainable aerospace vision.

Following the resounding success of the 2022 event, which welcomed more than 74,000 professionals from 102 countries, including more than 250 official government and civil delegations and racked up billions in global media reach, this year's airshow will demonstrate the future of the industry and represent the apex of aviation.

Global leaders, including Airbus, Boeing, Rolls-Royce, RTX, GKN and GE Aviation, will be exhibiting their latest aircraft, innovations and technology at the event.

Gareth Rogers, CEO of Farnborough International, says: "The Farnborough International Airshow is more than a five-day, biennial event, it's a change agent, powering excellence and innovation across the global aerospace and defence industries.

"The interest from global businesses to exhibit and attend the airshow has been phenomenal and reflects the incredible demand there is from leaders to showcase their technology at our imitable platform and revolutionise the next era of the industry. I look forward to welcoming the world's biggest, best and brightest to Farnborough in July this year."

The 2024 event will see the return of the award-winning Aerospace Global Forum (AGF), the global platform that aims to champion change and drive immediate action, accelerating transition to the net-zero economy. AGF will host high-level keynote sessions from leaders across the aerospace ecosystem dedicated to sustainability and defence. In addition, thought leadership, provoking talks, panel discussions and insight sharing will take place across the show floor at the Space and FINN Theatres, as well as the

Global Urban Advanced Air Summit (GUAAS) taking place on Thursday.

Features of the five-day airshow will include the Space Zone showcasing the newest technology and launch operators in the market, Business Connections Exchange programme matching buyers and investors with vetted suppliers and the networking Business Lounge sponsored by Lockheed Martin.

The event will focus on six key themes, each offering a unique message that is pivotal to the aerospace industry today.

Space

The Space Zone, hosted in one of the site's state-of-the-art sound stages, always proves to be one of the most popular and successful parts of the show. Featuring exhibitors from a wide range of space-driven companies and space agencies from around the globe, the variety of ideas being shared and showcased is immense.



Defence

The Farnborough International Airshow continues to play a vital role in bringing defence companies together with the strategic decision-makers behind military delegations at the show. The latest technological advancements will be on display in the exhibition halls as well as outside in the flying and static displays.

Sustainability

Sustainability and the path to Net Zero continues to be a huge driving force at Farnborough, enabling world leaders and industry pioneers to come together and

collaborate on the future of aviation. Visitors to the exhibition will be able to attend thought-leading sessions dedicated to accelerating discussion on sustainability and focusing on the importance of collaboration across global sectors.

Innovation

As the industry continually looks to enhance modern life with technological advancements and radical new approaches, FIA2024 acts as a platform for the latest and greatest innovations that are pioneering the future of aerospace.

Future flight

The Farnborough International Airshow provides a global platform to showcase the companies redefining and revolutionising the aerospace sector from those pioneers making advanced air mobility a reality, to the vital technological advancements being made in R&D and manufacturing.

Workforce

The workforce theme is an important discussion point throughout the 5 days at FIA 2024 but truly takes centre stage on the last day when attention turns to our Pioneers of Tomorrow event. Aimed at students and young professionals interested in a career in the sector, this event was created to inspire future generations and enable companies to highlight the opportunities they have on offer.



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FANUC to present the future of aerospace manufacturing

Factory automation specialist FANUC UK will showcase a suite of next-generation automation solutions at the Farnborough International Airshow in July to enable higher rate aircraft and aerospace manufacturing. Spanning the entire supply chain, including solutions for the burgeoning eVTOL sector, visitors to stand 4900 can witness the future of aerospace manufacturing first-hand. FANUC's automation demonstrations, in conjunction with its industry leading partners, will cover a variety of key applications essential for the aerospace sector such as dispensing, polishing, inspection, machining and drilling, helping manufacturers to meet increasing order levels by boosting productivity.

Futureproofing to increase output rates

The aerospace industry is booming. Commercial revenues are expected to grow 14 percent year-on-year over the next 10 years, while passenger traffic will grow by 3.6 percent annually up to 2044. Around 22,120 new aircraft will be delivered between 2024 and 2033. This equates to nearly 200 a month, every month, for the next 10 years.

"While this is great news for the industry, it means that manufacturers will need to find ways to increase production rates," says Oliver Selby, head of sales at FANUC UK. "Operations have to be more streamlined and cycle times must be cut, all while maintaining the highest standards of quality and safety."

Flexible future of the factory floor

Flexibility in manufacturing will be another key element in the industry's successful growth. To

this end, the FANUC stand will feature the University of Nottingham's world-class OMNIFACTORY project. A five-year, £3.8 million facility that employs advanced technology and methodology to make manufacturing more efficient and cost-effective, OMNIFACTORY is a bespoke test-bed floor which autonomously adapts to the next product's environment and specifications. The demonstrations around the project's AGV show a combination of digital technologies, robotics and artificial intelligence including robotic surface preparation and dispensing. The aim of this proof-of-concept project is to inspire a new generation of smart, highly efficient factories, embedded in local supply chains.

The power of partnerships

A variety of automated systems from some of FANUC's key partners, each employing FANUC robots at the heart of their technology, will also be on display at the event. One such example is an advanced metrology solution from Hexagon. Showing how data can be used throughout the product lifecycle to accelerate aerospace innovation and efficient manufacturing, Hexagon's Presto Robotic Metrology system dramatically cuts the time required to devise inspection routines, by reducing them to a single step. Built on leading scanning technology, this flexible, modular cell has been designed to effectively meet the evolving needs of modern manufacturing.

Meanwhile, an aerospace drilling cell developed by Electroimpact and featuring a FANUC CRX-25iA cobot, will demonstrate accessible and cost-effective pre-validated drilling functionality for the aerospace sector,



An aerospace drilling cell developed by Electroimpact and featuring a FANUC CRX-25iA cobot, will demonstrate accessible and cost-effective pre-validated drilling functionality for the aerospace sector.

offering improved reliability, repeatability and traceability compared to manual practices.

The growth of eVTOL

Finally, with the eVTOL sector being a key focus at this year's event, FANUC will also showcase its ROBODRILL vertical machining centre, featuring a Nikken 5AX-201 tilting rotary table. This combined machining and turning cell enables difficult to hold components to be rapidly mounted and changed, even where space is limited.



FANUC will also showcase its ROBODRILL vertical machining centre, featuring a Nikken 5AX-201 tilting rotary table.

"With a compact footprint, this is a perfect, cost-effective solution for small castings, using aerospace grade alloys, for products like eVTOL motor housings," Oliver Selby explains.

To learn more about the future of aerospace manufacturing, visit FANUC on **Stand 4900** at the Farnborough International Airshow.

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Factory automation specialist FANUC UK will showcase a suite of next-generation automation solutions at the Farnborough International Airshow to enable higher rate aircraft and aerospace manufacturing.

Heller to exhibit at Farnborough International Airshow

The UK subsidiary of German Horizontal Machining Centre (HMC) manufacturer, Gebr. Heller Maschinenfabrik GmbH, will be exhibiting at the Farnborough International Airshow as part of the Midlands Aerospace Alliance stand in **Hall 1**. Redditch-based Heller Machine Tools Ltd, which manufactures selected HMC models at its UK site for global markets, is celebrating its 50th anniversary this year.



At the lower capacity end of the Heller HMC range, the 5-axis F 6000 with its 1,000 x 1,000 x 1,400 mm working volume will be promoted graphically at Farnborough International Airshow 2024, as will the F 5000 with axis travels of 800 x 850 x 1,100 mm.

There will be much for the company to promote to the aerospace sector, not least its new F 5000 and F 6000 5-axis production centres, although the machines will not be on the stand. Both have a redesigned spindle head that can be equipped with various in-house manufactured spindles to suit machining of anything from aluminium to titanium and nickel superalloys. A pallet changer is included as standard for first-level automation, enabling easy integration later of a linear or rotary pallet pool.

To be featured also is HELLER Services Interface, which provides an intuitive operating concept to ensure transparency in manufacturing, maintenance and service processes throughout the entire lifecycle of the machine. Forming part of the manufacturer's 360-degree solutions offering, the option can help to reduce machine downtime by providing evaluations and statistics.

Visualisation of specific machine status information, including status indicators for axes, spindles or other assemblies, enables users to determine the wear condition of each and take preventive action to reduce unscheduled downtime.



Featured also will be HELLER Services Interface, which provides an intuitive operating concept to ensure transparency in production, maintenance and servicing.

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Securing the future at this year's Farnborough International Airshow



Join Dassault Systèmes at Farnborough to discover how new technology is facilitating an exciting future for the world's aerospace and defence companies.

Every two years, the key players in the aerospace, aviation and defence industries descend on a small town in the south of England to pioneer change. At this year's event, Dassault Systèmes will be there to showcase solutions and promote discussion across the aerospace and defence ecosystem.

It will be announcing some new and exciting developments at the show, including how it is building Artificial Intelligence (AI) into its solutions to deliver innovation at scale. It will also be hosting roundtable discussions with customers which include some of the biggest names in the aerospace and defence industry as well as their customers and suppliers, to promote collaboration across the entire value chain.

Its theme for this year is 'securing the future'. It has chosen this because it represents the paradigm shift facing today's aerospace and defence stakeholders. Not only is there a pressing need to ramp up high quality production, but there's also huge pressure to meet ambitious net zero targets so that we can transition to a carbon-free world. Commercial aviation companies and defence Original Equipment Manufacturers (OEMs) can only succeed in securing their future by addressing these challenges.

On each day of the event, it will be leading conversations on five different themes, all of which have a role in securing the future:

- Day 1: Enabling sovereignty
- Day 2: Defence modernisation
- Day 3: Uncompromising quality
- Day 4: Sustainable innovation
- Day 5: Workforce of the future

"This year's Farnborough International Airshow is going to be an action packed five days," says David Ziegler, Dassault Systèmes' vice president of aerospace and defense. "In addition to the sessions we will be running, we will also be making a lot of exciting announcements that demonstrate the acceleration of digitisation and innovation coming from our customers. It will be an incredibly exciting week and we look forward to taking the opportunity to meet up with our customers and prospects while we are there."

Dassault Systemes UK Ltd Tel: 024 76 85 7400 www.3ds.com

WFL machines manufacture key components for aerospace

WFL multifunction turning and milling centres are employed across various industries, with aerospace being a significant market. ArianeGroup, at the forefront of space transportation, stands as a prime example of utilising MILLTURN machines. The production of key components necessitates the use of reliable and precise machinery.

The ArianeGroup site in Vernon, France, designs, develops, manufactures and tests liquid hydrogen propulsion systems. Much of its activity revolves around propulsion for launch vehicles. The site encompasses three test benches for cryotechnic thrusters and component testing benches. In total, six WFL machines are present on the site: four M60 MILLTURN and two M35 MILLTURN, all utilised for machining key components.

MILLTURN technology at the heart of key component production

"Machines from WFL are particularly crucial for us as we use them to manufacture high-value parts," states Dominique Delor, head of industrial maintenance. The first M60 MILLTURN was acquired 20 years ago. Since then, three M60s and two M35s have been added to the production hall. Key components or "critical parts" produced on WFL machines are primarily rotating engine parts.

"We primarily require precision and good rigidity in our machines because we machine hard materials that will undergo significant stress during use. Furthermore, process



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Millturn machines in Vernon produce a large number of components for complex engines.

standardisation is part of ArianeGroup's business strategy." In production, this entails working with the same machines and the same numerical control. For Dominique Delor, this is undeniable: "It saves us time and allows all our operators to work on these machines.

"Our satisfaction has increased as we gained experience with these machines. We have realised that they are good, sturdy and reliable machines. Therefore, if we were to need a new machine, we would undoubtedly opt for a MILLTURN. Our colleagues in Ottobrunn, Germany, are also convinced by the MILLTURN. After visiting our production site in Vernon and

the subsequent purchase of an M80, they were able to significantly reduce their production time," adds Dominique Delor.

Understanding customer needs and building trust

The Vernon site has been working with WFL machines for 20 years. Dominique Delor asserts:



The Vinci engine represents the latest generation of engines. It was developed by ArianeGroup in collaboration with its European partners as part of an ESA program.



Copyright: ArianeGroup Holding/Master Image Programmes/Thomas Leaud

ArianeGroup - Vernon has been using WFL Millturn machines for 20 years. The high precision and rigidity of the machines, as well as customer service, are particularly appreciated.

"For 20 years, we have maintained excellent relationships with WFL. Whether your interlocutor is from sales or customer service, competence and trust are 100 percent. WFL understands the customer's needs. For us, in a new project, it is always important to have assurance of a functioning production and that's the case with WFL. Its service doesn't stop at simply selling a machine. Implementation is also impeccable. By purchasing a WFL machine, we know everything will go smoothly.

"Another reason we are very satisfied with WFL machines is the efficiency of their after-sales service. Our M60 machines are used in three shifts. We produce complex parts and always have to ensure quality and adherence to delivery deadlines. WFL's after-sales service is extremely competent and fast. When we need spare parts, we receive them promptly and everything works perfectly," explains Dominique Delor.



During production, there must be no scrap. Every part must be precise. WFL machines help guarantee quality because one of its major assets is its ability to respect tolerances.

Maintaining performance constantly

ArianeGroup produces a considerable number of parts each year, maintaining a constant and significant activity on the machines. Any rejects are therefore excluded, each piece must be perfect and meet very precise specifications. "Quality is an absolute priority in our workshops," Dominique Delor emphasises.

He continues: "With WFL, we can guarantee this quality. Indeed, one of the great advantages of these machines is adherence to tolerances. Currently, we manually control tolerances, but in the future, we would like to implement automated control. This should contribute, on one hand, to reducing production time and on the other hand, to cost savings. We want to utilise machine data and information to plan production in advance through predictive maintenance."

Growing demand requires perfect mastery of production

Due to the constantly increasing demand, the technical requirements imposed on launch vehicles are also rising. Dominique Delor sees the improvement and digitisation of production as a decisive project for the years to come. He concludes: "I am convinced that with WFL, we will also be able to upgrade our production in terms of monitoring and predictive maintenance."

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Aerospace turned parts subcontractor raises production efficiency with technology from Citizen

Founded in 1965, subcontract machining firm Apel specialises in the manufacture of precision components for the aerospace industry. The company began investing in Citizen CNC turning centres in the 1980s to help raise efficiency and over time has continued to re-invest in modern, highly productive lathes purchased exclusively from Citizen Machinery UK.

Today at its Wilmslow facility, Apel operates nine Cincom sliding-head lathes and one Miyano fixed head model. Together they produce around 50,000 components per month across more than 3,000 part numbers. Utilisation of these Citizen CNC lathes and related technologies has led to much increased levels of productivity and profitability.

The technology that has contributed most to raising efficiency of production at Apel is Citizen's proprietary Low Frequency Vibration (LFV) chip breaking software, which is part of the operating system in the control of three of the six 20 mm capacity Cincom L20s on site. When activated, the function breaks what would otherwise be long, stringy swarf into short, manageable chips. Around 50 percent of material processed by Apel is aerospace grade stainless steel bar and LFV is especially effective when processing this alloy.

Paul Bowker, Apel's quality director says:



"We were an early adopter of LFV in 2018 following a visit to Citizen Machinery's technical centre in Bushey to witness demonstrations.

"The function reduces metal removal rate slightly, so we don't use it all the time, but it's really useful to be able to pick and choose when to program the function to start and stop.

"We switch it on mainly when turning stainless steel components on the

Apel's quality director Paul Bowker with the latest Citizen Cincom L20VIII LFV sliding-head lathe to be installed at the subcontractor's Wilmslow facility. Here the machine is producing a run of 50,000 aluminium distance tubes.



A view of Apel's shop floor, showing the Citizen Cincom lathes and the Miyano in the foreground.



LFV-equipped machines, especially when processing parts shorter than one inch, 25.4 mm. It is normally chip breaking the metal for up to half of a typical cutting cycle."

He further explains that the decision to use LFV is also based on the surface finish required on components. Some customers' drawings stipulate a very high surface tolerance and

machining with the LFV function switched on allows this to be achieved by turning alone, avoiding the need to centreless grind parts afterwards, thereby reducing unit manufacturing cost and raising profitability. Dimensional and surface finish tolerances on many component drawings can be met and maintained when using this facility.

Apel also uses Citizen Machinery's Adaptive Guide Bush (AGB) system, which automatically compensates for variation in bar diameter, preventing stock seizing in the bush. It also constantly maintains concentricity to prevent run-out. Downtime is avoided and tight machining tolerances are maintained. The system is used not only on the 20 mm capacity sliding-head lathes but also on three 32 mm capacity Cincom models on the shop floor.

The aerospace sector is very busy presently and Apel is well placed to win work due to the quality management system it operates, competitive pricing and the many industry and customer approvals it holds. Exports account for 20 percent of turnover, with India and Saudi Arabia being major overseas markets.

The AGB systems ensure reliability during unattended operation by compensating for bar diameter inconsistency and preventing stoppages. Additionally, the LFV machines do



The Miyano BNE-51MSY fixed-head lathe is seen here producing stainless steel aerospace components.

not have swarf clogging the working area when processing stainless steel. It contributes further to reliability and eliminates the need for an operator to be in attendance to untangle ribbons from the components and tooling.

Paul Bowker concludes: "Our nine Cincoms, as well as the Miyano for turn-milling larger components up to 50 mm diameter, support all

of our production and will continue to do so as we increase our volume of work in the expanding global aerospace industry."

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Bumotec solves medical production puzzle for Dawnlough Precision

Dawnlough Precision is a subcontract manufacturing business that has travelled a relentless journey of growth since it started manufacturing tooling for the aerospace and medical industries back at the start of the millennium. The ascension to success has arrived through an aggressive growth strategy and investment in high-end machine tools. Part of this high-level investment journey has included the arrival of two Bumotec 191neo turn/mill centres from Starrag.

Initially founded in 1987, the turn of the millennium has seen the Galway manufacturer gain accreditation to ISO: 9001, ISO: 13485 and AS: 9100D, establish a design department and increase its manufacturing facility to 50,000 sq/ft. Underpinning this growth is the adoption of advanced production tools such as FMEA, PPAP and SPC.

To maintain its growth trajectory, Dawnlough has invested in the most flexible, capable and productive machine tools and this is why it has recently taken delivery of two Bumotec 191neo machines. The world-class production facility on the West Ireland coast has more than 54 CNC machine tools that provide premium manufacturing solutions. Recently acquired by the Acrotec Group, the 110-employee business is still run by longstanding managing director and previous owner Brian McKeon.

Looking at the path the business is taking, Keith Kennedy, aerospace production manager at Dawnlough says: "We manufacture high precision components for the aerospace and robotic assisted surgical industries as well as tooling and production aids for the medical device sector. When I started in 2006, tooling was the main business focus, but as the aerospace and medical device industries have expanded locally this presented many opportunities. Our aerospace work started with seating components for Rockwell Collins, which led us to 5-axis machining. We then progressed to flight-critical components for the likes of Spirit Aero Systems and Pratt & Whitney. Similarly, we progressed from manufacturing medical tooling and instruments to producing complete assemblies."

Discussing the expansion in the medical industry, Keith Kennedy continues: "Our core business has predominantly focused on Vascular work and from this, we have expanded our offering. We now produce an array of components for our RAS Customers as well as consumable instruments."

The first Bumotec on the Emerald Isle

It is here that the search for a suitable machine led Dawnlough to purchase a Bumotec 191neo FTL-R in June 2022. Discussing the acquisition,

Keith Kennedy recalls: "We had several components we initially targeted for this type of machine. We needed a machine with very high levels of accuracy, short cycle times and incredible efficiency because it's a very competitive market. We visited many companies reviewing high-accuracy machines, but it's only as you look closer and purchase one of these machines for this type of work - you really see the 'value-add' they bring. We were looking for repeatability, flexibility, high spindle speeds, the ability to machine hard material and 2-3 µm precision on production runs. We had very specific requirements and we were not sure if it was going to be achievable."

"Some of our initial trial parts were 46HRC and we are using tools from 0.1 to 0.5mm. We needed repeatability of 2 to 3 µm, but we needed to hold that overnight. Some of the functions of the Bumotec machine such as the software for monitoring the machine, the cutting load, the contact cutting time and the large 90 tool ATC in the machine are incredible."

Keith Kennedy continues: "It was a huge investment and an unknown risk, but the Bumotec ticked all of our boxes. The big thing about Bumotec was the flexibility. It offered everything we wanted. It's an exceptional machine with accuracy that takes our business to a different level."

The two Bumotec 191neo machines in the new machining facility at Dawnlough.



Following the success of the Bumotec 191neo with FTL-R configuration, the Galway company then added a second Bumotec 191neo in March 2023. Supplied with an FTL-PRM configuration, the second Bumotec 191neo was introduced with complete automation and a 20-position pallet station for lights-out production. As Keith Kennedy explains: "What they offered us with the second machine was a complete turnkey solution for our instrumentation components. We had given them a target for extreme levels of precision and production volume with the flexibility to produce families of parts."

"We needed to machine materials from 46 to 52HRC such as 17-4 and 420 stainless steel as well as titanium. The instrument parts for use in invasive robotic surgery include tools like grippers, cutting instruments and scissors. We are producing the parts in medium to high volume runs across two different parts in various quantities per month."

Some of the parts had very long cycle times on the 5-axis machines and this needed to be reduced to below 30 minutes with 48HRC material. Not only was the cycle time a challenge, but Dawnlough had to attain precision levels in a production environment with the flexibility to produce upwards of 30 different components. Initially machining 20 to



50 parts a month, the schedule was set to rise rapidly to 200 parts per month before reaching production volumes, numbers not possible on a 5-axis machining centre.

Keith Kennedy adds: "With the second machine, we knew exactly what Bumotec could offer, so we worked with them remotely. What Bumotec offer is exceptional and way beyond anything we had anticipated. With the original Bumotec 191neo FTL-R, we had the sub-spindle, but with the next set of parts we needed the

Bumotec 191neo FTL-PRM. With this machine, we had the option of the vice, a 3 m barfeed and also a robot loader. We needed the robot loader for traceability. It also expanded the capacity of the machine where we could go from 50 mm barfed stock to 80 mm billet loading."

Looking to the future, Dawnlough has plans for more Bumotec machines and continued expansion, which will certainly continue with the ambition of the Acrotec Group. The company is well positioned to serve its customers, but machine tool suppliers have not always served Dawnlough with a level of customer support that a leading manufacturer would expect. Referring to the service and support from Bumotec, Keith Kennedy concludes: "The service is exceptional. There is absolutely no comparison to some of our other machine suppliers. Starrag is a brand with a limited footprint in Ireland and I believe our Bumotec was their first machine in Ireland. Despite other brands having a larger footprint in the area, the Bumotec support is second to none."

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Subcontractor grows by investing in Hurco machines

Factory 33 was established in 2016 in a factory unit in Carterton, Oxfordshire, as a subcontract manufacturer of medium to large batches of components to fine tolerances in short lead-times. It is maintained to exceptional standards of cleanliness commensurate with the expectations of customers in the food, scientific, medical, motorsport and other discerning industries.

An extensive variety of materials is processed from aluminium, brass and copper to stainless steel, titanium, Inconel and a variety of different plastics, principally on machining centres and a CNC lathe from Hurco Europe, High Wycombe.

When they started Factory 33, owners Martin Krzywina and Karina Ringer-Krzywina, both time-served engineers, had more than 10 years' experience in the design and manufacture of precision engineered components for numerous sectors including Formula 1, cryogenics, aerospace, nuclear and medical. They invested initially in a Hurco VMX30Ti 3-axis vertical machining centre with a 4th axis rotary table and a Hurco TM8i lathe, since which time additional 3- and 5-axis VMCs have been bought.



The most recent purchase is a Hurco VMX30UDi 5-axis machining centre supplied with linear scales and through-spindle coolant as standard, as well as a 40-station magazine with swing-arm toolchanger. The direct-drive SK40, 15,000 rpm spindle can deliver 15 kW of power and travels are 763 mm x 508 mm x 520 mm. Control is by the proprietary WinMax 5 twin-screen CNC system.

Managing director Martin Krzywina is impressed by the coolant delivery system, which he says is one of the best he has ever worked with, particularly as there is no loss in pressure irrespective of the coolant level in the tank. He also singles out for praise the direct-drive spindle on the 5-axis machine, which produces surface finishes that he describes as "impeccable".



He is also a fan of the 'interrupt-cycle' button, with which he can pause any job mid-cycle and change inserts on a mill or check tools. He is then able re-start the program exactly where it was stopped. This can be done at any time while the program is running and works equally well for NC and conversational programs.

The sustained growth of Factory 33 has allowed extra services to be added that are tailored to customers' needs, underpinned by continued investment in high quality machine tools from Hurco.

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Nigel Atherton provides the inside track on 40 years of XYZ Machine Tools

Nigel Atherton, the managing director of XYZ Machine Tools, recently took time to reflect on 40 years of trading since he founded the business in 1984. His thoughts touch on what has changed, how the company has grown and what the future holds for the UK's largest supplier of CNC machine tools.



Nigel Atherton was just 22 when he launched XYZ. Like many things in life, it was little more than circumstance that prompted the ambitious young engineer to embark on a career of entrepreneurship.

"I served an apprenticeship building machine tools, the latter years of which focused on demonstrating CNC systems," he explains. "Remarkably, the company I worked for in Yorkshire was unconvinced about the future of CNC. Unhappy with this stance I left to work for a company in Nottingham. However, it was tough times economically and unfortunately the business closed. Then a friend offered me a job in Devon so, at a loose end, I headed southwest keen on

the idea of living in Torquay as a 22-year-old."

The move proved a useful stop-gap while he considered his options, a thought process that led him to start his own business, initially focusing on the rebuild and refurbishment of Bridgeport turret mills. Originally called XYZ Systems and Service, the company started out in a 500ft² unit in Newton Abbot. The venture proved fruitful, with XYZ soon diversifying into importing new machines. XYZ's first two King Rich machines arrived from Taiwan in 1986.

"I couldn't afford the flight to Taiwan, so I bought two machines blind," he explains. "But there was no need to worry as I discovered the machines were absolutely fantastic upon their arrival in the UK. Today we take approximately 70 percent of King Rich's build."

A major step-change in the growth trajectory of XYZ arrived in the early 1990s when Nigel Atherton became interested in the ProtoTRAK[®] control. He invited a representative over from Southwestern Industries, the US-based manufacturer of ProtoTRAK, who duly provided a demonstration. Within 10 minutes, the potential of this

innovative system was plain to see, particularly regarding the simplicity of programming. Nigel Atherton then ordered 12 ProtoTRAK controls on the spot.

ProtoTRAK offered the potential to make a monumental change in the machining of small batches and 1-off components. XYZ paired the control with a machine and, once word got out, the company sold 406 ProtoTRAK-controlled machines in just 18 months. Indeed, as a result of ProtoTRAK, XYZ's sales would grow from £3 million to £15 million over the next five years.

The time to expand the company's machine portfolio arrived in 1996. Until then, XYZ had only offered ProtoTRAK controlled CNC machines but, with a £30,000 Vertical Machining Centre (VMC) from a rival supplier appearing on the market, he headed to Taiwan to source a machining centre of his own. This allowed the company to provide the right machining solution to users, be it bed mill or VMC and, as a result, the business continued to soar. This growth meant that just two years later the company moved to its current location in Burlescombe near Tiverton.





“Since then, our range has continued to expand based on what customers tell us they need, whether it’s larger machines, 5-axis VMCs, twin-spindle lathes or whatever,” says Nigel Atherton. “Customer feedback drives our ongoing evolution.”

Such is XYZ’s success that the company now supports its Devon headquarters and production facility with a number of satellite showrooms around the UK. The first was Nuneaton in the Midlands, with Livingston, Huddersfield, London and Sheffield, in

partnership with cutting tool manufacturer CERATIZIT subsequently coming on board. The company also has distributors in over 20 European countries, as well as the Middle East and South Africa.

After 40 years of such a rollercoaster adventure, which included selling and buying back the business from Southwestern Industries, XYZ is today unrecognisable from the company Nigel Atherton started with just £3,000 of capital back in 1984.

“Our success is as much a surprise to me as

anyone else,” he states. “Back then, I could never imagine in 40 years’ time that I would be sat at the helm of the UK’s largest CNC machine tool supplier with 90 employees and a 100,000ft² manufacturing facility.”

The underlying reasons for XYZ’s leading market position are numerous, but Nigel Atherton has his own thoughts on the matter: “Always treat people; customers, suppliers, employees, the way you would like to be treated. With that policy you won’t go far wrong.”

Despite recent challenges such as Brexit, soaring energy prices, global supply chain fragility and labour shortages, Nigel Atherton always manages to take hold of the situation and move forward in a positive way. This is unlikely to change in the years ahead.

He concludes: “The future for XYZ Machine Tools is more evolution, without doubt. “As for me, at 62 years of age, I’ve no intention of retiring. You can expect to find me here for a number of years yet.”

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Dugard introduce new MYLAS turning centres

Last month, Dugard Machine Tools announced that it is now the UK sales partner for MYLAS machine tools. As one of the UK’s premier machine tool suppliers, Dugard is delighted to introduce the first range of machines available from MYLAS: the DT Series of twin-spindle twin-turret multi-tasking turning centres.

With a company strapline of ‘Turning Precision into Perfection’, it is easy to understand how MYLAS machine tools epitomise this with the DT Series of high-end turn/mill centres that are perfect for one-hit machining of everything from the simplest to complex of components. With three machines in the series, the DT42, DT52 and DT65 that all signify the main spindle bar capacity of 42, 52 and 65 mm, the MYLAS DT Series demonstrates remarkable stability throughout with a stress-relieved Meehanite casting that dampens vibration. Complementing this are oversized precision ground boxways on all axes and a heavy-duty spindle that generates remarkable surface finishes and lightning-fast linear axis movements.

Built upon this foundation block of stability and rigidity is a machine series that offers power

and versatility with twin spindles and twin turrets with impressive back machining credentials. At the front spindle is a BMT45 12-station turret that can accommodate up to 24 tools. The main spindle generates 7.5/11 kW of power and the bi-directional driven tool turret with FANUC Alpha motors can achieve driven tooling speeds up to 6,000 rpm with 20 bar high-pressure coolant and higher pressures to 100 bar as an option.

For back-working, the DT Series has a VDI 25 8-station sub-turret and a sub-spindle that can undertake super-imposed machining to obliterate excessive cycle times for the most productive of machine shops. Furthermore, the sub-turret has a host of options that include a power turret, servo turret or hydraulic turret, emphasising the variety of options available with this class-leading brand. The sub-spindle generates 3.7/5.5 kW of power with a 32 mm diameter through bore. With a total capacity of up to 32 tools, this multi-tasking centre is an



advanced machine designed for the precision machining of complex parts in a single setup.

From a specification perspective, the DT42, DT 52 and DT65 have a swing over the saddle of 260 mm with a maximum bar turning length of 135 and 150 mm on the main spindle with 60 mm on the sub-spindle that provides a maximum turning length of 350 mm.

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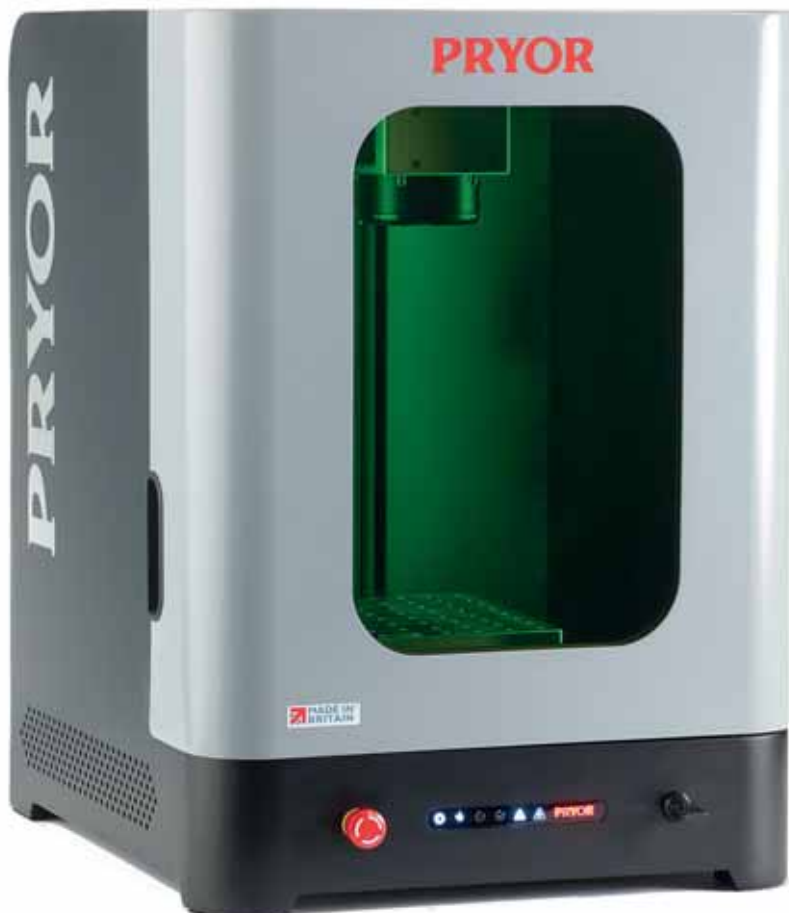
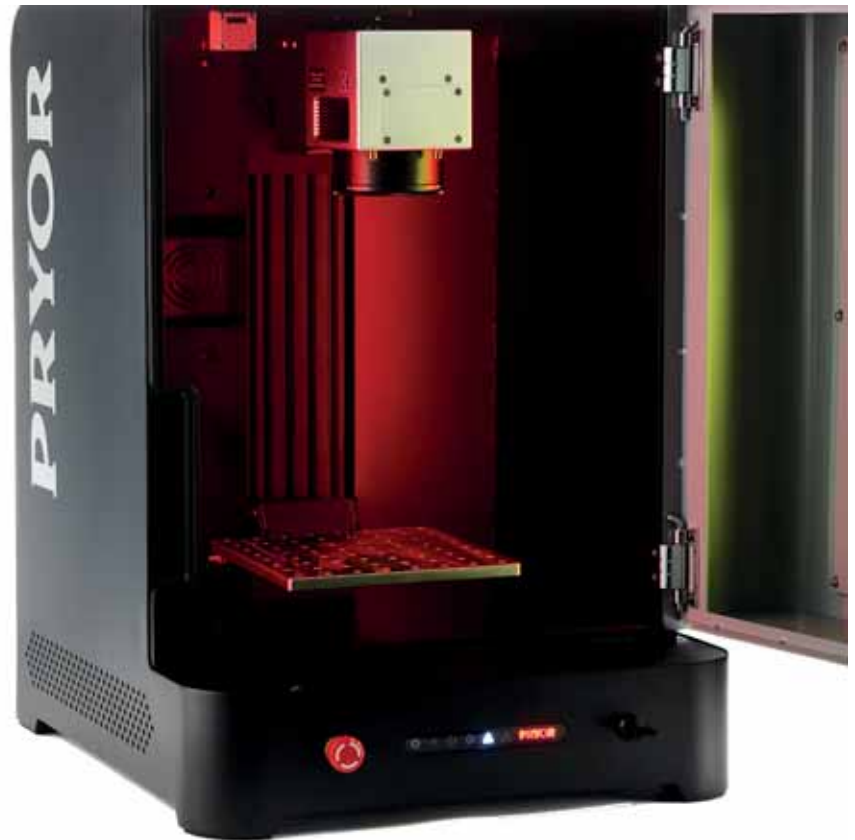
Exciting new products from Pryor Technology

2024 is a big year for Pryor Technology. As the company celebrates the incredible achievement of its 175th birthday, it is launching the first of two new products into its range of marking and traceability equipment.

The new MarkMate Laser is your ultimate solution for precise and efficient desktop laser marking. Engineered with cutting-edge technology and user-friendly features, the MarkMate Laser is designed to meet the demands of a variety of marking applications with incredible accuracy and speed.

At the heart of the MarkMate Laser is a fibre laser capable of delivering crisp, permanent marks on a wide range of materials including metals, coated metals, plastics, ceramics and more. Whether you need to engrave serial numbers, logos, barcodes, or intricate designs, the MarkMate Laser offers exceptional versatility and precision to meet your marking needs.

The MarkMate Laser is designed for ease of use and is supplied with leading traceability software. The software has a versatile, intuitive interface that allows users to quickly set up marking parameters and adjust settings with



minimal effort. The desktop design of the MarkMate Laser makes it ideal for space-constrained environments, while still offering ample workspace for marking various sized parts and items.

Equipped with advanced safety features including interlocks and shielding, the MarkMate Laser ensures operator safety without compromising performance. Additionally, its efficient cooling system keeps the laser running smoothly even during prolonged use, minimising downtime and maximising productivity.

Whether you're a small business looking to enhance product branding, a manufacturer in need of reliable part identification, or a hobbyist, crafter or jeweller wanting to add personalisation to your creations, the MarkMate Laser delivers unmatched performance and precision, making it the perfect choice for all your laser marking needs. Experience the power and versatility of the MarkMate Laser and take your marking capabilities to new heights.

The MarkMate Laser joins the Pryor Laser Marking product range that consists of the Bench Laser, Workstation Laser, Portable Laser

and Integrated Laser systems. All are designed and built to the highest possible standards by expert Pryor engineers at its headquarters in Sheffield, UK.

Pryor have been putting marks on things for over 175 years and have unparalleled experience marking metals of all types. Originally focused on supporting the cutlery and knife making industries that Sheffield is famous for and then supporting the huge growth in stainless steel when it was discovered in Sheffield in 1913, Pryor now supports its global customer base from its headquarters just a stone's throw from the company's original manufacturing location.

For all of its proud Sheffield heritage and its commitment to supporting the local community, the company is also very proud of its overseas customers and the partners that rely on its products for part marking and traceability. All of Pryor's products are still manufactured in Britain and the company have now been exporting around the world for over 70 years, all from its home in Sheffield, S1. Pryor proudly shows the Made in Britain logo on all of its products as recognition of this fact.

Since 2018 Pryor have sold products to 90 countries and have worked in many more via its



distribution network. From Sweden to Senegal, Mexico to Malaysia, the largest global manufacturing companies trust Pryor with providing them with the equipment they need to maintain traceability in their production process.

The 175 years since Pryor's founding has included many changes. Pryor's journey has been one of resilience, innovation and above all putting customers first. As this milestone is celebrated, Pryor looks back and reflects on its history, but focus remains on the future and the many exciting developments on the horizon like

the new MarkMate Laser and a second new product to be launched later this year.

Pryor's longevity can be attributed in no small part to its employees and their steadfast dedication to quality craftsmanship. Despite the shifts in manufacturing processes over the past century and a half, their commitment to precision engineering and British manufacturing excellence has remained unwavering. This relentless pursuit of innovation and quality has earned Pryor a myriad of loyal customers and partners across the globe.

Giving something back

Pryor is proud to have been owned by a charitable trust since 1978 when Ronnie Pryor transferred a majority stockholding into the newly set up charitable trust. For over 45 years, the trust has worked with national and local charities to support causes close to the Pryor family and support the needs of the business.

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How robots are set to shape the future of food manufacturing

By Paul Carter, sales manager system automation robotics, FANUC UK



Paul Carter, sales manager system automation robotics, FANUC UK.

For decades, robots have been helping to increase production efficiency, improve quality and consistency and alleviate labour shortages in industries such as automotive, machinery, and plastics. Other sectors however, including food and beverage, have been slower to wake up to the benefits of automation, with many food producers still heavily reliant on manual labour and semi-automated equipment. Figures from the IFR 2022 World Robotics Industrial Robots Report show that only three percent of global industrial robot installations are for food and beverage applications, compared with 23 percent for automotive. Fortunately, the tide is beginning to turn, global robot installations in the food and beverage industry grew by 12 percent year on year from 2016 to 2021. In the UK, of the 2,054 industrial robot installations in 2021, 164 were in the food and beverage industry, representing a total of eight percent, well above the global average.

Most robot installations in food production lines are for packaging, picking and placing tasks. However, there is a lot more that robots can do. At FANUC, we believe the adoption of robotics is set to change the face of food manufacturing for the better, both for primary and secondary processing and packaging tasks. Here, we look at four ways in which food production lines could look very different thanks to the increased use of robots and automation...

Increased use of cobots

Lightweight and simple to use, collaborative robots, or cobots, are becoming increasingly popular within food factories, especially where space is restricted. Extremely slimline and with a base not much bigger than an A4 sheet of paper, they fit easily into crowded areas, such as loading/palletising environments and can work alongside humans. Despite their size, they lend themselves well to lifting applications, such as palletising and material handling tasks. The FANUC CRX-25iA, for example, has a 25 kg payload and a 1,889 mm reach. We are continuing to develop our cobot range and in the future we expect to see cobots with

increasingly high payloads and longer reaches, to cope with growing customer demand.

Less manual handling

Since COVID and Brexit, labour shortages in the food industry have worsened and companies are looking to remove manual handling wherever possible. While a number of the individual processes in a food factory may already be automated, in many cases, people are still required to move products from one stage to another. Robots are ideally placed to help in these scenarios. Inherently flexible, they can easily be repurposed to cope with product changes enabling the factory to remain agile in the face of labour shortages.

Packing is another area which is traditionally very labour intensive. There is now a clear trend of using robots to pack ingredients into trays, trays into boxes and boxes onto pallets, freeing up human workers to carry out more value-added tasks. In the future, food factories will resemble automotive factories more and more, with robots carrying out the majority of manual handling tasks. There will also be an increased use of autonomous robot vehicles to move stock around the warehouse and for loading/unloading.

AI-powered vision inspection systems

Another area which is ripe for automating is quality control. Robotic vision inspection systems using AI and machine learning can



FANUC has joined forces with baking oven manufacturer WIESHEU and retail specialist Wanzl to develop the automatic Bakisto system. (Copyright Wanzl)

detect product faults quickly, accurately and reliably, helping to speed up production lines. This technology can also be used for product sorting and grading, eg potatoes. Repetitive, manual tasks such as this are ideal for being completed by AI-powered vision-guided robots, helping to free up valuable human employees.

Robots in the field

Finally, robots are moving out of the factory and helping to replace labour shortages in the fields. There are already trials of robots being placed onto tractors and incorporated with a vision system to inspect produce in the field. They can assess the stage of growth/ripeness, and then pick the fruit or vegetable when they're ready to be harvested. Expect to see many more of these applications in the future.

Automation in action: Meet Bakisto, the robot baker

FANUC has joined forces with baking oven manufacturer WIESHEU and retail specialist Wanzl to develop the automatic Bakisto system. Comprising three interconnected systems: a FANUC cobot; Wanzl's smart baked goods presenter 'BakeOff i' featuring artificial intelligence and a network-enabled baking oven, and the WIESHEU TrayMotion automatic loading and unloading system, Bakisto automates important tasks for retail bakeries, such as loading baking trays, inserting and removing trays from the oven and restocking displays.

Based on historical data and current stock levels, the AI-powered BakeOff i estimates daily baked goods demand and predicts when peak



Packing is an area which is traditionally very labour intensive. There is now a clear trend of using robots to pack products into trays, freeing up human workers to carry out more value-added tasks.

baking should take place. The FANUC cobot then carries the baking trays loaded with frozen baked goods from the refrigeration unit and pushes them into the transport trolley, which runs on rails in front of the preheated oven. The TrayMotion loading system pulls in the loaded trays, enabling the baking process to begin. After baking, the system pushes the baking trays back into the transport trolley, which moves to the side, allowing the baked goods to cool down while also making space for subsequent production. The FANUC cobot then fills the predefined compartments of the BakeOff i with the finished and cooled baked goods. Feeding new data into the AI system



In the UK, of the 2,054 industrial robot installations in 2021, 164 were in the food and beverage industry, representing a total of eight percent which is well above the global average.

ensures the process is continuously being optimised.

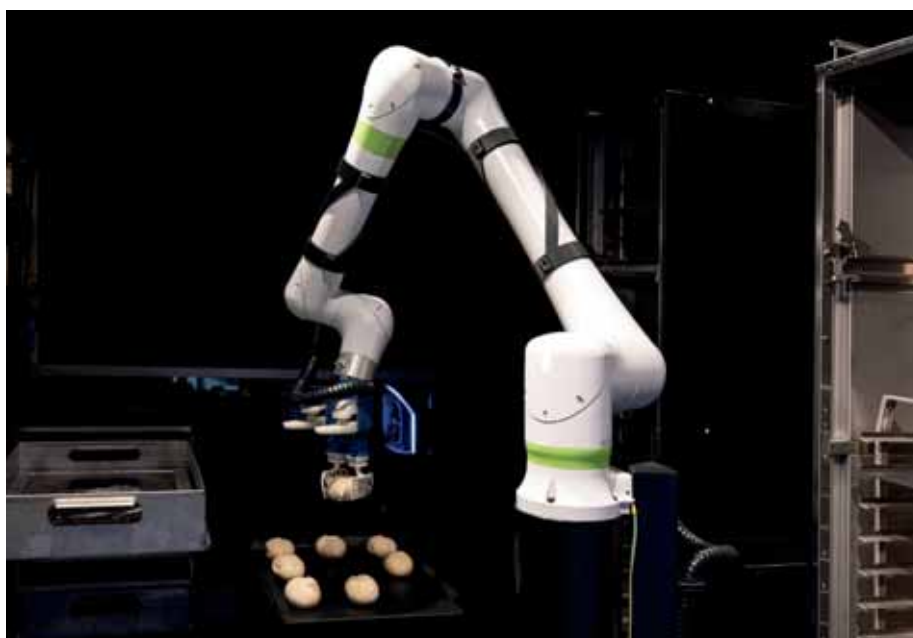
FANUC believes that Bakisto is ripe for addressing labour shortages in the food industry by relieving retail workers from repetitive tasks and unsociable working hours, as well as increasing product consistency and reducing food waste.

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Bakisto automates important tasks in retail bakeries, such as loading the baking tray, inserting and removing the tray from the oven and stocking the displays. (Copyright Wanzl)

ABB expands modular large robot portfolio

ABB Robotics is continuing the expansion of its modular large robot portfolio with the introduction of the new IRB 7710 and IRB 7720. The new robots, combined with recently launched IRB 5710-IRB 5720 and IRB 6710-IRB 6740, offer a combined total of 46 different variants capable of handling payloads between 70 kg - 620 kg, to give customers a new level of flexibility, greater choice and performance in their operations.

"As businesses introduce new technologies and components to meet productivity and sustainability goals, we've engineered our modular large robot portfolio to enable them to select the best robots and variants to allow them to efficiently undertake their operations," says Marc Segura, president of the robotics division at ABB. "With the most comprehensive portfolio of mechatronic platforms, industrial robots, cobots and Autonomous Mobile Robots (AMRs) in the marketplace, the latest robots extend our portfolio even further, helping our customers navigate labour shortages and ensuring they remain competitive, while operating in a sustainable manner."

ABB's new IRB 7710 and IRB 7720 robots offer 16 new variants and are ideally suited to support applications across various industries.

Operators can choose from a wide range of ABB robots to ensure they have the ideal variant to handle various applications for Electric Vehicles (EV), hybrid and traditional car production spanning press automation, body-in-white, EV battery construction and final assembly. These robots are perfect for high payload assembly, such as giga casting, high speed press tending and palletising, as well as high accuracy contact applications such as machining and friction stir welding.

Powered by OmniCore™, the new robots achieve class-leading motion control with path accuracy down to 0.6 mm, even with multiple robots running at high speeds of up to 1,600 mm/s and moving payloads of up to



The IRB 7710 IRB 7720 Class-leading path accuracy down to 0.6mm at high speeds of up to 1,600 mm/s.



The IRB 7710 IRB 7720 offer up to 25 percent reduction in cycle times.

620 kg. Customers can also benefit from up to 25 percent reduction in cycle times, further enhancing productivity and quality. In the automotive industry, the all-new IRB 7710 with the latest OmniCore controller, will boost the production output of robotic press lines from 12 to 15 strokes per minute to produce 900 parts per hour. Furthermore, in the construction sector, the new robots will support the growth in modular construction, capable of constructing steel building frames and surface finishing, with improvements in speed and quality.

The IRB 7710's energy efficient design in combination with OmniCore's re-generation technology achieves up to a 30 percent energy reduction, while the built-in power pack can relay energy back to the grid.

ABB's new large robots made their debut at the Automate Show in May. They were working in a fully functional automotive production cell on ABB's stand, performing car body component material handling, spot welding and arc welding. For further information about ABB's modular large robot portfolio, including the new IRB 7710 and IRB 7720 visit: <https://new.abb.com/products/robotics/robots/articulated-robots/irb-7710>

ABB is a technology leader in electrification and automation, enabling a more sustainable and resource efficient future. The company's solutions connect engineering know-how and software to optimise how things are manufactured, moved, powered and operated.



The IRB 7710 7720 high accuracy contact application such as friction stir welding.

Building on more than 130 years of excellence, ABB's 105,000 employees are committed to driving innovations that accelerate industrial transformation.

ABB Robotics & Discrete Automation is one of the world's leading robotics and machine automation suppliers and is the only company with a comprehensive and integrated portfolio covering robots, Autonomous Mobile Robots (AMRs) and machine automation solutions, designed and orchestrated by its value-creating software. It helps companies of all sizes and sectors, from automotive to electronics and logistics, become more resilient, flexible and efficient. ABB Robotics & Discrete Automation supports customers in the transition towards the connected and collaborative factory of the future. The business area employs approximately 11,000 people at over 100 locations in approximately 53 countries.

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New robotic systems for automating machine tools

A new range of storage and handling systems for loading and unloading machine tools automatically has been introduced to the UK and Ireland by Whitehouse Machine Tools, Kenilworth, in partnership with the Turkish manufacturer Tezmaksan.

CubeBOX robotic cells are suitable for automating virtually any make of CNC lathe or machining centre, including those that Whitehouse markets, Biglia, Brother and Spinner, as well as other types of machine tool.

Robot operation is non-stop, resulting in close to 100 percent Overall Equipment Effectiveness (OEE) of the machining cell, which is unattainable if machine tending is performed manually. Higher productivity and reduced lead times are the result. Fast loading and unloading of workpieces into and out of up to three machines enhances flexibility and agility, enabling quick adaptation to changing production requirements.

Amortisation of an investment is rapid, as the operator only needs to load billets, castings or forgings into the workpiece magazine and unload the finish-machined components. The person is therefore free to carry out other



added-value tasks elsewhere on the shopfloor. Additionally, unattended ghost-shift production is possible, contributing further to profitability and allowing manufacturers to compete more effectively in a competitive global marketplace for machined components.

Cell integration and robot programming are said to be particularly easy. Connection to any make of machine control system is possible, eliminating the need for customisation or modification. The process therefore does not rely on a skilled integrator. The high degree of compatibility simplifies and lowers the cost of implementation. Downtime is minimised during installation and commissioning, which normally takes one day, reducing the expense associated with prolonged setup periods.

The foundation of all CubeBOX systems is RoboCAM, an intelligent, 2.5-axis CAD/CAM automation software developed by Tezmaksan. Operators can effortlessly integrate any compatible industrial 6-axis robot into the cell, without the need for prior programming knowledge. RoboCAM translates any uploaded 2D product drawing into a robot-friendly language, enabling seamless communication and execution of automated cycles.

The flexibility of CubeBOX allows its easy transportation between different machine tools within a factory. Such mobility ensures optimal utilisation of the system across various workstations, eliminating the need for separate robotic setups for each machine. The versatility empowers manufacturers to streamline their production efficiently, optimising resource allocation and floor space.

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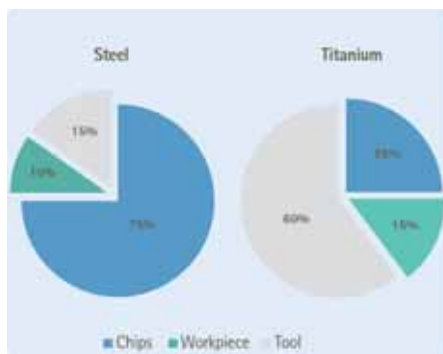
Holistic process understanding for optimum machining results

Machining titanium economically

Machining titanium is fundamentally different from machining cast iron or steel. For economic results, tool technology and the process must be optimally designed. With its holistic understanding of the overall interrelationships in the machining of titanium, MAPAL is able to identify this optimum combination of precision and cost-effectiveness.

The material properties of titanium are valued in many fields such as aerospace, the automotive industry and medical technology. However, the material is notoriously difficult to machine. This is because of its extremely low thermal conductivity. By way of comparison, with steel machining, ten percent of the temperature remains in the workpiece, 15 percent causes stress on the cutting tool and by far the largest proportion, 75 percent of the heat, is transferred into the chips and removed with them. Titanium is completely different. In this case, the chips only absorb 25 percent of the heat. The lion's share of 60 percent goes into the tool and causes a high thermal load on the cutting edge or the cutting material. This leads to considerably shorter tool lives. In this way, the cutting material costs become the focus of attention.

If the cutting speed is too low, this can lead to adhesion, i.e. the material sticking. If the cutting speed is too high, the risk of abrasion and tribochemical wear increase sharply and the cutting material is burnt. One way to ascertain the condition of the cutting edge is to look at the width of the wear mark. In a stationary range, it grows slowly and continuously. If this range is exceeded and the machining enters the transient range, a rapid and incalculable failure of the tool cutting edge occurs. This happens when the selected cutting speed or feed is too high. There is a difference of up to 100 percent



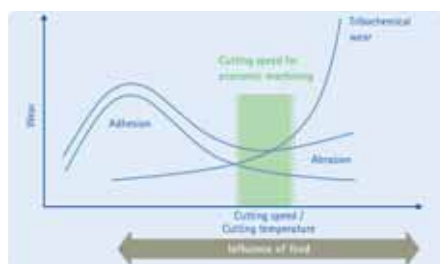
in tool life between the stationary and the transient range.

It is very important for MAPAL's area field service to help run in processes, to check the width of the wear mark and to show the customer when the end of the stationary range has been reached, for reliable and optimum machine running times. As a general rule, MAPAL recommends replacing the tool when wear is approximately 0.2 mm. A carbide milling cutter can still be reground then, but not at higher levels of wear.

MAPAL has incorporated process knowledge of titanium machining into the development of its tool technology. The focus is on wear and tear criteria and their influence even beyond the most suitable cutting material. To ensure optimum heat resistance, MAPAL uses innovative cutting materials, i.e. selected carbide grades and matching coatings that produce as little friction as possible. The micro and macro geometry with extremely positive tool geometries, polished rake faces and

measures for efficient cooling pave the way for cost-efficient machining. However, careful balancing of the cutting data is essential for the cost of titanium machining.

When machining steel and cast iron, higher cutting speeds often mean higher productivity and lower overall costs, which are made up of machine costs and cutting material costs. The machine costs get lower the quicker and more efficiently the machine operates. Although the cutting material costs increase in this case, an optimum in terms of overall costs is nevertheless achieved at a relatively high cutting speed. Conversely, when it comes to titanium, higher cutting speeds are not expedient. Tobias Gräupel, technical expert for indexable tools at MAPAL, proves this with an economic efficiency calculation that optimises the cutting data of titanium machining from a cost point of view. A milling operation with a NeoMill-Titan-2-Corner with four cutting edges that machines TiAl6V4 with a cutting depth of 4 mm and a cutting width of 24 mm is considered. An examination of different combinations of feed rates and cutting speeds leads to a clear recommendation in terms of the machining values for titanium machining.



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ITC introduces a smarter way to rough bore

The Smart Damper precision boring series from BIG KAISER is recognised as an industry leader in the world of holemaking. Now, the precision tooling and holemaking specialist has expanded its modular CK family with new head types for rough boring.

Available in the UK from Industrial Tooling Corporation (ITC), the new Smart Damper SW head for the CK1, CK2 and CKB3 boring tools includes BIG KAISER's Smart Damper technology. This minimises vibration and eliminates chatter, which is of critical importance when conducting rough boring operations. The exceptional new modular CK system is the world's most versatile tooling system and when supported by industry experts from Tamworth-based ITC, the performance and results will far exceed that of any other holemaking system.

The new additions to the CK modular precision tool system are also available for the full range of the BIG KAISER SW rough boring family. This makes the SW heads more versatile than ever before. Furthermore, it boosts the already impressive stability of the CK compatible connections with the BIG KAISER CK



The complete CK Smart Damper Assembly.

now found compatible with rough boring heads, fine boring heads, bridge tools as well as many accessories in the BIG KAISER range from ITC.

Based on a cylindrical connection with the radial locking screw, the CK system has been continuously improved over the years to adapt to customers' changing needs and the increases in machine tool performance. Compatibility with existing tools has always been a stringent requirement for newly designed products. As well as interchangeability within the BIG KAISER family, the CK system is also fully compatible with all machine tool interfaces and enables customers to create tool assemblies specific to each machining application. This includes extending tools for machining in deep cavities. The integration of the Smart Damper shortens

the distance from the damping mechanism to the cutting edge which creates the source of vibration. This increased damping system within the tool assembly minimises vibration and enables the CK system to achieve better surface finishes and improved metal removal rates while also prolonging tool life and enhancing surface finishes. The Smart Damper SW head for the CK1, CK2 and CKB3 is now available and all components are available from ITC. For further information, please contact your local ITC representative.

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Machining super alloys whilst keeping it cool

When machining heat-resistant materials, such as titanium and other super alloys, two factors play an especially crucial role in controlling temperature and maximising service life downtimes: top-quality tools and a targeted coolant supply. The additively manufactured MaxiMill – 211-DC indexable insert milling system showcases how proper nozzle positioning can be a true difference maker.

As anyone in the business of machining titanium parts and super alloys can attest, there's no getting around using improvised strategies aimed at cutting costs and time. Despite high-speed machining, these incredibly tough materials simply make it difficult to ensure process reliability. "If these processes are to be carried out in an even remotely financially viable manner, professionals often times have to deviate from the proven "roadmap" and be open to trying out new strategies. It's for such stubborn instances that we developed our 3D-printed indexable insert milling system MaxiMill – 211-DC," says Robert Frei, product manager at CERATIZIT.

3D-printed and precision-cooling

Optimised coolant is essential for achieving top quality results, especially when machining titanium and other heat-resistant materials. It is here where the patented shoulder mill from CERATIZIT shines, thanks to precision coolant placement on the milling indexable insert flanks.

"Additive manufacturing processes are no longer mere nice-to-haves. They are essential to achieving results that would be impossible with conventional strategies. A prime example is our indexable insert milling system, the additively manufactured MaxiMill – 211-DC," says Robert Frei. CERATIZIT recognised early on that 3D-printed solutions could go beyond the limits of traditional manufacturing processes and deliver viable alternatives. Developed in-house and tailored to meet individual needs, these specially designed tools are manufactured additively.

Precising cooling that's out of this world

One example displaying the power of 3D-printed solutions and additive manufacturing is the base body of the milling cutter on the MaxiMill – 211-DC. CERATIZIT's team of engineers sought to optimise the flank cooling process that is essential for machining titanium. Robert Frei explains: "Our objective



was to funnel the maximum amount of coolant directly on the flank, which sounds straight-forward enough. However, pulling it off required a very complex construction process, which was only made possible by additive manufacturing. Thus, we were able to create the perfect combination of geometric and functional properties, including the ideal nozzle position and an insert geometry precisely tailored for cooling. In doing so, we are able to guarantee full coverage wetting of the coolant on the indexable insert cutting surface."

Despite the complexity of the numerous coolant holes present inside the tool body, the MaxiMill – 211-DC is compatible with standard adapters with thro' coolant supply, without requiring any standard coolant on the chip breaker. Moreover, it provides the same performance and advantages as using direct cooling for turning tools.

Maximised service life

To see where the MaxiMill – 211-DC with direct cooling really proves its value, just take a look at its service life compared to tools with standard cooling: 60 percent longer service life. "This additional surplus of service life makes for fluid machining of titanium and super alloys, while delivering the benefits of secure manufacturing processes and minimising tool use," Robert Frei concludes.

For more than 100 years, CERATIZIT has been a pioneer in the field of sophisticated hard material solutions for machining and protection against wear. The private company, with registered offices in Mamer, Luxembourg,



develops and produces highly specialised cutting tools, indexable inserts, rods made from hard materials and wearing parts. The CERATIZIT Group is a leader in various application segments and successfully develops new carbide, cermet and ceramic grades, such as for wood and stone working.

With over 7,000 employees at more than 30 production facilities around the world and a sales network with over 50 branches, CERATIZIT is a global player in the carbide industry. The company's international network includes subsidiary Stadler Metalle and joint venture CB-CERATIZIT.

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TopPack from rose plastic

The perfect protective packaging for your tools

As part of rose plastic's product offering, its TopPack family offers maximum product protection for your high quality cutters and drill bits. The various models are designed to solve a very particular problem. A great example of this is TopPack XLine series: this is the perfect packaging for extra-long and delicate shank tools, while its TopPack FoldBack features a functional shaft clamp that perfectly protects the sensitive tips of micro drills and precision cutters while also ensuring easy insertion and removal of the tools.

TopPack Xpress is the most popular in the range. The patented shaft clamp ensures even better grip with trouble-free insertion and removal of solid carbide milling cutters and drills. If you would like to receive a free sample of any of the TopPack range, contact the rose plastic UK team on 01709 721794 or send an email to: info@rose-plastic.co.uk



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Versatile toolholder for Horn grooving system



Tool manufacturer Horn has combined the attributes of various tool holders into one to provide a new version with two connections to suit the user's coolant delivery equipment. The holder has been designed for the popular 224 indexable insert grooving tool range.

One connection suits a VDI system that directs coolant to the cutting edge via the insert's clamping finger, while the other is a threaded G 1/8 connector on the side leading to a hole on the other side of the insert to deliver coolant to the flank face. The two circuits cannot be used simultaneously.

The holder is of compact design and is offered with a 16 mm, 20 mm or 25 mm square shank. All sizes are available from stock for widths of cut of 2.0 mm, 2.5 mm, 3.0 mm, 4.0 mm, 5.0 mm and 6.0 mm. The shanks are made of high-strength steel, which ensures accurate location of the insert seat, leading to rigidity and hence long service life.

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Workholding upgrade doubles productivity



Archway Engineering programmer-operator Ben Jaine setting up a new batch of components in the three Chick OneLOKs on the table of the Leadwell VMC, ready for machining in one continuous CNC cycle.

At the Elland, West Yorkshire factory of Archway Engineering, which manufactures drilling equipment for site investigation, mineral exploration, water well construction and environmental monitoring, a Leadwell V-50L 3-axis Vertical Machining Centre (VMC) performs some of the more arduous machining operations on the shop floor. Remarkably, the productivity of parts going through this machine has been doubled simply by changing the way workpieces are clamped.

The transformation has been achieved by the purchase in September 2023 of three US-made Chick OneLOKs from sole UK agent 1st Machine Tool Accessories, Salisbury. One of the units remains permanently at one end of the machine's 1,420 x 610 mm table, where it has been clocked into a known position to within 10 µm across the 152 mm face of the clamp's fixed hard jaw. The other two OneLOKs may be removed to make room to mount a 4th axis indexer, but they are quick to set up again relative to the permanently-positioned clamp by means of a parallel bar.

During frequent small-batch runs, it is a simple matter to secure three parts side-by-side, write a sub-program to machine the workpiece in the permanent OneLOK, probe the



position of the parts in the other two clamps, repeat the sub-program twice at the appropriate offsets and run the complete cycle in one go.

This process differs markedly from previous practices involving either bulkier conventional vices, only two of which would fit on the table, or a lathe chuck for holding round parts, an arrangement so large that just one could be accommodated in the working area. The positions of all these former workholding setups were slow and laborious to establish accurately and in practice each machining cycle was executed individually.

Another advantage of the Chick product is that it has a time-saving ratchet mechanism to allow the operator to adjust the position of the rear, moveable jaw in one swift action so that it almost touches the workpiece. A few turns of a handle move the jaw in the same direction over the last few mms to complete the clamping action quickly, contributing further to short setup times. The mechanism's novel squeeze clamping action with pull-down as the jaws close applies an equal and opposite force on both sides, resulting in repeatability to within 20 microns.

A practical example of the time savings is in the production of a so-called TC shoe for a drilling machine, produced from an S355 hot-finish steel tube weighing 50 kg. Setting up three billets in machined aluminium jaws side-by-side in the OneLOK takes 1.5 hours, compared with a total of four hours previously needed to clamp the parts individually one after the other in the lathe chuck on the VMC table.

Furthermore, clamping forces were lower using this workholding equipment, as well as when employing conventional vices, compared with up to 26.7 kN of retaining force exerted by a OneLOK. Therefore, feed rates previously needed to be slower, lengthening cycle times. The versatility of the new units to hold prismatic parts in hard steel jaws, or round parts in soft aluminium jaws machined to match the shape of the component being secured, sets the Chick product apart from conventional vices and underpins the elevated gripping pressure.

Danielle Toner, production manager at Archway Engineering comments: "Most of our production involves one-offs or small batches, with individual cycles generally running for several hours. Being able to clamp parts of any shape so firmly in the OneLOK allows us to mill much more aggressively using high-feed inserted end mills and solid carbide drills. In one instance, an EN8 steel drive unit end plate that previously took six hours to machine is completed in one hour."

Danielle Toner explains that it is now possible to feed at 7 m/min a 32 mm diameter end mill rotating at 1,200 rpm, whereas the previous maximum feed rate was 2 to 3 m/min. At the same time, higher quality tools may be employed and depth of cut has increased from 0.3 to 1.0 mm. Additionally, because parts are held more rigidly and the OneLOK is of low-profile design, there is less vibration so tools last longer and the machined finish is better. It helps particularly with production of the TC shoe as well as phosphor bronze sliding plates, both of which require features with a near-polished surface.

Danielle Toner concludes: "The quicker setup times using the Chick OneLOKs and the faster machining cycles that their secure clamping allows means that a typical short batch of parts can be produced on the Leadwell in two days, compared with up to one week previously.

"I estimate that productivity across the parts produced on this VMC has increased by 100 percent and probably more. The machine operator is also more productive, as he has extra free time and can plan his work around the factory more effectively.

"Overall, our investment in Chick workholding has been a fantastic



Circular and other non-prismatic parts are clamped in the OneLOKs in soft aluminium jaws machined to match their shape. The jaw sets can be exchanged in seconds.

success and the advice and service provided by 1st Machine Tool Accessories have been first class."

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Zero-point clamping system from LANG

There are many quick-clamping systems. That's good, because every machinist's day-to-day work is different. What they all have in common is that every job starts with the clamping process with the aid of clamping systems or clamping devices. This is followed by the machining process via turning, milling, grinding or a hybrid combination of these tasks.

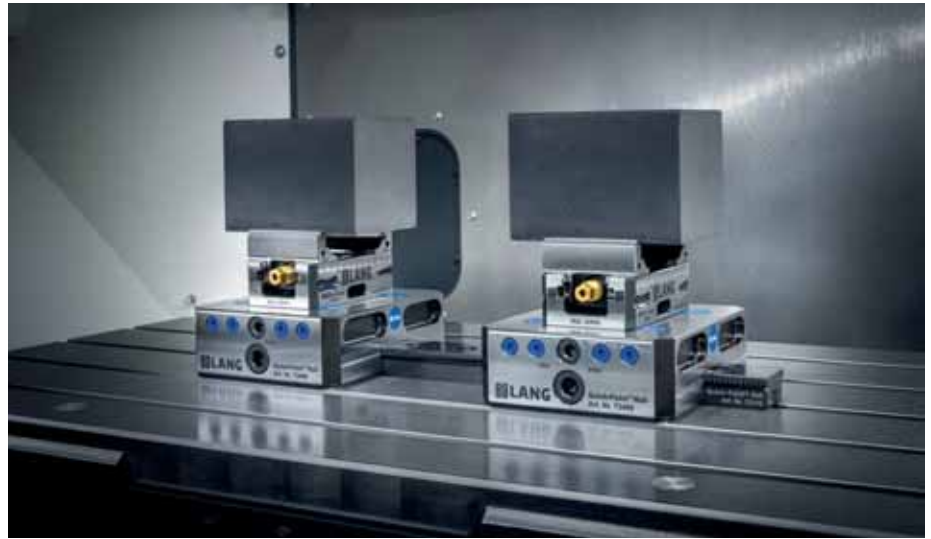
Welcome to the parts universe

Once the job or a machining sequence is finished, changeovers take place and everything starts again from the beginning. The most important task of a clamping system is to lock the part in place in order to be able to handle the machining forces in the turning or milling process.

The clamping system or clamping device must match the component geometry and the machine process. Typical shapes for components in an industrial environment are cuboids, cubes, prisms, pyramids, cones, spheres, cylinders and others. If workpieces are manufactured individually or in series, part quality is ensured by using a zero-point clamping system, which ensures the necessary accuracy and repeatability of the machining processes by means of a predefined reference point. Choosing the right clamping device here has a significant impact on the efficiency of the machining process on a machine, as the machine can be set up more quickly.

Why zero-point clamping systems are not always efficient

However, potential is still being wasted here too, as the zero-point clamping system is often only placed in the centre of the machine table



for simple single clamping. The remaining space often remains unused. As safe as zero-point clamping systems are, efficiency can certainly diminish at this point.

The Quick•Point® Rail quick clamping system from LANG puts an end to this and can be used more efficiently than many zero point clamping systems. It can be installed in any CNC milling machine and does not require a base plate.

Flexible positioning of the zero-point clamping system

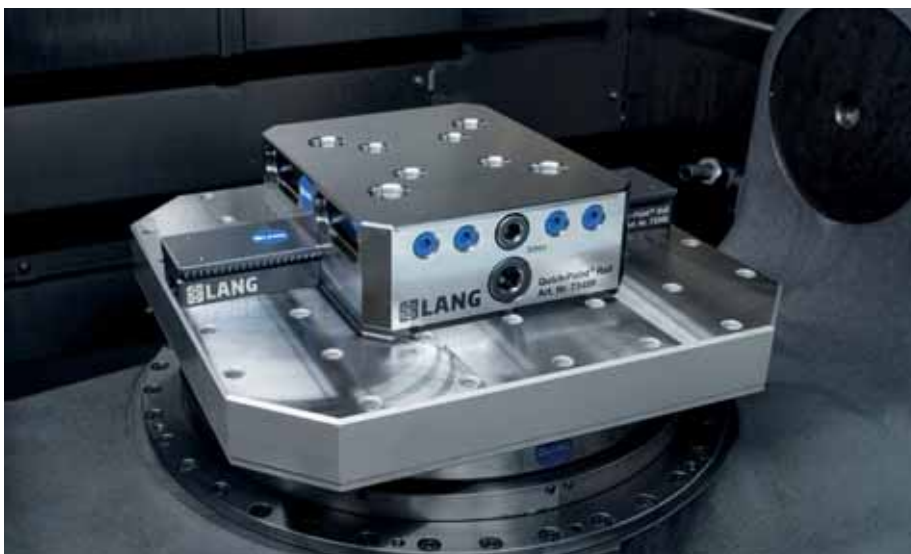
But how can the range of tasks be expanded? Quite simply: by moving the clamping device variably using the Quick•Point Rail clamping bars. The length of these depends on the component length, anything is possible with combinations. Especially when two clamping devices are in use, the distances between the two clamping devices can be flexibly adjusted

using the Quick•Point Rail clamping system. This is made possible by a 4 mm grid that can be moved back and forth as required.

Risers are also frequently used in the zero-point clamping system to increase the distance between the machine table and the workpiece. Once inserted in the zero-point clamping system, these are firmly locked in place on the automation pallet or machine table. With the Quick•Point Rail quick clamping system, a zero-point riser can now be moved for the first time and still leave the desired space. Quick•Point Rail takes just a few minutes to install and turns a reliable zero-point clamping system into a movable zero-point clamping system with a wide range of options.

The quick-clamping system makes use of the existing conditions in the machine tool. Quick•Point Rail can be fastened in the grooves of the machine table. This is done with the aid of sliding blocks. The clamping bars are fixed above this using cylinder head screws.

If you are working with automation pallets, simply screw the clamping bar of the Quick•Point Rail clamping system directly onto the automation pallet using the existing threaded holes. The clamping rails are available in different versions so that it can always be guaranteed that the available width of the base is ideally utilised. The Quick•Point Rail starts with performance improvements where every machining task begins with the increase in clamping efficiency.



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New holders for tools with through-tool coolant supply for back working

ARNO Werkzeuge presents well-designed holders for back working for Swiss-type auto lathes. The range includes fixed holders for Star and Citizen machines with a Y2 axis and height-adjustable holders for machines without a Y2 axis. Both systems offer adjustable through coolant supply direct to the cut point. The new holders have several features that are hard to find anywhere else. This makes them unique and raises ease of use for back working tools to a new level at a time when there is a shortage of skilled labour.



“Our new height-adjustable holders for back working have a number of features that other conventional systems have to match,” promises Werner Meditz, head of technology at Arno Werkzeuge. The new recently introduced height-adjustable holders for machines without a Y2 axis can be finely pre-adjusted off-machine using an adjustment device. The system consists of a basic holder, spacer plate, top holder and coolant supply attachment. The basic holder is precision clamped and fixed by a dovetail guide. This increases stability and prevents chip build-up. The tool length is also adjustable by means of a spacer plate. It is simply pushed over the shank of the basic holder. The top holder and coolant supply attachment can each be firmly connected by a simple clamping fixture and secured by just one screw.

When the top holder is changed, the centre height setting is retained and ensures outstanding repeat accuracy. “This offers an incredible time advantage,” says Werner Meditz, who is an expert in the field. The system with the height-adjustable basic holders is very well thought out and designed. The optional coolant supply attachment with adjustable high-pressure jets delivers coolant directly to the tool cutting edge. All holders offer insert pockets with carbide shims to ensure a long-life insert seat.

The centre height setting of the fixed holders with tools for machines with a Y2-axis is changed by the adjustable axis. These holders for Star and Citizen machines are designed in collaboration with the manufacturers to ensure optimum dimensions and are therefore very compact. Combined with their fastening by two screws on the front and on the shaft diameter, these holders promise high stability. The through tool coolant supply can be connected from either side and the coolant jets are adjustable. The



holders can also be fitted “overhead” to optimise chip fall. All holders offer insert pockets with carbide shims to protect the insert seat.

For Star machines, the manufacturer offers a short and a long version of the holders for turning with positive ISO indexable inserts. Holders are also available for both machine types for threading with ER16-ISO inserts, for grooving with Arno TE14 inserts and for boring bar holders with diameters of 6-16 mm. In addition, the range includes D20 combination holders to install Arno clamping inserts to suit the patented ARNO AMS Mini Boring System. They also allow drilling with collet holders ER16 or ER 20 which have through tool coolant supply.

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Vision Engineering increases its capabilities

Manufacturing services divisional head Harry Curtis explains how the company continues to innovate and grow

It has been 30 years since Vision Engineering launched its first Mantis Microscope in 1994. Why was this award-winning instrument so innovative?

The original Mantis Microscope launched in 1994 was innovative for two key reasons:

- **Eyepiece-less design:** This was a revolutionary concept at the time. Traditional microscopes require users to look through eyepieces, which is uncomfortable and limits hand-eye coordination when performing manipulation tasks under magnification. Original Mantis offered a direct view of the magnified object through a viewing head, without the need to hunch over a traditional microscope, providing a much more ergonomic and natural experience combined with incredible 3D image quality.

- **Bridging the gap:** It filled a gap between a simple magnifying glass and a complex microscope. It offered higher magnification than a magnifier but with a simpler and more user-friendly design compared to traditional microscopes, along with superb image quality and long working distance. This combination of benefits enabled users to work for much longer, more comfortably, which improved accuracy and productivity. This is still the case today.

In 2023, the third generation of Mantis was launched. What are the key improvements that have been made to the product over the years?

Mantis 3rd Gen, launched in 2023, features several improvements over the second generation model including:

- **Enhanced Optics:** It offers better optics for both hand-eye coordination and depth perception, crucial for manipulating objects under magnification.
- **Versatility:** It features a 3-position turret that allows users to switch between different objective lenses (3x to 15x magnification) and an optional 8x super long working distance lens, catering to a wider range of applications.
- **Improved Illumination:** Mantis 3rd Gen provides five different illumination options, giving users a greater level of control over lighting conditions for optimal subject viewing.
- **Digital Integration:** Mantis PIXO includes



designed-in digital integration via a high resolution camera for capturing and sharing images and videos of the magnified object.

How has the third generation Mantis been received by your customers?

Our customers have welcomed the performance improvements that Mantis 3rd Gen has brought to market. Mantis has maintained its reputation for superb ergonomics, image quality, and effective working distance, and the innovations we have made in subject illumination, digital integration and lens availability for multiple views have been well received by our customer community.

What are the key applications for Mantis?

Mantis 3rd Gen is ideal for applications requiring high-quality magnified views with good ergonomics. Popular applications with our customers include:

- **Electronics Engineering:** Soldering and rework on delicate electronic components.
- **Medical Device Manufacture:** Examining and assembling tiny medical devices.
- **Biology and Research:** Studying insects, plants, and other biological specimens.
- **Quality Control:** Inspecting surfaces for defects or flaws.
- **Precision Engineering:** Inspecting and manipulating small parts.

Are there any products in the Vision Engineering range that are proving particularly popular at the moment?

The Mantis family have always been some of our best selling products and with the upgrades made in the 3rd Gen this is showing no signs of change. Aside from Mantis we have seen strong growth in our 3D viewing technologies, in particular our DRV products. These systems deliver high resolution 3D images without the need for polarising glasses. We've seen strong sales of this product throughout our core inspection markets when paired with our stereo microscope module, but the display head has opened up opportunities in multiple new markets for us. The ability to see in true high resolution 3D is invaluable during surgical operations, eye examinations and when working with geospatial images, just to name a few applications. The systems are proving popular and allowing us exciting opportunities to grow into new markets.

The company launched its new anodising facility in Leicestershire a few months ago. How will this further enhance Vision Engineering's manufacturing capabilities?

The opening of the new facility for Miltorn Finishing (A Vision Engineering Group Company) gave us the opportunity to massively increase our capabilities as a company when it comes to

finishing. We have been able to fit new larger anodising tanks and a heavy duty crane system so that we can more effectively handle larger components (3 m x 1 m x 1 m) and larger batch sizes while maintaining a consistent high quality finish. As well as sulphuric anodising and hard anodising in a range of colours, we are also able to offer vacuum blasting, powder coating and wet spray painting as finishes.

Vision Engineering requires a large number and variety of finished parts in the manufacture of our inspection and metrology systems for our core markets. By utilising Miltorn Finishing for this work, we ensure that high quality is maintained.

With the new facility Miltorn Finishing is ready to take on new business, please contact us through www.miltornfinishing.co.uk to get a quote for your subcontract finishing needs.

Can you highlight any key growth areas that the manufacturing services division will be targeting in the coming months and years?

We continue to offer a wide range of manufacturing services to our production partners. As well as our finishing service through Miltorn Finishing, we also offer extensive machining services through our UK machine show. Numerous milling and turning systems allow us to cater to a large range of

parts, and our skilled team are able to work within tight tolerance bands across a wide range of materials.

Another service we provide is sub-assembly and quality testing of 3rd party designs. We have been certified to ISO 13485 for subcontract manufacturing of medically certified products and so we are looking to use this to grow more into medical markets.

How does the company look after its customers?

Having been a UK manufacturer for the last 66 years, we understand what partners are looking for from a subcontract manufacturer. We treat all our customers' parts and products with the same professional care that we do our own products to ensure only the highest levels of quality are delivered.

Our UK headquarters is located in Surrey and Miltorn Finishing (including a regional Vision Engineering sales office) is in Leicestershire. This means that we are never too far away, whether it be in person, or at the other end of a call.

Finally, what can we expect from Vision Engineering in the future?

We will continue to innovate, pushing to develop new and exciting products that meet customer needs within our core business. For the manufacturing services we are looking to continue our investments into new machinery and processes to make sure we are offering the best service we can.

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More flexible with the digital twin

Since the aluminum die-casting component manufacturer Alupress implemented VERICUT, the simulation, verification, analysis and optimisation software for CNC machines in its production process, it has reduced cycle times and improved the final quality of its products.

There's a characteristic that, more than others, should be possessed by those operating in the automotive field and this is flexibility. A high level of flexibility that allows coping with strongly fluctuating demand. But being flexible is not such a trivial concept. It implies careful management of resources and supply chains and it cannot do so without constant technological updating, as well as a commitment to innovation to be able to handle any type of request. The headquarters of Alupress is located in Bressanone, in the province of Bolzano in Italy, a reality born in the late 1960s and specialising in the production of aluminum die-cast components mainly for the automotive sector. Alupress has made flexibility one of its main strengths. In an effort to reduce the manufacturing times of its products, two years ago the company implemented VERICUT. The software was first launched in 1988 by the Californian company CGTech, into its production process.

Technological partner

Alupress has a staff of around a thousand people divided among its three production plants in Bressanone, Hildburghausen in Germany and Laurens in South Carolina. Each site caters to very important clients in the sector. Alupress is not a typical company specialising in providing third-party mechanical processing. The company has chosen to position itself in the market as a technological partner focused on the supply of die-cast products that are mechanically processed and assembled. Quirico Calabretti, senior process development engineer says: "To optimise the quality of finished components and accelerate the production process, we consider it essential to establish and carry on a close and synergistic



collaboration with the technical offices of our customers. Making our extensive know-how and deep experience in the field of die-casting available to them allows us to overcome the superficial perception of the mechanical piece as merely a drawing or a unique model, laying the groundwork for improving the efficiency of the production process and the quality of the products with positive repercussions also on the final cost."

The digital twin

The collaboration with the Californian company CGTech, known worldwide for its VERICUT software that is now in its 9.4 release, began in mid-2022 and stems from a very specific need to reduce production machining times.

"VERICUT allows us to create the digital twin of the machine tools we use for our production,"

explains Quirico Calabretti, "Giving us the possibility to study, analyse and modify, if necessary, all phases of the production process before the actual process takes place on the real machine."

Before VERICUT, Alupress used CAM software, a solution capable of greatly simplifying the programmer's work. Quirico Calabretti continues: "VERICUT not only offers us the possibility to update the code produced by the CAM software according to our needs, but also allows us to verify that the changes made are correct, by simulating exactly what the machine will do. Thanks to the creation of a digital twin of the machine tool, VERICUT allows us to conduct a detailed analysis of machining dynamics, any conflicts or collisions and tool path optimisation, ensuring that the changes not only improve production efficiency but are



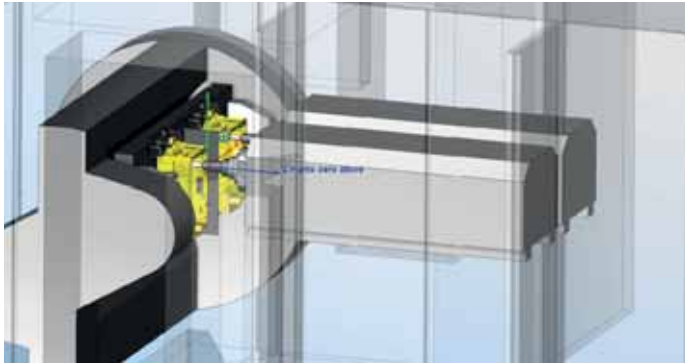
also error-free, ensuring maximum precision and reliability. It often happens that the changes we make are not only to the code but also to the operational logic of the machine and VERICUT allows us to verify this aspect as well."

Undisputable advantages

"The implementation of VERICUT has allowed us to reduce cycle times," Quirico Calabretti adds, "Also and, above all, to eliminate collisions. VERICUT also offers us the possibility to simulate different profiles or tools, something that not all

software allows you to do so easily and quickly. In this way, the entire process is even more efficient."

Simulation, verification, analysis and optimisation reduces production time, improving the quality of machining and enabling the production department to be more reliable and secure. This also reduces energy consumption and extends the life cycle of tools, effectively achieving one of the most important goals today, namely, increasingly sustainable production.



Learning speed

The implementation of VERICUT into Alupress's production process took place in two steps. Quirico Calabretti concludes: "Initially, we decided to purchase and start using the VERICUT Single Platform license, which is the version of the software that allows recreating the digital twin of a single machine. This allowed us to learn about the platform and the various functions it provided. However, after about six months, as we had already planned beforehand, we deemed it necessary to upgrade and switch to VERICUT Multi-Platform. This is because in our plant, there are machines that are geometrically very different from each other which had to be managed by different digital twins."

Originally published in Openfactory, Tecnè Aprile 2024

Photos by Rolf Neighbor

CGTech's VERICUT software is the standard for CNC simulation, verification, optimisation, analysis and additive manufacturing. The company also offers programming and simulation software for composites automated fibre-placement, tape-laying and drilling/fastening CNC machines. VERICUT software is used by companies of different sizes in all industries. CGTech has an extensive network of offices and resellers throughout the world.

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Tebis is well known as a premium CAD/CAM and MES software company that offers advanced solutions for model, pattern, die and mould making as well as mechanical component manufacturing. Tebis also helps customers to optimise CNC machining processes and to automate CAM work with Intelligent Manufacturing technologies.

Tebis Intelligent Manufacturing software and associated services help customers to increase productivity and profitability.

Intelligent Manufacturing with best practice built into libraries

The best CNC machining practices of a company can be built into Tebis library database which can then be shared and reused for daily operations. This will help to optimise uses of machine capacities and cutting tools as well as to optimise machining processes and machining parameters. Tebis works together with customers to define goals and to achieve them, with experiences of thousands of projects done worldwide.

Virtual Machine Library

For CNC programming, Tebis uses Virtual Machines for toolpath calculations in addition to cutting tools, toolholders and machine tool heads. Virtual Machine geometry information and machine tool axis limits are included for toolpath calculations. Besides ensuring machining safety, it is possible to see if a toolpath angle can be achieved on the machine during CNC programming. Tebis will not allow creation of a toolpath which is not achievable in reality. Special parameters for Virtual Machines can also be defined during the programming stage to account for certain applications such as activating of particular parameters which you may

not always want to be active. With Tebis, what you see is what you get. It is a clear advantage that Virtual Machines are an integral part of Tebis CAM software, which can save time and money by avoiding using a separate machine simulation and toolpath verification software package.

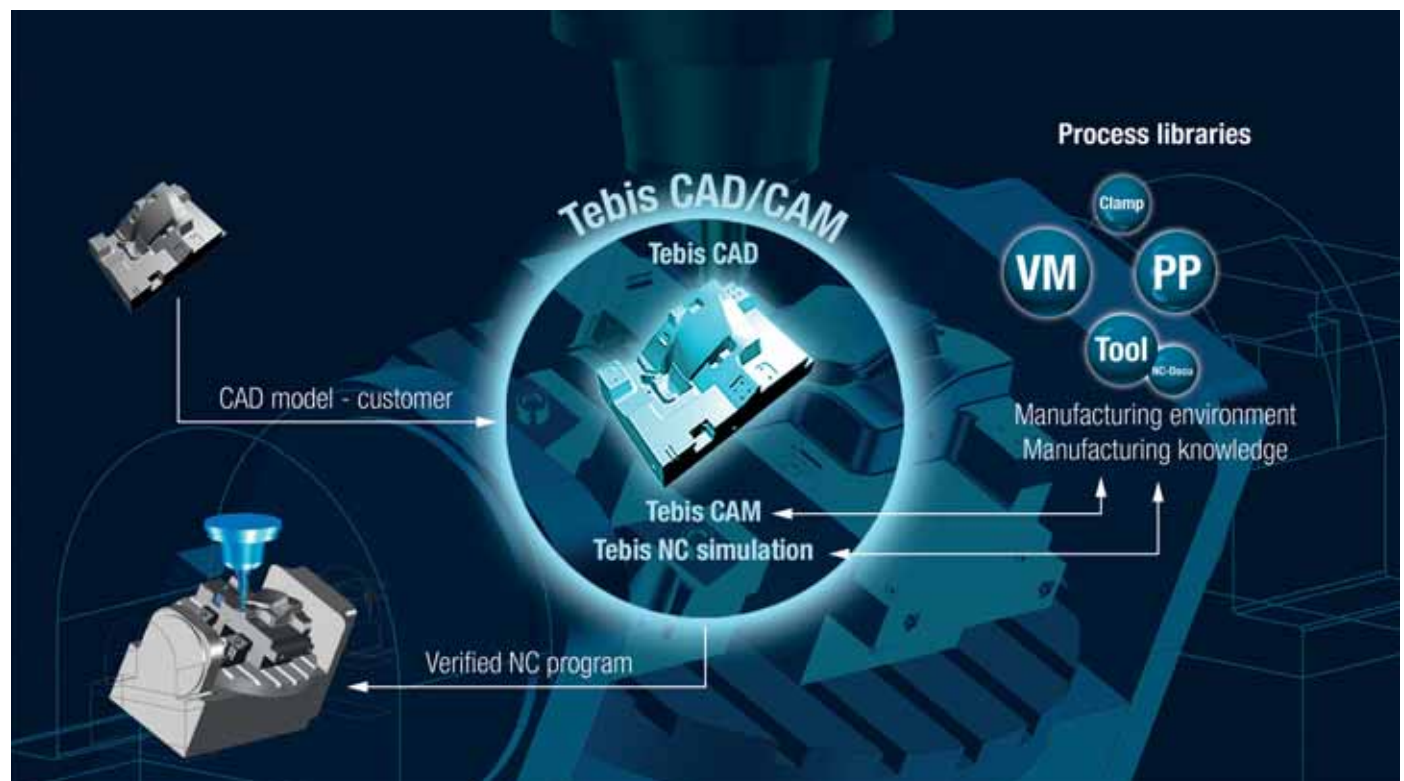
Clamping Devices Library

Tebis clamping device library represents all common devices for fixing parts in the machining process. From the screwless vise to clamps and chucks, all common clamping devices can now be easily managed in a library and quickly used for realistic simulation and collision checking. In the CAD/CAM model, the precise clamping position can be exactly aligned, zero point and conventional clamping systems represented and all assembly possibilities checked. Tebis supports virtual clamping and validation with Clamping Device library, which increases productivity and profitability by saving time on job setup and avoiding costly wrong clamping and fixturing at the shopfloor.

Cutting Tools Library

Tebis cutting tool library not only stores cutting tool geometry shape information, but also stores advanced machining parameters grouped for different materials, different tools and toolholders, different machine tools as well as different machining processes. Tebis cutting tool library stores comprehensive machining parameter types such as corner feed rates, stepdown feed rates, machining depth, machining width and coolant options in addition to conventional machining parameters.

Tebis cutting tool library is capable of storing exact geometries of cutting tools, toolholders and intermediate toolholders and validate the



assembly. This ensures these elements used by the CAM users are correct and available on the shopfloor.

With the Cloud-based environment, Tebis has the master tool library sitting on the Cloud central server which is managed by the administrator to ensure consistent uses among all users even across different work shifts and sites.

Geometry Feature Library and feature-based machining

Tebis Geometry Feature library recognises geometry data within CAD models. Once Tebis software recognises the geometry data and assigns some basic attributes, then, Tebis can start to add predefined machining operations to machine the geometries in the CAM programming process. This creates an environment where machining operations and parameters for machining the features can be optimised, standardised, predefined and are consistent across the company's entire working process to improve CAM programming efficiency and quality.

With Geometry Feature library, Tebis automatically detects and assigns features to the geometries and automatically group features for machining. In addition to working with ruled geometries, Tebis software also recognises free-form geometries and does feature-based NC programming. Features are not limited to the usual 2.5D type features such as holes and slots, Tebis software is also capable of dealing with 2D open features and free-form shapes.

Machines Cycles library

Tebis NCsets are sets of predefined machining operations for individual geometry features. Once the NCsets are associated with geometry features, they can be used to machine entire groups of geometries with a single programming operation.

Tebis NCsets can be defined and optimised, then, shared among CAM engineers as database library. This means that new recruits will only need one or two weeks training. This also means greatly reducing the difficulty and workload of CAM work as well as reducing the costs of CAM work by reducing the number of CAM personnel and also wage level for junior engineers while senior engineers can create more value by optimising CNC machining processes.

Machining Process Library

CNC machining processes with series of toolpaths can be created, optimised and stored within Tebis library as templates. The predefined machining processes means that every time a new part is programmed, the surface quality and part accuracy is the same every time. With this level of consistent programming, it is very easy to control quality and also estimate how long a part will take to manufacture.

The automated programming also allows job knowledge to be retained within the company. If the company loses a key member of staff, the standards and strategies already developed within the company are retained with Tebis libraries. This also means that if the company employs a new CAM engineer, the new recruit can produce parts to the company's own existing standards rather than learning from the scratch. This comes with the added benefit that the learning curve for a new user can be much shorter than having to learn the entire software and machining processes.

Digital Twin for optimised CNC machining

One of the key offerings of Tebis CAD/CAM is Digital Twin for optimised CNC machining. With the unique manufacturing database structure as the core of Tebis CAD/CAM system, all key elements of customers' manufacturing environments can be built into Tebis libraries as one-to-one Digital Twins the same as the physical objects on the shopfloor, which can then be used to optimise CNC machining. This is



especially significant that all toolpaths and machining parameters can be optimised for individual machine tools on the shopfloor with machine-oriented CAM programming, in addition to optimisations for cutting tool/toolholder assemblies, workpiece materials, clamping devices and machining processes.

While many companies are very cost sensitive when choosing CAD/CAM software, it is very important to choose a CAD/CAM system which can optimise CNC machining processes and also reduce CAM work difficulties and workload.

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Tech Soft 3D strengthens portfolio with acquisition of Actify SpinFire business

Acquisition cements the company's position as a leading provider of CAD data translation, visualisation and collaboration tools for both application developers and end-users.

Tech Soft 3D, a leading provider of engineering software development toolkits, has announced that it has acquired the Actify core business including SpinFire, CAD Publisher and Centro from Actify, Inc., a leading force in advanced CAD viewing and collaboration technology. This strategic move underscores Tech Soft 3D's commitment to accelerate growth, as it establishes an end-user solutions division and broadens its product portfolio through further acquisitions.

Actify SpinFire is a powerful CAD viewer and collaboration tool supporting more than 20 standard CAD formats for 3D and 2D viewing, measuring and markup capabilities for company-wide departments including project managers, development, engineers, procurement, sales, supply chain and quality assurance teams.

Ron Fritz, CEO of Tech Soft 3D, commenting on the acquisition, states: "Actify has been a long-term user of our HOOPS technology and we share the common objective of unlocking the true value of 3D CAD files for manufacturing enterprises and their supply chains. SpinFire has established a strong market position and we are enthusiastic about leveraging our extensive

expertise to enhance collaboration across engineering teams, particularly in handling feedback and client change requests."

While Tech Soft 3D remains dedicated to providing core intellectual property to developers, the SpinFire team will continue its commitment to delivering future products and providing top-tier support to customers and the global reseller network.

Dave Opsahl, CEO of Actify Inc., expresses his confidence in the collaboration: "Over the years, Actify has harnessed the power of core component technologies from Tech Soft 3D. They are engineering innovators and our teams are well acquainted with each other's code base and working practices. I am confident about what we can achieve together."

This acquisition marks a significant step for Tech Soft 3D, reinforcing its position as a leader in engineering software development and enhanced solutions in the CAD viewing, CAD data translation and collaboration space. For further information, visit www.techsoft3d.com

Details of the acquisition are not disclosed. Tech Soft 3D is backed by global, technology-focused investment firm Battery Ventures.

Tech Soft 3D is a leading provider of

engineering software development toolkits. Established in 1996 and headquartered in Bend, Oregon, USA, Tech Soft 3D also has offices in California, France, England, Japan and Norway. The company's toolkit products power more than 700 unique applications running on hundreds of millions of computers worldwide. Tech Soft 3D is backed by investment firm Battery Ventures.

For 15+ years, Actify has been helping manufacturers to visualise and interact with design and engineering information. Actify serves a global base of more than 2,000 companies of whom approximately 85 percent are suppliers to the auto industry. Actify is headquartered in Detroit, Michigan with sales and support in 45 countries through its offices in the United States, United Kingdom, Germany and a global network of partners. For more information, visit www.actify.com

HOOPS is a registered trademark of Tech Soft 3D. All other products or company references are the property of their respective holders.

Tech Soft 3D

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Productive Machines makes autonomous machine tool optimisation available to all

Software allows manufacturers to easily eliminate chatter vibrations in CNC milling machines across the whole toolpath and make significant quality, productivity and sustainability improvements.

Productive Machines, a provider of autonomous machine tool optimisation technology, has made its core technology available in a fully automated Software-as-a-Service (SaaS) offering. Productive Machines' pioneering SenseNC Finesse software is the world's first to provide automated optimisation of all milling operations, enabling manufacturers to set up each machine tool and run the production preventing chatter vibrations at every cutter location across the toolpath.

The software uses an Artificial Intelligence (AI) model to optimise machine processes and is deployed at more than ten major manufacturers already, including Renault and MASA Aerospace. By making it available as an automated SaaS product, Productive Machines aims to help many more manufacturers globally eliminate trial and error iterations on machine tools, reduce waste and deliver better products faster.

Machines configured with Productive Machines' have demonstrated the ability to produce parts in half the original time, significantly improve surface quality, and reduce waste by up to 25 percent. Users have reported a substantial decrease in tooling costs, up to 20 percent, on optimised machines.

SenseNC Finesse is now available to manufacturers using Siemens NX CAM software via a software plug-in, enabling them to improve the performance of existing machines within their chosen CAM environment. Productive Machines will launch a plug-in for Mastercam users this summer and make its software available to users of CAM software from other vendors in the coming months.

Dr Erdem Ozturk, CEO at Productive Machines, comments: "Since the beginning of our journey, manufacturers have told us they needed an optimisation solution that doesn't need extensive experience to use. We've poured more than 100 years of our cumulative machining dynamics and software engineering expertise into creating our autonomous, easy-to-use solution that machine operators, application engineers and CAM programmers of all levels can use to utilise machine tools to their full potential.



Founder and CEO Erdem Ozturk, Productive Machines.

"We've successfully demonstrated the effectiveness of our technology in some of the world's most sophisticated manufacturing environments and this launch is a huge milestone in making it accessible to all machine shops that want to reduce lead times and enhance quality, productivity and sustainability."

The efficiency of SenseNC Finesse could be seen at work at the recent MACH Exhibition.

It was 2021 when Productive Machines spun out from the University of Sheffield Advanced Manufacturing Research Centre (AMRC) but the journey began long before that.

In 2010, Dr Erdem Ozturk, Founder and CEO of Productive Machines formed a research team at the AMRC and together they worked for ten years to push the boundaries of the machining dynamics field using specially developed digital twins and simulations to improve productivity, monitor tool life and eliminate chatter vibrations. Thanks to the support of the University of Sheffield, the AMRC and the ATI Boeing Accelerator, Productive Machines was formed to bring the results of this groundbreaking innovation to every machining workshop and to make the technology it had

developed at the Machining Dynamics Team available commercially.

Today the company has already impacted leading manufacturers from a variety of sectors from medical to construction. Productive Machines has raised a cumulative £3m investment and grown an amazing team of exceptional staff.

Productive Machines is making autonomous machine tool process optimisation more accessible to manufacturers. It uses AI to predict and mitigate the influence of harmful vibrations in milling processes, enabling manufacturers to reduce lead times and improve quality, productivity and sustainability. Investors in Productive Machines include Boeing HorizonX Ventures, UK Innovation & Science Seed Fund (UKI2S), Innovate UK, Fuel Ventures, NPIF Mercia Equity Finance and ACT Venture Partners. Its technology is already used by major manufacturing companies, including Renault, MASA Aerospace and AML.

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Versatility, precision and reliability

The latest generation of Lasertube, LT12 already boasts great success among customers

BLM GROUP's Lasertube LT12 is not just a new laser cutting system, but a true convergence of technology and innovation. It is a solution capable of meeting the most challenging needs of companies in the tube and profile processing industry, providing them with an invaluable competitive advantage. BLM GROUP's new Lasertube, presented in the second half of 2023 at the Innova Open House, immediately won over customers with its versatility and high performance.

LT12 was also illustrated at the Tube trade show in Düsseldorf through the support of an innovative application of artificial intelligence, which intrigued booth visitors. Product manager Gianbattista Mazzoleni describes LT12 and its features in detail.

Why a new system?

The goal of this new system is to fill a gap in our Lasertube system offering, which is manifested between two products: the LT8.20, which focuses on flexibility and performance and the LT14, which is dedicated to processing long and heavy profiles. LT12 is the solution for processing tubes, profiles and beams, keeping the focus on versatility and productivity. Many times, customers have asked us for a product

larger than LT8.20, but the jump to LT14 was too great both in terms of footprint size and performance across the lower range. LT12 was created precisely to give many customers the opportunity to process 'light' tubes with great performance, but also to be able to process larger tubes when needed.

What sectors is LT12 aimed at?

Certainly a very interesting sector is agricultural machinery. This is a vibrant and dynamic world, but one in which laser tube cutting technology has not yet shown its full potential, as it has in other sectors.

We have seen great opportunities since square tubes, rectangles, and even open profiles including "C," "L," and "H" profiles whose size easily comes to around 300 mm diameter exactly the size range of the LT12.

There are also many structural assemblies in this sector that would benefit significantly in terms of reduced manufacturing cost from the use of a Lasertube system. Of course, this new product is also very interesting in light construction architecture, for making canopies or small sheds, with tubes or beams up to 6-8 mm thick and lengths typically longer than the traditional 6 m.

What are the main features of the LT12?

The machine concept is similar to the LT8.20 with a mandrel in the tail and a chuck to support the tube in the cutting zone. LT12 has the interpenetrating mandrel in the chuck, so that minimal scrap is guaranteed without the need for chuck or mandrel movement. Especially on large tubes, this results in time savings in the scrap reduction stage and is consistent with the desire to have a larger machine, but with excellent processing time performance. LT12 is equipped with a chain loading system for tubes from 8.5 m up to 12.5 m, fully automatic unloading can reach a length of 12.5 m. The quality of the tube support and handling systems both downstream and upstream of the cutting zone has always been a distinguishing and distinctive aspect of BLM GROUP's systems, which has always pioneered innovative solutions in this aspect.

In addition to a clever mix of the smart template systems and chain-controlled tracking supports that characterise the LT8.20 and LT14, a special inverted smart template has been added that operates from above to hold the tube in place, reducing wear and tear on the support itself. Of course there are the Active

functions characteristic of Lasertube systems and in particular the Active Scan, which quickly allows the correct position and size of the tube being cut to be verified, ensuring accuracy.

The focusing head is another special feature consisting of a tube cutter with a longer focal length that allows it to process higher thicknesses than the LT8.20, the machine can process tubes up to 62 kg/m in weight and is able to tilt up to 50° from vertical, a full 5° more than the LT8.20 and LT14. Active Piercing and Active Focus, which we now take for granted on our machines, complete the picture of a cutting system that provides precision, speed and flexibility. Finally, the machine has excellent accessibility and a relatively small footprint compared to the LT14 and is equipped with 4 cameras, which are necessary to see the cutting area that is inaccessible due to the fibre source, allowing complete visibility of the entire workpiece being processed.

Not only lasers, but also machining

On tubes and beams, but increasingly in other areas as well, the possibility of adding some mechanical machining is highly appreciated because it avoids an additional step following



laser machining. LT12 is equipped with a mechanical machining unit capable of making threaded holes from M4 to M12. A 16-tool magazine with tool integrity control allows these machining operations to be fully automatic, programmed directly in the CAD/CAM design phase with ArTube. We fully expect that the LT12 will further expand the application range of Lasertube systems by enticing customers and industries that until

now have remained reluctant to tackle this type of technology, but certainly, all those who already have a Lasertube system and want to replace it or increase production volume will now have one more choice opportunity.

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Gripple reports significant benefits of using Nukon fibre laser

Since the installation of a new Nukon 2D flat sheet metal fibre laser machine at its recently opened, net-zero-certified Norfolk Bridge manufacturing site in Sheffield, UK, Gripple reports considerable benefits from the purchase of the machine.

With increasing global sales for its Fast Trak® bracket systems for mechanical and electrical service suspension, a desire to equip its Ideas & Innovation team with greater opportunities for new product development and a drive to further reduce its carbon footprint through greater vertical integration, Gripple took delivery of a new Nukon 2D fibre laser machine at its Norfolk Bridge facility in 2022.

The machine, a Nukon Eco 315 4 kW model, was supplied by Nukon Lasers UK, the exclusive UK and Ireland distributor for Nukon's 2D fibre laser, 3D fibre laser and fibre laser tube cutting technologies and the sister company of UK-based tube bending machinery specialists, Unison Ltd. Built in Europe, Nukon's fibre laser machines offer highly accessible power and performance, and are equipped with solid state American-made nLIGHT fibre lasers as standard. After considering a number of fibre laser machine manufacturers, Gripple shortlisted Nukon and another leading brand. With the high levels of product quality and capability provided by Nukon machines never in doubt, it was the commitment shown by Nukon Lasers

UK's sales director, Steve Haddrell, into fully understanding Gripple's laser-cutting requirements, that secured the sale.

At Gripple's Norfolk Bridge site, production surrounds the manufacture of the company's Fast Trak bracket systems, as well as solutions for the OLE rail industry and utility solar applications. For this type of work, Gripple typically uses CNC-controlled punch machines, with tooling specific to individual customer requirements. However, with an Ideas & Innovation team continually looking to provide new solutions to the challenges faced by customers and a company-wide drive to bring even more production in-house through a vertically integrated supply chain, it wasn't long before the new Nukon fibre laser began making its mark.

"Following installation, our Nukon fibre laser machine quickly gained a key role in the cost-effective manufacture of our OSHPD OPA-2123-10 seismic bracing and blast protection systems brackets developed for some of the most demanding environments in the world," comments Claire Tunnard, production manager at Gripple's 21,000 sq. ft. Norfolk Bridge site.

"The machine is also being used to produce components for our lightweight, easily transported solar cable hangers, suspended routing systems that are significantly faster to



install than traditional underground solar cabling. The ease of programming, speed, accuracy and flexibility of the machine are also providing our Ideas & Innovation team with exciting opportunities for new product development. Added to that, the Nukon fibre laser is being used to produce components for the manufacture of machine tools that will be based at other Gripple sites."

Net zero by 2030

"Investing in equipment such as the Nukon fibre laser also supports our enterprise-wide goal of becoming totally net zero by 2030," adds Claire Tunnard. "We use local component providers whenever possible, for a minimal carbon footprint, with the additional security of manufacturing as many components as possible for our suspension systems in-house. This dual source approach ensures security of supply and helps immensely with quality control."

Significant savings from cutting with air

From the outset, Gripple's manufacturing team was impressed with the Nukon laser's build quality, performance and precise cut. "Nukon Lasers UK has shared a wealth of advice and technical knowledge with us, including specific production processes and the most cost-effective gas to use depending on the material being cut. For example, our solar cable hangers are cut exclusively using compressed air, an essentially free medium," says Claire Tunnard. By largely cutting with compressed air, rather than costly nitrogen gas, which looks set to remain at historically high prices, Gripple is also benefiting from significant savings which, in turn, assist it in remaining competitive. In terms of reliability, Gripple reports that the Nukon machine has been trouble-free.



Nukon Lasers UK collaborates with Lantek UK for laser cutting excellence

Premium Turkish laser manufacturer Nukon is one of Lantek's OEM collaborative partners, combining the 2D and 3D technology of Nukon's lasers with the expertise Lantek brings to the industry with its Lantek Expert software for programming 2D lasers and its Flex3D software for tube cutting lasers.

Nukon Lasers UK, the company's UK and Ireland distributor has been working with Lantek's UK office for two years and has already collaborated in the installation of multiple machines.

Steve Haddrell says: "We are part of the Unison Ltd family of companies, which has been manufacturing and selling high-end tube bending machinery to the aerospace, oil and gas

and automotive industries for over 50 years. After thoroughly investigating the fibre laser market we partnered with Nukon. With its technology we can offer a technically advanced machine to our customers and, by partnering with Lantek our customers are productive within days of the machine installation. By working with Lantek we have every confidence in the success of every project we undertake."

According to Steve Haddrell, 2D laser technology is very mature and the quality of the Lantek software is a factor in separating Nukon from its competitors. He adds: "Lantek has all the essentials such as heat dissipation, job estimates, film burning for plastic coated sheet, common line cutting and powerful nesting, ensuring optimum yield from the material processed."

The Nukon lasers offer advanced technology using US made, high quality nLIGHT resonators which offer CutLine adaptive beam control 'on the fly' during cutting. One of the benefits of the CutLine system is a much smoother finish on thicker materials via the tuneable beam profile. Nukon machines also feature, Beckhoff controls and drives, piercing and cut sensors, automatic nozzle changing as well as multiple options for load/unload automation.

Its range of tube machines includes the NK-T160 which has up to 4 kW power and can process 226 mm diameter tube and U L H and I sections up to 160 mm² with minimal scrap. These machines can be coupled with auto load/unload systems or conveyer or roller systems to cut the whole or part length of the section being processed.

Steve Haddrell concludes: "Lantek Expert and Flex3D products are head and shoulders above others in the market. Lantek software is fully featured and the quality of the support staff and their depth of knowledge gives us complete confidence."

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Sheet metal fabricator gets smart with investment in multiple AMADA machines



Bideford-based sheet metal fabrication specialist Smart Manufacturing Ltd is taking its manufacturing operations to the next level by investing more than £1 million in a number of cutting-edge AMADA machines and building an additional factory in which to run them 24-7.

The company says the new machines, which include a state-of-the-art VENTIS-3015AJ 4 kW fibre laser cutter and EMZ 3612MII punch press, both with automation, will help double its turnover to circa £8 million within five years. Founded in 1986 by Martin Murch the father of current production director Shaun McQuillan, the company began life serving the food-pharma sector, manufacturing parts from high-end stainless steel equipment. While this activity continues, today there is far more to Smart Manufacturing thanks to its investment in AMADA technology.

"Since buying the AMADA machines we're picking up a lot of thinner gauge work in much higher quantities," says Shaun McQuillan. "A year ago we would probably view an order for 500 as high quantity, but now we are seeing orders for over 5,000. Of course, the only way we can handle these orders and maintain reasonable lead times is with automation."

In combination, Smart Manufacturing's automated VENTIS-3015AJ 4 kW fibre laser cutter and automated EMZ 3612MII punch press allow the company to load almost 10 tons of material and run the machines lights-out overnight.

"Our customers therefore get to enjoy both reduced costs and shorter lead times," says Shaun McQuillan. "With the new AMADA machines we can increase our daily material tonnage throughput by five times. It's almost scary to see how fast these machines run."

Employing 35 people, Smart Manufacturing is currently on a steep growth trajectory. Turnover is currently circa £4 million, but with its investment in AMADA machines the company is projecting to hit £6 million in two years and £8 million within five years. Among new clients taking up the services of Smart Manufacturing since the arrival of the AMADA machines in January 2024 are those operating in entirely new sectors, such as military, defence and AI technology.

"We looked at all the main players for our new machines, but AMADA are superior in my opinion," Shaun McQuillan states. "Moreover, AMADA always provides excellent customer service for our existing HFE-series press brakes."

Smart Manufacturing has built another £500,000 factory next to its existing facility in which to house the new AMADA machines. Also now on site is a new nitrogen-generation system, saving around £35,000 a year in nitrogen deliveries and the CO₂ emissions associated with transportation.

Key to the successful ramp-up of manufacturing operations at Smart



Manufacturing will be AMADA software. The company is now getting familiar with AMADA VPSS3i Blank CAD/CAM software and V-factory software, the Industry 4.0 of AMADA. V-factory actively monitors the performance and operation of machines by collecting data in real-time and facilitating access to that information anytime, anywhere.

"We're still new to V-factory but it will prove very useful for managing our production," explains Shaun McQuillan. "The software can monitor alarms during the night and identify any issues with our cutting schedules. It will ensure we are as productive as possible for as long as possible."

The philosophy at Smart Manufacturing is quite simple: the company combines teamwork and technology to exceed the quality and customer service expectations of clients. Smart Manufacturing not only produces everything from simple products to extremely complex bespoke machine builds, it also offers full design of conceptual ideas, through to final design of 1-off units and mass production of high-volume parts. Production excellence is at the heart of this offer.

Shaun McQuillan concludes: "AMADA machinery allows us to offer products and services that our competitors simply cannot produce, so much so that we regularly supply other sheet metal companies with metal parts for their clients. I would never go anywhere other than AMADA: we are 'team red' now and I can't see it changing."

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ETG has laser focus with new arrival

Now available from the Engineering Technology Group (ETG) is the new Durma HD-FO laser cutting machine. As the latest addition to the Fabrication Division at ETG, the impressive new HD-FO series demonstrates industry-leading productivity, cut-quality and integrated automation solutions that make this new arrival an exciting prospect for sheet metal manufacturers.

As a brand that leads the way in the UK sheet metal industry sector with its manufacturing efficiency, industrial design and ease-of-use, the Durma HD-FO provides low operational costs and an ergonomic quick-opening top cover and easy access to the cutting area with a compact bridge design that will appeal to all manufacturers. The Durma HD-FO laser is a user-friendly machine that integrates automated work processes that will save time and create efficiencies in your business. Furthermore, the new HD-FO has been designed to be energy efficient.

The advanced Durma technology ensures this machine has low running costs in a compact work area. The unique design minimises the footprint of the Durma HD-FO by incorporating the laser source and chiller inside the machine. Complementing this is the quick-opening front door that has been designed especially for customers with factory layout and space availability issues. Sheet loading and unloading are extremely easy in cases where no shuttle table is needed. The quick opening front door will save time and energy and while a manual cutting table is supplied as standard, customers can optionally select a pneumatic shuttle table option.

From a specification perspective, the impressive Durma HD-FO laser has a working area of 3,048 by 1,530 by 125 mm in the X, Y and Z-axes with a



maximum sheet capacity of 575 kg. The Durma machine offers class-leading dynamics with X, Y and Z-axis travel of 90m/min and synchronised acceleration of 14m/s² with an incredible positional accuracy and repeatability of 0.05 mm. The Bosch Rexroth CNC control system and the user-friendly 19-inch screen combine to simplify and enhance programming and setup.

The Durma Precitec Lightcutter laser head presents a combination of power and precision that enhances cut quality and edge finishes with its automatic focus that further enhances ease-of-use. This durable and powerful laser source is available with a range of options that include the YLR1000, YLS2000, YLR3000 and the YLS4000 which offer power from 1 to 4 kW for cutting a host of material types.

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Warrior Edge 500 DX welding system features new WeldModes to optimise performance

Synergic WeldModes deliver premium performance without complexity

ESAB has introduced its Warrior® Edge 500 DX multi-process power source featuring four advanced MIG/MAG WeldModes: THIN, ROOT, ROOT Pipe and SPEED as well as an Advanced Pulse WeldMode. All WeldModes enhance arc stability, offer more control at faster travel speeds and reduce spatter for less post-weld clean-up. With Warrior Edge DX, manufacturers and fabricators can make good welders great, optimise productivity, improve quality, consistency and simplify training.

Users set up material after wire spool change on an intuitive TFT LCD interface inside the RobustFeed Edge DX wire feeder. The feeder's front panel features day-to-day controls, Quick Job, memory, buttons, WeldMode selection and RFID badge-controlled access to promote consistency and manage a workforce with varying degrees of skills.

The Warrior Edge 500 DX has built-in connectivity and comes with a lifetime subscription to the InduSuite WeldCloud Fleet online software application.

Productivity enhancing WeldModes

The THIN WeldMode reduces heat to minimise distortion when welding thin plates, 0.7 to 3 mm, or 22 to 11 gauge. With an ability to bridge gaps, the easy-to-control ROOT WeldMode is optimised for root passes on plates in all welding positions and creates a smooth arc even while weaving. The ROOT Pipe WeldMode optimises gap bridging in vertical down pipe applications.

The THIN, ROOT and ROOT Pipe WeldModes use enhanced short circuit transfer processes with a novel type of adaptive control that delivers consistent and smooth metal transfer for a more stable weld puddle. Improved stability gives the operator better control even when welding at faster travel speeds, plus it suppresses the conditions that lead to the formation of spatter. Even though these WeldModes lower heat input for reduced distortion, their gap-bridging ability promotes consistent fusion without excessive reinforcement on the backside of the joint. In addition, there is no need for a voltage sense



cable which simplifies setup and reduces the risk for mistakes.

The SPEED mode creates a more focused arc by taking a conventional spray transfer arc and overlaying a modified pulsed current wave form on top. Benefits of the SPEED mode include improved control at higher travel speeds, reduced spatter, deeper more focused penetration in fillet welds and the ability to weld in narrower grooves. The Warrior Edge 500 DX also offers synergic Pulse MIG WeldMode, conventional and synergic MIG/MAG welding, MMA, Live TIG and carbon arc gouging. The Warrior Edge 500 DX has a rated welding output of 500 amps at 60 percent duty cycle.

"The Warrior Edge 500 DX enables ordinary welders to benefit from sophisticated WeldModes without needing continuous training or relying too much on individual operator skill," says Arne Lagerkvist, global director for heavy industrial welding equipment at ESAB. "The intelligence inside the system makes setup fast and welding easy. When using a synergic WeldMode, operators can fine-tune performance simply by adjusting the wire feed speed and trim control knobs and the system will maintain optimised arc characteristics and deliver excellent weld results."

Warrior Edge systems also offer an Arc

Dynamics function where the operator can set welding parameters and fine-tune by turning a single knob. Benefits include creating a more focused arc for faster travel speed when making fillet welds, adjusting arc energy for specific welding conditions, stability control for specific travel speeds, wire stick-out and better control of the weld pool and weld bead geometry. Arc Dynamics works in all synergic WeldModes to provide customised control over welding.

The Warrior Edge power source is designed to work with the RobustFeed Edge wire feeder, which features an effective and quick to setup operator management system that uses an RFID-reader to scan operator badges. This allows locking parameter limits for the quick jobs, improving repeatability and adherence to Weld Procedure Specifications. The feeder also provides ESAB's new TrueFlow digital gas control technology for greater precision, confidence and cost savings. The system automatically prevents insufficient gas flow and optimises flow during arc starts and welding, a common source of quality issues and gas waste.

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In TIG welding, the focus is entirely on achieving a high weld quality. In doing so, it is just as important to maintain a stable arc at all times as it is to have a wide range of functions on the welding system. The Artis-170/210 generation masters this balancing act perfectly, combining both in a compact, robust system design. Despite its lightweight and easy-to-handle design, weighing in at less than 10 kg, it offers all the key adjustment options that are otherwise found only on the larger professional TIG systems.

The challenge of thin sheet welding in mechanical engineering

“It works” is the motto of Knoll Maschinenbau GmbH in Bad Saulgau, which lies in the heart of Germany’s Upper Swabia region. Founded in 1970 by Walter Knoll as a one-man company, today more than 1,100 employees manufacture advanced industrial systems in Germany, Poland, China and the USA. Welding is carried out with the Fronius TPS 320i, a reliable welding machine that leaves nothing to be desired when it comes to handling, welding processes and functions.

Knoll enjoys a leading position in terms of technology, quality and brand awareness. The Swabian family business is economically independent and creates added value for all companies in which metal is machined in the automotive industry, in energy and medical technology, in machine and plant construction and in the aerospace sector.

The advanced solutions from Bad Saulgau optimise the performance of many machine tools. Resource-conserving cooling lubricant cleaning systems, chip conveyors and pumps are produced. The product range also includes central systems, which are individual pieces of equipment linked to form one system. They are required for the fully automatic transport of chips and cooling lubricants to central processing plants. Automation solutions for assembly lines and intralogistics are another mainstay for Knoll. Examples include assembly conveyor belts, automated guided vehicles or cobot solutions.

Due to the high real net output ratio, Knoll retains the majority of the added value in its own company. It significantly reduces logistics requirements and all associated CO₂ emissions in a way that is both cost-effective and sustainable.

Not everything undergoes series production in Bad Saulgau. Many components are welded by hand in shell construction. Sheets with different wall thicknesses up to 25 mm are used



during this process. For coolant cleaning and conveying systems, the Knoll experts mainly use S355 steel, which is joined with the shielding gas M21 and the wire additive SG3. The company’s own Welding Procedure Specification (WPS) provides the basis for parameterisation.

When joining thin sheets, the experts at Knoll rely on the pulse welding process. This is characterised by low spattering and reduced distortion. The intelligent MIG/MAG pulse synergic function of the TPS 320i offers Knoll specialists a pulsed-arc process with controlled material transfer. In the base current phase, the energy input is reduced to such an extent that the arc only just burns steadily and preheats the surface of the workpiece. In the pulsing current phase, an accurately controlled current pulse ensures targeted droplet detachment. Both phases result in precise, low-spatter welding across the entire power range. Unwanted short-circuits with simultaneous droplet explosion and uncontrolled welding spatter are almost excluded. The Spatter-Free Ignition (SFI) also helps to avoid unnecessary spatter.

Over 70 manual welding workstations at Knoll are equipped with the advanced welding machine. It is easy to operate thanks to a customisable 7-inch touch display, penetration and arc length stabilisers and the fact that it can be expanded with task-specific software packages known as Welding Packages. Examples of this include Low Spatter Control (LSC), Pulse Multi Control (PMC) and Cold Metal

Transfer (CMT). Welders can log in with their own NFC card and access their personal authorisations and settings.

The menu navigation is available in over 30 languages. Considering that Knoll is using more and more welding professionals from other countries due to the increasing shortage of skilled workers in Germany, “native speaker welding machines” are extremely helpful. Not only is the welding machine’s display multilingual, it also uses clear language.

The TPS-320i variant used with integrated wirefeeder is ideally suited for welding tasks to be carried out manually. This device’s particularly simple wire threading process, which takes just a few steps, is a huge plus and makes everyday life easier for welders.

The welding machine is operated with a central rotary push-button combined with a touchscreen. The quick-change function that allows users to switch between properties, processes and functions is particularly practical. If you touch the respective prompt on the status bar of the display, you can immediately access the available parameters.

On the central display of the TPS 320i, the specialists can see all the relevant control variables and adjust them one by one. Innovative animations support the welding specialists when entering parameters.

Even if the operation is carried out with welding gloves, the machine responds perfectly. Recurring parameter combinations for specific



tasks can be saved as personalised easy jobs at the touch of a button. For example, when welding a 3 mm thick steel plate, job 1 is used. If you are welding a 5 mm thick chrome-nickel plate, use job 2. If a JobMaster welding torch is used, these jobs are available directly on the welding torch. The practical Fronius WeldConnect app for Android and iPhone is helpful for setting the welding specifications.

Welding does not necessarily have the best image. The profession is often associated with noise, harmful welding fumes and monotony. At the same time, the job is quite demanding, at least when robots come into play. Then, in addition to welding knowledge from electrical

engineering to metallurgy, programming skills are also required. There is huge demand for welding technicians who know how to program robots and they are well paid.

Many companies, including Knoll, now create their welding programs offline, i.e. separately from the robotic welding system on a PC or laptop. This not only minimises downtimes, it also offers the big advantage of welding simulation on the digital twin. In this process the software identifies axis limits, calculates starting points, limit positions and journeys and sets teaching points independently. Obstacles are visualised and welding torch positions corrected on time, before the first weld is made.

Knoll now also uses a cobot system. It is easy to use and does not require traditional programming skills. If you want to create a weld path, you move the welding torch point by point along the joint line and save the points one after the other. The weld path and sequence are automatically calculated by the software, recorded and are



permanently available for later jobs. The system at Knoll uses CMT technology.

Due to its extremely stable arc, combined with reduced heat input and low spattering, today the renowned "cold" MIG/MAG welding process from Fronius is used worldwide in various key industries. It plays to its unrivalled strengths, especially when it comes to thin sheet welding.

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State-of-the-art KUKA welding technologies for e-mobility

Major order in the double-digit million range

KUKA is supporting its customers in the transition to more sustainable mobility with state-of-the-art technology. The company is supplying 23 friction stir welding cells with integrated robots for the production of electric vehicles for an automotive customer. It is the largest single order in this area to date.

The Friction Stir Welding (FSW) cells, with various technologies and KUKA KR FORTEC robots, are integrated into production lines for electric vehicles, where they are used in several production steps. Robots in the cells weld battery trays together and join cooling plates to the battery trays in a second production step. KUKA is also responsible for the entire friction stir welding process.



Many years of expertise for complex tasks

This is an important task, as battery trays play a crucial role in electric vehicles. They must be leak-proof and resilient, support the correct temperature of the batteries and help to prevent the vehicle occupants from being endangered by the battery in the event of an accident. A particular challenge in production is 3D welding, for which robot-based FSW technology is particularly suitable. This also requires complex clamping technology, for which KUKA was able to contribute comprehensive engineering expertise. A tool changer and a cleaning station for the FSW tools are also used for fully automatic operation.

In addition to the modern technical solution, the customer was impressed by KUKA's comprehensive expertise and many years of experience in a wide range of areas, from process technology and engineering to good cooperation with the sales experts.

Higher quality, more efficient and more sustainable welding

In FSW welding, a rotating, pin-like tool is guided between the contact surfaces of the component. The frictional heat causes the material to plasticise and the parts are joined together. Even difficult-to-weld or dissimilar materials, such as aluminum, can be welded together with magnesium, copper or steel. This process consumes less energy and material and does not require shielding gas or flux cored wire as in conventional processes.

FSW welding is used in a wide variety of industries that have special requirements for welding seams, be it battery containers, side walls of high-speed trains or tank structures of rockets. In addition to the growth market of e-mobility, the technology is therefore also used in the aviation and electrical industries, for example.

KUKA is working with research partners to further develop the technology. In order to monitor the quality of the weld seams during the process and thus reduce the time and costs of the subsequent inspection, KUKA is working with partners in the AI production network of the University of Augsburg on an AI-based process monitoring system.

KUKA at the Battery Show Europe in Stuttgart

Modern technologies and processes such as friction stir welding are playing an increasingly important role in the complex production of electric vehicles and their batteries. KUKA has been supporting customers here for decades with comprehensive industry and technology expertise. At the Battery Show Europe in Stuttgart, the largest event for battery and electric vehicle technology in Europe, industry experts and leading manufacturers discussed the latest developments. The company exhibited for the duration of the event.



Robot-based FSW technology is particularly suitable for 3D welding, a challenge in production.

KUKA is an international automation group with around 15,000 employees. As one of the world's leading suppliers of intelligent, resource-saving automation solutions, KUKA offers industrial robots, Autonomous Mobile Robots (AMR) including controllers, software and cloud-based digital services as well as fully connected production systems for a wide range of industries. These markets include automotive, with a focus on e-mobility and battery, electronics, metal and plastic, consumer goods, food, e-commerce, retail and healthcare. The company is headquartered in Augsburg, Germany.

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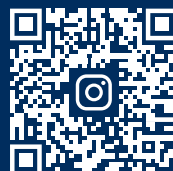
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