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Citizen's patented LFV cutting technology

Citizen's patented Low Frequency Vibration (LFV) machining technology has taken-off with 584 machines scheduled for build this year. It is totally different to any form of macro programming or mechanical vibration used on some more conventional machines. It is a fully integrated combination of specialised software and a mechanical engineered package that is activated through a G-code at the machine control. It enables the X- and Z- servo axes of the machine to oscillate or 'back-off' in the axial direction involving movements of tens of microns that are synchronised with the rotation of the spindle drive. As a result of the minute 'air-cutting' motion created by the pulse, the actual length of chip produced by the cutting tool can be programmed at the control and sequenced to operate when required within the production cycle.

Darren Wilkins, deputy managing director of Citizen Machinery UK, says: "The process cannot be retrofitted to existing machines and took three years to develop in Japan. This involved machine tool elements such as special slideways, drive, bearings and support systems plus the software algorithms in order to maximise the advantage and gains from using the cutting technology."



The L20-VII is the first production machine in the Citizen stable to accommodate LFV which has now been followed by a smaller 12 mm capacity version. However, the technology is to be expanded into other machines including the company's fixed-head Miyano turn-mill centres with the recent launch of the BNA-43GTLYLV.

LFV provides a host of advantages to the cutting operation and can be used for turning, profiling, facing, taper and interrupted cutting, drilling and even thread cutting as well as micro-machining and very thin wall production processes. As the LFV influenced toolpath now includes 'air-cutting' this interrupts the cut to break up the swarf stream into smaller, highly manageable pieces.

LFV can be engaged over a wide range of materials from difficult to cut exotics to poor chipping ferrous and non-ferrous types including copper and plastics where chip making is brought under control and improved.

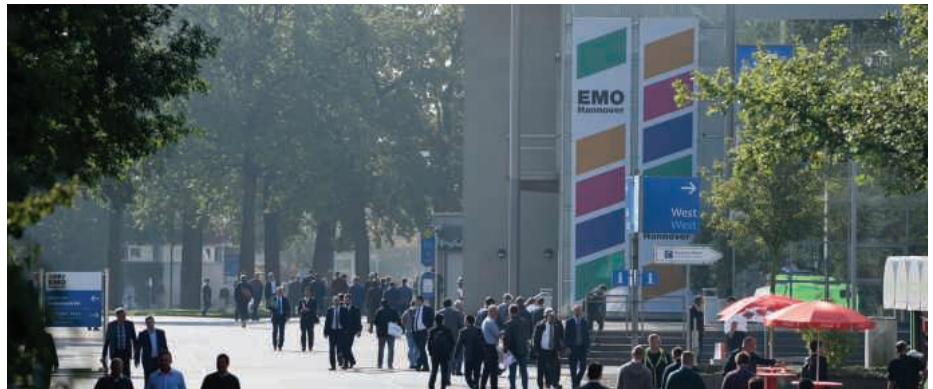
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EMO sets the pace for the future of manufacturing

"A veritable hotbed for business success"; a fantastic window onto the global market"; "a pacesetter for the future of manufacturing" these are just a few of the ways in which participating exhibitors have described the outcome of EMO Hannover 2017. After six action-packed days, more than 2,200 international manufacturers of production technology are left Hannover with full order books and in a highly optimistic frame of mind.

"More business, more international drawing power and more innovation: EMO has once again lived up to its reputation as the leading global tradeshow for the world of metalworking", remarks Carl Martin Welcker, general commissioner for EMO Hannover 2017, adding that it was also the definitive exhibition for machine tool makers worldwide and a pacesetter for the future of production technology. He also pointed out that EMO had a major impact on business activity, quoting a survey in which EMO visitors indicated their intent to invest a total of over 20 billion euros in production technology over the course of the next 24 months. Deals worth 8 billion euros were sealed during the one-week event. Aalen-based SHW Werkzeugmaschinen company, for example, sold several machines all at once. "In addition to these unexpected sales, trade visitors came to us armed with tangible projects, some of them even going so far as to specify the actual dimensions of the machines required. Dozens of such customers came from China, alone," states managing director Anton Müller.

The show's chosen motto of "Connecting systems for intelligent production" proved to be right on the mark, effectively pulling in the crowds, especially from abroad. Many



exhibitors were touting connectivity solutions, data analysis applications and innovative services. The emphasis was on systems capable of interconnecting multiple partners, cloud-based machine monitoring solutions, simulation software, augmented reality for machine maintenance, blockchain technology for secure data transfer, new business models and much more.

Christian Thönes, chairman of the Executive Board of DMG Mori, based in Bielefeld, Germany, echoes the statements of many other exhibitors in saying: "The keynote theme of this year's EMO Hannover gave us the ideal backdrop against which to present market-ready products for digital manufacturing."

Additive manufacturing was also very high on the agenda for a great many EMO visitors. Mirroring the interests of a fifth of the show's attendees, Dr. Alexander Krupp, application engineer at Multiphoton Optics GmbH based in Würzburg, Germany, says: "As an applications engineer in a firm that produces 3D printers for high-precision parts manufacturing, my main reason for attending EMO Hannover 2017 was to see what is happening in the additive manufacturing sector and get to know the

new technologies. I needed to assess the current state of the art, and for the world of metalworking, there is no better place to do this than at EMO Hannover."

Overseas exhibitors clearly see EMO Hannover as a stepping stone to international markets. Jens Thing, managing director Europe at Haas Automation's Belgian subsidiary, described EMO as "a fantastic window on the international market. Here you can meet visitors from all over the world. For doing international business, there is simply no alternative to EMO."

The increasing global drawing power of EMO was matched by the decision-making caliber of its attendees. Many exhibitors enthusiastically spoke of the in-depth, high-caliber nature of the talks in which they engaged with customers and prospects from around the world. "We had more than 400 enquiries by day two of the show, and this trend has continued very nicely," comments Norbert Teeuwen, president and COO of Okuma Europe GmbH, the European subsidiary of Okuma Corporation, Japan. "In comparison with recent fairs, we were delighted, even a bit surprised, to see a much higher number of conversations turning into firm orders. Customers from Central and Western Europe have less of a tendency to order directly at the fair, but we had visitors from Eastern EU countries or the Russian-speaking part of the world, for example, approaching us with some very specific requests, which was highly satisfying."

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14th-17th November

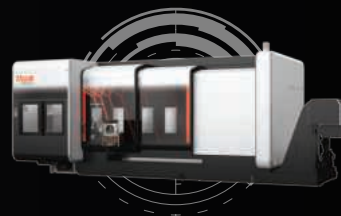
Come to Mazak's UK Open House event in Worcester.

Mazak will be displaying a number of machines from this year's EMO, including the INTEGREX i-500, VARIAXIS i-300 AWC and HCR-5000S.

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Double world debut for Mazak Multi-Tasking range at EMO

Yamazaki Mazak gave world debuts to two machines from its acclaimed INTEGREX series of Multi-Tasking machine tools at EMO.

The first machine that took centre stage in the Multi-Tasking zone, was the latest extension to Mazak's flagship INTEGREX range: the INTEGREX i-500.

Specifically designed to further extend the capacity of its highly successful i-series, and meet the growing demand for larger workpiece sizes, the i-500 features a large machining envelope and boasts increased X- and Y-axis capacity. Benefiting from a new compact-designed 24 kW 12,000 rpm mill spindle, complemented by a 37 kW 2,500 rpm main turning spindle, the i-500 also delivers improved ergonomics which allows the operator closer access to the workpiece. The machine on display at EMO 2017 features a tailstock and optional second spindle, and will be controlled by Mazak's revolutionary SmoothX: the fastest CNC in the world.



The INTEGREX i-500 was joined by another machine shown for the first time on the global stage, the INTEGREX i-800V/8. Combining full 5-axis milling, powerful turning operations and pallet-changing capabilities, the machine has the ability to quickly process large, highly complex workpieces on a vertical platform, such as marine propeller parts or commercial jet engine components.

Equipped with a tilting high power 10,000 rpm 37 kW main spindle, capable of machining a wide range of 5-axis applications, the i-800V/8 also benefits from a 45 kW turning table powered by a direct drive motor for a complete DONE-IN-ONE solution.

Controlled by SmoothX CNC, the INTEGREX i-800V/8 displayed at EMO is



equipped with Renishaw's SPRINT™ on-machine contact scanning system to further increase the level of real-time data analysis available to operators. With the ability to record a constant stream of accurate 3D points across the part surface, and analyse this data in real-time through the SmoothX CNC controller, it has the potential to provide a further step-change in automated in-process control.

Also in the Multi-Tasking zone on the Mazak stand was its highly popular INTEGREX i-400S machining centre, complete with two new specifications that debuted at EMO 2017. Benefiting from Mazak's SmoothX CNC, the i-400S features Mazak's new smooth spindle analytics, which provides instant spindle vibration analysis and feedback which can be quickly accessed via the control panel on the shop floor. Crucially, this increases both accuracy and productivity, facilitating full traceability of component

manufacture, while also incorporating preventative maintenance techniques to reduce downtime. The machine can handle workpieces up to 1,519 mm in length with a swing capacity of Ø658 mm.

The i-400S is ideally suited to the automotive market, as evidenced by its



second new function, Mazak's SMOOTH gear cutting software, which combines advanced Multi-Tasking machines and Mazak's latest developments in gear manufacturing processes, including SMOOTH Gear Skiving, SMOOTH gear milling and SMOOTH gear hobbing. What's more, the software allows the operator to develop complex gear machining programs easily by entering the gear data via a user-friendly dialogue on the CNC, further reducing setup times.

The final machine completing Mazak's Multi-Tasking line-up at EMO 2017 was the INTEGREX j-200S. Bringing maximum value, precision and throughput to the production of complex medium-sized workpieces without compromising performance or accuracy, the j-200S is the perfect entry-level machine for those looking to take their first steps in Multi-Tasking. The machine's high rigidity fully-cast structure



delivers outstanding machining results thanks to the integral 5,000 rpm, 11 kW main and second turning spindles.

The INTEGREX i-200S on display at EMO 2017 was fitted with a performance package comprising of a range of Mazak's highly popular machine peripherals, including high-power coolant and a large capacity tool magazine, offering a total Multi-Tasking solution at a competitive price point.

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CB FERRARI are renowned for their very adaptable multi-axis high speed, high accuracy solutions. Linear motors are also available on some models including the horizontal machine. All machines are equipped with CB Ferrari designed and built rotary axes and a large range of CB Ferrari's own electro-spindles

Laser machining range – one of the easiest and quickest laser machines to program on the market



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COMI Spa manufacture high speed 5-axis machining centres for a wide range of materials. A range of 11 models, specifically developed to match the application, size of the working piece, production needs in automotive, aerospace, moulds and appliances. **NEW! Horizontal 5-axis machining centre with two large work tables that automatically change and raise into position for high speed machining of monolithic aluminium structural parts**



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Open House features new D25 and LFV technology

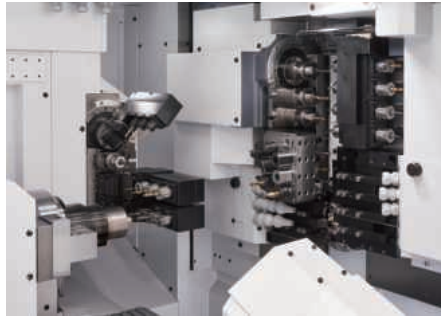
Citizen Machinery UK followed up a successful EMO show in Hannover with its ever-popular Open House. The annual event featured a pre-launch preview of Citizen's latest generation Cincom D25 sliding headstock, a 10-axis CNC turn-mill centre, with new control, two gang and a back-tool post plus B-axis with 59-tool capacity.

As well as 12 Citizen and Miyano machines installed at the showcase event, there was also the UK launch of the widely acclaimed Low Frequency Vibration (LFV) technology, now available on the smaller capacity Cincom L12-VIII LFV. This additional model is the next phase of the machine tool builder's programme to extend this production advantage across its product range following its UK launch on the L20 machine type during 2016.

Visitors to the UK headquarters at Bushey, Watford, were also able to discuss face-to-face, confidential finance support to help with future investment plans involving machines from the Citizen Cincom and Miyano fixed head turn-mill centres ordered during the event.

Deputy managing director, Darren Wilkins says: "We enjoy this event, because we get very close to the clients and there are normally discussions on specific projects."

The Cincom D25-VIII has a 135° B-axis incorporated within its first gang tool post for complex feature machining at both the main and sub-spindles. It also features a Z-axis with the second gang tool post enabling simultaneous balanced cutting with the first gang tool post. A back-tool post will now accept radial or face fixed or driven tools capable of adjustment through



90 degrees for face, radial or angle machining. There is also a further opposite tool post with fixed tool position that is mounted alongside the sub-spindle.

A further 19 companies supported the Open House event covering CAD/CAM, tooling, quality, materials and machine accessories.

The Citizen D25 sliding headstock turn-mill centre represents the next generation of Citizen's advanced CNC system featuring touch screen and qwerty keyboard. Operational flexibility is increased for complex cycles with two gang vertical toolposts each with X-, Y- and Z-axes and one with a B-axis capable of both front and back machining. In addition, there is a back toolpost and opposite toolpost. Now available from Citizen Machinery UK, the Cincom D25 has a tool capacity up to 59 tools with the added advantage of removable guide bush for more economic material use on shorter components.

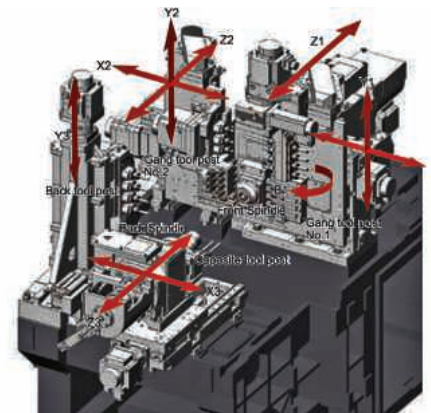
The Cincom D25 is configured as a 10-axis machine which includes the 0 to 135° swivelling B-axis. This swivel axis is incorporated within the first (X1, Y1, Z1) axis gang toolpost capable of holding four double-sided driven spindles to service both the main and sub-spindles. In addition, the second gang toolpost (X2, Y2, Z2) is able to work independently or simultaneously with the (X1, Y1, Z1) toolpost to overlap for instance, rough or finish turning operations or apply in unison, drilling or milling based cycles.

Adding to the flexibility of the tooling application, there is a further (Y3) back toolpost axis with one fixed or three driven tools having 90° adjustment for face, radial or angle machining. The opposite toolpost is positioned alongside the sub-spindle (X3,

Z3) which provides a further two fixed tool positions.

The power on the main spindle is 5.5 kW and 3.7 kW for the back spindle, with both having a maximum speed of 10,000 revs/min. The gang driven tools are powered by drives of 2.2 kW with maximum speeds of 9,000 revs/min and the back driven tool speeds are 6,000 revs/min. Rapid traverse rates are 32 m/min with 24 m/min available on the Z2 gang toolpost.

The new D25 model at the Open House event was a prototype with a new Mitsubishi 800 controller as well as the usual unique operating system.



Darren Wilkins describes the importance of this feature: "The new platform is at a higher level and allows you to control five axes simultaneously. Although available on lathes, until now it has not been available on sliding head machines. Normally, five axes are not needed, but there are components where this is a distinct advantage, for example dental components, where a curved tube can be milled at the side then drilled down the middle using the 5-axis control."

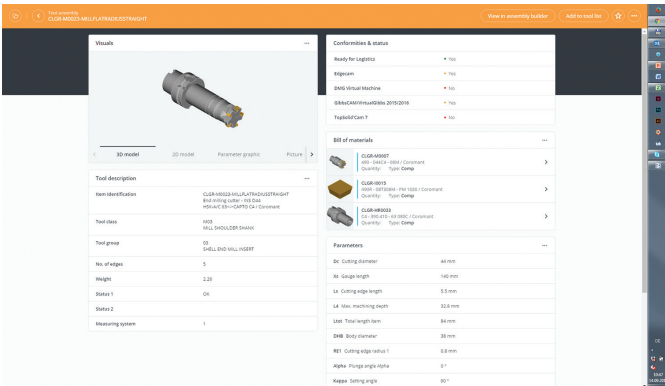
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TDM Cloud Line is revolutionising tool data management worldwide

Sandvik Machining Solutions and its partner TDM Systems are playing a leading role in the modernisation of tooling

At EMO TDM Systems, a subsidiary of Sandvik Machining Solutions, presented the world's first cloud-based solution for Tool Data Management. TDM Cloud Line enables users at manufacturing companies to easily access tool data and use it for cutting. The new product was demonstrated live at the international press conference in Hannover.



Hugo Nordell, director digital solutions, Sandvik Machining Solutions, says: "Sandvik is assuming a leading role in the digital transformation of tooling with the introduction of TDM Cloud Line. The TDM cloud solution enables customers to accelerate their engineering process, simulate the use of various tools and securely plan production on the basis of comprehensive, precise tool data. TDM Systems is our systems partner because of its many years of experience with Tool Data Management and it is able to provide users with a fully mature solution."

TDM Cloud Line is based on TDM 2017 Global Line, the fully modernised TDM solution launched in spring. The key advantage of this cloud solution is that users can download and manage data from thousands of tools without having to purchase them. The solution can test alternative tools during the product design process and select the optimum tool for the specific design. At present, users have only data from tool manufacturers available to them, which can vary both in quality and depth. Data from the TDM cloud is available anywhere and is ready for immediate usage in the virtual cutting process.

Peter Schneck, CEO of TDM Systems, says: "The digital development process often still fails as a result of data gaps and media breaks in the tool area. The quality and availability of tool data are crucial to the success of metal-processing companies. Our cloud-based solution marks the start of the digital transformation for users. We regard ourselves as drivers of digitisation for all of Tool Lifecycle Management, from selection to recycling."

Sandvik Machining Solutions and TDM Systems offer an innovative solution that takes Tool Lifecycle Management to the next dimension.

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600 UK launches new CNC milling machine at EMO

600 UK, the home of Colchester and Harrison lathes, Pratt Burnerd Workholding and Clausing, launched the latest addition to its Clausing range of precision machine tools at EMO, the Clausing MillPWR CNC milling machine

The New MillPWRG2 CNC milling machine is fitted with the powerful, flexible and user-friendly Acu-Rite control system from Heidenhain, which is also available in 4 optional languages of English, French, German and Spanish.

The MillPWR mill allows you to create and program complex parts in minutes; manufacture one-offs and small batch components; routinely mill prototype and test components; utilise the easy-to-use, full conversational programming system for quick, no fuss cutting; produce highly accurate parts first-time with ultra-high precision 1 µm resolution scales.

The MillPWR Acu-Rite control uses a 12.1" high resolution screen, displaying graphics in either 2 & 3D line or 3D solid formats and although user-friendly conversational programming is used throughout with the addition of an on-board calculator, the MillPWR system allows uploading, editing and running G Code and DXF files, enabling users to transfer and use programs directly to and from the machine.

Data storage is also industry leading, with a huge 2.5 GB of internal memory and the



ability to store and modify up to 99 part programs, all as standard features. For external storage, USB and Ethernet capability are also available as standard.

The MillPWR CNC mill is supplied in three models with table sizes from 230 x 1,245 mm and 254 x 1,370 mm. Powerful 2.2 or 3.7 kW motors are used, giving spindle speeds of up to 4,350 rpm, combining fast, powerful, and highly accurate cutting. Spindle tapers of either R8, ISO 30 or 40 can also be supplied.

Paul Rushworth, 600 UK sales director, says: "We are really excited about the impressive new addition to our already comprehensive turret and bed milling range and the MillPWRG2 CNC mill takes this to a new level. All our machine tool products from Clausing, Colchester, Harrison and Pratt Burnerd are available through our low-cost finance options too."

Colchester MultiTurn CNC lathe takes the stage at EMO

Following much-welcomed feedback from its extensive worldwide distributor and customer base, 600 UK launched the Colchester MultiTurn 2-axis manual/CNC lathe at EMO.

The new MultiTurn is a simple, flat-bed CNC lathe now incorporates the powerful and user-friendly Siemens 828D control with Shopturn as a standard feature, although FANUC 0iTF with Manual Guide i can also be fitted should the customer specify it.

The MultiTurn takes a highly established, robustly engineered lathe concept from Colchester that makes it the perfect machine for many of today's CNC turning applications. The MultiTurn is everything that you come to expect from a Colchester

lathe and is therefore robust, stable and highly precise, irrespective of the component size handled.

The Siemens 828D control with Shopturn has a well-earned reputation for being highly user-friendly and intuitive, ensuring that operators can cut quickly and easily with very little training. However, the Shopturn system is also powerful enough for more advanced CNC users to output maximum productivity quickly.

The Colchester MultiTurn lathe has been designed specifically for: CNC users looking for increased versatility on one-off and small batch production; first time CNC buyers and jobbing shops looking for real programming simplicity; education and training establishments needing a real lathe with step-by-step simplicity.



600 UK offer six Colchester MultiTurn models, starting with the compact MultiTurn 1000, which has a 330 mm swing over bed, a 7.5 kW motor, outputting spindle speeds of 3,500 rpm, right through to the heavyweight MultiTurn 6000, which has a massive 760 mm swing over bed and an 18.5 kW motor giving spindle speeds of up to 1,400 rpm.

The MultiTurn 6000 also has bed length options ranging from 1.5 to 6 metres, ensuring that the MultiTurn is capable of turning any component, regardless of size, right through to long shafts, billets, bar stock and castings.

600 UK

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CB Ferrari unveils GT series and more at EMO

Renowned for its very adaptable multi-axis, high-speed, high accuracy machining solutions, CB Ferrari showcased for the first time at EMO its new GT1600/2000 machining centres. The GT Series is a high-speed, 5-axis machining centre featuring a moving column design with a tilting vertical spindle. This design creates a rigid and compact structure that enables highly efficient roughing and finishing operations to be carried out. A key feature of the machine is the 2,000 mm x 1,500 mm table that incorporates the 750 mm diameter rotary table. The two machine series has axis travels of 1,600 or 2,000 mm in X, 820 mm in Y and 850 mm in Z.

The GT Series has two options for the toolchange with either 30 or 60 tool capacity available; through spindle, filtered, coolant and in process probing available. To aid high-performance metal removal there are also two options of spindle speed and power, both of which are CB Ferrari-built electro-spindle units. The first is a 20,000 revs/min 28 kW unit with HSK -A63 spindle nose, the second is a more powerful

16,000 revs/min 33 kW unit with an HSK-A63 connection. Maximum torque is achieved at 4,200 revs/min and 3,000 revs/min respectively. This highly capable machining package is contained within a footprint of just 5,805 mm x 4,000 mm.

In addition to its machining centre ranges, CB Ferrari is also a leader in the design and manufacture of laser machining systems. To highlight this it displayed its 3-axis laser 813 machine from its extensive 3- and 5-axis laser machining range. The Laser 813 is a compact laser marking system with a footprint of 1,100 x 1,900 x 2,200 mm and axis travels of 320 x 320 x 320 mm. In addition to marking applications the lasers can be applied to processes such as ablation, texturing, drilling or welding, as well as the production of small shallow moulds which can be machined complete by laser without the need of electrodes.

The CB Ferrari laser machines are easy and quick to program and come with various control options including Siemens,



Heidenhain and Bosch. As part of CB Ferrari's customer support services these lasers can also be integrated with other machines in the CB Ferrari family, with the company supplying many bespoke solutions to a diverse customer base.

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In seventh heaven with Victor CNC

Victor CNC introduced a host of exciting new machine tools and innovations at EMO. With seven machine tools on the booth, Victor CNC used the event as a platform to launch the new Vcenter-P136 and the new Vturn-45/125CM, alongside a number of established machines.

The new Vcenter-P136 vertical machining centre is available with Y-axis travel of 700 mm, a powerful FANUC Oi-MF CNC control unit with a 15-inch monitor, a robust 12,000 rpm spindle powered by a T8/12000i high torque motor. Renowned for being a brand built upon quality, stability, rigid and performance, the new Vcenter-P136 takes these attributes a step further. The new addition to the company's VMC line up is supplied with a CTS, oil skimmer and much more. This exciting development will appear alongside the renowned Vcenter-AX800 that has set a new standard in heavy duty machining.

The Vcenter-AX800 was shown at EMO with a new Heidenhain TNC-640 full 5-axis CNC control unit, component measuring system, table shower, automatic door operation and the KinematicsOpt system with calibrating ball. This very latest Heidenhain TNC-640 CNC control with comprehensive 5-axis features was also debuted on the market leading Vcenter-AX350. Offering a spacious 350 mm diameter tilting table with Roller cam drive, the robust Vcenter-AX350 guarantees high reliability without backlash for prolonged service life, precision and performance.

As a manufacturer that has earned an enviable reputation for its high performance turning centres, Victor CNC took its standing to new heights at EMO with the launch of the new Vturn-45/125CM slant bed turning centre. Extending upon the qualities that have made the Vturn a household name in the heavy duty turning sector, the new Vturn-45/125CM brings all these qualities into a more compact unit with a Z-axis travel range of 1250 mm. Smaller than the 2200, 3250 and 4250 mm variants, the new Vturn-45/125CM packs the same heavy-duty machining capabilities into a compact envelope for manufacturers with limited floor areas. With a belt driven

spindle and GTP gearbox for the C-axis, the Vturn-45/125CM also marked the arrival of touch screen features on its FANUC Oi-TF CNC control unit.

Alongside this new arrival was the Vturn-NP16CM with its upgraded C-axis BMT-45 tooling turret that incorporates a new 6,000 rpm milling spindle, high pressure coolant, a work feeding

Victor CNC Ltd, based in Rochdale, Lancashire is an associated subsidiary company of Victor Taichung Machinery Works Co Ltd. Victor CNC Ltd is the sole distributor of Victor CNC lathes and machining centres in the UK, Eire and selected countries within mainland Europe. In addition, spare parts are supplied throughout the whole of Europe. In the past



WF-E100/10P with turnover station and an extremely impressive Easyway EWR-03 robotic loading station. While the Vturn-NP16CM highlighted the automation credentials of the Victor CNC brand, the VT-Q200T2Y2 further emphasised automated production and flexibility with its twin spindle and twin turret configuration with Y-axis and robotic part catcher.

The final machine of the EMO line-up was the extended VT-A26 turning line. The new VT-A26LSB-Y incorporates a 105 mm large spindle bore with a Fanuc Bi250S spindle motor and YCM milling capability, a high-quality Kitagawa BB-212 chuck and a 14-bar high pressure coolant unit.

If you didn't make it to Hannover to see these exciting new innovations, get in touch with Victor CNC and it will take you through what these innovations can bring to your business.

years since its inauguration Victor CNC Ltd has seen continuous growth and development, which is reflected in its marked increased market share. Supply, installation and commissioning of machines, as well as technical support through service, spare parts etc., are all supplied direct from Victor CNC Ltd's own base.

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Machine sales and new partners for XYZ at EMO

XYZ Machine Tools' attendance at the EMO show has proved to be successful and the company is already planning for its return in 2019. The stated aim of attending EMO for XYZ was to increase its distribution and, with some extensive dialogue taking place on the stand, additional partners look likely within mainland Europe and Africa.

Howard Bamforth, XYZ's export sales director, also confirms the finalising of two distribution deals, one with PBS Machine Tools in South Africa and the second with CNC Island, based in Iceland: "We have had limited sales to both South Africa and Iceland before, but with these two distributors coming on board it is exciting times for both these sales territories. In fact, we are already seeing the positive effects with two machines on their way to Iceland, which will be supported in the coming weeks with a visit by one of our applications engineers once they are installed at the customer."

XYZ Machine Tools also saw some direct sales activity at EMO with orders being received for a range of machines from

customers in Germany and Bulgaria during the week-long exhibition.

Howard Bamforth continues: "The European market is one that has terrific potential for XYZ and its range of machines. Sales within mainland Europe have increased by 12 percent in the past 12 months and there is no reason, given the reception we had at EMO, that this positive trend cannot continue. We have the advantage of the ProtoTRAK control system, which continues to lead the way in helping customers make that step into CNC, and there was also considerable interest in our recently introduced series of linear rail machining centres. The innovative XYZ 2-OP portable vertical machining centre also proved a hit with visitors to the stand. In addition, we have invested in additional resources and support for our European distributors at our headquarters in Devon. The results of this are already



Howard Bamforth (second left) with colleagues Uwe Heinemann, Thorsten Kohlstedt, Andy Ostheimer and Norbert Pfitzer from XYZ's German distributor Piper Werkzeugmaschinen

bearing fruit with greater efficiency dealing with inquiries, resulting in additional sales."

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CNC sliding-head multi-spindle autos launched at EMO

DMG MORI has combined the speed of multi-spindle automatic turn-milling with the versatility of sliding-headstock (Swiss-type) technology to launch two new machines with up to 41 CNC axes at EMO. The multis are manufactured at the group's recently remodernised Gildemeister Italiana factory in Brembate di Sopra, which has experience of delivering more than 5,000 fixed-head multi-spindle autos.

In a compact footprint of 21.9 m² including proprietary bar magazine and high-pressure coolant system, the MULTISPRINT 25 and MULTISPRINT 36 are capable of manufacturing components from bar up to 25 mm and 36 mm diameter respectively. The larger machine can also turn chuck parts up to 50 mm diameter, a process that can be automated by one or two robots in the working area.

Driven tools and a 100 mm Y-axis on the cross-slides at each of the six spindle positions allow highly complex workpieces to be completely machined with up to 28 standard tools, 24 of which may be driven. X-axis travel is 50 mm and Z-axis travel is



100 mm, or 180 mm in combination with DMG MORI's SWISSTYPEkit including driven guide bush. Converting the lathes for long part turning takes less than two hours. Maximum rotational speed of the spindles is 7,500 rpm, while driven tools rated at 13,800 rpm / 14.2 Nm provide considerable versatility of production.

For rear machining, MULTISPRINT machines can be optionally equipped with a pick-up spindle or one or two counter spindles, allowing cycle time reductions of up to 35 percent through one-hit production. The pick-up spindle moves 230 mm along the Z-axis. The counter spindles, which index in 0.002 degree increments, move 280 mm in X-, 320 mm in Y- and

370 mm in Z-. Machining is completed using a double endworking station with three driven and two fixed tools. Control is provided by a Fanuc series 30i.

The machines are currently being tested for 12 months by five selected customers under production conditions and will be commercially available from early 2018. A video showing the MULTISPRINT in operation may be viewed at www.youtube.com/watch?v=wTPSAVdXu8Y

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Greenleaf revolutionises the ceramic insert market

Greenleaf Corporation has introduced XSYTIN®-1, a new revolutionary phase-toughened ceramic insert grade complementing its world-class line of ceramic insert cutting tools. XSYTIN-1 is engineered by Greenleaf to machine more materials than any other ceramic grade in the industry today. It is designed to mill, turn and groove the most difficult materials on the market at extreme feed rates with the high surface footage of ceramic inserts.

The strongest ceramic insert grade ever produced by Greenleaf, XSYTIN-1 is ideal for use in interrupted cuts, removal of scale, roughing, semi-finish and finish cuts in heat-resistant superalloy materials, cast irons, nodular irons, ductile irons, steel alloys and stainless steels.

The unique properties of XSYTIN-1 will establish new benchmarks in the performance level of ceramics. The structure of this new phase-toughened ceramic



exhibits high wear resistance and outstanding thermal shock resistance, which makes XSYTIN-1 a very predictable, high-performance product.

Simply put, XSYTIN-1 revolutionises the ceramic cutting tool market by expanding into application areas where, until now, ceramics have not been an option and significantly improves the areas where ceramics have been traditionally applied. Greenleaf offers superior productivity gains and cost savings opportunities by combining the market-leading XSYTIN-1 with the application expertise for which Greenleaf has been known for over 70 years.

XSYTIN-1 is available now in a wide variety of ANSI/ISO geometries. For more information or to schedule a demonstration, visit www.greenleafcorporation.com/xsytin-1 or contact Greenleaf Europe B.V.

Greenleaf Corporation is a leading supplier of cutting tool technology,

specialising in the manufacturing of high-performance tungsten carbide and ceramic grade inserts and innovative tool-holding systems. Greenleaf continues to build on over 70 years of innovation and the legacy established by its founder Walter J. Greenleaf, Sr., which centres on supplying customers with productive solutions to every metal-cutting situation.

The corporation traces its roots back to the early 1940s when Walter J. Greenleaf, Sr. sold tungsten carbide tooling systems to the steel industry in Western Pennsylvania. Greenleaf Corporation was formed in 1945, and began marketing a diverse line of products for the machine tool industry. Greenleaf Corporation moved into manufacturing in 1960. In 1969, Greenleaf was the first to introduce CVD-coated carbide inserts to the US marketplace.

Over the next 44 years, Greenleaf grew in market share through the development of its technological capabilities and product line. Walter J. Greenleaf, Jr. assumed the presidency from his father in 1966 continuing the family legacy of innovation and excellence in manufacturing. Greenleaf capitalised on its reputable line of carbide products

by engineering innovations in the areas of ceramic, ceramic composites and custom-designed tool-holding systems. Greenleaf's introduction of WG-300®, a whisker-reinforced ceramic insert that is recognised as one of the most significant advancements in the history of cutting tools, enabled companies to reach previously unachievable machining speeds.

Today, Greenleaf Corporation is positioned to serve the evolving needs of companies in major industries, including



aerospace, automotive, bearings, machine tool and rail among others. Greenleaf's products are engineered to provide optimal performance against a wide range of materials under the most rigorous metal-cutting conditions. In addition to a comprehensive line of carbide inserts, Greenleaf offers high-quality ceramic and ceramic-composite materials, which can be custom designed for specific machining applications.

Under the guidance of current company president James M. Greenleaf, the company sells and distributes its product lines in over 60 countries. Currently Greenleaf services its



global customer base from a number of locations. Greenleaf's Corporate Headquarters in Saegertown, Pennsylvania and a facility in North Carolina are the mainstays of pioneering breakthroughs in cutting tool technology and manufacturing. On the global front, award-winning customer service and technical support is also achieved through offices in the USA, Europe and China.

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Expanded solid carbide drill series

The Hoffmann Group, a leading system partner for quality tools, has expanded its GARANT MasterSteel solid carbide drill product series. In the summer of 2016, the Hoffmann Group presented the new MasterSteel SPEED and FEED high-performance solid carbide drills. This product family has now been expanded to include the variants 8 x D and 12 x D. GARANT MasterSteel FEED could be found at EMO.

The GARANT MasterSteel FEED is now available with the world's largest L/D ratio of 12 x D for three-edged solid carbide drills and comes with a matching three-edged NC spotting drill. This means more tools for professional machining of steel, cast iron and stainless steels which generate with three cutters up to 50 percent more feed per rotation and offer long tool life.

For three-edged drills, chip removal is a particular challenge. Compared to the classic two-edged unit, the flutes are small. The Hoffmann Group has nevertheless succeeded in designing the GARANT MasterSteel FEED with 8 x D and 12 x D,

without having to make promises with the excellent feed rates. This is ensured by a special cutting-edge geometry with stable cutting edges and a large clearance in the centre. A special taper with a specially shaped tip angle reduces the cutting pressure and creates an optimal chip flow as well as controlled chip breaking.

The Hoffmann Group has also developed a matching NC spotting drill for GARANT MasterSteel FEED in order to be able to carry out deep drilling precisely. Here too the Hoffmann Group relies on the excellent self-centring capability of the three-blade unit, where the forces spread over three instead of just two blades. This allows for targeted spot drilling even on critical and uneven surfaces. The point geometry is optimally matched to the geometry of the following MasterSteel FEED drill with a point angle of 155 degrees.

GARANT MasterSteel FEED and SPEED



have been optimised to suit a range of production environments. GARANT MasterSteel FEED solid carbide drills develop their highest performance in machining centres with high spindle speed and high torque. Whereas the GARANT MasterSteel SPEED has been designed for machines with a low spindle output but a high speed as well as for thin-walled components.

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New machine model and a wide range of digital components

With its new C 650 machine model from the Performance Line series, the Maschinenfabrik Berthold Hermle AG presented, at EMO a new machining centre for varied 3-axis and 5-axis jobs. A steel die for automotive tool and mould making shows the precision and performance capacity of the new machining centre. This was complemented by three other machine models.

The compact C 250, also a member of the Performance Line series, has been part of the Hermle product portfolio for a year now, proving its worth here with a job from the field of model construction.

With an RS 05 robot system adapted to a C 12 U dynamic from the High-Performance Line, Hermle confirms its place in the field of machining centre automation for a wide range of sectors.

The new HS flex handling system, adapted to a C 42 U dynamic 5-axis machining centre, was displayed for the first time at a trade fair. The system already attracted a great deal of interest at the in-house exhibition in Spring from

customers needing a high-performance, compact automation tool at a very attractive price.

Hermle AG also showcased the complete range of its digital components for the first time. A number of software tools were highlighted including: Increasing machine productivity and process reliability with the aid of the AFC, ACC, CTC, AVD, LAC control functions; Application-oriented optimisation of surface quality, dynamics or precision using Hermle's own setups; Intelligent order management with the Hermle Automation Control System (HACS) and HACS-Connect, Hermle's own interface for integration into ERP or PPS systems; central information and monitoring tool Hermle Information Monitoring Software (HIMS); convenient tool management with HTMC & HOTS for Hermle machining centres.

Also on display for the first time was a new



touch monitor for all TNC 640 control units that will be standard on all models using this control system from September.

Also, additive manufacturing with Hermle's own Metal Powder Application Technology (MPA) was presented with the aid of many examples and expert advice.

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Versatile quality control of medical parts

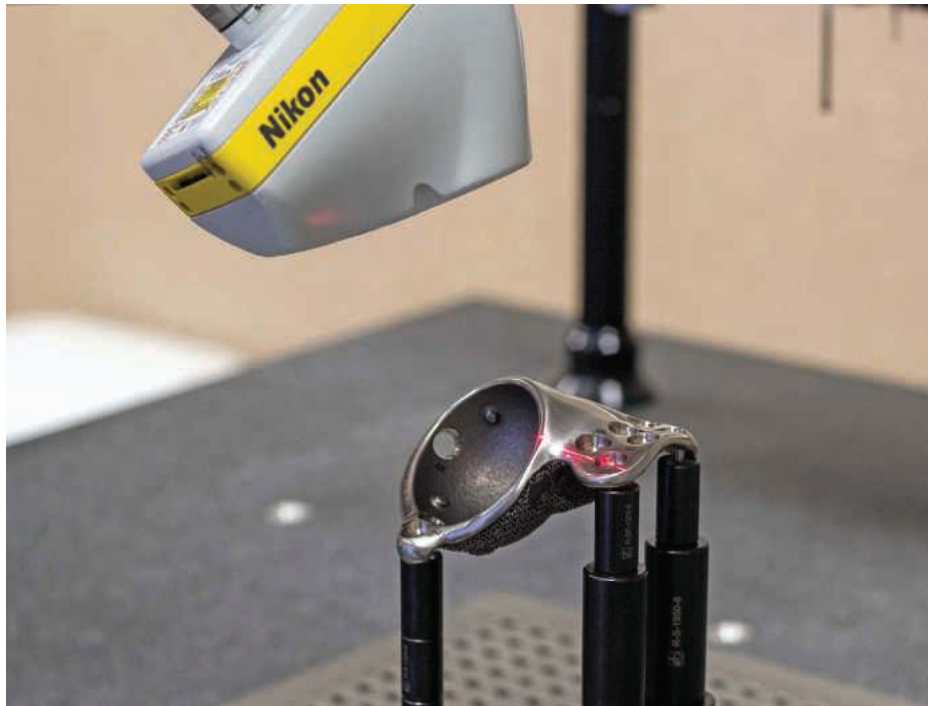
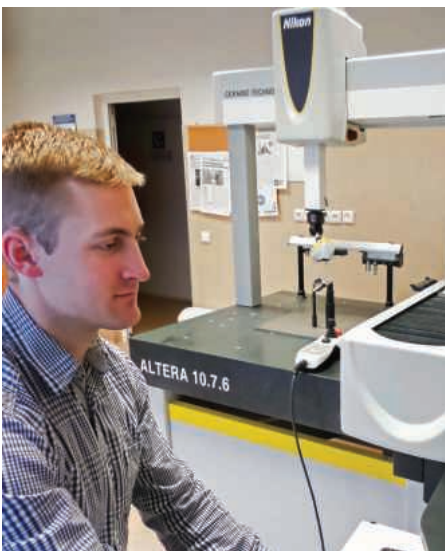
Quality assurance is vital in the production of accurate, patient-specific implants, endoprostheses and surgical guides. Consequently, Baltic Orthoservice in Kaunas, Lithuania uses a multi-sensor Coordinate Measuring Machine (CMM) including a laser scanner in conjunction with a micro-CT (computed tomography) system, all supplied by Nikon Metrology.

The ALTERA CMM with LC15Dx laser scanner allows fast inspection of 3D-printed implant surfaces and screw holes, while the XT H 225 CT guarantees internal structure quality and accurate geometrical correlation between CAD implant model and manufactured product.

Paulius Lukševičius, engineer of mechanics, explains: "3D-printing is a complicated technology and there is a big variation in processing parameters, so predicting the quality and geometry of printed objects is quite a challenge.

"Patient-specific implants are a bespoke treatment solution, which means that the surgery must be 'pre-planned' virtually so the implant can simply be put in place. To be able to execute the virtual plan, it is vital to be 100 percent sure that implant geometry is exactly the same as the CAD model and that the holes are machined to high accuracy.

"To fulfil these goals, we use a variety of metrology equipment. The CMM with laser scanner is irreplaceable when we need to perform fast checks after each manufacturing and post-processing stage, especially to check spherical surfaces, bearing surfaces and hole angles."



Unlike standard modular hip implants used to treat severe clinical conditions, patient-specific alternatives are designed as a single device with anatomically adapted surfaces. It eliminates the risk of instability and adapts the implant to the bone rather than the bone to the implant. A major benefit of the procedure is that, during surgery, there is no need to shape the bone to adapt it to the implant or use bone cement, meshes and augments to fill the bone defect. The implants are designed using virtual anatomical bone models which are obtained from medical CT scans of a patient.

For manufacturing the implants, Baltic Orthoservice uses direct metal laser sintering equipment purchased in 2012. After 3D-printing, implants undergo a variety of post-processing steps, including heat treatment, surface polishing and milling for screw holes. There are a number of medical device standards and regulations that must be met, which is why it is paramount for products to be of ultra-high accuracy.

With fine tolerances and strict standards to be adhered to, the post-processing stages are repeated until the physical implant matches the desired virtual model exactly. Quality assurance measures are taken following every step, during which the LC15Dx laser scanner is able to show quickly

how well the physical part matches the virtual model.

Paulius Jokymaitytė says: "Laser scanning and micro-CT serve two different purposes and both excel in different areas. The CMM with laser scanner is very effective for inspecting features and surfaces of bigger parts such as an acetabular implant, for quality control of standard products like osteosynthesis plates and for assessing standard elements in patient-specific implants, i.e. screw holes or spherical shapes.

"The micro-CT system is a vital tool for non-destructive analysis of the internal structure and geometry of additively manufactured components."

As the Quality Control Laboratory at Kaunas was a new project to supplement the additive manufacturing facilities, there were no previous systems to be replaced. Baltic Orthoservice knew what was required and compared the best technologies on the market to find the right solution.

Paulius Lukševičius says: "The primary requirement was to have the capability to inspect parts made from different types of materials. The size of the working area was also important, but most crucial was accuracy."

He pointed out that a key advantage of the Nikon Metrology LC15Dx is its ability to scan reflective and multi-material surfaces

thanks to Enhanced Sensor Performance (ESP) technology. It maintains accuracy, speed and data quality by intelligently and continuously adapting the laser settings for each measured point. Probing error is comparable to that of tactile inspection (1.9 µm) and data collection is fast at 70,000 points per second. By maintaining such high standards when scanning difficult surfaces, the LC15Dx is an ideal tool for inspecting complex parts in the medical industry.

Paulius Lukševičius concludes: "The Nikon



solution offers more in-depth knowledge of what we are manufacturing and gives better precision and understanding of 3D-printing errors and deviations.

"It means we achieve superior product quality and avoid problems during operations. Implants with Nikon quality assurance are more reliable and it is easier to prove their worth.

"Often our quality control laboratory receives inquiries from other manufacturers in the medical sector and other industries to

perform geometry inspection for them."

With 100 years expertise in the field, Nikon has always been at the forefront of optical and technological innovation, promoting creativity and trustworthiness as part of the company's global mission statement.

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Solar-powered skin opens new possibilities for prosthetics

A new way of harnessing the sun's rays to power 'synthetic skin' could help to create advanced prosthetic limbs capable of returning the sense of touch to amputees. Engineers from the University of Glasgow, who have previously developed an 'electronic skin' covering for prosthetic hands made from graphene, have found a way to use some of graphene's remarkable physical properties to use energy from the sun to power the skin.

Graphene is a highly flexible form of graphite which, despite being just a single atom thick, is stronger than steel, electrically conductive, and transparent. It is graphene's optical transparency, which allows around 98 percent of the light which strikes its surface to pass directly through it, which makes it ideal for gathering energy from the sun to generate power.

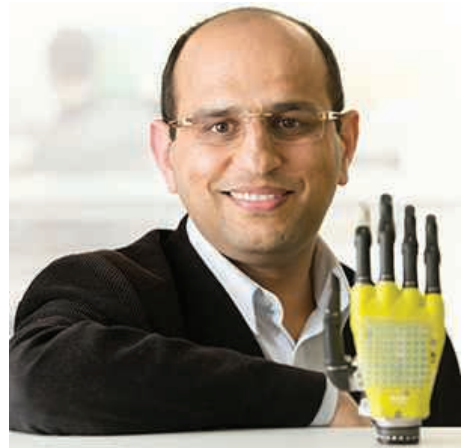
A new research paper, published in the journal *Advanced Functional Materials*, describes how Dr Dahiya and colleagues from his Bendable Electronics and Sensing Technologies (BEST) group have integrated power-generating photovoltaic cells into their electronic skin for the first time.

Dr Dahiya, from the University of Glasgow's School of engineering, says: "Human skin is an incredibly complex system capable of detecting pressure, temperature and texture through an array of neural sensors which carry signals from the skin to the brain.

"My colleagues and I have already made significant steps in creating prosthetic prototypes which integrate synthetic skin and are capable of making very sensitive pressure measurements. Those measurements mean the prosthetic hand is capable of performing challenging tasks like properly gripping soft materials, which other prosthetics can struggle with.

"Skin capable of touch sensitivity also opens the possibility of creating robots capable of making better decisions about human safety. A robot working on a construction line, for example, is much less likely to accidentally injure a human if it can feel that a person has unexpectedly entered their area of movement and stop before an injury can occur."

The new skin requires just 20 nanowatts of power per square centimetre, which is easily



met even by the poorest-quality photovoltaic cells currently available on the market. And although currently energy generated by the skin's photovoltaic cells cannot be stored, the team are already looking into ways to divert unused energy into batteries, allowing the energy to be used as and when it is required.

The University of Glasgow

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Renishaw robot makes guest appearance in popular television drama

Renishaw's neuromate stereotactic robot recently featured in an episode of the BBC drama *Holby City*. During the episode, neuromate assists with the treatment of an Obsessive-Compulsive Disorder (OCD) patient who undergoes a stereotactic Deep Brain Stimulation (DBS) procedure.

In the storyline, neurosurgeons use advanced MRI technology and Renishaw's neuroinspire software to identify the region of the brain responsible for generating the OCD symptoms. A carbothane neuroguide guide tube kit is used to create tracts for the insertion of thin and flexible specialist electrodes. Powered by a battery pack implanted in the patient's chest, the electrodes deliver a series of persistent electric impulses to stimulate the symptom-generating region of the brain. DBS can have remarkable therapeutic effects in the treatment of OCD, and other neuro-disorders such as Parkinson's disease. To be effective, the electrical stimulation must be delivered at a high frequency, typically greater than 130 Hz.

The success of DBS depends on careful mapping and targeting of brain anatomy. Accurate positioning of electrodes is essential. The Renishaw range of products for stereotactic neurosurgery are designed to integrate into a comprehensive system for improved efficiency and safety at each stage of the DBS procedure, from planning through to verification and delivery.

Renishaw's neuroinspire software provides neurosurgeons with an easy-to-use platform for target identification and trajectory planning. The software fuses MRI and CT datasets into a 3D volume, enabling neurosurgeons to explore the best available approach to the target, avoiding key anatomy and blood vessels.

Whilst the neurosurgeon remains in complete control of the procedure, neuromate can assist by providing a stable base and accurately aligning the surgical tools in accordance with the neurosurgeon's pre-planned trajectory. The ergonomic functionality of the neuromate robot combined with state of the art pre- and intra-operative imaging technology can improve chances of accurate electrode placement.

The neuroguide electrode delivery system, designed for use in DBS, is a long-term implant which facilitates electrode implantation by acting as a conduit, preventing the electrode from bending off target. The neuroguide system includes a radio-opaque stylette which can be used for target verification prior to electrode implantation.

The patient undergoing surgery in *Holby City* is kept awake during the DBS procedure. Historically, this would have been necessary to allow the neurosurgeon to monitor the patient's response to treatment. A typical DBS procedure lasts 6-8 hours, which can be grueling for both patient and neurosurgeon. The prospect of remaining awake has often acted as a bottle-neck on the number of patients receiving the benefit of this treatment.

However, improvements in surgical imaging and supporting technology, including the products from Renishaw described above, means that DBS is increasingly available as an asleep procedure. Increasing confidence in the ability of medical



technology to support accurate delivery reduces the need for the patient to be conscious for verification, greatly reducing stress and improving the patient experience.

UK-based Renishaw is a world leading engineering technologies company, supplying products used for applications as diverse as jet engine and wind turbine manufacture, through to facial reconstruction and neuro surgery. It has over 4,000 employees located in the 35 countries where it has wholly owned subsidiary operations.

For the year ended June 2017, Renishaw recorded sales of £536.8 million of which 95 percent was due to exports. The company's largest markets are China, the USA, Japan and Germany.

Throughout its history Renishaw has made a significant commitment to research and development, with historically between 14 and 18 percent of annual sales invested in R&D and engineering. The majority of this R&D and manufacturing of the company's products is carried out in the UK.

The company's success has been recognised with numerous international awards, including eighteen Queen's Awards recognising achievements in technology, export and innovation.

Renishaw is listed on the London Stock Exchange (LSE:RSW) where it is a constituent of the FTSE 250.

For further information on Renishaw's range of products for stereotactic neurosurgery, visit www.renishaw.com/neuro

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Ground breaking X-Ray technology developed with Baty Vision System

Bowers Group has supplied IBEX Innovations with a Baty VuMaster CNC Vision System to ensure the accuracy of key components used in ground breaking X-Ray detector technology. IBEX Innovations Limited (IBEX) has developed and commercialised an innovative X ray detector technology capable of generating high sensitivity materials information from standard X-ray detectors.

When used in medical applications additional information such as Bone Mineral Density becomes available without further dose to the patient, enabling better diagnosis of conditions such as Osteoporosis. IBEX is also testing the technology in order to improve the standard X-Ray techniques used in the routine screening of women for breast cancer, potentially enabling the early detection of cancer cells.

The patented IBEX technology adds a precise three-dimensional structure, the IBEX Multi Absorption Plate (MAP), in front of an existing X ray detector to modulate the X ray beam in a predictable way over the area of a few pixels. It was this Multi Absorption Plate that IBEX had to ensure was highly accurate in order to facilitate the correct modulation of the X ray beam, and was therefore in need of a high precision measurement solution.

Bowers Group supplied IBEX Innovations Limited with a Baty VuMaster CNC Vision

System. The Baty VuMaster CNC Vision System encompasses a floating measuring camera that moves anywhere in the measuring range. Because the camera moves and the part stays still, expensive and potentially time consuming workholding devices are not needed.

IBEX Innovations' Grants and Project Delivery manager Kurt Scott says: "We are very pleased with the performance of the VuMaster. Although it has mainly been used for research and development so far, it's a valuable piece of inspection kit. The features of the VuMaster are a perfect fit for our application, and the automated measurement process means that our lab technicians are free to get on with their work. The measurement process is fast and accurate, it really works for us."

Using the The VuMaster, IBEX is able to ensure the accurate measurement of the MAPs, which are thoroughly inspected to ensure all dimensions are consistent and within the required tolerances. IBEX is accredited for ISO 9001:2008, a well-known international quality standard for any business, and ISO 13485:2012, which specifically addresses work in relation to medical devices, therefore accurate measurement solutions are key to the company's commitment to meeting high standards of quality.

The VuMaster can be operated manually or programmed to carry out inspection routines that can be recorded and stored. When played back, these 'programs' give a fully automatic (CNC) process, recreating the same lighting conditions and using 'Video Edge Detection' to automatically 'capture' feature data. The result is fast, accurate, 'non-contact' measurement over a large measuring range, including automatically generated reports in the form of a fully dimensioned drawing of the measured part, and more detailed tabulated data report in pdf or xls format. SPC data analysis is also included in Fusion software, these reports can be stored locally or to the company network.

Once the IBEX MAP is fitted in front of an existing X ray detector, advanced software algorithms then deconstruct the effect of the MAP to determine pixel by pixel spectral

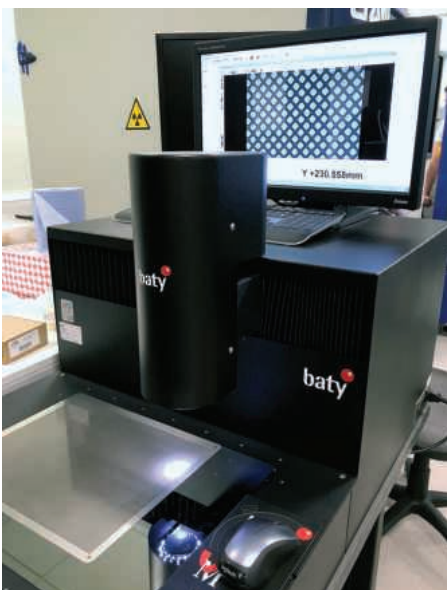


content. Using the additional spectral information returned by IBEX equipped detectors, the IBEX Software Toolkit independently classifies the material type and thickness of features.

By recovering spectral information normally lost in single images from indirect silicon line and area sensors, IBEX-equipped X-Ray detectors can effectively classify both materials and thickness changes in a sample. This enables the delivery of improved medical diagnostic imaging as well as detection of impurities, defects and threats. The IBEX Multi Absorption Plate (MAP) technology rapidly integrates into most existing detector types, and adds materials information whilst retaining the speed, signal to noise, spatial resolution and imaging area characteristics of the underlying sensors.

When used in medical applications, the technology has a sensitivity equivalent to that of dedicated DEXA systems, with no compromise to the high quality diagnostic output, and no increase in patient dose. This is achieved in a single exposure, with no changes to standard clinical procedures, whilst retaining the speed, sensitivity and resolution of the underlying detector. Tests are in process at IBEX to use the technology for mammograms, lowering the risk of radiation by using half the dose, and providing contrast based on material composition which could potentially detect cancer cells.

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Complex, fast and fully automated: the art of wire erosion

As the demand for leaner, more efficient production processes increases, so too does the requirement for more complex, automatable machines. Wire EDM is ready to meet that challenge

UK manufacturing industry is under more pressure than ever to meet demanding sales targets, streamline operations and increase productivity to compete in the global market place. To do this successfully, manufacturers need to be sure their machines and tools are up to the task.

While traditional machine methods such as milling, lathing and grinding remain popular for certain processes, wire EDM, or Electronic Discharge Machining, has built a reputation as a more precise, efficient and cost-effective machining method. Initially used in the 1960s as a means of making tools from hardened steel, wire EDM has since developed into a highly reliable and accurate process for the manufacture of complex and durable components.

Andrew Spence, ROBOCUT product manager at FANUC UK, says: "The principle of wire EDM is a spark that is generated between the workpiece and the electrode, similar to the spark that you see in films when the main character hotwires a car. With EDM, you control this spark, which melts the material and creates the shape you need.

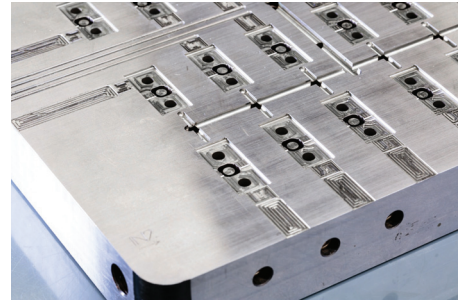
"Wire EDM involves a thin piece of wire, which is pulled between two guides to act like a high-precision bandsaw. Pre-determined computer numerical controlled (CNC) Drive Systems guide the wire into making complex shapes."

The CNC aspect of the machine allows manufacturers to specify the shape and boundaries of the cut with minute precision. Andrew Spence explains, this helps them to produce the same result every time.

"EDM is accurate down to +/- 3 µm on tolerance and +/- 1.5 µm on positioning. You can only achieve that with milling if the shape is relatively simple. With an EDM process, once you've proven the first one, the repeatability is the same for each one."

The accuracy of wire EDM, guided by the CNC Drive Systems, has led to the introduction of such machines across a variety of sectors.

Andrew Spence continues: "EDM has been a very big part of the manufacturing process for tool makers, but you can now also see wire EDM in motorsport, aerospace, university R&D and general engineering. Medical is also a major sector



for wire EDM, which is used to manufacture medical devices such as stents or implants. This is because EDM doesn't use a cutting force like traditional machines, so you can cut very thin and accurate components.

"Wire EDM can also cut a different form for the top and bottom of a piece of material, which allows you to create extrusion dies for door seals on cars, for example."

The versatility of wire EDM also extends to its ability to cut thick and hard materials, even polycrystalline diamond.

Andrew Spence continues: "It has always been difficult to grind, mill or lathe hard, thick materials using traditional processes because the force of the cut causes wear and damage to the machine tooling. Wire EDM doesn't require any force or impact, which really opens up the kinds of materials we can shape with this machine.

"For example, you could shape a piece of hardened D2, 60 Rockwell, Inconel, Tungsten carbide or titanium. A wire EDM can even cut polycrystalline diamond, a manmade material on a carbide backing. The only proviso is that the material must be conductive, so plastics and other non-conductive materials are not suitable for EDM manufacture.

"Modern machines are also capable of cutting materials of up to and over 500 mm thick, and because the material is cut instead of chipped, you can use the waste material or 'slugs' to manufacture even smaller components, another cost saving."



However, there is a downside to the EDM's manufacturing capabilities, as Andrew Spence explains: "Wire EDM is a highly-regarded process across the manufacturing industry, but its main disadvantage is speed. It's not a fast process, if you're cutting a material that is 500 mm thick, the machine will only be able to work at about 1 mm a minute.

"Having said that, it only takes one pass with the machine to create the object you want, as opposed to traditional machining methods where it might take three or four. Furthermore, if you want to create the same shape several times, you can put three, four or even ten pieces of material on top of one another and make identical copies of the component at the same time. In effect, what you lose in the initial speed of the process, you gain in efficiency overall."

With the rise of Industry 4.0, the most important consideration for manufacturers is the role that automation can play in streamlining their processes. Wire EDM machines are powered by pre-determined automated commands which can offer a significant cost saving to industry.

"Traditional machine methods such as milling or grinding would usually require an operator to be present, who would check the wear on the grinders and make sure the tools are functioning correctly. It might only be £5 an hour to run the machine, but if you've got an operator standing there at an extra £15 an hour, you're then looking at four times the cost of an automated solution. That's also time the operator could have spent working on other processes, so you're losing output as well.

"A FANUC wire EDM, for example,

requires less than 10 percent of operator intervention to run a full program. That 10 percent will be the initial contact to program the machine and set the component. After that, the machine can be left to run all the way through a program without interference. It can even recover and repair itself if the wire breaks."

Expenses or unexpected halts to production are also kept down by the low running costs and longer lifespans of EDM machines.

"A FANUC machine runs at approximately £5 an hour. This covers wire, filters, electrodes, resins, etc. The machines are also built to be as eco-friendly as possible, so energy costs are kept to a minimum.

"In terms of service, it's good practice to regularly replace consumable parts, such as bearings, rather than wait for them to fail. With wire EDM, it's unlikely that you're going to need a full service more than once a year because you're not dealing with the force and impact of traditional, heavy-duty machines, so preventative maintenance is key. FANUC offers a tailored service to suit each business, but we also do a minor/major service between which you can alternate, depending on how long you've had the machine and how long it's been since you had it serviced.

"Saying this, however, modern EDM machines are built to last. Machines are now 30 years old and still going strong. More modern machines could last even longer. Compare this with the ten-year life



expectancy of a typical machine tool, and you can see how much of a saving you could achieve. Furthermore, no matter when you purchased the machine, FANUC will always supply you with the part you need, so an EDM machine really does last for life."

When it comes to implementing automated machining processes such as wire EDM, many manufacturers are concerned that they do not have the skills in-house to do this successfully. For Andrew Spence, a user-friendly interface and training are key: "Many think EDM is a bit of a black art, but I've worked with people who became proficient in a week, despite having little to no CNC experience. The key is to work with the machine as much as you can and build your experience, you don't even need to know any coding because this can be produced automatically.

"Training to build those initial skills also helps. We offer a set schedule or can tailor it to a customer's needs. The user-friendly nature of the machines means that even someone with no knowledge of CNC can operate the machine to a basic level in a week. After that, it just comes down to practice and experience."

For manufacturers that are already implementing wire EDM into their processes, the advantages are clear: a complex, precise cut with low running costs and minimal requirements for human intervention. Furthermore, the versatility of these machines means that they can be implemented for a range of uses, from the smallest medical devices to the building blocks of an aeroplane.

Andrew Spence concludes: "If it conducts, we can cut it."

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New CUT P wire EDM solution

Engineered to simplify even the most demanding applications, GF Machining Solutions' all-new AgieCharmilles CUT P series of solutions brings the limitless possibilities of new intelligence to the wire-cutting electrical discharge machining (WEDM) process. The CUT P, unveiled in April, also took centre stage on the company's booth at this year's EMO exhibition.

The fourth industrial revolution, also known as Industry 4.0, represents the new era of innovation shaping the way in which manufacturers work. The new AgieCharmilles CUT P wire EDM series delivers new intelligence to advance their speed, flexibility and quality while helping them get to the heart of even the most critical applications in electronic components, automotive and medtech.



Designed for productivity

From producing a surgical tool weighing only a few grams to machining a six tonne die-casting mould for automotive, every detail of the AgieCharmilles CUT P series is designed to help manufacturers expand their business opportunities. The solution's new state-of-the-art Intelligent Power Generator (IPG) enables precision parts as well as mould-and-die manufacturers to increase cutting performance by 20 percent. Thanks to the series' automatic slug management and tooling and automation solutions, machine uptime is optimised. In addition, running costs are minimised by an array of innovative capabilities such as Automatic Slug Welding (ASW), Automatic Slug Management (ASM), ECO machining, an improved Econowatt function, automation readiness, and leading-edge ergonomics. This translates into reduced time to market and faster production at lower costs.

Ideal for every application

Whether the job at hand requires micromachining or macromachining, the AgieCharmilles CUT P series helps manufacturers master complexity and realise limitless possibilities for business expansion and perfect performance in any situation. This includes obtaining the accuracy-boosting thermostabilisation and machining repeatability to achieve accuracy down to 2 µm and finer surface finishes

down to Ra 0.08 µm. Advanced taper accuracy below 10 seconds with straightness, sharp contours and no lines becomes easily achievable with the AgieCharmilles CUT P series' EXPERT systems. At the same time, this solution's unique collision protection system prevents costly machine maintenance and ensures long-term accuracy and reliability. All of these benefits, including the EXPERT systems and more than 600 available technologies made possible by the new, cutting-edge IPG, allow manufacturers to cut their costs by up to 20 percent.

Ready for any challenge

Productivity and machine availability are essential for profitability. This is why the AgieCharmilles CUT P series focuses on putting SMART and connected solutions at manufacturers' fingertips.

SMART consumables, for example, integrate RFID chips into wires and filters to eliminate the risk of errors. They facilitate the quick replacement of consumables, avert breakdowns, minimise stock, and ensure complete process traceability. At the same time, System 3R's WorkShopManager and CellManager software takes process administration and surveying to the next level. eTracking digitises process monitoring as well as traceability and GF Machining Solutions' rConnect suite of modular digital services keeps manufacturers connected to their machines anytime, wherever they are.

Moreover, the productivity-enhancing AgieCharmilles CUT P solutions increase tooling life, reduce scrapped parts, advance quality control, decrease the need for manual intervention, and allow manufacturers to work 100 percent automatically. This means manufacturers spend more time machining and enjoy limitless possibilities in tackling complex applications and expanding their business horizons.

GF Machining Solutions is a leading provider of machines, diverse technical solutions and services not only to the tool and mould making industry but also to manufacturers of precision components. The products range from electrical discharge machines, high-speed and high-performance milling machines, including clamping and palletisation systems, 3D Laser surface texturing machines and spindles, to solutions for tooling and automation, services, spare parts, expendable parts and consumables. GF Machining Solutions is a globally acting division of the Georg Fischer Group (Switzerland) and maintains a presence on 50 sites worldwide within its own organisation. Its 3,102 employees generated sales of CHF 916 million in 2016.

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Sodick die-sink EDM on course for 18-month ROI at ATS UK

Investment by ATS UK in a Sodick AG60L from Sodi-Tech EDM is on course for an impressively short payback period of just 18 months. This is predominantly as a result of cycle times that have been cut by two-thirds in some instances, as well as reduced electrode requirements.

Advanced Tooling Systems UK Ltd was first incorporated in 2001. Since then, it has become one of the country's leaders in design, product development, prototyping and manufacturing for a number of demanding sectors. The company was formed by the amalgamation of two well-respected, Kent-based manufacturers: Millaber, based in Maidstone, and Folkestone Precision Engineering. Both companies, which remain at their respective facilities, served the automotive, white goods and medical industries for over 50 years before joining forces.

At Folkestone, ATS focuses on injection mould tools and precision engineering projects for a Europe-wide customer base. Core business of this ilk demands technologies such as EDM, and it is here that ATS UK recently sought to upgrade its die sink capabilities.

Mark Terry, technical director at ATS, says: "We were witnessing an increase in demand for spark erosion work involving thin, deep ribs. For instance, we were recently awarded a repeat contract for a number of multi-impression two-shot wheel moulds. Traditionally, each impression required 45 hours of spark erosion and three electrodes. The target cost and lead-time for the package would not have allowed us to complete the project on-time and on-budget, so we began investigating new EDM technologies."

Among three vendors invited to put forward a proposal was Sodi-Tech EDM, which recommended the Sodick AG60L CNC die-sink machine with optional 30-station tool changer.

Mark Terry says: "Sodi-Tech quoted some extremely impressive time savings on the wheel mould impressions and indicated that each impression could be completed in a third of the time using the Sodick AG60L. In all honesty, we thought this was unlikely, so we offered up a core and an electrode and



invited them to prove it. We went along to Sodi-Tech's facility in Coventry to watch proceedings. Needless to say, they did it, and we placed the order for the machine on the way home. We knew that EDM technology had moved on, but not to that extent. It was an incredible eye-opener."

Featuring linear motor drives and glass scale feedback on the X, Y and Z axes, the Sodick AG60L houses special circuits for electrode wear reduction, fine finishing and energy saving. Travels are 600 by 420 by 370 mm in X, Y and Z respectively.

Since the installation of the machine in March 2017, ATS UK confirms that EDM timings had been reduced by approximately 60 percent. Furthermore, less electrodes are required, thus delivering further savings.

Mark Terry says: "In reality, we experience almost zero electrode wear when using the AG60L, which is very impressive. We found ourselves only swapping the electrode on this particular job simply because we'd made one, not because there was a real requirement."

The graphite electrodes for the wheel tools were shaped like a wheel featuring a dozen spokes. Each spoke started at 1 mm at the root tapering with draft to 1.2 mm at the top and 62 mm in depth.

A further saving for ATS UK is the fact that two of its previous EDM machines have been replaced by the output of the Sodick

AG60L. In fact, the Sodick machine has been paired with a 32-pallet automation device that allows the company to run lights-out overnight.

Mark Terry continues: "The speed of the machine and its automation means we are on track for an 18-month ROI. If we left our previous die-sink machine to run overnight it would finish at 4pm the next day, the Sodick finishes the same quantity of work by 4am. That's a great result for ATS UK, which not only vindicates our investment decision but supports our business growth moving forwards. We are increasingly seeing mould tool work return from offshoring projects in China, particularly as the exchange rate means that tools from the Far East are now 20 percent more expensive than 12 months ago."

This increase in work for UK mouldmakers means that ATS UK as a whole now employs 65 people and achieves turnover just shy of £8 million, which is up an impressive 25 percent in the past five years alone.

Mark Terry says: "We have full CAD to production capability here, which is a major contributor to our growth, along with financial security that allows us to take on larger projects. Clearly, investment in the latest manufacturing technologies, such as the Sodick AG60L, is another factor delivering genuine competitive advantage. For instance, some of our jobs demand

tolerances as tight as 20 µm. The new machines provides us with the confidence to achieve this limit first time, whereas previously we would normally need two hits."

Another significant benefit to the ISO9001-accredited company is the ease-of-use afforded by the Sodick control and its simple programming functionality.

Mark Terry concludes: "The biggest problem in our industry is finding fully-skilled toolmakers, who simply no longer exist. As a result, we have been growing our own toolmakers by taking on two apprentices, every year, for the past eight years. Using our previous machine it would take up to six months to complete EDM training. However, with the Sodick machine we have already fully trained three employees in a fraction of that time."

Sodi-Tech EDM Ltd is the exclusive distributor of Sodick EDM products in the UK. A wide range of Sodick wire-cut and sink EDM machines are on display at its large showroom in Coventry, West Midlands.

With an experienced team of regional sales engineers, backed up by a specialist



team of application engineers, the company are on hand to demonstrate each machine's capabilities, ensuring that customers final choice will suit the type and quality of components that they wish to manufacture.

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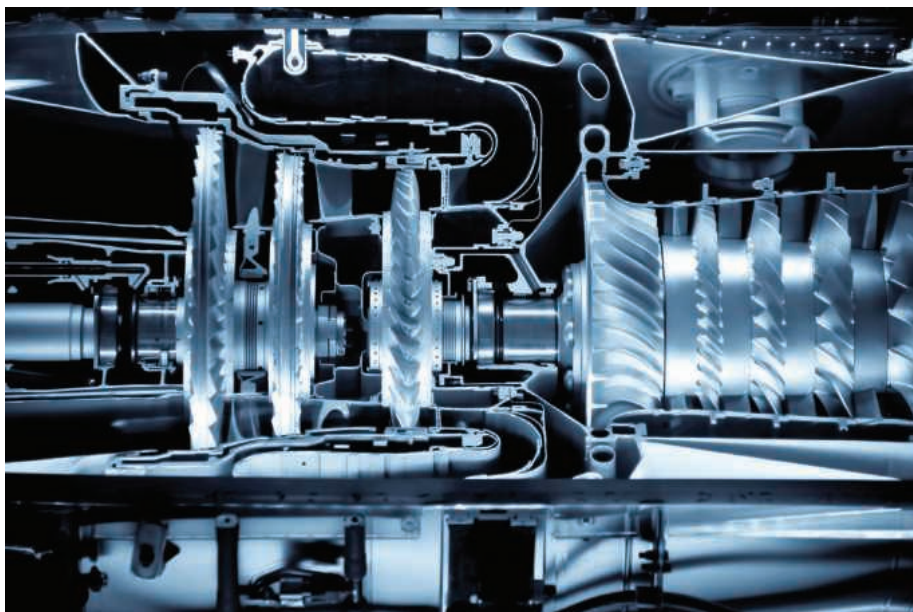
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EDM solutions for aerospace and power generation

Located in the Basque Country, at the heart of the Spanish machine tool industry, ONA is the world's oldest EDM machine manufacturer and a pioneer in the development of EDM technologies. Here, its prestigious facilities house a team of experts with the talent and knowledge to provide tailored solutions that adapt to specific industry needs. Its complete product range is supported in the UK by Warwick Machine Tools.

Comprising main offices and R&D of 15,000 sq ft, a 110,000 sq ft production area and technical application support of 20,000 sq ft, ONA's modern high-performance facilities provide a complete service to the most demanding manufacturing sectors. One of the most technically challenging is, of course, the aerospace sector; with aero engine manufacturers pushing the performance boundaries the hardest.

Today, most modern passenger and military aircraft are powered by gas turbine (jet) engines and similar, but static, turbines are also used to obtain large scale electrical energy production. There are several different types of gas turbine engines, but all of them have some common components.



The EDM process plays an important role in the process of manufacturing some of these parts, including turbine vanes, turbine blades, impellers and so on. Jet engines are gas turbines optimised to produce thrust from the exhaust gases. Those that generate thrust with the addition of a ducted fan are often called turbofans.

Industrial gas turbines differ from aeronautical designs in that the frames, bearings, and blades are of heavier construction. They are also much more closely integrated with the devices they power; electric generator and the secondary energy equipment that is used to recover residual energy.

A turbine is made up of several blade and nozzle guide vane (NGV) stages. Each of the NGV stages comprises between 18 and 38 segments that are joined to form rings. The seal slots of these joints are produced by EDM and ONA has developed technologies specifically suited for the production of these seal slots in NGV segments, including twin-headed machines, special tool changers, and process optimisation settings.

Some types of turbine vanes also have cylindrical and shaped cooling air holes, running from the inner to the outer edge of the shroud or from the trailing edge to the core, produced by EDM. Honeycomb seals usually manufactured from Hastelloy and Inconel nickel alloys are also produced using the EDM process.

The development of blisks, blades integrated on disc, has been an area of rapid change for the aero engine sector, as one blisk can substitute up to 120 different pieces in one turbine. ONA's NX range



fitted with a single axis rotary table provide the ideal solution. The machining each blade cavity requires three electrodes with different shapes. Turbine impellers are some of the most complex parts of the turbines to be manufactured. The first stage in the manufacturing process is often achieved by milling. EDM is then used at the final stage to obtain a homogenous final surface finish. Heat resistant super alloys (HRSA) such as high nickel alloys, titanium, duplex stainless steel, Inconel, Hastelloy, Nimonic and cobalt alloys are used for impellers, they are extremely hard and are very difficult to machine.

Although blades are cast to near net shape any extra material left on them during the casting process must be removed efficiently while maintaining an acceptable surface finish and minimum recast layer. ONA NX machines fitted with 400 Amp power supplies can perform this task 30 percent faster than the best time achieved by any other EDM supplier. Additionally, the ONA patented long-life filter ensures a significant reduction of operating costs.

To meet the challenges of the guide rings for steam turbines ONA has developed its new ONA RX Series. Designed to machine

large cylindrical pieces, such as impulse wheel turbines, the RX machines combine two machines into one. With two NX machines facing each other sharing a common work tank it can access every point of the ring.

Location housing for the vanes and blades that are placed inside turbine rings is achieved using wire EDM. ONA has developed a family of wire EDM machines especially designed to machine large cylindrical pieces such as vane and blade rings in a vertical orientation. The inner diameters of the turbine rings can range from 300 up to 2,000 mm.

Turbine blade rotors are also produced from HRSA and the geometric forms at their bases are generated by the wire EDM process. Seal rings, or shrouds, also rely on the wire EDM process. Turbine seal rings are cut in segments to aid handling and assembly. Cutting with wire EDM is slower than sawing, but unlike sawing the edge produced by wire EDM cutting is clean and burr free, avoiding secondary operations. In collaboration with its customers, ONA has developed a special machine to perform this operation in an automated and efficient process.

Due to the high costs and low flexibility of broaching operations, wire EDM is being used as an alternative method to produce the fir tree shaped slots of the turbine blade holder. Roughing is done using wire EDM and finishing can be achieved either by broaching or by a finish pass with the wire. ONA has successfully met all the process and performance goals set by its customers. These include keeping the recast layer below 3 micron, and a fast roughing strategy of 12 minutes per slot.

Warwick Machine Tools (WMT) is a full-service machine tool supplier. From its 5,000 sq ft showroom near Kenilworth, the company provides pre- and post-sales support for its principals ONA EDM and Excetek Technologies. As part of the company's post-sales activities it offers extensive training programmes and front-line spares.

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GB Precision rises to sub-millimetre titanium aerospace challenges

Machining components for the aerospace sector poses some of the most demanding engineering challenges tackled by companies today, not only in terms of the high accuracy and tight tolerances that must be achieved but also due to the specification of increasingly exotic and difficult-to-work materials.

Birmingham-based specialist subcontractor GB Precision has positioned itself to take on exactly this type of work, through its investment in the most advanced CNC equipment and its many years dedicated to solving the most intricate engineering problems.

One recent challenging aerospace task was for a mere two components, which together would have fitted inside a 100 mm cube.

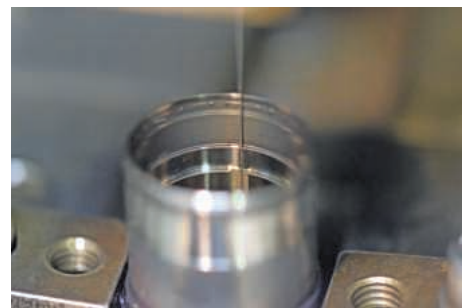
Machined in titanium, the first component incorporated two slots and the second component incorporated three slots. One of GB Precision's EDM machines could certainly accomplish that, even though

these components were only 30 mm diameter and 10 mm thick and the finished slots were specified to be 0.6 mm wide. That meant that the EDM start holes had to be 0.5 mm diameter, which called the capabilities of the company's Mori Seiki NL 1500 CNC lathe into play.

Director Paul Turner explains: "In this instance it was the combination of technologies available on our shopfloor that made the difference, turning an impossible task into one that was just pretty challenging. One of the key benefits I believe we provide to our customers is our ability to develop creative solutions by bringing different technologies to bear on a single task."

GB Precision was established in Birmingham in 1968. It's current factory of 8,000 sq ft has been significantly extended to accommodate new equipment and to cope with increased demand.

The company invests in the latest, high quality machining technology in order to



offer customers a comprehensive range of precision engineering services, engineering complex geometries to tight tolerances through multiple machining steps all in-house.

It offers a truly customer-focused service, from initial friendly and unbiased advice, through to more detailed outline discussions to understand the precise requirements of each job.

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MIL-Tu-Fit wins more business with the DMG MORI CLX 450

From its Bristol factory, Mil-Tu-Fit Engineering has been manufacturing precision components for the electronics, oil and gas, defence, construction and medical industries for over 40 years. As well as machining facilities, the company can also offer laser cutting, surface treatment and welding, enabling it to supply complete high-quality assemblies to its customers. Paul Beattie, production manager at Mil-Tu-Fit, explains: "Some of our existing machinery was reaching the end of its useful life and we needed to replace it and at the same time upgrade our manufacturing capabilities."

The company's machined products are generally under 125 mm diameter with low batch quantities from just one or two parts up to around 100 and the most commonly machined materials are 303 grade stainless steel and plastics.

Mil-Tu-Fit evaluated a range of machines. The main criteria were 4th axis and driven tools, the spindle diameter, the number of tool stations in the turret, accuracy and ease of programming.

Paul Beattie says: "Simplicity of programming on the machine was a major consideration as, with small quantities, we needed to be able to complete this task quickly and also be sure it was right first time. I am familiar with the Siemens control on the DMG MORI CLX 450 and had absolute confidence in the system. Programming the Y-axis and the driven tools can be done easily and the verification and graphics check ensure a reliable milling and turning toolpath."

The CLX 450 is fitted with a bar feeder and can feed 80 mm diameter through the spindle, giving Mil-Tu-Fit the opportunity to bid for larger work at a competitive cost.

Paul Beattie says: "Previously, we would often have to carry out turning and milling operation on multiple machines. We can now combine the operations on the CLX 450, with many parts coming off the machine completed in one hit. As well as manufacturing parts around 20 percent quicker, we save on handling, we only have to set one machine, and fixtures for different operations have been largely eliminated."

As well as these savings, the company also



reports that the parts are more accurate with better concentricity and parallelism and that tool life has improved.

Paul Beattie says: "What appealed to us was the large 80 mm bar feed, which means that parts which were previously billet work can now be bar fed. In addition, the operating system is user friendly, the machine has a small footprint and the reliability of the machine is very good. Overall, the price of the machine was very attractive, availability was within three months and the blue-chip companies investing in DMG MORI convinced us we were making the right decision."

Since the company installed the CLX 450 it has seen an increase in its order books from existing customers. It has been winning more of the work it is bidding for and, because of the machine, it has increased capacity enabling it to keep to short delivery schedules. Paul Beattie says: "It is a good all-round machine and it has certainly lived up to our expectations. We needed to maintain our competitive lead and our customers definitely appreciate our investment in DMG MORI advanced

technology. We now have the capacity to absorb the increasing workload we are experiencing through winning more business. It is a major step forward in our manufacturing capabilities."

By combining sales and service activities, DMG MORI offers a broad product portfolio and unique market presence. The cooperation covers sales and all technical services, such as customer services, training courses and technical support. More than 7,400 employees are available to assist customers in 164 national and international sales and service centres in 76 countries.

DMG MORI brings together German and Japanese tradition, precision and technological leadership in machine tool building. Behind DMG MORI is the combined engineering mastery of 68 years of Mori Seiki and 148 years of GILDEMEISTER.

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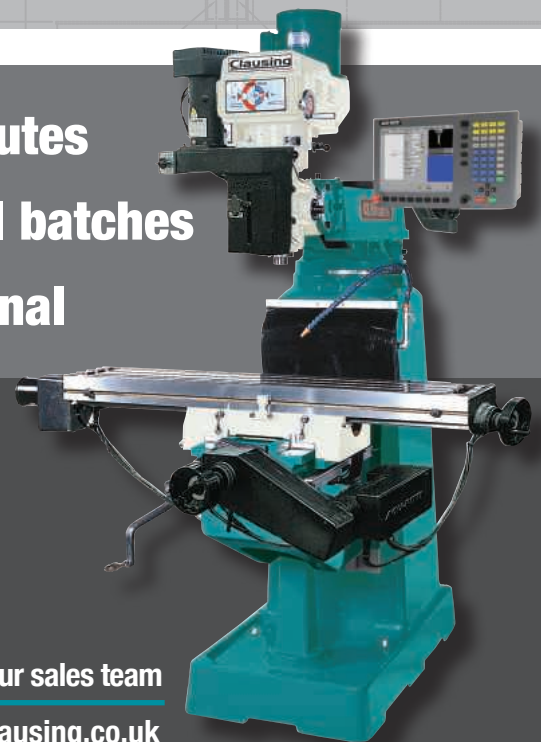


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Pressings subcontractor brings toolmaking in-house

PAB Coventry, which produces sheet metal components, pressings and fabrications in quantities from prototypes up to 10,000 per year, has since early 2016 invested £1.5 million in new machine tools. They include a Hurco vertical machining centre, another hydraulic press, and a 4 kW flat-bed fibre laser cutting machine, a 4 kW 5-axis laser cutting machine and a 2-m press brake, all from Prima Power. The company also bought a second and third industrial unit in Falkland Close, Canley, increasing floor area by two-thirds.

Underpinning this expansion is strong growth in sales to the automotive sector, which accounts for 90 percent of turnover. TS16949-accredited PAB specialises in fabricating sub-frame pressings, bracketry and grilles as well as assemblies such as windscreen surrounds for Aston Martin, Lotus and other top-end car manufacturers as well as Triumph Motorcycles.

The company, which operates 24/7 with close to 100 employees, is moving strongly into the rail industry and has recently used its AS9100 quality accreditation, gained through earlier military work, to win contracts in the aerospace sector.

Overall, turnover has doubled in the last three years. It is partly due to an association with Imperial College London spin-off firm, Impression Technologies, whereby PAB was the first company licensed to manufacture using the patented HFQ (heat treatment forming and in-die quench) technology. It is a method for deep-drawing thinner and hence lighter weight aluminium components for the automotive industry. Aston Martin is supporting the project by designing components, particularly A-pillars, for manufacture using the process.



In 2015 alone, PAB spent over £1 million buying in press tools to produce its vast range of components from aluminium, mild steel and stainless steel, mainly up to 3 mm thick. Around 700 line items are handled per month in typical batch sizes of 300 to 350. The expenditure on tooling was becoming so high that Mark Brazier, second-generation director at the family-owned pressings subcontractor, decided to bring some of the manufacture in-house.

Mark Brazier says: "We already had a smaller Hurco machining centre and one of their CNC lathes which we bought about six years ago to help fulfil a defence contract involving manufacturing blast seats for military vehicles.

"Various metalcutting subcontractors were letting us down, so my father asked one of his friends in manufacturing which machine tools he would recommend.

"He was unequivocal in his advice to purchase Hurco machines, so they were installed and have indeed proved reliable over the years. We had no hesitation in returning to the same supplier for a bigger machining centre to address our toolmaking needs."

The 3-axis Hurco VMX60Ti, with its 40-taper, 10,000 rpm spindle and 1,524 x 660 x 610 mm work envelope, weighs nearly nine tonnes. It machines PAB's press tools comfortably to accuracies within ± 0.015 mm. During 2016, it produced 20 percent of the subcontractor's tools, helping to manufacture more than one million components shipped that year. In the first

half of 2017, the proportion of tools made in the Coventry facility rose to around 35 percent and Mark Brazier predicts that it will eventually increase to more than half.

Additional duties of the latest machine are the manufacture of inspection fixtures and composite tryout tools, and the production of smaller components.

As far as programming is concerned, the complex surface profiles of most press tools require off-line preparation and downloading of machining cycles, in PAB's case using a seat of OneCNC software. However, for simpler jobs like milling of inspection fixtures and tooling plates, maximum advantage is taken of Hurco's WinMAX conversational programming software resident in the proprietary twin-screen control. The second screen allows a graphic of the component to be viewed and checked as it is programmed on the shop floor.



The latest project, PHFHE, will for the first time involve the company in plastic component manufacture. In association with the University of Nottingham, it is helping to develop, optimise and manufacture lightweight polymer micro-hollow fibre heat exchangers that are half the weight of traditional metal heat exchangers, and 50 per cent less expensive. PAB will also develop the heat exchangers for electric vehicles.

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Two more Heller machining centres for producing high precision valves

Manufacture of braking systems for rail vehicles is the specialism of Knorr-Bremse Rail Systems UK. Its patented EP2002 distributed brake control is recognised as the best in the world and is the de-facto standard on all new trains for London Underground as well as metros in Bangkok, Dubai, Manila and throughout China.

Designed in the company's engineering and manufacturing facility in Melksham, Wiltshire to a very high specification, which includes 25 µm dimensional tolerances and a mirror finish of 0.2 CLA in the valve bores, the products comprise eight main prismatic parts. They are machined in a production facility in nearby Knorr-Bremse Corsham from solid aluminium on six Heller twin-pallet, horizontal-spindle machining centres (HMCs). The latest was installed in July 2017, fitted with a four-pallet pool.

Paul Ranford, improvements manager at the Corsham facility, says: "Our EP2002 brake control system was introduced in 2004. Production grew steadily until the end of 2015, not least because it became the standard for railway vehicle bogies in China. Our units have been installed on metro systems in over 30 cities in China including Shenyang in the north-east via Beijing down to Shenzhen, near Hong Kong.

"In 2016, demand increased further and 2017 will be another record year, with 15,000 units manufactured. The system's success is down to the way braking effort is applied across the entire train to optimise braking performance and allow for different weights of the individual carriages and track conditions.

"However, the level of precision that goes into manufacturing the valves is also a strong selling point, as it translates into long service life, efficient braking and energy



savings. For this reason, we need very high-quality production equipment."

Due to the higher manufacturing throughput, the company had to rethink its production strategies. It had already foreseen an upturn and installed a second stand-alone Heller HMC, an H2000, in 2015 to work alongside a flexible manufacturing system (FMS) comprising three Heller machines. The purchase of a sixth H2000 was brought forward and the decision was taken to have it equipped with a four-pallet pool to take maximum advantage of minimally attended production overnight.

Coupled with this investment, between July and September 2017 a lot of effort was put into program optimisation to increase output further, resulting in an average reduction of 20 percent in machining cycle times. It has been achieved by speeding traverse rates to minimise idle times within cycles, increasing feeds and speeds during cutting using new grades of carbide insert tooling, and introducing special cutters like form tools and diamond-coated reamers, principally from Mapal.

Additionally, maximum flexibility is provided by having the potential to equip every Heller HMC to manufacture all eight types of prismatic valve component that go into the Smart, Rio and Gateway variants of the EP2002. The pallet-pool cell, for example, is tooled up to make six

component types. Two kit boxes of parts for each EP2002 product are delivered line-side to the Melksham factory, where they are assembled.

Paul Ranford explains: "Knorr-Bremse Rail Systems UK inherited four of the Heller's, including those in the FMS, when we took over the subcontractor in Corsham that was previously manufacturing the parts for us on this site.

"When we purchased our additional stand-alone machine in 2015, we considered a couple of other potential suppliers of HMCs used in Knorr-Bremse Group's Budapest manufacturing facility.

"However, we saw no reason to change, as Heller's UK headquarters is only two hours away from us in Redditch. They also have a manufacturing operation there, so the technical expertise and service capability available in this country are more in-depth than would otherwise be the case."



Both the stand-alone machine and the recent pallet-pool cell, which were passed off at Redditch and again after installation in Corsham, were running 24/7 within three weeks of delivery, according to Paul Ranford, who added that the Heller team has a true understanding of Knorr-Bremse Rail Systems UK's manufacturing operation.

He regards the working relationship with the supplier and the service back-up as first rate.

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Gearing up with Haas

Newmont Engineering is one of the UK's most respected leaders in gear cutting and precision engineering. Established in 1955, it continues to support UK manufacturing by delivering engineering excellence, supplying vital parts to the aerospace, defence, medical and metrology sectors.

Based in Isleworth, West London, Newmont was founded by Charles Newson and is still independently owned by the Newson family. During the sixties its focus was on manufacturing precision gears and in the seventies, the company won a prestigious contract to make a missile stabilisation platform for Dassault Aviation. Since then it has expanded its range to include leadscrews for the medical industry and crown splines for commercial aircraft, including parts for the historic transatlantic airliner, Concorde and the current Airbus A380 and Boeing 787.

Newmont began its journey with Haas over 10 years ago with a TL-1 Toolroom Lathe. The company followed this two years later with a big-bore TL-25 twin spindle lathe, purchased to tackle the heavy



machining operation required for aerospace components.

Rob Davies, managing director of Newmont Engineering, says the decision to invest in Haas was an easy one: "We did our homework and then we sat with the guys in the workshop and asked them which brand they wanted. They were unanimously in favour of Haas. The machines are light and spacious inside and the large glass panels all around mean you can see what's going on when you're cutting, which is a good advantage. The universal Haas control means we can switch lathe operators to VMC during holiday periods, and vice versa."

The last four years have seen Newmont invest in three more Haas machines; an ST-10Y lathe with Y-axis, and VF-1 and VF-2 vertical machining centres, both equipped with 4th axis, through-spindle coolant and wireless probing.

Rob Davies says: "We bought the VF-1 based on our experience with the Haas lathes and loved it. A year later we were in the market again. We chose the VF-2 because, for a little more money, we could get a much bigger table, meaning we can add another vice without having to remove the Haas 4th axis rotary."

Newmont is committed to precision manufacturing in the UK, and actively encourages young people to come into the industry, via work experience and apprenticeship schemes, as well as inviting engineering students to its facility.

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Complex made easy with ProtoTRAK

Setting the standard for at-machine conversational programming for one-off and small batch work the ProtoTRAK SMX CNC system from XYZ Machine Tools adds further productivity and simplicity for even the most complex of parts through its optional DXF converter.

By importing CAD files in DXF or DWG formats via USB or network, the ProtoTRAK operator can quickly simplify the data by turning off layers such as borders and dimensions before choosing their initial datum point. Once selected the standard ProtoTRAK conversational programming language is used to create the machining path. The added advantage is that all points are taken from the CAD file so no dimensional mistakes can be made via the operator inputting incorrect data. With the addition of the DXF converter option complex components become easy to programme and can be machined in a matter of minutes.

Once the program has been created, the operator can confirm everything is OK by using the standard features of ProtoTRAK to confirm the toolpath or, verify the part in 3D to show the machining process in full on screen. A 3.5-minute video on the XYZ Machine Tools website takes you through the entire process from uploading the DXF file to pressing the cycle start button

For those companies using 3D solid modelling software, ProtoTRAK is also able to import Parasolid data (.X_T format), which can then be viewed in 3D with the ability to zoom, rotate and pan the drawing on screen to facilitate ease of programming. Using the ProtoTRAK's Inquiry function, the operator can interrogate the



Parasolid file to identify the key data required to ensure the correct tooling is used and to minimise cycle time.

Nigel Atherton, managing director XYZ Machine Tools, says: "The functionality and power of the ProtoTRAK CNC control system, puts it head and shoulders above other systems aimed at one-off and low- to medium-volume production. The option of the DXF converter and Parasolid model data takes the efficiency of ProtoTRAK to the next level."

A selection of videos including the DXF converter is available at www.xyzmachinetools.com/videos/

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Seven reasons why you need to automate your machine tending processes

When it comes to robots and automation in the workplace, the UK remains far behind many of its global competitor nations. Many businesses still regard automation as a “nice-to-have” that’s only meant for the biggest players in the market. FANUC UK’s Mark Schlaner argues that automation is becoming a must-have for the future of all UK manufacturing, big or small, and that machine tending might just be the best place to start

It’s finally happened. You’ve invested in a state-of-the-art, wire-cut EDM machine that will revolutionise the way you and your company work. You also have the potential to increase your productivity, expand the scope of your operations and improve the quality of your manufactured components. Your customers are thrilled that you are investing in the future.

Why, then, is Phil still standing by the machine, loading and unloading the parts as they move from one process to another? It may seem strange to imagine the latest in automated manufacturing technology working alongside a manual machine tending process that has been used for decades, yet it’s one that we’re still seeing on factory floors up and down the country.

The statistics speak for themselves. According to a report released by IFR World Robotics Statistics in 2015, the UK has only 71 robots per 10,000 manufacturing employees. Compare this to South Korea, where there are 500 robots to every 10,000 employees, Germany and Japan, where there are 300; and Sweden and Denmark, where there are 200, and you begin to build

an idea of just how far behind the UK is in terms of automation and robotics.

In many cases, it’s only when directors are gathered around the table to discuss how efficiency could be improved, not to mention how Phil’s time could be put to better use, that the words “robot” and “automation” begin to make an appearance. In fact, whether you want to retrofit a robot to existing production lines, or build them in from the start, automating manual, repetitive processes such as machine tending comes with a host of benefits to productivity, efficiency profitability and competitiveness in the long term.

Here are seven reasons why manufacturers should consider upgrading their high-volume, low cycle production processes to the latest in automation and robotics:

Robots are highly repeatable

Robots don’t get tired. They aren’t affected by low energy or distractions and they don’t make mistakes. Once a robot has been programmed to carry out a task, whether



that’s moving a part from one machine to another or loading a magazine for uninterrupted machining, the robot will perform that task without hesitation or deviation. As a result, parts or components are of a highly consistent quality, reducing the loss or wastage of key materials due to machine errors or incongruity. Robots will run for as long as needed, whether manned or unmanned. In an international market, manufacturers need to ensure that production continues, even after the last employee has left the building. Robots don’t need sleep, and require little intervention or supervision once programmed. The reliability of automated technology means that manufacturers who choose to invest in robots for machine tending will be able to achieve lights-out, unmanned running for increased output and higher productivity.



Robots can work in environments that humans cannot

Machining often involves working in aggressive or dangerous environments, where continuous exposure could lead to health problems or injury for human workers. Days lost to illness or injury can be expensive for manufacturers, and cause disruption to production and output. Modern robots are capable of working in even the harshest of environments, including those where extreme temperatures, dust or debris are common. They are also flexible, strong and highly durable, meaning that a robot can be adapted to suit almost any machine tending application required.

Robots free up human workers for complex, rewarding and valuable tasks

Despite the developments currently being made in artificial intelligence, a robot cannot compare with the adaptability of the human brain. Why then waste paid employees with engineering experience on manual, repetitive tasks that anybody could do? By replacing workers with robots for machine tending applications, manufacturers can then retrain employees for any areas of the business that are under-staffed, such as maintenance, monitoring, programming or repairs. For employees, this also means a more varied and rewarding working day, which increases job satisfaction and reduces the rate of employee turnover.

Robots provide the perfect plug-and-play solution

Most robots operate using a similar control system, and the best ones will be easy to

use, with little programming experience required. It is best practice, however, to ensure that a cell largely includes the same brand of machines. This will ensure that the robots and machines will be able to communicate effectively, with minimum set-up required. In some cases, integration of a robot as part of a cell could take as little as two hours, making it the perfect plug-and-play solution for machine tending applications.

Robots are flexible and can work with more than one part

Although robots cannot tend several different machines at once, they can work with a range of parts and components, if programmed correctly. For example, an automatic tool-change station will allow a robot to change grippers to suit the size and shape of the part being handled. Vision capabilities also ensure that a robot can recognise a part as it is fed-in, and alter its position, gripper or function accordingly.

Robots can potentially achieve a return on investment in less than two years

The slow uptake of robots by manufacturers is often due to a hesitation over the purchase cost. While robots may not currently be cost-effective for low volume, high cycle time production, they can achieve a return on investment for high volume, low cycle time processes. In some cases, this can be achieved in as little as two years. This is largely due to the increased productivity, capacity, efficiency and unmanned capability that a robot can provide for a manufacturing process, but it is also representative of the expansion capabilities



that automation can present to UK manufacturers who, thanks to a higher level of reliable, consistent output, are able to compete at an international level to a wider range of customers and sectors.

UK manufacturing can only compete on an international level if it recognises the importance of integrating automation and robotics as a part of its processes. Swapping out workers for robots on manual, repetitive tasks is a simple and effective place to start. By taking this first step, manufacturers are investing in the future productivity and efficiency of UK manufacturing, as well as the skills of the UK workforce. That is the true value of automation.

Mark Schlanker is a regional sales manager in the robotics division at FANUC UK, where he has worked for more than four years.

To find out more about retrofitting robots for machine tending, visit:

www.fanuc.eu/uk/en/industrial-applications/machine-tending

At its newly-opened state-of-the-art headquarters in Ansty Park, Coventry, FANUC UK brings together world-leading capabilities in industrial robots, machine tools and plastic injection moulding machines to facilitate the complete integration of factory automation systems for UK manufacturers.

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Automation versatility

As a Universal Robot Preferred Distributor, RARUK Automation provides customers with not only a higher level of technical support but also priority access to Universal Robot resources such as applications expertise. At Advanced Engineering 2017 visitors, were able to take advantage of this know-how and learn how Universal Robots are the ideal basis for cost-effective production solutions that enable humans and robots to work collaboratively.

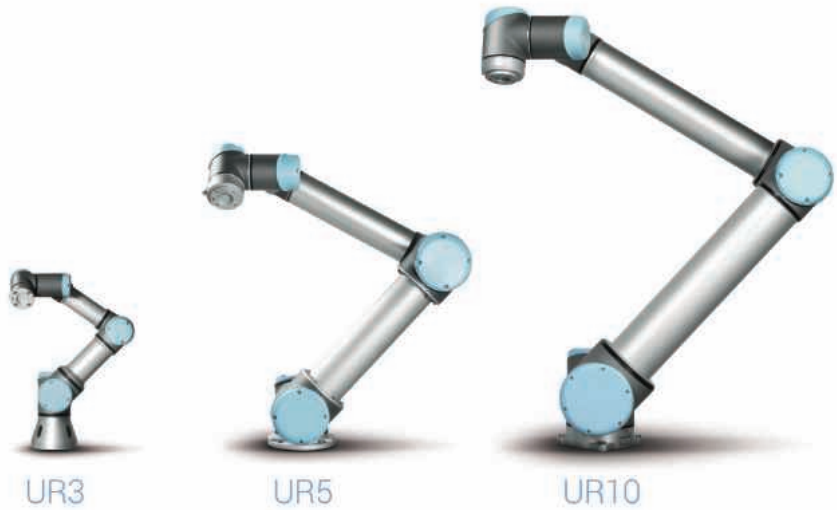
There are now three flexible and lightweight 6-axis robot arms in the Universal Robot range from RARUK Automation. Each can be used for a wide range of applications and are categorised according to their payload limits. The models also have reach, weight and footprint differences.

The smallest and most recent addition is the table top UR3. This is an extremely compact and virtually noiseless machine with a footprint of just 118 mm. It weighs only 11 kg but has a payload of 3 kg and, in common with other Universal Robots, it has ± 360 degree rotation on all wrist joints and infinite rotation on the end joint.

Additional features include: a patented safety system with 15 adjustable safety functions; a wide range of I/O ports; standard communication protocols for easy integration and programming via a 12" touch screen.

Complementing these versatile robots is Universal Robots+, an online showroom available via RARUK Automation that 'houses' cutting-edge products to customise the Universal Robot for specific applications. From end-effectors and accessories to vision cameras and software, it's a one stop shop for products that are tested and approved. The result is fast, smooth, low-risk integration.

One of the most recent additions to this range of accessories is YouRing, a smart



programmable collar that gives visual and audible information on robot status. Wireless connectivity and the URCaps plug-in that is supplied with the YouRing makes this neat and clever device easy to install; URCaps is the accessory platform that enables full integration into Polyscope, the UR GUI for robot programming and operation. YouRing can then be freely programmed to meet the needs of the application and operator.

Visitors to Advanced Engineering will also have the opportunity to see the MiR200 robot. This mobile robot will interest manufacturers actively looking at the most cost-effective ways of automating their production. Its extraordinary flexibility and smart technology can be used in virtually any situation where employees are spending time pushing carts or making deliveries. It removes the tedium, allowing staff to focus on higher value activities. The MiR200 robot autonomously transports a load of up to 200kg and can be customised with top modules such as bins, racks, lifts, conveyors or even a Universal Robot. Top modules are easy and quick to change so the MiR200 can

be redeployed for different tasks. With built-in sensors and cameras and sophisticated software, the MiR200 can identify its surroundings and avoid all obstacles; there is no need for expensive and inflexible wires or sensors to control navigation.

Since 2011, R. A. Rodriguez has been steadily adding automation products to its portfolio and what a success story it has been. Sales have increased year on year as UK manufacturers seek to enhance their global competitiveness through automation. Indeed, consistent growth has now prompted the Letchworth-based company to strategically separate this division of its company.

As a result of this decision, all automation sales are now the responsibility of the newly formed RARUK Automation Ltd, a company dedicated to developing a group of automation products with a unique edge.

"The creation of a separate organisation allows us to tool up for the growing demands of automation in the UK, whilst not losing sight of our traditional strengths as a supplier of the highest quality transmission components," explains Peter Williamson, MD of both R. A. Rodriguez (UK) Ltd and RARUK Automation Ltd. "The move allows us to optimise the growth of both strands of our business.

"With the new corporate structure, we can now better address the respective needs of our design and production engineering customers. It gives us the freedom to develop a framework that best supports both markets."

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Controller for 24V/48V modules

SCHUNK, the competence leader for clamping technology and gripping systems, has developed its modularly designed SCHUNK ECM controller for electrically driven gripping and rotary modules. With an input voltage of 24 V or 48 V and equipped with robust M12 standard plug connectors, it can be connected quickly and easily.

Control can be provided via PROFINET, Profibus (up to 12 Mbit/s) or CAN (up to 1 Mbit/s). The SCHUNK ECM has a USB interface for commissioning and gripper parameterization via PC with the SCHUNK Motion Tool as well as for firmware updates. Alternatively, it can be put into operation in seconds without connecting a programming device. A USB stick can be parameterised for this purpose and addressing is done manually via an easily configurable rotary encoding switch. Initial module movements can be realised manually via a DIP switch.

The SCHUNK ECM is also equipped with an LED and 7-segment display for status display and error analysis. It also comes with four optional digital inputs and outputs. It is suitable for evaluating resolvers, encoders with an index, differential encoders and absolute-value transducers (SSI, EnDat). In particular, this enables the control of SCHUNK EGN, EZN and EVG grippers as well as the SCHUNK ERS rotary module. This can be used to freely program the stroke, speed, motor current or angular velocity and angular position. In addition, it is possible to pre-position the gripper fingers in order to shorten the cycle time.

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The SCHUNK ECM controller is equipped with standardised plug connectors. It can be put into operation quickly and easily

Cellro premieres Fixture Exchange module at EMO

At the recent EMO exhibition, Dutch automation manufacturer Cellro launched a cutting edge new module: Fixture Exchange. A robot equipped with this module can now automatically change and store milling machine vices. This is a game-changer for machining companies that produce workpieces in varying shapes and sizes. Now, they can combine different series into one single production cycle, without the assistance of an operator. This cuts back significantly on time and costs.

The Fixture Exchange isn't the first module launched by Cellro. The company holds a deeply rooted tradition in modular automation for the machining industry. Its robotic cells are engineered to be easily adjustable with hardware and software modules at any time. This high degree of flexibility allows companies to profit from automation for many years, regardless of changes in their future needs.

The Fixture Exchange has been developed specifically to increase the versatility of Cellro's well-received Xcelerate automation system. Xcelerate is Cellro's



most accessible solution, resulting from its compact size, wide storage and all-round functional flexibility.

The Fixture Exchange extends Xcelerate's flexibility even further. Where milling machines traditionally required the operator to manually change machine vices, this task can now be completely automated by the Xcelerate robot. Profitable automation is becoming viable for increasingly more machining companies, even ones that focus on small and varying series.

At the Cellro booth at EMO, visitors were able to see the Fixture Exchange fully operational. The module was integrated into an Xcelerate X20 system. In addition,

Cellro brought along an additional Xcelerate X10 to demonstrate the system's all-round flexibility for automating variable products with milling machines and lathes.

Cellro was created in 2004 in the workshop of a metal processing company in the middle of The Netherlands. Bram de Koning, founder of Cellro, was and still is the owner of this successful company in the machining industry. Linear pallet handling systems were used and a robot was installed in the automotive branch in 2000. However, Bram de Koning required a more flexible and more clever process-controlled automation solution. He also saw opportunities to optimise the production process in the company in an efficient way. The Cellro concept was created as a universal automation solution for metal-shaping machines which was able to automate every handling which occurred.

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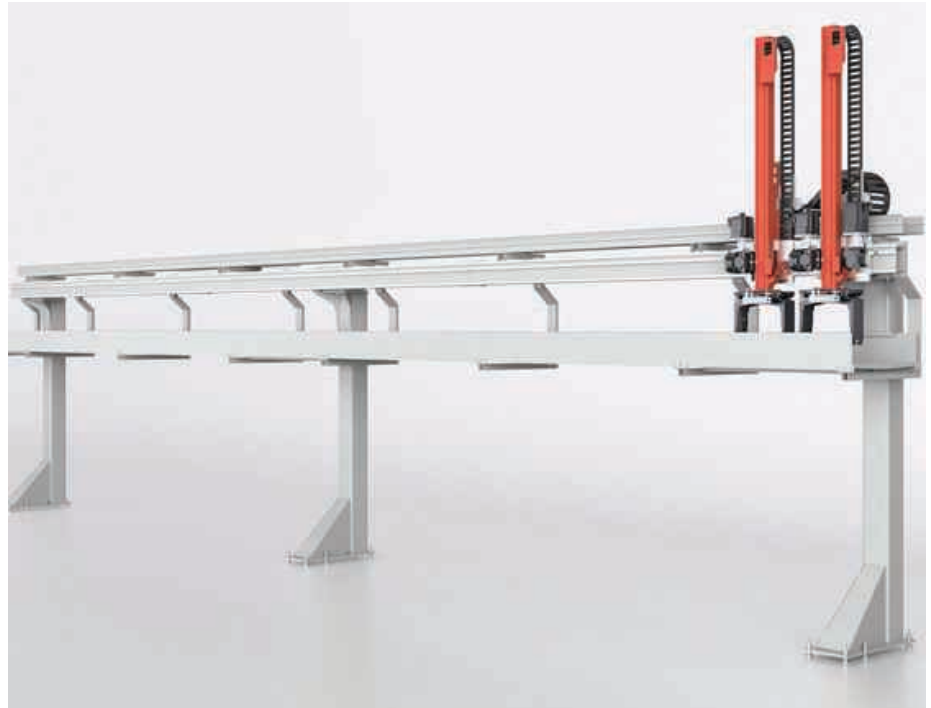
Fast, powerful and flexible – the new LP 100 gantry portal

Liebherr is plugging a gap in the automation system field with the new LP 100 gantry portal, which is particularly suitable for handling smaller and lighter components. Its flexible design makes it dovetail well with inline production concepts, where workpieces have to cover larger distances.

Downsizing is a growing trend in the automotive sector. Engines are becoming more efficient, and therefore smaller and lighter. This new size of gantry robot LP 100 gives engine and gearbox manufacturers many more options enabling them to find their own optimum solutions. It is suitable for use in the weight category including cylinder heads and gearbox housings as well as alternative drivetrain units, like electric or hybrid engines, fuel cells or components of a similar size. The option of configuring the gantry to deliver 'High-Speed' or 'High-Load' performance is brand new. This variability further increases the flexible use of the LP 100.

Ideal for inline production

The design of the gantry robot has been adapted to meet the wide range of modern production process requirements. "The new design enables our customers to select a wider clearance between uprights, for example", explains Martin Winterstein, director Global Business Development & Sales Channels Automation Systems in



Kempten, Germany. "Planners have thus extra production-line design and installation options."

Nowadays, the "inline concept", featuring long travel ways, dominates production lines. Loading gantries handle transportation of workpieces as well as loading and unloading of machines. Conveyor belt systems for the transportation of workpieces are now only

required to a lesser extent. Furthermore, the number of machines covered by a single loading gantry is increasing in order to increase production capacity at minimised use of automation systems.

"Changes in the line design have consequences for the automation system: Workpieces must cover greater distances at higher speeds" explains Martin Winterstein. "The fact that machinery and machining centres are constantly getting faster is also putting pressure on cycle times. Of course, we take these trends into account in the development of the gantry and offer solutions such as the high-speed versions. This new specialism (high-load and high-speed versions) is due to be applied to existing gantry models over the course of the next two years. Liebherr will therefore be able to provide optimum-sized, cost-effective automation solutions for all industries with no limitations on functionality and performance.

Modularly controlling the automation process with the LMS 4.0

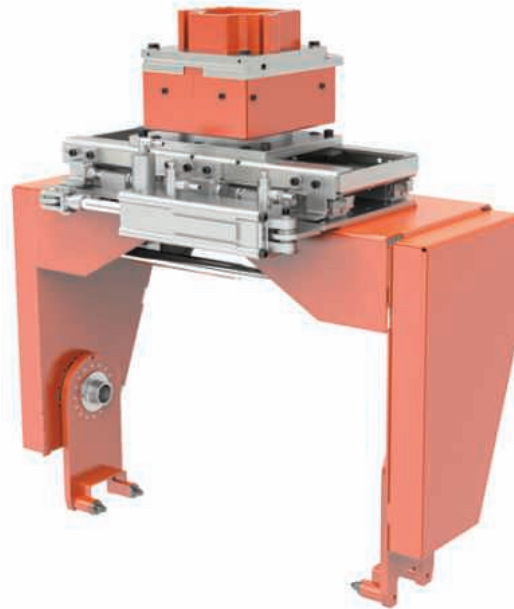
Central tasks of automation software include the acquisition of operating data, production planning, parts tracking and an information system. These modules are



available with the new Liebherr Manufacturing System 4.0 (LMS 4.0). They can be added to a basic package forming the foundation of all modules. This means that every customer gets the right software solution for its automation system. Simple operation is the top priority: a new graphically guided interface concentrates functions in a user-friendly manner on the host computer and, if required, allows full control of production. Furthermore, there are interfaces to the most common ERP systems.

For the LMS 4.0 Part Tracking Application module, the workpieces need clear identification codes, such as bar codes or matrix codes. Scanners must be installed at every station to continuously register the processing steps and the status of the parts. The LMS 4.0 Production Scheduler can set up production assignments statically or dynamically according to the final deadline. External assignments, for example from SAP, can also be imported, which gives the user flexibility when planning and managing their assignments.

The LMS 4.0 Production Monitoring Application is used for data acquisition. It gathers operating data and statuses of the



individual stations and their availability. In addition, it also counts the workpieces and displays error messages. If this module is installed, users can also use the LMS 4.0 Info Board module. This visualises the production cell: production and operating data can be called up on a large monitor, taking current or historic data (including target specifications) into account. For

example, the Info Board means that the user always has an eye on whether the cells are active and whether the target specifications are being fulfilled.

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ROBOJOB - just the job for manufacturers

An automated manufacturing cell was given pride of place at Mills CNC's Open House in October.

Mills CNC, the exclusive distributor of Doosan machine tools in the UK and Ireland, showcased the advanced automated flexible manufacturing cell at its 'Strokes of Genius...LIVE' Open House that took place at the company's Technology Campus facility last month.

The cell, comprising a new Doosan DNM 5700 vertical machining centre and a ROBOJOB (Mill-Assist) automated workpiece load/unload system, supplied by Hydrafeed, the UK agent for ROBOJOB automated solutions, demonstrated the significant productivity gains component manufacturers can expect to achieve from automating their machining processes and embracing unmanned production.

Mills CNC's technical director, Tony Dale says: "Our Open House provided the ideal platform for component manufacturers to see the latest advanced technologies now available from Mills.



"There were 18 Doosan machines being exhibited at the event, and one of these, a new DNM 5700 vertical machining centre, was interfaced with a compact, high-productivity ROBOJOB automation system."

The ROBOJOB system exhibited at the Open House is particularly relevant to component manufacturers involved in small-to-medium size batch production.

The system's compact footprint, inherent

versatility and easy setup and operation were a real 'eye-opener' to those component manufacturers who are under the false impression that automation can be costly, complicated and, as a consequence, not for them.

Tony Dale continues: "Automation, such as that offered by the ROBOJOB system, enables manufacturers to become much more flexible and, for a relatively modest outlay, get more from their machine tools by allowing them to run unattended during the day and overnight."

The machining demonstration at the Open House showed the ROBOJOB Mill-Assist solution, comprising an industrial robot with an exchangeable clamp gripper, a workpiece plate and racking system and a user interface control, in action.

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New product brand name for Mitsubishi Materials

MMC Hartmetall GmbH, the European Headquarters of the Japanese Group Company Mitsubishi Materials, Advanced Materials and Tools Company, has announced the launch of the product brand name for carbide tools "DIAEDGE" in the European market. DIAEDGE has been introduced as part of the Group's logo redesign and restyling of the Corporate Design in Japan on April 1st, 2017. The new product brand name will be used for all carbide products such as cutting tools, wear resistant tools, construction tools and mining tools produced and sold around the world.

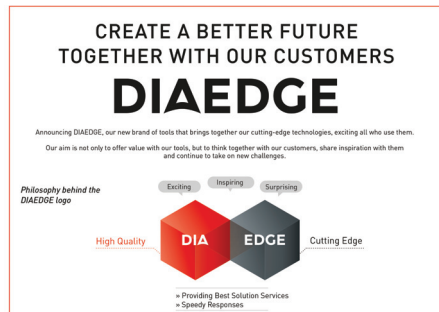
DIAEDGE is a combination of the words "DIAMOND" and "EDGE", that represent the superior product quality and the innovative, futureproof technologies of Mitsubishi Materials. DIAEDGE unites the luxury image of diamonds, the three world-known diamonds of Mitsubishi and the advanced cutting tool technologies in a single word. The launch of a consistent product brand name across continents gives a clear signal for customer proximity, trust and the company's global activities.

Yutaka Tanaka, president of MMC Hartmetall GmbH, says: "We are very pleased with the strong, meaningful brand name DIAEDGE, chosen by our parent group company. We are convinced that the name will soon be established in the European market and recognised by our international customers as an integral part of our brand. The changes in our brand are an important step in the process of our continuous improvement and they substantiate our company values."

Mitsubishi Materials presented the new design and the new product name for the first time in Europe at EMO in Hannover.

MPS1 drills

MPS1 drills have been designed with the aim of double performance, use the very



highest cutting parameters or obtain extra-long tool life. This has been achieved by combining the best of proven existing features together with the very latest state of the art technology. The series has now been expanded with the addition of a superlong type, from 10 up to 40 xD lengths that are now available as standard.

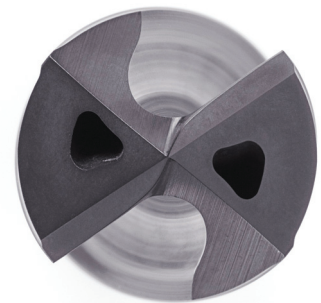
Optimum cutting-edge design

MPS1 drills use a newly designed straighter cutting edge in flute lengths LD3 ~ 8 and a specially optimised curved cutting edge for the new, longer LD10 ~ 40 types. These two different designs were found to offer a smoother cutting action for improved penetration at the depths required. The cutting edges and innovative Z-thinning point geometry requires lower thrust and work effectively in tandem with the new Miracle Sigma based coating and provide excellent tool life.

Proven features

The reworked double margin flute is part of the proven existing technology that provides the highest hole accuracy; especially when used with a pilot drill, efficient chip evacuation and smooth surface finishes. The coolant holes are optimised for MQL and have also shown to greatly improve coolant flow where it matters most, at the cutting point of the drill. Extensive flow dynamics research revealed not just the benefits of extra volume, but also the way in

which the coolant flowed more efficiently from the hole. It was found that by optimising the shape, more than double the amount of coolant is discharged and at greater speeds than with conventional round type through coolant holes. It is this combination of extra flow and improved delivery to the cutting point that is critical for effectively removing chips. The efficient removal of chips enables continuous high performance across a wide range of work materials and applications.



MIRACLE SIGMA coating

The new MIRACLE SIGMA based PVD accumulated Al-Ti-Cr-N coating provides the protection needed to ensure longer tool life, especially at the higher cutting speeds and feeds that are demanded by today's modern production environment.

Additionally the polished Zero-µm surface of the coating provides several important assets such as excellent resistance to welding and a very low coefficient of friction for a sharper but reliable cutting action. The smooth surface also helps greatly towards efficient chip evacuation, an important aspect of overall performance considering the extra material generated by higher feeds and speeds. The all-important carbide substrate provides the toughness and hardness required to complement the performance of the new coating.

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Silent turning, digitally connected

Silent Tools + connectivity strengthens offer for Industry 4.0

With an advanced solution that enables manufacturing companies to take steps towards digital machining and Industry 4.0, cutting tool and tooling system specialist Sandvik Coromant has introduced connectivity capability to its renowned series of Silent Tools™ toolholders. The innovation is offered as part of the company's CoroPlus® suite of connected solutions for machine shops keen to embrace the rapidly advancing trend of industry digitalisation.

Among a number of enhancements, the latest Silent Tools technology for internal turning at long overhangs now feature embedded connectivity within the adaptor.

Named Silent Tools +, this solution enables data from the machining process to be collected and sent to a dashboard, giving the operator a valuable insight into what is happening inside slender tubular components. For instance, it will be possible to detect if there is too much vibration or if the surface quality is at risk of being compromised. Furthermore, operators will be able to reduce the time that the machine runs without the tool in cut.

Åke Axner, product manager Silent Tools turning adaptors at Sandvik Coromant, says: "The combination of CoroPlus connectivity and Silent Tools damping technology makes this a solution that shows the technical heights we can expect from the machining solutions of the future. Silent Tools + turning adaptors with embedded connectivity support our overall CoroPlus strategy, which enables customers to work more efficiently."

By way of example, the Silent Tools + vibration indicator is able to detect issues with machining at an early stage, helping to prevent vibration-associated issues such as noise, poor surface quality and accelerated

tool wear. Furthermore, centre height setting functionality displays the level of the cutting edge, so that it can be quickly and easily set according to requirements. The result is better machining performance and longer tool life.

The range of Silent Tools from Sandvik Coromant is designed to minimise vibration through a pre-tuned dampener inside the tool body that consists of a heavy mass supported by rubber spring elements. The benefits of this design are multi-faceted, allowing machine shops to increase metal removal rates, improve surface finish, secure the process or reduce production costs.

The Silent Tools + turning adaptor also includes a new Wedge Lock quick-change interface between the adaptor and cutting head. The fast and accurate cutting head changes this facilitates will appeal to manufacturers in a variety of industries, including aerospace, for machining components such as landing gear components, and in oil and gas, where the machining of long tubular parts are commonplace. As the cutting heads use CoroTurn® TR inserts, options exist for a wide variety of materials.

Part of global industrial engineering group Sandvik, Sandvik Coromant is at the forefront of manufacturing tools, machining solutions and knowledge that drive industry standards and innovations demanded by the metalworking industry now and into the next industrial era. Educational support, extensive R&D investment and strong customer partnerships ensure the development of machining technologies that change, lead and drive the future of manufacturing. Sandvik Coromant owns over 3,100 patents worldwide, employs over 8,000 staff, and is represented in 150 countries.



Silent Tools + offers embedded connectivity within the adaptor, enabling real-time data from the machining process to be collected and analysed by the operator

With its deep knowledge of metal cutting and insight into the varying challenges of different industries, Sandvik Coromant strives to develop innovative solutions in cooperation with its customers to meet both current and future demands.

As a partner, it offers world-class cutting tools and extensive process and application knowledge. In this constantly changing manufacturing world, the passion for metal cutting is crucial to stay ahead. Sandvik Coromant shares that passion. With a keen understanding of your business realities, it provides you with cutting tools and solutions that match the ambitions of your company.

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DD solid carbide drills

DD solid carbide tools for steel and stainless steel drilling applications

HORN introduced a range of solid carbide drills at EMO in Hannover. Two geometry variants with diameters from 4.0 mm (0.1575") to 18.0 mm (0.7087") are available.

The tools feature the excellent standard of precision that customers have come to expect from HORN. They are produced with particular attention paid to the surface quality, the precision of the ground geometry and the cutting-edge preparation. Together with the various coating options, these aspects ensure that customers using the tools will achieve excellent, consistent results.

DDP type tools for 3 x D, 5 x D and 8 x D hole depths have been designed for a universal range of applications. The materials they are most suited to are unalloyed steels, cast steel and alloyed steels with a tensile strength of up to 1,000 N/mm². All the tools feature internal cooling, although a variant without internal

cooling is also available. Solid carbide drills with a conical ground surface are designed with double lands from 5 x D, which results in a higher standard of hole quality.

The DDM type's geometry variant with four ground facets is intended for machining stainless and acid-resistant steels, titanium alloys and nickel alloys. In order to achieve excellent results during use, the drills are designed with internal cooling and are available for hole depths of 3 x D and 5 x D. In combination with new coatings, this geometry ensures a longer tool life.

The entire range of tools available with both geometry variants can be obtained with taper shanks in HA and HE designs, conforming to DIN 6535. The outstanding performance of these tools is sure to impress and users can also benefit from the flexible service and technical support that HORN provides.

Horn Cutting Tools Ltd. is the wholly owned UK subsidiary of Horn S.A.



Luxemburg, a leading European supplier of grooving tools and a leader in precision grooving technology. The Horn group of companies is led by Paul Horn GmbH, based in Tubingen, near Stuttgart, which has been developing and producing grooving, side turning and slot milling tools since 1969.

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Flexible aluminium end milling

The 3041 Cyber Series of square-end milling cutters has long been the go-to end mill for manufacturers machining aluminium components. Now, this industry leading series of versatile 3-flute end mills from Industrial Tooling Corporation (ITC) has been expanded with a complete selection of corner radii.



The centre cutting 3-flute end mill line from ITC is a high-performance series that is ideal for a multitude of applications from roughing through to finish machining, plunging, ramping, slotting, pocket machining and much more. This diversity is credit to an innovative geometry and a high helix polished flute design that is carved from a high quality micro-grain substrate. All this makes the solid carbide end mill series the outstanding performer for all aluminium alloy machining requirements.

The extended 3041 Series is available in diameters of 3, 4, 5, 6, 8, 10, 12, 16 and 20 mm with an overall length from 38 to 100 mm and a cut length from 12 to 40 mm, depending upon the chosen diameter. The smallest 3 to 5 mm diameter tools are now available with a corner radius of 0.25, 0.5, 0.75 and 1 mm.

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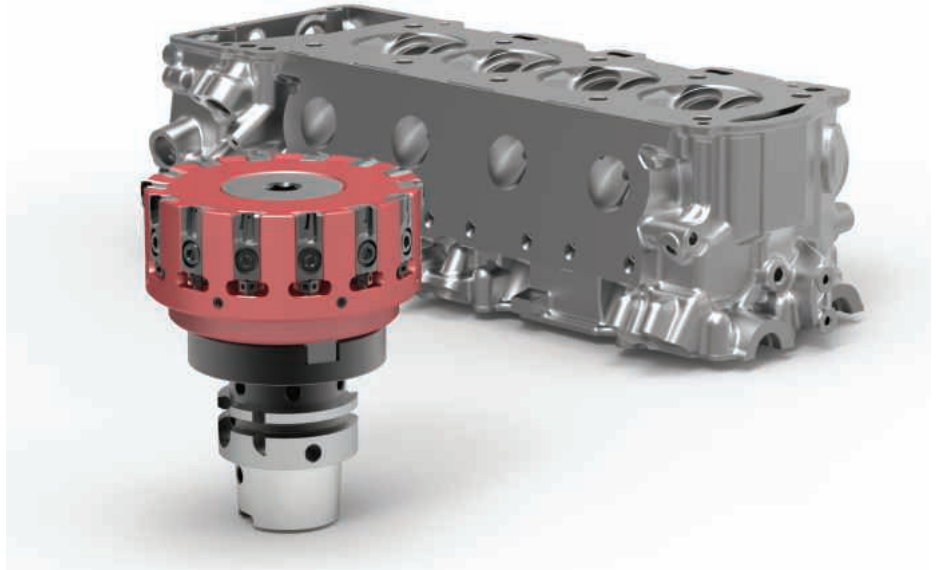
MAPAL introduces new milling and holemaking lines

At EMO 2017, MAPAL demonstrated why its global sales are continuing to rise through the ongoing development of innovative new product lines. The manufacturer of precision tools utilised Europe's leading manufacturing exhibition as the launch pad for its new c-COM cloud based data platform as well as a host of new product lines.

At the exhibition, MAPAL focussed on the extension of its holemaking line, with the arrival of its new CPR500/510 replaceable head reamer. Incorporating optimised cooling that offers an economic advantage in cast machining, this new arrival can significantly extend tool life as its solid carbide replaceable heads are designed with an innovative CVD coating. This coating was especially developed by MAPAL for cast machining and it has already been successfully used for milling.

Offered in diameters from 8 to 40 mm, the new development of the CPR500/510 is its optimised cooling using a sleeve. The issue of cooling is very important for cast machining due to the abrasiveness of the material, which is now resolved by the internal coolant supply and the outlets that direct fluid at the cutting edges.

Complementing the new reaming line will be a complete programme of ISO indexable inserts for boring steel, stainless steel and heat-resistant cast-steel. This new ISO



indexable insert series will be available as standard or as special designs. For this new product line, MAPAL has gone beyond the call of duty. The new range incorporates new coating developments and an optimised carbide substrate for the inserts.

Depending on the prevailing general conditions such as material, machine stability, coolant and clamping condition, customers can choose between PVD and CVD coated cutting materials.

In 2016, MAPAL defined a new standard in drilling with the arrival of its Tritan-Drill range. The drills with three cutting edges were extended at EMO with a specially adapted version for machining steel. With the new Tritan-Drill-Steel, the material can be machined significantly more cost-effectively compared with drills using two cutting edges.

The robustness of the Tritan-Drill-Steel is due to the completely new cutting-edge design that is different to the Tritan-Drill-Uni for universal use. The resulting stable cutting edges reduce the mechanical loads whilst the coating is also specially adapted for the machining of steel.

For manufacturers that were looking for innovative milling solutions at EMO, MAPAL extended its programme of solid carbide high-performance milling cutters for

roughing applications with the new OptiMill-Uni-Wave. This full slot milling series makes a groove depth of up to $2 \times D$ possible. With the new milling cutter that can be used for many materials, the level of performance is significantly increased compared with previous existing HPC milling cutters.

To achieve this, MAPAL has developed a highly ductile carbide substrate with an extremely wear-resistant coating and special cutting-edge preparation. These developments generate 50 percent longer tool life than comparable HPC milling cutters. An innovative diamond knurl geometry guarantees an improved distribution of the cutting forces and ensures optimum chip formation. The short, tightly rolled chips are reliably removed. The five cutting edges of the OptiMill-Uni-Wave are divided unevenly and the new line will be available in short, long, overlong and extra long sizes in the HB shank form with a diameter range from 4 to 25 mm.

For face milling operations, EMO will see the arrival of a new generation of milling tools for cutting depths up to 4 mm. With replaceable PCD milling cartridges, the new PowerMill-Blue is the cutter of choice when machining aluminium in the automotive industry. The setting and clamping system



of the milling inserts has proven itself beyond compare, while the chip guiding geometry has been optimised for the new series. The chip former is no longer integrated in the tool body but directly in the milling cassettes. The chips are reliably removed resulting in better surface finishes, while the coolant outlet is localised in the milling cassette to support swarf evacuation.

As well as these exciting new product lines, MAPAL also introduced a host of other new developments such as the new features of the UNIBASE-M tool storage and management system.

MAPAL Präzisionswerkzeuge Dr. Kress KG is one of the leading international suppliers of precision tools for the machining of practically all materials. The company founded in 1950 supplies leading customers, in particular, from the automotive and aerospace industries and from machine and plant engineering. With its innovations the family-owned company sets trends and standards in production and machining technology. MAPAL sees itself as a technology partner, supporting its customers with the development of efficient and resource-conserving machining processes using individual tool concepts.



The company is represented with production facilities, sales outlets and service partners in 44 countries. In 2015 the MAPAL Group had 4,800 employees, generating sales of EUR 540 million.

The English subsidiary MAPAL Ltd. was founded in Rugby in 1993 and since then has ensured fast, direct contact to customers in Great Britain for sales and service. Currently there are around 50 employees at

MAPAL Ltd., which also offers engineering and other services from the MAPAL range. MAPAL Ltd also has a production unit to be able to offer direct service and short reaction times.

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LACH DIAMANT introduces the PCD drill type »PS-plus«

Based on the previous success of PCD drill type »PS« during burr and delamination free machining of fibre composites, also in combination with aluminium so-called stacks components, LACH DIAMANT has developed the PCD drill type »PS-plus«.

»PS-plus« drills show highest efficiency and quality for a diameter range of 2.5 up to 12 mm and time savings of up to 75 percent. A long tool life makes »PS-plus« drills the ideal choice for maximum machine utilisation and unmanned shifts.

The trouble-free use of these PCD drills normally saves 2-3 previously necessary work steps, such as pre-drilling/drilling of pilot holes, drilling and even reaming when aiming for burr-free quality up to h6. Optimal chip removal is guaranteed via MQL or coolants. For drill diameters over 5.0 mm, »PS-plus« drills will be delivered with internal cooling.

»PS-plus« drills are designed for maximum cutting speeds and feeds and therefore guarantee shortest cycle times. PCD drills type »PS-plus« are super-fast tools for serial production and drilling into



solid material, eg. for all aluminium or die-cast housing components, extruded or drawn parts, aluminium turning parts and in general for all pinhole, thread and core drilling from 2.5 to 12 mm.

Of course, »PS-plus« is also available as step drill tool. Moreover, type »PS-plus« PCD drills are ideal for aluminium and fibre composite components in today's automobile and aircraft manufacturing industries.

Jakob Lach laid the foundation for the present company in 1922. In the beginning, in Hanau, the city of precious jewellery, natural diamonds were cut into jewellery

diamonds, called brilliants by up to 600 diamond cutters. In 1932 industrial diamonds and diamond tools were added, which, in 1950, finally replaced the jewellery diamonds.

Before the background of a modern industry, strengthened by new technologies, such as the development of synthetic diamonds, LACH DIAMANT became a worldwide leading manufacturer of diamond and CBN tools and a supplier of special machines for the manufacturing and sharpening of all polycrystalline diamond tools for the processing of aluminium and plastics, PCB, GRP, GFRP etc, as well as all wood and wood-like materials.

For good reason, LACH DIAMANT is today considered a pioneer of such work.

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Complete tool management solution for machine tools

The HAIMER Group, a leader for shrinking and balancing technology, has become a complete system provider for tool management all around the machine tool.

At EMO 2017 the company exhibited its entire product portfolio which ranges from solid carbide tools to toolholders, shrinking and balancing technology and also presetting devices. All products complement each other perfectly and offer the ideal conditions for network integration as well as continuous data flow.

At the exhibition, HAIMER presented a complete tool management solution for machine tools. One of the many highlights was the Microset tool presetting technology with which the family-owned company expanded its product portfolio at the beginning of the year.

Managing director Andreas Haimer explains: "With our broad system range we want to make the entire work process as easy as possible for the machine operator. From tools and toolholders to shrinking, balancing and highly-precise presetting technology, we are now able to offer our customers the entire process chain from one single source."

Tool clamping and presetting belong together

The reason why the Microset presetting devices complement the well-known HAIMER products so perfectly lies in their high-quality and user friendliness.

Furthermore, they cover a broad range of applications, a philosophy which HAIMER also follows when it comes to their shrinking and balancing machines. The product range of HAIMER Microset tool presettlers includes entry level machines that are very profitable for the low volume users. The semi-automated machines with Autofocus are suitable for the average volume users. Last but not least, the product range includes fully automated presetting devices with linear drive which are especially designed for regular to high volume.

The presetting devices distinguish themselves through high-quality hardware, best ergonomics and user friendliness. One of the many advantages is the thermostable cast iron construction which ensures that all



operations are simple, easily repeatable and don't require re-calibration.

Continuously compatible and network compatible

While the Microset presetting devices already have a network interface and can communicate with the machine tool, HAIMER demonstrated shrinking and balancing machines that are equally equipped for the first time ever during the EMO show. A new Power Clamp series with a completely new design and software was also introduced to the market. In order to improve the user friendliness of the shrinking machines and make it even easier to use, they were further developed. From the outside, this developmental step is visible through a touch screen control panel with which the Power Clamp machine can be connected to the network.

Furthermore, HAIMER is developing a simplified tool management system which is designed for the combined use of the above mentioned HAIMER products.

Andreas Haimer explains: "For many small and medium-sized companies most tool management systems are too complicated and unstructured. We, however, offer a solution which is easy to use and provides a simple way to organise and digitise their tool presetting system."

HAIMER has been offering another solution for data transmission for some time: Upon individual requests the company equips their tool holders with RFID Chips which enables the customer to save all the important tool data on it. In the future all HAIMER devices, at least optionally, can be purchased with a read/write station. This way they will be equipped for modern data exchange in accordance with Industry 4.0.

New Duo-Lock and solid carbide end mills for universal usage

Next to the digital developments, HAIMER also introduced many practical innovations at the EMO show, for example, the expansion of its solid carbide end mill portfolio. Aside from the Power Mill series, the HAIMER product portfolio also includes Basic Mill solid carbide end mills. These tools are reduced to the basics in terms of product characteristics and can be used in almost all materials. They are suited for a broad range of applications such as roughing, finishing, slotting, ramping, up to 45°, and even direct drilling. Compared to the performance optimised Power Mill series, the Basic Mill end mills are less expensive, but provide the same, well-known HAIMER quality. Furthermore, a number of new tool geometries and products for the Duo Lock interface will be

introduced. The patented and innovative thread design with double cone and an additional, third support area ensures high stability and resilience during the milling operation.

HAIMER is a family run, medium size company located in Igenhausen, Bavaria near Augsburg, Germany. It designs, produces and sells innovative, high precision products for metal cutting as well as for other branches including automotive, aerospace, energy, rail and general machining. In addition to its large offering of toolholders in all popular interfaces and lengths, including shrinking and balancing machines, as well as 3-D Sensors, solid carbide cutting tools, its product offering now also includes tool presetting machines.

Out of approximately 700 employees worldwide, 450 work at its main production facility in Igenhausen together with the most modern of machines and a high level of automation. At its second HAIMER production site in Bielefeld with around 40 employees, HAIMER Microset presetting machines are manufactured. Its experienced, dynamic and highly qualified employees guarantee the well-known and highest quality "made by HAIMER." As an



active apprenticeship company with almost 50 apprentices and a high internal acquisition rate, HAIMER is able to secure its future skilled employees and to fulfill its contribution to further educate young adults, as well as securing the future of the German manufacturing location.

As a European market leader in the area of toolholding technology, with a daily capacity of approx. 2,000 toolholders, keeping the technological edge of its products is very important to the company.

Every year Haimer invests between 8 and 10 percent of its revenue in research and development. Every day the company desires to be better and that works perfect with its corporate philosophy that quality wins.

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Hexagonal, super-strong mandrel

Introducing a mandrel with a hexagonal pyramid shape instead of a round taper that is designed with stringent manufacturing requirements and process reliability in mind. Hainbuch has acted in response to demand from the market that has been steadily growing. Users are requesting mandrels that deliver higher performance as well as process reliability and the result is Maxxos. It exceeds even the highest customer requirements and more than this, offers all the advantages of a hexagonal clamping mechanism. The segmented clamping bushing with hexagon inside shape fits perfectly onto the clamping pyramid and enables maximum cutting performance. The lubrication, combined with its tightness, ensures a very constant production flow and as a result, achieves maximum reliability. Customers that value process reliability and maximum torque transmission will be delighted with the Maxxos T211.

The best for heavy I.D clamping

Thanks to the hexagonal pyramid clamp, maximum torque transmission can be

achieved with 155 percent more transmissible torque and up to 57 percent higher rigidity compared to the classic Mando T211 mandrel. This makes it possible to achieve higher process parameters and consequently improve the quality of finished parts. Greater process reliability is facilitated by the spacious layout between the clamping bushing and the clamping pyramid.

Even during the clamping process, this design prevents virtually any dirt getting onto the surfaces. This significantly cuts down the frequency of maintenance times for cleaning and lubrication. The mandrel has a clamping diameter range of 18 to 100 mm and clamping areas of each size are designed to overlap. This has the advantage that users can choose from up to three mandrel sizes depending on the clamping diameter. The larger the mandrel is, the greater its stability and rigidity. Smaller



mandrels may be able to handle more of the customers smaller workpieces and users are free to choose the size they want, based on their own judgement and preferences. The system has a minimum concentricity of 0.01 mm and there is a higher precision version available.

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Family drives expansion, with help from WNT

Having worked at Hertfordshire-based Precise Components since 1987, Ed Laanest jumped at the chance to buy the business when the then owners retired in 2002. At the time it was using mainly manual machines with just two basic CNC machines at Ed's disposal. Moving forward 15 years, the business has expanded in terms of floor space and also machining capability, with a diverse mix of CNC lathes, mill-turn centres, vertical machining centres and the latest arrival, a Mazak HCN 4000 4-axis machining centre, with a six-pallet pool, with many machines running 24/7.

With his sons Tom and Sam now a full-time part of the business and acting as a driving force in the development of the machining centre side of things, Precise Components is building on its expertise in the high volume manufacture of architectural fittings, and also in the manufacture of high precision mechanical parts for various applications involving turning and milling operations. In particular, it is working in the lighting sector, where batch sizes can range from 500 off up to 10,000 off. Much of this work is in aluminium, but the company is also proficient in machining a wide range of materials from plastics through to stainless steel.

Ed Laanest says: "The decision to invest in the Mazak was due in part to an order we received from our biggest customer for a

large quantity of bespoke light fixtures. Our milling capability had fallen behind and the VMCs were manually loaded, so needed an operator by them all the time. With the Mazak and its pallet system, we would have our first machining centre capable of running lights out, which has always been of the highest priority to us."

With the arrival of a machine with an 18,000 revs/min spindle, six pallets and a 60-tool carousel, the next decision for Precise Components was an effective workholding solution. It was here they turned to WNT (UK).

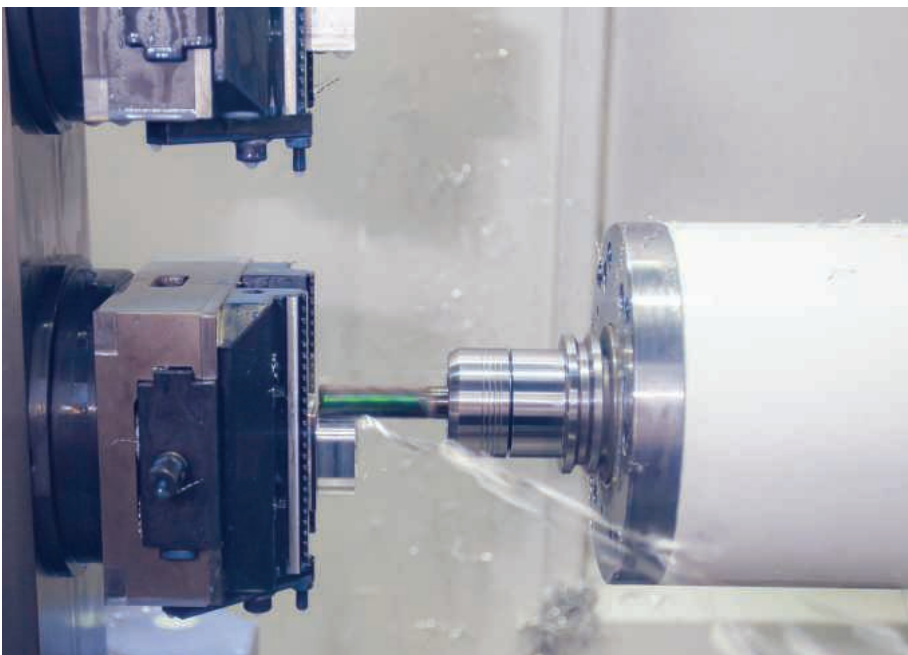
Tom Laanest says: "We had already used WNT's ZSG4 vice system on our VMCs and were very happy with it. The versatility of the reversible jaws and the use of the zero-point location system makes them very easy and quick to use and set. Therefore, it made perfect sense to equip the Mazak with the same workholding system, but utilising tombstone clamping towers to get multiple vices on a single pallet. The success we found on our VMCs cemented our decision."

The total workholding package from WNT included six tombstone clamping towers and 72 WNT ZSG4 vices, allowing multiple setups to be completed and, where necessary, enabling long running jobs to be permanently set on the Mazak. One of the key features of the WNT ZSG4 vices that appealed to the company was the clamping



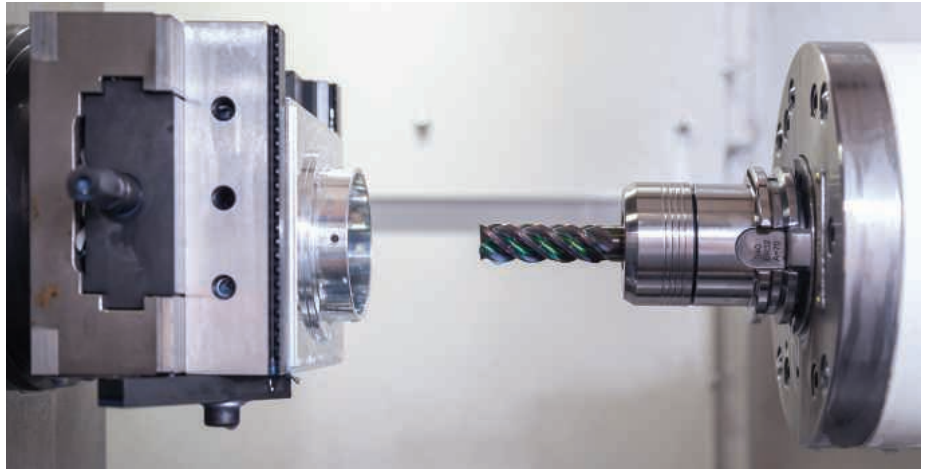
process, which requires just a 160 degree maximum movement and by using a torque wrench the clamping power can be set precisely, up to the maximum 32 kN. This limited movement makes loading multiple vices, in what may be confined spaces, fast and precise without any interference between the handle, operator's hands and the machine. Another area of versatility that was of interest was the modular nature the zero-point system offered, allowing different clamping setups to be used in the future. The unique jaws of the ZSG4 system also provide benefits, in that they are capable of gripping on as little as 3 mm of material parts can be relocated in the vice accurately, if required, without the use of a crimping machine to generate location points.

In addition to workholding, Precise Components also makes use of WNT (UK) and its local technical sales engineer Duncan Slough, for tooling and machining advice. The new Mazak is now fully equipped with WNT tooling, including the use of the adaptable Centro P collet system for high speed milling. The Centro P collet chucks provide high gripping force, double that of conventional chucks, along with excellent precision as runout is less than 6 µm at 3 x diameter. Similar to the ZSG vices, clamping force is guaranteed by use of a torque setting wrench. The Centro P collets have proved ideal at Precise Components in conjunction with WNT's Diamond Like Coated (DLC) solid carbide end mills for the machining of aluminium parts. The 16 mm diameter cutters are running at considerably higher cutting speeds than conventional coated cutters could achieve, with typical speeds and feeds of the order of 14,000



revs/min and a feedrate of 10,000 mm/min with depth of cut of 48 mm.

Tom Laanest says: "Using the Centro P collets in conjunction with the WNT DLC cutters, we are witnessing tool life increases of 500 percent and cycle times have been cut by at least 50 percent. The support we have had from Duncan Slough at WNT has helped us adapt to the new equipment quickly and easily. In fact, I don't think we



have worked with a company that is so willing to assist with cutting data and advice. Since having the machine, we have also maximised use of through tool coolant and used thread forming for the first time."

With the arrival of the Mazak HCN 4000, Precise Components has also invested in CAM software and here again WNT has provided CAD models of its entire library of tools along with models of the vices and tombstone fixtures. Having this information readily to hand further reduces any risk of collisions when the programs are transferred to the machine.

The service and support provided by WNT (UK) to Precise Components is typical of how the Sheffield-based tooling specialist works with its customers.

Duncan Slough concludes: "By working with our customers, who tend to be small and medium sized businesses, we can help them grow and that is to the benefit of them and us."

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Adhesive workholding system demonstrated

NCMT Fixture Solutions demonstrated at EMO 2017 the advantages of the photo-activated adhesive system, Blue Photon. It is intended for the manufacture of workholding systems for use on machine tools and is ideal for securing awkwardly shaped parts for tight-tolerance machining and inspection.

The process involves applying an adhesive that is cured by ultraviolet light via an LED spot curing system. The adhesive can subsequently be melted and the machined workpiece removed by immersion in hot water or by application of another heat source, which optimally should be at 80°C. Alternatively, the adhesive contact points can be sheared to free the workpiece by rotating the gripper pins in the fixture plate with a spanner.

Use of the technique is predicted to grow rapidly due to its ability to hold components securely with an average shear resistance of 136 kg per gripper point, yet allow cutters excellent all-round access for machining on five sides. Unlike magnetic clamping systems, it can be used to secure not only



ferrous metals but also non-ferrous metallic parts as well as ceramics and composites, including delicate materials.

Blue Photon is ideal, for example, for clamping a turbine blade to enable the fir-tree and wedge face on the root as well as the shroud end features at the tip to be ground in one-hit. Traditionally, due to clamp interference, multiple operations are required on conventional CNC grinders. The single manufacturing process is not only faster, but also eliminates work-in-progress and the risk of introducing inaccuracy due to repeated refixturing. The novel turbine

blade fixture incorporates four gripper inserts that, once adhesive has been applied and cured, hold the blade securely by one side of the aerofoil. The fixture is then mounted on the table of a Makino iGrinder using a zero-point clamping system to ensure a high degree of repeatability. NCMT is licensed to sell this Japanese manufacturer's VIPER grinding solutions not only in the UK but across Europe.

Tests have shown that the clamping force produced by the fixture can easily withstand the requirements of machining. Material removal rate exceeded that achieved when the blade was mechanically clamped, as the pressure had to be limited to avoid component distortion and loss of accuracy.

Other advantages of the Blue Photon clamping process include an absence of workpiece distortion and good damping properties to suppress chatter.

NCMT Fixture Solutions

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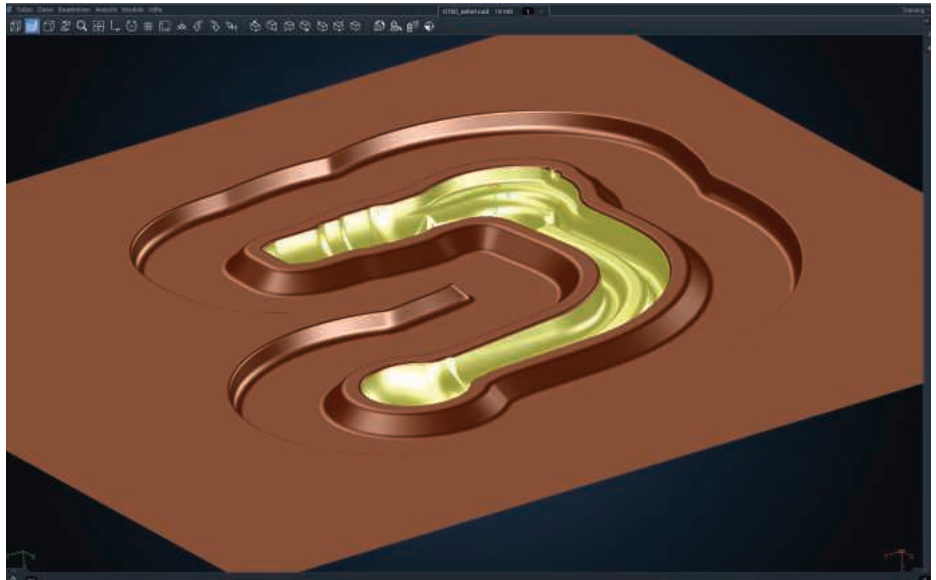
With Version 4 Release 5, users can speed up work activities and significantly increase productivity

Tebis, the CAD/CAM expert for the development, design and manufacturing of models, moulds and components, has continually expanded and modernised the functionality of its software over the past few years. NC programming is now largely automated based on templates. The process libraries enable fast and reliable procedures, for example with standardised machines and tools. Users can also very easily edit large and complex parts with Tebis.

Convenient and powerful technologies place large demands on computing resources and can easily affect performance. If this is compromised, the results can be expensive for the user. Tebis has therefore made it a goal to take a very close look at the available resources and to ensure, and improve, software performance. In order to do this, it investigated the exact point where the heaviest loads occur in specific processes. Keywords are response time and access paths for data queries, so-called bottlenecks that result in long waiting times as well as heavy use of resources and conflicts. The Tebis developers then adapted the system to optimise the use of all available memory. Multi-core technology relying on parallel processing was simultaneously integrated.

Increase productivity

Tebis has especially optimised the



performance of its software with the current Version 4.0, Release 5. This helps users significantly accelerate processes without functional restrictions. Examples include machine simulation, working with tool sets, searching for tools in feature machining or exchanging tools in the job manager. The extended parallel processing now used saves significant time, especially in the calculation of NC programs for re-roughing. Parts can be loaded, shaded and saved with time optimisation. The results that can be achieved ultimately depend on the part and the system configuration.

Manfred Kartusch, jointly responsible for

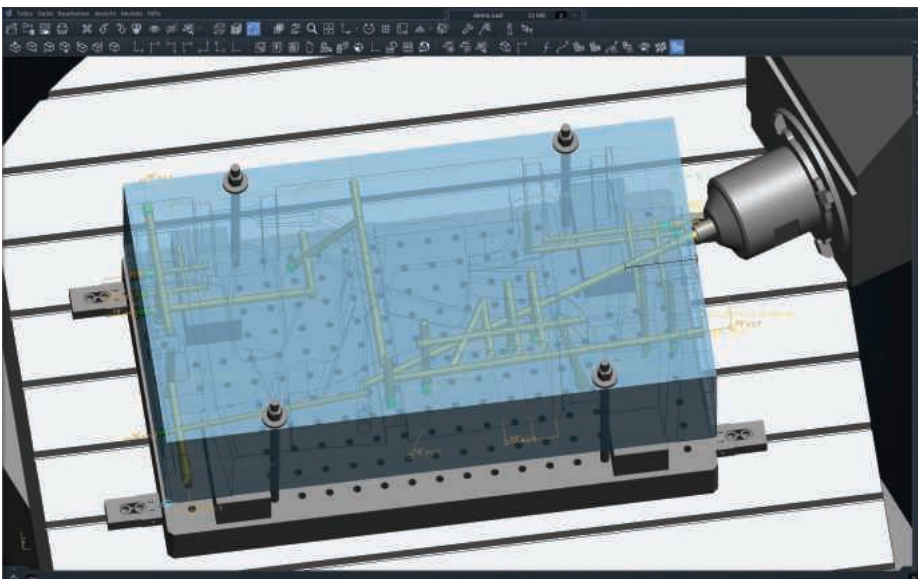
quality assurance at Tebis, says: "Those responsible for finances are pleased to see the improved performance, because high software performance increases productivity and is good for the bottom line. And work has become much simpler for the users with the high speed of Version 4.0 Release 5."

Tebis users are also still reaping the benefits of the new features in Release 4 particularly in the areas of design, manufacturing and robots.

Design

Nothing is as consistent as change. Tebis creates area curves during part comparison to enable better detection and limitation of modified areas. Design measures can thus be quickly implemented or new NC programs can be quickly calculated for modified areas.

A new function in Release 4 creates non-overlapping shifted surfaces from any curves at defined angles. All overlaps within parts that would result especially at sharp edges and small radii of curvature are automatically filtered out and smoothed. These surfaces are ideal for separating part surfaces in mould manufacturing as well as for trim steel and trim line surfaces in draw die manufacturing. As is usual for Tebis, the lengths and angles of surfaces can be conveniently and interactively adjusted using drag arrows. In addition, parts can be



automatically morphed together with the most complex trimming curves in surface morphing. The geometry of the original curves is fully retained and colour properties are transferred 1:1.

Curves can now also be included in surface morphing. This results in benefits in draw die manufacturing, for example: If the active surfaces have to be morphed to compensate for springback of the sheet, all trimming curves can be morphed as well to yield the geometries for a correctly trimmed sheet metal part in a single step.

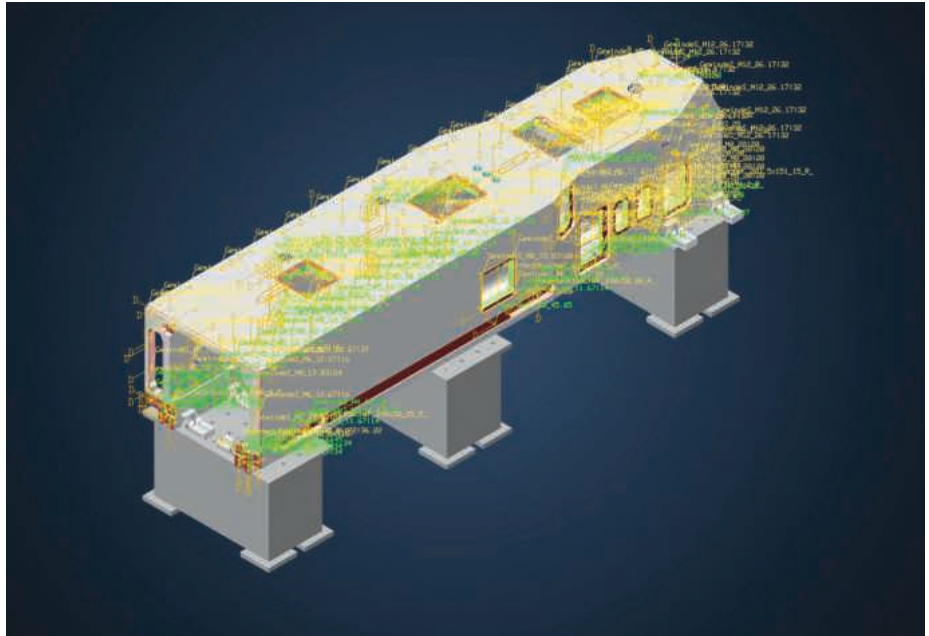
Manufacturing

With Release 4, deep hole drilling in the CAM area has been better oriented to supporting automated calculation and machining. There is also a new tool type with an extended set of cutting data and special speeds, feed rates, cooling types and depth sections needed for deep hole drilling. These values can thus be separately managed for each individual tool.

There is a new machining function suitable for this tool type that perfectly manages the special requirements of deep hole drilling such as threading, intersections of bores or acceleration ramps. This even further simplifies automated deep hole drilling based on drilling information stored in the part.

The definition of toolpaths has been further simplified in 5-axis milling and operating convenience of the functions has been improved. Options have been included for fast vector smoothing and for tilt-optimised calculation of toolpaths even without manual definition of vectors.

When using barrel cutters, the tool contact point can now be better controlled



according to the respective part situation. For these tools, which are especially suitable for machining cavities, it is often better to first start with a slightly greater slope with a tool contact point that is closer to the cutter tip. The slope can then be reduced to optimise tool wear. The slope can be increased at the bottom of the pocket until the cutter tip (ball) exactly contacts the fillet between the flank and bottom. This removes the residual stock at the end of the flank.

Robots and new technologies

Tebis Version 4.0 Release 4 also offers new possibilities for machining with robots. Additional axes in robot cells can now also be controlled as simultaneous NC axes, for example if the robot is mounted on a positioning unit. It is especially practical

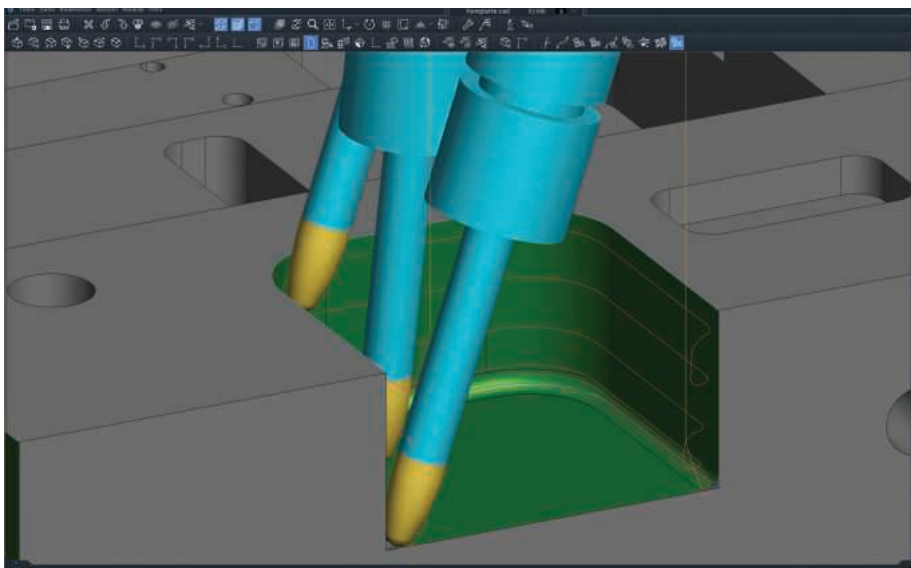
here to permanently position the robot with the linear axes so that the arm is used within the optimal working area. With the new part-driven robotic machining, the robot can now guide a workpiece past a tool that is in a fixed position in the robot cell.

Tebis now supports laser hardening and laser weld cladding, and these can be used in an even larger range of applications. As both technologies are being used increasingly in die and mould manufacturing, it is highly advantageous to be able to combine these with milling and other shaping methods in a single comprehensive programming environment.

Tebis is a global company that has been developing its state of the art CAD/CAM software technology and process solutions since 1984 with its software used in many OEM factories across the world. The company provides efficient manufacturing process solutions & associated services to industries across the UK including automotive, motorsport, aerospace, machinery and equipment, model making, mould & die, and industrial design. High-complexity models, components, and die & mould tools can all be produced quickly and cost-effectively with Tebis.

For more information about Tebis CAD/CAM software and services, contact:

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Tel: 02476 236413
Email: info-uk@tebis.com
www.tebis.com



Dassault Systèmes launches SOLIDWORKS 2018

Dassault Systèmes has announced the launch of SOLIDWORKS 2018, the latest release of its portfolio of 3D design and engineering applications. SOLIDWORKS 2018 features an integrated, end-to-end solution for the design to manufacturing process that enables businesses of any size to rethink their approach to how parts and products are made and quickly bring innovative ideas to market in today's experience economy.

Powered by Dassault Systèmes' 3DEXPERIENCE platform, SOLIDWORKS 2018 supports a business' complete design through manufacturing strategy with solutions that simplify the interactions between disciplines across the product development workflow. This unified process leverages smart manufacturing, a connected and seamless flow of data that is available to all teams involved in product development whenever, wherever and in whatever format is needed without having to port data from one system to another.

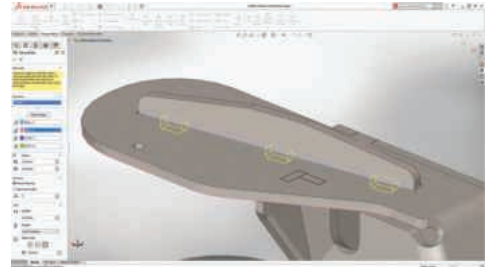
"Lots of designs involve welding plate and sheet metal parts and most people use 'tab and slot' techniques for self-fixturing the parts for welding," says Edson Gebo, owner of Digital Detail & Design. "The new tab and slot feature saves a lot of time versus having to create these features manually. This will really help get designs to the shop faster."

In today's marketplaces, competition is fierce and consumer loyalty is nurtured by businesses that can create compelling experiences that go beyond simply purchasing or using a product. While this

inspires businesses to innovate in all aspects of their operations in order to thrive, obsolete organisational structures, processes and tools separate the design and manufacturing aspects of product development and can lead to mistakes impacting collaboration, schedules and budgets.

With SOLIDWORKS 2018, teams can collaborate concurrently to more rapidly and cost-efficiently design a product or part, validate its function and manufacturability, manage its data and related processes, streamline and automate its manufacturing, and inspect it. Any changes in design or manufacturing are fast and easy to manage and automatically flow to all related models, programs, drawings and documentation, thanks to intellectual property embedded early in the design process.

A key feature of SOLIDWORKS 2018 for this process is SOLIDWORKS CAM, a new application that provides rules-based machining with knowledge capture to allow for the automation of manufacturing programming. Designers and engineers can gain a greater understanding of how their designs are made, make more informed decisions, and quickly create prototype parts and manufacture in-house to control quality, cost and delivery. This application also enables teams to execute new "build to order" strategies with custom parts that are automatically designed and programmed in seconds rather than hours.



"A successful consumer experience must have a well-designed product at its core and an efficient way to produce it. SOLIDWORKS 2018 brings more than just a smarter approach to manufacturing parts or products, it helps businesses translate imagination into innovation and build ecosystems," says Gian Paolo Bassi, CEO, SOLIDWORKS, Dassault Systèmes.

A number of key features are included relevant to subcontractors. These include:

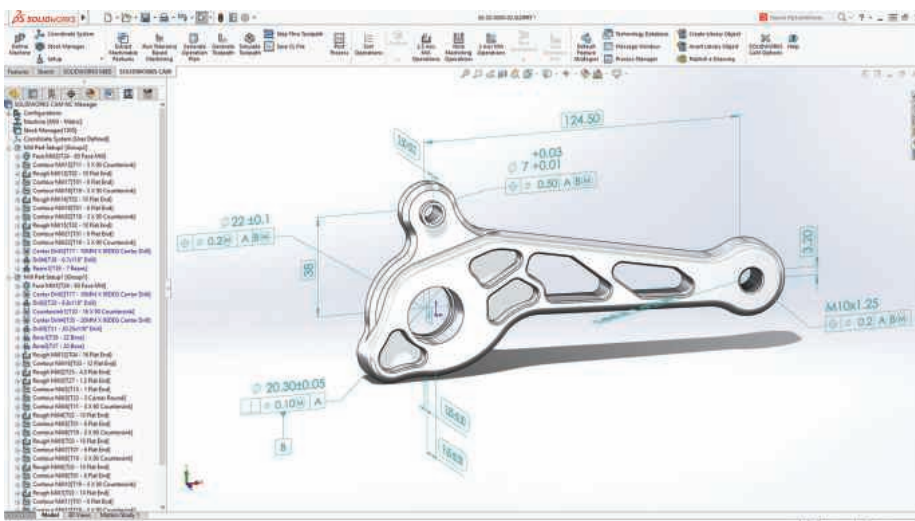
Touch Sketching – create, navigate and modify designs by touch, including a customisable toolbar and the option of magnifying specific details

VoluMill – reduces programming time by rerunning programs and updating the tooling needed.

SOLIDWORKS Inspection – generates instant reports within a 3D model for parts and assemblies. Usable with a coordinate measuring machine.

Topology Study – includes manufacturing processes and provides a route to additive manufacturing.

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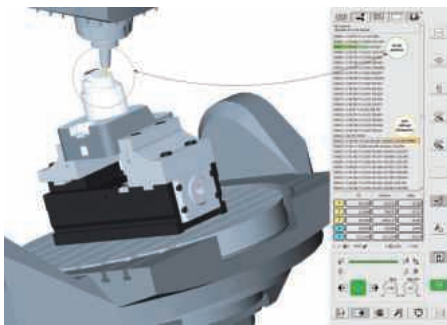
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OPEN MIND presents virtual machining simulation solution at EMO

True to EMO 2017's theme 'Networked systems for intelligent production', CAM/CAD manufacturer OPEN MIND gave its world premiere to hyperMILL® VIRTUAL Machining, a key component for implementing digital production systems. The simulation solution creates a perfect virtual rendering of reality in the machine based on NC data.



Built with Industry 4.0 in mind, the tool generates a bi-directional communication link between the machine control and the hyperMILL VIRTUAL Machining Center, thus delivering a new level of process control and optimisation. Components are becoming more and more complex, yet turnover times keep getting consistently shorter. As a result, manufacturing companies must optimise the productive time of their machines by minimising auxiliary processing times and preventing production downtime. The highly efficient NC code-based hyperMILL VIRTUAL Machining simulation solution from OPEN MIND enables manufacturers to do just that.

Thanks to added networking and virtual mapping of the actual processes, machining operations can be reliably evaluated, checked and optimised before running the job. The Center, Optimizer and CONNECTED Machining modules of the simulation solution help to decisively step up communication between the hyperMILL CAM suite and the machine tools.

The core solution, the hyperMILL VIRTUAL Machining Center, draws on cutting-edge postprocessors from OPEN MIND. It offers a rich selection of simulation and analysis options based on the NC code following the postprocessor run. The optional Optimizer module offers functions

such as automatically choosing the best setting from the wide range of possible tool angles for multi-axis processing. The CONNECTED Machining component implements a bi-directional communication path between the machine tool and the CAM workstation, thus allowing for an interactive dialogue between the program that is being created and the machine.

This simulation and analysis features deliver considerable benefits to users. Working with a 'digital twin' facilitates significant optimisations without reducing the productive machining time. Benefits include optimised workpiece positions and tool angles, checked axis movements and the reliable prevention of collisions. This results in shorter processing times and improved processing quality and efficiency, as well as greatly increased overall productivity.

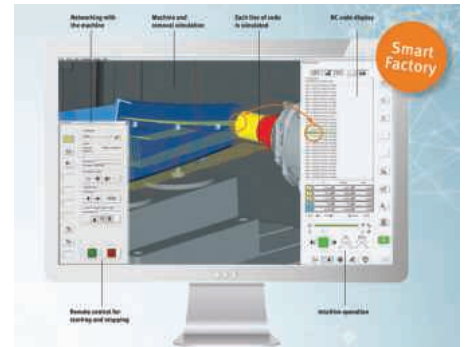
The Machining Center simulation functions assure fully reliable machining, thanks to an NC code-based simulation following the post-processor run. This creates a direct link between the NC program and the postprocessor. Actual machining operations, including transition movements are mapped virtually, thus allowing for a comprehensive simulation. This enables users to generate NC code-based simulations of virtual machine movements that precisely match the machine movements in real life, allowing operators to reliably prevent collisions, among other things.

The hyperMILL VIRTUAL Machining Optimizer module brings simplicity to multi-axis machining. Thanks to powerful optimisation algorithms, the Optimizer automatically determines the best tool position that allows efficient traverse movements during machining. All selected tool positions are checked for possible collisions, thus assure a safe machine run. The Optimizer helps to avoid programming errors, which also does away with the need for making subsequent changes to the machining programs at the machine.

hyperMILL CONNECTED Machining



enables networking and synchronisation with the machine. The deep link created by the module provides a means for bi-directional data exchange with the control. This means that users can send data to the machine and execute it there, as well as receive data from the machine. Therefore, the simulation provides actual machining data in real time. This way, the CAM system and machine world are networked in the best possible way.



Before starting the machine, a safety protocol is executed to compare various machining and machine configurations. This includes reading out zero-point definitions, tool data and machine configuration parameters and checking these against the program data in hyperMILL®. The actual machining job will only start if these data sets match and if the collision check did not come up with any issues. As an additional safety feature, the NC programs are loaded directly into the memory of the control system, making it impossible to mix up the programs or access data without authorisation.

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New VERICUT version on display at Advanced Engineering

CGTech demonstrated the new version of VERICUT® CNC machine simulation and optimisation software at Advanced Engineering 2017.

VERICUT 8.1 sees enhanced support for Force™ optimisation, a new Additive Manufacturing (AM) module being employed, along with Workpiece Sectioning, X-Caliper measurement tool, Report template, and Grinding and Dressing operations.

VERICUT's new Additive module simulates both additive and traditional machining capabilities used in any order on hybrid CNC machines. Simulating both operations can identify potential problems that can occur when integrating additive methods. The user can access detailed 'history' stored with VERICUT's unique droplet technology, which saves programmers time by quickly identifying the source of errors, in most cases using a single mouse-click. It checks accurate laser cladding and material deposition, detects collisions between the machine and additive part, and finds errors, voids, and misplaced material. Users can virtually experiment with combining additive and metal removal processes to determine optimal safe hybrid manufacturing methods.

VERICUT 8.1 streamlines simulation

Vericut CNC simulation software enables you to simulate your machines in order to detect program errors, potential collisions

and areas of inefficiency. It also protects your tools and ensures that your components are right first time, every time. The latest version, VERICUT 8.1, features several enhancements and new modules designed to further increase the ability of manufacturing engineers to analyse, optimise and document the CNC programming and machining process. These include:

Enhanced Sectioning – easier and faster to see inside a part during simulation

X-Caliper dimensions – quickly create measurement labels on VERICUT cut stock

Improved report template editor – create custom reports easier with Easier G-code offset, while updating features, making adding work offsets simpler

New Module: Teamcenter Interface – import 3D cutting tools from Siemens Teamcenter PLM software

New Module: Additive – simulate both additive and traditional CNC machining capabilities applied in any order

New Module: Grinder-Dressing – enhanced support for grinding and dressing operations

VERICUT ties complex CNC processes together, giving you the ability to monitor

and evaluate potential problems in an efficient and consolidated method, thereby reducing time spent in the Programming & Machining cycle.

CGTech also demonstrated its Composites Applications software for the programming and simulation of Automated Fibre Placement (AFP) and Automated Tape Laying (ATL).

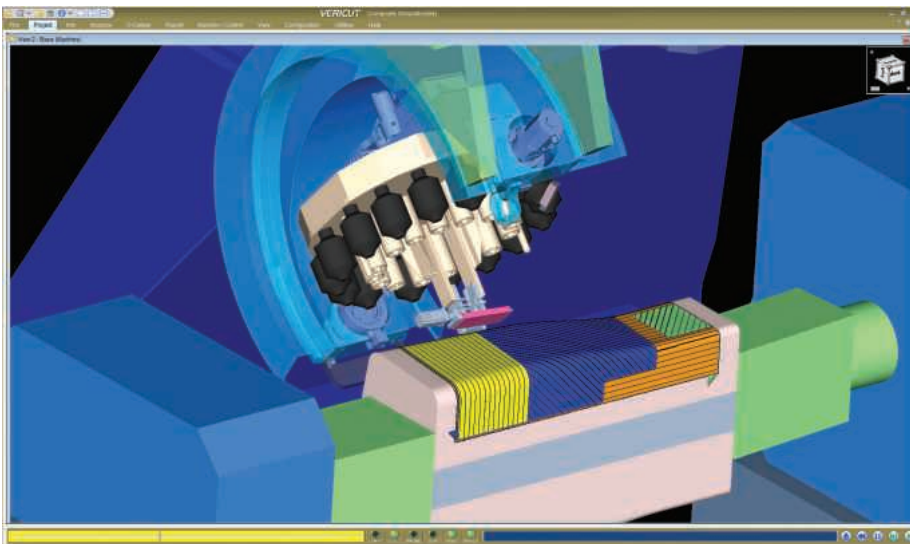
"Due to the extensive time, energy, and labour invested in composite workpieces prior to machining, they can often be more expensive than even some exotic metal alloy parts," says Tony Shrewsbury, CGTech Ltd managing director. "Repairing composite workpieces after a machining error is problematic and many times not advisable. Thus, validating the part program prior to trimming is exceedingly critical."

Visitors to CGTech's stand had the opportunity to receive a thorough overview of the steps needed to get from a CAD designed composite part to CNC programs that drive an Automated Fibre Placement (AFP) or Automated Tape Laying (ATL) machine. Information was also available to visitors relating to new projects that highlight the implementation and use of machine independent off-line NC programming software for AFP and ATL machines.

CGTech's VERICUT software is the standard for CNC simulation, verification, optimisation, analysis, and additive manufacturing. CGTech 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. Established in 1988, and headquartered in Irvine, California; CGTech has an extensive network of offices and resellers throughout the world.

For more information, contact:

CGTech Ltd
Tel: 01273 773538
Email: info.uk@cgtech.com
www.cgtech.co.uk



VERICUT Composite Simulation of an AFP machine creating a spar

Latest Moduleworks release offers a range of new options

ModuleWorks has announced the latest release of its CAM components, ModuleWorks 2017.08, the second major update of 2017. Each ModuleWorks release contains many new and enhanced features across the product range.

The Geodesic toolpath processor is the next evolution in constant step-over pattern generation. It uses a global distance field without a fixed direction of reference to enable full flexibility for calculating different pattern types while maintaining consistent distances between the cuts, even for undercuts.

The new Deburring module creates a deburring toolpath on the outer edges of a part's geometry. This eliminates the need for time-consuming manual deburring and means the entire toolpath is now generated fully automatically by simply selecting the part's geometry.

The Collision safe area for finishing feature automatically filters out all the cuts where collisions between the entire tool (including the holder and arbor) and the machining surfaces have been detected.

The Fixture curves for roughing feature enables users to provide the fixture contours used for the toolpath calculation to avoid collisions between the tool and the fixtures.

The innovative adaptive roughing strategy guarantees a stable tool load which makes it possible to increase the material removal rate at higher feed rates, reduce the overall machining time and extend the tool life

The new Hybrid simulation/manufacturing software consists of two components:

- high-performance backplotting for 3D printing with layer interval analysis that provides a representation of the additive process without material deposition;

- material deposition that shows material deposition and material removal simultaneously. The resulting part can be exported as a mesh or stl file.

The GPU-Shader quality improvement feature uses the full power of the GPU to improve the quality of the cut material. It uses a shader (a computer program that performs shading, i.e. produces lighting and shadows in 3D modeling and performs



post-processing), to calculate rendering effects on graphics hardware with a high degree of flexibility. The results can be exported as a mesh. The GPU shader refines each screen pixel to allow users to zoom in extremely close and still see the full detail.

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Crossen votes for VISI

Anyone who voted in the recent UK General Election and last year's American Presidential election is likely to have slotted their paper into ballot boxes manufactured for the leading Government election solutions provider Pakflatt, by Irish injection moulding specialists Crossen Engineering Ltd.

Operating from a 22,000 sq ft facility in Belfast with 32 employees, Crossen produces all its own tooling, ranging from aluminium alloy moulds for small to medium batch production through to fully hardened hot runner mould tools for larger runs of 500,000+ components.

Servicing a variety of industries, including automotive, aerospace, medical, construction, household and materials handling, Crossen can ship up to quarter of a million moulded parts a month produced on its Romi, FANUC and Demag machines.



As well as Crossen's technical expertise in mould design, finely honed by the use of the market-leading mould and die software, VISI, this success is built on strategic partnerships with clients, assisting on project needs from initial design concept through to prototyping and production, tailored to meet individual budgets and timescales.

In addition to the ballot booths and ballot boxes for the recent elections, other notable products include: components for the award-winning Bloc Blinds; plastic mouldings for Resusannie medical CPR mannequins; release mechanisms for the Euro fighter pilots; interior solutions for Porsche; helmets for the Irish national sport of hurling.

Bloc Blinds' managing director, Cormac Diamond, says Crossen is now an integral part of its team, having established a strong and collaborative relationship over the last ten years.

"Their superior technical expertise, ability

to deliver within rigid lead times, and their service, have all helped Bloc become a market leader in the manufacture and supply of innovative and award-winning window blinds."

Business development manager, Peter Crossen says he likes to be included at the start of the design stage, and the company is geared up for a quick turnaround of its aluminium alloy injection mould tools for low volume to medium production:

"Every mould we make is designed in VISI, and manufactured on our range of 3-axis and 5-axis Hurco CNC milling machines. We've also recently invested in a Rödgers high speed machining centre, mainly for the quick turnaround of complex mould inserts."

The other side to the family-run operation is press tools. It has 13 presses in place, ranging in capacity from 50 to 500 tonnes, and all press tooling for that is also designed exclusively with VISI and manufactured in-house.

"We work with companies who have an idea for a product but need assistance with design, a low-cost tooling option and rapid turnaround. We frequently find that a customer has a 3D printed part and needs to start running at volume, but it can be costly for them to see it through to fruition, independently. However, with VISI we can quickly design inserts to turn around a simple injection mould tool in less than two weeks.

"We review a customer's CAD file in VISI and then design the mould around that file. We can easily make adjustments to aspects such as wall thicknesses, part radii, and draft angle."

Managing director Paul Crossen says the company has used the VISI CAD module for several years, but have only recently installed VISI Flow, which is now playing an increasingly important part in their process. The "preventative analysis" software

optimises the tool design and moulding parameters by detecting a wide range of potential manufacturing issues such as warpage, weld lines, air traps, filling issues and hot spots, while determining the optimum gate size and position, along with runners.

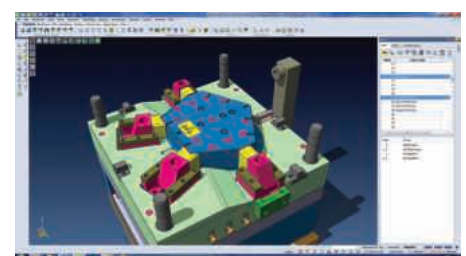
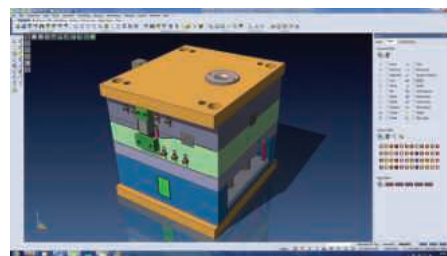
"It gives us total confidence that the parts are achievable, and the gates are in the right place. It highlights any warpage and filling issues, and means we can see potential problems which may occur further down the line while we're still at the mould design stage. The cost of changing a mould to correct a preventable quality issue only adds up to wasted time and money. Customers are extremely impressed that we can accurately forecast these issues and back it up with facts from the flow simulation. All moulding variables and results are reported and fed into a report that can be shown to the customer. We couldn't do all that without VISI."

His team import the customer's CAD file directly into VISI then undertake a draft analysis and carry out the basic mould design before running it through VISI Flow.

"When everything has been proved out, we'll continue with the full mould design, importing the steel or aluminium and bill of materials directly into VISI. Then we'll cut the cavities and add in the injection system."

Paul Crossen says that the apprentices are trained how to operate VISI at an early stage of their development, as it's something they'll need to be highly proficient in throughout their careers, complementing traditional engineering skills.

Third year apprentice James makes extensive use of VISI for extracting electrodes, and modifying parts for machining: "If I'm starting from scratch with 2D, I'd import that into VISI and start to build the relevant geometry. However, if a colleague provides me with a 3D model I'll open that directly and make any machining adjustments on that."



He began using VISI in the first year of his apprenticeship and says his job would take considerably longer without it: "It's a very powerful system, and means we don't have to manufacture a mould only to find it doesn't perform as expected. By simulating the entire process in VISI we can be sure the mould is going to produce perfect plastic products before we start cutting the metal."

Headquartered in England, Vero Software designs, develops, and supplies CAD/CAM/CAE software radically enhancing the efficiency of design and manufacturing processes, providing its customers with exceptional value through high productivity gains and significantly reducing time to market. The company's world-renowned brands include Alphacam, Cabinet Vision, Edgecam, Machining STRATEGIST, PEPS, Radan, SMIRT, SURFCAM, WorkNC and VISI, along with the production control MRP system Javelin. Despite the diversity of application, these solutions have one thing in common: they all address the rising challenges of achieving manufacturing efficiencies and bring huge value to the operations in which they are deployed.

Vero has direct offices in the UK, Germany, Italy, France, Japan, USA, Brazil,



Netherlands, China, South Korea, Spain and India supplying products to more than 45 countries through its wholly owned subsidiaries and reseller network.

Vero is part of Hexagon, a leading global provider of information technologies that drive productivity and quality across geospatial and industrial enterprise applications. Hexagon's solutions integrate sensors, software, domain knowledge and customer workflows into intelligent information ecosystems that deliver actionable information.

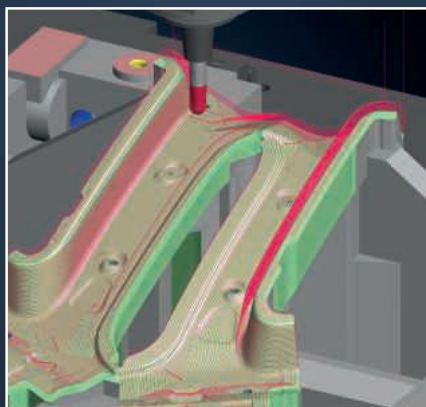
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Lantek delivers a unified solution for sheet metal manufacturers working towards Industry 4.0

Sheet metal manufacturers usually have many different processes which they use to produce finished products and assemblies. These can include waterjet cutting, CNC punching, laser cutting, oxy-cutting, folding, shearing, painting and assembly.

Lantek, a leader in sheet metal and fabrication technology, is unique in developing a CAD/CAM, MES and ERP system which unifies all these CNC processes in one environment and database, irrespective of the different machines and their manufacturers, including non-CNC operations, all integrated with management and control of the complete business.

For a company trying to control the manufacture of hundreds of different parts through multiple processes, Lantek's software greatly simplifies the task, bringing together quotations, works orders, CNC programs, manual operations, purchasing, stock control, production monitoring and reporting into one single system. In addition, the flexibility of the solution enables manufacturers to pick and choose what they wish to implement allowing them to have a system that fits their needs, yet enables them to have a clear upgrade path, as their requirements develop, putting them on the road to Industry 4.0.

When a new job is ordered, or a new quotation is prepared, managers have to decide how the parts are to be



manufactured, which involves selecting a series of operations on each component, the material it is to be made from, which machines are to be used and, from that, determine the time taken and hence the cost. This is a complex task when large volumes of parts are going through the workshop simultaneously.

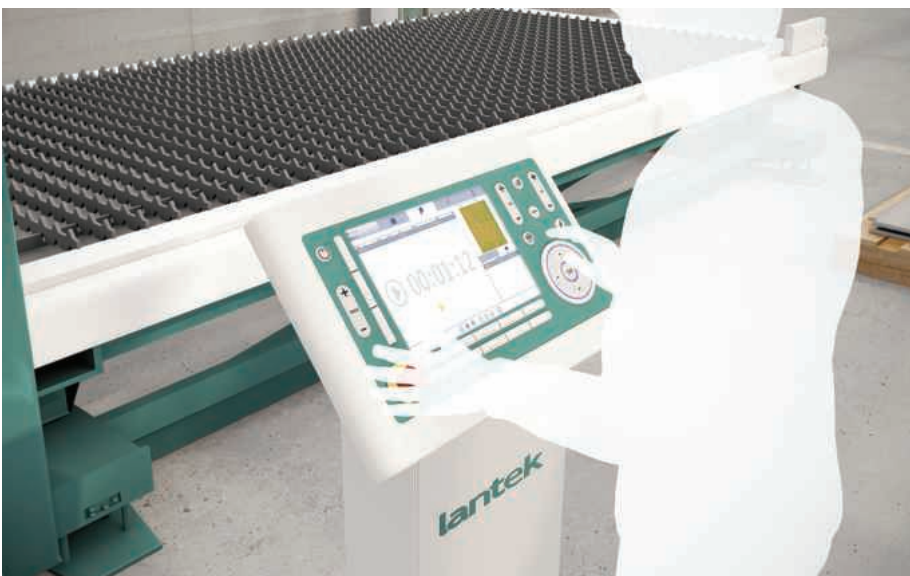
With Lantek, all the data for the job and the customer are only entered into the system once, eliminating duplication of effort and possible error. CAD data is analysed and each component in the job is allocated to an environment which is

configured to match the technology and capabilities of each individual machine.

This process builds up work lists for each machine in the factory segregated by material thickness and material type, unifying the programming and optimising the running of all the machines and combining multiple parts from multiple orders in the same sheet of material. This maximises the use of resources and material utilisation, while reducing delivery lead times. With this information, Lantek's software can then automatically nest parts for multiple jobs for each different machine in one or more sheets of the same material, while at the same time generating the cutting path and the CNC code to drive the machine. Lantek's expertise in sheet metal CAM ensures that the machine use and performance is fully optimised.

With this capability, managers simply have to provide information on the job itself, the machine to be used and the material properties. Lantek software does the rest.

With Lantek's ERP and MES (Manufacturing Execution System) capability, factory administration is taken to another level. Using information on the cost of material and its usage, from analysis of imported CAD data, and cycle times for both CNC and non-CNC tasks, quotations can be created extremely quickly. This information is reused in the process



planning, order processing and CNC code generation phase as information about the customer, the whole job, the individual components, processes, delivery dates, costs and cycle times, as well as much other information, will already be within the Lantek software.

By implementing shop floor data collection, which covers both CNC and manual operations, companies will be able to close the loop to find out the status of production in real time, comparing planned with actual performance, monitor machine efficiency, check that delivery dates are met, generate delivery documentation and link to accounts packages.



Production is subject to many different variables, from customer demands to machine breakdowns and spoilt parts. With live information coming back from the workshop, managers can see exactly where a part has reached and perform other tasks such as, check that planned manufacturing times match reality, request extra parts to replace scrapped components, redirect parts to different machines, check that delivery meets the customer's requirements, or processes and generate reports on company KPIs.

The capabilities of the system do not end there. Managers of companies with multiple sites can control their businesses remotely while they are on the move. Purchasing and stock control can be included while other software systems such as accounting packages can be integrated.

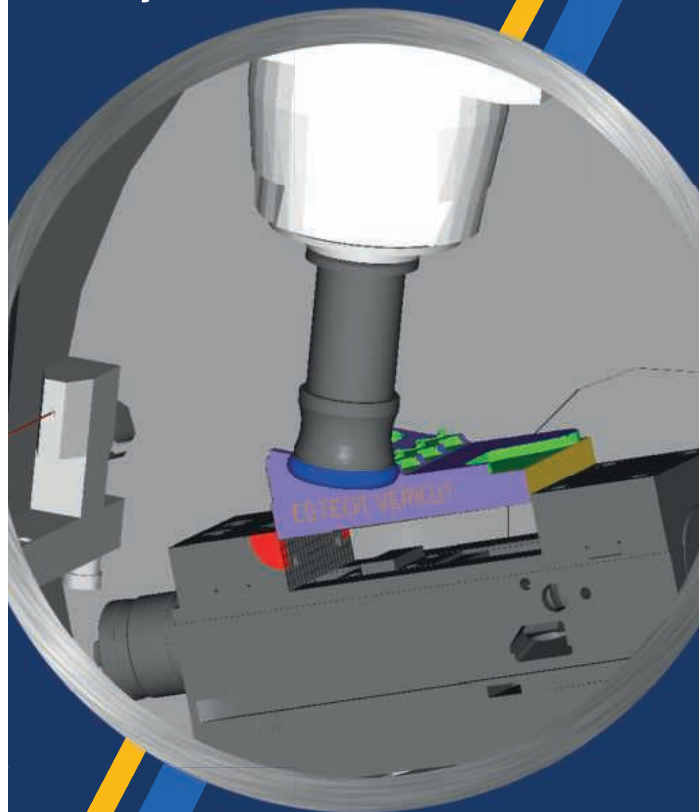
By providing a system that unifies CAD/CAM, MES and ERP, dedicated to sheet metal and fabrication applications, Lantek has made it possible for companies within this industry to make a leap forward in managing their factories, simplifying and speeding up vital administrative tasks, bringing together the programming and nesting of all their CNC machinery as well as managing all their other manufacturing operations, a capability which is unique and which brings industry 4.0 within reach.

Lantek is a multinational company that is leading the digital transformation of companies in the industrial sector of sheet metal and metal. It offers its own software solutions in business manufacturing intelligence, which enable connecting the plants thereby converting them into smart factories. It rounds off its range with the development of CAD/CAM/MES/ERP solutions for companies that manufacture metal parts from sheet metal, tubes and profiles, with any cutting technology: laser, plasma, oxycut, waterjet, shearing, and punching.

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IndySoft takes calibration management to the Cloud with latest release

IndySoft, a leader in calibration and asset management software, has announced a new release of IndySoft Version 11. Version 11 adds over 70 new features, a faster interface, Unicode and multi-lingual support, and uncertainty and tooling features included in every client license. With this, it has also announced a simplified pricing structure with perpetual license, monthly cloud hosting and self-hosted subscription based options.

Rhett Price, chief technology officer, says: "We are very excited about our new cloud based option. Our customers can have the same experience whether they are in a lab or onsite on a mobile device. Another bonus is that they will always have access to the latest version. Upgrades for the latest enhancements, features and security updates can quickly and easily be pushed to all users on the system. As long as you have an active support agreement, Version 11 is available to you for download free of charge.

Cloud-based software offers many advantages over on-premise software. Operational agility is frequently noted as a key driver of going to the cloud; flexibility to quickly and easily scale based on business needs is built in. Going to the cloud may also have financial benefits. Perpetual licenses require a lot of capital on the frontend, where cloud subscriptions provide cheaper monthly options and include support. Additionally, it allows businesses to focus on what they are in business to do. Because there is no on-premise hardware required and setup and management is much simpler, an expensive IT department or outsourced IT services are not needed.

Version 11 also introduces an optimised cache system for speeding up network database access and a new faster option for accessing the client from a shared network drive. These optimisations provide greater robustness and over 3 times speed improvement in some applications.

Oracle database support now utilises the latest BLOB/CLOB technology for

embedded documents in order to meet the latest IT requirements. And, as an added bonus, a new IndySoft email server application allows for all emails to be funneled through one central server which eliminates the need for clients to have their own specific email settings for each workstation.

In addition to these core optimisations, Version 11 includes improvements to the user interface. New customisable slide-out panels allow for easy access to advanced functions without complicating the IndySoft Dashboard interface. Also available is a new

Now included as a part of the IndySoft product line is the formerly optional uncertainty and trend analysis modules. These functions have become a critical requirement for Enterprise and Commercial Lab customers provoking the integration into the product at no additional cost.

At the close of 2017, IndySoft will start shipping German, French, Spanish, Italian, and Portuguese versions of the software. With the new Version 11 release, customers can already begin performing their own translations of the IndySoft Client.

Rhett Price concludes: "IndySoft has long



look and updated header options which allow for efficient viewing of equipment data.

Rhett Price says: "In order to encourage every customer to upgrade to this new version, we have decided to include the older Version 8 "Classic" application in a new updated Version 11 form. We understand some long-time customers being hesitant to upgrade to the new look and feel of our dashboard application introduced in Version 9; however, Version 11 now allows all customers to migrate to this latest version and still continue to work with the older application look and feel. IndySoft will be offering free customer web training to encourage existing users to begin utilising the enhanced functionality found in the new dashboard interface.

been known for our industry leading customisation capabilities which makes every deployment feel like it was designed specifically for each company. Now, with the addition of Unicode and multi-lingual support we are prepared to offer a comprehensive solution for multi-national organisations with support personnel using any language."

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Xtrac gets in gear with Mitutoyo

Widely recognised as a world leader in the design and manufacture of transmission and drive train technology, Xtrac has built its business and reputation on a passion for innovation, precision and quality. So, when the company needed a metrology supplier with likeminded principles, the Thatcham-based company naturally turned to Mitutoyo.

Established in 1984 and manufacturing everything from casings through to gears, shafts, crown wheels and pinions and everything else that constitutes a high-performance motorsport transmission system, Xtrac utilises high specification casting, milling, turning, grinding, EDM, surface finishing, gear cutting and grinding technologies, all inspected with Mitutoyo metrology equipment.

Xtrac inspection manager Neil Warwick has been at the staff-owned business since it was a small 15 employee company back in 1988. At the once fledgling company, Neil Warwick was instrumental in specifying Mitutoyo equipment almost 30 years ago.

Recalling the first Mitutoyo CMM the company purchased, Neil Warwick says: "At the time, all our customers in the motorsport and F1 industries were employing Mitutoyo equipment. We looked at what they were using and we wanted equipment to create a synergy with our customers. Except for the machine shop micrometres, our first foray into Mitutoyo was a manual BHN706 CMM in 1990. This was rapidly followed in the mid-1990s by Mitutoyo BHN544 and BNH706 CNC CMMs as our business rapidly expanded in line with the F1 industry widely employing our transmission technology."

In 2000, the company moved to its purpose built 88,000 sq ft UK factory to accommodate its exponential growth and this noted the arrival of numerous Mitutoyo



inspection systems to support the increase manufacturing output. The Berkshire business retained its Mitutoyo CNC CMM systems with Renishaw PH Series motorised indexing heads that enable the CMM's to achieve complete programmable probe orientation. Attached to the motorised Renishaw heads are the TP200 Series of probe bodies and stylus modules from 1 mm to 6 mm diameter. With CMMs in satellite inspection rooms on the shop floor as well as in the main inspection department, Xtrac specified the same probe bodies and styli for all its CMMs.

Since moving to its state-of-the-art facility over a decade ago, Xtrac has expanded to 330 staff with 20 employees in the meticulous inspection department. As part of this growth, Xtrac acquired two compact Crysta S544 CNC CMMs with a 500 by 400 by 400 mm work area. One was bought to support growth and the other to replace an ageing CMM. For the inspection of larger

components, Xtrac purchased a Crysta C9106 CNC CMM with a 900 x 1,000 x 600 mm working area. These three CMMs were accompanied by the arrival of three Crysta S776 CNC CMMs in the last two years. These most recent arrivals were all direct replacements for the BHN Series CMMs that had been at Xtrac for over 20 years.

Neil Warwick says: "The fact that we've had Mitutoyo CMMs for 20 years speaks volumes for the performance, reliability, consistency and ability of Mitutoyo CMMs to conform to our impeccable standards."

Creating a synergy

All six CMMs at Xtrac utilise the same Mitutoyo MCOSMOS software, the same workholding jigs and fixtures and also the same Renishaw probing systems.

Neil Warwick says: "We have a number of CMMs on the shop floor as well as in our inspection department. All CMMs are networked, so we can easily transfer programs and data to reduce programming times and eliminate program duplication. This can make inspection as simple as just a 'touch of a button' on the CMM."

This level of automation is critical for a company that manufactures complex parts in small batches with an often-high level of SPC and reporting required.

Neil Warwick continues: "All our customers are different in their demands. Some customers require complete reporting and traceability whereas other customers



only want inspection data for critical features. Whatever the requirement, the Mitutoyo CMMs provide comprehensive reporting on all geometrical tolerances and features, if the customers need it. Furthermore, this data is all stored on our system for historical traceability purposes."

Tracing a strategy for success

With the ever-increasing complexity of parts, a CMM cannot support the measuring of all geometries and features. This was apparent for Xtrac when a particular F1 component had undercuts on form gears that needed to be machined and measured to tolerances of +/-5 microns.

The Formtracer contour measuring



machine delivers extremely precise and simplified CNC measurement. Featuring a precision arc-scale built into the Z1 axis detector that allows the arc trajectory of the stylus tip to be read directly, the Formtracer SVC-3100W8 specified by Xtrac minimises error for best in-class accuracy.

The capability and success of the Formtracer soon brought the arrival of two Contracer CV-3100H8 machines with an X and Z2 axis travel of 200 mm and 500 mm respectively. This was followed by a smaller CV-3100H4 machine.

The increasing demand for surface texture measurement, especially for gear teeth, quickly became too much of a capacity restraint for the Formtracer, leading to the purchase of dedicated, fully featured surface texture measurement machine.

The SJ500-P is a high precision, high-performance surface roughness tester with PC control and the same software as deployed on the Formtracer, so training wasn't an issue. The built-in joystick on the control unit enables quick and easy positioning whilst a manual adjustment knob allows fine positioning of a small stylus for positioning.

Neil Warwick concludes: "In my 29 years

with Xtrac, we have evolved from a small innovative business to a global leader in drive train and transmission systems for the most demanding motorsport and high-performance engineering applications.

"Along our journey to global success, Mitutoyo has been at our side. Firstly, we had micrometers and vernier callipers, then manual to CNC CMMs and now the addition of Contracers, Formtracers Optical Projectors, and surface texture measurement. Down the generations, Mitutoyo has supported all our metrology needs with industry leading products, training and support. Over this period, the rapid emergence of ever more complex components required at shorter lead-times with greater certification has been comfortably managed by the Mitutoyo equipment. This is credit to the software and technology that networks all our metrology equipment and delivers comprehensive reporting of all the required dimensions and data."

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Frazer-Nash enhances inspection capabilities with Aberlink CMM

Boasting a proud heritage stretching back nearly 100 years, Frazer-Nash Manufacturing Ltd is a precision engineering and manufacturing company that has earned a reputation for technical innovation and for delivering high-quality value for money projects. Serving a domestic and international customer base that is predominantly involved in the demanding food industry, Frazer-Nash Manufacturing has grown its business by supplying imaginative solutions to customers who have challenging requirements that cannot be satisfied by standard products or sourced from catalogues.

The Frazer-Nash name boasts a rich and varied history, from manufacturing cars in the 1920's and building powered turrets for use on bombers such as the Lancaster during World War II, to producing innovative postal mechanisms and complex aerospace components in the 1960's.

In 1990, the Frazer-Nash group was split up and a number of "baby Nashs" were born, formed from a significant portion of the group's manufacturing and design departments, Frazer-Nash Manufacturing is one of these "off-springs".

Petersfield, Hampshire-based Frazer-Nash Manufacturing now has a wide range of advanced capabilities that are best suited to low to medium volume production, from traditional milling and turning, through to grinding and wire EDM. A recent investment in a Renishaw Additive Manufacturing machine has further extended the company's wide range of manufacturing competencies.

As increased levels of production began to place a strain on Frazer-Nash Manufacturing's inspection department, a search was recently made for a CNC driven Coordinate Measuring Machine (CMM). After considering several alternatives an

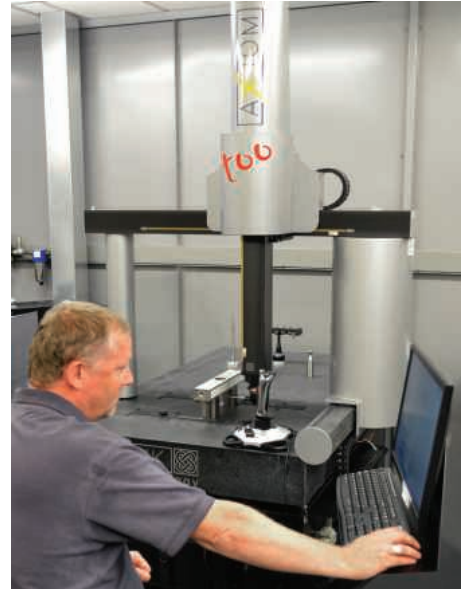
Axiom Too CMM was purchased from Aberlink. Frazer-Nash Manufacturing managing director Paul Mortlock says: "We pride ourselves on our quality, we are ISO 9001 certified and offer 100 percent inspection on manufactured items, we also provide certificates of conformance and full traceability on our work when appropriate.

"Having evaluated several other makes and models of advanced CMMs, we decided that the CNC version of Aberlink's Axiom Too CMM was ideal for our needs. As our production volumes are continuing to grow, the high precision specification of the Axiom Too, and its ability to rapidly inspect multiple parts in a fully automatic CNC mode, were major factors in our choice.

"Due to the Axiom Too's ease-of-use, following an initial short training course our operators quickly mastered the CMM's basic operations and were able to perform a range of inspection routines. After becoming more familiar with the machine, a follow-up Aberlink training session then enabled our operators to master the CMM's more advanced features.

"Now, our quality staff are able to quickly measure one-off parts in a manual mode, or use a pre-written program to inspect larger batches of components in an automatic CNC mode. Also, when we produce repeat batches of smaller parts, we can quickly recall the relevant stored program, load a large batch of parts onto our Aberlink CMM, and start a fully automatic mass inspection routine.

"After investing heavily in enhancing our manufacturing capabilities, with the purchase of equipment such as our new, advanced additive manufacturing machine, our Aberlink CNC CMM will allow our busy inspection department to keep pace with increased throughput and to inspect our high-accuracy parts to the required levels of



precision. Also, the Aberlink Too's ability to generate in-depth inspection reports and documentation will help us with our traceability records."

The cost-effective Axiom Too is the best-selling CMM from the largest UK owned Coordinate Measuring Machine manufacturer. Aberlink's popular Axiom Too CMM is available in both manual and CNC variants in a range of capacities and is described by Aberlink as the 'complete inspection centre'. The recently upgraded CMM is ideal for use in either controlled environments such as inspection departments, or within less than perfect shop-floor conditions, as it boasts an aluminium bridge with a very low thermal mass. Thanks to the Axiom Too's use of advanced materials, the machine's reduced inertia also results in class leading speed of operation.

Borrowed from the laser optics industry, the CMM's sturdy table consists of an advanced granite/aluminium honeycomb



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construction, this technology, provides natural damping and further improves the machine's thermal properties. Despite the Axiom Too's generous X-Y-Z measuring volume, 640 mm x 600-900-1,200-1,500 mm x 500 mm, the machine's compact design occupies a relatively small footprint, with the controller and all peripherals housed within the Axiom Too's workbench.

The Axiom Too utilises Aberlink's well-known 3D software, ensuring greater user productivity and profitability. A welcome bi-product of any Aberlink CMM inspection routine is that a simultaneous picture of the measured component is created on the computer screen. Dimensions between the measured features, mirroring those that appear on the component drawing, can then be simply picked off as required. In essence this 'smart' software represents an intelligent measuring system that is able to automatically recognise and define the various features being measured. Aberlink 3D is claimed to be the easiest to use and most intuitive CMM software currently available.

Now the largest UK owned CMM manufacturer, Aberlink's comprehensive range includes 23 standard sizes of both CNC and manual CMM variants. Aberlink CMMs enable the precise measurement of the smallest of components, to parts of over 3 m long and up to six tonnes in weight. Customers are able to select from a wide range of probing and non-contact measurement options and on-machine fixturing. The company's wide range of available solutions allows Aberlink to offer high quality CMMs and vision measuring systems to suit all applications and budgets.

Based in Eastcombe, Gloucestershire, Aberlink has established a global reputation for its metrology products which are innovative, easy-to-use and competitively priced.



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AMADA launches 3 kW ENSIS and makes first UK sale

AMADA has launched the ENSIS-3015 AJ fibre laser CNC cutting machine featuring a 3 kW source. At 3 kW, the machine offers the industry's largest single-diode module size. Unlike other machines, there is no diode module beam combiner, thus improving reliability and increasing machine uptime. Such is the interest in the new machine that two have already been sold into the UK market, the first to Bristol-based LW Jenkins Ltd, a specialist in fine-detail sheet metal solutions for the electronics industry. The machine is due for delivery in August.

Aside from the large, single-diode module, there are many more advancements in the 3 kW ENSIS. Firstly, AMADA's patented ENSIS technology is capable of changing the laser beam mode, not just the focal spot size and focus position. This results in the optimum beam control for thin and thick sheet processing. The machine also offers single-lens processing for all materials and thicknesses, and features a large-capacity nozzle changer to cover the full range automatically.

Importantly, the machine can cut up to 25 mm thick mild steel, which is equivalent to the performance levels of a standard 6 kW fibre laser, but uses just half the power



to do the same job. With energy prices proving a major overhead for profiling and fabrication shops, this presents the opportunity to make significant savings.

Among further new features is a development of the ENSIS technology, which provides a high-speed pierce in 20 mm mild steel, and faster cutting than a 4 kW fibre laser. This performance is achieved by instantaneously changing the beam mode between pierce and cut. For piercing materials at the thicker end of the material spectrum, oil-shot functionality is available for added reliability.

The 3 kW ENSIS also offers WACS II, the latest version of AMADA's proprietary Water-Assisted Cutting System. This advanced device allows the amount of water to be varied in two stages, providing further assistance when processing thicker mild steel.

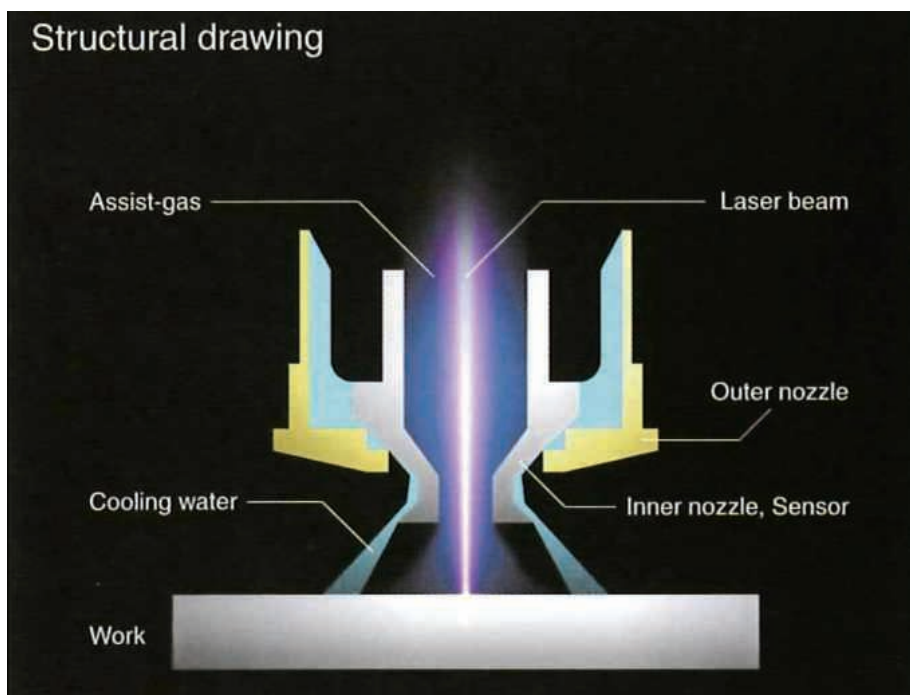
Featuring a compact footprint, the machine is ideal for both OEMs and subcontract profiling and fabrication shops where every minute counts in the quest to outperform the competition. Integral automation features include cut and pierce monitoring for stable processing, as well as an X-axis conveyor. If required, operators can gain easy access to the cutting bed from the side or end.

The ENSIS machine also provides much lower part costs, by utilising compressed air cutting, compared with standard nitrogen cutting. In fact, cutting speeds are the same as nitrogen processing, with part quality comparable in many thicknesses. Across a cutting range of 3,000 x 1,500 x 100 mm in the X, Y and Z axes, processing feed rates of up to 100 m/min are possible.

Ultimately, ENSIS supports manufacturers seeking maximum productivity and efficiency from their laser profiling operations, regardless of what type of metal or thickness needs to be processed.

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Twice the cutting speed

New processes on TRUMPF 2D laser cutting machines use 70 percent less cutting gas and double the sheet throughput

Higher cutting speed = higher laser power. This formula has been more than just a rule of thumb, but TRUMPF engineers have now severed the correlation between speed and kilowatts. The fruit of their labour? The Highspeed and Highspeed Eco cutting processes. A newly designed nozzle boosts the feed rate by up to 100 percent for solid-state laser machines that employ fusion cutting with nitrogen. What's more, laser power does not need to be increased. Not only is the feed rate now faster, but also the piercing process. These new cutting processes also allow for nearly a twofold increase in sheet throughput compared to standard cutting. What's more, less cutting gas is used thanks to the nozzle's innovative design. The Highspeed process requires 40 percent less nitrogen on average, with the Highspeed Eco 70 percent less. These new processes mean that TRUMPF has achieved another milestone on the road to lower parts costs.

In fusion cutting, gas under relatively high pressure blows molten material out of the kerf; this entails high operating costs. Flame cutting using oxygen has usually been used for mild steel, especially for relatively thick sheets. The advantage of low gas costs is offset by oxidised cut edges, which often need to be reworked. The new Highspeed and Highspeed Eco processes, by contrast, are faster and use less gas, which greatly increases the cost-efficiency of fusion cutting mild steel with nitrogen. In addition, the scope of application is now broader for 8 kW lasers used in fusion cutting. The laser can now cut sheets as thick as 12 mm instead of just 10 mm as in the past.

The Highspeed process makes use of a bi-flow nozzle. Some of the cutting gas passes through the centre of this nozzle, as does the laser beam. The rest forms a secondary flow around the principal flow to concentrate it onto the kerf, expelling molten material more efficiently. The Highspeed Eco process relies on a patented nozzle fitted with a sleeve that forces the gas directly into the kerf, ensuring that little or no gas flows off to the side. While this moving sleeve glides across the material during fusion cutting, the nozzle remains 1.5 mm from the sheet surface. This ensures



The Highspeed cutting process can nearly double sheet throughput compared to standard cutting. A bi-flow nozzle reduces gas consumption by 40 percent on average

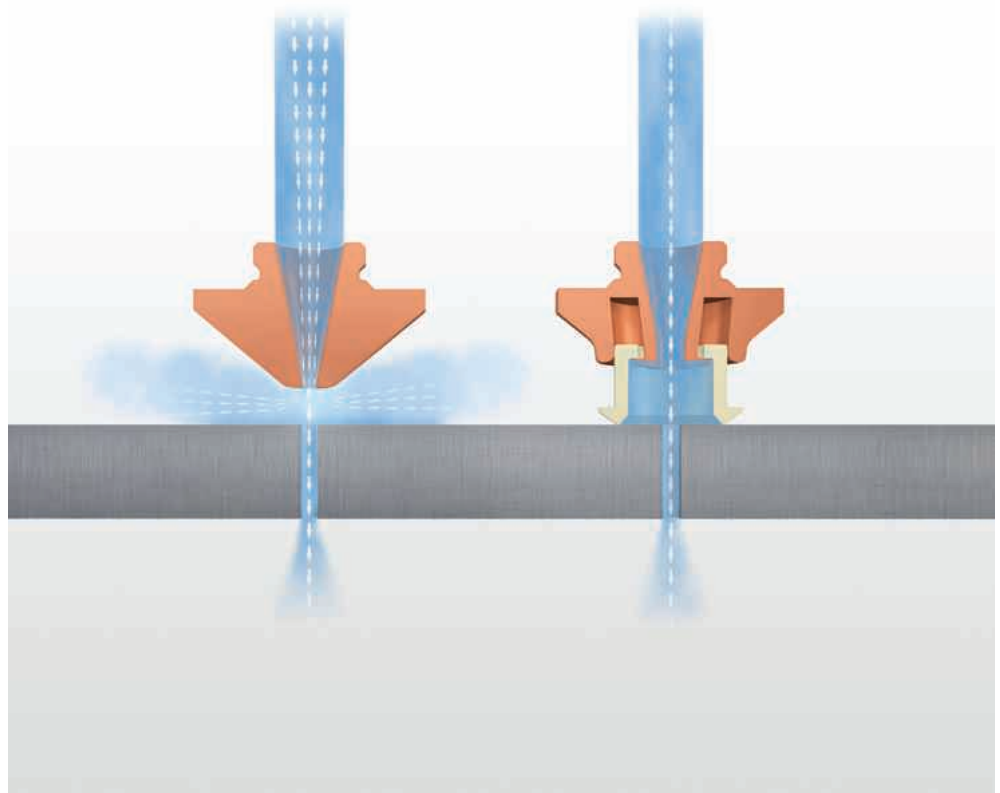


A newly designed nozzle reduces nitrogen consumption by 70 percent on average in the Highspeed Eco process. As with the Highspeed process, feed rates and sheet throughput increase by as much as 100 percent

the nozzle can effortlessly withstand any chips generated during piercing, which accelerates piercing and minimises the risk of damage.

Highspeed and Highspeed Eco can be used for fusion cutting of mild-steel and stainless-steel sheets at least 4 mm thick. Just one nozzle is needed in these cases, which makes mix-ups less likely and shortens setup times. Cut edges exhibit low surface roughness and a high-quality, homogeneous look.

Highspeed Eco and Highspeed can now be used on machines in the TruLaser Series 5000 equipped with an 8-kW solid-state laser. Soon it will be available for use with 6-kW solid-state lasers. The Highspeed process is featured on machines in the TruLaser Series 3000 fitted with a 6-kW solid-state laser. Many relatively new machines can be retrofitted with these processes.



The Highspeed Eco nozzle's sleeve forces the gas directly into the kerf

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Prima powers into Blechexpo

Prima Power is giving a number of new technologies and solutions their world premieres at Blechexpo, the international trade fair for sheet metal working held in Stuttgart from 7 to 10 November. Prima products are being presented under the slogan "Prima is Power.2 always productive, flexible and connected, Prima Power laser and sheet metal machines are a boost of power to companies' business and competitiveness.

Visitors to the Prima Power booth can gain a first-hand preview of the Group's latest innovations. The exhibits covered all technologies and are Industry 4.0 ready, as is the entire Prima Power product portfolio.

The top-of-the-range 2D laser cutting machine Laser Genius 1530 with the Combo Tower Laser automation system are being showcased for the first time with 10 kW fibre laser source, which further boosts its performance, especially on high thicknesses.

For the first time at an exhibition, Prima Power is showcasing its LPBB (Laser cutting - Punching - Buffering - Bending) manufacturing line. It features fibre laser cutting, punching and automatic bending enhanced with LSR loading and stacking robot. As a world premiere, a new generation laser marker is being introduced, integrated into the production line.

The eP-1030, the most versatile servo electric press brake of the eP family is now available with the new version of the bending follower option, allowing the simpler and faster positioning of big and heavy parts.

A Software area is dedicated to live demonstrations and presentations of the full array of products for digital manufacturing.

Laser Genius

The top-of-the-range 2D laser cutting machine Laser Genius 1530 is being showcased for the first time with 10 kW fibre laser source by IPG Photonics, which further



boosts its performance, especially on high thicknesses. This product configuration is particularly dedicated to market sectors where thicker sheet metal is commonly used, like agricultural and construction.

Thanks to its laser head with adaptive optics for the automatic management of the focal position, Laser Genius provides best quality and maximum speed without compromising on the whole thickness range for a wide variety of processable materials (mild steel, stainless steel, aluminum, copper, brass). Unique machine architecture based on a synthetic granite frame and carbon fiber cantilever structure and linear drives are some of its other key technical features. Laser Genius is managed by the smart and user-friendly Prima Power Open CNC and the HMI framework is the new Prima Power Tulus Laser 2D, a highly logical, modern and user-friendly interface, applying existing Tulus platform and its ecosystem to 2D laser cutting machines. At Blechexpo the machine was equipped with a Combo Tower Laser, the flexible storage system with integrated loading and unloading features, developed and manufactured by Prima Power specifically for 2D laser machines.

LPBB line

The LPBB line making its debut at the Blechexpo 2017 consists of the new combined punching/laser system Combi Genius 1530, the Express Bender EBe 5-3 panel bender and the LSR loading and stacking robot, creating a high-end automation solution from a blank sheet to a ready produced sheet metal part.

Combi Genius is a very flexible tool for handling a wide product selection. With new automation solutions high productivity is reached by minimizing waiting times and utilising hidden time operation.

Additionally, the new CG1530 has all intelligent Genius series options and features, i.e. iRam and Sheet floating system.

Prima Power EBe5-3, included in the LPBB system, is a flexible, automatic and fully-equipped servo-electric bending machine with a maximum bending length of 2750 mm. It is equipped with PCD Picking & Centring Device, BTD Bend Turning Device, a single wagon for standard pallet with new part stacking function and a new lifting door designed to reduce the machine footprint. Amongst the main innovations, Tulus HMI software presents an optimised tool change, a monitoring view function to follow the process flow step by step, as well as a new interpolation function that generates new angle correction parameters to bend parts with thicknesses and bending lengths that do not correspond to the values saved in the database.

eP-1030 press brake

Another product on show on the Prima Power stand at Blechexpo is the eP-1030, the most versatile servo electric press brake of the eP family. Well known for its excellent combination of tonnage and working capability, the new version of the bending follower option, allows the simpler and faster positioning of big and heavy parts that cannot be handled by a single operator.

The eP-press showcased in Stuttgart was



also equipped with a flattening table to increase the productivity and facilitate the operation. Finally, the Wila-style upper and lower hydraulic tool clamping by Prima Power and an IRIS PLUS device for the real-time correction of the angle complete this machine and makes it suitable for producing high-quality complex components.

Software

As always on Prima Power stands, software solutions play an important role at Blechexpo, with an area dedicated to live demonstrations and presentations of the full array of products for digital manufacturing. Prima Power Industry 4.0 Inside solutions improve throughput, enhance production efficiency and increase flexibility in production batches. New releases on the whole range of SW products are being presented in Stuttgart. In particular, the new web console application for machines monitoring and analytics Fleet Manager is now available for 2D and 3D laser machines, features improved usability and more powerful cloud connector. Fleet Manager provides information on timeline, trigger maps, alarms and manual operations, also in

real time. Analytics reports on machine performance and production reduce downtime and enable preventive and predictive maintenance.

With Prima Power solutions for digital manufacturing and cloud-based communication, highly productive and flexible machines interact with the factory and with the whole enterprise, and people have the power to remotely monitor, control and predict the production process for the highest efficiency.

Prima Power is a world-class supplier in the high-tech field of laser machines and

sheet metal machining. Its product portfolio is one of the most complete in the industry and includes: 2D and 3D laser machines for cutting, welding and drilling, punching machines, combined punching/laser and punching/shearing systems, bending presses, panelling machines, bending centres and Flexible Manufacturing Systems (FMS).

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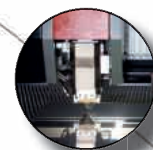
Expanded Capabilities

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Cost-effective solution for laser cutting small parts

Laser cutting is often the preferred process for metal cutting and indeed there are innumerable systems in production today cutting and profiling a wide range of metal parts for a multitude of applications.

Many of these systems use high power CO₂ lasers to process large sheet sizes, often 4.0 m x 2.0 m and up to 25 mm thick. However, many alloys and higher-value metals are only available in smaller sheet sizes and in these instances, as well as when thinner sections are being processed, the larger CO₂ laser systems are less cost-effective and can also become somewhat unstable at the lower power settings needed for thinner materials.

Designed specifically for smaller sheet sizes, and ideally suited to smaller production runs and thinner sections, the LaserCube is a compact fibre laser cutting platform that delivers superior cutting performance combined with low operating costs. Available from Bromsgrove-based TLM Laser, LaserCube is targeted at existing subcontractors that wish to add cost-effective capacity for smaller components.

Manufactured by the world leading developer and manufacturer of high-performance fibre lasers IPG, LaserCube is flat bed cutter is the ideal cutting tool for metals, including mild steel,



IPG's LaserCube is a highly efficient laser cutting system with a compact footprint and low operating costs



LaserCube provides fast and efficient cutting of carbon steel parts and reflective metals such as copper, brass and aluminium

stainless steel, aluminium, copper, brass and exotic alloys. Ideally suited to smaller part sizes, prototypes and smaller production runs, the LaserCube provides the most cost-effective capacity addition and lowest cost of ownership of any professional laser cutter.

Although compact in size, LaserCube is truly a general-purpose laser cutting system with high-velocity motion stages and high CW power lasers, providing fast and efficient cutting of carbon steel parts and reflective metals such as copper, brass and aluminium. With many alloys or higher-value metals only available in smaller-size sheets, the 1,250 mm cutting bed of the LaserCube is the perfect size for cost effective material processing. The system is also available in a wide range of different power configurations, allowing users to select the power they need.

The range of fibre lasers used within the system are entirely solid state, with no mechanical cavity resonators or mirrors and no adjustable or replaceable parts within the laser. Light is delivered along a flexible optical fibre pipe that is plugged directly into the laser cutting head, eliminating the need for optics and any adjustments in the

beam delivery path. With an emission wavelength of just one micron, a fibre laser's efficiency in cutting metals is better than traditional CO₂ alternatives, allowing higher cutting speeds or the option of using a lower power laser. Typical estimates show an IPG fibre laser cutting 1 mm thick steel approximately 3.5 times faster than an equivalently powered CO₂ system.

The LaserCube system is offered with lasers ranging in power from 500 W to 4,000 W. By offering such a broad range of options, users can select the exact cutting solution required.

Each laser is equipped with a 100 µm output fibre and can be used over a dynamic operating range from 10 percent to full



The FLC-30 cutting head has been specifically designed for metal cutting applications

power, with no change in beam divergence or beam profile throughout the entire range. This allows a single laser to be utilised for both high and low power applications, ideal for processing different thicknesses of metal.

Cutting head standard features

The FLC-30 cutting head use in LaserCube has been designed specifically for metal cutting applications. Taking advantage of the IPG fibre delivery, it has an extremely low weight to minimise moving mass when cutting small parts at high speed. Rated for laser power up to 10 kW and having an integrated height sensor, the FLC-30 head is compatible across the LaserCube product range.

The LaserCube system is ideally suited to applications within the aerospace, medical and automotive sectors, where high precision cutting is required on materials, which are often exotic in nature.

TLM Laser can provide more information on LaserCube to subcontractors seeking a compact and cost-effective solution for laser cutting smaller parts, smaller production runs and prototype development.

Founded in January 2006, TLM Laser Ltd

is a dedicated laser service company, providing a second to none service and maintenance program which we can implement to best suit its growing customer demands.

Located regionally throughout the UK TLM provides a quick and efficient service, whether it be a preventative maintenance contract or emergency breakdown cover. Its highly trained and experienced engineers have vast experience on a complete range of lasers. Whether it be for lamp pumped lasers, diode pumped or CO₂, it will endeavour to maintain and extend its growing reputation at the forefront of the laser servicing and repair industry by carrying out scheduled maintenance visits as well as providing call out cover.

Initially providing a 'Total Laser Maintenance' service, the company now offers a complete range of laser products from some of the leading names in laser technology. Alltec, Foba, Innolas, Univet,



Bofa, ALPHA LASER, Coherent Laser Machining and Swisstec Micromachining are names immediately recognised globally within the laser industry for the highest of quality and outstanding customer service. These are all supported by experienced and highly trained engineers to ensure your equipment generates the maximum in productivity.

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Tube processing on a flat-bed fibre laser cutting machine

Sheet metal working equipment manufacturer, Bystronic has introduced a new rotary axis for processing tube on its ByStar Fiber flat-bed laser cutting machine, which offers up to 10 kW of fibre laser power. The new equipment enables users to switch between sheet and tube processing in a few simple steps.

The factory-fitted rotary axis, together with a retractable tailstock, enables tubes from 30 mm to 315 mm in diameter and in a variety of lengths to be machined. The operator inserts the tube either from the outside through a hatch in the ByStar Fiber's housing or directly into the machining area through the sliding door along the side. Unloading of cut parts is similarly rapid.

Also on offer is a Tube Cutting software module, which is an expansion to the proprietary BySoft 7 programming software. It allows users to design parts for tube processing, input existing CAD files, edit them and generate cutting plans.

To support fast setup times for processing a variety of tube profiles, Bystronic has integrated an assistant function into its ByVision Cutting user interface. This guides the user through every operating step via the ByStar Fiber's touch screen.

For manipulating longer tubes, Bystronic offers a rotary axis box, akin to a bar magazine on a lathe. The detachable accessory is mounted on wheels and enables tubes up to 3 metres long to be fed in through the hatch in the machine housing and positioned accurately. With an additional extension box, tubes up to six metres in length can be processed.

An informative video showing tube cutting on a ByStar Fiber can be viewed at: www.youtube.com/watch?v=9G3-IMSc4pY&feature=youtu.be



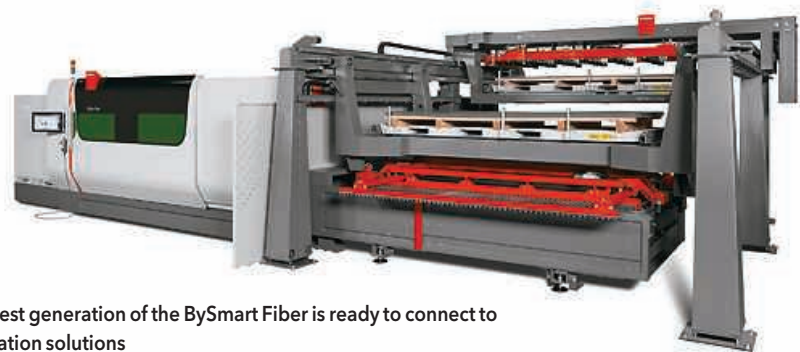
For processing longer tubes, Bystronic offers a mobile rotary axis box for the ByStar Fiber



An integrated rotary axis on the Bystronic ByStar Fiber and a setup assistant facilitate rapid transition between sheet and tube cutting

BySmart Fiber: Now with automation
Bystronic has expanded the BySmart Fiber laser cutting system with suitable automation solutions. Customers now have the choice between the ByTrans and the Byloader.

Automation solutions for fibre laser cutting offer a decisive competitive advantage. They maximise the capacity utilisation of the laser cutting system and reduce the user's workload with regard to the time-consuming material handling. Both these factors mean that cutting jobs are



The latest generation of the BySmart Fiber is ready to connect to automation solutions

performed faster and at lower cost.

Bystronic is now opening up the new generation of the BySmart Fiber for appropriate automation solutions as, even for entry-level users, automated laser cutting is increasingly becoming the key criterion for success.

"Our experience shows that particularly in highly competitive markets, companies that automate their laser cutting system have a competitive edge. Hence, Bystronic is now also offering various automation modules for the BySmart Fiber," explains Bystronic product manager Martin Bauer.

Customers have the choice between two systems: ByTrans and Byloader. The ByTrans loading and unloading solution organises the material flow on the BySmart Fiber fully automatically. It loads raw metal sheets onto the laser cutting system's shuttle table. After the cutting process, the ByTrans also unloads the finished parts and residual sheets. ByTrans requires only 60 seconds for the complete loading and unloading cycle. This means that the automation system is always faster than the cutting plan that is being processed. For users, this means: laser cutting without the interrupting setup times. Because the ByTrans loads one shuttle table while the BySmart Fiber is cutting on the other table.

The Byloader automation system is a compact loading unit that is positioned on the side of the laser cutting system's shuttle table. The system supplies raw metal sheets to the laser cutting system without taking up unnecessary space. This is automation on the minimum amount of space.

The ByTrans and Byloader are operated using the BySmart Fiber's touch screen.

Bystronic has seamlessly integrated the control of the two automation systems into the laser cutting system's operating software. This enables users to perform all the operating steps on a single touch screen.

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More power, increased accuracy, higher speeds

Sheet metal subcontractor Accurate Laser Cutting's £700,000 investment in the UK's first 10 kW fibre laser has continued its success almost to the year it was first installed.

With its phenomenal processing speeds and improved processing capabilities, the 10 kW Bystronic ByStar cutting system has set a new benchmark in laser cutting.

The high-performance equipment is capable of laser cutting aluminium and stainless steel up to 30 mm thick, mild steel up to 25 mm, 15 mm brass & 12 mm copper. It can also clean cut mild steel up to 15 mm thick, which is beneficial to customers who require an oxidation free edge on their parts.

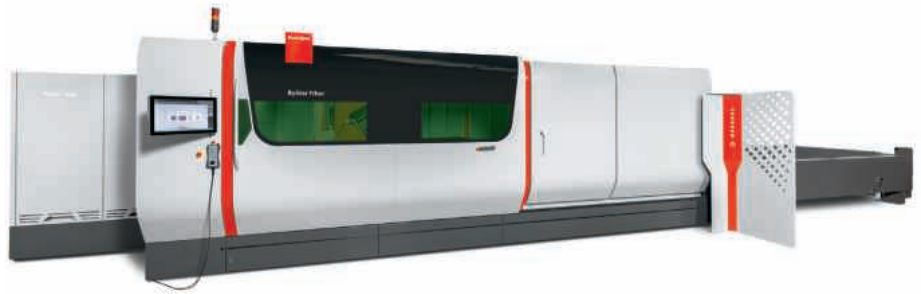
Jon Till, company director, explains: "Nitro-cutting offers so much more to our customers. Previously, our ability to clean cut mild steel was limited to 3 mm using our CO₂ equipment. To now have the capability of five times that thickness is an incredible improvement & a major benefit to customers who require further secondary operation processes."

This investment replaced its CO₂ cutting equipment at its Tividale, West Midlands manufacturing premises. The laser cutting facility is fully equipped with two state-of-the-art Bystronic fibre lasers; one 6 kW BySprint 4 m x 2 m and its newest investment, a 10 kW ByStar 3 m x 1.5 m system. They also have a dedicated press brake facility on-site, which offers a maximum pressing capacity of up to four metres and 320 tonnes.

Steve Morgan, company director, says: "Following the success of replacing our first CO₂ laser with a 6 kW fibre laser in 2015, the move to upgrade our second CO₂ was inevitable." Its powerful 10 kW output allows for accelerated cutting speeds and has provided a significant boost to capacity on the shop floor.

Jon Till says: "In our view, having the best technology means we can provide the best service. With faster processing speeds, we have more capacity available to service our customers with even shorter lead times and still consistently deliver on quality and price."

The company has come a long way in such a short period of time. No doubt with its continued record breaking sales, passionate customer care service and the production of high-quality components,



Accurate Laser Cutting will continue to grow in stature and lead the way in the laser cutting industry.

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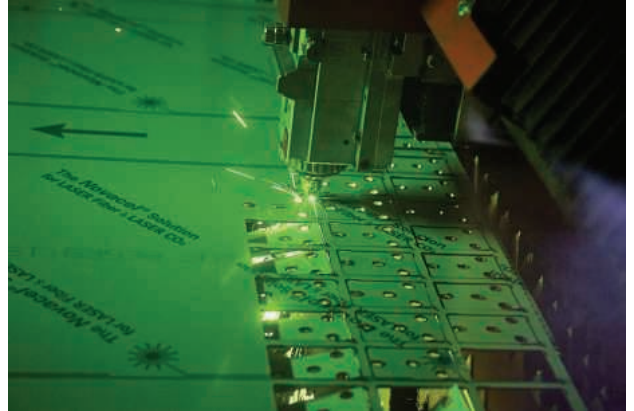
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Laser cutting – is your supply chain holding you back?

Charles Corner, managing director of full-service sheet metalwork manufacturer Malton Laser, discusses the importance of being able to trust your subcontractor, and how a full-service provider can be more beneficial



tight deadlines can often prove difficult when relying on others to provide a service within a timeframe, especially when you're counting on them to represent your brand with the quality of the work. I have seen this first hand with one of the UK's leading boiler brands. A large quantity of the manufacturing work has to be outsourced to keep up with demand in peak times for the company. By building a trusted relationship over many years and demonstrating our skills, we have recently been chosen as a preferred partner and act as an extension of its workshop to produce high-quality components that reflects its renowned quality.



Time is money, so any hold-up within the supply chain can cost manufacturers more than just their reputation. Finding reliable subcontractors that reflect the standards your company works to can often be difficult and time consuming. Having to rely on different suppliers can also put unnecessary pressures on a company when keeping to tight deadlines.

When looking for a supplier, the first step is to ensure you are properly prepared and know exactly what your requirements are. Then you can begin looking for a trusted subcontractor to provide a service that reflects the level of quality your company works to. It is worth considering if you know anyone who can recommend a supplier to you, or if there's any with relevant accreditations that jump out to you. This is something that cannot be overlooked, as recommendations are majorly important when trusting a company with your product, so it's worth asking around and spending extra time when researching.

Every minute counts when subcontracting and every minute costs money. Keeping to

Opportunities like this must be taken with both hands for subcontractors. Any situation where a relationship can be built and a company is willing to trust you to manufacture parts on its behalf cannot be done half-heartedly. Once a trusted and good working rapport has been established, it is much more likely you will be recommended or noticed within the industry and this is invaluable for a business.

On the other hand, outsourcing can be a risk, especially when establishing a new relationship. If you're in need of a service within a tight deadline, a subcontractor may make promises they cannot keep. If it sounds too good to be true, it probably is. It is always worth taking the time to research a qualified and dependable manufacturer, instead of sending your products somewhere that may not take as much pride in the work, in order to keep to your deadlines.

There is a lot to be said for selecting a manufacturer with these qualities, as everything can be performed on one site with a supplier they can trust.

Consequently, choosing one

manufacturer for several services means there is less chance of disrupting the whole supply chain, while saving you time and money. Knowing exactly where your products are and who is looking after them for you, even being able to visit the site and check on them if needs be, can be extremely valuable to a producer. One point of contact always makes life easier too. Knowing one person or team is in charge of keeping track and providing updates throughout all processes your products go through, can give peace of mind to a producer.

Overall, it boils down to sourcing a trustworthy supplier to provide a high-quality finish you can be proud of and it is worth going the extra mile to find one that is right for you and suits your needs. Any disruptions have the potential to snowball problems for you, causing a domino effect within the whole chain as hold-ups and resolving issues may cause you to miss time booked with other suppliers.

Whether you choose one or several subcontractors, it's essential your supply chain is as streamlined and efficient as possible to ensure your products reflect your standards and meet your bottom line.

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Fibre lasers are the future of manufacturing

You don't have to look far in the media to see that fibre lasers are the future of manufacturing, with the majority of CO₂ users including subcontractors making the move the new technology.

What's not to like, with faster, more efficient, lower maintenance and running costs. Now, never before has it been so affordable.

MBA Engineering is a long-established provider of service and support to CO₂ Bystronic users, but with the changing market MBA has evolved. This has led to the partnership with Kimla, offering fastest fibre and mist-efficient fibre laser to the UK market. This has ensured a smooth transition for MBA's customers to move from CO₂ to fibre.

There has been a significant jump in enquiries recently from subcontractors and sheet metal fabricators looking to make the move to fibre. A common misconception was that the fibre is too expensive compared to the tradition CO₂, but that all depends on your needs. MBA has worked with customers looking at every angle of their business, including cutting hours,

metal thickness, frequency of use, current costings on CO₂ and completed full costings analysis to show the types of saving they can make. If they didn't need a fibre or the Kimla wasn't suitable, MBA was upfront. The machine has to work for the business needs. "If it's a no, that's fine with us."

So why put your faith in the new kid on the block? Kimla's production is based in Poland and has been long established supplying waterjets, milling machines and fibre lasers to the European market for over 16 years. Until recently unknown in the UK, the Kimla has been picking up momentum and causing a stir amongst the big boys. The speed of the KIMLA is mind blowing and, in recent case studies, each time the Kimla came out on top for running costs, speed, accuracy and efficiency. But why does that matter? Because time matters.

MBA recently conducted a case study to the running costs of one of its customers, running a 4.4 kW Byspeed CO₂ vs the Kimla 4 kW and Kimla 6 kW fibre.



The figures show that it's a third of the cost per hour to run the Kimla fibre vs the CO₂. The Kimla Fibre is up to six times quicker than CO₂ and twice as quick as rival fibres. Huge savings can be made.

To see it in action, visit: <https://mba-eng.co.uk/kimla-fibre-laser> or to book a demo, contact:

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The total laser cutting solution

Centrally-based in Rugby, Warwickshire, MSS Lasers specialises in the supply of quality used CNC laser cutting machines from the world's leading laser system manufacturers, Trumpf, LVD and Amada.

MSS Lasers is a privately-owned company formed in 2003 by managing director Carlos Gonzalez-Lee. His research and experience in laser cutting, and the need for an independent specialist laser company in the UK, provided the springboard for the company's growth. Its core business is servicing and sales of all types of refurbished laser cutting machines as well as the supply of new Eagle fibre laser cutting machines. The company has developed partnerships across Europe, especially in Spain where it is also distributing the Eagle machines. The company is a pioneer in the supply of high pressure nitrogen generation plants for laser cutting. Not only does this save users the cost of purchasing gas, but it also has environmental and operational benefits by providing nitrogen on demand at the customer's premises.

With a team of experienced and highly qualified engineers with an unrivalled knowledge of both the laser and gas generation industry, MSS is able to offer "The Total Laser Cutting Solution."

MSS was formed in 2003 with the aim of offering a complete service to the laser cutting industry, with the company's excellent reputation for servicing all makes of laser cutting machine, providing the springboard for the company's growth.

MSS Lasers has become leading specialists in the sale of fully reconditioned laser systems and UK market leaders in the supply of high pressure nitrogen generation equipment to the laser industry.

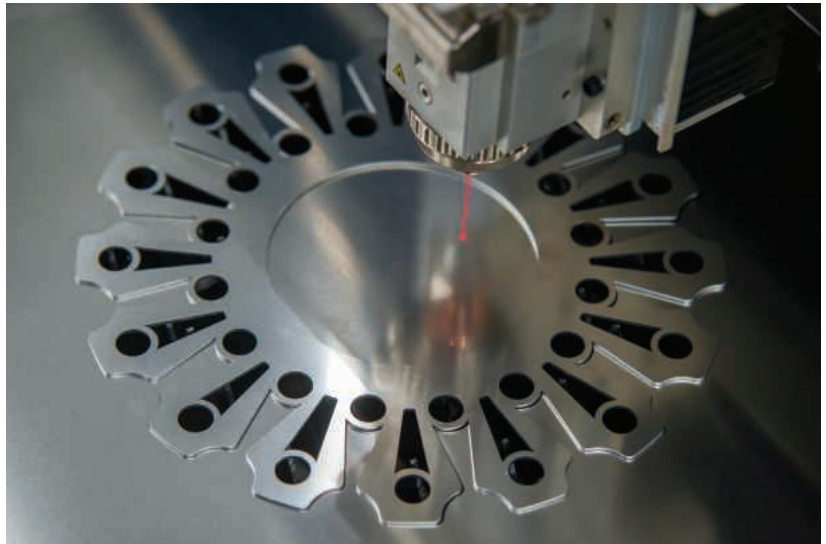
It is the company's aim to build up and maintain a personal relationship with all of its customers. You will deal with the same engineers on a regular basis and they will therefore know your machine(s) and your exact needs as a customer, ultimately enabling them to respond quickly to potential problems.

MSS understands that downtime costs money, therefore service response will always remain a priority. It endeavours to resolve problems over the telephone with no need for a site visit, keeping "downtime" to an absolute minimum. However, should a visit be required, an engineer will respond as quickly as possible.

Because it does not have the overheads of some of the larger machine tool builders, MSS can, without compromising the

technical ability or experience of its engineers, offer all of our services at very competitive rates.

As an independent business offering a "One Stop" sales and service solution, it knows it will only succeed long term if it gives customers the best possible service.



Save time and money with plug-n-play Nitrogen Generation Systems

You could be saving every month producing your own nitrogen cutting and assist gas with NitroCube. MSS Lasers offer three options:

NitroCube range

Available in four standard sizes with up to 840 m³/day of generated nitrogen, the NitroCube range is perfect for all-purpose CO₂ laser cutting. Flexible storage options mean you can customise the amount of storage to suit your requirements. You can also personalise your NitroCube with optional special colours to match your laser cutting machine or company branding.

NitroCube Fiber range

Specifically designed for fibre lasers, the NitroCube Fiber range incorporates higher purity, higher flow rates to suit the larger nozzles used with Fiber Lasers, along with 50 percent less energy consumption.

NitroCube Mini range

For use with laser beam purge, the NitroCube Mini ensures your laser beam path is readily purged with pure nitrogen gas, helping to keep mirrors clean and maximise the working life from your laser.

MSS Lasers

Tel: 01788 552299

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Mazak launches latest FABRI GEAR laser cutter at EMO

The latest version of Yamazaki Mazak's highly successful FABRI GEAR range of laser cutting machines was given its European debut at EMO 2017.

The new 3D FABRI GEAR III 4KW is capable of cutting large structural materials such as pipe or tube, up to a maximum length of 8,000 mm, with options available up to more than 15,000 mm.

The 3D FABRI GEAR III is ideal for cutting long and heavy tube used in the construction industry, such as building structures, heating and ventilation systems, along with machinery applications including cranes and agricultural machinery.

The FABRI GEAR series have been used in a number of highly prestigious construction projects, including the Yas Marina Formula One circuit in Abu Dhabi, the national football stadium in Gdansk, Poland and the Tokyo Sky Tree, the world's tallest broadcast tower.

The new laser cutting machine is equipped with a 3D torch that enables movement on five different axes, ensuring that the machine is capable of cutting both closed and open profiles. The torch delivers industry-leading levels of accuracy by cutting vertically to ensure that the metal tubes sit flush against each other with no gaps. This reduces the need for jigs to hold the cut metal in place prior to welding and reduces the amount of weld material, offering the benefit of faster weld times and greater strength from the weld.

Mazak estimates that tube cut with the 3D FABRI GEAR III can be welded and assembled twice as fast as conventionally cut tube. In addition, highly accurate cutting is guaranteed by an automatic optimum focus positioning capability, which significantly reduces piercing time.

The machine on the Mazak stand at EMO was a new MAK III version, capable of cutting any shaped material, from round through to square, rectangular and triangular pipe. The maximum cutting size for round workpieces is 406.4 mm and 300 mm for square workpieces. It is equipped with a four-chuck system which prevents vibration and ensures highly accurate cutting. In addition, an auto-centring clamp enables fast set-up with no change in set-up from square to circular or triangular tube.

In addition, the 3D FABRI GEAR III offers a DONE-IN-ONE solution, including an optional tapping unit which can help generate significant reductions in process time by tapping in the same machine setup as laser cutting. An optional chain conveyor is also available offering increased versatility and maximum workpiece throughput.

Yamazaki Mazak UK Ltd
Tel: 01905 755755
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The new 3D FABRI GEAR III 4KW is capable of cutting large structural materials, such as pipe or tube, up to a maximum length of 8,000 mm, with options available up to more than 15,000 mm

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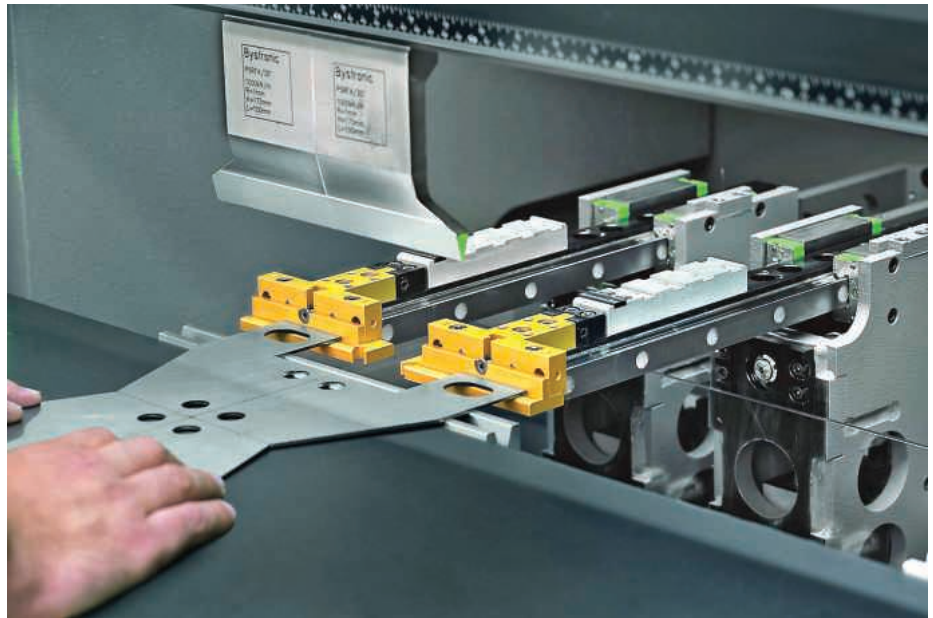
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Mobile press brake offers high bending capacity

Swiss sheet metal working machine manufacturer, Bystronic has launched a new press brake that can be moved around a factory by fork lift truck. In a footprint of less than three sq m, it offers a generous bending capacity of 80 tonnes over 1.5 m.

The Xpert 80 joins the smaller 40-tonne, 1 m Xpert 40 model that can be similarly repositioned and has proved popular since its introduction at the 2014 EuroBlech exhibition in Hannover. Both machines boost productivity by avoiding having to use a large, slower press brake to bend a small component. Output can be increased further by relocating the machines next to a laser cutting cell, another press brake or other machine tool.



The new, larger press brake can bend material up to 20 mm thick and is suitable for almost any task, from large volume runs to small batch, job shop production of complex parts. The machine may be equipped with multiple tools to enable all bends to be completed sequentially. ByMotion drive control, a Bystronic development, ensures that the Xpert 80's upper beam and backgauges are accelerated with high precision. Fast bending speeds up to 25 mm/s are attained.

Ergonomic design features include drawers built into the side of the machine for housing bending tools and other equipment within easy reach of the operator. A height adjustable, folding table at the front of the machine can be used as a working surface or storage area. Power consumption is low due

to the machine's energy-conserving design and the start-stop technology employed in the drive train.

Upper and lower tools self-seat during clamping as the operator presses an icon on the machine's touch screen control. Tool positions are automatically calculated as a part of the program and flashing LEDs on the front of the upper beam instruct the operator where the tools need to be mounted to correspond with the 3D movements of the high speed backgauge.

The ByVision touch-screen control, which is mounted directly in front of the operator, displays simple 3D graphics of the bending process. An optional bar code reader allows the program to be called from a bar code on a work sheet or from a QR code etched on the blank should the owner have a Bystronic laser cutting machine.

A Bystronic has long used dynamic crowning on the Xpert model range pressbrakes. This unique compensation system adjusts the curvature of the lower beam automatically during bending. State-of-the-art dynamic crowning makes this correction in real time and with the latest sensors. Users can therefore achieve exact, constant bending results, and this even with bent parts that are more than 3 m long.

Precision is the most important yardstick for pressbrakes. Slight deviations from the desired bending angle are physically unavoidable. The bending angle can either be basically inexact or can vary across the

entire bending length. During air bending, compensation systems balance out these errors. Bystronic uses the unique hydraulic dynamic crowning technique on its pressbrakes: The stamp and die are specifically curved to balance out the deformation caused by the bending process. Another decisive factor is the behaviour of the workpiece during bending. For precise bending results, state-of-the-art sensors provide all required information to the pressbrake controller. This data is evaluated here and an intelligent bending process is implemented thanks to automatic corrections.

Bystronic develops and sells systems for sheet processing. Its headquarters are in Niederönz, Switzerland. Two additional development and manufacturing locations are in Gotha, Germany and Tianjin, China. Bystronic has its own sales and service companies in approximately 30 countries across three continents, as well as being represented by agents in countless other countries. Since 1994, Bystronic has been part of Conzzeta, a Swiss industrial holding company primarily active in machine construction.

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www.bystronic.com

Next generation beveling system

ESAB Welding & Cutting Products has introduced the DMX Automated Plasma Beveller, a next-generation beveling system delivering significant performance improvement through a simple, compact design. The DMX Beveller provides high reliability, enhanced safety and ease-of-use. It cuts the full range of weld preparations, including V, Y, X, and K bevels, with cut angles up to 45° on materials up to 50 mm.

The DMX Beveller is complemented by the release of ESAB's new SmartBevel™ technology, for easier programming and accurate bevel cutting with minimal operator intervention. SmartBevel includes beveling data and geometric

compensations necessary to cut V, X, Y, and K bevels on mild steel from 6- to 50-mm thick. Unlike competitive systems, SmartBevel integrates all bevel compensations into the CNC, so bevel programming is simplified, and any fine tuning of the cut is done quickly and easily at the machine.

ESAB uses a new approach to providing 5-axis motion, utilising direct drive motors to radically reduce complexity, eliminate the need for breakaway crash protection, and deliver responsive, accurate positioning. The direct drive design eliminates gearboxes, belts, pulleys, limit switches and exposed cables. The resulting "compliant motion" lets the DMX Beveller absorb and detect a torch crash without any added components, as well as automatically reset after a collision without the operator touching the torch or climbing on the cutting table to do so. Faster resets result in higher productivity and eliminate dangerous operator tasks from the beveling process.

The reduction in complexity afforded by direct drive technology enhances both

performance and reliability, and enables an extremely compact design.

Reducing the size and weight of the bevel head has additional advantages. The DMX Beveller is significantly smaller and lighter than traditional plasma bevel heads, so it can be mounted on smaller gantries, making quality plasma bevel cutting more affordable and saving valuable floor space. DMX is available on ESAB's Combirex DX and larger gantries.

The DMX Beveller also uses compound motion to provide beveling in any direction. This type of motion system has no rotation limit and thus eliminates the need to unwind the torch leads or pre-position the head, which further improves cycle time and productivity. It also extends torch life by not twisting the torch leads, but does so without using an expensive torch bearing.

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High speed and outstanding quality

LaserHybrid combines the advantages of laser and MIG/MAG welding

Cost-effective, reliable, consistently precise and, above all, fast. The requirements placed on automated welding processes in the automotive industry, shipbuilding and pipeline construction continue to rise. It must be possible to join thick sheets as well as thin sheets in series production with increasing speed and quality. This is where LaserHybrid welding, for example, can bring greater profitability. This welding process combines laser and gas metal arc welding in a single process, making optimal use of the synergies. Users primarily benefit from a highly stable welding process, less preliminary work and rework along with high speeds and quality. Fronius is now also offering the LaserHybrid welding process together with the intelligent TPS/i power source to provide an additional increase in performance.

LaserHybrid welding is a combination of two different welding processes: laser welding and gas metal arc welding (GMAW). A special focusing lens is used to focus the laser beam. This creates a high energy density, which quickly melts the material. The result is very deep penetration as well as



high speed and strength. Another advantage of this welding process is the low thermal load and thus low distortion. Gas metal arc welding involves melting the wire electrode under a gas shroud. The gas used emerges on the welding torch around the wire, keeping the welding location free from oxygen and thereby preventing oxidation. The advantages of gas metal arc welding include its outstanding gap-bridging ability, easy seam preparation and targeted manipulation of the heat input.

The LaserHybrid head forms the heart of the welding process

Fronius has taken the key characteristics, benefits and advantages of both welding processes and brought them together in a single system. During LaserHybrid welding, a laser beam initially heats the surface of the component, resulting in deep, narrow penetration. The arc then forms a wide weld pool to provide outstanding gap-bridging ability. At the same time, deep penetration can be achieved. At the heart of the welding system is a compact LaserHybrid head with an integrated MIG/MAG welding torch and built-in laser optics. Different welding heads are available for various applications, in the automotive industry, shipbuilding or pipeline construction, for example. A robot holder forms the link between the LaserHybrid head and an industrial robot. This gives the LaserHybrid head the flexibility it requires to access difficult-to-reach areas of the component.

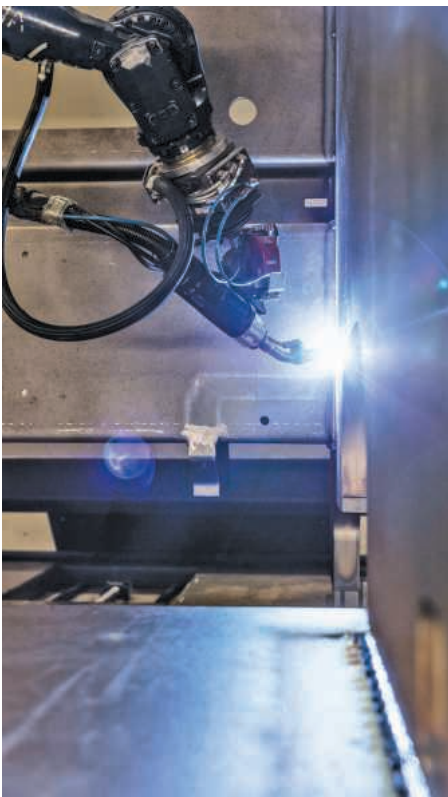
The welding wire can be placed in any position with respect to the laser beam, thus enabling the joining process to be adapted precisely to the wide variety of seam preparations, outputs, wire types, wire grades and joining tasks.

Hybrid system: quick, cost-effective and powerful

The interplay between GMAW and laser welding results in an extremely stable welding process with a high degree of thermal efficiency. The LaserHybrid welding process from Fronius is ideal for joining thin-sheet metals in series production, as is required in the automotive industry, for example. It is also a suitable solution for welding thick sheets, for which considerably fewer weld layers are required, such as in shipbuilding.

With Fronius LaserHybrid, it is possible to carry out automated joining of different aluminium and steel items at speeds of up to 8 metres per minute, in superlative quality. Users primarily benefit from the extended range of welding options and minimum effort required when it comes to seam preparation.

The results are also virtually faultless. Complex and time-consuming seam rework is only necessary in rare instances. What is more, users can also weld edges created by plasma cutting, guillotine-shear cutting or flame cutting. All this means that LaserHybrid welding plays a significant role in reducing production and operating costs.



LaserHybrid on TPS/i

Fronius power sources provide the necessary energy and computing power. To date, the LaserHybrid system has been available with the TPS (TransPuls Synergic). Fronius is now also offering the hybrid process in combination with the innovative TPS/i power source. The TPS/i is a welding system with a modular structure that consists of networked and perfectly harmonised components. It has a high-performance processor and a high-speed bus, meaning that greater amounts of data can be transferred even more quickly and control loops are faster than ever before. This results in increased welding speeds, more precision and outstanding welding results. Further advantages of the TPS/i are the various dip transfer and pulsed arc processes, such as the Fronius-developed LSC (Low Spatter Control) and PMC (Pulse Multi Control), that can be used with the aid of function packages. These allow the welder to use the same system for different applications, saving time, money and effort. The TPS/i also offers a wide range of options for networking and data documentation so that welding processes can be evaluated and optimised where necessary. Now users will also be able to benefit from all of these advantages with LaserHybrid welding.

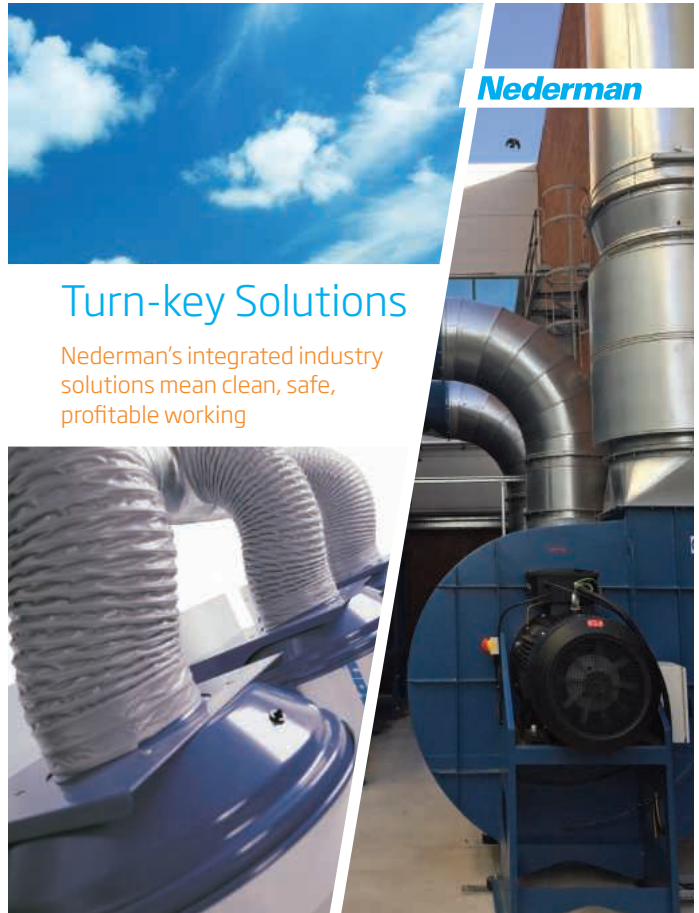


Patented Crossjet unit protects the LaserHybrid head from spatter

A coated optical protective glass is used to protect the laser optics from damage and keep the system ready for operation. The LaserHybrid head uses a closed Crossjet unit to ensure that the protective glass itself remains clean, undamaged and transparent for the laser. An air flow very effectively diverts any welding spatter into an extraction channel at supersonic speed. The air flow itself is also extracted before it can reach the weld area and interfere with the work of the shielding gas. The processing cell remains free of contaminants and welding fumes. This reduces errors on the device and ensures a high level of availability.

Fronius International GmbH is an Austrian company with headquarters in Pettenbach and other sites in Wels, Thalheim, Steinhaus and Sattledt. With 3,817 employees worldwide, the company is active in the fields of welding technology, photovoltaics and battery charging technology. Around 89 percent of its products are exported through 28 international Fronius subsidiaries and sales partners/representatives in over 60 countries. With its innovative products and services and 1,242 granted patents, Fronius is a global innovation leader.

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Incredibly fast welding times with K-TIG

Australian company, Keyhole TIG Ltd (K-TIG) has developed a high-speed, high-productivity variant of TIG with 8 x the penetration of GTAW, allowing it to perform x-ray quality welds in materials up to 5/8 in (16 mm) thick in a single pass, without the need for edge bevelling.

K-TIG has been exported to 18 countries and is being used in production by many of the world's most productive fabricators in numerous industries from pressure vessels and tanks to power generation and nuclear applications.

Neil Le Quesne, K-TIG's CEO, says: "K-TIG welds meet US, European and Australasian welding standards including ASME IX, and has been subjected to exhaustive Lloyds-witnessed and certified testing.

"K-TIG is a single-pass, full-penetration keyhole welding technology which performs a six hour TIG weld in under three minutes, just one percent of the time normally required. The average cost saving of K-TIG customers is between 80 and 95 percent."

K-TIG welding technology combines the high-quality and cleanliness of GTAW with a depth of penetration that is unmatched by conventional gas-tungsten arc, gas metal arc or plasma welding processes.

Neil Le Quesne says: "K-TIG is a GTAW process which requires no edge bevelling, uses as little as 10 percent of the gas normally required and produces highly repeatable, x-ray quality welds with superb cap and root aesthetics."

K-TIG works across a wide range of applications, and is particularly well suited to corrosion resistant materials such as stainless steels, duplex, super duplex, nickel



alloys, titanium alloys, super alloys and exotic materials.

It easily handles longitudinal and circumferential welds on pipe, plate, spooling, vessel, tank and other applications.

K-TIG's incredibly fast welding times result in dramatic reductions in labour costs, welding cycle times, rework and repair costs, gas and power consumption. K-TIG's full-penetration welds significantly reduce or eliminate grinding, back-gouging and reworking. The K-TIG process eliminates the need for edge bevelling and dramatically reduces or eliminates the need for filler material. K-TIG requires only a simple square butt joint, and can also be utilised with all standard GTAW preparations.

Neil Le Quesne says: "The ability to weld in a single, full penetration pass virtually eliminates the potential for lack of fusion and inclusions, and dramatically reduces the potential for porosity and other defects typical of multi-pass welding processes.

"K-TIG is a low distortion process, with heat inputs well within normal ranges. As a result, transverse shrinkage and distortion are greatly reduced. K-TIG's weld pool provides an exceptional quality cap and root that requires no back-gouging, finishing, cleaning or interpass grinding."

High speed, full penetration

The K-TIG process delivers advantages previously achievable with only high-cost laser, hybrid laser or electron beam welding. This simple process makes automated, high quality, deep penetration welding accessible to any small-to-medium sized fabricator.

Neil Le Quesne says: "High productivity welding solutions have typically travelled with very high price tags. The large capital investments required have put these technologies beyond the reach of all but the largest military and aerospace fabricators."

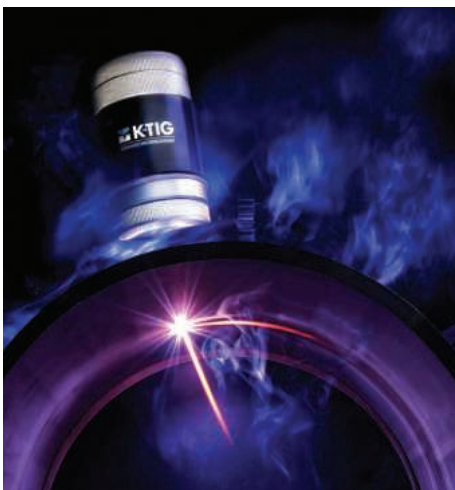
Electron Beam Welding (EBW) and Laser Welding (LBW) are the two most obvious cases in point. These technologies, both developed in the 1960s, deliver very high welding speeds.

Unfortunately, electron beam welding and laser welding are limited by very high capital and operating costs, the need for highly skilled operators, dedicated facilities and extensive occupational health and safety precautions. They also require near-perfect fitup, which is rarely achievable in a typical production welding application.

Plasma welding, also developed in the 1960's, has traditionally been used to fill the large gap which has existed between conventional arc welding processes such as TIG and MIG, and high energy density processes such as laser and electron beam welding.

Plasma welding is widely regarded as the most complex of the arc welding processes. The constricted, high energy density plasma jet is produced by maintaining a critical balance between plasma gas flow rate, shielding gas flow rate, current, orifice diameter and the alignment between the electrode and the orifice. This requires meticulous setup and frequent maintenance.

Neil Le Quesne says: "Plasma welding's limited speed, penetration, propensity to entrap gas voids, difficulty in managing tie-ins, high complexity, numerous critical



parameters, minimal fitup tolerance, high cost of consumables and rapid process drift, typically 20-30 minutes, due to erosion of the nozzles and orifice have all contributed to limiting its adoption."

K-TIG in action

K-TIG is playing a major role in the construction of the US \$170 million Acueducto Gran San Juan, a 50 km pipeline that will transport drinking water to San Juan in Argentina. Of the 50 km of pipeline, 15 km will be fabricated by Industrias Metalúrgicas Jaime SRL in 1,600 mm in diameter, 9 mm thick stainless steel using K-TIG.

Just four months into this large-scale Government-funded project, the productivity gains being delivered by K-TIG are remarkable. The fabrication of the pipeline is set for completion an astonishing 550 days ahead of schedule.



According to Gustavo Gonzalez, who is working with Industrias Metalúrgicas Jaime SRL on the pipeline: "The fabrication of the pipeline began four months ago. I am pleased to report that what we had heard about the speed, productivity and quality of K-TIG welding is true. K-TIG delivers very clean and smooth weld seams and perfect roots, with no weld preparation needed.

"K-TIG is extremely fast, uses a fraction of the gas normally required and a tiny fraction of the wire consumables we would have consumed with any other process. The productivity that it is delivering for this major project is remarkable, it is at the highest level."

Gustavo Gonzalez concludes: "The productivity of the K-TIG process is allowing us to fabricate an average of eight stainless steel tubes per day. Each of these tubes is 12 m long, 1.6 m in diameter



and 9 mm thick. The timeframe in which we had expected to complete the fabrication of all 1,300 12 m tubes is 720 days, indeed we are contracted to this timeframe. The use of K-TIG has transformed the economics of the project and we will complete the fabrication in 162 days, which is a fantastic result for us, the Government and the people of San Juan."

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Welding industry pioneer showcases a complete future welding ecosystem

At Schweissen und Schneiden 2017, Kemppi showcased future welding with an ecosystem approach that comprises advanced machines, automation, application software, management systems and human skill. It takes advantage of the full potential of the internet of welding by connectivity, cloud-enabled solutions and software.

Frederic Lanz, vice president Sales Europe and Global Projects, Kemppi Oy, says: "Forty years ago, we introduced the first inverter power source and have continued to pioneer the industry ever since. For us, future welding incorporates advanced technology with IIoT enabled digital solutions, quality management, process knowhow and the ultimate usability."

Solutions that push the boundaries of welding

Kemppi's flagship product, X8 MIG Welder, is a ground-breaking multi-process solution. Its state-of-the-art technological features combined with native connectivity to WeldEye welding management software make the X8 MIG Welder a unique and powerful tool for demanding industrial welding. The digital WPSs and wireless Control Pad enhance the solution's usability to a new level and make printed WPS documents unnecessary.

Integration and connectivity is essential in future welding. The universal, cloud-based

WeldEye software is compatible with any brand's welding equipment, accessible anywhere, and always up-to-date with support to ISO, ASME and AWS standards. At the exhibition Kemppi introduced a new WeldEye module, welding production analysis, for companies looking to benefit from a light and easy-to-set-up solution for monitoring and analysing welding production efficiency.

In the complete welding ecosystem, A7 MIG Welder represents Kemppi's expertise in industry 4.0 enabled robotic arc welding. The sophisticated system can be integrated with any robot brand. The power source's comprehensive Wise process packages improve welding productivity beyond regular MIG processes. The Gamma GTH3 helmet represents Kemppi's high quality personal protective equipment. The innovative X8 MIG Welder, as well as A7 MIG Welder and Gamma helmets, are designed and manufactured in Finland.

New WeldEye module provides enhanced insight into welding production efficiency

The universal welding management software WeldEye, compatible with any brand's welding equipment, has become even more comprehensive with the introduction of WeldEye for welding production analysis.

WeldEye for welding production analysis tracks and measures the arc time of welding stations, and standard times in serial production. Furthermore, it provides information on the time spent on non-welding activities with reason codes. The software's data mining tool arranges the data into user-friendly visualisations, and provides e.g. comparisons between planned and actual welding time per machine, teams, shifts locations or projects. This enables production managers to identify improvement potential in processes or working methods that have an impact on welding. By applying continuous production monitoring, it is possible to increase arc-on time by even 40 percent, and thus shorten welding production lead times.

In addition, the WeldEye for welding production analysis module enables third party data connections via cloud APIs.



Joint sensor technology development with Suunto

The data input for WeldEye for welding production analysis is managed today with a handheld device. For future applications, Kemppi develops sensor technology to measure welding time based on magnetic field detection together with Suunto. Suunto is a global leader in sports precision instruments. This R&D cooperation focuses on the use of a small and cost-efficient battery-powered wireless sensor solution that utilises Suunto Movesense technology.

The future of welding management is now

In addition to welding production analysis, the cloud-based WeldEye offers four other software products that provide unprecedented savings and insight for value creation: WeldEye for welding procedure and qualification management; WeldEye for welding quality management; WeldEye for welding documentation management; WeldEye for welding production management.

Kemppi is a pioneering company within the welding industry. It develops solutions to help its customers win business. Headquartered in Lahti, Finland, Kemppi employs over 600 welding experts in 13 countries and has a revenue of more than 110 million euros. Its offering includes welding solutions, intelligent equipment, welding management software and expert services for both demanding industrial applications and ready-to-weld needs. Local expertise is available via its global partner network covering over 60 countries.

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Aerospace welding – a joint solution

Welding is used to form a joint of two similar or dissimilar metals to create a solution where forming in one piece isn't possible. Welding is used in aerospace production and repair of various systems and products such as protection systems, aircraft joints etc. with materials from stainless steel and aluminium to titanium and magnesium.

Specifications mandate the initial and re-qualification, coding, of the welder, the review of any design changes, the tests to verify the procedure and integrity of the component. The qualifying weld must be witnessed by an approved welding engineer, a qualified welding supervisor or a third-party inspection body. The verification tests check the internal metallurgical health, Heat Affected Zone (HAZ) and immediate vicinities, taking into consideration the type, class, joint configuration and criticality of the joint and the welder.

Matthew Mellor, technical services director at Keighley Laboratories Ltd, explains: "The integrity of the weld can be assessed using a combination of tests, depending on material type, thickness,

welding process and assessment criteria: Visual examination, non-destructive testing (dye penetrant and x-ray), tensile testing, hardness testing, bend testing and metallographic examination to identify deleterious indications/phases and defects such as lack of fusion, porosity, alpha case, alloy depletion etc.

"These tests and specifications, including BSEN ISO and ASTM standards, are mandated by companies such as Bombardier, Rolls Royce, Airbus, Safran, CAA and British Aerospace. As a UKAS 17025 and Nadcap (Materials Testing) testing facility, Keighley Laboratories can fully support these requirements, and can provide CAA signatories who are available for onsite aerospace weld component invigilation. Keighley Labs can also offer valuable remedial advice should a weld fail, allowing our customers to modify and improve their procedures and welding techniques."



Keighley Laboratories Ltd offers a comprehensive weld testing and inspection service including welding procedure consultancy and approval, welder qualification test, on site welding investigation and a complete range of destructive and non-destructive testing facilities.

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Handy purge monitor, now with PurgeNet

To remain at the forefront of weld purging technology, leading weld purging experts and inventors of the Weld Purge Monitor®, Huntingdon Fusion Techniques HFT has launched the updated hand-held PurgEye® 200 Weld Purge Monitor, now with PurgeNet™.

When welding metals such as stainless steel and titanium, it is essential to measure the oxygen level before, during and after welding using a Weld Purge Monitor.

Georgia Gascoyne, CEO of HFT says: "PurgeNet allows networking to a range of accessories. Typically, one accessory allows direct interface to an orbital welder or any other automatic welding machine, so that the oxygen level in the vicinity of the weld can be monitored and the welding machine can be switched on or off according to pre-set oxygen levels. A second accessory is a warning lamp that can signal when oxygen levels are low and high according to pre-set levels."

The revolutionary portable PurgEye 200 is now manufactured with a new Organic Light Emitting Diode display (OLED) which will



give brighter, clearer and sharper readings for viewing at greater distances than before and at wider angles. These OLED displays are mainly symbol based rather than text based, making the menus internationally comprehensible.

The PurgEye 200 operates either on batteries or mains power. Charging can also be carried out from a dock (optional) and battery life is much longer than its predecessor. Along with louder, pre-settable audio alarms for rising or falling oxygen levels, the PurgEye 200 comes complete with a faster response long life sensor.

This updated model has an integral electro-mechanical pump so that it can be used to extract samples from a weld purge zone, in the event that there is insufficient flow rate or positive pressure to activate the sensor correctly.

The PurgEye 200 Weld Purge Monitor reads down to 1 ppm, very accurate to 10 ppm, for the accuracy that other oxygen measuring instruments don't give. The Monitor is IP65 rated, which means it can be used in very demanding areas where instruments are used on site, such as in desert or tropical conditions. PurgeLog™ software also gives weld purging results to give quality control documents for each weld. The monitor also has the capability to switch between percentage oxygen and parts per million shown on the display.

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