Higher productivity with SINUMERIK

With its SINUMERIK CNC, Siemens offers highly productive automation solutions for the shopfloor, job shops and large serial production environments. Whether individual parts or mass production, simple or complex workpieces – SINUMERIK CNC systems make sure that every workpiece is an absolute success.

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A strong partner in the world of machine tools

For years, Siemens Machine Tool Systems has been the global and innovative partner in the world of machine tools.

We set the standard when it comes to productivity
For many applications, a SINUMERIK CNC is simply the best choice – for example, when new, revolutionary machine tools are to be realized – and naturally, when maximum productivity is to be achieved for a specific machine tool application.

We are the global partner
We are close to our customers around the globe: With a tight global network of sales, service and training centers as well as international production facilities, Siemens Machine Tool Systems is optimally organized to address the needs of the global machine tool market.

We are the innovative partner for the future
SINUMERIK controls have been setting the standard in the machine tool market for more than 50 years. Siemens Machine Tool Systems is there with the power of innovation and an experienced development team that is absolutely unique in the market, so that in the future, highly productive machine tools, based upon SINUMERIK CNCs, can be implemented as well.

Digitalization in machine tool manufacturing
Siemens identified the potential of digitalization at an early stage. Especially in the CNC production domain, with SINUMERIK, Siemens has been pushing the envelope for years now with innovative ideas. These ideas include simulation, virtual machines and integrating systems into the factory IT landscape. The objective is to further promote this integration, and therefore prepare the way for Industrie 4.0 in machine tool manufacturing. For the world of the digital factory, Siemens Machine Tool Systems offers seamless and integrated solutions that extend from the machine tool up to the enterprise level.
We stand for quality
We continually improve our development, production and test processes in order to secure maximum availability of our software and hardware. This involves continuous quality assurance processes with pilot customers, consequential supplier qualification, evaluating and assessing returned products at the component level, multi-stage hardware load tests, as well as intensive system and field tests to secure our software quality. This ensures that our components operate without any disturbances, even under extreme environmental conditions – for example, in the tropics.

We are the pioneer in energy efficiency
Siemens is a pioneer when it comes to sustainability and energy efficiency. Siemens Machine Tool Systems is a leader when it comes to energy-efficient equipment for machine tools.

We have the expertise to address almost any question about a machining application
The experience of our experts extends far beyond the SINUMERIK CNC. Highly-qualified machining specialists in our Technology and Application Centers (TACs) have extensive application expertise. Our TACs represent the incubation cells for our technological progress – this means that all of our CNC functions are in compliance with what is required in practice; therefore, ensuring the maximum degree of user-friendliness.
In a class of their own – SINUMERIK CNC control systems

SINUMERIK CNCs offer the optimum solution for each and every machine tool – from basic, standard CNC machines through standard machines, up to modular, high-end machine concepts.

SINUMERIK 808D: the entry-level CNC for basic, standard machines
SINUMERIK 808 controls are panel-based CNCs for the lower performance range. The compact and user-friendly entry-level solution is used for basic turning and milling applications. Features such as simple operation, easy commissioning and maintenance, and also an optimal cost position, represent the perfect basis for equipping entry-level CNC machines.

SINUMERIK 828D: the compact CNC for standardized machines
SINUMERIK 828 controls are optimally suited for standardized machines, which are produced in high unit quantities with a lower degree of modularity. Whether SINUMERIK 828D BASIC, 828D or 828D ADVANCED: The powerhouse in the compact class is the ideal solution for cost-sensitive markets, where high CNC performance and easy commissioning is required.

SINUMERIK 840D sl: the open CNC for modular machine concepts
SINUMERIK 840D sl offers an absolute maximum degree of openness and flexibility. This makes the SINUMERIK 840D sl the optimum CNC for machine tools whose mechanical design must be individually adapted to the requirements of individual users. SINUMERIK 840D sl BASIC, based on the SINAMICS S120 Combi, facilitates the entry into the modular and flexible premium class for machines with up to six axes.

www.siemens.com/sinumerik
## SINUMERIK – a CNC portfolio for the global machine tool market

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### SINUMERIK 808D
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- SINUMERIK 808D

### SINUMERIK 828D
- SINAMICS V70 SIMOTICS S-1FL6
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- SINUMERIK 828D ADVANCED

### SINUMERIK 840D sl
- SINAMICS S120 Combi
- SINUMERIK 840D sl BASIC
- SINUMERIK 840D sl

Siebert Automation // Fon +49 8105 772 87 0 // info@siebert-automation.com // www.siebert-automation.com
SINUMERIK 808D – outstanding performance, simply intelligent

SINUMERIK 808D and SINUMERIK 808D ADVANCED bring impetus into basic turning and milling machines. CNCs from the global technology leader, combined with a revolutionary operating concept make the SINUMERIK 808 the perfect entry into the world of CNC.

Compact and rugged
Thanks to a panel-based CNC design with few interfaces and an operator panel with IP65 degree of protection, SINUMERIK 808 controls are the perfect answer for applications in harsh environmental conditions. The small dimensions of these units allow them to be used in compact machines. At the same time, SINUMERIK 808D and SINUMERIK 808D ADVANCED facilitate user-friendly operation with shortcut keys and softkeys that you have come to expect from SINUMERIK.

Ideal for entry-level machine operators
Using the integrated startGUIDE, the SINUMERIK 808 is the ideal partner when entering the world of CNC. In addition to operation and programming, commissioning is also explained interactively in a graphical form. The standard operation and programming method makes the SINUMERIK 808D and SINUMERIK 808D ADVANCED the ideal system when entering the world of SINUMERIK CNC applications.

Optimized for basic turning and milling applications
SINUMERIK 808 controls address specific technologies, and are perfectly preconfigured for milling and turning. They address a range of applications starting from basic, standard milling machines or simple machining centers through cycle-controlled lathes up to basic full turning machines.
SINUMERIK 828D – the powerhouse in the compact class

Turning and milling on standard machines as well as functions for the basic automation of grinding machines – here, SINUMERIK 828D BASIC, SINUMERIK 828D and SINUMERIK 828D ADVANCED with their unique CNC performance, set standards when it comes to productivity.

Rugged and maintenance-free
With an operator panel front manufactured from die-cast magnesium, the panel-based CNC design with just a few interfaces, as well as a high degree of protection, make SINUMERIK 828 controls a dependable partner even in harsh environments. With no fan and no hard disk, and an NV-RAM memory without a battery, SINUMERIK 828D BASIC, SINUMERIK 828D and SINUMERIK 828D ADVANCED are completely maintenance-free CNC systems.

Standard turning and milling and more
With their technology-specific system software, the range of applications of SINUMERIK 828 extends from vertical and basic horizontal machining centers – naturally also for moldmaking applications – through surface and cylindrical grinding machines up to two-channel turning centers with a counterspindle, driven tools and y-axis.

User-friendly
Thanks to a full QWERTY CNC keyboard with shortcut keys and a high-resolution 8.4”/10.4” TFT color display, SINUMERIK 828D BASIC, SINUMERIK 828D and SINUMERIK 828D ADVANCED are very easy to operate. Equipped with USB, Compact Flash (CF) card and RJ45 interfaces at the operator panel front, CNC data is quickly and easily transferred to the machine.

Scalable CNC performance
In addition to two CNC performance versions of SINUMERIK 828D, SINUMERIK 828D BASIC represents a favorably-priced entry into the compact class. And the SINUMERIK 828D ADVANCED rounds off the portfolio upwards with 2 additional axes/spindles. As a consequence, SINUMERIK 828 controls perfectly address the performance required by standardized machines for turning (T), milling (M) and grinding (G).
SINUMERIK 840D sl is considered to be the standard in premium class CNC, which is certainly justified. Maximum CNC performance, along with a degree of flexibility and openness that has not been able to be achieved until now, are the basis for almost any CNC machine.

Maximum performance
The SINUMERIK 840D sl offers an almost inexhaustible performance potential – thanks to its drive-based, high-performance NCUs (Numerical Control Units) with state-of-the-art multicore processor technology. This means that up to 93 axes in 30 machining channels can be controlled in the NCU link. Machine tools with fewer axes benefit from the performance of the SINUMERIK 840D sl as a result of the highest degree of machining precision with the shortest machining times.

Demanding turning and milling applications ...
High-speed milling and turning are two of the strengths of the SINUMERIK 840D sl. The milling spectrum extends from highly productive machining centers for powertrain manufacturing in the automotive industry, up to high-speed 5-axis machining centers for moldmaking in the aerospace industry. The turning spectrum extends from multi-channel 5-axis turning centers with B-axis up to highly productive multi-spindle applications.

... are part of the wide technology spectrum
Beyond turning and milling applications, the SINUMERIK 840D sl can address an almost inexhaustible range of technologies ranging from grinding and laser machining, through gearwheel, up to multitasking machining.

The SINUMERIK 840D sl is even the first choice for new engineering and manufacturing applications including tapelaying and composites for the aerospace industry.
Modular and scalable
In addition to scalable NCU performance, the SINUMERIK 840D sl has a high degree of modularity when it comes to the operating components. With flexible M:N operation, for example, any operator panel can be combined with the NCU making the SINUMERIK 840D sl the ideal fit in the operation of high-end machine tools. With SINUMERIK 840D sl BASIC, the link with the compact SINAMICS S120 Combi drive, even compact machines can be ideally addressed.

Modern touch operation in production
SINUMERIK blackline panels with touch screens open up the way to create new machine operating philosophies. In conjunction with the state-of-the-art SINUMERIK Operate user interface, touch and gesture operation are establishing themselves in production.

Benchmark for open architectures
The openness of the SINUMERIK 840D sl is second to none. Using SINUMERIK Integrate, the CNC can be optimally adapted to the machine’s technology, and SINUMERIK Integrate ensures a high degree of flexibility in the production automation environment. For example, the operating system can be supplemented and adapted – even robots and handling systems can be integrated. With the openness in the CNC kernel and in the drive, unique mechanical concepts can be implemented; such as the use of adapted closed-loop control algorithms or specific kinematics transformations.

Communication at every level
Using PROFINET, the leading Industrial Ethernet standard, the SINUMERIK 840D sl is perfectly embedded in the Siemens Totally Integrated Automation (TIA) environment. TIA stands for a unique level of integration – from the field through the production, up to the company supervisory level. The result – every component within the automation solution optimally interacts with one another. This allows you to achieve maximum transparency and availability of the production process.
Siemens is simply world-class when it comes to drive technology – and therefore has outstanding drive solutions for machine tools.

**SINAMICS V60 and V70 – small and powerful**
The SINAMICS V60 and V70 drive concept is simply unbeatable when it involves a price-sensitive entry-level machine. The compact design of the single-axis motor modules without any fan ensures the highest degree of ruggedness. Thanks to intelligent commissioning, the motor modules can be adapted to the requirements of the feed axes by simply setting a few parameters.

**SINAMICS S120 – the highest degree of flexibility**
SINAMICS S120 is synonymous with performance and flexibility when it comes to equipping machine tools. In addition to a wide range of motor modules up to a power rating of 300 kW, there is also an infeed unit with a controlled DC link. This ensures the shortest spindle acceleration times and facilitates perfect reactive power compensation for the complete machine ($\cos \varphi = 1$). This is complemented by DSC (Dynamic Servo Control), which represents a unique position control technique to achieve the highest dynamic performance of feed and spindle motors. The SINAMICS S120 high-performance drive system can also be used in decentralized solutions with the S120M variant.
SINAMICS S120 Combi – the ideal drive for compact machines
SINAMICS S120 Combi combines the performance of the modular SINAMICS S120 in a compact, rugged design. Here, an infeed and up to four motor modules are integrated in one housing. By intelligently expanding the system to include two more motor modules, the SINAMICS S120 Combi is the ideal drive for compact, standard CNC machines with a spindle power of up to 15 kW and up to five feed axes.

SINAMICS S120 Hydraulic Drive with integrated safety functionality
SINAMICS S120 Hydraulic Drive supports high forces in the smallest space. It comprises a high-performance hydraulic control and the compact, space-saving SINAMICS S120 HLA interface module. The hydraulic system is simply commissioned, operated, diagnosed and serviced through SINUMERIK Operate. Further, SINAMICS S120 Hydraulic Drive has Safety Integrated functionality.

www.siemens.com/sinamics
SIMOTICS motors represent the driving force for SINUMERIK CNCs and the SINAMICS drive in the machine with the highest precision and dynamic performance.

**SIMOTICS servomotors**
High standstill torques, the fastest speeds and smooth-running characteristics make SIMOTICS servomotors the optimal feed drive for CNC machines. A high degree of protection, strong bearings and rugged design mean that these synchronous servomotors have outstanding reliability. High-quality magnetic materials result in a very high power density – and therefore very small motor dimensions. This allows these motors to be installed in extremely tight spaces.

**SIMOTICS linear and torque motors**
Going beyond conventional rotary motor principles, the SIMOTICS range also encompasses linear and torque motors with a high dynamic performance. Elasticity, backlash and friction as well as mechanical transmission elements of the machine drivetrain can be almost completely eliminated when using SIMOTICS 1FN3 linear motors. Further, using SIMOTICS 1FW6 torque motors, completely new technological domains can be addressed, for example, turning on milling machines (multitasking).
Spindle solutions from Siemens
Siemens has a long tradition in the design and construction of electric motors – and Weiss Spindeltechnologie GmbH has a wealth of knowledge and competence when it comes to designing and building spindles. These two experts ideally complement one another: This means that Siemens Machine Tool Systems can offer a wide range of spindle solutions from a single source. The result is a portfolio that ideally supports each spindle solution type. This portfolio starts with the classic 1PH8 mounted spindle motors and 1FE1 and 1FE2 synchronous built-in spindle motors, through mechanical spindles up to hybrid and 2SP1 motor spindles.

www.siemens.com/spindles

SIMOTICS geared motor
With the SIMOTICS 1FG1 geared motor, Siemens is offering the complete range of motors, including integrated gearbox for machine tools from a single source. With its high energy efficiency, very flexible torque ratio and output direction, it is ideally suited for auxiliary equipment such as pallet changers, chip conveyors and feeding units.

www.siemens.com/simotics
SINUMERIK CNC performance – the machining standard

SINUMERIK CNC controls set standards relating to every aspect of machining performance.

SINUMERIK sets the pace – whether precision and speed, energy efficiency and safety or reducing cycle times.

Highest precision
SINUMERIK CNC and SINAMICS drives compute with high-performance 80-bit NANO® accuracy. This eliminates rounding errors and results in an extremely high internal computational accuracy in the complete controller cascade. Further, a dynamic feed forward control ensures that the following error is almost completely compensated. While accelerating, jerk limiting reduces the stress on the mechanical system. Using its Dynamic Servo Control, SINAMICS control technology provides additional position control in the drive – representing an additional advantage by achieving an increased level of disturbance resistance of the machine control.

Maximum speed
When machining many CNC blocks in the shortest time, for example, free-form surfaces, the machining process itself no longer defines the speed, but the performance of the CNC system. Here, with its Advanced Surface and Top Surface features, SINUMERIK offers you the ideal solution. Advanced Surface stands for state-of-the-art control algorithms, such as Look Ahead or the dynamic compression of linear and circular blocks in 5th degree polynomial (NURBS). With Advanced Surface and Top Surface, machines can be operated at their physical limits.

The shortest idle times
Especially in large series production, idle times, where the machine is no longer productive, represent a critical productivity-inhibiting factor. Here, SINUMERIK provides the optimum solution with its synchronous architecture and intelligent functions, such as synchronized actions and asynchronous subprograms. For example, loading equipment can be implemented without having to make time-consuming interventions in the PLC.
**Kinematic transformations**
SINUMERIK CNC is in its element when it comes to handling complex machine kinematics – from the classic face/peripheral surface transformation for turning machines through multi-side machining in swiveled planes, up to dynamic 5-axis transformation in tool- and moldmaking as well as in the aerospace industry. Further, SINUMERIK 840D sl supports every type of special transformation up to milling with robot kinematics – therefore paving the way for advanced machine tool applications.

**Energy efficiency with SINUMERIK Ctrl-Energy**
Siemens Machine Tool Systems sets the standard when it comes to energy efficiency in machine tools: SINUMERIK Ctrl-Energy encompasses a wide range of high-efficiency drive and motor components, CNC/drive functions, software solutions and services. SINUMERIK Ctrl-Energy offers energy-efficient solutions over the machine’s entire lifecycle – from design to the operation of the machine. Users have intelligent functions at their fingertips, such as the ability to analyze the energy costs associated with a specific workpiece. SINUMERIK helps you to save energy by simply pressing the Ctrl + E shortcut key.

**SINUMERIK Safety Integrated to protect personnel and machines**
Siemens Machine Tool Systems is the leader when it comes to protecting personnel and machines. For almost two decades now, SINUMERIK Safety Integrated has been setting the benchmark for machine tool safety technology. Here, intelligent system functions permit user-friendly operation of the machine – for example, machines can be set up with the protective doors open. This provides the highest degree of safety for machine operators and the machine itself.
SINUMERIK Operate – the state-of-the-art operating concept for the 21st century

SINUMERIK Operate provides the highest degree of operator convenience at the machine tool.
As a consequence, SINUMERIK Operate sets the standard for efficient machine tool operation.

www.siemens.com/sinumerik-operate

Innovative details for user-friendly operation
With Animated Elements, SINUMERIK Operate makes it very easy to enter parameters. Animated Elements completely redefine what graphic programming and operation really mean – using a unique display with moving image sequences.

Shortcuts in SINUMERIK Operate allow data to be quickly entered at the operator panel – saving operators a lot of time.

Program manager for an enhanced overview
Simple data handling – just the same as when using a PC: SINUMERIK makes it possible with its program manager. Content in the DXF, BMP, PDF, JPG and HTML formats of various storage media are transparently displayed. CNC programs can be transferred from the data server to the CNC memory by simply copying and pasting. And now it has been made even simpler: Large moldmaking workpieces can be selected in the program manager, and directly executed via the company network, USB stick or CF card.

SinuTrain for SINUMERIK Operate
The SinuTrain NC programming station, which is identical to the control system, brings SINUMERIK Operate – including animated machine operator panel – to the PC. This facilitates convenient job preparation in a familiar work environment. NC programs can be directly generated here, and as a result of the original SINUMERIK CNC kernel, can be verified before they are transferred to the real machine. Users profit from a higher machine availability and reliability. Further, SinuTrain can be ideally used for training machine operators on how to operate and program SINUMERIK – as well as for presenting and testing new SINUMERIK functions.

www.siemens.com/sinutrain
SINUMERIK Operate – intuitive handling, shorter setup times

Based on an intelligent JOG mode and intuitive tool management, SINUMERIK Operate graphically and interactively supports all of the typical setup functions. This keeps unproductive times to an absolute minimum.

Intelligent JOG mode
In SINUMERIK Operate, the intelligent JOG mode provides graphic, interactive support for all typical setup functions for turning and milling machines. This means that a probe can be simply loaded with just three clicks. On lathes, face turning of a blank or boring soft clamping jaws is also directly realized in the intelligent JOG mode – without having to generate a part program. The extended retract function allows a tool to be retracted after a power failure, and to be returned to the precise point of interruption after power has been restored. Whether turning, milling or multitasking: The retract function is available for all machining technologies – this saves a lot of time.

Measuring tools and workpieces
Tool and workpiece measurement are optimally supported in the intelligent JOG mode. It is sufficient to probe an edge, corner or holes in order to determine the clamping position, including the basic rotation of the tool – also in swiveled workpiece planes. Measuring tools is also a simple operation for SINUMERIK. Irrespective of whether the tool geometry is simply “scratched” or determined using a tool measuring system. By pressing just one key, the geometry is transferred into the tool offset memory of the CNC.

Transparent tool management
SINUMERIK provides the perfect command station when it comes to tool management. Tool data and magazine location information are clearly displayed on a screen. The selection of a suitable magazine location is completely automatic: simply select a tool, press a key and SINUMERIK CNC does the rest. It goes without saying that each tool’s lifetime is monitored, and when required, the appropriate replacement tool is loaded.
SINU\u00f8ERIK Operate – perfect for all programming tasks

With various programming languages, SINUMERIK supports every CNC programming method that is used around the world – from machining individual parts up to large serial production.

For large series ...
Shortest machining times for large serial production and with the highest flexibility for special applications: SINUMERIK CNC controls make this possible with advanced CNC programming based on high-level language elements. Using programGUIDE, SINUMERIK CNC programs can be easily combined with high-performance technology and measuring cycles. Even classic ISO codes can be programmed. As a result, SINUMERIK is especially attractive for machine operators who prefer this classic programming method.

... and small series
The programming time is a decisive productivity factor for small serial production and individual parts. ShopMill and ShopTurn machining step programming methods are simply unbeatable in this discipline. Machining operations such as drilling, centering, plunging or pocket milling are shown in the form of machining steps. Even for complicated machining operations, CNC programs are extremely compact and easy to read. Using dynamic broken-line graphics, which are absolutely unique in the market, all of the geometrical elements can be displayed to scale in the CNC program.

CNC simulation for reliable and safe processes
SINU\u00f8ERIK CNC simulation guarantees maximum process reliability and safety as the real geometries of the tools are always used. It goes without saying that the simulation shows the precise image of the required machining operation – not just bright, colorful graphics. Whether face or peripheral surfaces, swiveled workpiece planes or even machining in several channels, SINUMERIK CNC simulation simulates every machining type. With the moldmaking quick view, even very large part programs can be displayed on the screen within seconds.
SINUMERIK Operate – everything onboard for optimization and diagnostics

SINUMERIK Operate offers the ideal onboard resources to optimize axes, diagnose faults and perform maintenance work and service tasks. External PC-based software tools are not required.

One-click optimization
With its Auto Servo Tuning (AST) functionality, SINUMERIK Operate offers fully automatic optimization of control parameters to achieve maximum dynamic performance and accuracy of the machine axes – and with just one click! This simplifies commissioning the machine. In operation, the machine can be regularly optimized. This ensures maximum precision over the entire life of the machine.

All information is onboard
Using context-sensitive graphic onboard help, SINUMERIK technical documentation can be called up on the CNC screen. As a result, all of the information on the input fields, CNC language commands as well as system messages and system parameters, are directly available at the machine – manuals no longer have to be printed out. On one hand, operation and programming are simplified – and on the other hand, commissioning, diagnostics and maintenance become significantly more user-friendly and efficient.

Diagnostics
Especially in large serial production, machine downtimes can result in enormous loss of production. SINUMERIK Operate offers intelligent integrated diagnostics if problems arise so that machine operation can be resumed as quickly as possible. In addition to bus diagnostic tools for drive, peripheral and network components, there is also a powerful trace function. This is used to trace and troubleshoot NC, PLC and drive signals.
Premium technology cycle packages – turning, milling and more

With a powerful technology cycle package for turning and milling, Siemens Machine Tool Systems once again proves its technological leadership in CNC technology.

Technology cycles for all machining operations
SINUMERIK controls offer a range of drilling, milling and turning cycles that are absolutely unique in the marketplace – from basic machining operations such as centering, deep-hole drilling, milling circular pockets and turning grooves, up to more complex machining operations such as engraving, deep-hole milling and trochoidal hard metal milling. Thanks to intelligent kinematic transformations, these technology cycles are available at all machining levels. For instance, on the face and peripheral surfaces of turned parts or in swiveled planes of milled workpieces.

High-end solid contour machining and stock removal
In addition to standard geometries, when you use SINUMERIK CNC, even complicated geometries can be machined without a CAD/CAM system – thanks to the integrated geometry computer and intelligent stock removal cycles. The range extends from the contour milling of pockets with a maximum of twelve islands, up to contour plunging on turning machines – and all of this with automatic residual material detection. This means that the ideal tools can be used for every machining phase. The result – optimum machining quality with significant time-savings.

Measuring cycles for the highest precision
Integrated measuring cycles ensure workpiece precision during the machining process. Tool geometries and work offsets are automatically corrected, so that the required production tolerances are maintained even for high-batch quantities. The integrated recording function ensures that the workpiece quality is optimally documented. A special highlight is available for 5-axis machines: A special measuring cycle determines the exact machine geometry, which helps to compensate machine tolerances while workpieces are being machined.
Simple data transfer using an integrated DXF reader
The new DXF reader option is an important factor when it comes to paperless production environments. The DXF reader supports the display of this CAD data format, and direct transfer into the CNC program. Programming times can be slashed by up to 90% if, at the CNC, the contour positions for the drilling template no longer have to be completely programmed, but data can be transferred using the CAD reader. This means that DXF files can be directly opened on the CNC, and data transferred to the CNC program with a mouse click!

Editor-based flexibility
SINUMERIK Operate now facilitates an even faster overview in the editor: The syntax is highlighted so that part programs are easy to read – and typing errors can be more quickly identified. Displaying cycles as machining work step in programGUIDE facilitates straightforward plaintext interpretation. Adaptable cycle screen forms mean that cycle parameters can be even more simply entered. Users can choose between displaying all of the parameters, or just concentrating on the most important ones. In this case, only the open parameters have to be programmed, the rest are preassigned.

Logging function for the highest process conformity
Logging in JOG as well as in the automatic mode is an important component for quality assurance. In the setup mode on general-purpose machines, data logging ensures that machining is even more precise and machining results are simpler to reproduce. The log is generated in all of the usual office formats, so that it is available on the PC for downstream processing.
The optimum SINUMERIK for every machining technology

With its SINUMERIK controls, Siemens Machine Tool Systems is the only CNC manufacturer that offers a product portfolio covering every important technology in the machine tool industry. Siemens sets the standard when it comes to combining various technologies for multitasking concepts.

We master the standards...
Using preconfigured technology packages, SINUMERIK control systems are ideally suited for turning and milling machines. Also the associated multitasking concepts, i.e. turn-milling and mill-turning can be addressed using pre-defined solutions. SINUMERIK also offers a modular set of system functions. These allow other standard technologies to be addressed, such as grinding, gearwheel machining, laser cutting and handling.

... and the specialties
Based on the unique level of system openness, in addition to standard technologies, SINUMERIK also offers solutions for new machine concepts such as Additive Manufacturing or the machining of composite materials in aerospace. These solutions are based on unique features, such as an open architecture in the CNC kernel. This makes SINUMERIK synonymous with maximum technological competence from a single source, extending from standard all the way up to special applications.

SINUMERIK Operate – one operator interface for every machining technology
Using the innovative SINUMERIK Operate graphic user interface, every machining technology can be addressed with a standard look & feel. This provides production facilities with a high degree of flexibility when it comes to the organization and deployment of their personnel. SINUMERIK Operate is the basis for multitasking machines of today – and tomorrow.
Multitasking made easy: Maximum CNC performance and operator-friendliness for multitasking turning and milling applications is obtained as a result of the standard and seamlessly integrated CNC functions in SINUMERIK, complemented by the standard look & feel when it comes to operating and programming with SINUMERIK Operate.

**Powerful CNC functions**
With just a few parameter entries, intelligent kinematic transformations transform milling machines into turning machines – and turning machines into milling machines. In conjunction with additional CNC features, such as cross-technology tool management and state-of-the-art velocity control, completely new CNC applications are opened up – from turning on milling machines, up to machining free-form surfaces on turning machines.

**Standard operation**
The standard look & feel of SINUMERIK Operate for every machining technology allows several technologies to be combined on one machine – and of course, with the highest degree of standardization when it comes to operation and programming that is expected from SINUMERIK. Further, SINUMERIK technology cycles for drilling, milling, turning and measuring are adapted to the particular multitasking machine. This results in a maximum degree of standardization and seamless integration for all multitasking operations on a machine.

**Universal CNC programming**
Comprehensive CNC programming tools that go beyond technology limits ensure that CNC systems are efficiently programmed for multitasking machines – from machining step programming for individual parts, up to multi-channel programming in large serial production environments. Powerful CNC simulation permits part visualization across every technology and offers the highest degree of process reliability and safety for all kinematic versions of state-of-the-art multitasking machines.
SINUMERIK MDynamics – synonymous for outstanding milling results

Cutting-edge operation, unique technology cycles, ultimate shopfloor programming and high-quality CNC simulation – together with premium motion control – combined in one package: This is the outstanding SINUMERIK MDynamics milling package.

Advanced Surface and Top Surface to achieve maximum machine performance
Advanced Surface and Top Surface are synonymous for milling at physical machine limits – with the highest velocity and precision, the best surface quality – and not only for moldmaking.

5-axis machining at the highest level
SINUMERIK CNCs offer the optimum kinematic transformations for modern milling machines – from peripheral surface transformation with slot wall correction for cylindrical workpieces, through statically-swiveled planes for multi-side machining, up to dynamic 5-axis transformations (TRAORI) for demanding toolmaking, moldmaking and aerospace applications.

High-speed settings
The user-friendly high-speed settings cycle simplifies parameterizing moldmaking applications. With just a few parameters, SINUMERIK is set to the machining task – roughing, finishing or pre-finishing – as well as the required machining tolerance.

The sum makes the difference
Advanced Surface and Top Surface, high-speed settings, kinematic transformations, SINUMERIK Operate for efficient operating and programming as well as a comprehensive portfolio of technology and measuring cycles create a unique set of highlights for demanding and sophisticated milling machines. And top-class milling has a name: SINUMERIK MDynamics.

www.siemens.com/sinumerik-mdynamics
smart operation – new concepts in machine operation

It was never so simple as now to integrate a machine tool into the overall production workflow. With smart operation, we facilitate state-of-the-art work methods to be used in production without incurring high associated costs. This is especially true for small and medium-sized companies.

**smartPrepare**
Identical with the machine itself, at the PC the next order can already be programmed 1:1 offline and simulated. This maximizes machine utilization times.

**smartIT**
Never again have to look for the documentation, never again have memory limitations. All order documentation – such as part programs, DXF drawings and diagrams – are transparently available at the operator panel through the network. It is no longer necessary to search for documentation.

**smartOperate**
State-of-the-art touch screen technologies facilitate simple and efficient working at the machine.

**smartMobile**
Even if he is not at the machine, with smartMobile the machine operator always knows what is going on: He always has the information on his own smartphone, tablet or PC, whether it be job status, part inventory, etc.
Always a reliable overview of the entire process chain

Machining complex workpieces always represents special challenges when it comes to precise machining, perfect surfaces and high process reliability. With SINUMERIK, Siemens offers the complete range of innovative, seamless solutions across the complete process – from job preparation with CAD/CAM systems through control-specific simulation up to CNC machining.

Efficient processes with SINUMERIK
In CNC production landscapes, the focus is especially on the process between the original product idea and the machined part. This process encompasses:

• Computer-supported product development at the CAD/CAM level
• NC program generation with optimum postprocessors
• Simulation to check and optimize the manufacturing process at the PC
• Optimized efficient workpiece machining at the machine tool

Computer-supported NC programming is based on NX CAM from Siemens PLM, for example. This offers extended programming functions to support the already powerful SINUMERIK functions. Already at the CAM level, the functions, cycles and options available with SINUMERIK are parameterized for the particular machining step. In addition to the portfolio of flexible NC programming methods, NX CAM also provides the possibility of managing data and establishing a data coupling to the shopfloor.

Manage MyPrograms and Manage MyTools, modules of the software suite SINUMERIK Integrate for production, facilitate efficient program and tool management across the complete production environment. This increases production efficiency:

• Operators can load changes to NC programs or tool lists to the server
• The changes are compared and released at the job preparation

Central production data management:
This saves time and increases the reliability of the interaction between operators and job planners.

This process chain can even be implemented up to higher-level IT systems: This means that tools, their associated components, holders and cutting edges can be intelligently managed and organized with an additional availability analysis.
Higher production efficiency
• The optimized process chain – from designing a workpiece in the CAD system up to CNC production – increases flexibility and productivity
• 100% offline verification/evaluation of NC programs is possible as a result of the original CNC kernel
• Production resources can be networked with SINUMERIK Integrate
• Production processes can be optimized through centralized production data management

VNCK simulation for an optimum final result
Even before the actual production at the machine, the production sequences can be simulated – based on the integrated SINUMERIK virtual NC kernel – and finally also optimized. With Run MyVNCK, Siemens makes it possible to set up a virtual machine: The new workpiece can already be run in at the virtual machine on the PC, while the real machine produces another part.

The machine operator can increase the cycle times and does not have to wait for machines to become available in order to test the new workpieces. As a consequence, he can optimize the production planning and utilization of his machines. The workpiece costs can be reliably calculated using the machining times calculated within the VNCK.
Solutions for every industry that are fit for the future

Siemens knows where machine tools will be needed in the future, so we leverage our industry expertise to support our customers to make certain that their businesses will remain successful in the future, as well.

www.siemens.com/machinetools

Many years of industry expertise is convincing
As a long-time partner to the machine tool industry, Siemens Machine Tool Systems is in the position to address the needs of companies that are operating CNC machines. Based upon our many years of outstanding industry expertise, SINUMERIK controls can always provide the ideal solution for cost-effective manufacturing – for example in automotive, aerospace, power generation, electronics and medical part production. We are certain that our focus on end-user industries will be proven in the future, as well. Global trends, such as the continuous population growth and the rising demand for communication resources, are leading to an ever-increasing demand for highly-productive and innovative CNC machines.

We are your partner for machine tool automation – including complete manufacturing automation
We have been maintaining direct contact with end-users in our core industries for decades. We know the challenges that they face and the requirements that they place on current and future machines. This expertise flows directly into our product development and guarantees that SINUMERIK controls are closely-aligned to addressing market requirements. In addition to machine tool automation, Siemens can act as the general contractor for the manufacturing automation of your entire plant. Customers will also benefit from this as a result of integrated and seamless automation solutions from a single source – ultimately helping you to achieve a highly-productive manufacturing environment.
The ideal solution for each and every industry
Every industry has its own specific requirements. Siemens Machine Tool Systems can offer the appropriate solutions – whether standard automation for the automotive industry or special technologies such as tapelaying for aerospace – we have the ideal solution. This is supplemented by an industry-specific portfolio of support services with training and hot line, as well as local service, spare parts and repair. This allows us to ensure maximum productivity in manufacturing, service and maintenance.

Outstanding international support
Our industry solutions are used around the globe and our international organization ensures that we can optimally support machine tool end-users around the world.

We set the trends in manufacturing
Siemens Machine Tool Systems is an innovation leader in the machine tool market. The development of innovative, cutting-edge solutions is a given for us. This is reflected in our leading IT integration and simulation solutions to easily network manufacturing IT, while securing maximum machine tool productivity and availability.
SINUMERIK Manufacturing Excellence –
service and support at the highest level

Basic services –
what you can expect from Siemens

Field service
As a global company, Siemens Machine Tool Systems also
has a global service team to provide fast and expert ser­
vice, repair and maintenance around the world in more
than 60 regions.

Technical support (hot line)
In more than 25 regions around the world, our hot line
experts answer every question related to SINUMERIK CNC –
and of course, in your local time zone and in your local
language.

www.siemens.com/industry/onlinesupport

Spare parts and repair
A tight-knit, flexible and responsive spare parts and repair
network in more than 70 regions around the world
ensures that replacement parts are quickly available –
and at reasonable prices.

SINUMERIK training
SITRAIN offers professional training for the operation,
programming, commissioning and maintenance of
SINUMERIK controls in more than 30 countries around
the world.

www.siemens.com/sitrain
Field service, spare parts, technical hot line support and training form the basis of our service and support portfolio. SINUMERIK Manufacturing Excellence, with intelligent services, addresses every machine tool need.

www.siemens.com/sinumerik/manufacturingexcellence

Additional services – what our customers find attractive

With a wide range of additional services, SINUMERIK Manufacturing Excellence increases your machine tool productivity – from the initial design, through use, up to machine retrofit and even modernization.

- Siemens Financial Services – financial solutions that perfectly fit your needs  www.siemens.com/sfs
- Manufacturing IT – process optimization through the implementation of the SINUMERIK Integrate product suite
- Extended Machine Contracts – tailored machine tool service contracts that fit your budget
- Spares Plus – preventive spare parts management
- Productivity Improvement – reduce the cycle times of your existing machines
- Machine Retrofit – general overhaul of CNC machine tools that gives new life to old iron
## Technical data

<table>
<thead>
<tr>
<th>Configuration</th>
<th>SINUMERIK 808D</th>
<th>SINUMERIK 828D</th>
<th>SINUMERIK 840D sl</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mechanical design</strong></td>
<td>Panel-based</td>
<td>Panel-based</td>
<td>Drive-based</td>
</tr>
<tr>
<td><strong>CNC performance versions</strong></td>
<td>PPU141 (808D)/PPU16X (808D ADVANCED)</td>
<td>PPU24X (828D BASIC)/PPU26X/PPU28X</td>
<td>NCU710/NCU720/NCU730</td>
</tr>
<tr>
<td><strong>Display size (TFT color display)</strong></td>
<td>7.5”/8.4” color display</td>
<td>8.4” (828D BASIC)/10.4”</td>
<td>7.5”/10”/12”/15”/19”</td>
</tr>
<tr>
<td><strong>Maximum number of axes/spindles</strong></td>
<td>4 (808D)/5 (808D ADVANCED)</td>
<td>10 plus 2 auxiliary axes</td>
<td>93</td>
</tr>
<tr>
<td><strong>PLC adaptation control</strong></td>
<td>SIMATIC S7-200-based</td>
<td>SIMATIC S7-200-based</td>
<td>SIMATIC S7-300</td>
</tr>
<tr>
<td><strong>Maximum number of machining channels/mode groups</strong></td>
<td>1</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td><strong>CNC user memory, up to</strong></td>
<td>1 Mbyte</td>
<td>10 Mbyte</td>
<td>22 Mbyte</td>
</tr>
<tr>
<td><strong>Extended CNC user memory</strong></td>
<td>–</td>
<td>100 Mbyte</td>
<td>100 Mbyte</td>
</tr>
<tr>
<td><strong>Additional CNC user memory on hard disk</strong></td>
<td>–</td>
<td>–</td>
<td>12 Gbyte</td>
</tr>
<tr>
<td><strong>Operation with SINAMICS V60</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Operation with SINAMICS V70</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Operation with SINAMICS S120 Combi</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Operation with SINAMICS S120 Booksize</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Torque motor operation</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Linear motor operation</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
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<tr>
<td><strong>OPC UA</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Standard data transfer</strong></td>
<td>RS232C/USB/Ethernet</td>
<td>RS232C/USB/CF card/Ethernet</td>
<td>RS232C/USB/Ethernet</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Turning</strong></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td><strong>Milling</strong></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td><strong>Gear hobbing</strong></td>
<td>–</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td><strong>Multitasking (mill-turning, multi-channel turn-milling)</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Additional technologies</strong></td>
<td>–</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td><strong>Axis functions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Acceleration with jerk limiting</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Dynamic feed forward control</strong></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td><strong>Dynamic Servo Control in the drive</strong></td>
<td>– (808D)/● (808D ADVANCED)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Interpolation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interpolating axes, up to</strong></td>
<td>4</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td><strong>Linear, circle, helix</strong></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td><strong>Splines</strong></td>
<td>–</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td><strong>Advanced Surface</strong></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td><strong>Top Surface</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Look Ahead</strong></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td><strong>Compressor</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Tools/tool management</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of tools/cutting edges, up to</strong></td>
<td>64/128</td>
<td>768/1536</td>
<td>1500/3000</td>
</tr>
<tr>
<td><strong>Unit quantity/tool lifetime monitoring with management of replacement tools</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Compensations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Compensation of measuring systems and spindle pitch</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Temperature compensation</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Other compensations (sag, volumetrics)</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Feature</td>
<td>SINUMERIK 808D</td>
<td>SINUMERIK 828D</td>
<td>SINUMERIK 840D sf</td>
</tr>
<tr>
<td>---------</td>
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</tr>
<tr>
<td><strong>SINUMERIK synchronous architecture</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synchronized actions</td>
<td>–</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Asynchronous subprograms</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td><strong>Transformations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Face/peripheral surface transformation</td>
<td>–/● (808D ADVANCED)</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Multi-side machining (3+2-axis machining)</td>
<td>–</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Dynamic 5-axis machining (TRAORI)</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Additional machine-specific kinematic transformations</td>
<td>–</td>
<td>–</td>
<td>●</td>
</tr>
<tr>
<td><strong>CNC operation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SINUMERIK Operate BASIC</td>
<td>●</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>SINUMERIK Operate</td>
<td>–</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Animated Elements</td>
<td>–</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>startGUIDE: graphic interactive commissioning, onboard tutorials</td>
<td>●</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>User interface on NCU/PPU (Linux)/PCU50 (Windows®)</td>
<td>●/–</td>
<td>●/–</td>
<td>●/●</td>
</tr>
<tr>
<td>Training and offline programming tools</td>
<td>● (808D on PC)</td>
<td>● (SinuTrain)</td>
<td>● (SinuTrain)</td>
</tr>
<tr>
<td><strong>CNC programming</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SINUMERIK CNC programming language with high-level language elements</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Online ISO dialect interpreter</td>
<td>●</td>
<td>●</td>
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<tr>
<td>DXF reader</td>
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<tr>
<td>programGUIDE</td>
<td>programGUIDE BASIC</td>
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<td>●</td>
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<tr>
<td>Technology cycles for drilling, milling and turning</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Technology cycles for grinding</td>
<td>–</td>
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<tr>
<td>Cycles for process measurements</td>
<td>–</td>
<td>●</td>
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<tr>
<td>Balance cutting</td>
<td>–</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>ShopMill/ShopTurn machining step programming</td>
<td>–</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>CNC simulation for turning/milling</td>
<td>● (2D)</td>
<td>● (3D)</td>
<td>● (3D)</td>
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<tr>
<td><strong>Onboard optimization and diagnostics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Context-sensitive onboard help system</td>
<td>●</td>
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<td>●</td>
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<tr>
<td>Onboard servo and drive optimization (AST)</td>
<td>–/● (808D ADVANCED)</td>
<td>●</td>
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<tr>
<td>Onboard signal, bus and network diagnostics</td>
<td>–</td>
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<tr>
<td>Onboard maintenance and service tools</td>
<td>●</td>
<td>●</td>
<td>–</td>
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<tr>
<td><strong>Safety functions</strong></td>
<td></td>
<td></td>
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<tr>
<td>SINUMERIK Safety Integrated</td>
<td>–</td>
<td>●</td>
<td>●</td>
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<tr>
<td><strong>SINUMERIK Ctrl-Energy</strong></td>
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<tr>
<td>Ctrl-E Analysis (determining the energy usage of the machine)</td>
<td>–</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Ctrl-E Profile (machine energy management during non-productive times)</td>
<td>–</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Automatic reactive current compensation</td>
<td>–</td>
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</tr>
<tr>
<td>Automatic flux reduction for induction spindle motors</td>
<td>–</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

– not available
● available (certain functions are available as CNC option, please ask your machine tool manufacturer)
Everything about SINUMERIK CNC can be found on:
siemens.com/sinumerik

Learn more about our machine tool solutions

🔗 Detailed information and videos about our products and services