

**SIEMENS**



# SINUMERIK 828D SINUMERIK 828D BASIC

The powerhouse of compact-class CNC machines

[siemens.com/sinumerik](https://www.siemens.com/sinumerik)

Answers for industry.



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## We bring your manufacturing up to speed

With their unique CNC performance, the SINUMERIK 828D and SINUMERIK 828D BASIC CNCs set benchmarks when it comes to milling and turning on standard machines. Our premium CNC technology opens up unique possibilities for even more productive workpiece milling and turning.

With its SINUMERIK 828 controls, Siemens Machine Tool Systems offers compact CNC systems for standard turning and milling machines. With its technology-specific system software, the range of applications extends from vertical and basic horizontal machining centers — naturally also for moldmaking applications — up to turning machines with counterspindle, driven tools and Y axis. Rugged hardware architecture and intelligent control algorithms, along with premium drive and motor technology, ensure the highest dynamic response and precision when machining. The intuitive SINUMERIK Operate user interface facilitates efficient machine operation. With their outstanding performance, SINUMERIK 828 controls master all of the demands for standard turning and milling machines, and are supplemented by a range of IT integration solutions.

# SINUMERIK — a CNC portfolio for the global machine tool environment



## SINUMERIK 808D

- Panel-based compact CNC
- Technologies: turning and milling
- Up to 4 axes/spindles
- 1 machining channel
- 7.5" color display
- S7-200 PLC

SINAMICS V60

SINUMERIK 808D

Entry class

## SINUMERIK 828D / SINUMERIK 828D BASIC

- Panel-based compact CNC
- Technologies: turning and milling
- Up to 8 axes/spindles
- 1 machining channel
- 8.4"/10.4" color display
- S7-200 PLC

SINAMICS S120

SINAMICS S120 Combi

SINUMERIK  
828D BASIC

SINUMERIK  
828D

Compact class

## SINUMERIK 840D sl

- Drive-based, modular CNC
- Multi-technology CNC
- Up to 93 axes/spindles
- Up to 30 machining channels
- Modular panel concept up to 19" color display
- SIMATIC S7-300 PLC

SINAMICS S120  
Combi

SINAMICS S120

SINUMERIK  
840D sl BASIC

SINUMERIK  
840D sl

Premium class

# Compact, powerful, simple ... ... simply perfect



SINUMERIK 828D and SINUMERIK 828D BASIC set standards in the compact CNC class when it comes to ruggedness and operator friendliness.

## Rugged and maintenance-free

With an operator panel front manufactured out of die-cast magnesium, a panel-based CNC design with well conceived interfaces along with the high IP65 degree of protection make the SINUMERIK 828 a reliable CNC, even in harsh environments. The SINUMERIK 828D and SINUMERIK 828D BASIC are completely maintenance-free CNC controls as they have no fan and no hard disk — and are equipped with NV-RAM memory technology without buffer battery. Two different panel layouts are available — horizontal and vertical — a feature that further enhances their versatility.

## User-friendly

Equipped with a full QWERTY CNC keyboard with shortcut keys and a high resolution 8.4" / 10.4" TFT color display, SINUMERIK 828 controls can be simply operated. CNC data can be transferred quickly and easily using USB, Compact Flash (CF) card and RJ45 interfaces at the operator panel front. The fully graphical user interface and the structure of the CNC direct keys facilitate fast operation with just a few keystrokes. Turning and milling machines are operated in an identical fashion.

# An overview of the Panel Processing Unit (PPU)

## Communications:

Front interfaces (IP65)

- RJ45 Ethernet
- USB 2.0
- Compact Flash (CF) card

## Durable and rugged:

Panel-based CNC with panel front manufactured out of die-cast magnesium

## Everything at a glance:

Depending on the particular model:

- 8.4" TFT color display
- 10.4" TFT color display

## 16 softkeys:

Using the 8 horizontal and 8 virtual keys, you can quickly get into all of the operator screen forms with just a few keystrokes.



• **Maintenance-free:**

- No battery (continuous data buffering based upon NV-RAM technology!)
- No fan
- No hard disk

• **User-friendly:**

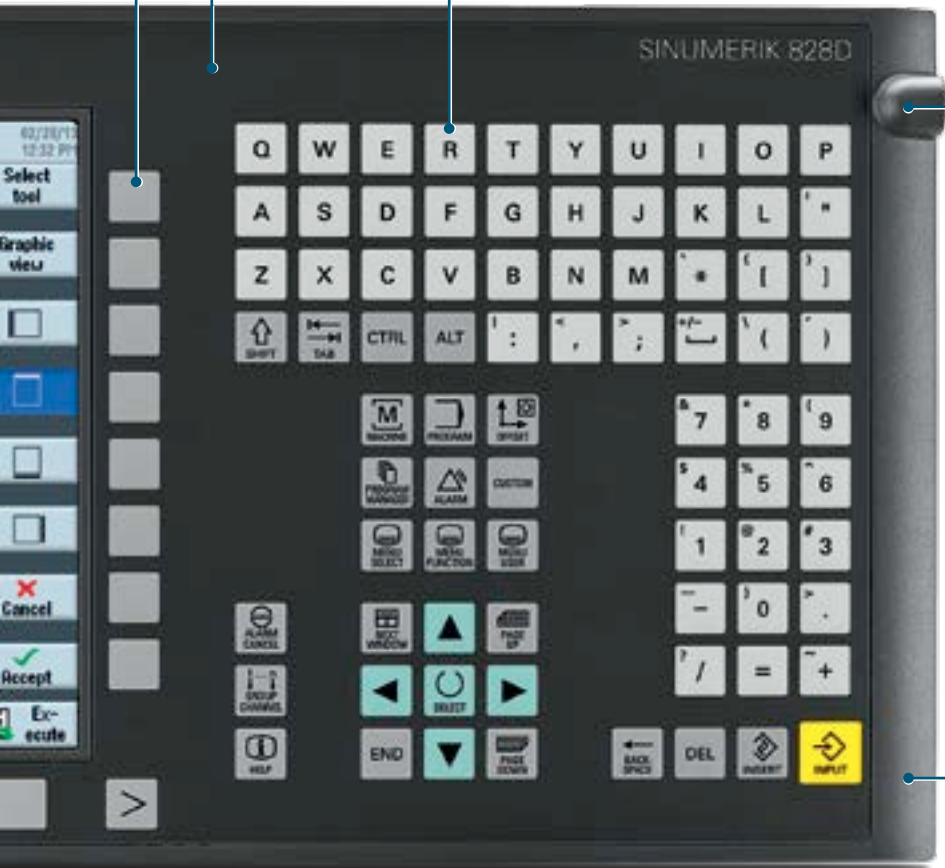
- Full QWERTY keyboard
- Hard keys with protective foil
- IP65 degree of protection

• **Clever:**

- 3/8" thread for accessories

• **Optimum connection:**

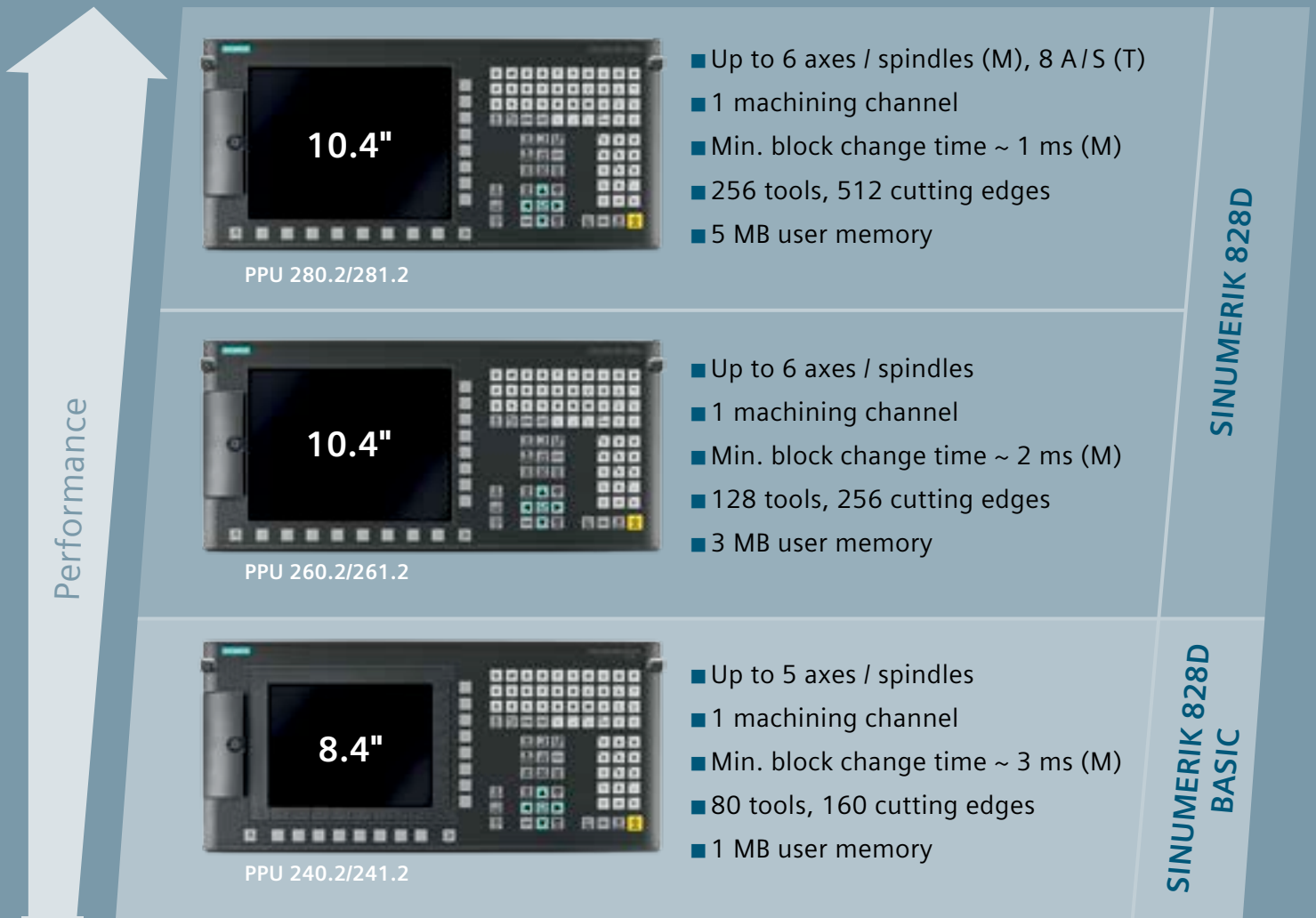
- Rear interfaces
- USB 2.0
- RJ45 Ethernet
- DRIVE-CLiQ
- PLC I/O interface
- RS232 C
- NC inputs/outputs



Accessories for the SINUMERIK 828 CNCs can be found at:  
[www.sinumerik-gadgets-pfeiffer.de](http://www.sinumerik-gadgets-pfeiffer.de)



# SINUMERIK 828D and SINUMERIK 828D BASIC — optimum scalability in the compact class



## Scalable CNC performance

In addition to two high-performance CNC versions of the SINUMERIK 828D, the SINUMERIK 828D BASIC is the favorably-priced entry into the compact class.

This means that SINUMERIK 828 CNCs are always perfectly adapted to the performance requirements of standard machine tools.



# SINAMICS and SIMOTICS — the powerhouses behind the scenes

SINUMERIK 828 controls in conjunction with SINAMICS drives and SIMOTICS motors are optimally designed to address the requirements of standard turning and milling machines.



## **SINAMICS S120 — the highest degree of flexibility**

SINAMICS S120 is synonymous for performance and flexibility when it comes to machine tools. In addition to a wide range of modules with power ratings up to 300 kW, there is also an infeed unit with controlled DC link. This ensures the fastest spindle acceleration rates. This is complemented by DSC (Dynamic Servo Control), a unique position control technique to achieve the highest dynamic performance from feed and spindle motors.

## **SINAMICS S120 Combi — the optimum drive for compact machines**

SINAMICS S120 Combi combines the performance of the modular SINAMICS S120 in a rugged, compact design. One infeed and up to four motor modules are integrated in an enclosure. Through the intelligent expansion to include two additional motor modules, SINAMICS S120 Combi is the ideal drive system for compact, standard machine tools with a spindle power of up to 15 kW and up to five feed axes.

[www.siemens.com/sinamics](http://www.siemens.com/sinamics)

## **SIMOTICS servomotors**

High static torque, high maximum speed and smooth-running properties make SIMOTICS servomotors the optimum feed drives for machine tools. A high degree of protection, strong bearings and a vibration-free design ensure that these synchronous servomotors have an outstanding degree of reliability. High-quality magnetic materials result in a very high power density — and in turn, the smallest motor dimensions. This means that they can be installed in machines where space is extremely tight.

## **SIMOTICS torque motors**

In addition to conventional rotating motor principles, the SIMOTICS range also includes the SIMOTICS 1FW6 torque motor. This is a direct drive concept with a very high dynamic performance.

## **Spindle solutions from Siemens**

Siemens has supplemented its long-standing tradition in the production of electric motors to include expertise in spindle manufacturing with Weiss Spindeltechnologie GmbH. As a result, Siemens Machine Tool Systems can offer a wide range of spindle solutions from a single source.

[www.siemens.com/simotics](http://www.siemens.com/simotics)

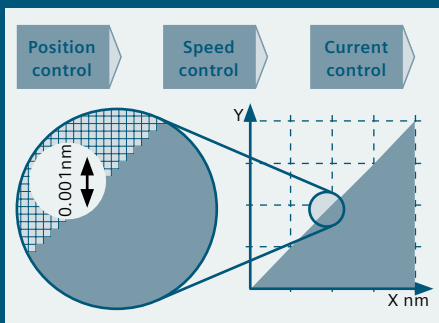
[www.siemens.com/spindles](http://www.siemens.com/spindles)

# SINUMERIK CNC performance — the machining standard

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

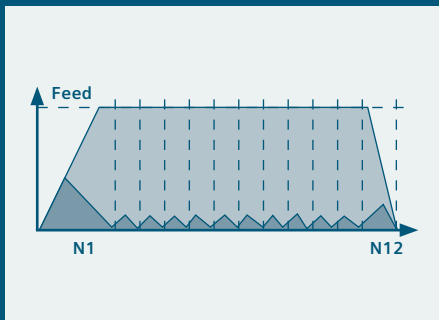
Whether precision and speed, energy efficiency and safety or reduced cycle times —

SINUMERIK sets the pace.



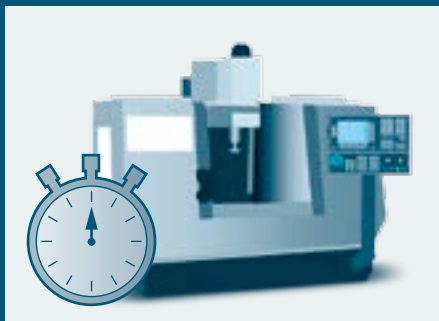
## The highest precision

SINUMERIK CNC and SINAMICS drives compute with a high-performance 80-bit NANO<sup>FP</sup> accuracy. This eliminates rounding errors and offers an extremely high internal computational accuracy in the complete controller circuit. Further, dynamic pre-control ensures that the following error is almost completely compensated — and jerk limitation reduces stress on the mechanical system when axes accelerate. Thanks to Dynamic Servo Control, SINAMICS drive technology offers additional position control — and, as another positive feature, noise immunity for 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 velocity, but the performance of the CNC. Here, SINUMERIK with the Advanced Surface feature represents the ideal solution: Advanced Surface stands for state-of-the-art control algorithms, such as Look Ahead or dynamic compression of linear and circular blocks in 5th degree polynomials (NURBS). This means that machines equipped with SINUMERIK can be operated up to their physical limit.



## The shortest idle times

Especially in large serial production, where the machine is no longer productive, idle times represent a critical productivity inhibiting factor. Here, with its synchronous architecture and intelligent functions, such as synchronized actions and asynchronous sub-programs (ASUPs), SINUMERIK provides the ideal solution. For example, the loading of equipment can be implemented without having to make time-consuming modifications to the PLC adaptation control.

### Kinematic transformations

When handling complex machine kinematics, SINUMERIK CNC is in its element — from classic face/peripheral surface transformation for turning machines up to multi-side machining in swiveled planes. As a result, SINUMERIK paves the way for leading-edge 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 highly efficient drive/motor components, CNC/drive functions, software solutions and services. SINUMERIK Ctrl-Energy offers energy-efficient solutions over the complete machine lifecycle — from the design to operation of the machine. For example, users have intelligent functions at their fingertips, such as being able to analyze the energy costs associated with the workpiece: SINUMERIK helps save energy by simply pressing the shortcut key Ctrl + E.



[www.siemens.com/sinumerik/ctrl-energy](http://www.siemens.com/sinumerik/ctrl-energy)

### Protection of people and the machine with SINUMERIK Safety Integrated

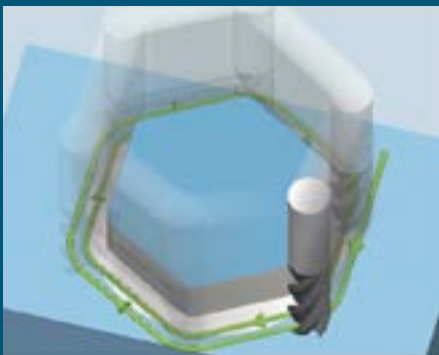
Siemens Machine Tool Systems is the pioneer when it comes to protecting both people and the machine. For almost two decades, SINUMERIK Safety Integrated has set the standard for machine tool safety technology. Here, intelligent system functions facilitate user-friendly operation of the machine, for example, machine setup with the protective doors opened. This provides the highest degree of safety for machine operators and the machine.



# SINUMERIK Operate — the state-of-the-art operating system for the 21st century

SINUMERIK Operate offers you such an easy-to-use graphical interface, that it sets the standard for efficient machine tool operation.

[www.siemens.com/sinumerik-operate](http://www.siemens.com/sinumerik-operate)



## Interactive input with Animated Elements

With Animated Elements, SINUMERIK Operate makes it very easy to enter parameters. Animated Elements completely redefine what graphical programming and operation really mean — using a unique display with moving image sequences.



## Program Manager for a better overview

SINUMERIK's Program Manager makes data handling just as easy-to-use as a PC, where data from various storage media are displayed. A CNC program can be transferred from the data server to the CNC's memory by simple copy and paste. And it becomes even easier — large moldmaking workpieces can be executed in the Program Manager, directly via the company network, USB stick or a Compact Flash (CF) card.



## SinuTrain for SINUMERIK Operate

The SinuTrain training software makes SINUMERIK Operate even closer to reality on the PC, including the animated machine operator panel. Expertise gained during the training course can be easily transferred into practice. The powerful tool closely facilitates offline programming at the PC, and NC programs can be transferred to the CNC directly.

Thanks to SINUMERIK Operate and the original SINUMERIK CNC kernel, every operation and programming process can be used, and every CNC program can be executed without restriction.

[www.siemens.com/sinutrain](http://www.siemens.com/sinutrain)

# SINUMERIK Operate — intuitive handling, faster setup

Based upon intelligent JOG mode and intuitive tool management, SINUMERIK Operate graphically and interactively supports all of the typical setup functions. This makes machine setup quick and easy — while increasing the machine's overall productivity.

## Intelligent JOG mode

In SINUMERIK Operate, the intelligent JOG mode provides graphical, interactive support for all of the typical setup functions for turning and milling machines. This means that a tool can simply be loaded with just three clicks. Face turning of a blank or boring soft clamping jaws is directly achieved in the intelligent JOG mode — without having to generate a part program — a time-consuming affair. This means that non-productive times are reduced to an absolute minimum.

## Tool and workpiece measurement

Measuring tools and workpieces 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 — even in swiveled workpiece planes. Tool measurement is also a simple procedure for SINUMERIK CNC. Regardless 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 offers the perfect command when it comes to tool management. Tool information and magazine location are clearly displayed on the screen. A suitable magazine location is automatically selected simply by selecting a tool and pressing a key — the 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.





# The finest technology cycle packages — turning, milling and more

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

## Technology cycles for every machining operation

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 or turning grooves up to more complex machining operations involving engraving, deep-hole milling and trochoidal milling of hard metals. Based upon intelligent kinematic transformations, the technology cycles are available at all machining levels. For example, at face or peripheral surfaces of turned workpieces, or in swiveled planes of milling workpieces.

## Multiple clamping for ShopMill machining step programming

Milling machines become even faster and even more flexible — ShopMill machining step programs can be automatically compiled for multiple clamping with reduced tool change operations. CNC programs are automatically generated — and multiple clamping is supported for both identical and different workpieces.

## Solid machining along contours and stock removal with residual material detection

When you use SINUMERIK CNC, in addition to standard geometries, complicated geometries can be machined without a CAD/CAM system thanks to the integrated geometry computer and the 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 segment. The result — optimal machining quality and significant time-savings.

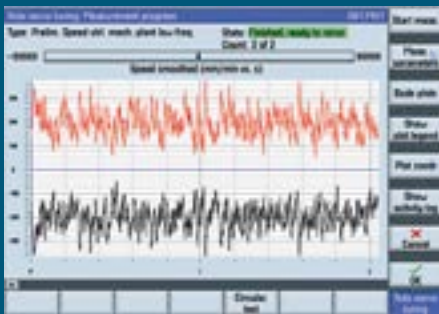
## Measuring cycles for the highest precision

Integrated measuring cycles ensure workpiece precision during the machining process. Tool geometries and work offsets are corrected automatically, so that the required production tolerances are maintained, even for high batch quantities. The integrated reporting function ensures that the workpiece quality is documented.



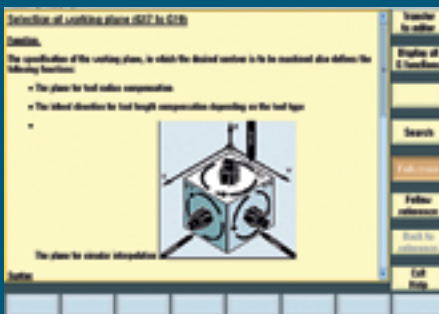
# SINUMERIK Operate — everything on board for optimization and diagnostics

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



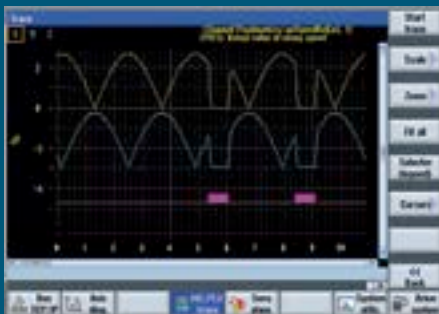
## One-click optimization

With its Auto Servo Tuning (AST), SINUMERIK Operate offers fully automatic optimization of control parameters to achieve maximum dynamic performance and accuracy of the machine axes — onboard and with just one click. This simplifies commissioning of the machine, and it can be post-optimized on a regular basis during operation. This ensures maximum machine precision over its complete service life.



## All information onboard

Using context-sensitive graphical onboard help, the SINUMERIK's technical documentation can be called up on the CNC screen. As a result, all of the information in the input fields, CNC language command, as well as system messages and system parameters, are directly available at the machine without having to print out manuals. This simplifies operation and programming, while making commissioning, diagnostics and maintenance far more user-friendly and efficient.



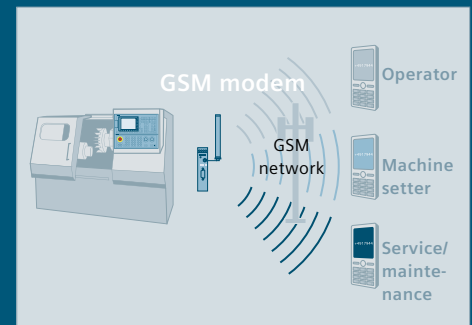
## Diagnostics

Especially in large serial production, machine failures can result in huge production losses. SINUMERIK Operate provides intelligent onboard diagnostics, so in the case of a problem, the system is up and running again 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.



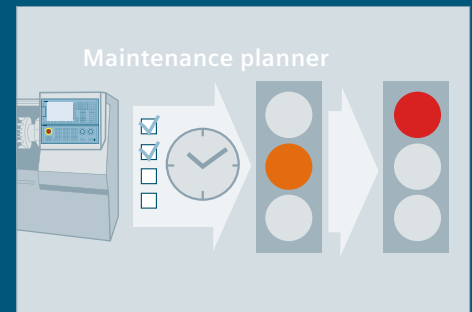
### Consistent control with Easy Message

The process status of the machine is always available at a glance — and Easy Message makes it possible. All of the important status information is sent to your mobile phone by text message (SMS) — for example, tool life, the availability of blanks and even upcoming machine maintenance schedules. This means that you are always up to date, even if you are not standing at the machine. This feature increases machine efficiency, your overall productivity and the production process — while facilitating preventive maintenance.



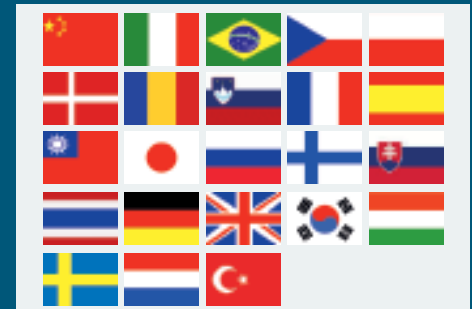
### SINUMERIK 828D maintenance planner — all maintenance work is displayed on the screen

Using the onboard maintenance planner, it is even easier to plan and implement maintenance schedules. Advance warning messages support machine operators when preparing the work — and pre-defined actions play a role in protecting both the operator and the machine. The onboard maintenance planner almost completely replaces printed maintenance manuals.



### SINUMERIK Operate — it speaks your language

SINUMERIK Operate is available in over 20 languages. With this comprehensive package of languages for the graphical user interface, SINUMERIK CNC systems support the global marketing of machine tools.



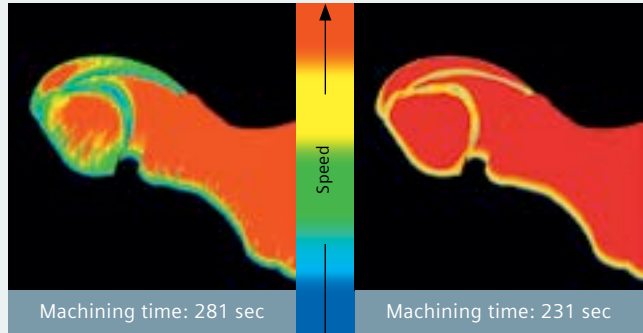
# SINUMERIK MDynamics — synonymous for perfect workpiece surfaces

SINUMERIK MDynamics features cutting-edge operation with unique technology cycles making it the ultimate in shopfloor programming, high-quality CNC simulation and motion control.

**Advanced Surface gets the most out of your machine**  
Advanced Surface is synonymous for milling to the physical limits of the machine. State-of-the-art look ahead algorithms and intelligent block compression ensure maximum machining speed with the highest surface quality and precision.

## High-Speed Settings

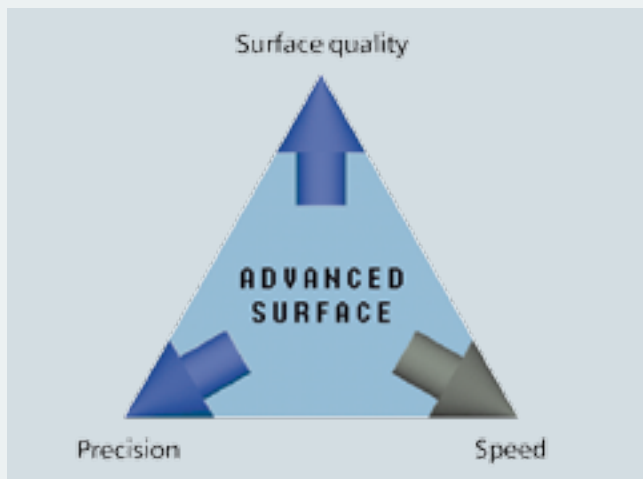
The High-Speed Setting cycle is user-friendly and simplifies the parameterization of moldmaking applications. Using just a few parameters, SINUMERIK is set to the particular machining task — roughing, finishing or semi-finishing, as well as the required machining tolerance.



## The combination makes the difference

Advanced Surface, High-Speed Settings, kinematic transformations, SINUMERIK Operate for efficient operation and programming, as well as a comprehensive range of technology and measuring cycles, create a unique combination of exciting features for sophisticated milling machines. This is SINUMERIK MDynamics.

[www.siemens.com/sinumerik-mdynamics](http://www.siemens.com/sinumerik-mdynamics)



# IT integration with Siemens — intelligent networking in production

In addition to CNC technology, Siemens offers a comprehensive portfolio for IT integration — from standard data transfer using SINUMERIK Operate to PLM data management with TEAMCENTER.



SINUMERIK controls master all of the usual data transfer techniques such as USB, Compact Flash (CF) card and TCP/IP Ethernet — without the need for emulation or file conversion programs.

## **SINUMERIK Integrate**

SINUMERIK Integrate allows SINUMERIK 828 controls to be remotely serviced and maintained. A powerful tool is available in the form of Access MyMachine.

[www.siemens.com/sinumerik-integrate](http://www.siemens.com/sinumerik-integrate)

## **SINUMERIK and NX CAM**

Using NX CAM, the well-proven solution for programming CNC systems, companies can maximize the production yield of their modern machine tools. In addition to a wide range of flexible technologies for the programming of CNC systems, NX CAM also includes a part manufacturing solution.

This encompasses a library of clamping resources, as well as options for data administration, data management, process planning and direct connection options to the shopfloor. Being closely connected to the SINUMERIK CNC technology results in maximum productivity while machining high-quality workpieces.

[www.siemens.com/plm](http://www.siemens.com/plm)

## **TEAMCENTER**

TEAMCENTER, a product from Siemens PLM Software, is the central information source for product and process expertise in companies. Thanks to a comprehensive PLM (Product Lifecycle Management) solution portfolio, TEAMCENTER links every stage of the product lifecycle to this central source. The portfolio encompasses requirements and engineering process management, simulation process management, as well as production process management. The latter is a single, scalable, reliable and secure source for production information, which supports lifecycle processes from development all the way up to production.

[www.siemens.com/plm](http://www.siemens.com/plm)

# Siemens Machine Tool Systems — your partner for machine tools



## Siemens Machine Tool Systems

### **A strong partner for the machine tool environment**

SINUMERIK CNCs have been setting standards in the machine tool market for more than 50 years. With the power and innovation of a unique and experienced development team in the industry, Siemens is there to ensure that highly productive machine tools can also be implemented in the future based upon SINUMERIK control systems. In addition to innovation, quality is first and foremost, and based upon continuous improvements in development, production and test processes, we ensure maximum availability of software and hardware products.

### **Global organization**

With a closely meshed network of sales, service and training locations, as well as international production facilities, Siemens Machine Tool Systems is optimally organized to globally market machine tools. Here, our own Technology and Application Centers (TACs) prove our technological expertise, and secure the ergonomics of our CNC software in practical use. Additionally, Siemens is the pioneer when it comes to sustainability and energy efficiency as Siemens Machine Tool Systems plays a leadership role when it comes to energy-efficient equipment for machine tools.

### **The optimum solution for each and every sector**

Global trends, such as the continuous population growth and the rising demand for communication resources, are placing new requirements on sectors such as automotive, aerospace, power generation and medical. Siemens Machine Tool Systems is in direct contact with these machine tool markets. This guarantees the optimum product fit for SINUMERIK systems.

### **Premium IT integration and services**

We also supply leading-edge IT integration and simulation solutions to optimally network production and the IT environment. This is supplemented by a sector-specific portfolio of support and services to ensure maximum productivity in production, service and maintenance. As a consequence, SINUMERIK sector solutions are being employed around the world.

# 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 service, repair and maintenance around the world in more than 60 regions.

### Technical Support (hotline)

Worldwide in more than 25 regions, our hotline experts answer any question relating to SINUMERIK CNC — and naturally in the local time and the local language.

[www.siemens.com/industry/onlinesupport](http://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 operation, programming, commissioning and maintenance of SINUMERIK controls in more than 50 countries around the globe.

[www.siemens.com/sitrain](http://www.siemens.com/sitrain)

## 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 the requirements and situation [www.siemens.com/sfs](http://www.siemens.com/sfs)
- Manufacturing IT — process optimization through the implementation of the SINUMERIK Integrate product suite
- Extended Machine Contracts — tailored service contracts that fit your budgetary requirements
- 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

[www.siemens.com/sinumerik/manufacturingexcellence](http://www.siemens.com/sinumerik/manufacturingexcellence)

# Technical data

	SINUMERIK 828D BASIC	SINUMERIK 828D	
	PPU24x	PPU26x	PPU28x
<b>Configuration</b>			
Mechanical design	Panel-based		
Operation with SINAMICS S120 Combi drives	●	●	●
Operation with SINAMICS S120 Booksize drives	●	●	●
Maximum number of axes/spindles (M: milling/T: turning)	5/5	6/6	6/8
CNC user memory, up to	1 MB	3 MB	5 MB
Additional CNC user memory on CF card/USB stick	●	●	●
Minimum block change time	~3 ms	~2 ms	~1 ms
Current/speed controller cycle	125 μs		
Current/speed controller cycle, e.g. for high-speed spindles	62.5 μs		
Display size (TFT color displays)	8.4"	10.4"	10.4"
PLC adaptation control	S7-200-based		
PLC I/O interface based on PROFINET	●	●	●
<b>Axis functions</b>			
Travel to fixed stop with Force Control	●	●	●
Acceleration with jerk limitation	●	●	●
Dynamic precontrol	●	●	●
Advanced Position Control (APC)	–	–	–
Dynamic Servo Control in the drive	●	●	●
<b>Interpolation</b>			
Interpolating axes, up to	4	4	4
Straight line, circle, helix	●	●	●
Splines, polynomials, involutes	●	●	●
Advanced Surface	Milling		
Look Ahead, number of blocks	50	100	150
Compressor	Milling		
<b>Couplings</b>			
Synchronous axis pair (gantry axes)	●	●	●
Synchronous spindle/multi-edge turning	●	●	●
Master value coupling/cam table interpolation	–	–	–
Electronic gear	●	●	●
<b>Transformations</b>			
Face/peripheral surface transformation TRANSMIT	●	●	●
Multi-side machining (3+2 axis machining)	●	●	●
<b>SINUMERIK synchronous architecture</b>			
Motion-synchronized actions	●	●	●
Asynchronous subprograms ASUB	●	●	●
<b>Compensations</b>			
Compensation of measuring system and spindle pitch (bidirectional)	●	●	●
Temperature compensation	●	●	●
Sag compensation	●	●	●
Additional compensations (cogging torques, etc.)	●	●	●
<b>Tools/tool management</b>			
Number of tools/cutting edges in the tool list, up to	80/160	128/256	256/512
Unit quantity/tool life monitoring with replacement tool management	●	●	●

	SINUMERIK 828D BASIC	SINUMERIK 828D	
	PPU24x	PPU26x	PPU28x
<b>CNC operation</b>			
SINUMERIK Operate	●	●	●
Animated Elements	●	●	●
SinuTrain training and offline programming tool	●	●	●
<b>CNC programming</b>			
SINUMERIK CNC programming language with high level language elements	●	●	●
Online ISO dialect interpreter	●	●	●
programGUIDE (technology cycle support)	●	●	●
Technology cycles for drilling, milling and turning	●	●	●
Cycles for in-process measurements (with cycle support) (tool probe calibration, workpiece measurement, tool measurement)	●	●	●
ShopMill/ShopTurn machining step programming	●	●	●
programSYNC (multi-channel operation and programming)	–	–	–
3D CNC simulation for turning/milling	●	●	●
Simulation parallel to the main machining time (simulation of program X, while program Y is being executed)	–	–	–
Additional functions to increase machine performance (residual material detection, multiple clamping, contour processor, etc.)	●	●	●
<b>Onboard optimization and diagnostics</b>			
Context-sensitive onboard help system	●	●	●
Onboard servo and drive optimization (AST)	●	●	●
Onboard signal, bus and network diagnostics	●	●	●
<b>IT integration</b>			
Standard data transfer	RS232C/CF card/USB/Ethernet		
SINUMERIK Integrate (Access MyMachine)	●	●	●
<b>Safety functions</b>			
SINUMERIK Safety Integrated (drive-based)	●	●	●
<b>Open Architecture</b>			
Openness in the user interface SINUMERIK Integrate Run MyScreens (OA EasyScreen)	●	●	●
Openness in the CNC kernel and in the drive	–	–	–
<b>SINUMERIK Ctrl-Energy</b>			
Ctrl-E analysis (determining the energy usage of the machine)	●	●	●
Ctrl-E Profile (energy management of the machine in non-productive times)	●	●	●
Automatic reactive current compensation (with Active Line Module)	●	●	●
Automatic flux reduction for induction spindle motors	●	●	●

– not available

● available (certain functions are available as CNC option, please ask your machine tool manufacturer)

Everything about SINUMERIK CNC  
can be found online

[www.siemens.com/sinumerik](http://www.siemens.com/sinumerik)

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Helpful tips-and-tricks for SINUMERIK users,  
SinuTrain downloads, tutorials and more:  
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Siemens AG  
Industry Sector  
Motion Control Systems  
P.O. Box 31 80  
91050 ERLANGEN  
GERMANY