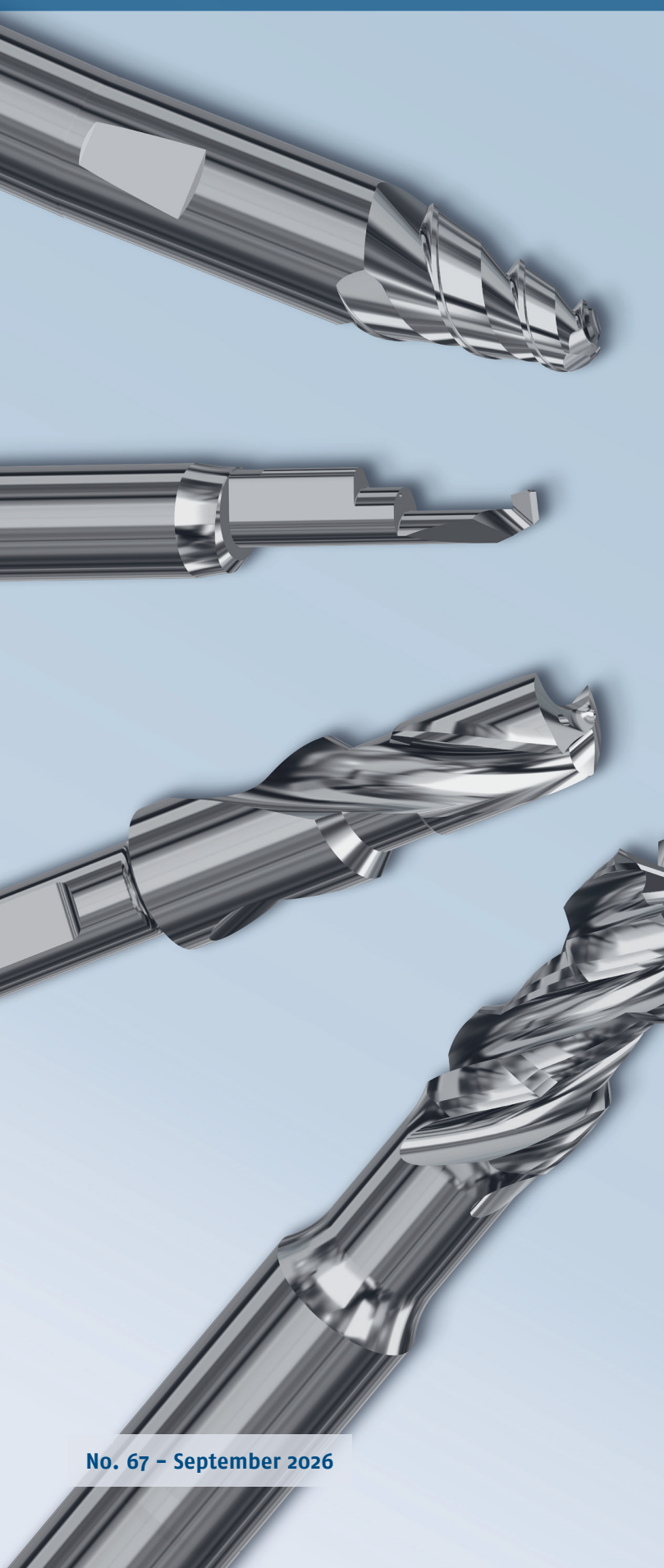




numinformation

JOURNAL FOR CNC-TOTAL SOLUTIONS

- 02 Editorial, News, Event Calendar
- 04 Engineering NUMgrind
- 08 Precision in the Field: **Hearn Machine Tool** and NUM Revolutionize Portable Beam Drilling for the Steel Fabrication Industry
- 10 Breaking the 33% Barrier: How NUM and **OBOT China** Elevate Non-Circular Grinding to Peak Performance
- 12 Masters of the Micron: **Gloor** and NUMROTO Setting the Pace for High Precision
- 14 **SPADA** – Beyond Traditional Transfer Machines: Integration and Control in a Large-Scale Machine Designed for the Automotive Industry
- 16 Unlocking Five Axis Potential: How NUM Empowers **TAIGONG** to Redefine Precision Machining
- 18 Precision Meets Productivity: NUM and **Pype-Server** Partner to Redefine Plasma Pipe Cutting Retrofits

Editorial

Massimiliano Menegotto

CEO NUM Group



Dear readers

Innovation in manufacturing rarely announces itself with fanfare. More often, it emerges quietly in the form of a smarter algorithm, a tighter tolerance or a cycle time reduced by seconds, which adds up to hours over a production shift. It is in these incremental yet decisive advances that the true measure of progress is found.

This edition of our magazine is dedicated to exactly that kind of progress.

Inside these pages, you will find an overview of the latest functions and enhancements we have developed for machining applications, improvements born out of close dialogue with our customers and refined through real-world validation on the shop floor. From enhanced process control to more intuitive operator interfaces, these developments reflect our commitment to keeping your machines, and your business, at the leading edge.

You will also find an insight into the broad and diverse community of grinding machine builders who trust NUM technology at the heart of their products. This network of manufacturers, spanning continents and specializations, is a source of pride for us and a testament to the versatility and reliability of our solutions.

But perhaps what resonates most in this issue are the stories. Stories of manufacturers who faced a specific challenge, whether in high-speed cutting, non-cylindrical grinding, transfer machining for the automotive industry, tool grinding, or pipe cutting and found in our partnership the tools and expertise to overcome it. Each of these success stories is different. Each reflects a unique set

of requirements, constraints, and ambitions. And yet all of them share a common thread: the determination to build machines that perform better, last longer, and deliver more value to the end user.

What makes these outcomes possible is not any single product, but the depth and coherence of what NUM brings to the table. Since 1961, we have been building expertise at every layer of the machine: CNC hardware and software, drive systems, motors, HMI and CAD/CAM solutions, all developed in-house, all designed to work seamlessly together. It is this integrated approach, combined with decades of application know-how, that allows us to go beyond the role of a component supplier and act as a true engineering partner, one who understands not just the technology, but the specific demands of the industries we serve.

We believe that technology is only meaningful when it creates tangible results for the people who use it. That belief is what has guided us since our founding, and it is what we hope comes through clearly in every page of this publication.

We trust you will find it both informative and inspiring.

Kind regards,

Massimiliano Menegotto
CEO NUM Group

Imprint

Publisher

NUM AG
Battenhusstrasse 16
CH-9053 Teufen

Phone +41 71 335 04 11

sales.ch@num.com
www.num.com

Editor & Layout

Larissa Kühne

© Copyright by NUM AG

Reuse allowed with reference only, specimen copy welcomed.

NUMinformation is published once a year in English, German, French, Italian and Chinese.

65 Years of Innovation, 20 Years of Independence: NUM's Journey Continues

In 2026, NUM celebrates two major milestones: 65 years of CNC development and 20 years as an independent group. A journey defined by precision, innovation, and strong partnerships.

From Pioneer to Trusted Partner

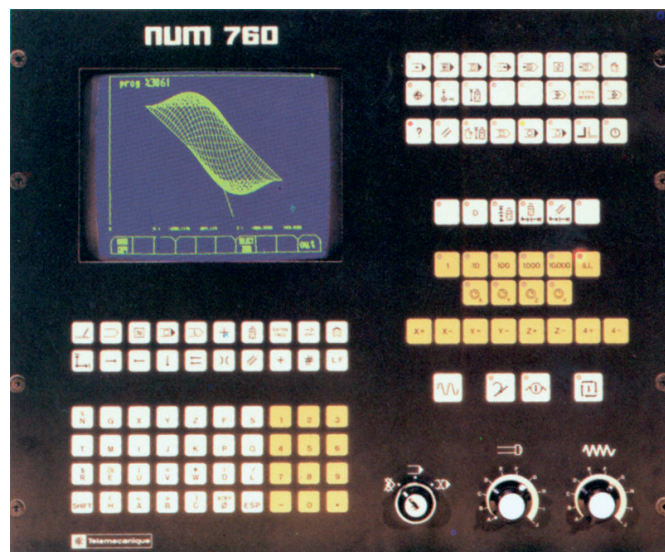
Since its founding in 1961, NUM has continuously advanced CNC technology. From early numerical controls to today's high-performance CNC systems, the company has built a reputation for reliability and flexibility. Close collaboration with machine builders remains at the core, enabling tailored solutions for demanding applications.

Independence Driving Innovation

The transition to independence in 2006 marked a turning point. It allowed NUM to act faster, focus sharper, and strengthen its position as a global provider of complete CNC solutions. By combining CNC hardware, software, and application know-how, NUM delivers integrated systems that enhance efficiency and productivity.

Shaping the Future

Today, NUM continues to advance smart manufacturing with powerful CNC platforms, intuitive HMI solutions, and specialized applications such as NUMROTO, NUMgrind, and more. The anniversary is not just a reflection, but a commitment to the future, delivering innovation that moves the industry forward.



1983: With the NUM 760, NUM introduces the first CNC machine featuring groundbreaking 16-bit control to the market.



The whole history of NUM

Events

NUM Event Calendar 2026/2027

IMTS 2026

September 14–19, Chicago, USA
North Building Booth 236404



DMP 2026

December 3–6, Shenzhen, China



TIMTOS 2027

March 2–6, Taipei, Taiwan



CIMT 2027

April 19–24, Beijing, China



Ligna 2027

May 10–14, Hanover, Germany



GrindingHub Americas 2027

May 18–20, Cincinnati, USA



How NUMgrind Expands Precision, Integration and Strategic Flexibility

Grinding applications are becoming more dynamic. Complex contours, tighter tolerances and automated production environments are redefining what modern CNC systems must deliver. For machine builders, this means scalable integration and shorter development cycles. For manufacturers, it means stable processes and predictable quality.

With the latest NUMgrind enhancements, NUM strengthens both perspectives. The new functions are not isolated upgrades. They form a coherent performance architecture fully embedded in the Flexium+ CNC platform.

Fully Integrated Non-Circular Grinding – Dynamic Control Built into the CNC Core

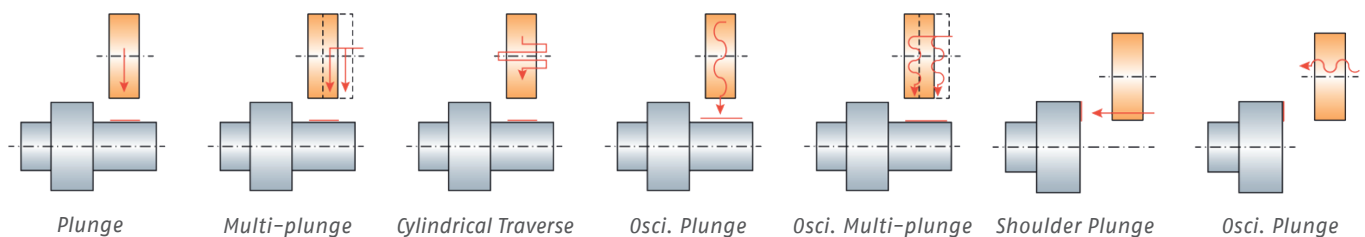
Non-circular grinding requires continuous synchronization between axes under highly dynamic conditions. The grinding wheel must adapt in real time to the rotating workpiece while maintaining contour precision and surface quality.

In NUMgrind, the non-circular grinding cycles are built on CNC functions that are fully integrated into the CNC kernel. Interpolation, drive control and speed regulation operate within one unified system. There is no external motion layer and no additional complexity.

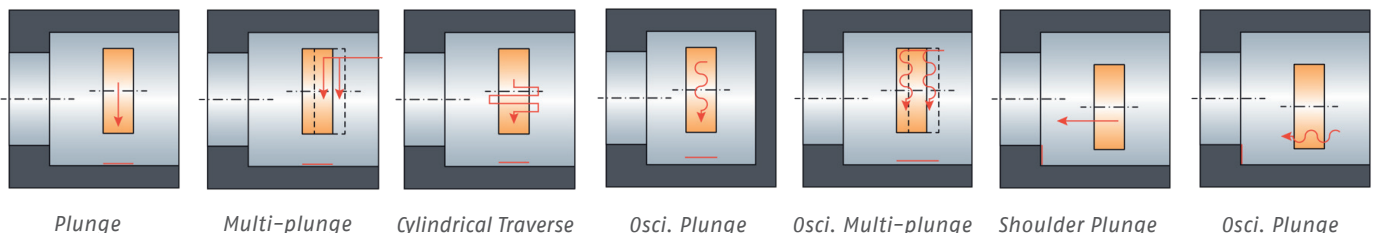
For OEMs, this means simplified system design and reliable scalability.

For end users, it means smooth motion profiles, stable contact conditions and consistent machining results.

New grinding strategies such as Oscillating Plunge, Oscillating Multiplunge, Shoulder Plunge as well as Oscillating Shoulder enable new ways of grinding the workpiece.



The same logic applies to internal non-circular grinding, with profile import in Cartesian or polar coordinates and consistent cycle structure across OD and ID applications.



Dynamic motion becomes structured engineering.

Intelligent In-Cycle Dressing in Non-Circular Grinding– Stability Without Interruption

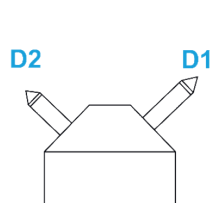
Dressing is no longer treated as a separate manual step in non-circular grinding. NUMgrind now allows operators to request dressing directly within the cycle. It is moved cleanly away from the workpiece, dressing is performed and corrections are reactivated before non-circular grinding resumes at the exact position.

The process continues without manual interruption.

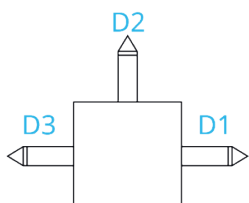
For machine builders, this integrated logic reduces application risk.
For operators, it increases confidence and process reliability.

Strategic Dressing Flexibility – Multiple Units, One System Architecture

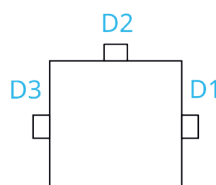
NUMgrind supports six fully integrated dressing unit types, including fixed diamond systems and form dressing rollers for conventional and CBN wheels. Guided setup pages and application-specific cycles simplify commissioning and reduce configuration errors.



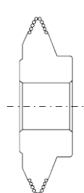
Fixed 2 Diamond Dresser



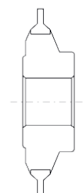
Fixed 3 Diamond Dresser



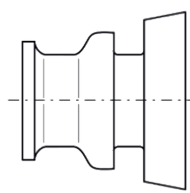
Fixed 3 Tiles Dresser



Form Dressing Roller



Form Dressing Roller for CBN Wheels



Profile Dressing Roller

Automatic spindle speed calculation ensures consistent dressing conditions based on disc diameter and speed ratio for the form and profile dressing roller, within the set limits of the allowed rpm.

The new "Secondary Dressing Unit" concept adds strategic flexibility. A second active dresser can be defined and selectively assigned at any place where dressing or shaping can be selected. Selection rules prevent configuration conflicts.

This makes it possible, for example, to dress the grinding wheel at different dressing stations between the process steps "roughing" and "finishing." If one unit is unavailable, the system automatically checks the alternative.

Setup Number 1

Left		Right	
Face Wear	0.0000	Face Wear	0.0000
Side Wear	0.0000	Side Wear	0.0000
Radius Compensation	0.0000	Radius Compensation	0.0000
Cutter Orientation	1	Cutter Orientation	3
X Part Compensation	0.0000	Z Part Compensation	0.0000
Counter Left Side Dressing	0	Counter Right Side Dressing	0
Counter Face Dressing	0		
Wheel Data			
DAT1 X for Part	0.0000	Wheel Head Place	None
DAT1 Z for Part	0.0000		
Primary Dresser Type	Fixed 2 Diamond Dres	Secondary Dresser Type	Form Dressing Roller

Head Setup	Left side shaped	Right side shaped	Dresser Setup	Part Setup

For OEMs, this means modular flexibility in machine designs.
For end users, it means more flexibility in where to dress the wheel.

NUMgrind – Expands Precision

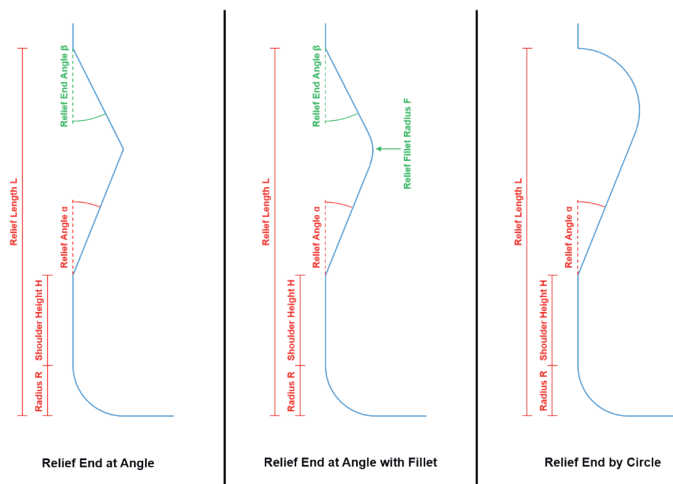
NUMgrind – Partners

Geometric Control at the Wheel Relief

Grinding performance begins at the wheel. NUMgrind now supports three configurable relief end geometries, including angle, angle with fillet and circular transitions.

Parameters such as relief end angle β and fillet radius can be defined independently for left and right wheel sides. What was once a fixed geometry is now a controlled design parameter.

Wheel geometry becomes part of the performance strategy.



Transparency and Operational Clarity

The new Production Page of NUMgrind provides a centralized overview of active cycle status, In-Cycle information, program version and grinding wheel parameters.

Furthermore, the setup page has been redesigned so that all spindle data is grouped together and all dressing data can be found in one place.

In addition, Flexium⁺ HMI version 04.02.20.00 and higher allows entire commands and tools to be copied in the FXCAM.

This is a huge relief for machine operators when they have, for example, a camshaft with 8 cams. They can then fill in all the grinding parameters for the first cam in the command and then copy this completed command seven times, leaving only the grinding positions to be adjusted.

For OEMs, this enhances usability and machine differentiation. For operators, it delivers immediate process clarity.

Active Grinding Operation	
Active Grinding Cycle	OD Non-Circular Grinding Cylindrical
Active In-Cycle	Traverse No. 1 In-Cycle No. 1 / 4
Program	
Name	TEST_ULTRA_LONG
Create	06/02/2025 15:38:20
Update	06/06/2025 14:46:55
Config Version	4.2.11.27
Active Wheel	
Name	OD_220_31
Type	Standard Wheel
Create	06/06/2025 14:16:56
Update	06/06/2025 14:18:18
Current Diameter	220 mm
Current Width	31 mm
Current Wheel Rotation Speed	2000 rpm
Current Wheel Surface Speed	23 m/s

Engineering Productivity in Grinding

The latest NUMgrind release demonstrates how integrated CNC intelligence creates value across the entire grinding lifecycle.

Machine builders benefit from scalable architecture and reduced engineering effort. Manufacturers gain stability, transparency and strategic flexibility in production. Grinding becomes more precise.

Dressing becomes more intelligent.
Operation becomes more predictable.

NUM continues to translate advanced CNC technology into measurable productivity.

A Global Partner Network Driving Grinding Innovation

NUMgrind brings together leading machine builders and technology specialists worldwide. The growing partner network demonstrates one clear strength: flexibility. Together with NUM's CNC expertise, partners develop tailored grinding solutions for cylindrical and surface grinding applications across diverse markets.

NUMgrind is a dedicated CNC software platform for grinding machines, fully integrated into the NUM Flexium+ CNC platform. It combines advanced grinding and dressing cycles with intuitive workshop programming and integrated 3D visualization.

Designed specifically for cylindrical and surface grinding, NUMgrind supports multi-axis interpolation, enabling precise contour control and complex grinding geometries. The scalable architecture allows flexible adaptation to different machine concepts while ensuring high process stability and repeatability.

This combination of openness and performance provides OEMs with a robust technological foundation for advanced grinding systems.

Strong Brands One Platform

The NUMgrind partner network includes:

- Agile Wing
- GRINTIMATE
- Guangdong Dingtai High Tech Technology Co., Ltd.
- Guangdong Hotman Machine Tool Co., Ltd.
- GUANGDONG MINGKE INTELLIGENT EQUIPMENT TECHNOLOGY Co., Ltd.
- Hunan Yuhuan Precision Manufacturing Co., Ltd.
- LIH JAAN Industrial Co., Ltd.
- Nantong Vorisen Intelligent Equipment Co., Ltd.
- PALMARY MACHINERY Co., Ltd.
- Xi'an Changdao Hitech Co., Ltd.
- Xiamen Chuangyun Jingzhi Machinery Co., Ltd.
- Zhejiang IVKE Machinery Technology Co., Ltd.

Each partner contributes deep application expertise, specialized machine concepts and strong regional market presence. Combined with NUMgrind, this results in high-performance grinding systems engineered for precision, reliability and long-term operational stability.

Designed for OEM Differentiation

NUMgrind integrates seamlessly into different machine architectures and control strategies. Its modular and scalable design enables customised configurations, from compact grinding solutions to complex multi-axis systems.

Advanced interpolation capabilities, stable process control and repeatable accuracy support demanding production environments. OEMs benefit from design freedom while maintaining a consistent CNC platform strategy.

One Platform Shared Expertise

The expanding NUMgrind partner ecosystem demonstrates a clear principle: adaptability through technology. Across cylindrical and surface grinding applications, NUMgrind enables innovation based on a shared, scalable CNC foundation.

NUMgrind. Precision engineered. Partnership enabled.



The NUMgrind partner network unites leading grinding machine builders

Precision in the Field: Hearn Machine Tool and NUM Revolutionize Portable Beam Drilling for the Steel Fabrication Industry



LINCOLN, NEBRASKA – In the world of large-scale structural steel fabrication, the logistical challenge of moving massive workpieces to a stationary machining center often dictates the pace of production. Whether it is a bridge section, a massive ship hull, or industrial structural members, the workpiece is frequently too large for the machine. To solve this, Hearn Machine Tool Inc. has long specialized in bringing the machine to the workpiece. Now, through a strategic partnership with NUM, Hearn is elevating the intelligence of its portable equipment, integrating the advanced NUM Flexium⁺ 6 CNC architecture to transform their heavy-duty drills into high-precision, mobile machining centers.

The Challenge: Mobile Precision in Rough Environments

Hearn Machine Tool, a multi-generational family business based in Lincoln, Nebraska, has earned a reputation as the industry's "problem solver." Their flagship portable drills, the SDT7 and the high-powered SDT8, are designed to perform "Big Hole" drilling – up to 2 5/8 inches (6,66cm) in diameter – directly on-site. Unlike standard workshop magnetic drills, Hearn systems are essentially mobile CNC centers, often mounted on adjustable rail frames reaching up to 12 feet (3,6m) in length.

The complexity of field drilling involves more than just raw power. Steel beams are rarely perfectly aligned with a portable machine's frame. Traditionally, aligning a portable drill to a specific hole pattern required painstaking manual setup and constant operator intervention. To overcome this, Hearn required a control system that offered more than just motion; they needed a platform capable of dynamic adaptation and sophisticated file handling.

The Solution: A Powerful Partnership with NUM

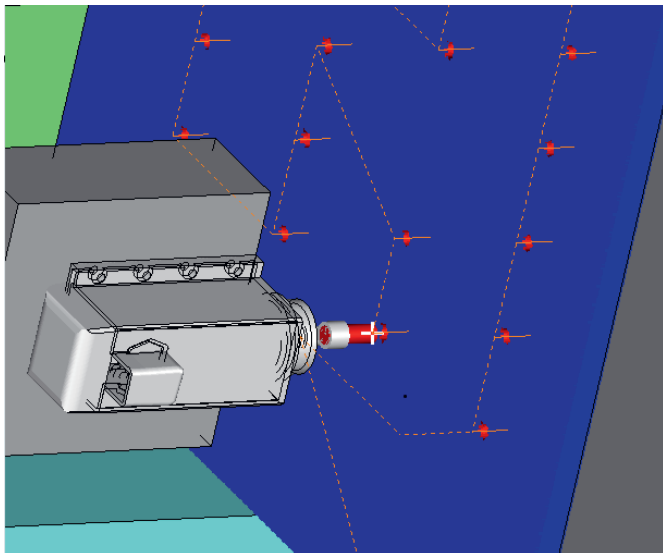
Hearn found their ideal partner in NUM, a global leader in high-performance CNC solutions known for their "open" architecture and

technical agility. The collaboration between NUM's control engineering staff and Hearn's mechanical experts resulted in a bespoke implementation of the NUM Flexium⁺ 6 CNC system. "The combination of NUM's advanced system functionality and staff technical expertise with Hearn's track record of rugged drilling capabilities have come together to deliver a game changing level of efficiency improvement for highly technical steel drilling for field operations" noted Chuck Sidles of Hearn.

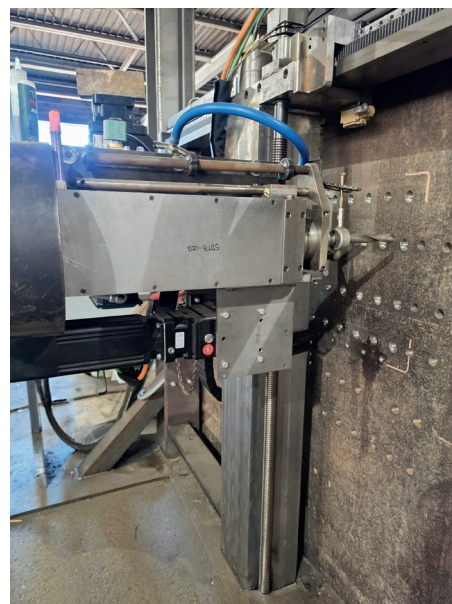
The hardware suite selected for the Hearn SDT8 is a testament to modern industrial engineering. The machine is built around the Flexium⁺ 6 platform configured in Type M milling mode. This combination goes beyond basic drilling operations and provides dynamic 3D simulation and programming flexibility needed for complex structural work.

Advanced Interface and Intelligent Automation

The true "brain" of the new Hearn system lies in the software integration. The machine utilizes a high-performance P2 G4 Box PC



Machine in Flexium 3D



Machine View

running Windows IoT Enterprise LTSC, providing a rugged and stable environment for the operator interface. By leveraging the NUM's Flexium+ software suite, Hearn has introduced several features that drastically reduce setup time and improve production efficiency:

- **Dynamic Beam Alignment:** One of the most significant benefits of the NUM system is the automatic compensation feature. After an operator "teaches" the machine a few reference points on the beam, the CNC dynamically aligns the internal coordinate system to the physical beam using NUM's inclined plane feature. This ensures that even if the portable frame is mounted at a slight angle in any plane, the holes are drilled with mathematical precision.
- **Direct CAD Integration:** Efficiency is further enhanced by the ability to import DWG/DXF files directly into the programming interface. Operators no longer need to manually enter coordinates; they can simply load the engineering drawings, and the NUM control identifies the hole locations instantly, and can produce the most efficient motion sequence path to perform the drilling operation.
- **Graphical "Skip Hole" Selection:** In steel fabrication, drift pins and existing hardware often obstruct the path. The NUM interface allows operators to graphically select and "skip" specific holes, or "go around" holes that might have an obstruction in the way, guiding the machine safely around obstacles without rewriting the program. The programming interface also displays the current machine position so there is no guess-work to understand what the motion sequence is doing.



Bridge Piece



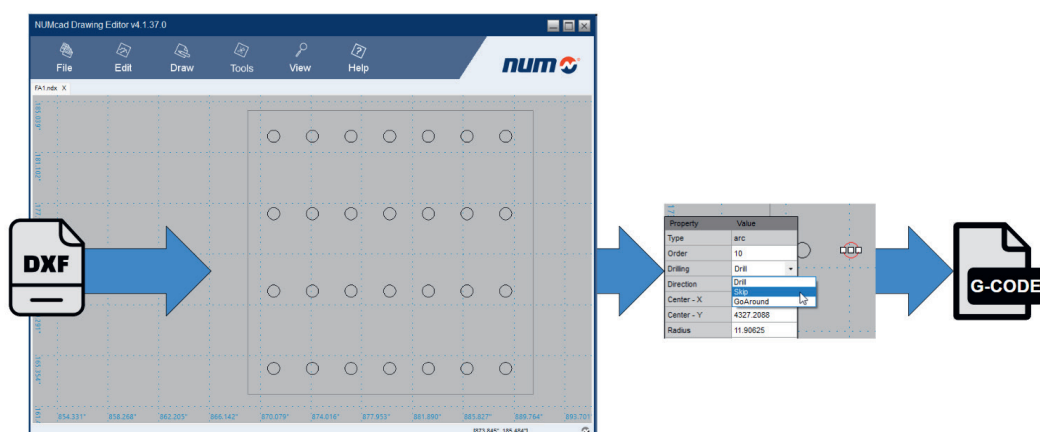
Operation Panel

- **Resumable Interruption:** Given the scale of these projects, power interruptions or tool changes are inevitable. The NUM system allows the SDT8 to detect an interrupted program and also resume a program exactly where it left off, maintaining the integrity of the workpiece and saving hours of recalibration.
- **Dynamic Operating Limits:** The machine can intelligently set the minimum and maximum limit of the spindle speed override and axis feedrate override based on the size of the hole that is being drilled. For especially large holes it's important to maintain higher spindle speeds and reduced drilling infeed speed, but for smaller ones the operator can speed up the machine to reduce cycle time.

Engineering Without Boundaries

The partnership has enabled the SDT8 to maintain its most famous engineering feat: Inverted Operation. Thanks to the precise control of the NUM servodrives and the robust EtherCAT I/O architecture (using CTMG1100 gateways and high-speed CTMT modules), the machine can operate horizontally or completely upside down. This is critical for bridge builders and shipbuilders who must work on underside structural members while maintaining full torque and through-the-bit coolant flow.

"NUM's focus on high-performance, accurate, and fast systems was the perfect match for our 'Hearn Tough' engineering philosophy," says Chuck Sidles of Hearn. "By combining our heavy-duty drilling capabilities with NUM's control expertise, we've created a machine that handles like a stationary CNC but can be moved to where the material is located."



Breaking the 33% Barrier: How NUM and OBOT China Elevate Non-Circular Grinding to Peak Performance



Innovation meets real world performance where advanced CNC technology and a strong partnership converge. In Xi'an, NUM and OBOT China are unlocking new levels of precision, speed, and flexibility. The outcome is a compelling success story that combines Swiss engineering expertise with global manufacturing ambition.

From First Attempt to High Performance Benchmark

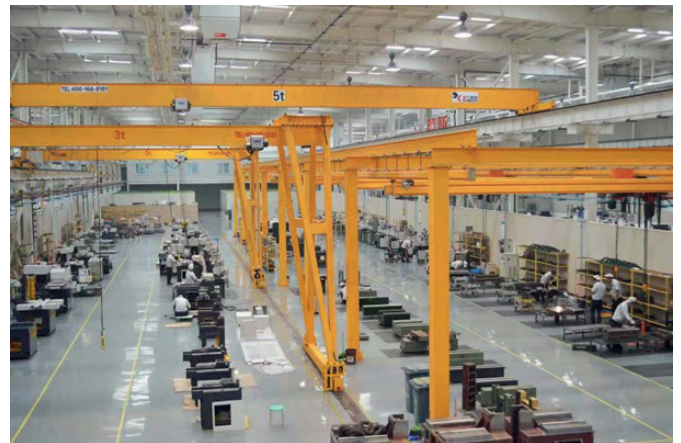
OBOT China entered new technological territory with the goal of mastering non-circular grinding. This step required more than incremental improvement. It demanded a complete rethink of machine capability, control strategy, and system intelligence.

As a first-time user of an imported CNC platform, OBOT faced a steep learning curve. At the same time, customer expectations were uncompromising. High precision, superior surface quality, and faster cycle times were essential to remain competitive in industries such as automotive and precision engineering.

Initial results showed promise. Required quality standards were achieved, but cycle time plateaued at 52 seconds. Increasing speed introduced vibration, limiting further optimization. The benchmark of 43 seconds, defined by established international machines, remained out of reach.

Engineering Intelligence for Non-Circular Precision

NUM addressed this challenge with a solution built on the Flexium+ CNC platform, delivering both precision and dynamic control. The



Modern production environment at OBOT China, showcasing advanced manufacturing capabilities and integrated CNC grinding solutions powered by NUM technology

Flexium+ 8 CNC combined with the CNG function pack enabled accurate execution of complex non-circular profiles.

Advanced axis control formed the backbone of the system. A direct drive motor on the C-axis ensured direct and backlash-free rotation. A linear motor on the X axis provided high-speed responsiveness, while the servo-driven Z-axis maintained stability and accuracy. This architecture allowed synchronized motion with exceptional smoothness.

NUMgrind software and an intuitive HMI simplified programming and process optimization. Engineers gained full control over grinding paths and parameters, reducing development time while increasing repeatability.

Close collaboration played a decisive role. NUM specialists worked alongside OBOT engineers, refining performance through iterative testing and tailored enhancements. A fast and highly efficient exchange between the NUM Technology Center China and NUM headquarters played a key role. Joint testing, continuous feedback, and shared improvement ideas led to a clearly defined optimization roadmap. This structured approach ultimately enabled the significant reduction in cycle time.



High precision grinding center powered by NUM Flexium+ CNC, engineered by OBOT China for advanced non-circular machining applications

"The support from NUM was exceptional throughout the entire process," says Mr. Wang Chengbing, the director of the department of OBOT China. "Their team worked closely with us to solve every challenge. Achieving 35 seconds while maintaining precision clearly demonstrates the strength of the NUM CNC technology."

33% Faster Performance with Proven Stability

Cycle time was reduced from 52 seconds to 35 seconds, representing an improvement of approximately 33%, and clearly surpassing the original benchmark. This gain was achieved without compromising stability or surface quality.

Precision remained consistently high, with positioning accuracy of ± 0.005 mm and repeatability of ± 0.002 mm. At the same time, vibration was eliminated, enabling stable operation even at higher speeds.

Beyond performance gains, the solution significantly increased production flexibility. OBOT can now process complex geometries more efficiently while reducing setup time and operator intervention. The system's automation capability and intuitive HMI provide a scalable foundation for future growth.



From left to right: Mr. Guo Jun, Mechanical Engineer OBOT, Mr. Wang Chengbing, Director of the Department OBOT, Mr. Longwei Jiang, General Manager NUM China, Mr. Cédric Trachsler, Product Manager NUMgrind, Mr. Mo Guifang, Sales and Technical Engineer OBOT and Mr. Zeng Yongning, electrical engineer at OBOT

A Partnership That Delivers Measurable Impact

"The support from NUM was exceptional throughout the entire process," says Mr. Wang Chengbing, the director of the department of OBOT China. "Their team worked closely with us to solve every challenge. Achieving 35 seconds while maintaining precision clearly demonstrates the strength of the NUM CNC technology."

Driving the Next Wave of Intelligent Grinding

This success story represents more than a single achievement. It marks the beginning of a long-term partnership focused on continuous innovation and performance leadership.

With NUM technology at its core, OBOT China is strengthening its position in advanced manufacturing. The combination of Swiss precision, powerful CNC systems, and strong local collaboration creates a blueprint for future ready production.

As global demand for precision and efficiency continues to rise, NUM and OBOT are driving the next generation of intelligent grinding solutions.



Machine in Operation

Masters of the Micron: Gloor and NUMROTO Setting the Pace for High Precision



Precision that drives industries – from the finest gear teeth in the watch industry to highly complex tools for medical technology. Gloor Präzisionswerkzeuge AG has been one of the technological leaders in the machining industry for decades. Where micron-precise profiles determine efficiency, quality, and safety, Gloor produces tools that only a select few manufacturers worldwide are capable of delivering at this level.

Founded in 1959 by Friedrich Gloor, Gloor Präzisionswerkzeuge AG has been a leading manufacturer of solid carbide special tools for more than six decades. Based in Grenchen, Switzerland, the company stands for maximum precision, innovative strength, and consistent specialization. Certified management systems for quality, environmental management, and occupational health and safety underscore its high standards for quality and sustainability and provide a reliable foundation for long-term customer relationships.

With an export share of 58%, Gloor supplies customers in Switzerland, Germany, and the United States. The company develops and manufactures exclusively customer-specific tools – from form cutters and threading tools to complex gear-cutting tools.

Martin Pfeuti, Head of Sales/Marketing and co-owner, emphasizes that comprehensive consulting and close customer support have al-

ways been among the company's key strengths. Products are sold directly to customers without intermediaries.

The combination of deep expertise and many years of experience enables Gloor to develop solutions precisely tailored to each application.

With a team of around 50 employees and an international customer base, Gloor serves demanding industries such as gear manufacturing and medical technology, as well as the key and watch industries, turning technology, and mechanical and equipment engineering. The tools are often manufactured with micron-level precision, ensuring fundamental process reliability and repeatability. "Our goal is to develop tools that are better than their predecessors with every generation. This allows us to significantly reduce our customers' process and unit costs," explains Managing Director Daniel Flury.



From left to right: Daniel Flury, Managing Director and co-owner of Gloor Präzisionswerkzeuge AG, Patrick Erb, Deputy Head of CNC Manufacturing at Gloor Präzisionswerkzeuge AG, Martin Pfeuti, Head of Sales/Marketing and co-owner of Gloor Präzisionswerkzeuge AG, and Gustav Heer, Application Engineer at NUMROTO

At the end of 2024, Gloor moved into a modern new facility in Grenchen, which became fully operational at the beginning of 2025. The new production environment offers optimal conditions for manufacturing highly complex tools with shaped and profiled grinding wheels. Gloor uses patented processes for this work, including methods for producing finely toothed profiles with up to 200 teeth.

Software Expertise Meets Grinding Expertise

Close collaboration with NUMROTO forms the digital backbone of production. Since the first machine equipped with NUMROTO was installed in 2018, the machine fleet has been continuously expanded. Today, Gloor relies on state-of-the-art CNC grinding machines from Strausak, TTB, and Vollmer – all programmed uniformly with NUMROTO.

For Gloor, NUMROTO has a decisive impact on productivity and precision. Collision control, process-integrated measurement, and 2D and 3D simulation are indispensable, ensuring maximum process reliability – especially for complex profiles and tight tolerances in the micron range.

“For us, NUMROTO is the most precise and user-friendly software on the market. New employees require surprisingly little training before they can work productively,” emphasizes Martin Pfeuti.

Complex tools that once required significantly more manual programming can now be prepared, simulated, and manufactured more efficiently – and with the highest precision – thanks to NUMROTO, even when working with demanding materials such as titanium or stainless steel. Patrick Erb, Deputy Head of the CNC Manufacturing Department, describes the difference clearly: “Today, thanks to NUMROTO, we can simulate every tiny detail in the micron range.”

The high-resolution simulation method, a feature of the 3D special functions, makes it possible to detect and correct even the smallest program inaccuracies in advance, ensuring that even the first tool falls within the specified tolerance. Given the long service life of the tools, this capability is particularly valuable.

This digital transparency greatly increases process reliability and enables demanding geometries to be implemented more quickly and consistently.

Some of Gloor’s tools are ground using specially profiled grinding wheels – a technology that requires the highest precision. Profile tolerances in the range of ± 1 micron are standard. 2D simulation based on precisely defined grinding wheels, exact profile definition, and automatic collision avoidance are indispensable for Gloor. “The software’s performance is particularly evident in gear-cutting and threading tools with a large number of cutting edges,” Erb adds.

Automation of the machine fleet also enables unattended production overnight and on weekends while maintaining consistent accuracy – another advantage of the clearly structured NUMROTO operating concept. “The fact that a large proportion of our machines run on NUMROTO and are programmed according to the same operating principle creates enormous efficiency. This reduces complexity and increases our team’s flexibility,” adds Flury.

Focus on Tomorrow’s Innovations

Gloor has a clear goal of further digitizing precision manufacturing and providing customers worldwide with even more efficient, durable, and dimensionally stable tools. The close partnership with NUMROTO remains a central building block for future innovations.

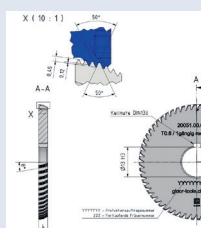
Pfeuti summarizes the company’s outlook: “We want to continue offering our customers the best solution – technically, economically, and in terms of quality.” Flury adds, “We are growing, but we remain true to our values: precision, reliability, and collaborative partnership.”

Close collaboration with NUMROTO will continue to play a key role in the future – as the foundation for innovation, precision, and sustainable success.

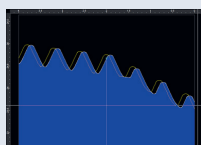
High-Precision Thread Milling Cutter for Producing the Head Thread of a Bone Screw

The conical head thread of a bone screw can be produced very efficiently and virtually burr-free using thread milling cutters (polygon milling). To enable this, the profile of each individual cutting edge must be calculated and designed separately. Time savings compared to conventional thread milling (using indexable inserts) can reach up to 75%.

At the same time, service life is significantly increased because wear is distributed across 60 or more cutting edges. This meets the high requirements for surface quality, process reliability, and reproducibility.



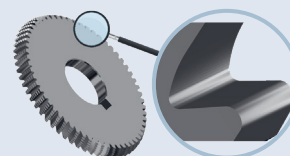
Detailed drawing of the end mill



Detailed view of the 2D simulation in NUMROTO
The specially calculated profile varies for each tooth and is also offset in the longitudinal axis of the tool



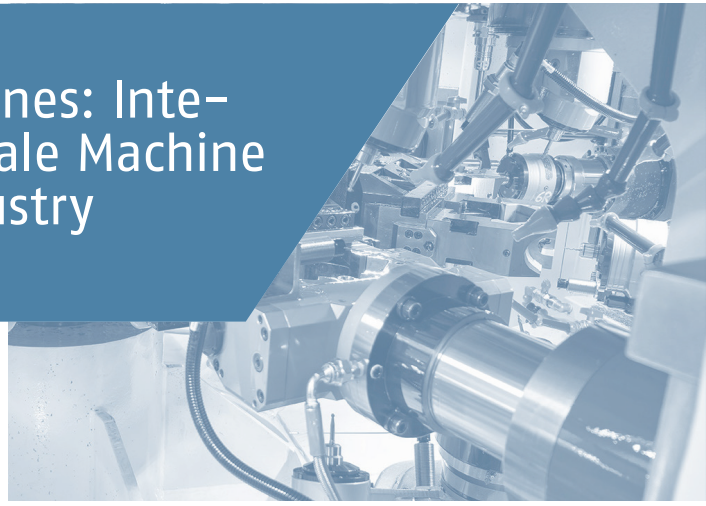
Machine



3D-Simulation in NUMROTO
High-precision thread milling cutter with detailed area of the high-precision 3D simulation. Tool diameter: 50 mm → Simulation accuracy 1 micron

Beyond Traditional Transfer Machines: Integration and Control in a Large-Scale Machine Designed for the Automotive Industry

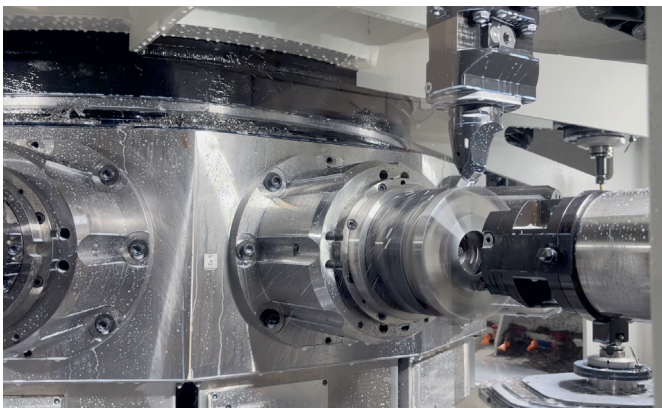
SPADA
—MACHINES—



In the transfer machine sector, where standard configurations struggle to handle increasingly complex machining operations, Spada Machines has chosen to develop highly integrated proprietary solutions. It is within this context that the long-standing collaboration with NUM takes place, finding one of its greatest expressions in the development of a machine for the automotive sector, characterized by a high level of complexity and process coordination.

The growing complexity of machining in the automotive sector, particularly for components related to electrification, is putting pressure on traditional production models, especially when it comes to managing multiple processes simultaneously and in a controlled manner. It is in this context that the long-standing collaboration between NUM and Spada Machines – a Brescia-based company specializing in the design and manufacture of transfer machines, multi-spindle turning centers, and special-purpose machines – reaches one of its most advanced milestones: the development of a transfer machine for a German automotive customer, characterized by a level of integration and process density far exceeding industry standards.

“The main challenge of this project was not only to increase the number of machining operations, but to manage them in a coherent manner,” emphasizes Marco Battistotti, Managing Director of NUM Italy. “This machine is, in fact, among the most sophisticated NUM has ever worked on, and the numbers clearly highlight its complexity: 66 controlled axes, 26 spindles in total, and the ability to manage up to 40 simultaneous machining processes.”



Machine in progress

A Different Approach

Spada Machines operates in this landscape with a positioning that breaks away from the established norms of transfer technology. With a history dating back to the 1960s, the company has in fact chosen not to compete on standard configurations – vertical or horizontal – but to develop proprietary solutions built around customers' application needs. “When we started, we clearly understood that we couldn't compete with those already dominating those seg-

ments,” says Mauro Guerra, CEO of Spada Machines; “we had to offer something different.”

This approach gave rise to the patented Multi-S technology, based on a multi-station structure capable of integrating turning and milling operations – even simultaneously – concentrating multiple operations into a single setup. This setup allows the machine to overcome the traditional limitations of transfer machines and handle components that differ in material, geometry, and dimensions within the same system, while maintaining high levels of precision and process stability. Throughout this journey, the collaboration with NUM has been crucial from the earliest stages of technology development, contributing substantially to the definition of the control architecture and application solutions.



Machine

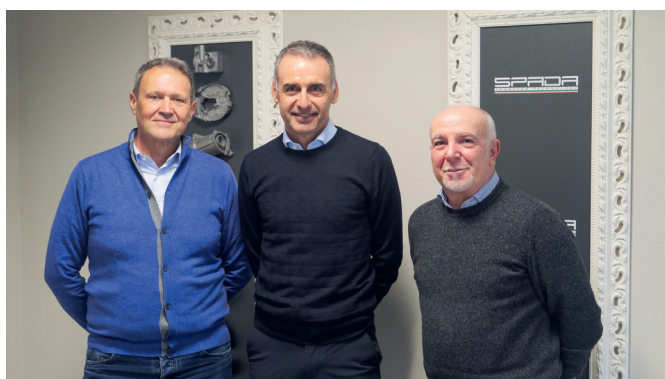
Flexibility, Efficiency, and Precision

This level of integration finds its fullest expression in the machine developed for a German automotive industry client, where transfer technology is pushed to a degree of integration and process density rarely found in traditional configurations.

“The machine we developed,” explains Battistotti, “features 66 controlled axes, a total of 26 spindles – 13 of which are closed-loop controlled and 13 open-loop – and has the capacity to handle up to 40 simultaneous machining operations, equivalent to that many part programs running in parallel. But the critical issue is not merely the parallel execution of the programs, but rather their synchronization, because the machine's overall efficiency depends on this coordination.”

The structure is based on a multi-station architecture – up to 12 operational stations – in which each unit can be reconfigured according to the cycle: a spindle can be transformed into a C-axis or a milling unit, switching from turning operations to milling operations within the same process. This flexibility generates a very high number of operational combinations and allows multiple production phases to be concentrated into a single system.

“This versatility,” emphasizes Mattia Spada, Project Manager at Spada Machines, “is complemented by a mechanical design focused on stability. The machine must, in fact, withstand heavy material removal in the first stations while simultaneously ensuring high precision during finishing operations. The base- s and the structure are therefore designed to isolate vibrations and prevent the stresses generated during the heaviest machining operations from being transmitted to subsequent stations, preserving the quality of the part and the repeatability of the process.”



From left to right: Dario Spada, Marco Battistotti, and Mauro Guerra

Technological Partnership

In this context, NUM's contribution goes far beyond simply supplying the numerical control system, extending directly into the definition of the machine's mechatronic architecture. The system is based on a configuration with 5 modular NCKs, designed to coordinate the management of the high number of active axes and processes, and on a single centralized PLC – a choice that goes against the trend of multi-PLC architectures, simplifying management by enabling unified control of all machine functions and avoiding the need to synchronize separate logic systems.

“This architecture is complemented by full integration of certified safety functions,” adds Spada, “distributed across all axes and spindles but managed by a centralized system, as well as a drive system based on DSL technology, which drastically reduces cabling by using a single cable for power and feedback. In a system with 66 axes, this choice has a significant impact on the machine's design and industrialization, making it more compact and efficient.”



Inside cabinet

Rounding out NUM's technological contribution is the adoption of liquid-cooled synchronous spindles, an uncommon solution in the world of transfer machines. “Unlike traditional systems based on asynchronous motors,” Battistotti explains, “these spindles are direct-drive, with no intermediate kinematics, and operate in line with the motor, while liquid cooling maintains a constant operating temperature and thus dimensional stability.” The result is greater precision over time, accompanied by high dynamic performance.

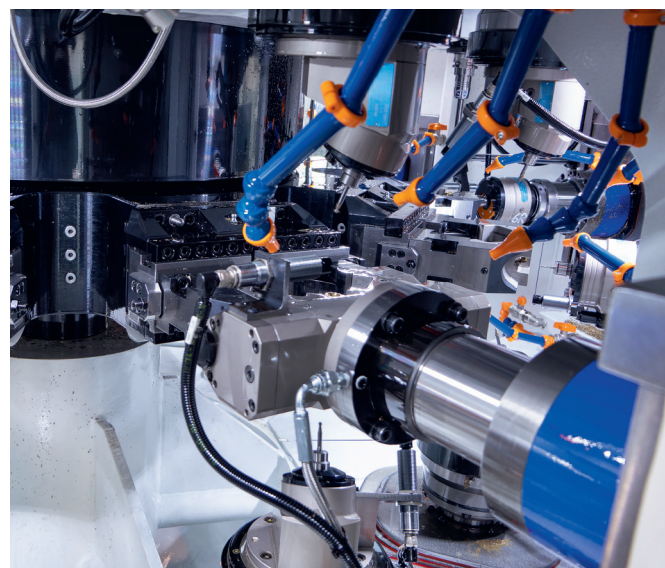


HMI

Efficiency over time

Rounding out the picture is the ability to translate this architecture into real operational continuity, where the key parameter is not theoretical speed but efficiency over time. The system integrates advanced monitoring functions that allow for real-time process control and the detection of any anomalies before they result in scrap or machine downtime – a crucial aspect in a transfer press where multiple parts are processed simultaneously. “Better to add a second to the cycle time but achieve a higher and more consistent level of efficiency,” Guerra notes, “because stability is what determines overall productivity.”

At the same time, energy management based on modular drives with grid-feedback allows for the reuse of energy generated during deceleration phases, improving the overall efficiency of a system characterized by high installed power. The result is a platform that, while developed for a specific application in the electric automotive sector, demonstrates clear industrial scalability.



Machine in progress

Unlocking Five Axis Potential: How NUM Empowers TAIGONG to Redefine Precision Machining



When ambition meets the right technology, transformation happens. As TAIGONG set its sights on advanced five axis machining, NUM delivered more than a CNC platform. The result is a scalable, high-performance solution that accelerates precision, flexibility, and growth in modern manufacturing.

A Clear Vision for CNC Excellence

Innovation in machining begins with a clear focus on performance and usability. TAIGONG, a China-based manufacturer of CNC machine tools, specializes in high-performance solutions for industrial production. The company is known for combining precision engineering with cost-efficient design and practical application focus.

Its core strengths include CNC machining centers, automation-ready machine concepts, and flexible configurations tailored to customer-specific requirements. By integrating proven CNC technologies with efficient manufacturing processes, TAIGONG delivers reliable and scalable solutions for a wide range of industries.

Engineered for Demanding Applications

TAIGONG machines are widely used in general mechanical engineering, automotive component manufacturing, precision metalworking, mold and die production, as well as electronics and industrial component manufacturing.

Serving both domestic and international markets, TAIGONG supports manufacturers that require consistent precision, high productivity, and dependable machining performance. Its combination of robust

machine design, competitive pricing, and strong application focus clearly differentiates the company in a competitive global market.

The Turning Point: Entering the Five Axis World

As customer requirements continued to evolve, TAIGONG identified the need to expand into advanced five-axis machining. Higher precision, increased flexibility, and improved process stability became critical success factors.

At the same time, introducing an imported five axis CNC system marked a significant technological step. Internal engineering teams needed to quickly build expertise in multi-axis control, system integration, and advanced machining strategies.

The challenge was clear: reduce complexity, accelerate learning, and maintain performance from day one.

"The NUM CNC system offers strong openness and excellent cost performance," Mr. Liu General Manager of TAIGONG explains. "The support from NUM engineers was outstanding. Their expertise helped us overcome challenges and quickly unlock the full potential of the system."



From left to right: Mr. Wu Rong, Technical Director of 5-axis Machine, Taigong, Mr. Longwei Jiang, Managing Director NUM China, Mr. Hu Xiaoxuan, Sales Manager NUM China together during machine presentation, highlighting close collaboration and successful project implementation

The NUM Solution: Control Meets Flexibility

NUM addressed this challenge with a powerful and open CNC architecture.

At the core: the Flexium+ 68 CNC system, combined with the Milling Pack M3, MDLUX drives, and high-performance SPX motors. Together, they deliver dynamic axis control and outstanding motion accuracy.

A key enabler is RTCP (Rotation Tool Center Point). This function ensures precise tool positioning during complex multi-axis movements, significantly improving machining quality.

NUM supported TAIGONG at every stage. From system configuration to on-site commissioning, NUM engineers provided hands-on expertise in tuning, validation, and optimization.

The open system architecture also allowed full customization. A tailored HMI with integrated virtual PLC functionality ensures intuitive operation and perfect alignment with application needs.

Precision That Performs

The result is a high performance five axis solution with positioning accuracy of ± 0.005 mm and repeatability of ± 0.003 mm. This level of precision ensures consistent quality across demanding machining applications.

NUM technology enables improved efficiency through optimized motion control and reduced setup times. The system's flexibility allows fast adaptation to different production requirements and customer needs.

The integrated 3D simulation capability further enhances development and testing processes. By enabling virtual machining scenarios, it reduces risk and accelerates commissioning.

In addition, the combination of performance and cost-effectiveness strengthens TAIGONG's competitive position in both domestic and international markets.

Customer Voice: Real Impact on the Shop Floor

"The NUM CNC system offers strong openness and excellent cost performance," Mr. Liu General Manager of TAIGONG explains. "The support from NUM engineers was outstanding. Their expertise helped us overcome challenges and quickly unlock the full potential of the system."

This close cooperation was essential, particularly during the development of the customized HMI and the initial system integration.

Looking Ahead: Scaling Innovation Together

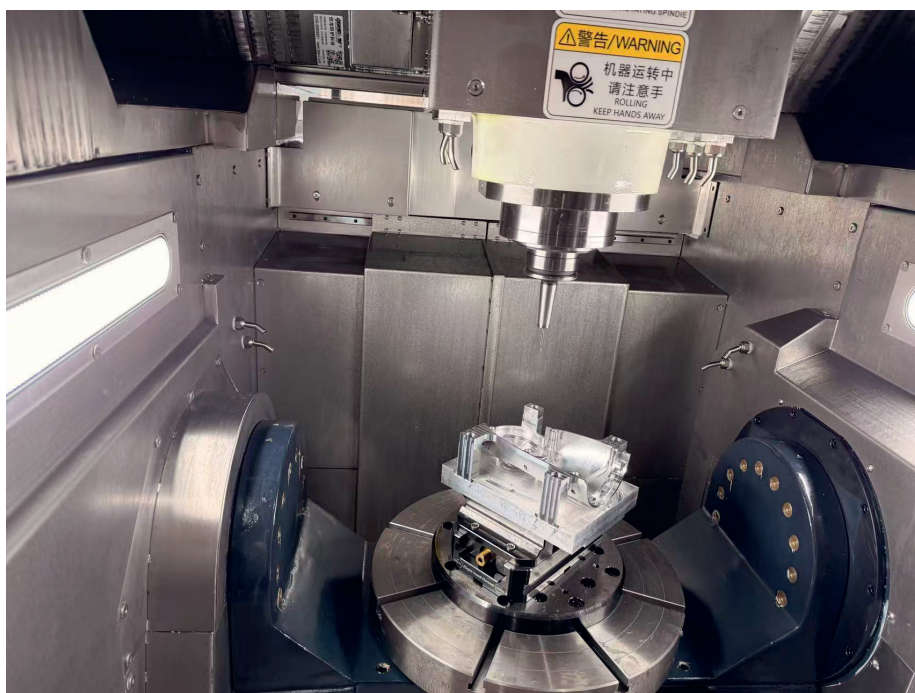
With this successful implementation, TAIGONG is well positioned for the next phase of growth.



TAIGONG machine park in China showcasing advanced CNC machining centers in a modern production environment

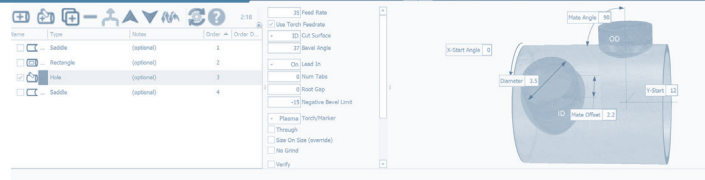
Together with NUM, the company continues to expand its capabilities in high-precision machining and smart manufacturing. The partnership highlights how open CNC platforms and strong engineering collaboration can unlock new levels of performance.

The journey does not end here. It is only the beginning of a more flexible, digital, and productive future.



Machine in Operation

Precision Meets Productivity: NUM and PypeServer Partner to Redefine Plasma Pipe Cutting Retrofits

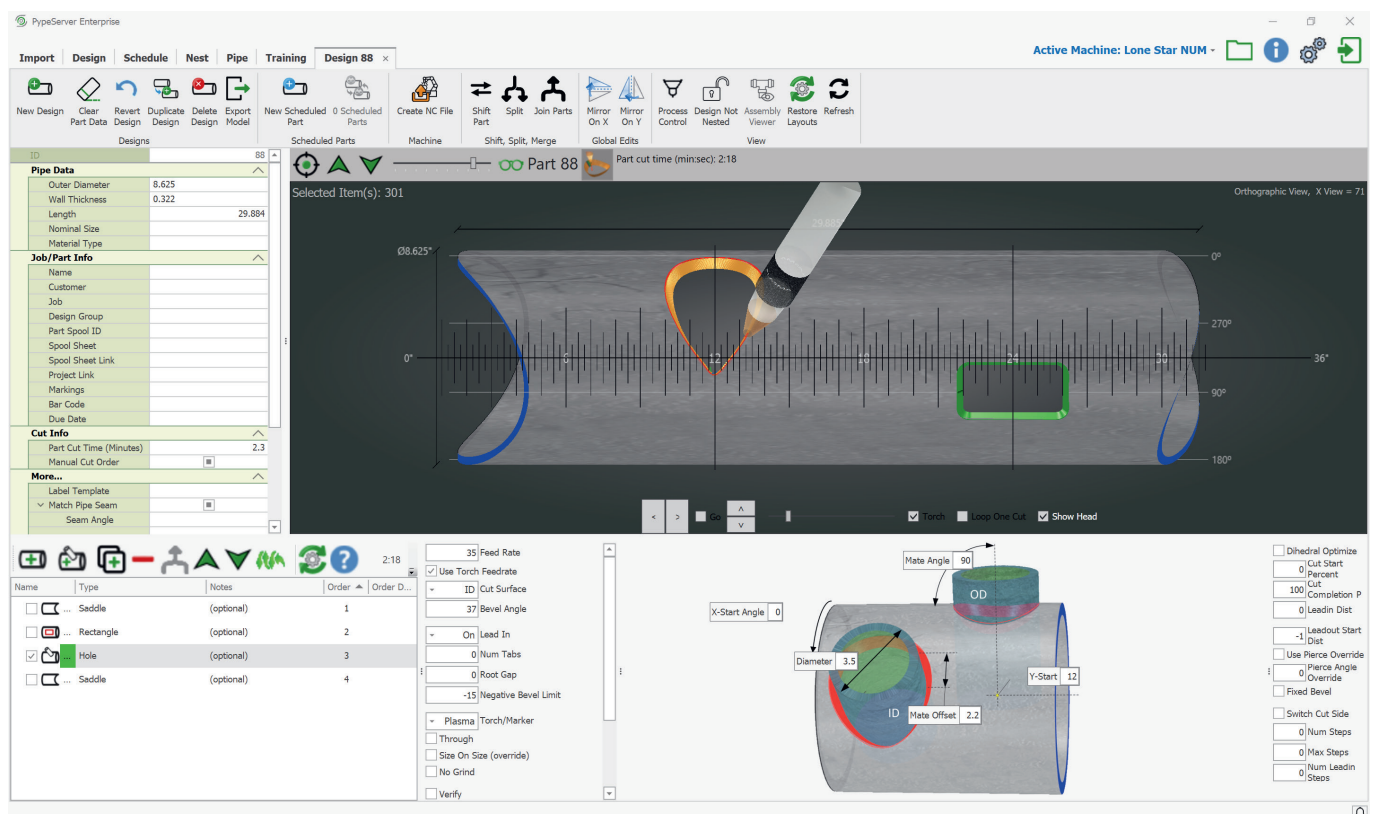


In the rapidly evolving landscape of industrial fabrication, the decision to retrofit or remanufacture existing machine tools has become a strategic necessity for companies looking to maximize ROI without sacrificing cutting-edge performance. A powerful synergy has emerged in the pipe-cutting sector: the integration of NUM's high-performance CNC hardware with PypeServer's intuitive workflow software, specifically highlighted in the revitalization of a Watts Specialties W244 four-axis CNC plasma pipe cutter at Holaday-Parks, a full-service mechanical, electrical, and plumbing contractor headquartered in the Pacific Northwest.

The Watts W-244 is a powerhouse of a machine, engineered to convey and rotate pipes ranging from 2" to 24" OD. Built on a massive 20' to 50' ($\approx 6,1$ m to $15,2$ m) bed, it is capable of supporting 500 lbs per foot (≈ 744 kg/m), reaching a maximum capacity of 20,000 lbs ($\approx 9,1$ t). To bring this heavy-duty mechanical frame into the modern era, the retrofit utilizes the NUM Flexium+ 8 CNC platform. This upgrade replaces aging, proprietary control systems with a modern, scalable architecture that provides the robust processing power required to handle complex 3D pipe profiles with ease.

The motion control system is the core of this transformation. The Watts W-244 features a four-axis profiling carriage moving on preci-

sion-machined and hardened tracks. The motion is divided into four critical synchronized axes: X (Axial along pipe), A (Tilt across pipe), B (Tilt along pipe), and C (Rotate pipe). All axes are now powered by NUMDriveX (MDLUX) digital drives. For the primary rotation (C-axis), a high-torque NUM SPX126 servo motor provides the necessary precision and IP67-rated durability. To streamline the retrofit workscope and maintain mechanical compatibility, Hudson motors with NE-MA-compatible mounts were selected for the X, A, and B axes. The inherent flexibility of the NUMDriveX platform allows the system to control these third-party motors with the same high-level algorithms used for NUM's own motors, ensuring optimum performance across the entire drive train.



One of the most significant technical advantages of this hardware suite is the inclusion of the FXS0000523 Backtrack On Path function, which allows operators to safely retract the plasma torch along its stored path – a critical feature for maintaining part integrity during unforeseen process interruptions.

Under the hood, the NUM CNC G-code programming format is both performant and extensive. Complying with IEC 61131, it also supports advanced features like G93 (inverse time feedrate), custom G-code cycles, and even custom homing routines that allow the integrator to modify the behavior of the homing process to suit unique mechanical constraints. To tie the hardware and software together, the FXServer SDK gives the integrator the ability to use any type of programming interface to communicate with the NUM system. This enables them to deeply embed the Flexium control system within the PypeServer interface for everything from simply sending G-code files to achieving fine-tuned, real-time user control.

The mechanical efficiency is further supported by a floating pipe clamp with a locking mechanism that eliminates “pipe walk” during rotation. Material handling is equally advanced, featuring a hydraulically controlled lift deck with a machine conveyor on the cutting bed and hydraulically actuated off-loader arms to transfer finished parts off the cutting cell.

The true strength of this retrofit lies in the seamless “design-to-cut” workflow enabled by PypeServer. By connecting the NUM CNC direct-

ly to industry-standard design software – including Revit, AutoCAD, SDS2, and Tekla Structures – PypeServer eliminates the manual data entry that often leads to costly errors. Through a combination of PypeServer’s Cloud+ software add-ons and status tracking system, fabricators can move projects from the drafting table to the machine floor instantly and have full visibility on progress.

The benefits of this recent upgrade are measurable. First, the precision of NUM’s control algorithms delivers superior cut quality and significantly higher throughput. Second, PypeServer’s software introduces flexible label printing with a “what-you-see-is-what-you-get” (WYSIWYG) editor and QR codes for end-to-end part tracking. This transparency extends beyond the shop floor; with PypeServer’s web and mobile apps, stakeholders can monitor project status in real-time through fabrication, assembly, and field installation.

This advancement is the result of a close technical partnership. NUM’s control engineering staff and PypeServer’s software team work in tandem to ensure that the complex motion cycles required for intricate pipe miters and beveled holes are executed with mathematical perfection. This collaborative approach ensures that the end-user receives a unified, modern system that outperforms its original specifications for a fraction of the cost of a new machine.



Control cabinet



Machine in Operation

Complete CNC Solutions Worldwide



NUM systems and solutions are used worldwide.

Our global network of sales and service locations guarantees professional service from the beginning of a project to its execution and for the complete life cycle of the machine.

NUM has service centers around the world. Visit our website for the current list of locations.

www.num.com



Follow us on our social media channels for the latest information and news on NUM CNC applications.

[linkedin.com/company/num-ag](https://www.linkedin.com/company/num-ag)
 WeChat-ID: NUM_CNC_CN
 [instagram.com/num_cnc](https://www.instagram.com/num_cnc)
 [facebook.com/NUM.CNC.Applications](https://www.facebook.com/NUM.CNC.Applications)