



NUM information

JOURNAL FOR CNC-TOTAL SOLUTIONS

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Editorial

Peter von Rüti, CEO NUM Group



Dear Readers

Glancing through the headlines in this edition of NUMInformation, you might be forgiven for thinking – what, another new CNC out already?! As soon as I get to know one CNC, there is another controller on the way.

I have to concede to readers that things do move very quickly where new products and product improvements are concerned. The rapid developments in a range of different areas translate into constantly increasing demands from the market. In order to increase productivity still further, we, of course, need to consider these demands, and this inevitably means new products and ideas. However, our own experience shows that a new product always involves a great deal of effort for both the integrator and the user. We strive to ensure that new products and new functions are as compatible as possible without allowing ourselves to be restricted by the new functions. This is very clear from the continuity of NUM products.

The Flexium+ is an enhancement of the extremely successful Flexium, over 10,000 of which have already been produced. We have now given this successful product a few additional features, such as a multi-touch control panel, a new drive package, built-in safety, single-cable motors, etc., and the result is the Flexium+. What is less immediately obvious is the fact that the overall performance

And things are not only afoot on the product side, we are constantly working on making changes to capitalise even further on existing potential for optimisation. It has become apparent that our current central logistics centre is on the verge of bursting at the seams in terms of space. This is why we have decided to build a new central logistics centre for the NUM Group in Teufen (Switzerland), which we will

„The rapid developments in a range of different areas translate into constantly increasing demands from the market“

(Peter von Rüti, CEO NUM Group)

of the system has also been significantly improved. After presenting this controller for the first time at IMTS 2012 in Chicago, we are now presenting more new functions of the Flexium+ system at EMO. The aim is to improve the flexibility and performance of the product even further. Additional details can be found in this newsletter and at our stand at EMO in Hanover.

be able to move into and have operational by the end of 2013. The new logistics centre will allow us to optimise our internal processes and make sure we are well equipped for the further expansion of our activities. For example, we have had a new branch in Seoul (South Korea) since June 2013. This means we are now able to support our customers in this important market directly with our products and services.

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As you read NUMInformation and prepare for your visit to our stand at EMO, I would like to share a quotation from George Bernard Shaw (1856–1950) with you: “You see things; and you say, ‘Why?’ But I dream things that never were; and I say, ‘Why not?’”

I hope you enjoy reading NUMInformation and hope to see you in person at EMO.

Peter von Rüti
CEO NUM Group

NUM goes Social Media

Everybody is talking about social media, and NUM is now actively involved. Social media opens up new channels for corporate communication and provides opportunities to deliver information and news to stakeholders in different ways. NUM has decided to open accounts on both Facebook and Twitter.

Twitter enjoys great popularity, especially in the USA. As tweets are limited to 140 characters, this service is ideal for disseminating short items of news and links to specialist articles online concerning NUM as well as our partners and customers. -> Follow us on Twitter @NUM_CNC.

For many, the worldwide social media platform Facebook has already become part of their daily routine. NUM is represented with an attractive profile, where we can inform you about application reports, showcase products and also provide a look behind the scenes from time to time. -> Click on "Like" and keep up to date.



 <http://www.facebook.com/NUM.CNC.Applications>

 [http://www.twitter.com/NUM_CNC \(@NUM_CNC\)](http://www.twitter.com/NUM_CNC (@NUM_CNC))

NUM Event Calendar



EMO
From 16th – 21st September 2013 in Hanover, Germany
Booth C43, hall 25



GrindTec
From 19th – 22nd March 2014 in Augsburg, Germany



Industrie Paris
From 31st March – 4th April 2014 in Paris, France



CCMT
April 2014 in Nanjing, China



SIMTOS
April 2014 in Seoul, South Korea

Events

Flexium⁺

New Flexium / Flexium⁺ Extensions



Flexium 8 / Flexium⁺8

A new commercial intermediate step between Flexium 6/+6 and Flexium 68/+68 has been introduced: the name will be Flexium 8/+8. This new control unit is intended for machine builders who require increased flexibility. It offers up to 5 axes – one more than the Flexium 6/+6. In terms of flexibility, the new control unit is comparable to its 'big brother' Flexium 68/+68. When combined with NUMDrive X components, Flexium 8/+8 enables OEMs to implement a very flexible high performance system for small and medium size machines. The principal attributes of each Flexium model are listed in the table below.

Flexium ⁺	Flexium ⁺ 6	Flexium ⁺ 8	Flexium ⁺ 68
Axes + Spindles per NCK	4 + 1	5	32
Spindles per NCK	1	1	32
Axes + Spindles per system	5	5	> 200
Interpolated Axes per NCK	4	4	32
Interpolated Axes per system	4	4	> 200
Channels per NCK	1	2	8
Channels per system	1	2	> 50
CANopen axes/spindles per system	> 100	> 100	> 100
CANopen interfaces	1	1	2
Servobus digital ports per NCK (DISC NT)	3	3	3
Measurement Inputs per NCK	2	2	2
Handwheels per NCK	2	2	4
CNC Program Memory per NCK	40 MB	40 MB	40 MB
PLC Program Memory	1'024 MB	1'024 MB	1'024 MB

nPad – Mobile Operator Panel

The nPad mobile operator panel is an ergonomic handheld device that provides easy, machine-oriented control of kinematics in manual mode. It incorporates a 5" TFT touch-screen display with a programmable HMI, and is available in wired and wireless versions.

nPad is equipped with WinCE 6.0 and the CoDeSys HMI runtime environ-

ment. A communication library allows the nPad hardware to be accessed by the handwheel, touch buttons, selector, overrides and other signals.

Only one toolset – Flexium Tools – is needed for graphical editing and programming, layout design and system integration. This is the same toolset that is used for NCK configuration and PLC programming. Advanced fea-

tures such as multi-language support in visualisation are provided as standard, and the graphically supported touch panel software can be simulated without the need for nPad hardware.

A customised application example of a CoDeSys HMI is provided by NUM, so OEMs do not need to start from scratch.



nPad overview



Technical characteristics nPad wireless / wired

General Specifics for nPad:

- 5" TFT touch screen monitor (resistive, 16:9, resolution 480*272)
- Certified safety interfaces:
 - E-Stop pushbutton certified according to SIL 2 / PL d
 - Enabling Device certified according to SIL 2 / PL d
 - State selector (up to 16 positions) certified according to SIL 1 / PL c.
- Data interface:
 - 2 potentiometers
 - Dedicated keys (examples: Start, Hold, Jog+, Jog-, Axis+, Axis-)
 - Programmable function keys. Functions fully user defined
- Dimensions: 220x130x50mm (of the hand held terminal only)
- Weight: 750 grams for wireless and 610 grams for wired version
- Degree of protection: IP65 (the handheld terminal)
- Magnets on rear allow attachment to metal surfaces
- Power supply: 10-30 VDC

Wireless Specifics for nPad:

- Recharging station (IP54) power supply: 10 – 30VDC
- Controller Interface Station (CIS) HMI data. Ethernet link to Controller
- Bluetooth communication for safety connection.
- WiFi communication for HMI data
- Maximum handheld distance to CIS up to 50 m

Flexium+

New Flexium / Flexium+ Extensions

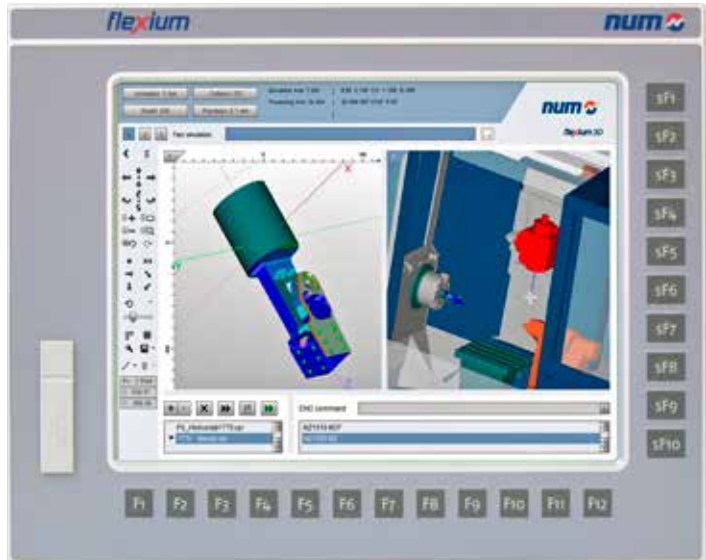


FS122 – 12" Operating panel

A new commercial 12" operating panel will be announced in Q3, 2013. The optical design is equivalent to NUM's customised version of FS152 operator panel. The display resolution is XGA (1024 x 768), which supports the Flexium / Flexium+ HMI optimisation.

FS122 specification

- Passive panel (NO PC)
- Video Interface: DVI and VGA (DVI/USB extension up to 50 m as an option)
- Power supply: 24V
- Display: 12" with 1064 x 768 (XGA) resolution
- Degree of protection: Front IP65
- USB: one at the front and 2 at the rear
- Resistive touch screen
- 22 x function keys (12 horizontal / 10 vertical)



BoxPC P1 / P2:

NUM Industrial Box PC P1 can be used as a DPLC substitute (target system for real-time environment), e.g., where NUMROTO machine tool applications use an external powerful office PC together with a passive panel. The new Box PC P1 has the same footprint as its predecessor, but is 3 mm lower in height.

The high performance Box PC P2 is qualified to cover all customer requests for an industrial PC. NUM

recommends that customers use this fully tested product when real-time performance is important, to provide predictable execution time and ensure that no interrupts are missed. Displays with a DVI interface are also supported.

The big advantage of this product is its long-term reliability and very good price/performance ratio.

Specification and Interfaces

	NUM Box PC P1	NUM Box PC P2
CPU/Board	Intel® Atom™ CPU D525 1.80GHz Dual Core	I5 M520 Dual Core 2.4 GHz
Mass Storage	CF 8 GB	>= 260GB
RAM	2 GB	>= 2 GB
OS	WES 2009*	Windows XP prof.
Ethernet	3x Gigabit LAN / RTE	3x Gigabit LAN / RTE
Field bus CAN / EtherCAT	Max. 2 / 1	Max. 2 / 1
USB	2 ext.	2 ext.
COM / VGA / DVI / PS2	3 / 1 / -- / 1	3 / 1 / 1 / --
Fan	Yes (at housing)	Yes (at housing)
Power supply	24 VDC (+15%/-15%)	24 VDC (+20%/-15%)
Power consumption	Approx. 14 W	Approx. 50 W
Protection class	IP20	IP20

* Windwos Embedded Standard 2009 based on Windows XP

Flexium CAM

Many machine manufacturers want to provide their customers with an individual customer- or machine-specific user interface. NUM controllers provide various options in this respect. NUM now offers another innovative solution for what are known as technology HMIs: Flexium CAM. A technology HMI refers to the part of the user interface that is responsible for the creation of part programs.

Flexium CAM is the mechanical engineering framework that NUM provides

for the simple creation and integration of individual technology HMIs.

Input screens for basic data, tools and processes can be defined simply and intuitively in the Flexium CAM Designer. You can set out standard values and data types, as well as rules for validating input, define calculations for input values and enter the appropriate input screen.

Finally, the data is linked to the appropriate CNC program elements.

The actual input screens are created using simple HTML programming and JavaScript, and do not require specialist programming tools.

The application is encrypted and saved in a configuration file. This means the technology is protected and not openly available. NUMgear, NUM's production solution for gear machines, which is described on the following page, was produced using Flexium CAM.

The Flexium CAM Engine executes the application configuration. It is fully integrated into the Flexium+ HMI. Clicking on the relevant project file opens the application, and work can begin on data entry and process definition. A part program is produced at the touch of a button, and the machine is ready to edit the first workpiece.



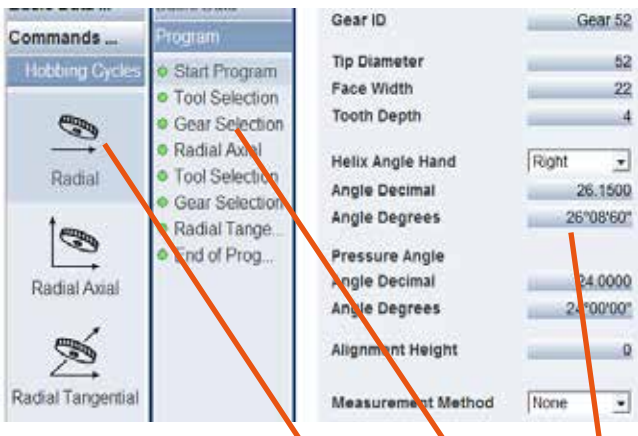
Flexium+

Flexium+

New Flexium / Flexium+ Extensions



NUMgear



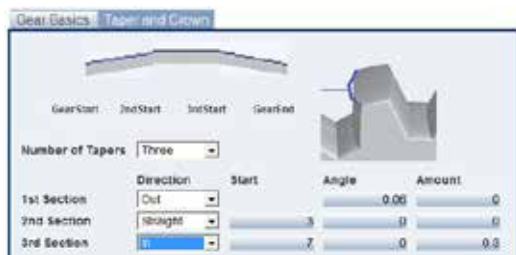
Work stages, workflow, details

With its latest-generation Flexium+ controller, NUM is providing a completely redesigned version of the tried and tested production solution for roller milling and grinding of cylindrical gears.

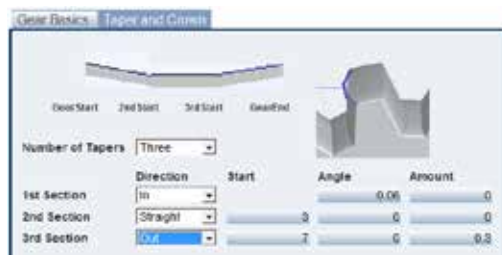
NUMgear is available either fully integrated into the Flexium+ HMI or as a stand-alone PC version. Projects can be created on the PC and transferred to the gear machine.

If the data for the workpiece, tool and process have been entered, the CNC cycles can be created at the touch of a button and are then immediately ready for processing. There is no need for manual copying and activation on the controller. The NUMgear user interface is integrated into the Flexium+ HMI and is automatically started if a gear project is selected. The interface is clearly structured and adapted to the working process.

NUM has focused on graphical, intuitive operation and data input. In a table, the texts can easily be translated into any language. For each input, an explanatory graphic is shown, which helps even inexperienced users work productively with NUMgear within a short space of time.



Flank modification menu

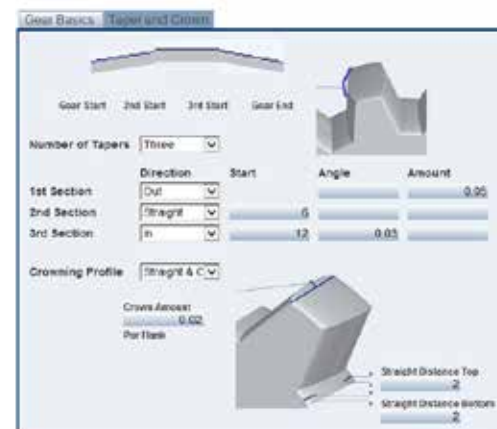


Flank waviness menu

NUMgear can be used to produce nearly all cylindrical gears, including spur gears, helical gears, worms, worm wheels, involute root splines and parallel splines.

All combinations of radial, axial and tangential movements of the tool are available as processes. This includes incremental and continuous shifting across the entire width of the tool.

Gears, tools and processes can be integrated into a single workflow. NUMGear makes it possible to combine the processing of a wide range of different gears and parallel-spline profiles in a single workflow.



NUMDrive X

The NUMDrive X servo drives with their modern design are the ideal counterpart to the powerful Flexium+ CNC. One distinguishing feature of the NUMDrive X is its high power density. A high degree of integration and efficiency has allowed us to achieve an extremely compact design that makes NUMDrive X one of the smallest high-end drives on the market. Thanks to a small depth and a modular width (a multiple of 50 mm) the cabinet layout is greatly simplified.

The range is characterised by a wide choice of current from a few amperes up to 200 Arms, and Bi-Axes versions rated up to 2x35 Arms are available to enable each application to be optimised at the lowest cost.

NUMDrive X is a modular drive system that is optimised for multi-axis applications. Use of a common power supply unit means that only one mains connection, one line filter and one braking resistor are required per system, reducing cabling and overall costs. The system's modularity also facilitates energy exchange between different axes via the DC bus, offers the possibility of using stored energy for retraction purposes, and – in the case of regenerative power supplies – allows energy to be re-injected into the mains to reduce machine operating cost. Such system conception also leads the way for a greener approach.

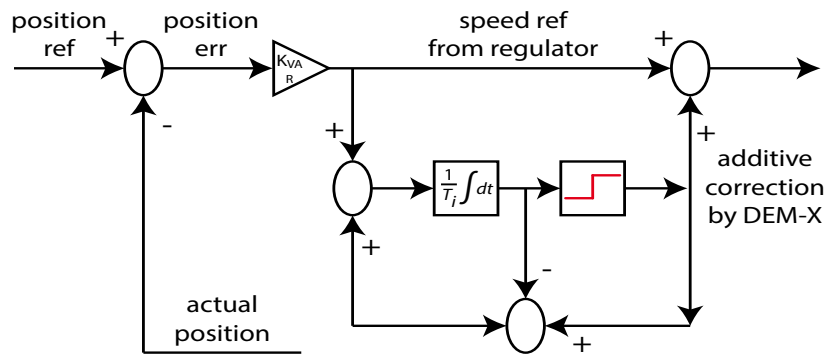
NUMDrive X offers a choice of performance levels:

- Standard-Performance (SP) version
- High-Performance (HP) version
- Enhanced-Performance (EP) version

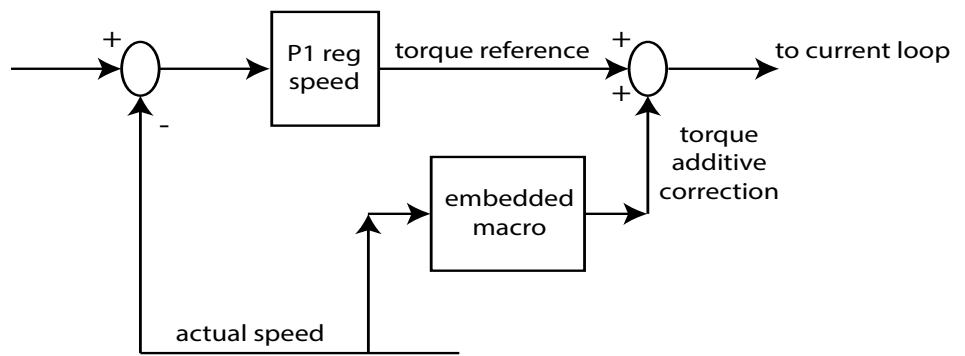
The High Performance (HP) version provides unique functionality in the form of a Drive Embedded Macro (DEM-X). This enables users to create their own real-time macro to interact with all physical and virtual drive resources – it even allows manipulation of the regulation algorithms. Users can now design and implement filters, monitors, test points and pilot outputs which obey their own choice of performance rules.

The Extra Performance version defines new standards needed for machine automation of the future. As well as featuring high internal resolution, huge calculation power, es-

A simple integrator block added to position regulator



A simple anti-pitch function



Top : The user can now create its own real time macro to interact with all physical and virtual drive resources even manipulating regulation algorithm examples

pecially developed algorithms and a wide range of functions, NUMDrive X EP samples variables at 40 kHz, allowing it to achieve extremely wide current, speed and position loop bandwidths.

Designers are constantly striving to increase machine throughput by reducing the mass of moving parts (using various methods, such as composite materials), and by increasing their stiffness, speed and acceleration; but all these efforts to improve machine mechanics are wasted if the servodrive systems are limiting the regulation bandwidths. When this is the case NUMDrive X EP is needed.

NUMDrive X accepts almost all measuring systems and can control a broad range of motors (servo, torque, linear, and asynchronous) from NUM or other manufacturers. This ensures that a solution can be optimised from technical and economic perspectives.

Within the NUMSafe architecture, NUMDrive X provides the safe motion functionalities by means of two different modules:

- NUM-STO is the basic module for implementing the Safe Torque Off function certified up to SIL 3 according to IEC 61508. This allows the realisation of E-STOP functions category 0 and 1 according to EN60204-1.

- NUM-SAMX is an enhanced module which provides a huge number of safe motion monitoring functions: STO Safe Torque Off, SLS Safely Limited Speed, SOS Safe Operational Stop, SS1 Safe Stop 1, SS2 Safe Stop 2 and SLP Safe Limited Position.

Every machine builder has experienced the complexity of encoder wiring and knows that it takes time and effort to install and debug it satisfactorily. NUMDrive X introduces a revolutionary innovation to overcome these issues. The drive incorporates a full digital encoder interface which uses a two-wire communication protocol. The two wires are integrated in the power cable.

NUM helps Richter Maschinenfabrik AG with the patent for submerged-arc welding system with user-friendly joystick



a 6-axis CNC-controlled control



The CNC-controlled contour submerged-arc welding system with 6 interpolating axes has a high-end Flexium CNC from NUM. The system is operated using a joystick, and the controls are simple and quick to learn. A few teach points are determined in order to learn complex welding contours directly from the component itself. The operator can adjust the welding path at will, simply at the touch of a button, which makes CNC-automated multi-layer welding possible on complex curved contours.

The submerged-arc welding process is nothing new in itself – it is an established technique for achieving high quality welded seams during production of large components. What makes the system developed by Richter in conjunction with NUM special is the combination of various machine components available on the market and their perfect interaction based on a CNC and a specially developed application. This results in consistently high welded seam quality far beyond the quality achieved by normal methods.

Together with the wire and powder feed, the welding head of a submerged-arc welding system was fitted on a horizontally moving cantilever arm that can be swivelled in all directions and adjusted vertically. This means that the welding head can be positioned at any point above the welding table. The cantilever arm also incorporates the system's control unit consisting of an FS152 monitor with function keys, a seat and a joystick. All commands and settings for the system, from set-up to work processing, are carried out using this joystick. Within the production pro-

cess, this provides not only flexibility but also considerable ergonomic advantages; the welder can operate the machine wearing gloves, and the complex controls of the machine have been simplified to the extent that a new welder can operate it and work independently within the space of just a few hours. The simple controls and the connected controller have been developed carefully by technicians from Richter and NUM on site and perfected based on various practical tests. The commands given by the joystick are converted into movement by the Flexium CNC by means of 6 axes.

The workpiece to be machined is placed on a large 60-tonne rotary tilting table below the cantilever arm. As the name suggests, the table can turn endlessly, and can also be tilted to up to 45°, which allows welding of seams that are not horizontal. A further advantage of the swivelling cantilevered arm is that it can be pushed entirely to one side. This means that large components whose dimensions exceed that of the turntable can be welded.

Previously, submerged-arc welding systems normally welded V- or X-shaped seams that were always



*Left: welder operating the submerged-arc welding system using the joystick
Right: submerged-arc welding system with rotary tilting table*

High-Quality



Top: screen and joystick

Bottom: worker setting up the system for the welding process using the joystick



straight lines. Until now, the welding of contours always needed to be done by hand using other welding methods (MAG), which meant considerably more time and effort was involved, not least to avoid fluctuations in quality (formation of blowholes). This new submerged-arc welding system now allows contours to be welded automatically. This represents a real time saving with no compromise on quality. "Overall, the submerged-arc welding system developed here means that an increase in production performance in the region of 25 to 30% is altogether reasonable," explains Dirk Kunig, Head of Electronics at Richter AG and developer of this system.

Nearly every day, the work preparation and welding monitoring departments of Richter AG find new applications for this system which would previously have been inconceivable. "There has been a real quantum leap in terms of performance and quality," confirms Dirk Kunig.

The complex control of the system is handled by a Flexium 68 CNC unit from NUM, but this is not noticed by the user. The standard NUM HMI to operate the plant, which was supplied with the system, has been very much simplified by means of an application developed specially for this machine. It is controlled using a single joystick. The welder can use this joystick to map the welded seam to be created during the teaching process and at the same time read in the teach points. At a later date, there are plans for the flame cutting system we reported extensively on in the last issue of NUMinfo to transfer the teach points to the submerged-

arc welding system digitally, thus completely obviating the need for manual loading by the welders. This would save even more time. As can be seen on the monitor, the menu items are arranged so that they can be selected using the joystick. The arrangement of the bottom buttons and colours on the monitor corre-



Top: SA system during welding process – the system moves to the pre-defined teach points

Bottom: NUM Flexium 68 CNC





From left to right: Daniel Kurta, welder at Richter AG, Axel Richter, Chairman of Richter Maschinenfabrik AG, Dirk Kunig, Head of Electronics at Richter AG, Peter Kairies, Services & Applications, NUM Germany, and Bernhard Simon, Head of Sales, NUM Germany

sponds to the arrangement of the buttons on the joystick, which can be used to switch between different menu items or levels.

In the background, the CNC governs the position of the welding head producing the welded seam, while a second CNC channel controls the wire advance and rotational movement of the powder-coating unit, so that it always precedes the course of the welded seam. Even components made of different materials, such as thick steel sheets and heavy cast

components, can be welded perfectly, without errors and with the required level of precision. Such large-scale components made of different materials are required for massive digger arms in the mining sector.

With this new submerged-arc welding system, Richter Maschinenfabrik AG, in close cooperation with NUM, has taken a major step towards improved quality for welded seams, faster and more time-saving welding and significant reduction of production costs for submerged-arc weld-

ing. Once more, it has been shown that if two companies share their know-how in order to create something new, it is possible to successfully exceed expectations.



High-quality welded seams can be produced on steel and cast components using the SA system

High-Quality

High precision and flexibility thanks to NUMROTO



Whether in mechanical engineering, the automotive industry, electrical and medical technology or wood and plastics processing, the range of different tools used in an increasingly differentiated production environment seems endless. Mauth Werkzeug-Schleiftechnik GmbH is a long-standing NUM partner – it has been using NUMROTO for its highly specialist production for around 15 years.

Mauth develops and produces perfect-fit tools in series, which meet exacting customer demands. Complex shapes are designed to specific measurements in the CAD system and loaded onto the CNC machines using NUMROTOplus. Whether it is a drill, an end-mill, a form cutter or a step drill, NUMROTO gets everything in shape and ensures a perfect finish. Mauth opted for NUMROTO around 15 years ago, following a market analysis which revealed that a NUM controller combined with NUMROTO software was difficult to beat in terms of flexibility and quality. It is this quality and, more importantly, the flexibility which is so important to Mauth Werkzeug-Schleiftechnik GmbH. As all 16 tool grinding machines in the company are running on the NUMROTO multiuser system and are networked to a central sys-

tem database, any employee trained in NUMROTO can operate all the machines. This guarantees continuity in the event of employee absence, and helps maximize productivity as employees do not need to wait for a particular machine to be available – they can simply move to a free machine and continue production.

Mauth Werkzeug - Schleiftechnik GmbH, which has a production area covering over 1000 square metres in Oberndorf am Neckar, is constantly increasing its fleet of machinery. In 2013, Mauth is adding another two machines to the fleet. "These new machines will also be equipped with NUMROTO," explains Michael Mauth, Managing Director of Mauth Werkzeug-Schleiftechnik GmbH. This keeps the company at the cutting edge of technology. Measurement

machines fitted with infrared and swivel cameras, as well as constant reconciliation of actual and target values, ensure consistently high process quality. The connection between the measurement machine and the grinding centre adds more production accuracy, as does measurement of the rotary tools while they are turning – all controlled and monitored by NUMROTO. Most of Mauth's customers are in Germany and its neighbouring countries, though it also has some in the USA and Asia. A sophisticated logistics system makes it possible, in exceptional cases, to produce tools and deliver them to the customer within 24 hours, even if the customer is based in Asia.

Mauth's most precious asset is the expertise of its engineers and employees, based on 35 years of experi-



From left to right: Tilo Leicht, Production Manager at Mauth Werkzeug-Schleiftechnik GmbH, Michael Mauth, Managing Director of Mauth Werkzeug-Schleiftechnik GmbH, and Jörg Federer, NUMROTO Application Manager at NUM AG

Below: Form cutters and removable disk systems for one-, two and three-blade tools



ence in metal processing. Its philosophy is the same as NUM's, to offer 'maximum quality and perfection', and this ensures low error rates at both companies and great customer satisfaction. Continuous professional development is very close to the hearts of those at Mauth. NUM works together with innovative customers such as Mauth on targeted developments to achieve a competitive advantage. This is the only way that it is possible to produce standard and specialist tools with optimum precision, run-out accuracy and machining performance. Mauth works in the same way as NUM, in close proximity with its customers, thus providing the aforementioned flexibility and quality as well as problem-solving at the machine. This means that the customer's workflow can be examined on site if required. Its know-

how allows Mauth to optimise specific customer processes, which can mean cutting several seconds off the entire working process – and everyone knows what a few seconds can mean in modern series production.

Removable inserts – the complete solution

With the help of its inserts systems, Mauth can provide tools for internal and external processing – shaped removable inserts with one, two or three blades. Excellent replacement accuracy of under 0.01 millimetres and consistent repeat accuracy ensure uncompromising quality and optimum service.



Perfection

Custom CNC is at heart of groundbreaking laser cutting machine



Customized CNC technology from NUM is helping the laser cutting machine manufacturer Favor Laser to accelerate product development and address new markets. Using special hardware and software designed by NUM, the Taiwanese company has developed a high precision laser cutter that is equally capable of producing very small or very large parts from sheet metal, with a cutting feed rate of up to 60 meters per minute.

Until now, Favor Laser has concentrated on producing laser cutters for the low cost end of the market. In 2010, it began developing a high performance multi-capability laser cutting machine for the international market, which is currently dominated by a small number of Swiss, German and Japanese manufacturers. By combining its laser cutting technology with value-engineered hardware and advanced CNC soft-

ware, the company anticipated it could produce a machine with the same performance as the market leaders, but at significantly lower cost.

All Favor Laser machines are based on an innovative flying optics system, where the metal sheet that is being cut is supported on a stationary table, and the cutting head which directs the laser beam is moved

horizontally above the surface of the sheet. The company's new X0 high performance laser cutter is a four axis machine, but uses two motors for the X axis. Horizontal positioning of the cutting head is controlled by the X and Y axes, which have working lengths of 3 and 1.5 meters respectively; this large working area, combined with an X-Y positioning accuracy of ± 0.01 mm, helps maximize machine versatility.



To maintain beam focus and cutting efficiency, the gap between the cutting head and workpiece is continually monitored and adjusted using a high speed servo on the Z axis. The X, Y and Z axes are fully interpolated to ensure smooth and continuous motion control, while patented adaptive optics compensate for the length of laser beam, which varies depending on the position of the cutting head relative to the laser oscillator. The machine's fourth (U) axis handles material loading and unloading.

After investigating various CNC options, Favor Laser chose NUM's Flexium 68 system for its new X0 machine. The CNC system's motion control hardware closely matched requirements and provided configuration flexibility for future enhance-

Left: Favor Laser's new X0 high performance laser cutting machine is based on custom CNC hardware and software from NUM

Right: Adrian Kiener, Director NUM Taiwan, Robert von Arx, NUM Business Dev. Director Asia, Xavier Molinet, CFO NUM, YS Lai, General Director Favor Laser and Yann Song, Application Specialist NUM Taiwan

Below: The X0 laser cutting machine's versatility makes it ideal for high volume production of intricate precision components

Bottom: Innovative flying optics can position the X0 machine's laser beam anywhere within a 1.5 x 3 m working area, to an accuracy of ± 0.01 mm



ments, and its software functionality would simplify application programming. In particular, the 'Dynamic Operator' function – which is unique to NUM – was judged ideal for the program that dynamically controls the gap between the cutting head and the workpiece. Using fast calculation and communication facilities, the function enables event-driven machine cycles to be integrated into the real-time CNC kernel.

According to Favor Laser's General Manager, Mr. Lai, "We were delighted to discover that NUM Taiwan had the engineering expertise, resources and willingness to assist us at every stage of design. Thanks to their help, which included developing custom hardware and CNC software, we have been able to bring our new X0 high performance laser cutter to market on time and to budget. As a result of reduced development and build costs we have gained an enormous competitive advantage. Our machine is likely to be priced about 20 to 30% below comparable machines from Japanese and German manufacturers."

All motion control elements of the X0 laser cutter are supplied by NUM. In addition to the motors, NUMDrive C servodrives and Flexium 68 CNC kernel, the machine uses NUM Ethercat I/O terminals and a dual-processor Flexium FS152i operator panel with a 15-inch flat screen and hard drive. The custom human-machine interface (HMI) was developed entirely by NUM Taiwan and makes extensive use of graphics – including visualization of the workpiece and cutting course – to simplify machine operation and minimize training needs.

Operating conditions can change abruptly during laser cutting, demanding quick adjustment of a large number of parameters to ensure consistent performance. Controlling the laser oscillator's power output is a particular design challenge, and

requires extremely fast and stable communication facilities. To meet these demands, NUM Taiwan developed a special pulse train control card for the CO2 laser oscillator in the X0 machine. Implemented entirely in hardware (the use of software would impose unacceptable timing restrictions), the card translates duty cycle and frequency control signals, which are optically coupled to the oscillator to minimize transmission delay.

The performance of NUM's CNC products and the responsiveness of NUM Taiwan has caused Favor Laser to completely re-evaluate its machine control strategy. The company now intends migrating its existing product lines over to Flexium systems, and to base future machines on NUM's CNC technology. As Mr Lai explains, "I am confident that our partnership with NUM places Favor Laser in the best possible position to create new laser cutting machine solutions that will benefit our customers."

Performance

Flexium powers new aerospace centreless grinder



The UK-based grinding specialist RefreshEng has launched a re-engineered centreless grinder based on one of the world's most widely-used machines, with the aid of software development support from NUM. The upgrade converts any of the veteran Cincinnati 2-OM family of machines to the same kind of automated and precision machining available on state-of-the-art centreless grinders - but for an outlay that is some 60% lower than a new machine.



The upgrades transform the 2-OM's original hydraulic- and mechanical-dressing architecture - with its fixed cam-and-stylus control - to an advanced CNC software-based system with up to seven axes of servomotor-based motion depending on customer choices. Initially, the new machine is targeted at the aerospace industry, and comes with application-specific software to automate the production of the specialist countersink, button-head and relief style fasteners used in aviation fuselage and engine production.

To complete the automation upgrade RefreshEng incorporates numerous

advanced features. These include acoustic sensors that automatically monitor and compensate for grinding wheel wear. The sensing system is also used to dynamically adjust grinding wheel feedrate to provide 'gap elimination'; this feature alone can reduce grinding cycle times by almost 20% across a batch of raw material parts. Higher resolution control of movement, and the ability to interpolate movement, improves both grinding accuracy and extends the range of shapes that can be ground. The grinding wheel has been fitted with a dynamic balancing system. Wheel speed can also be varied to suit different materials. Another key feature is a choice of drop-, finger- or front-loading autoloaders.



This idea for the project span out of RefreshEng's intimate knowledge of the centreless grinding business, derived from its established tooling services in the UK and Europe. Many of its clients wanted to re-control their old machines to an advanced level, to increase throughput and eliminate manual operations, but found it difficult to source the technical support for such work. RefreshEng recognised the opportunity, es-

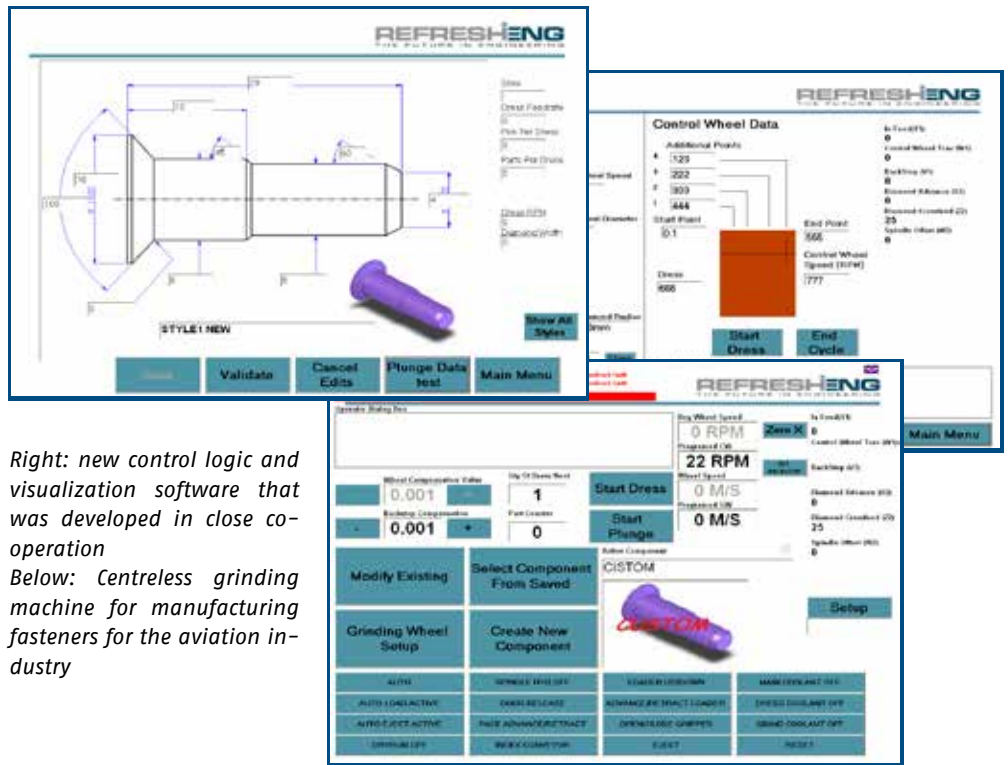
Top: The original hydraulic/mechanic-controlled Cincinnati 2-OM-grinder serves as the base for RefreshEng's new machine

Below: A finished re-engineered centreless grinder

pecially for the popular Cincinnati 2-OM, as it estimates there are still some 2000 of these machines in the UK alone.

RefreshEng's staff - who have grinding machine design experience - had clear ideas of how to update the mechanical architecture. This involved the replacement of hydraulics in favour of servomotor-controlled motion, with numerous modifications to the underlying framework including new castings to mount the electro-mechanics. The key hurdle for RefreshEng's CEO Damian Clements was finding a CNC supplier that would be prepared to complement his company's know-how with high-level control system software skills. In order to make the project financially viable, RefreshEng also wanted the CNC supplier to defer the return on their development efforts until sales of the machine started to build. Previous good experience with NUM led Clements to discuss the project first with the NUM UK. NUM offered to act as a virtual partner, allowing its programming staff to work alongside RefreshEng's staff as a development team.

RefreshEng provided NUM with flow charts of the way it wanted the new machine to function, so that the control logic and operator interface software could be developed. The companies' engineers then worked together - often using internet communications to link remotely to the prototype - to realise and test the new control system. Even though the type of custom HMI RefreshEng wanted was seemingly fresh to this type of machine, NUM's software developers completed the work within just 3-4 man-months. The open programmability of Flexium's man-ma-



Right: new control logic and visualization software that was developed in close co-operation
Below: Centreless grinding machine for manufacturing fasteners for the aviation industry

chine interface was the catalyst for this rapid design cycle. In addition to providing the control structure, NUM also exploited the HMI programmability to generate a distinctive look-and-feel for the control software - to simplify use and to start building a brand feel for RefreshEng's entry into the grinding machinery market.

NUM's software employs dialog boxes to simplify programming - allowing new grinding profiles to be created in under a minute. The operator simply populates data fields on a sequence of screens, which include graphical representations of the fastener style, and the profile is automatically generated. Parts can then be produced completely automatically, with the machine's software also automati-

cally performing housekeeping tasks such as dressing the wheel.

The hardware is based on the economic Flexium 68 CNC kernel, with an FS152i touch-screen HMI, machine panel with handwheel for operator programming and control, plus MDL03 drives and BPX servomotors with absolute encoders. The axes controlled (depending on machine model) are control wheel-infeed, -traverse and -rotation, dresser-infeed and -traverse, backstop and spindle lateral adjust.

„This project exemplifies the way NUM likes to work,” says Steve Moore of NUM UK. „Because our business is built on helping small to medium sized machine builders to compete, we have invested in a decentralised R&D structure which locates engineering staff all around the world, and we are very willing to customise our CNC technology to support clients.”



Advanced CNC retrofit package gives new lease of life to hob sharpeners



In collaboration with NUM, machine tool rebuilder North East Technologies Inc. has developed a CNC retrofit package that brings the performance of early generation hob sharpening equipment up to modern-day standards. The system doubles accuracy and can increase the productivity of machines immensely – by margins of 40% or more. By extending the life of hob sharpening machines and enhancing their performance significantly, the retrofit provides gear manufacturers and tool service companies with a highly cost-effective alternative to purchasing new equipment.

North East Technologies specialises in servicing and rebuilding hob sharpening equipment. The company is renowned for its knowledge of the gear manufacturing process, and a major part of its business is retrofitting modern control systems to early generation hob sharpeners – such as the SNC 30 and AGW Series machines originally produced by Klingelnberg back in the 1980s. To expedite refurbishment, North East Technologies

decided to develop a 'standard' high performance CNC retrofit package that could readily be adapted to different machine configurations.

Most companies that cut gears or service gear cutting tools have at some time used Klingelnberg SNC 30 hob sharpeners. Capable of handling work pieces up to 300 mm (12 inches) in diameter, they can grind helically fluted hobs to a depth of 90 mm (3.5



inches). They are widely regarded as an industry standard – there are hundreds of these machines in the USA alone, many of which have been in continual use for 25 or more years. However, despite still being mechanically sound, most of these machines are showing signs of age. Their motion control hardware is not up to today's standards in terms of speed, accuracy or efficiency, so the machines act as a production bottleneck. And as their original CNC systems become increasingly unreliable, and use obsolete components, rising support costs and downtime eventually renders them ineffective.

Above and left: An advanced CNC retrofit package based on NUM technology doubles the accuracy of Klingelnberg SNC 30 hob sharpeners

When choosing a control solution provider for the retrofit package, North East Technologies was heavily influenced by its customers, many of whom request NUM's CNC technology for machine upgrades. Most of these customers regard NUM's gear hobbing solution, NUMgear, as the best in the industry, and are aware of the local development resources that can add further functionality from NUM Corporation's headquarters in Naperville.

According to Harry Salverston, President of North East Technologies, "NUMgear provided much of the functionality we needed for our hob resharper retrofit at the outset, making it an ideal platform. And NUM's willingness to assist us in developing application-specific features, such as a custom HMI and special machine code, confirmed this choice. NUM effectively acted as an extension to our own engineering resources to help speed development."

The CNC retrofit package content depends on the hob sharpener's configuration. Basic SNC 30 machines have two CNC axes as standard – one (X) for the wheelhead slide and the other (A) for the workpiece spindle – and can be fitted with a further two optional axes to automate axial (Y) and radial (Z) movement of the wheelhead. In addition to upgrading the machine's controller to a NUM CNC system, the retrofit replaces all motors and drives with high performance NUM servomotors and NUM-

Drive C servo drives. The new servomotors have high resolution 262,000 pulse/rev encoders – the original motors had 1,000 pulse/rev devices – which provide much more accurate control of speed and position.

Considerable attention has been paid to ensuring that the HMI of the CNC retrofit preserves the familiar 'look and feel' of the original SNC 30 operating system. A 'fill in the blanks' programming method, backed by custom control macros, means that the machine operator is not presented with unfamiliar CNC nomenclature, and simply enters parameters such as the length of flute and the amount of material to be removed. Each screen is context-sensitive to eliminate ambiguity. For example, selecting a grinding cycle that uses a CBN (carbon boron nitride) wheel opens a folder that only contains options for CDG (conventional deep grinding) and SDG (single flute deep grinding), with dressing disabled. The software also allows the operator to 'teach' the machine the relative positions of the X,Y, Z and A axes under manual control, enabling grinding cycles for different hobs to be developed very easily.

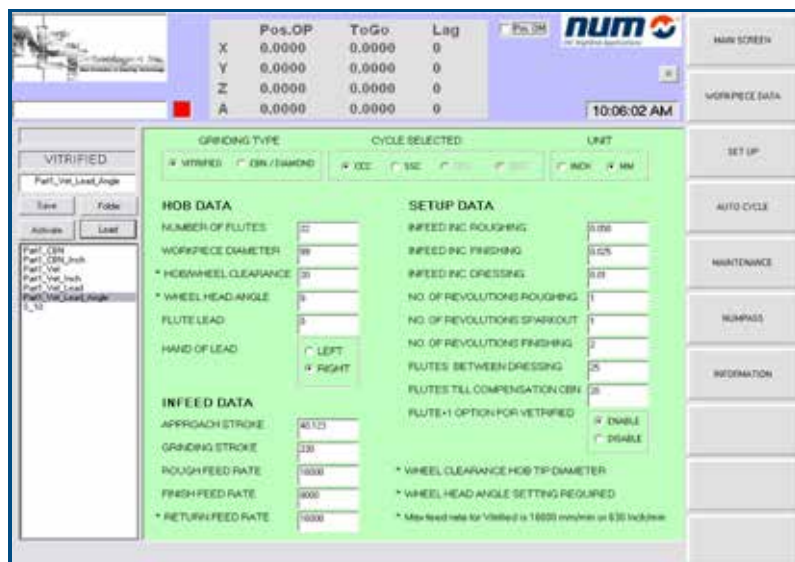
To maximise flexibility, the application accommodates multiple hob sharpening methods, including removal of stock in one or both directions of wheelhead traverse. For straight fluted hobs, as soon as one flute has been sharpened the workpiece is indexed through to the next



flute and sharpening recommences. Utilising the Flexium CNC system's 'Dynamic Operator' (DynOp) function, the machine builder can create custom axes linkage or compensation in real time, at the position loop clock cycle. In the case of sharpening helically fluted hobs, this unique DynOp feature allows the rotary (A) axis to be transparently synchronised to the X axis, so the grinding wheel accurately follows the helix angle.

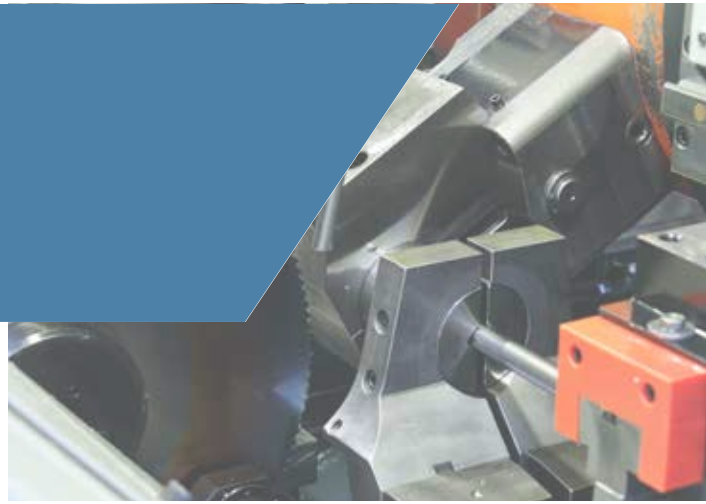
Above: Machine operation is simplified by the 15-inch flat screen and large function keys of a NUM control panel

Below: The HMI preserves the familiar 'look and feel' of the SNC 30 by using 'fill in the blanks' programming



Modernisation

SINICO and NUM, two qualified partners move on



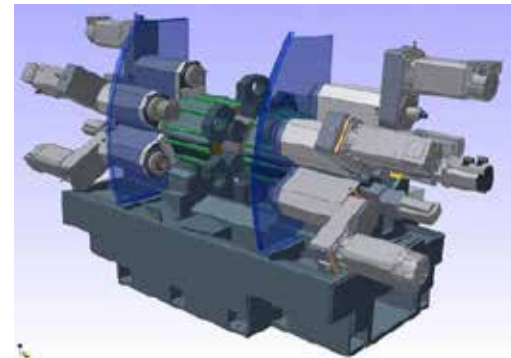
Two years ago we reported how SINICO and NUM embrace the same philosophy and have helped customers achieve unbeatable competitiveness for almost 50 years. Now SINICO has developed a completely new and gigantic transfer machine, to which NUM has contributed the first of its new-generation Flexium CNC systems, as well as motors and spindles. The combination of SINICO's machinery and NUM's CNC know-how makes the new TOP 2100 CNC an exceptionally powerful industry workhorse.

SINICO specialises in the design and manufacture of automatic rotary transfer double end machines with integrated cut to length and bar-feeder functions, suitable for producing medium/large metal parts (steel, stainless steel, copper, brass, aluminium, titanium, Inconel etc.) from tubes, bars, coils, forgings and blanks. With a single clamping, the SINICO machine can perform virtually all forms of operations including: cutting, facing, chamfering, boring, centring, turning, drilling, threading, tapping, milling and grooving, as well as shaping operations such as flaring, tapering, rolling, pressing, marking and knurling.

SINICO's headquarters and production facility are based in Montebello Vicentino in Italy's north-east. The modern and highly organised com-

pany employs a staff of 50 and its owner follows a strict policy based on research, innovation and investment, channelling efforts into the pursuit of new solutions and ideas for a dynamic, constantly expanding market. The company evolved steadily and specialised in the design and construction of automatic rotary transfer cut-off and end-finishing machines to become one of the leaders in this sector, currently exporting most of its production. In terms of the number of machines delivered, the biggest sectors are the automotive, bicycle and motorbike industries, manufacturing of hydraulic components, electric motors and power transmissions, industrial chains, earth moving machinery and contract machining.

The new Model Top 2100 is an automatic cutting and bar end working



Above: Lathe version, rotary transfer with 2x3 divisions, 2 opposed operating units

Right above: the rotating collector in the back

Right below: double turning carriage

Below: View of the entire TOP 2100 CNC machine complex with the NUM Flexium CNC control unit



Model TOP 2100 CNC from SINICO with 7 workstations:

- n° 2 Flexium 68 with: 16 axes and 8 spindles, 10 channels, 2 hand wheels
- n° 1 FS152i P2, touch screen, customized keyboard, MPO4 with hand wheel
- n° 1 Spindle Motors AMS100GB 9 KW
- n° 7 Spindle Motors BHL2601N 120 Nm
- n° 13 Brushless Motors BPX1263R 12,6 Nm
- n° 1 Brushless Motor BPH1903N 36 Nm
- n° 2 Brushless Motors BPX0952N 5 Nm
- n° 7 Drives NUMdrive C 200A
- n° 2 Drives NUMdrive C 130A
- n° 6 Drives NUMdrive C bi-axes 50A
- n° 1 Drive Numdrive C 50A
- n° 1 Drive NUMdrive C bi-axes 14A
- n° 2 120KW regenerative and regulated power supply
- Flexium PLC application has been made in cooperation with NUM Application Engineers using CoDeSys language
- Customized Flexium HMI made by Sinico using standard Visual Basic language with NUM libraries

From left to right: Mr. Alessandro Casalini, Sales Engineer, NUM Italy, Mr. Christian Cisco, Production Manager SINICO, Mr. Marco Battistotti, NTC Manager NUM Italy



machine with electro-mechanically controlled axes. A quick look at its impressive new architecture brings up some of the following facts. Up to 6 opposed work units with roller guides fitted on two arc-welded end walls, rotary transfer with 3 or 6 divisions and Hirth gear indexing, cutting with supplementary clamping jaw, NC-axis bar-feeder group, etc. – the list is almost endless. The entire machine is managed by two Flexium 68 CNC systems. The machine's production capacities are equally impressive; it can handle bars with diameters from 20mm to 110mm and machinable lengths from 40mm up to 800mm. The loading time is less than 10 seconds.

The two Flexium 68 CNCs on the TOP 21000 (Flexium is already used as the standard CNC system on SINICO's other machine families) provide the ultimate flexibility for a machine of this size; they offer almost unlimited customisation potential for performing a whole array of operations.

The combination of a strong and reliable machine with a flexible, high-performance control unit is the key for successful production and fast changeover from one production phase to the next. With the collaboration of SINICO and NUM, another highly competitive and future orientated machine has been realised, targeting the production and assembly lines of the world's market.

Gigantic

Advanced joinery machining centre uses state-of-the-art CNC technology



Graf-Holztechnik GmbH combines craftsmanship and design know-how in wood processing with state-of-the-art CNC technologies from NUM, which considerably increases production efficiency. This improvement was made possible thanks to the HAGewood CNC joinery machining centre fitted with a Flexium CNC from NUM.



Wood is a fascinating, sustainable and therefore environmentally friendly material with an attractive look and a range of benefits. Graf-Holztechnik, whose state-of-the-art production site is situated in the forest district of Horn, develops cost-effective and creative solutions from wood, from conventional carpentry via renovation projects to ambitious designs and elemental constructions with short building times (e.g. the Stetten Fossil World viewing platform). From static and design planning through production to on-site assembly, everything is carried out autonomously by skilled employees using the latest computer technology.



Viewing tower at Fossil World in Stetten



The components are designed in three dimensions on a CAD system, from which the machine data is derived and processed fully automatically on the CNC-controlled machine. Graf-Holztechnik has two CNC joinery centres and a CNC production system for compound systems. The latest system is the HAGewood CNC joinery machining centre, which successfully went into service last year. This system is fitted with a Flexium 68 CNC from NUM and has 10 axes, 5-axis interpolation and RTCP. The X axes can be operated both in a

master-slave configuration and individually. A special collision monitoring system is activated during single-mode operation to prevent collisions of the X axes. The heart of the system is the twin-axis milling head, which can spin continuously and machine the workpiece from all sides. The fluid-cooled 22 kW IBAG spindle accelerates the tool up to 12,000 rpm. The milling head collects the 24 different tools from the magazine itself. A 20-way tool drum changer from Miksch for drilling and milling tools, and a linear 4-way overhead special tool changer for saw blades up to 800 millimetres in diameter guarantee the flexibility of the system.

Top: twin-axis milling head in saw machining process

Bottom: twin-axis milling head in milling machining process

HAGeWood CNC joinery machining centre with support insert



Flexium 68 CNC system



Miksch 20-way drum changer



Right: Norbert Klaner, CNC timber machinist at Graf-Holztechnik GmbH
Left: Andreas Lumesberger, Sales Manager, NUM Austria

The HAGeWood can process components up to 25 metres long, 2.70 metres wide and 90 centimetres high with an overall weight of 9 tonnes. Depending on their size, the components are tensioned on a maximum of 6 supports, which are fitted with a pneumatic fast-tensioning system. This fast-tensioning system is width- and height-adjustable. The 6 supports are arranged asymmetrically so they can be brought together completely. The fast-tensioning system is controlled via the control panel for the CNC. Individual long components or up to 4 smaller components can be tensioned on the 6 supports at the same time. The coordinates of each component are calculated individually for the CNC by means of 4 laser measurement systems.

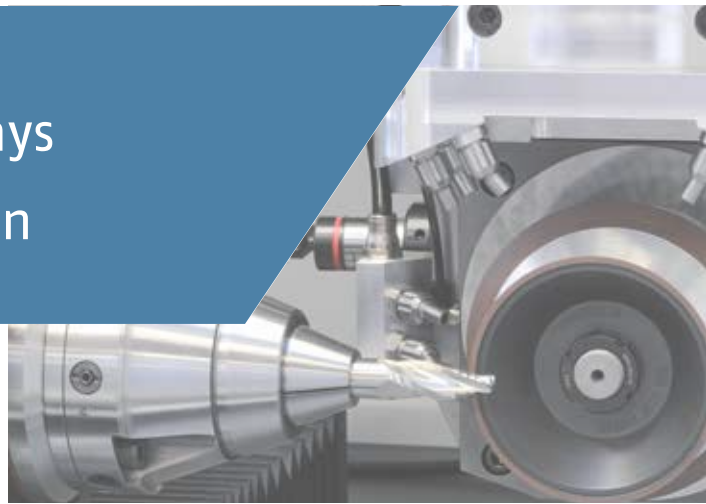
Precision wood processing is extremely important for the type of major joinery projects that Graf-Holztechnik GmbH regularly handles. The machine's high level of rigidity across its whole trajectory and its weight of 30 tonnes translate into precision levels of 0.1 millimetres. This is not something you find often in the timber industry. The HAGeWood provides various benefits for Graf-Holztechnik GmbH, the most important of which is the time saving. Because the workpieces can now be machined from all 6 sides, there is no need to reposition them during production. This is a huge advantage as it eliminates

many previous error sources. The extremely high productivity is supported by the strong spindle and the high maximum advance speeds of 80 metres/minute for the X axes and 40 metres/minute for the Y and Z axes. The modular construction makes the set-up of the system very flexible. This modularity is fully supported by the flexible CNC. As well as flexibility, easy maintenance of the system is also key. For example, the machining spindle is easy to access from all sides. And, last but not least, close attention has been paid to the operation of the system. In order to improve user-friendliness, the system can be controlled directly via a touch panel on the machine or from a PC.

Perfect cooperation between customer Graf-Holztechnik GmbH, the machine manufacturer HAGE and CNC system manufacturer NUM has resulted in a high-precision, extremely economical CNC joinery machine.

Wood Processing

Strausak – the flexible U-Grind pays homage to the company's tradition



Strausak has made an impressive comeback to the market with the flexible U-Grind grinding machine, which has allowed the company to perpetuate the good reputation enjoyed by its predecessor model, the Fleximat. Strausak also shares a long tradition of cooperation with NUM. The U-Grind, like the Fleximat before it, comes with a NUM CNC system and the NUMROTOplus tool grinding software package.

Strausak, which was founded as a repair workshop for the local watch-making industry in 1923, is a typical Swiss company that specialises in the development and construction of machine tools to meet exacting demands in terms of technology and quality. The company sought to diversify at an early stage in order to distance itself from the fluctuating economic cycles of the watchmaking industry. For Strausak, the devel-

opment and construction of curved milling and grinding machines not only represented a successful diversification, it also constituted a foothold in future-oriented CNC technology. In the 1980s, a number of new specialist machines for precision milling and grinding of complex components for the textile, turntable and computer industries were produced. A close, successful cooperation between Strausak and NUM



on CNC systems and programming has also existed since that time. In the early 1990s, Strausak AG developed a new tool grinding centre with five controlled axes – the Fleximat was born. It brought high levels of flexibility and productivity to many machine tool operators in terms of grinding tools of all kinds.

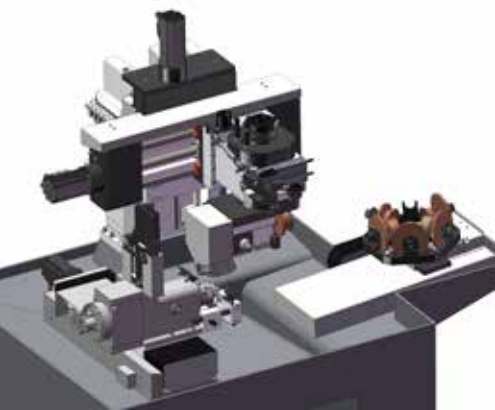
In 2012, Strausak AG, now part of Rollomatic Holding SA, launched the U-Grind, a new tool grinding centre with a latest-generation Flexium CNC system and the NUMROTOplus software package. For Strausak and for NUM, high levels of precision and quality have always been and will continue to be the most important objectives when it comes to the design of CNC machines as well as CNC systems and software.

*Top: Flexium CNC system
Left: U-Grind grinding centre with NUMROTOplus software package*

U-Grind grinding centre from Strausak



Right: Pierre-Alain Badoud, Strausak Production Manager
Left: Sébastien Perroud, Director at NUM Biel



Top: CAD rendering of U-Grind 5-axis grinding centre

Bottom: 6-way tool changer



What sets the U-Grind apart is that it is hugely flexible and economical to run. The quick and easy set-up and conversion processes result in extremely economical production times. The U-Grind is suitable for sharpeners and also for the production of high-precision small series. All five axes are powered directly to guarantee the ultimate in precision. The motor spindle for the B axis outputs 12 kW and produces speeds of 500 to 12,000 rpm. The high levels of rigidity and quiet running are due to the cast-iron base of the CNC machine and good insulation. This rigidity guarantees excellent surface qualities and tight measurement tolerances. The resting surface has been considerably reduced, a move that is also welcomed by the users. The machine is fitted with a 6-way disc changer that can be loaded from the outside. The U-Grind can be opened from three sides to facilitate set-up and maintenance.

Over the last few years, Strausak has undergone a process of reorganisation, and the 9 employees at the

1700 m² company site in Lohn-Amannsegg can now produce up to 10 CNC machines at the same time. The U-Grind will be exhibited on Strausak's 60 m² stand at the EMO Hannover 2013 trade fair. The functions of the NUMROToplus software package, which controls the movements of the U-Grind by means of the NUM Flexium CNC system, will also be explained to all interested visitors.

The combination of a robust, precise machine and a high-performance CNC system with strong, flexible software has allowed Strausak to closely associate the U-Grind with its highly successful predecessor model, the Fleximat.

Precision

NUM for you

Your reliable partner



NUM Service

When you select a system and a solution from NUM, you are making a long-term investment. We consider ourselves to be your partner: from the idea to its realisation and through to on-site customer service. We are there for you wherever you are and would also like to be there for you before a problem arises. This is why our motto is "one step ahead" – providing international assistance and support throughout the entire product life cycle across all cultures and countries.

NUM Service's claim for the future is defined by a proactive support approach which is clearly specified to our customers. Together with our customers, we therefore carry out a stocktake to highlight any potential for improvement, which can then be offered on a specific basis tailored to the individual customer. We focus less on the standards offered and much more on the individual customer requirements. We do not wait for our customer to contact us about a technical problem, we contact our customers in order to detect potential problems at an early stage and resolve them before they become issues. At NUM Service, we see customer retention as a win-win situation based on partnership, and this can be confirmed by many of our customers.

NUM Service is used both by machine manufacturers and, of course, by end users. However, the end users normally turn to the machine manufacturer, who is then supported by NUM Service if required. This makes sense, as the machine manufacturers definitely know the whole machine best. If, for whatever reason, the end user is not supported by the machine manufacturer, NUM Service will, of course, provide direct and uncomplicated service to the end user. NUM does not keep a stock of spare motors, because there are over 6000 different variants. However, in order to keep machine

downtimes as short as possible in the event of a failure, NUM Service can produce and deliver new axis motors within 48 hours.

Competition is getting increasingly tougher. NUM Service helps its customers to be "one step ahead" of this competition at all times. A step that can be decisive for a successful future based on partnership. To give just one example: what sets NUM Service apart is the fact that we are still able to repair nearly all NUM Group products (the NUM Group celebrated its 50th anniversary in 2011). In line with the motto: "The older the customer's system, the greater the challenge and the motivation of NUM Service to support its customers around the world and offer solutions."



NUM Switzerland – new service- and logistic center

The newly built centre is being constructed next door to company headquarters in Battenhusstrasse 16, in Teufen, Switzerland. The three-storey new building, with a floor space totalling 800 m², will be completed by the autumn of 2013. The investment volume totals around CHF 8 million. The new building will provide better working conditions for the new jobs created in 2008 and 2009, and will help optimise work processes.

The existing logistics centre in Bühler will therefore be relocated to premises of its own in Teufen. By merging the two production locations, work and logistics processes can be standardised, allowing costs to be saved as well. The new building will be constructed according to the latest developments in energy-efficient construction. There are plans to realise the entire heating for the building using geothermal probes, extending down to a depth of at least 170 m. A photovoltaic array on

the roof will also produce electricity. The planned capacity of the photovoltaic system totals around 70 kW, which will cover approx. 50% of the power required at the Teufen production site. The NUM Group has already installed a photovoltaic system boasting a capacity of 170 kW at its production site in Italy, providing further proof of the company's environmentally-friendly commitment. To keep the emissions from loading and unloading trucks to a minimum for local residents and vi-

sitors to the Paracelsus Clinic, and to ensure the space available is used optimally, the loading ramp was built on the south side of the premises, behind the existing NUM building. By setting the new building back from the street, the visual impression it makes fits in with the landscape and adjacent buildings very well.



NUM for you...

NUM for you

Your reliable partner

NUM expands asian presence with new South Korean office

NUM has opened a subsidiary for applications support, sales and after-sales service in Seoul, South Korea, to serve the country's growing market for CNC machine tools. This is the fourth Asian office for the CNC vendor, and results directly from the company's core business strategy of placing skilled applications engineering resources at the disposal of customers to help them develop market-winning machine solutions.



South Korea is the third largest economy in Asia, and is highly export-driven. The country has a diverse manufacturing base of indigenous, local and international companies, with a particularly strong presence in the electronics, semiconductor, automotive, shipbuilding, machine tools and luxury products markets, as well as a flourishing financial services sector. The high number of machine builders and machine tool OEMs in South Korea – the country is close to becoming the fourth largest producer, and user, of machine tools in the world – demonstrates the long term stability and sustainability of the CNC market in this part of Asia. Until now, NUM has supported its customers in the region from its facilities in Switzerland and Taiwan. With its growing number of Korean customers, NUM decided to invest directly in the local infrastructure to ensure that it continues to provide professional and responsive services.

As Robert von Arx, NUM's Director of Business Development, explains, "South Korea's amazing manufacturing success is continually creating opportunities for its machine builders, many of which are small to medium size companies with limited engineering resources. However, bigger sized enterprises often face similar issues. Our new subsidiary can support such companies, enabling them to seize their chances. We will help them to tailor CNC systems to suit their particular applications, to create unique machinery

solutions, and get to market more rapidly." Machine tools currently manufactured in South Korea cover a wide range of applications, including laser cutting, drilling, grinding, gear hobbing, etc., which are all areas where NUM has expert knowledge. Many of these machine tools are designed for highly specialised purposes, and are characterised by their need for complex and extensively customised control systems – making CNC the obvious first-choice for designers. However, due to limited development time, it is often only with the experienced help of companies such as NUM that they can progress a design from concept through to production.

NUM's new South Korean applications support, sales and after-sales service facility is a 100 percent NUM owned subsidiary. This has significant advantages for customers, as Robert von Arx points out, "As well as having representatives throughout the Asia-Pacific region, NUM also operates four wholly-owned subsidiaries – two in mainland China, one in Taiwan and now one in South Korea. Each of these subsidiaries can provide dedicated applications engineering support and is capable of developing customised software and hardware. As a result, we expect our South Korean customers to benefit considerably. We plan to highlight some of these advantages on our booth at next year's SIMTOS exhibition in Seoul – one of the world's leading manufacturing technology shows."





NUM Germany – new technology centre

The ground-breaking ceremony for the new technology centre for NUM GmbH Germany was held on 3 July 2013, two years after the NUM Group celebrated its 50-year anniversary in CNC technology. The new building will be at Zeller Strasse 18 in Holzmaden, Baden-Württemberg, just a few metres away from the current site.

The offices and workrooms in the new two-storey building will encompass 800 square metres. Attached to the office building will be a 200-square-metre warehouse. The building is due to be completed in summer 2014 and will cost a total of EUR 2 million. The new building is based on the latest findings in terms of energy-saving construction and heated using an air/water heat pump supported by gas heating to cover peak loads. Working processes will be significantly improved by means of shorter routes and glass walls to provide an optical connection between the offices. The offices are arranged around a central communication area which contains

a printer, a fax and a kitchenette equipped with drink-making facilities. The offices are grouped into departments and connected to this communication area by glass walls. Creating communications options and securing a feeling of togetherness were important factors in the design. There are two training/conference rooms, which can be opened up into one large space for internal and external events. There are plenty of parking spaces available so it will be easy to host larger events in conjunction with our customers. The situation in terms of loading and unloading large lorries will also be significantly better than at present.

The first sod was turned by Peter von Rüti, President and CEO of the NUM Group, Xavier Molinet, Vice-President and CFO of the NUM Group, Christian Unger, NTC Head of NUM GmbH Germany, Jürgen Riehle, Mayor of Holzmaden, and general contractor WESTO-BAU GmbH + Co. KG, represented by managing director Werner Stollsteimer, planners Ekkehard Knoblauch and Markus Faller, and project manager Carlos Rausch.



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