SIEMENS
Ingenuity for life

Discover the benefits of machining with SINUMERIK

Turning, milling, multi-tasking and more

usa.siemens.com/cnc-machining

Edition 2021

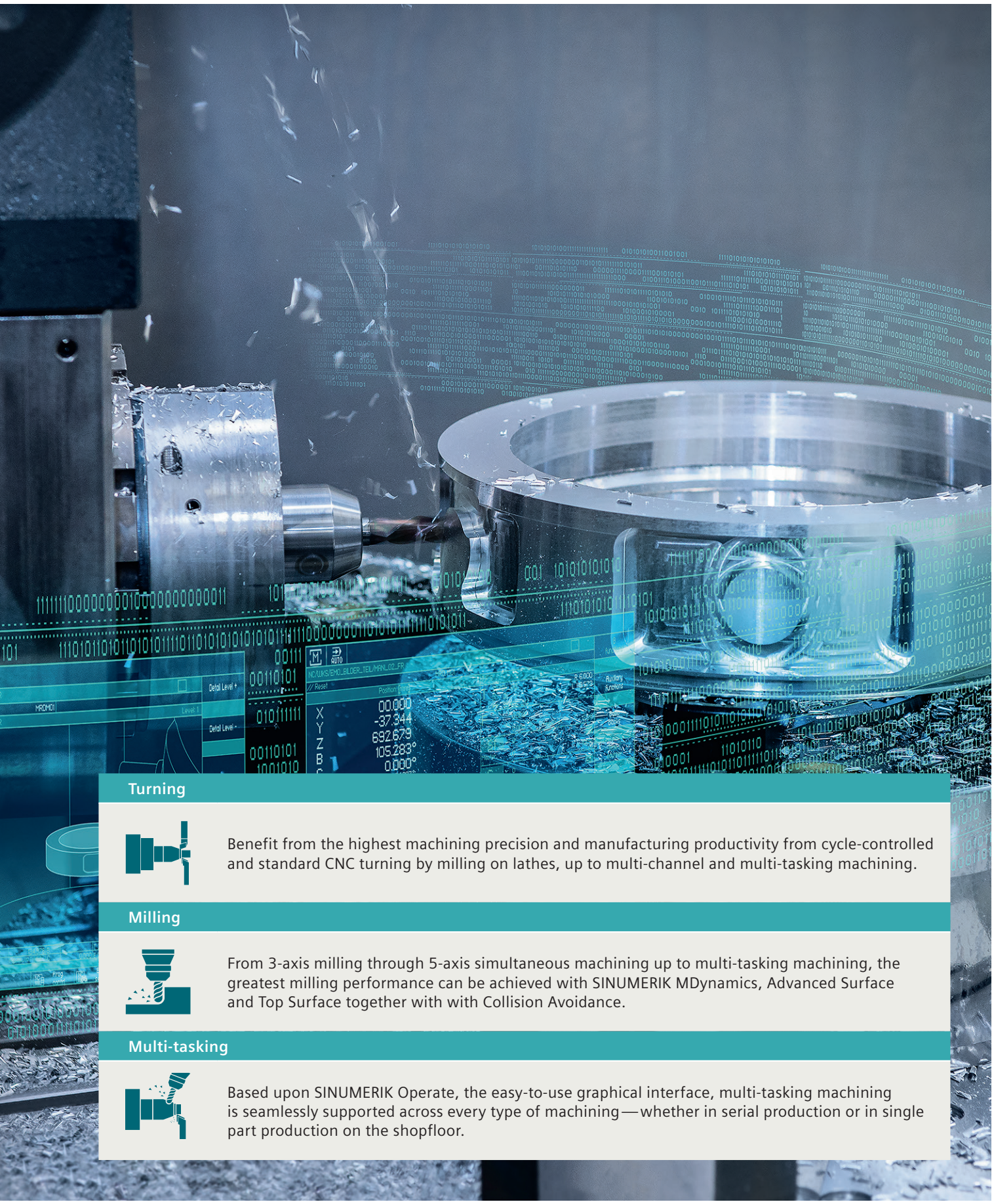
There's a SINUMERIK CNC for every machining application!

Overview

No matter if you're milling, turning, multi-tasking or 5-axis machining, there's a Siemens CNC that will increase your manufacturing productivity and accelerate your business.

SINUMERIK offers you such an easy-to-use graphical interface that has become the standard for efficient machine tool operation. Whether it's a basic part or a complex workpiece, the Siemens control system offers you a wealth of functionality with a very high degree of operator friendliness and manufacturing efficiency.

Contents



Turning

Benefit from the highest machining precision and manufacturing productivity from cycle-controlled and standard CNC turning by milling on lathes, up to multi-channel and multi-tasking machining.

Milling

From 3-axis milling through 5-axis simultaneous machining up to multi-tasking machining, the greatest milling performance can be achieved with SINUMERIK MDynamics, Advanced Surface and Top Surface together with with Collision Avoidance.

Multi-tasking

Based upon SINUMERIK Operate, the easy-to-use graphical interface, multi-tasking machining is seamlessly supported across every type of machining — whether in serial production or in single part production on the shopfloor.

SINUMERIK

The CNC portfolio for the machine tool industry

SINUMERIK controls offer the perfect solution for each and every machine design. No matter if you're manufacturing individual parts or mass producing, basic or complex workpieces— SINUMERIK delivers the greatest return on your CNC investment.

SINUMERIK 808

The entry-level CNC for basic machines

- Panel-based compact CNC
- Up to 6 axes / spindles
- 1 machining channel
- 8.4" color display
- SIMATIC S7-200-based PLC
- SINAMICS V70 drive, SIMOTICS S-1FL6 motor

SINUMERIK 828

The compact and advanced CNC for standard machines

- Panel-based compact CNC
- Up to 10 axes / spindles and 2 auxiliary axes
- Up to 2 machining channels T, M, G
- 10.4" display or 15.6" touch display
- SIMATIC S7-200 PLC
- SINAMICS S120, SINAMICS S120 Combi drives

SINUMERIK 840

The open CNC for modular machine tool designs

- Drive-based, modular controller
- Multi-technology CNC
- Up to 31 axes / spindles per NCU* and any number of PLC axes
- Up to 10 machining channels per NCU*
- Modular panel concept up to 24" color display
- SIMATIC S7-300 PLC
- SINAMICS S120 Booksize / Combi / Chassis drive, SIMOTICS motors

*Up to 3 NCUs can be connected via NCU-Link

SINUMERIK ONE

**The first-ever digital-native CNC—
the next level of digital transformation**

- Digital twin as an integral component of the controller
- Drive- and panel-based modular CNC
- Multi-technology CNC
- Up to 31 axes / spindles and any number of PLC axes
- Up to 10 machining channels
- Modular panel concept up to 24" multitouch color display
- SIMATIC S7-1500F PLC
- SINAMICS S120 Booksize / Combi / Chassis drive, SIMOTICS motors

SINUMERIK MC

The CNC for special manufacturing technologies

- PC-based CNC
- Open user interface design based on WinCC or Run MyHMI / 3GL
- Up to 8 axes / spindles
- Up to 4 machining channels
- Modular panel concept
- SIMATIC S7-1500F PLC
- SINAMICS S120 Booksize, SINAMICS S210 drives, SIMOTICS motors

User-friendly operation and programming

Operation

A wealth of functionality in SINUMERIK Operate ensure a high degree of user-friendliness. This includes state-of-the-art touch and gesture control, as well as the ability to work in several panes and the use of animated elements.

Touch and gesture operation

The new generation of SINUMERIK touch-panels with projected capacitive touch technology offers you the highest degree of performance for demanding, PC-based visualization tasks. This comes along with an attractive front panel design.

With its scratch-proof, non-reflecting surface and brilliant display, SINUMERIK-equipped machines can be operated even in harsh manufacturing envrionments.

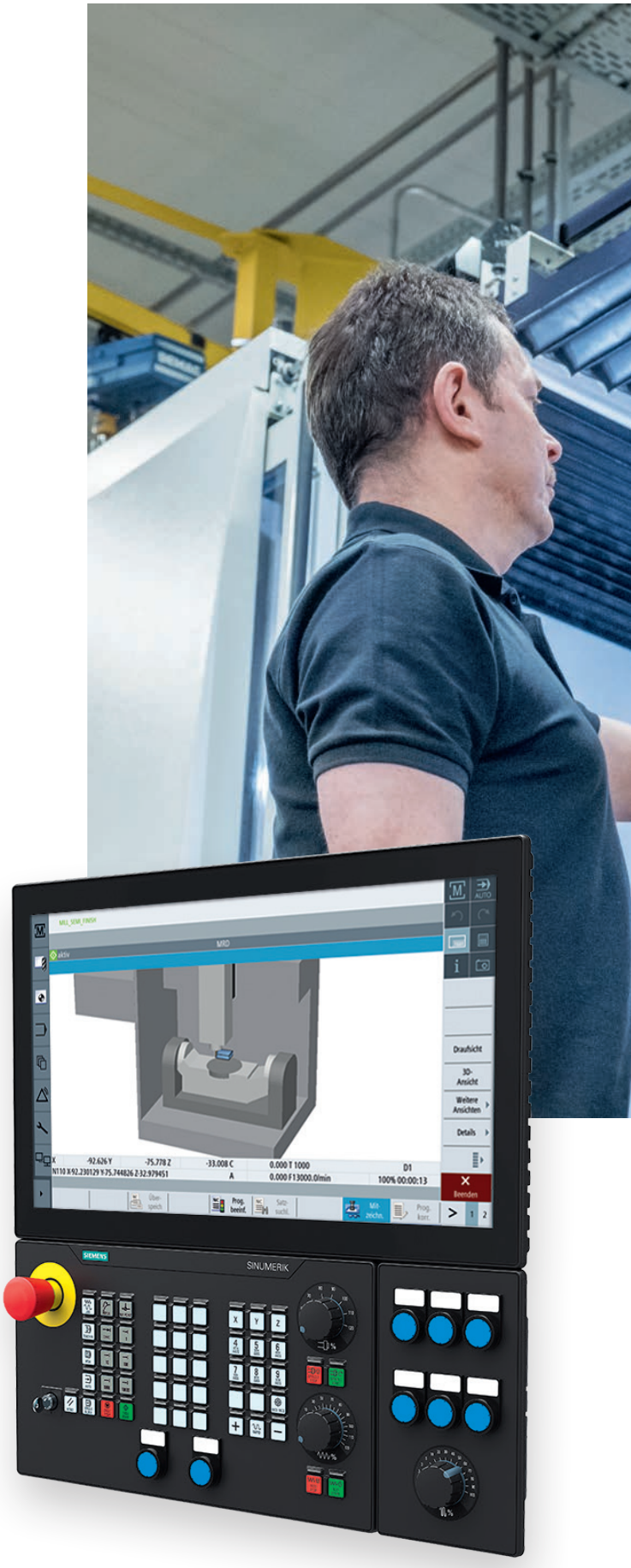
Animated Elements

SINUMERIK Operate makes it very easy to enter parameters. With its unique moving image sequences, Animated Elements make machine operation even more user-friendly.

Display Manager and Sidescreen

Using the Display Manager, the display area can be sub-divided into three or four panes—allowing large screens to be used effectively. Additional information can be selected and displayed making machine operation customized and flexible.

Sidescreen offers machine tool users an additional display to have the needed information at their fingertips. Users can scroll horizontally and vertically through the data displayed on the screen.



Machine tool setup

Based on an intelligent JOG mode and intuitive tool management found in SINUMERIK Operate, typical setup functions can be supported graphically and interactively. This keeps unproductive times to an absolute minimum.

Measurement

Measuring tools and workpieces are supported in intelligent JOG mode. It's sufficient to just probe an edge, corner or hole to determine the clamping position including the basic rotation of the tool—even in swiveled workpiece planes. Simply by pressing just one key, the geometry is transferred into the CNC's tool offset memory. Logging measurement results is simplified using standard or user logs.

Zero points

Integrated measuring cycles guarantee workpiece precision during the machining process. Tool geometries and work offsets are automatically corrected so that the required production tolerances are maintained, even for large-batch quantities.

Tool management

Tool data and magazine location information are clearly displayed on a screen. Selecting a suitable magazine location is fully automatic—simply select a tool, press a key and SINUMERIK CNC does the rest. It goes without saying that tool life is monitored, and when required, the appropriate replacement tool is loaded. This reduces the amount of time needed for machine tool setup.

Protection of your people

The intelligent SINUMERIK Safety Integrated system functions allow user-friendly operation, with the highest degree of safety for the operator and the machine itself—for example, when setting up the machine with the protective door opened. Users have an integrated Failsafe PLC at their disposal with SINUMERIK Safety Integrated plus. Safety-relevant logic is programmed in the TIA Portal.

When commissioning the SINUMERIK 840D sl, application engineers can use various innovative functions, such as the ability to graphically configure safety functions and the transparent diagnostic screen forms.

For Safety Integrated and Safety Integrated plus, as soon as commissioning is completed, a prompted, partially automated acceptance test can be performed in SINUMERIK Operate.

Programming

SINUMERIK Operate offers the ideal programming for each and every task: DIN ISO for large-series production and the shortest cycle times — as well as graphical programming, so individual parts and components can be programmed even faster.

High-level CNC language

The SINUMERIK high-level language means that the variance associated with families of parts or special tools can be easily mastered. The SINUMERIK high-level language comes into play precisely where graphical programming, DIN ISO and cycle programming reach their limits. Quickly programming workpieces with a wide range of variance means that the complete range of workpieces can be flexibly addressed — which is what makes it so unique.

DXF reader

The DXF reader supports the display of the CAD data format and direct transfer into the CNC program. Programming times can be slashed by up to 90 percent as the CAD reader is used to transfer data. DXF files can be directly opened on the CNC, and transferred to the CNC program with a simple click of your mouse. The DFX reader can be called up in the contour editor, and for positions, it can also be called in programGUIDE as well as ShopMill / ShopTurn.

programGUIDE

Using programGUIDE, part 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 CNC machinists who prefer this classical method of programming.

Machining step programming

Machining step programming (ShopMill / ShopTurn) ensures that demanding and complex parts and components can be quickly and simply programmed. Using the SINUMERIK contour computer, each contour can be entered and programmed directly at the machine. This results in maximum machine tool productivity when it comes to programming and operation.

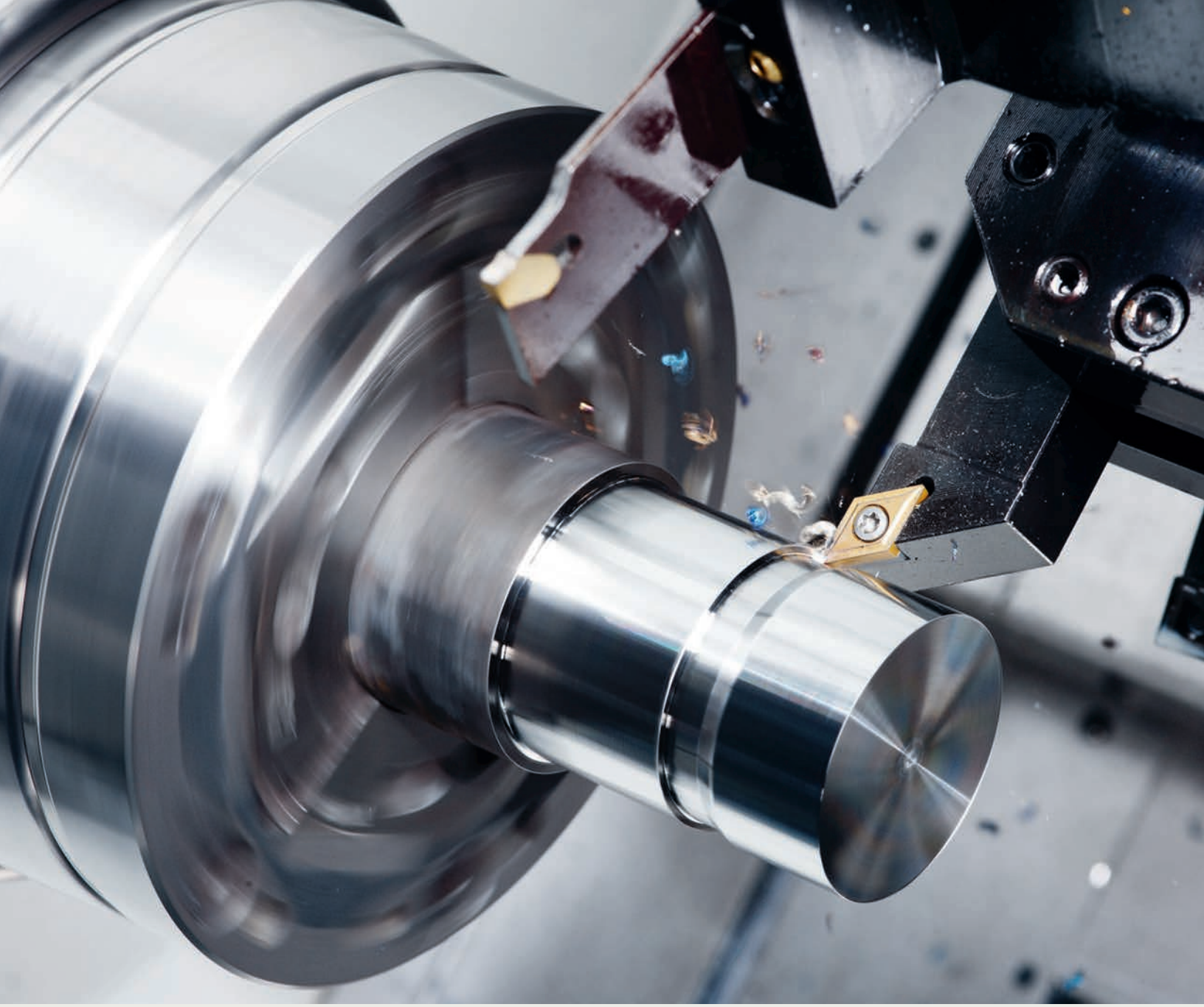
SinuTrain for SINUMERIK Operate

This control-identical, PC-based software tool is based upon the original NC kernel of the SINUMERIK control. SinuTrain can be used for offline part programming and even for training. You'll benefit from increased machine availability, enhanced security, and greater manufacturing productivity.

Diagnostics

Especially in large serial manufacturing, machine downtimes can result in an enormous loss of production. SINUMERIK Operate offers intelligent diagnostics if problems arise so that machine operation can be resumed as quickly as possible.

In addition to the bus diagnostic tools for drive, peripheral and network components, there is also a powerful trace function, which is used to trace and troubleshoot NC, PLC and drive signals.



Turning

Highly productive and precise with SINUMERIK

Standard CNC turning is a rather simple task for every SINUMERIK control. Depending upon the functional scope, the required performance and the number of axes, SINUMERIK 828, SINUMERIK 840D sl and even SINUMERIK ONE are the ideal CNCs for every turning application.

Cycle-controlled turning with SINUMERIK

Cycle-controlled lathes are frequently used for the repair and machining of individual parts. One requirement placed on the control is quite clear—it has to be very easy to program. SINUMERIK controls are the perfect solution.

"Manual machine" offers the greatest flexibility when it comes to operation and programming

Cycle-controlled lathes are mainly used to manufacture individual or small series parts. The operator of a manual machine expects a high degree of programming flexibility from the CNC.

Every SINUMERIK contol offers this usability in the form of the “Manual Machine” function. This function allows users to manually operate the machine—without a program having to be written.

The machine operator is navigated in a user-friendly way to the finished workpiece. This is achieved using special functions, which support the handwheels of a machine of this type, together with the standard use of machining cycles. This makes the “Manual Machine” function ideal for entry-level CNC machinists.

The “Manual Machine” function also offers additional options for cycle-controlled lathes. It allows straight lines and inclines to be turned using crossover switches, individual machining of turning and drilling cycles, as well as contours without having to generate a program. This function also makes it quite easy to repair threads.

808D	828D	840D sl
✓	✓	✓

Cycle-controlled turning with SINUMERIK

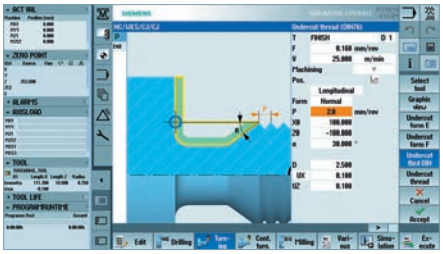
Standard turning with SINUMERIK CNC

When it comes to the machining of basic turned parts, the right control with shopfloor programming is necessary. CNC performance that is precisely tailored to the application is just as important. So no matter which control system you choose from the SINUMERIK family, we guarantee you'll benefit from the right CNC.

Broad SINUMERIK portfolio

Standard CNC turning is easy for every SINUMERIK CNC. Based upon the required functional scope, the required performance and the number of axes, the ideal SINUMERIK control is available for every application.

Machines with main and counter-spindle, Y-axes and driven tools are supported by the extensive turning and milling cycle package of SINUMERIK 828 and SINUMERIK 840D sl controls.

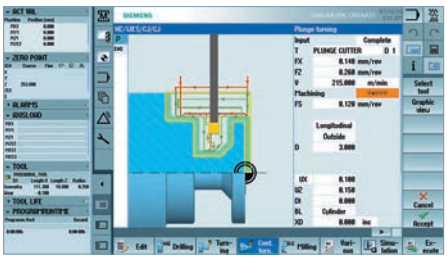


Machining technology cycles for standard CNC lathes

Intelligent turning cycles are the “core" of a lathe. This is why SINUMERIK CNCs have a comprehensive range of turning functions: cutting, grooving, undercut and thread cycles, up to machining freely definable contours and residual material detection. SINUMERIK CNCs comply with every turning requirement when it comes to machining strategies—such as roughing or finishing parallel to the axis and contour, plunging or plunge-turning.

Fast and effective plunge-turning

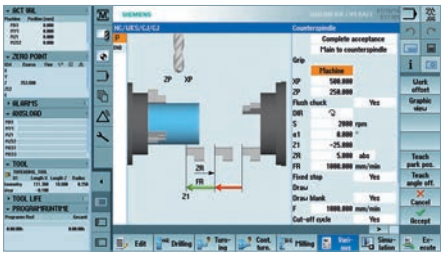
Move quickly from the drawing to the finished workpiece. Especially for difficult contours with relief cuts, plunge-turning represents the ideal machining process. Using just one tool, the complete contour can be machined with plunge and plunge-turning cycles. It's not necessary to setup and change tools. As you're programming, the contour is generated and linked with the plunge-turning cycle. There are no additional programming costs.



Technology cycle, counter-spindle

The counter-spindle technology cycle allows machining to be performed on two spindles on one lathe. With this configuration, workpieces are automatically transferred between the spindles.

Counter-spindle machining increases your productivity and machining quality—there's no need to manually re-clamp the workpiece.



808D	828D	840D sl
✓	✓	✓

Standard CNC turning with SINUMERIK

Milling on lathes with SINUMERIK

Flexible, high-performance CNCs—suitable even for programming directly on the shopfloor—are required if workpieces are to be milled on turning machines.

Innovative CNC functions for milling on lathes

SINUMERIK Operate, the state-of-the-art, intuitive graphical user interface makes milling on lathes easy. It's the exact same look-and-feel when it comes to machining with comprehensive CNC functions leading to the the ideal solution for the particular application.

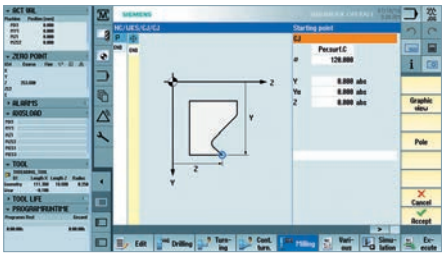
Regardless of whether parts should be milled or machined on the face or peripheral surface—with TRANSMIT and TRACYL, the machine plane is transformed at the precise location. This is done automatically thanks to the NC functionality embedded in SINUMERIK Operate without requiring a CAD/CAM system or calculator.

TRANSMIT makes face machining easy

A lathe spindle operated in the C-axis mode is more than just a simple positioning axis. Using the TRANSMIT function in SINUMERIK Operate, driven tools can be used to drill and mill on the face side of a workpiece.

Outstanding peripheral surface machining with TRACYL

Turning machines equipped with SINUMERIK Operate are perfect when it comes to peripheral surface machining. Even when the tool offset is activated, slots with parallel walls can be machined. Geometries are easily programmed in the flattened surface and the CNC takes care of everything else.



SINUMERIK technology cycles for milling applications

SINUMERIK cycles support machine tool users when it comes to quick and easy workpiece programming. Even for complex tasks, comprehensive machining steps can be performed faster and more easily by using innovative cycles—for example trochoidal milling and plunge-cutting for machining with low cutting pressure and low deformation levels. SINUMERIK CNCs provide all of the cycles and functions that are needed for the milling application.

808D	828D	840D sl
–	✓	✓

Milling on lathes with SINUMERIK

Multi-channel machining with SINUMERIK

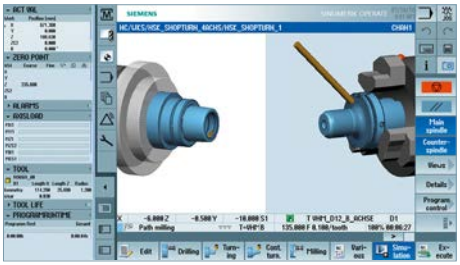
For multi-channel machining on lathes, high cutting volumes must be removed. For large-series production, it's also crucial to have short cycle times. High-performance and flexible CNC systems are needed to address these requirements.

Multi-channel machining made easy

Lathes with several tool slides are considered to be high-end CNC machines. SINUMERIK Operate ensures that these multi-channel machining operations can be programmed even more efficiently. The SINUMERIK control manages individual tool slides in the various channels. Programs must be generated for each channel, which then run simultaneously during machining. In SINUMERIK Operate, the "programSync" function is a high-performance editor, which permits programs to be edited, aligned and optimized simultaneously, when adapted to the channel structure of the machine — no matter if programmed in DIN/ISO or in ShopTurn.

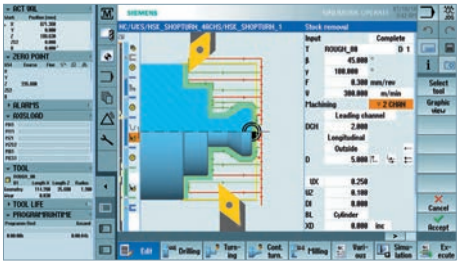
Workpiece simulation for multi-channel machining

Outstanding visualization of multi-channel machining can be achieved by using simulation in SINUMERIK Operate. This results in a higher degree of reliability and safety through 3D simulation with 3-plane view and volume model of the machined part — including simultaneous recording in automatic operation. Simulation also offers machine users comprehensive monitoring and optimizing options for multi-channel programming by automatically calculating the time needed for each machining step.



SINUMERIK cutting cycle

Using the SINUMERIK contour cutting cycle, sophisticated and demanding 4-axis turning can be programmed directly at the machine without needing a CAD/CAM system. Contour and basic cutting parameters can be entered easily in the control channel. The contour cutting cycle automatically generates the CNC sequences required for the specific 4-axis turning strategy. Machining with one tool can be expanded to involve two tools for highly-productive Balance Cutting by using just two additional parameters.



808D	828D	840D sl
–	✓	✓

Multi-channel machining with SINUMERIK

Milling

Perfect surfaces with SINUMERIK MDynamics

Milling expertise, powerful SINUMERIK CNCs and intelligent control functions to handle the CAD-CAM-CNC process, all combined in one package—this is SINUMERIK MDynamics—high-end motion control resulting in perfect workpiece surface finishes.

SINUMERIK MDynamics

Functions in detail

	SINUMERIK 828D	SINUMERIK 840D sl	SINUMERIK 840D sl
	3-axis/3+2-axis machining	3-axis/3+2-axis machining	5-axis machining
Included	**Milling system software package** ▪ Advanced Surface ▪ HMI user memory on user CF-card	**SINUMERIK MDynamics technology for 3-axis milling package** ▪ Advanced Surface ▪ Additional HMI user memory on the NCU's CF-card ▪ ShopMill machining step programming ▪ Automatic residual material detection and machining ▪ Measuring cycles in the automatic mode ▪ 3-D simulation and simultaneous recording ▪ TRANSMIT (face transformation) and TRACYL (cylinder surface transformation) ▪ Spline interpolation	**SINUMERIK MDynamics technology for 5-axis milling package** ▪ Advanced Surface ▪ Additional HMI user memory on the NCU's CF-card ▪ ShopMill machining step programming ▪ Automatic residual material detection and machining ▪ Measuring cycles in the automatic mode ▪ 3-D simulation and simultaneous recording ▪ TRANSMIT (face transformation) and TRACYL (cylinder surface transformation) ▪ Spline interpolationg ▪ TRAORI 5-axis machining package ▪ 3-D tool radius correction ▪ Measuring kinematics CYCLE996/9960
Optional functions	▪ Top Surface ▪ DXF reader ▪ EES — access and execution from any external memory ▪ Measuring kinematics CYCLE996/9960 ▪ ShopMill machining step programming ▪ Automatic residual material detection and machining ▪ Measuring cycles in the automatic mode ▪ 3-D simulation and simultaneous recording ▪ TRANSMIT (face transformation) and TRACYL (cylinder surface transformation) ▪ Spline interpolation ▪ Extended operating functions	▪ Top Surface ▪ DXF reader ▪ EES — access and execution from any external memory ▪ Measuring kinematics CYCLE996/9960	▪ Top Surface ▪ DXF reader ▪ EES — access and execution from any external memory

Intelligent motion control using Advanced Surface and Top Surface

Top Surface optimizes CAM data for the subsequent path control leading to an even better surface finish. Advanced Surface has an optimized "Look ahead" algorithm, which leads to perfect surface quality with identical results in adjacent milling paths.

The compressor ensures high contour precision and very high machining speeds. Intelligent jerk limiting puts less stress on the mechanical system of the machine. It enables smooth acceleration and deceleration even at the highest rates of acceleration, therefore extending the service life of the machine.

An essential advantage is the automatic harmonization of velocity profiles to adjacent milling paths by the control. It is also effective during forward / backward line-by-line milling of contours and free-form surfaces, resulting in a higher surface quality .

In addition, the ORISON function smooths out orientation fluctuations across several blocks.

With functions such as Advanced Surface and Top Surface, SINUMERIK controls can achieve the best surface finish and the highest possible speeds. This enables the complete machining of workpieces in just one clamping—allowing users to reach new levels of productivity for the high-speed milling of complex parts and free-form surfaces.

808D	828D	840D sl
✓	✓	✓

Advanced Surface

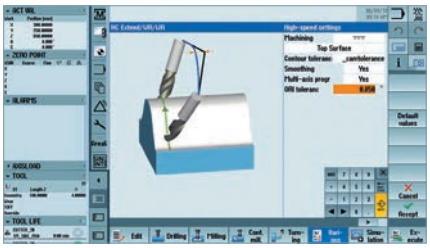
808D	828D	840D sl
–	✓	✓

Top Surface

Supplementary milling functions

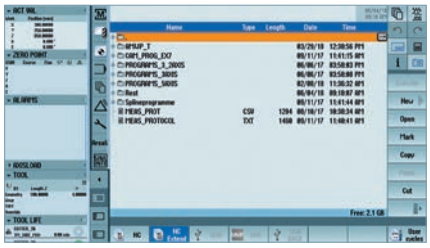
Top Surface — new COMPSURF compressor

The COMPSURF compressor allows significantly better workpiece surfaces to be achieved for inclined line-by-line milled finishing programs, for "poor" data quality and / or irregular point distribution in NC programs from the CAD/CAM system. COMPSURF also improves compliance with acceleration and jerk limits. As a result, machine-specific acceleration / jerk parameters can be increased. Standard values for contour and orientation tolerance are preset for almost all NC programs — independent of the calculation tolerance used in the CAD / CAM.



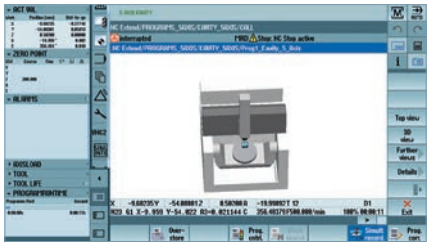
NC programs and workpiece documents can be freely accessed

The new EES option (execution from external storage) allows data to be freely accessed on USB sticks, hard disks and network resources connected to the NCU. This means that workpiece documents can be directly viewed at the machine via the graphical user interface — and part programs can be directly executed from external memories and storage devices. From the NCU perspective, with EES, external memories and NC memories are functionally at the same level. This means that only the capacity of the external data storage limits the maximum size of a part program.



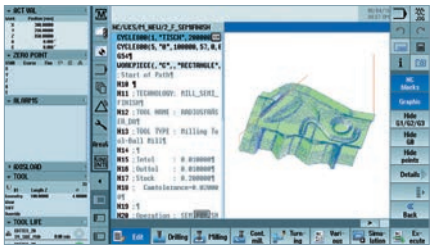
Optimum protection against undesirable collisions

Collision Avoidance in the SINUMERIK control offers 3D collision monitoring in real-time — for 1-channel machines with one NCU — and also for complex machining such as 5-axis simultaneous milling. Collision monitoring is available in every operating mode (JOG, MDA and automatic). The monitoring of machine elements with respect to one another, and with respect to tool cutting edges, can be visualized in 3D in SINUMERIK Operate.



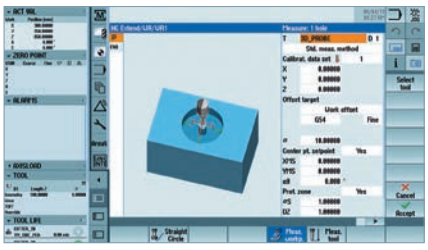
Quick moldmaking view (Quick Viewer)

For milling machines, the moldmaking Quick Viewer allows programs with free-form surfaces to be quickly visualized. G0, G1, G2, G3 NC blocks are supported along with the display of vectors for 5-axis machining — both when programming rotary axes as well as vectors.



Process measuring cycles – automatic measuring cycles

Using the SINUMERIK measuring cycles, the quality of machined parts can be easily monitored in the machine. Powerful and user-friendly cycles for workpiece measurement and tools ensure high productivity. Automatic measuring cycles in programGUIDE and ShopMill — identical to the measuring cycles in JOG — clearly reflect the high degree of user-friendliness and seamlessness of the control.



808D	828D	840D sl
–	✓	✓

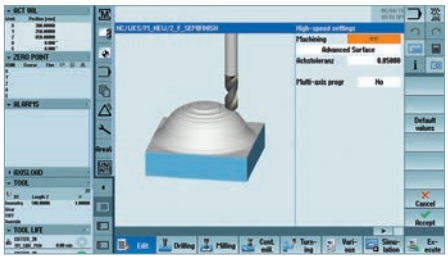
Supplementary milling functions

3-axis milling with SINUMERIK

The tool position is approached in space using linear axes X, Y and Z. This means that the tool tip can assume any position. For 3-axis machining, motion and machining are achieved by programming the three linear axes appropriately.

SINUMERIK cycles for complex tasks

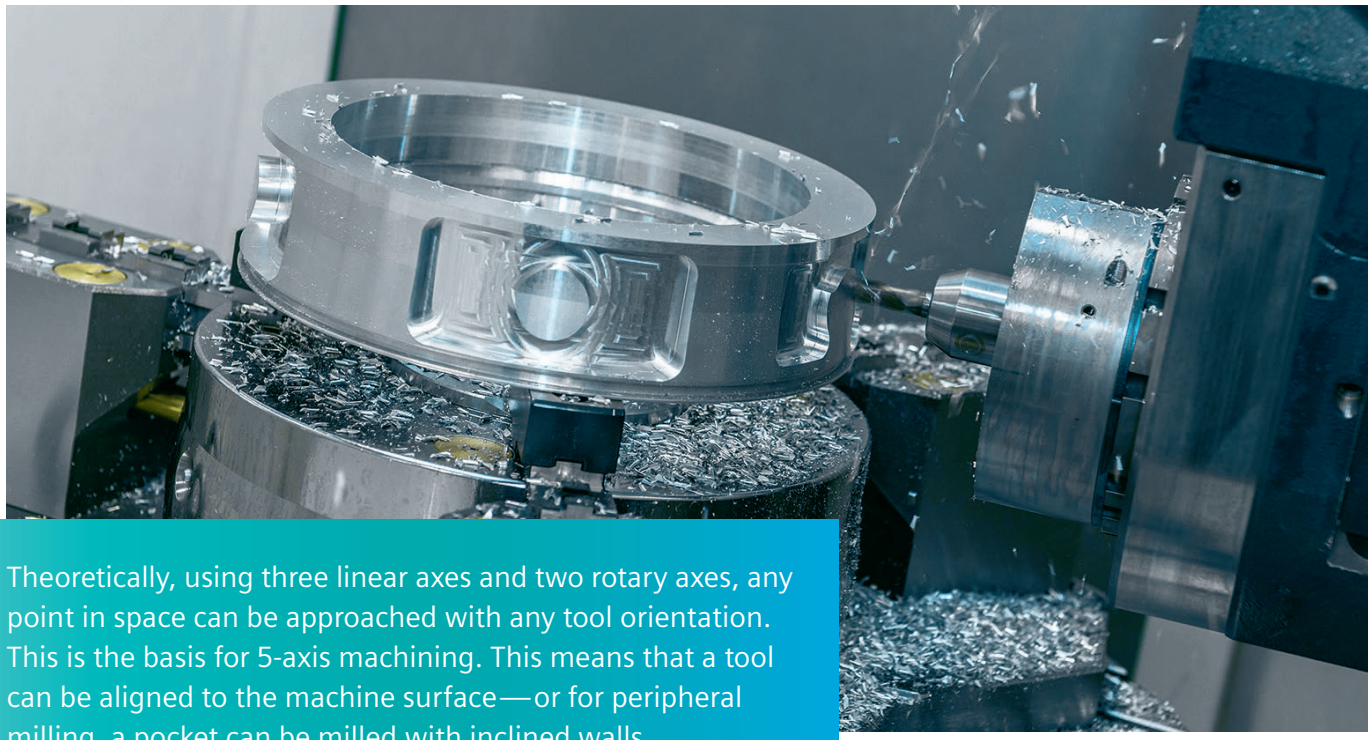
SINUMERIK cycles support users so that workpieces can be programmed faster and even more easily. For complex machining tasks, extensive machining steps can be handled without issue by using innovative CNC cycles—for example, using CYCLE832 for mold-making.



808D	828D	840D sl
✓	✓	✓

3-axis milling with SINUMERIK

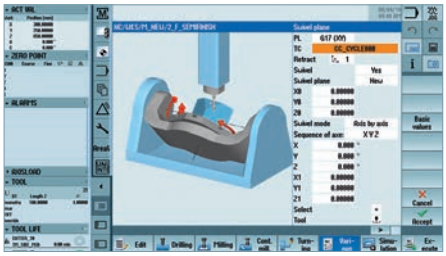
3+2-axis milling with SINUMERIK



Theoretically, using three linear axes and two rotary axes, any point in space can be approached with any tool orientation. This is the basis for 5-axis machining. This means that a tool can be aligned to the machine surface—or for peripheral milling, a pocket can be milled with inclined walls.

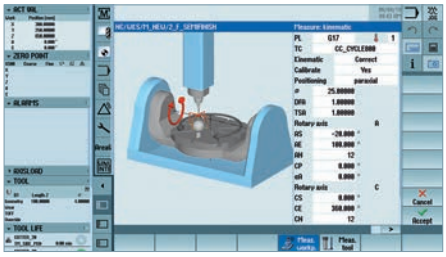
For all drilling and milling operations

3+2-axis milling with SINUMERIK facilitates every conceivable drilling and milling operation, including in any swiveled workpiece plane and on cylindrical workpieces. For simple handling, users have the popular CYCLE800 swiveling cycle available.



Checking the machine's precision at the press of a button

In addition to innovative measuring cycles for workpieces and tools, the “measure kinematics cycle“ CYCLE996/9960 has been specifically developed to measure multi-axis kinematics. It is simple to use and does not require expensive measuring equipment. The machine's kinematics can be measured at up to 12 positions per rotary axis using a 3D probe and the kinematics cycle. The cycle can be called directly from the NC program. Compared to conventional measuring techniques, this can save a lot of time with extremely precise measuring accuracy.



808D	828D	840D sl
–	✓	✓

3+2 axis milling with SINUMERIK

5-axis milling with SINUMERIK

The three linear axes X, Y and Z and two rotary axes A, B or C are used for milling with aligned tools, relief cuts or geometries arbitrarily located in space.

The axes must be able to be controlled and moved simultaneously.

Simplified work sequences

The SINUMERIK control has powerful functions, which significantly simplify multi-axis programming and operation. For example, TRAORI (tool center point programming), ORISON (orientation smoothing), CUT3DCD (tool radius compensation) and CUT3DFD (tool wear).

TRAORI

TRAORI is a dynamic process — rotary and linear axes can be traversed simultaneously during machining. The orientation of the tool in space can be changed continuously. And all axes (rotary and linear axes) are interpolated at the same time.

Orientation smoothing for 5-axis milling with ORISON

Using ORISON, the "smoothing of the orientation characteristic" function, orientation fluctuations are smoothened across several blocks. As a result, a smooth orientation and contour are achieved — and in turn, axes are smoothly and harmoniously traversed.

3-D tool radius compensation CUT3DC — CUT3DF

SINUMERIK supports the handling and machining of complex workpieces. For example, peripheral milling and face milling with tool radius compensation in 5-axis.

808D	828D	840D sl
–	–	✓

5-axis milling with SINUMERIK

Multi-tasking

Leading-edge machining with SINUMERIK

If your series production or small-batch part manufacturing involves mill-turning or turn-milling, Siemens has you covered. The SINUMERIK control supports you with various milling and turning tools; plus several different programming languages such as DIN/ISO, programGUIDE, ShopMill and ShopTurn; as well as simulation for both mill-turning and turn-milling applications. Siemens offers you the complete package for highly efficient and very productive CNC machining.

Innovative cycles for multi-tasking

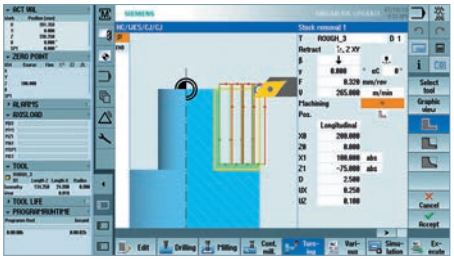
SINUMERIK cycles support machine tool users so that they can program the most complex workpieces more easily and even faster.

CYCLE800 swivel cycle

Machining operations can be easily programmed in the swivel plane (swivel table, swivel head) using the CYCLE800 swivel cycle. Also when using turning tools, this function—known from milling applications—can be used on a milling machine to approach turning tools or to align them. CYCLE800 is available in an easy-to-understand version for multi-tasking applications—perfectly combining turning and milling in one user interface.

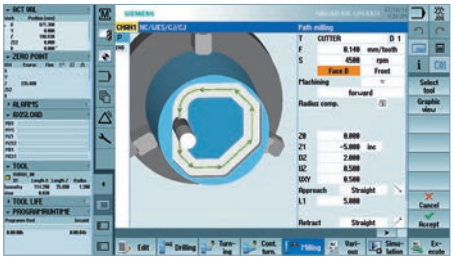
Turning cycle

Turning cycles have been expanded in programGUIDE, ShopMill and ShopTurn for easy operation of complex multi-tasking machines. A graphical contour computer supports users when entering data, while parameterization is easily achieved. This function is especially intuitive, as turning tools are displayed in the form of symbols. For the turning cycles function with ShopTurn and B-axis, aligned turning tools can be programmed both graphically and interactively. The approach angle of the B-axis and the positioning angle of the tool spindle are specified directly in the technology area of the cycle.



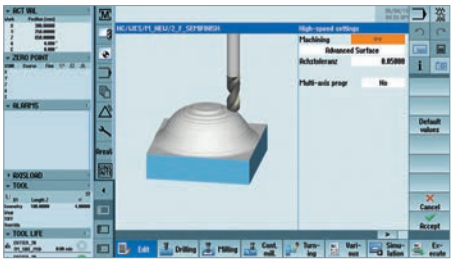
Milling cycle

Milling cycles with programGUIDE and B-axis are used to program machining operations on swiveled planes. After selecting the “Swivel plane“ function in CYCLE800, a new machining plane is generated on which all milling functions are created, also using cycles. Milling cycles with ShopTurn and B-axis allow workpieces to be milled on swiveled planes on a turning machine. Milling at the face or peripheral surface is defined by selecting the plane in the cycle. All milling cycles running on a lathe are identical with those in ShopMill.



High-Speed Setting

CYCLE832, the user-friendly High-Speed Settings cycle, simplifies parametization in mold-making and multi-tasking applications. Using just a few parameters, the SINUMERIK control is set to the particular machining task—roughing, finishing or semi-finishing—as well as the required machining tolerance.



808D	828D	840D sl
–	–	✓

Supplementary milling functions

Workpiece simulation for turn-milling and mill-turning

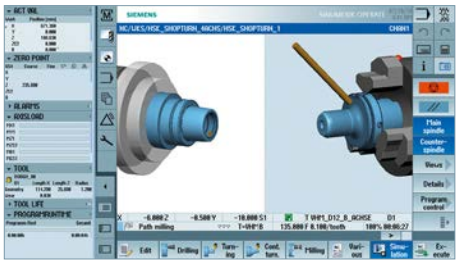
The more complex the application and the more expensive the workpiece to be machined are, the more important it becomes to have simulation—in other words, virtually checking the production process avoids costly mistakes and helps users calculate the machining time even before cutting begins. Important for achieving the ideal result—simulation can be started and stopped at any time, and relief cuts and hidden contours can be made visible.

Perfect simulation—so that it really is precise

Simulation in SINUMERIK Operate guarantees maximum process reliability and safety as real tool geometries are always used. It goes without saying that the simulation shows the precise image of the required machining operation—whether face or peripheral surfaces, swiveled workpiece planes or even machining in several channels. With the mold-making quick view, even very large part programs are displayed on the screen within seconds.

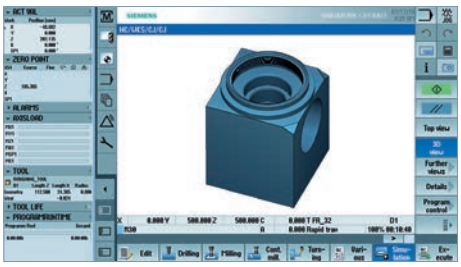
Turn-milling simulation

In turn-milling machines, milling and turning, as well as workpiece measurement, are simulated at the same time. 3D stock removal simulation is also possible for workpieces with inclined surfaces (3+2-axis machining) or free-form surfaces (3- to 5-axis machining). Machining operations using counter-spindles are also simulated—including simulation across several channels. In addition to simulation, machining operations can also be recorded simultaneously.



Mill-turning simulation

Mill-turning machines have the identical simulation and simultaneous recording options as turn-milling machines. In addition, for milling machines with several rotary axes, which are used as spindle for turning, the clamping parameters ensure the correct alignment of the unmachined part and the alignment with the simulation.



808D	828D	840D sl
–	–	✓

Workpiece simulation for turn-milling and mill-turning

SINUMERIK is the control of choice for every machining technology

It's well-known that SINUMERIK is powerful when it comes to turning, milling and grinding—as well as nibbling, laser cutting and gear wheel machining. It's also the perfect control for new applications such as multi-tasking, additive manufacturing and composites machining.

	SINUMERIK 828	SINUMERIK 840	SINUMERIK ONE	SINUMERIK MC
Grinding	✔	✔	✔	✔
Additive manufacturing	–	✔	✔	✔
Gear machining	✔ [1)]	✔	✔	–
Nibbling, laser, water jet and plasma machining	–	✔	✔	✔
Composites machining	–	✔	✔	–
Automated cell	✔	✔	✔	✔

[1)] *Option: CP-Comfort*

Grinding

SINUMERIK offers the ideal solution to increase machine productivity and reduce profiling times — from basic to high-end grinding applications.

Additive manufacturing

In additive techniques, such as material extrusion or laser cladding, the 5-axis technology of our SINUMERIK 840D sl — in conjunction with the SINAMICS S120 drive system and SIMOTICS motors — results in precise and dynamic motion control.

Gear machining

Machining gears is a complex process that demands the highest degree of precision. The advantages of SINUMERIK controls are fully leveraged when it comes to turning a gear wheel, cutting gears with a hobbing cutter — along with the final beveling and chamfering.

Nibbling, laser, water jet and plasma machining

Going beyond standard technologies, the openness of the SINUMERIK CNC system allows nibbling, laser, water jet and plasma machining solutions to be engineered.

Composites machining

When it comes to machining composites, the quality of the final product is absolutely decisive. Depending upon the particular material, production techniques such as laser machining, milling or grinding are used — all of which can be flexibly controlled by SINUMERIK.

Automated cell

Robots must be able to be simply integrated into CNC machines and production workflows. SINUMERIK Run MyRobot offers solutions that range from a simple connection via the user-friendly integration for handling tasks — up to high-precision motion control of machines using robot kinematics.

On track to achieve increased productivity with CNC Shopfloor Management Software

Machine builders and machine users can respond more flexibly to changing market demands while simultaneously increasing their productivity thanks to digitalization. CNC Shopfloor Management Software addresses your specific machine requirements by facilitating the management, analysis and optimization of your machine tools—independent of the control system manufacturer onboard.

Increased productivity during production

Machine tools are integrated intelligently into production processes. The pre-condition is that production planning and production—along with the various machines—are networked on three different platforms depending upon the specific requirement. This allows part programs and data to be transferred error-free.

SINUMERIK Integrate to optimize machine availability and increase productivity

The SINUMERIK Integrate platform hosts a wide range of machine tool applications that provide functions adapted to engineering and production. For example, with condition monitoring, both machine availability and productivity can be increased—and the advantages of the digital world leveraged—without any link to the Cloud.

SINUMERIK Edge—optimization based upon real-time data

SINUMERIK Edge is a rugged high-performance hardware and software solution for CNC machines (Edge Computing), which can process and analyze high-frequency data in real-time. Customized Edge-Apps facilitate machine tool monitoring and even machine optimization.

Manage MyMachines—for more transparency and digital manufacturing

The Manage MyMachines application captures data in the Cloud, so that the status of a CNC machine is available at any given time. As a result, users always have an overview of the current machine and production data of all of their machines on the manufacturing floor—users can even create visualization and analysis dashboards via the web quickly and easily.

The digital twin—the virtual image

This virtual image of the CNC machine and SINUMERIK control allows manufacturers to shift their production planning from the machine to the PC.

"My machine? It's highly productive — thanks to the digital twin."

SINUMERIK

Technical information

	SINUMERIK 808	SINUMERIK 828	SINUMERIK 840
Configuration			
Mechanical design	Panel-based	Panel-based	Drive-based
CNC performance versions	PPU15X PPU16X	PPU24X (828D BASIC) PPU28X PPU29X	NCU710 NCU720 NCU730
Display size (TFT color displays)	8.4"	10.4" / 15.6"	7.5" / 10" / 12" / 15" / 19" / 22" / 24"
Maximum number of axes / spindles	5	10 plus 2 auxiliary axes	93 + any number of PLC axes
PLC adaptation control	SIMATIC S7-200	SIMATIC S7-200	SIMATIC S7-300
Machine channels / mode groups, up to	1	2	30
CNC user memory, up to	1.25 MB	10 MB	22 MB
Extended CNC user memory	–	100 MB	100 MB
Additional CNC user memory on SSD, up to	–	–	120 GB
Servomotor operation	✓	✓	✓
Torque motor operation	–	✓	✓
Linear motor operation	–	–	✓
Spindle motor operation	✓	✓	✓
OPC UA	–	✓	✓
Standard data transfer	USB / Ethernet	USB / CF card / Ethernet	USB / Ethernet
Axis functions			
Acceleration with jerk limiting	✓	✓	✓
Dynamic pre-control	✓	✓	✓
Dynamic Servo Control in the drive	✓	✓	✓
Interpolation			
Simultaneously interpolating axes, up to	4	8	20
Straight line, circle, helix	✓	✓	✓
Splines	–	✓	✓
Advanced Surface	✓	✓	✓
Top Surface	✓ (PPU16X)	✓	✓
Look Ahead	✓	✓	✓
Compressor	✓ (PPU16X)	✓	✓
Tools / tool management			
Number of tools / cutting edges, up to	64 / 128	768 / 1536	1500 / 3000
Unit quantity / tool lifetime monitoring with management of replacement tools	–	✓	✓
Monitoring functions			
Work zone limiting	✓	✓	✓
Collision avoidance	–	✓ (ECO)	✓ (ECO, ADVANCED)
Compensations			
Measuring system and spindle pitch compensation	✓	✓	✓
Temperature compensation	–	✓	✓
Nodding compensation	–	✓	✓
Friction compensation	–	✓	✓
Other compensations (sag, volumetrics)	–	–	✓
Cogging torque compensation	–	✓	✓

	SINUMERIK 808	SINUMERIK 828	SINUMERIK 840
SINUMERIK synchronous architecture			
Motion synchronized actions	–	✓	✓
Asynchronous subprograms	✓	✓	✓
Transformations			
Face / peripheral surface transformation	✓	✓	✓
Multi-side machining (3+2-axis machining)	–	✓	✓
Dynamic 5-axis machining (TRAORI)	–	–	✓
Additional machine-specific kinematic transformations	–	–	✓
CNC operation			
SINUMERIK Operate	✓ (BASIC)	✓	✓
Animated Elements	–	✓	✓
startGUIDE: graphic interactive commissioning, onboard tutorials	✓	–	–
User interface on NCU / PPU (Linux) / IPC (Windows®)	✓ / –	✓ / –	✓ / ✓
Training and offline programming tools	✓ (808D on PC)	✓ (SinuTrain)	✓ (SinuTrain)
CNC programming			
SINUMERIK CNC programming language with high-level language elements	✓	✓	✓
Online ISO dialect interpreter	✓	✓	✓
DXF reader	–	✓	✓
programGUIDE	✓(BASIC)	✓	✓
Technology cycles for drilling, milling and turning	✓	✓	✓
Technology cycles for grinding	–	✓	✓
Cycles for process measurements	–	✓	✓
Balance Cutting	–	✓	✓
ShopMill / ShopTurn machining step programming	–	✓	✓
CNC simulation for turning / milling	✓ (2D)	✓ (3D)	✓(3D)
Onboard optimization and diagnostics			
Context-sensitive onboard help system	✓	✓	✓
Onboard servo and drive optimization (AST)	✓	✓	✓
Onboard signal, bus and network diagnostics	–	✓	✓
Onboard maintenance and service tools	✓	✓	✓
Safety functions			
SINUMERIK Safety Integrated	–	✓	✓ (plus)
SINUMERIK Ctrl-Energy			
Ctrl-E Analysis / Profiles (energy usage / energy management)	–	✓	✓
Automatic reactive current compensation	–	✓	✓
Automatic flux reduction for induction spindle motors	–	✓	✓

– not available
✓ available (certain functions are available as an option on the CNC; please ask your machine tool builder for more information)

Everything about SINUMERIK machining technologies can be found on the web

usa.siemens.com/cnc-machining

Published by
Siemens Industry, Inc.

390 Kent Avenue
Elk Grove Village, IL 60007

(800) 879-8079

Order No. MBBR-CNCMT-0121

Printed in USA
© 2021 Siemens Industry, Inc.

usa.siemens.com/cnc

This brochure contains only general descriptions or performance features, which do not always apply in the manner described in concrete application situations or may change as the products undergo further development. Performance features are valid only if they are formally agreed upon when the contract is closed.

Siemens is a registered trademark of Siemens AG. Product names mentioned may be trademarks or registered trademarks of their respective companies. Specifications are subject to change without notice.