In recent years, Mikron has contributed to significant industrial breakthroughs and to the expansion of technology in High Speed Cutting (HSC). During this time the company has been the recipient of various awards and has clearly established itself as number one in this machining segment with a defined cutting edge.

--- Hansjörg Lieber ---

HSM and XSM Mikron machine ranges are used as a benchmark for industry and in 2003 were marked by continued, strong and positive growth. Frequently, Mikron is only thought of in connection with HSC. In the world of modern cutting, however, the Swiss machine manufacturer has much more to offer.

This article is intended to illustrate how Mikron defines the performance spectrum and the different resulting machine requirements.

Nowadays, the term High Performance Cutting (HPC) is used rather indiscriminately and often as the antithesis to HSC. However, in reality, both milling strategies should be included in the high performance cutting process. HSC is clearly different in most aspects from HPC. As far as Mikron is concerned, HSC is consequently one facet of high performance cutting, the other being HPC with regard to the volumes of removed material.

High Performance Cutting (HPC)

In contrast to High Speed Cutting, this technology mainly works in 2D. The cut depth ae and the cut width ap allow the relative volume of chippings per unit of time (cm³/min) to be calculated along with the feed speed. In this case, we are involved in a process which is predesigned for machining complex three-dimensional surfaces at optimized times. The tools used are mainly ball nose end mills, end mills and solid carbide torus cutters.

High Performance Cutting is primarily directed towards the extreme facets of these milling strategies. The limit between High Speed Cutting (HSC) and High Performance Cutting (HPC) is, however, not static, in fact it overlaps. Most applications are somewhere in between, depending on the application, the most varied of demands can be made on a machining process by using different tools.

Applications and Areas of Implementation

As can be rapidly and clearly understood from the above points, requirements of both technologies cannot be optimally met in a single machine design. Mikron, therefore, not only manufactures HSC machines, but also offers a complete production range of products which have been developed specifically for HPC. Additionally, Mikron in particular offers a compromise in the two production ranges within the restraints of the technically feasible i.e. emphasis in the area of HSC or HPC with clearly demonstrable performance power in each of the respective extremes.

Undoubtedly, each user must decide on the most suitable product depending on specific requirements and decide which of the two technologies most probably complies with his application.

Information about Mikron and the different machine production ranges is best consulted at the Internet address www.mikron-ac.com. This page includes the address of Mikron sales offices, as well as instructions with regard to the application centres where advice, training, demonstrations or even test versions of farmed out orders are offered. For almost all applications Mikron is sure to have a machine which optimally meets requirements.
Dear Readers,

Even though the economic situation in the machine-construction sector is marked by the ongoing stagnation of the European and U.S. economies, Mikron looks back at a positive first quarter in 2004. We were able to increase the number of sales in comparison to the same quarter in the previous year. As the technology leader in the area of high-speed and high-volume milling, we are maintaining our hold on the market in 2004.

Through rigorous and continual development of our machines and the associated milling strategies, we are able to provide system solutions which are increasingly compatible and which set new standards in productivity, automation, precision and user-friendliness. This year we will continue to present interesting new things at the various industry fairs.

The association with Agie Chamäleon and the Georg Fischer Konzern continues to advance. We are now benefiting from shared activities in many countries. In the future, the membership in the “GF Machine Tools” group of Georg Fischer will be emphasized even more strongly.

Comprehensive information about Mikron, our products, the selection of used machines, and our range of services (HSM Competence Centre) can be found on the Internet at “www.mikron-ac.com”.

Mikron is your partner for all your milling solutions, no matter what material or type of application it may be.

Michael Hauser
Head of GZ Mikron and President Mikron AG Nidau

KTM produces important parts for its renowned motorcycles with a UCP 800 Duro from Mikron

KTM, the motorcycle manufacturer from Mattighofen, Austria offers everything which gets a motorcycle rider’s heart racing. Motorcycles for motocross, enduros, the adventure product group for large and small adventure or onroad bikes, where all 17 inches are found.

Jürgen Maurer

KTM’s success story started in 1934. Hans Trunkenpolz founded a metal worker’s shop in Mattinghofen. In 1937 the company Trunkenpolz already began selling DKW motorcycles. The entry into the motor cycle business was perfect. In the following years the company expanded and became one of the largest motorcycle and auto garages in Austria. The company’s first own motorcycle was constructed in 1951, and in 1953 KTM motorcycles began being mass produced. From this point on the company was officially called “Kronfeif, Trunkenpolz, Mattinghofen”. Ernst Kronreif joined as part-owner. Due to a crisis in the motorcycle and bicycle industry, the production of motorcycles was stopped at the beginning of the 1960’s. But at the same time the “Pony-Roller” and the first KTM moped were introduced. In spite of tough financial times, the product line was continuously expanded in the following years. KTM returned with its own team to off-road sports in 1964. The production of motorcycles was gradually resumed.

Other highlights of KTM’s success story include the production of their own engines, the series production of the model 250 (Cross and Enduro), the introduction of the street machine “Comet Grand Prix 125 RS”, the construction of a 125cc engine, the introduction of disk brakes (front and rear) in 1986 and the start of the mass production of the KTM 4-stroke engine.

In 1980 the company name was changed to “KTM Motor-Fahrzeugbau KG”. The production of the variety of models continued to increase. In 1989, the head of the company, Erich Trunkenpolz, passed away. The majority share of KTM was sold to GIT Trust Holding. The future of KTM took a turn in the early 90’s, when the company filed for bankruptcy. The splitting off of separate divisions for radiators, motorcycles, bicycles, and tool construction, enabled the founding of new follow-up companies.

A new beginning

The newly formed company for motorcycles – KTM Sportmotorcycle GmbH – started with new management, a new Hard Enduro concept and new motorcycle designs.

KTM Sportmotorcycle GmbH was transformed in 1994 into KTM Sportmotorcycle AG, i.e. being initially a limited liability company. It became a corporation. The company now has over 200 employees. New production plants, a new replacement parts warehouse and a new development centre were built.

The economic success of KTM is accompanied over the years by its success on racetracks all around the world. World and European championship titles as well as victories and top placements at the legendary Paris-Dakar rally have nearly become taken for granted. In 2000 KTM won 6 World-Championship titles and in 2001 became 5 time winner at the Dakar rally. The economic and sporting success of KTM in 2003 was rounded off with the sales of 70,514 motorcycles worldwide and a turnover of 376 million Euros.
KTM and Mikron

The research and development department is extremely important for a company as innovative as KTM. The affiliated prototype-construction is thus imminently important for the successful implementation of a new line of motorcycles. New models are brought on the market at an ever-increasing frequency. A broad spectrum of materials with special characteristics are put to use, which causes an increase in production complexity. Accordingly, the milling machines need to be able to produce not only high-precision filigree parts with tight tolerances but also machine coarse and large pieces.

KTM had long harboured the wish for a new 5-axis machining centre for the prototype construction. The decision was finally made in 2002 to construct a new development building. This new building included the room for the prototype construction department. In 2002 Franz Wagner, head of mechanical construction in the Research and Development department, received the task to purchase a new 5-axis machining centre. It was to be a compact, universally usable and easy-to-operate milling machine that covers the complete spectrum of machining.

At KTM, an extreme variety of machining tasks arise:

- small water-pump wheels with a diameter of 40mm and a height of 10mm,
- in and output channels with 5-axis simultaneous machining for engines,
- rocker bar for the rear wheel with measurements of 720 x 320 x 200mm,
- single-piece production for lots of 100 or more.

While searching for an appropriate machining unit, Franz Wagner came across the Swiss machine manufacturer Mikron. As Mikron is one of the leading suppliers of machining centres, a partnership with the company seemed more than appropriate.

Selecting a milling machine was difficult because of the large selection. Franz Wagner was especially impressed, however, by the UCP Duro line, which seemed nearly optimum. Except for one point: the UCP 1000 was too large for certain types of work, and the UCP 710 simply too small. Coincidentally, Mikron introduced the UCP 800 Duro in the autumn of 2002. The machine, with its traverse path of 800 x 650 x 500mm, was the perfect match for KLM. This was the machine which could handle both the water-pump parts and the rear wheel rocker bar. Franz Wagner thoroughly reviewed the technical specifications of the UCP 800 Duro. The facts spoke for themselves; the machine was truly optimal for KTM’s needs. KTM has been working with the UCP 800 Duro for over a year now and is completely satisfied with the results.

The UCP 800 Duro from Mikron

The UCP 800 Duro is a five-axis machining centre. It is well-suited for both precise and rough parts. The generously dimensioned swivelling table is mounted directly on the heavy-duty interface of the polymer concrete base. The UCP 800 Duro is suitable for 5-axis simultaneous machining as well as 5-position finishing. Because of its large clamping moment on the turning and swing axis, it is also suitable for 3-axis roughing. The swivelling table is ideally matched to the size, load-bearing capacity and dynamics of the machine. This enables 3-, 4- and 5-axis machining, from powerful roughing to the dynamic smoothing and finishing of free-form surfaces. The UCP 800 Duro is equipped with the digital Heidenhain iTNC 530 control system.

KTM, one of the most successful motorcycle manufacturers, and Mikron, the leading specialist in metal cutting, are cooperating successfully. The customer purchasing a KTM motorcycle profits from the know-how of both high-tech companies.
Choosing Machines for High-Speed Machining

Subject: Tool and Mold making and small and medium-sized batch production

In recent years, HSC (High Speed Cutting) has established itself as an alternative or complement to traditional machining processes such as conventional milling or die sinking (EDM - Electro Discharge Machining).

However, experience has shown that to be able to use the advantages of high-speed technology, it is not only necessary to use components that have been specially developed, but rather the entire system that needs to be looked at. This includes, for example, the workpiece on the one hand, and the spindle on the other, the aim is to achieve a mass relationship that is as balanced as possible.

The design engineering input is especially relevant. Normal circular sawing tables are here almost identical to those of the workpiece in terms of rigidity and precision: the workpiece is as rigid as the tool side. In this specific case this ensures that the dynamic properties of the Y-axis are to a great extent the same as those of the X-axis.

There is today rapidly growing interest in high performance and high-speed machining in the 5-axs form. In the context of high-speed machining, the layout and design of circular sawing tables is especially relevant. Normal circular sawing tables with a worm drive generally have none of the dynamics required to meet the needs of a five-axis simultaneous HSC process. In comparison, circular sawing tables with direct drive from a torque motor provide data (speed, acceleration, ...) that is comparable to or even better than the capability of linear axes. Another benefit of the direct drive circular sawing tables is that a drive design with no wear parts becomes possible for the first time. Thus a system that is completely homogenous in efficiency is achieved for five-axis simultaneous high-speed machining.

One of the basic dynamics in high-speed machining is to achieve a programmed feed speed as quickly as possible. The acceleration and switching values necessary are provided by powerful digital drive trains. These can be achieved either by brushless permanent magnet synchronous (PMSM) motors or by linear motors. Which type of drive will come out on top in the end, only time will tell. In all cases, both types have their pros and cons. The way the technology is today, the values for speed, acceleration and switching still have to be subordinate to the need for improved component precision, so there is actually no pressing need for using direct drives to linear axes apart from the admitted marketing value.

One important thing with all designs based on spherical circulation, both with spherical threaded drives and with linear guides with spherical or rolling circulation shoes, is that the spindle is driven in a pendulum control cycle. Firstly there is the potential use of the whole rev speed range, beginning from approx. 50 - 200 min⁻¹ to the maximum rev speed, and secondly there is high performance and a high torque at low rev speeds. This can enable rev speeds of well over 20,000 min⁻¹ even with spindles, and in certain conditions thread cutting, thread friction and milling operations can be carried out with high-performance milling tools.

Hybrid ceramic bearings, made of hardened bearing shells and ceramic balls, give improved rigidity, less wear, improved precision and increased temperature stability in comparison to conventional steel ball bearings. Without this type of bearing, modern high-speed spindles would be unthinkable for economic reasons (service life).

The feeding of an air and oil mix directly through the outer bearing shells guarantees the best possible lubrication and a lengthy service life. In comparison, the indirect side feeding of the mix is relatively unreliable because of the air turbulence created through the bearing cage. The HSK interface between the spindle nose and the tool holder has now established itself in high-speed machining. The improved thermal stability of the bearing and the system and the increased rigidity have contributed to this. A comparison of the SK 40 and the HSK A63 with sideways feeds shows that the HSK interface has almost half of the radial deflection. The HSK interface also distinguishes itself with a relation to true-running properties, whereas reduces true-running faults to around half those of the SK interface.

One problem for all high-speed spindles is the heat build-up at high rev speeds. Design engineering measures such as placing the fixed bearing as closely as possible to the spindle nose (Fig. 2) mean that the thermally influenced length exten-
Vibrations have a negative effect on the spindle bearing’s useful life, the life of the milling tool used and the quality of the workpieces produced, so they must be avoided at all costs. To this end, modern motor spindles have built-in oscillation sensors [2][3] that measure the actual vibrations. Relevant information about the quality of the machining process that can be extracted from these measurements, can then be provided to the operator on the control unit’s user interface. This data can then be used for the systematic optimisation of the machining process, e.g. for adjusting the rev speed and feed, for testing the effect of different milling tools and for identifying critical machining strategies and suitable modifications.

The Control System
Control system technology has made huge progress in recent years. Particularly significant in the repect, especially for simultaneous five-axis high-speed machining, was the digital redesign of the control process. The technology’s current state of the art consists of compensation algorithms for balancing out the thermal displacement of high-speed machinery, high-performance look-ahead functionality, optimised modelling of the machine hardware in the control system (tuning), integrated machine diagnostics and intelligent systems for target size based optimisation of the machine’s dynamics. It is clear that the set processing time should be as short as possible. In actuality, however, there are as yet no clear guidelines for defining this in a uniform way. So the set processing times of different control systems manufacturers cannot easily be compared with one another. Generally speaking, it may be said that with this specification the number of axes moved per line in the NC program plays a major role. Every additional command per NC set, such as additional functions, rev-speed or feed specifications, etc., will influence set processing times to a greater or lesser degree. A major effect, particularly with simultaneous 5-axis machining, is caused by the incorporation of potential co-ordinate transformations or the calculation of the misalignments of the rotation axes that commonly occur. It is important that the machine can continue to operate at all times without the effect of a jerky and non-fluid movement that is the result of incomplete calculations and known as “data stalvation”.

Thermally influenced displacements are unavoidable with high-speed machines and can be compensated for by suitable measures within the context of the end users’ expectations. Sensor- or software-based systems can be used here. Software-based systems have the advantage that they are better suited to compensating the total displacements of the individual components while sensor-based systems can usually only register one part of the displacement, such as the displacement of the spindle nose vis-à-vis the 2 cradles. Fig. 3 shows the result of compensating thermally influenced displacements by using various systems in comparison to the situation without compensation for a load profile consisting of different rev speeds and varying numbers of tool and palette changes as well as down times. High-speed processing would be unthinkable without powerful look-ahead functionality [5]. The look-ahead takes care of:

- maintaining the best possible axis-feed
- maintaining the best possible path acceleration
- maintaining the best possible path deceleration
- identifying corners and timely deceleration
- maintaining the required dynamics
- timely deceleration, without exceeding the machine’s characteristics

There is a common but erroneous idea that a look-ahead with the greatest possible number of pre-processed NC sets is advantageous. But the truth is that the actual number that is required depends on the look-ahead’s capabilities and the dynamics of the HSM centre. The look-ahead must be capable of regulating the dynamic behaviour of the machine so that the machine is never over- or under feeding, the quality of the workpiece is guaranteed at all times.

The more dynamic the machine and the better the modelling of the machine’s behaviour in the control system (tuning), the fewer the NC sets that the look-ahead has to look ahead to. The serious disadvantage of a large number of pre-processed NC sets is often the lack of options to intervene in a process run by making manual adjustments to the feed speed and the spindle rev speed. So tool changes that have already been pre-processed are stored in a buffer that may be inaccessible for making manual adjustments.

The active smoothing of the speed, acceleration and shift profile is an important feature of control systems for high-speed machining. Smoothed profiles exert less lifting pressure on the mechanics and electronics and enable higher maximum values for acceleration and shifting in comparison to unsmoothed profiles using the same machine hardware. Diagnostic and remote monitoring functionality should either be incorporated directly into the control system or may simply be implemented using external systems. They are a pre-requisite for achieving the greatest possible utilisation ratio from the machines, particularly in connection with automation.

The most recent developments are to do with the implementation of know-how and with active intervention in the machining process based on information from integrated sensors (adaptive control). Intelligent control systems permit, e.g., the optimisation of the machining process using priorities for individual manufacturing steps or taking into account workpiece weight or the complexity of the tool path. Such input, made by operators, is used internally by the control system to tune the system in a way that is aligned with the particular application. This enables shorter machining times, better surface finishes and better component precision to be achieved.

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Fig. 2: Arrangement of the moveable and fixed bearings for compensating thermal expansion in the non-critical direction.

Fig. 3: The effect of sensor and experimental-value-based systems for compensating thermally induced displacements.

Automation
In the industrialised countries of the west, automation is often used to compensate for relatively high inoust of the machine and wage costs. A well-defined interface to external or integrated workpiece changing systems is therefore of increasing importance. At the same time, the need for automation creates a need for efficient shavings management, adequate tool changing capacities, palettisation and, above all, organisation of the surrounding area. While automatic tool changers are standard equipment in almost all machining centres, the number of magazine positions is often insufficient. So tool changers with extended capacity should at least be made optionally available.

For the best possible shavings management, one needs a workspace set out for fallen shavings, if possible without horizontal surfaces where shavings can gather, and automatic shavings disposal. Depending on the material to be machined and the application, compressed air or cool liquid grease may be used as well as the minimal amounts of lubricant that are normal in high-speed machining. It is important that the machine has all the fittings needed to handle the coolant and lubricant cleanly and efficiently.

Intelligent Thermal Control, Internal report, Mikron Comp Tec AG, Nidau, Switzerland, June 2003
Quality Demands Quality

When Otto Bihler wants tools made, it turns to selected machine makers such as the Swiss company Mikron, with its XSM 400

Otto Bihler employs about 900 people. Bihler machine systems are used in more than 50 industrialized countries. Its quality and precision, and use of state-of-the-art technology, has made Bihler an internationally-recognized partner in many industries. This is backed by how accumulated over decades and innovative potential based on more than 8,000 tool systems created up to now.

Highly-qualified personnel, trained in their own factory, guarantee the quality of design, development and production. The entire production system is subjected to a quality management system certified under ISO 9001. Bihler ensures close partnerships with its customers by a comprehensive system of advice, training, service and customer care extending over many years.

Otto Bihler has been using a Mikron XSM 400 since March 2002 to make extremely demanding parts for their automated machines. The XSM 400 is fitted with OSS (operator support system) smart machine modules and ITC (intelligent thermal control). Christian Knuechel, the Mikron Product Manager, asked Paul Höldrich, Otto Bihler’s Tool Production Manager, about his experience of working with OSS and ITC.

You’ve been working with a Mikron XSM 400 for about more than 2 years. How happy are you with the machine? We’re very pleased with the Mikron XSM 400. With both the machine results achieved for our tool parts, and with Mikron’s professional service team who is always quick to help us out with its expertise. We were aware from the very start that there were still going to be a few teething problems with the machine supplied, since its serial number was 4 (!). But most of these disappeared with the first software update.

We were happy with its machining speed and precision from its very first job. However, we stay in very close contact with Mikron so that we can go on improving the machine, because the demands for precision in the tool parts we produce has of course risen since we began using the XSM 400.

Were you able to incorporate it smoothly into your existing processes? In itself, there was no great problem in integrating it, because we just gradually moved the machine into the NC program. The OSS allows the option of the machine operator intervening directly with the OSS user interface. In doing so, it has on speed. We were able to cut drop-forging bending running times from the 5 hours of our previous production method to about 45 minutes, but this wasn’t only due to the OSS.

To what extent did the operators approve of the OSS? (was training needed or was the application easy to learn, user-friendly, interesting, etc.)? The operators only needed a short briefing before they felt comfortable with the OSS user interface. The machine had only been in use for a short time before the first experiments with different tuning sets were carried out.

Do you always use the same, standardised settings or do you use individual settings that are adjusted to the particular application? After experimenting with various tuning sets, as I mentioned, it turned out that, for the form-milled parts of 20 x 20 mm and smaller, which is what we mainly produce, the most suitable option is a set that is made up of a compromise of all three priorities, or a tendency towards precision and surface finish.

ICT was retrofitting on your machine. So you have a direct comparison of how ICT has affected the machining of different parts. What has been your experience? Since we have had ICT installed, there has no longer been any need to have the spindle “warm up” for up to 25 minutes before every high precision job to get the spindle thermal stability. We have also pretty much got on top of the spindle’s mechanical expansion, conditioned by the high rev speeds. The typical warm up phase is now between 1 and 5 minutes, depending on the rev speed.

One experiment showed that a tool measured at a rev speed of 30,000 min⁻¹ also achieves the same result in the 2 depth at speeds of 10,000 and 42,000 min⁻¹, with a tolerance of + 0.002 mm. Prior to that, we used to see differences of up to 0.02 mm.

Do you still use machine warm up cycles to achieve thermal stability? If so, how long do these last and what are the benefits? Machine warm up cycles are only used first thing in the morning, when the machine has not been in use all night, and only when a high precision moulding needs to be produced straight away at the beginning of the working day. This warm up phase lasts around 15 to 25 minutes and is needed to bring all the axes and the spindle to a thermally consistent relationship, since not only the spindle, but also the X- and Y-axes have to be thermally stable. After that, the short spindle warm up that I mentioned before are quite sufficient.

How happy are you with the machine’s precision over the full working day - what have you been able to observe, measure, etc.? In terms of machine precision, over the whole working day (except for when the machine is started up in the mornings with no warm up) we have noted no greater (> 0.01) measurable deviation. Every moulding that has a particular precision requirement is measured on a measuring device after it has been machined. We can use the readings as a way of constantly monitoring the quality of the finished parts and the machine’s precision.

The OSS smart machine modules and ITC that are installed on the Mikron XSM 400 bring clear benefits to tool production at the Otto Bihler plant: OSS provides the option of the machine operator intervening directly on the machine to adjust surface finish, precision and speed, while ITC reduces the warm up time to an amazing 1 to 5 minutes.
Vario - A Boost for Flexible Production

The UCP 600 Vario constitutes an economic solution to the demands of automated production.

Rising wage costs and fierce competition demand new production strategies, particularly from small and medium-sized manufacturers. Improving the utilisation ratio of production resources minimises the unmanned night, and weekend shifts can give a decisive advantage over rivals.

Flexible Production is the Future

Given the short shelf-life of today’s products and consumer goods, flexible production equipment can no longer be installed and then used almost unchanged year after year. Automated production solutions such as Mikron’s UCP 600 Vario are thus of increasing vital importance when planning production for small and medium-sized batches. The Vario is also well-equipped to deal with other forward-looking production features such as mixed production, operating through lunch- and tea breaks, and shifts with minimum operating personnel. It is vital that a high-performance machining centre has a reliable palette changer, a scalable tool changer, a monitoring system and built-in measuring capabilities. Finally, the fallen chips also have to be disposed of cleanly and reliably.

Solution - the Vario System

With its UCP 600 Vario, Mikron has a convincing five-axis solution for automated production. As well as the compact basic machine itself, the Vario system has a multitude of high-performance milling spindle: a scalable, modular tool changer system, the best-known palette changer from the HSM range; and the right disposal or cleaning solution for every chip and coolant situation. The customers themselves can decide how variable their UCP 600 is to be. However, one thing is guaranteed to stay the same: access to the machine and peripheral devices is wonderful!

High-Performance Unit made up of Dependable Components

The Vario system builds on a stable, compact basic machine that has surprisingly large travel paths on the smallest possible base space. With one of the three high-performanc spindle provided and the simultaneous circular swivelling table, the UCP 600 Vario masters all milling processes. The pallet of possible spindles goes from the 12,000 min⁻¹ spindle for conventional machine tool technologies, to the 20,000 min⁻¹ spindle for machining a wide variety of materials using strategies from HSC technology, to the 42,000 min⁻¹ spindle, which when used in combination with the powerful Heidenhain iTNC 530 control system, gives access to HSC technology. The basic UCP 600 Vario has everything required to be successfully used for, for example, tool and mould making, medical technology and the entire machining process for frame components. The various modules in Mikron’s “smart machine” product ensure that the future of modern production is also incorporated into a UCP 600 Vario. Depending on their requirements, the customer can choose such differing modules as the RMS (Remote Notification System), the APS (Advanced Process System) or the ITC (Intelligent Thermal Control).

Scaleable Tool Changer Meets All Needs

When machining multi-functional components (complex cast iron casings, valve blocks, cylinder heads), there is a need for multiple operations that require a wide variety of tools to be readied, e.g. to make tap-holes, drill seats or boring functions, in the shortest possible time. Mikron meets these needs with a new, modular, scaleable tool changer whose most significant features are its small installation space, the sizes of the tool capacity that can be matched to the customer’s needs, and a very short tool set up time. The modularly designed tool changer has space for 100 to 220 tools, depending on the tool holder size of each tool. Taking up very little space and fitting optimally into the compact machine layout, this new tool changer is the ideal complement to make the UCP 600 Vario into a highly productive and flexible production unit.

A Palette Changer to be Proud of

The UCP 600 Vario ensures automated production by the cost-effective integrating of a palette changing system. In the smallest possible space, workpieces of a surface area of up to 320x320 mm, a height of 350 mm and a maximum weight of 80 Kg can be automatically changed and simultaneously five-axis machined (with manual machine loading: Ø 450mm x height 450mm, 200kg). Aligned in the best possible way with the machine and the circular swivelling table, the palette changer can be supplied for use with Dynafix pallets from Mikron’s system partner System 3R or for the GPS (Mecatool) or UPC (Erowa) palette types, according to the customer’s wishes.

Chips All Under Control

When it comes to chip management, Mikron does everything to ensure that the chips end up going where they should: namely in the chips container. To achieve this objective, any build up of chips in the workspace should really be avoided. Mikron has thought through the detail of the cabin’s construction so that chip nests cannot be formed. The 400mm wide chip conveyor takes care of disposal itself, as an edge filter clearly separates coolant from chips. Sedimentary material is collected in the bottom of a small, easily accessible adjacent tank, so that the important cleaning of the equipment becomes a simple, routine task. The chips disposal unit, of course, fitted with overflow protection. Where there is a chip jam, the scratching device automatically goes into reverse. The chip jam is unblocked or notification of the breakdown is appropriately displayed on the control console screen. The fact that the ejection position of the chip conveyor can be selected on a UCP 600 Vario with pallet changer illustrates just how seriously Mikron treats the subject of chip disposal. Above and beyond this already high standard, variants such as even more high-performance chip conveyors and mini-strip filters can be provided that guarantee the effective removal of chips with particular properties, such as needle and swarf chips, and floating chips. Through chip disposal is the last feature of a series of important production factors that make the UCP 600 Vario a successful high-performance machining centre for automated production and flexible manufacturing.

Mikron Nidau/CH

Tel.: +41 32 366 11 11

www.mikron-ac.com
New VCE Pro Machines

The new generation of standard machines with its workshop-ready Heidenhain control system proves itself

Mikron has significantly extended its successful VCE Pro range by launching the VCE 1400 Pro and VCE 1600 Pro models with their completely new design, may be proudly termed a new generation of standard machines. In terms of robustness, a maximum workpiece size of almost 2m² and a weight of up to 2000kg, the models go well beyond the existing VCE series. This meets the requirements for large workpieces to be machined cost-effectively or for multiple chuckings. Robust and generously sized When the draughtsmen were developing the new VCE 1400 Pro and VCE 1600 Pro, the following requirements were noted in their little book of ‘must haves’: robust and generously-sized basic construction as the basis for workpiece precision and quality surface finish, and for absorbing vibrations and forces when doing big roughing jobs.

For powerful machining A torque-strong spindle makes little sense if it does not have a stable base. The machining forces that occur cannot be completely absorbed, and the workmanship would be unduly reduced by the vibrations. Therefore, the new VCE range is fitted with machine components that guarantee stability. The width and the gap between the axis guides plus the diameter of the spherical spindles are significantly greater than on other comparable machines. The work table construction and the design of the telescopic covers promise performance that the machine really does smoothly achieve in practice. The heat produced by the machining process is dissipated from the source with great efficiency. To do this, several coolant jets and two compressed air jets are mounted on the spindle head as standard. The spindle can also, of course, be supplied with IKZ, in which case the coolant required is fed from an IKZ coolant tank with a filter and pump unit. A programmable coolant jet and a spray ring near to the machining process can also be optionally specified. The heat generated at the spindle head is continuously dissipated by the stream of coolant flowing through the spindle.

The VCE 1600 is ideally suited for machining large plates and cubic parts, e.g. housing, etc.

Workshop-ready Heidenhain control system

The workshop-ready Heidenhain iTNC 530 control system enables programming to be done directly to the milling machine. The control system is designed for a multiplicity of job types. Such flexibility is provided by the ergonomically adjustable operator console for trouble-free programming of the machine and the connection via an Ethernet interface to a data network that serves the manufacturing area.

Optimal Monitoring Guaranteed

An unrestricted view of the workpiece and of the machining process are vital for good milling results. At the front, the VCE milling centres have the largest possible doors which feature a sliding disc front and door frames of minimal width. This ensures an excellent view of the workpiece from both left and right. The optimal arrangement of the 2 doors means that the machine can be loaded using a crane or a fork-lift truck.

The tool changer is attached to the side as standard, so that sight of the workpiece is not hindered by a tool changer drum located at the workplace. The layout of the tool changer and the separation of workspace and tool magazine ensure both the option of machining cubic workpieces and optimal protection of the tool against soiling by any chips or coolant that might be flying around. Three powerful lighting units placed to the side guarantee good illumination for the large workspace.

Reliable Suppliers

Qualitatively high-grade components from dependable suppliers are the best guarantee for a robust and durable end product. Mikron’s preferred suppliers for the VCE Pro machining centres include Heidenhain, Siemens, Rexroth Star and Hennig and Grundfos. Reliability was consciously made the very top priority when the machines were under development. Using economically priced but dependable components guarantees the machine’s quality.

Sensible Options

The new models, like the others in Mikron’s VCE range, have a wide variety of options. The machines are designed so that customers can order all the available extras at any time and they can be retrofitted on site. An infra-red measuring and set-up sensor and/or a bench sensor system can easily be added to the machine. A side-mounted washing device can simplify chip removal and the cleaning of the workspace. The chips that were previously washed towards the chip conveyor by the strong flow of coolant are separated from the coolant by a double-filter system beneath the chip conveyor. A fourth axis in the form of a divider can also be installed in a very short space of time to give the user further usage options.

The Mikron VCE machine models described here are perfectly suited for use in engineering applications where large discs or cubic parts such as casings, etc. are being machined. Even gearbox shafts weighing up to a ton, with a diameter of up to 500 mm and over a meter in length can easily be clamped in the divider (an optional extra) and machined.

Technical data VCE 1600 Pro

<table>
<thead>
<tr>
<th>Working sector</th>
<th>x = 1600 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transverse movement</td>
<td>y = 900 mm</td>
</tr>
<tr>
<td>Vertical movement</td>
<td>z = 800 mm</td>
</tr>
<tr>
<td>Working spindle</td>
<td>ISO 40, speed / output 40% ED: 10'000 U/min / 18 kW</td>
</tr>
<tr>
<td></td>
<td>ISO 50, speed / output 40% ED: 14'000 U/min / 18.5 kW</td>
</tr>
<tr>
<td></td>
<td>ISO 50, speed / output 40% ED: 6'000 U/min / 18.5 kW</td>
</tr>
<tr>
<td>Feed rate</td>
<td>1.4 m/min</td>
</tr>
<tr>
<td>Rapid traverse rate</td>
<td>20 m/min</td>
</tr>
<tr>
<td>Control</td>
<td>iTNC 530</td>
</tr>
<tr>
<td>Working table</td>
<td>Round table: 1700 x 850 mm</td>
</tr>
<tr>
<td></td>
<td>Table load: 2000 kg</td>
</tr>
<tr>
<td>Tool changer</td>
<td>30 Magazine spaces</td>
</tr>
</tbody>
</table>

Mikron Nidau/CH
www.mikron-ac.com
Tel.: +41 32 366 11 11
Good Workmanship Ensures Top Customer Satisfaction

Machines from Mikron’s VCP range, particularly the VCP 1350, enable Spain’s Mundimold to meet its deadlines

Mundimold was founded in 1986. One of the firm’s founders was Pedro Novella. Now he and his son Jorge, an industrial engineer, run the company in tandem. Mundimold, whose head office is in Paterna in Valencia, has invested great effort in establishing itself in the sector for small and medium-sized mould and die producers.

Swiss machinery has helped its progress, and Mundimold now has several machines from Mikron’s VCP range.

Eating and drinking never go out of fashion, and plastic crates are needed to transport fruit and vegetables. Naturally enough, they also emerged in packaging (crates for tableware and drinks bottles).

Because there is a lot of wastage involved in crates, and thus an equivalent demand, Pedro Novella and his son Jorge decided to go into making moulds for plastic crates. Now Mundimold specialises in packaging (crates for agricultural use, for bottles, for industry, etc.).

Amongst others, Damm, Coca Cola, Kronenbourg, Mahou, Pepsi and Schweppes form part of their client portfolio as well as other specially export-oriented, large national and international industrial companies from the very outset.

In 1999, the company’s management decided to make money available for research, development and technical upgrading. This was a decision that was vital for Mundimold’s future. Management was aware that delivery times had to be reduced by around 40%, product quality had to be improved and process faults needed to be minimised if it was to establish itself as a leader in the mould construction sector.

Mikron Selected
Mundimold then began the search for a suitable machining centre. They attended fairs gathered brochures and worked through them. Naturally enough, they also made contact with the various machine manufacturers. Mikron has a sales outlet not far from Barcelona. It provided Mundimold with sales literature and, of course, personal input.

Mikron’s VCP 710 machining centre met all of Mundimold’s requirements. One important factor that proved decisive in the decision to purchase the VCP 710 was that it had a fixed workbench and could take loads of up to 1600 kg. The stable, robust workbench was also designed to machine large, heavy workpieces.

There were differing opinions within Mundimold with regards to the spindle – heated discussion took place on whether to go with the 12,000 min⁻¹ or the 18,000 min⁻¹ option. The great debate ended in a decision to purchase the 18,000 min⁻¹ spindle. The company had some crucial requirements.

- reduced machining times,
- reliability in the process and in the spindle’s performance when machining tools with a small diameter.

Before Pedro and Jorge Novella could get to work as intended on the new machine, the company took plenty of time to prepare and undertake a series of changes. The innovations were consistently preceded by staff training sessions, and there was more of the same while the new systems were being integrated. In this way, the Novellas were able to engage their staff in the new project, and at the same time train them up and breed enthusiasm for using the HSC strategies.

It was one of the most complicated parts of Mundimold’s reorganisation.

The CAD/CAM system that was best suited to Mundimold’s way of working was selected after a thorough comparison of the available options. Pedro and Jorge Novella are determined to keep on making improvements.

Another Mikron Machine is Purchased
The decision made in 2001 to buy a Mikron VCP 1350 with a spindle of up to 24,000 min⁻¹ was much simpler. The order trend clearly indicated that a larger machining centre now needed to be purchased. So management decided on a machining centre with a traverse path of 1350 x 800 mm. Given that Mundimold’s experience with the new project, and at the same time train them up and breed enthusiasm for using the HSC strategies.

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Mundimold believes that this will create the conditions for it to be able to offer quality products within a short delivery time on an extremely competitive basis. At Mundimold, the future has already begun.

Mikron Nidau/CH
www.mikron-ac.com
Tel: +41 32 366 11 11
Capo Industries - aerospace industry supplier

Mikron UCP 1350 now indispensable for manufacturers of super alloy aerospace components

Manufacturing products for the aerospace industry can become an almost endless series of procedures and small tasks if the demands for superior quality in critical tolerance high precision components are to be met. Systematically approach, and find a ceaseless quest for new technologies are required to not only meet current demands but also those that are focused on the future of the industry - this is the only way that advantage can be developed and sustained in this particularly complex and competitive market.

Reto Fehr

One company that is meeting the challenging demands of the aerospace industry is Capo Industries, Inc., which was founded in 1977 in Chino, California. Capo has successfully developed its component manufacturing procedures and has become one of the most respected suppliers and partners to leading aerospace companies.

An important factor in Capo’s success has been and continues to be the company’s dynamic leader, its President David Feltch. Through his unerring energy and far-sightedness, he has built up a company that has set itself the mission of always giving customers predictability.

Specialist in alloys that are difficult to machine

Capo Industries specializes in working with alloys that are difficult to machine and used to make aviation components. These components are employed in extremely hot environments such as turbines. Delivering above average quality and a similar level of service is the baseline customer expectation of any company hoping to establish itself in the industry. But Feltch looks further ahead to the future and deploys new and promising technologies that position Capo Industries as a preferred supplier on a level that easily exceeds the standards set by the world’s aviation authorities.

“With the 718 Inconel case the complexity of the work is raised, as the component is made from heat-treated 718 Inconel and designed such that it could not be turned. The only possible solution was five-axis milling around the entire periphery of the part. Feltch saw that he could only win the contract, which he viewed as a long-term investment, by using five-axis machining capabilities.

UCP 1350 – extremely reliable and precise

“We also wanted to incorporate high speed machining techniques that are very common to aluminum and apply some of those methods to the high nickel alloys. We evaluated a number of machine tool builders and chose Mikron and its UCP 1350, which proved to be a very sturdy, highly reliable and accurate machine.”

The Mikron UCP 1350 delivers simultaneous five-axis machining with an extremely robust milling head with 135-degree tilt range and integrated motor spindle. A high speed, 1,100 mm diameter NC rotarytable table can handle loads of up to 1,500 kg. The dynamic machining capabilities of the UCP 1350 are the result of a proven design based on a “travelling column” principle to ensure large axis movements with unrestricted access. The swivel axis can be indexed by degree to make precise use of the high torque ability of the spindle motor. Furthermore, the UCP 1350 can be switched from a vertical to a horizontal machining process in 1.7 seconds. This accommodates a wide range of applications - from simple prismatic parts to complex tool and die work, with two- and three-axis or five-axis simultaneous machining achieved in a single set up.

According to Feltch, the Mikron machine “has really cut down production costs on parts that previously had been produced with traditional milling machines.” On one aluminum-casting component, for example, the reduction was particularly impressive. The casting involved over ten turning operations and several milling operations. Using the Mikron machine, however, Capo Industries managed to reduce the number of operations to two. This cost reduction was due to the UCP 1350’s great efficiency and the elimination of the substantial inefficiencies of the multiple mill set ups.

UCP 1350 debuts in the USA

The installation of the UCP 1350 at Capo Industries in the spring of 2002 was the first of its kind in the United States. Given the newness of the five-axis technology, the new controls and the component that was going to be produced for the first time anywhere in the world, training was essential if the machine were to be successfully integrated into the Capo manufacturing process. Mikron engineers from the United States and Switzerland led on-site training sessions at Capo Industries headquarters followed by a week-long training session for Capo personnel at the Mikron training facility in Nidau, Switzerland.

The equipment and training investments made by Capo Industries were well worth the effort, according to Feltch. “As usual, we’ve stuck to our promise of giving our customers reliability and predictability to improve their competitive position as well as ours.”

Feltch banking on Mikron

“The Mikron five-axis technology really provides a glimpse into our future. The UCP 1350 is the first of our Mikrons, but there will certainly be others in the future. Mikron’s milling technology is very sophisticated and will play a crucial role in our strategy for continued success in the aviation industry of the future. The way we’re using it, and some of the technologies we’re developing internally, puts us at the forefront of incorporating high speed, five-axis machining in the manufacture of nickel alloy components.”

Handling tight tolerances such as those required for an airflow application are revealed in this close up detail of a thin-walled component made of 718 Inconel.
Intelligent Functions Support the Milling Process

“smart machine”
The Mikron Modular System for Process Optimisation

Mikron has embraced different modules (software und hardware) under the term “smart machine”. Each module has a special function for optimising the milling process. This innovation was already shown during the EMO 03 in Milan.

Jürgen Maurer

The objective of the “smart machine” modules is to make the milling process more transparent and easier to control for the user. In order to do so, the first thing to be achieved is communication between the user and the machine. It is only in this way that the user is provided with the comprehensive information he needs regarding the milling process in order to make proper judgements. Second, the user must get support during the optimisation of the different milling processes, as a result of which performance is significantly improved. Thirdly, the machine controls and optimises the milling process independently, thus improving process safety and the quality of the workpiece, especially during automated operation.

It is at this point that the “smart machine” functions begin to make their presence felt.

Use of the different “Smart Machine” modules

- Greater accuracy at short processing times
- Improvement in the workpiece finish as well as molding accuracy
- Detection of critical processing strategies
- Improvement in process safety
- Reduction in the machine rate resulting in an increase in machine availability
- Increase in availability
- Increase in operation comfort even during automated operation
- Considerable increase in reliability during automated operation
- Overall economic budget improved through optimisation in all process areas.

The Smart Machine Modules

Mikron Advanced Process System (APS)
The APS module is a monitoring system which opens up new possibilities to the user to observe and control the milling process. This system was specially developed for high performance and high speed cutting. However, it can be perfectly adapted to other milling machines.

With the help of an acceleration sensor integrated in the spindle, the vibrations during the milling process are detected and displayed to the user via the control. By doing so, it is intended that the necessary measures can be taken in the process to optimise this.

Remote Notification System (RNS)
A new era in communication and flexibility is achieved using this module. By using this system, it is now possible to receive information regarding the operating conditions in the Mikron machining centre regardless of the location as well as regarding the milling process itself. Via SMS on a mobile telephone the user can be informed of the operating conditions or the machine programme status. This is a way of enabling the extensive and flexible involvement of the user since with this module a stand-by organisation can be easily achieved.

The unique, worldwide first intelligent Operator Support System (OSS)
OSS optimises the machining process in accordance with the structure and requirements of the workpiece. By using an easily understandable user interface, the target sizes, speed, accuracy and finish, as well as the workpiece weight and the complexity of the machining, can be specifically set and changed at any time. This process-oriented way of working guarantees maximum use of the Mikron machine.

Intelligent Thermal Control (ITC)
By using the ITC the machine operator no longer has to maintain the machine’s thermal steady-state. He can concentrate fully on the requirements specific to the workpiece. The Mikron machine already possesses “thermal process knowledge”. For all Mikron machines with a Heidenhain control system

The “smart machine” modules can be used on all Mikron machines with current Heidenhain control systems. Some of the modules already form part of the standard machine equipment. Others are optional. Each of the “smart machine” modules fulfils a specific function. As in the modular system, the user can pick out the modules that he feels are most suitable for improving his milling process. This means that workpieces can be produced more in line with processes and more accurately. Reliability during automated operation is increased, the service life of machines is extended and production costs are significantly reduced.

It is Mikron’s objective to provide the user with even more information “straight from the machine”, that’s why Mikron is already developing more “smart machine” modules.

“Smart machine” is a modular system and new modules are continually being developed. The currently available combinations, Mikron-Machines and modules can be found on Mikron’s home page at www.mikron-ac.com.

Mikron Nidau/CH
Tel.:+41 32 366 11 11
Injection Moulding Specialist

Luc Van de Velde Industries Gets Top-Class Surfaces with a Mikron HSM 800

Plastics - that is Luc Van de Velde’s world. Born in East Flanders, in 1994 he seized the opportunity to "build bridges" between Belgian machine tool manufacturers and foreign customers. For two years he has had an ambitious, detailed business plan that is viewed positively by his business partners, banks and machine manufacturers.

Martin Brun

A New Beginning

In 1989 the injection moulding firm where Luc Van de Velde had worked for years was taken over by a foreign company. Some departments were closed down. The new management had no interest in continuing to work with Belgian tool manufacturers, but preferred instead to work with a foreign manufacturer.

Know-how and a whole part of the local economy threatened to disappear.

In 1994 Luc Van de Velde, who had since become a self-employed entrepreneur and Business Manager of Luc Van de Velde Engineering, spotted their opportunity and started to mediate between Belgian tool producers and foreign customers. He talks freely about what happened and about his aims.

“What I set out to do was design die plates and get orders for Belgian tool manufacturers.” The first order came from a British company. There was a need to produce new die plates for plastic flowerpots. Molds were required for products that would weigh very little but yield a lot - in other words, that were as durable as possible.

Van de Velde worked on it with a Dutch company from the same sector. In 1996 the first orders from the packaging industry presented the company with new challenges. Luc Van de Velde: "We had to make really excellent die plates, build prototypes, make three-dimensional aluminium models and use all our production know-how, because that’s the only way you can get good end products. This type of plastic product held a real fascination for us. Things were made more tricky by the fact that products for the packaging industry often have to have the label already on the die plate or on the tool. Take for example a nice-looking ice-cream tub or salad bowls. Around 70% of our turnover comes from exports, mainly with the Netherlands, Germany, Great Britain and France.”

Keep it small

Luc Van de Velde Engineering is currently working on a project for a German food industry manufacturer that is hoping to market special bowls for different sizes.

"On this sort of large project, we just design the die plates. Our partners take care of production. We come back in at the testing phase and for optimisation”, explains Luc Van de Velde.

"Our infrastructure and work capacity aren’t set up to produce around 20 different die plates for one specific customer. We very deliberately employ only around ten specialists. By ‘keeping it small’ we also reap the benefit of being able to maintain direct contact with our customers.”

Hungarian Supplier

Luc Van de Velde has been working with a Hungarian supplier since 1994. The main reason for this is not the low wages often associated with suppliers from Eastern Europe, but the sound quality of their work. Only in a very few cases have the mouldings made in Hungary had to be reworked, the wall thicknesses adjusted, burring removed or the shape realigned. This Hungarian partner even has someone working at Luc Van de Velde at the present time.

Two years ago, Luc Van de Velde worked out a five-year plan that clearly aroused the interest of its most important partners, its bank and machine suppliers. "This was my rationale - to keep up with the latest technology, and so to have a pool of machines with wide-ranging capabilities, but without having to do all the jobs ourselves. With a view to having the best possible quality control, we bought a Storck S 5500-2150 injection moulding machine in 2000. This enables us to test all the tools, including the bigger ones, before they’re delivered to our customers.

Mikron HSM 800 Commissioned

Because the market keeps demanding more attractive and complicated mouldings, we needed a high-performance machining centre. Our pool of machines was aimed more at rounded products. We were used to work with other suppliers because we didn’t have the technology required. So in 2001 we bought a Mikron HSM 800. This three-axis machining centre offers optimal stability, achieves a top-class surface finish and gives the best tolerance values. The machine hardly ever stops running here.”

Along with the HSM 800 and other modern machinery, we also have a "high-tech machine pool" that puts the emphasis not on quantity but on quality, and our Unigraphics software can deal with the most complex of mouldings.” Luc Van de Velde concludes.
Mikron works with various CAD/CAM specialists such as Cimatron, OPEN MIND and Unigraphics. Programs from these companies are used at Kächele. The plant’s technical centre in Nidau, Switzerland, to mill test parts for Kächele’s customers. Here we shall use examples to illustrate the work of CAD/CAM solution providers, in no particular order. The first of these shows how Cimatron, the CAD/CAM solution provider, and the German company Kächele GmbH have worked together.

When talking about rubber or rubber-metal parts, the name Kächele GmbH sooner or later comes up. Its best-known product has to be the “Vibrastop” motor - needing no rework. 16-slot tool for a rubber seal: the part comes out of the machine like a mirror - needing no rework. A tool that has been produced on a machine with integrated HSM functions, 5-axis trimming, information about the machining by stock removal. This consists of 2.5 to 5-axis machining with integrated HSM functions, 5-axis trimming, information about the machining by stock removal. This consists of 2.5 to 5-axis machining with integrated HSM functions.

Kärcher, Porsche, Bosch, Heidenhein/Teck. The upper and lower die can be used directly for NC programming. It is also a help that the hybrid model allows complex roundings to be made more easily. It is of great importance in die making, where smooth transitions are constantly required. Designing “case corners” is - in contrast to pure surfaces or solid modelling - far simpler. Rolf Fedderau has a high opinion of the options that NC programming offers. Firstly, the CAM modules, being integral components of Cimatron E, offer a wide range of machining strategies, including for HSM milling. Secondly, the post-processors are optimally aligned with the CNC control system - the result of collaboration between Mikron and Cimatron over a period of several years.

Great Demands

The rubber and rubber metal parts developed by Kächele place tough demands on die making at Weilheim/Teck. The upper and lower dies for the press plants are made from Cr-Mo steel, partly hardened to 65 HRC. “We place a heavy emphasis”, says Kurt Vollmer, the mould-making manager at Kächele, “on the moulded tools that are produced on the machining centres not having to be reworked due to poor precision or surface finishing. It has to come out of the machine like a mirror.”

Anyone who has ever had to produce parts under 10µm precision and 2 to 3µm surface finish just using the machining centre will know exactly what precautions need to be taken.

The Mikron Machining Centres

These great demands mean that Kächele has for years worked in partnership with the Swiss machine manufacturer Mikron. Their machine pool contains four Mikron machining centres: a Mikron UMS 900, a Mikron VCP 710 with a Heidenhain TNC 430 control system from powerful rough-working to the dynamic smoothing and finishing of free-form surfaces. After the machine was set to work, there was still some work to be done to ready it for unmanned night shifts, which are common at Kächele. Now the close contact with Mikron, particularly with the Special Machines department, paid off. Kurt Vollmer says of this contact, “We get really good feedback on our collaboration with Cimatron. For us as the user, it is definitely a benefit that the people who supply our core technologies, as Mikron and Cimatron do, work closely together.”

Kurt Vollmer, the mould-making manager at Kächele are more than satisfied with what they have achieved to date. The teamwork between the users and the technology suppliers, Cimatron and Mikron, is not the least crucial factor in producing above-average toolmaking results.

Kerstin Mueller,
Marketing Communications Manager, Cimatron GmbH
Clear Text Programming is now even easier with smarT.NC

Also for Mikron machines:
The new user interface for the iTNC 530.

HEIDENHAIN is presenting a new alternative user interface for the iTNC 530 at this year’s METAV Düsseldorf which is equally suited for NC beginners and clear text pros. smarT.NC – the new name of the user interface – leads the worker through the complete process of NC programming in a self-explanatory and intuitive way.

– Peter Goossens, Frank Muthmann –

What is exceptional about the new interface is that smarT.NC is usable as an alternative to the clear text dialogue. With smarT.NC, it is up to the worker whether a program should be created and executed at the clear text level or with the new graphical interface. While the user works with the intuitive interface, smarT.NC saves the data simultaneously as structured clear text dialogue programs. The machining steps are summarized as individual machining units in a machining plan. The advantage for the worker is obvious. Even if a TNC program was created with smarT.NC, it can still be modified as usual with the TNC clear text editor. In this way, “authentic” clear text dialogue commands can be inserted between the smarT.NC processing blocks. Both smarT.NC and the clear text editor access the same data: the clear text dialogue program!

In general: the simpler the machining the less data is necessary. Using smarT.NC, the worker defines all the necessary machining steps in a form. The predefined, globally valid parameters, like safety clearance, etc. assure that the TNC always uses these global parameters for each chosen step of the machining. If other machining options are required, smarT.NC automatically presents the necessary sub-form.

SmarT.NC’s division of the screen in two parts allows quick navigation on the left side: expanding and collapsing parts of the tree structure make it possible to show the programmed machining steps as a working plan. Easy-to-understand, graphically defined machining parameters each machining position is shown graphically in the preview. The definition of contours follows the same self-explanatory principle as the creation of machining programs with the graphical forms. Each individual contour element is shown in the tree structure and the associated data in a form. The contour itself is stored by the TNC as a clear text dialogue program in a separate file. Since the contour descriptions do not contain a radius correction, it is possible to re-use them later for different machining jobs. The programming-graphics immediately show which contour element is being entered.

With smarT.NC it is possible to handle all the necessary programming tasks from a single location – from creating the program to the program test and on to processing a complex program. The new 3D-graphics are also available, of course, for the program test.

The programming-graphics immediately show which contour element is being entered.

A new alternative user interface - smarT.NC

Mikron Nidau/CH
www.mikron-ac.com
Tel.:+41 32 366 11 11

Mikron / Agie Charmilles Representation
At A Lot Of International Trade Fairs

As in each year following EMO, Mikron is also represented this year at a lot of international trade fairs for mechanical engineering. Mikron’s latest products are presented at such events, while some of these trade fairs are used as a platform for launching world innovations.

Siegfried Joneleit

One such trade fair is the METAV in Düsseldorf, Germany. which takes place from 15 to 19 June, 2004. This event will be used to present the new Mikron UCP 1850. The unique, highly dynamic 5-axis simultaneous machining centre enables machining large parts. This innovation also includes a pallet changer. Another highlight at other fairs is the new product “smart machine” which is newly defined. You can experience this, and much more, at the events at which Mikron is represented. Mikron is worth taking a look at.

An overview of the fairs where Mikron is participating are listed below:

BIMH Bilbao
Spain
Bilbao
07.12.06.04

Mach Tool
Poland
Poznan
12.16.06.04

METAV Düsseldorf
Germany
Düsseldorf
15.19.06.04

Talencos Turkey
Istanbul
21.26.06.04

Int. Machining Tec.
USA
Chicago
08.15.09.04

AMB Stuttgart
Germany
Stuttgart
14.18.09.04

Alhankinta
Finland
Tampere
15.17.09.04

MSV Int.
Engineering Fair
Czech Republic
Brno
26.24.09.04

Den Teknikse Messe
Norway
Lillestrom
21.24.09.04

TWM
Netherlands
Hardenberg
Sep. 04

BIMU Machine Tool
Italy
Milan
01.06.10.04

Tributant Int.
Technical
Romania
Bukarest
11.15.10.04

Tekniska M issan
Sweden
Stockholm
19.23.10.04

Int. Tech. Far
Bulgaria
Plovdiv
27.09.02.10.04

Podesx
Switzerland
Basel
16.20.11.04

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