

Computerized Numerical Control

**OPTIMUM<sup>®</sup>**  
MASCHINEN - GERMANY

*CNC METAL WORKING MACHINERY*  
THE OPTIMUM IN TERMS OF QUALITY, PRICE-PERFORMANCE AND SERVICE



**MAIN CATALOGUE 2025/26**

OFFER FOR OUR CUSTOMERS WHO ARE ENTREPRENEURS AND NOT CONSUMERS

1. August 2025, 7:05 am



## The OPTIMUM in terms of quality, price-performance and service

Dear Customer,  
Dear Customer,

to enable many applications in metalworking, our OPTIMUM CNC catalogue offers you a wide range of products covering many areas with the corresponding machines. Each of our products impresses with its quality, precision, long service life and value stability.

Your requirements are our target

For more than 30 years, we have focused on the design, development and production of OPTIMUM machines, and for more than 15 years on CNC machines. We work unceasingly on continually optimising our machines. One important point here is also production, which is of great importance to us. This is why we made a careful choice of manufacturers to supplement our own production facilities. We set great store by the fact that these manufacturers meet our internal quality requirements. Besides our own manufacturing operations, OPTIMUM exclusively produces with manufacturers who meet our requirements. This means that we can offer you metalworking machines that impress on many scores.

OPTIMUM has built up a good reputation in the course of the years on what is a continually changing and developing tool and machine market. We are proud to say that we combine expertise, experience and a balanced price-performance ratio. Our utmost priority is you as a satisfied customer. With our motivated and expert personnel we strive to complete OPTIMUM's know-how and deliver it to you our customers.



**Kilian Stürmer**  
Managing Director



DISCOVER OUR PRODUCT VIDEOS NOW!

All of our product videos are available for you to watch on our YouTube channel OPTIMUM Maschinen Germany GmbH. Subscribe to our YouTube channel to make sure you don't miss any of the new videos.





## On-site for you: in Europe and worldwide

For many years, OPTIMUM Maschinen Germany has been synonymous with the development, design and production of metalworking machines and CNC machines characterised by high quality standards. In the course of the years, we have continually expanded our sales and service network.

In the meantime, the German company OPTIMUM Maschinen Germany GmbH works globally with expert partners from its headquarters in Hallstadt near Bamberg: OPTIMUM is represented all over Europe by retailers with great performance. Our international sales network extends well beyond Germany's borders to many countries all over the world. This helps us to ensure that our customers can rely on the fast, uncomplicated and service-oriented expertise and quality standards of OPTIMUM thanks to our extensive sales organisation. We have established a responsible market position that you can trust in the course of the years!



## WE ARE ON-SITE FOR YOU



 Service centre

 Company head-  
quarters and  
showroom



### CUSTOMER ADVISORY SERVICE

When advising customers, our CNC experts and sales staff will work out individual machine and service solutions for you. In close collaboration with the customer, our staff analyse the fields of application to clearly identify the requirements. Our meaningful, detailed production information makes it easier for you to find your "dream machines".

### INSTALLATION, COMMISSIONING AND INSTRUCTION

Our service ensures you not only telephone support from specially trained staff, but also on-site support. Whether it's a planned service appointment or quick help after a sudden machine failure: In the event of service, our intensively trained OPTIMUM technicians are at your disposal with their sound knowledge and many years of experience. They quickly and reliably take care of repairing your CNC machines. With our carefully considered service solution we help to keep your OPTIMUM CNC machine working in a trouble-free way

### SERVICE

Trained service personnel carry out one-off maintenance or - agreed by maintenance contract - regular maintenance. Our expertly performed maintenance ensures that machines run trouble-free for a long time! Repair costs are minimised and operational safety is maintained. In addition, our experts detect possible defects and wear at an early stage. In this way, we save our customers from unnecessary repair costs and avoidable downtime. Should a repair nevertheless be necessary, it will be carried out immediately in consultation with the customer.

### MAINTENANCE AND REPAIRS

On request, our service technicians perform set-ups as well as professional commissioning and briefings so that the new machines and systems run reliably right away. Our trained staff help the user to get to grips with the new machine in the shortest possible time and to use it efficiently. This service saves our customers time and therefore reduces costs. In addition, these services help to avoid application errors and queries.

### COST TRANSPARENCY

Working time and travel shall be charged according to the agreed flat rate plus agreed material costs. The services of our service field service are charged fairly and favourably for the customer.

**MORE SERVICE - FAST EXECUTION - DIRECTLY ON SITE:**  
**We ensure customer satisfaction!**

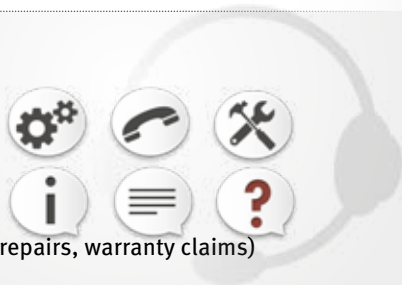




## EVERY MACHINE NEEDS SERVICE ONCE - WE OFFER THIS!

Maintenance work after a defined operating period  
Service in the event of malfunctions  
Competent advice and information  
Spare parts supply  
Complaint processing  
Service in the CNC workshop or - if necessary - also at the customer's site

## CUSTOMER REQUIREMENTS ARE SOLVED QUICKLY AND PURPOSEFULLY!



Service hotline (repairs, warranty claims)

Quick acceptance & status enquiry: write us an e-mail: [CNC\\_service@stuermer-maschinen.de](mailto:CNC_service@stuermer-maschinen.de)



### **SALE DEMONSTRATION CENTRE**

+49 (0)951 96555-513

[BERATUNG@OPTIMUM-MASCHINEN.DE](mailto:BERATUNG@OPTIMUM-MASCHINEN.DE)



### **SERVICE HOTLINE (REPAIRS, WARRANTY CASES) SPARE PARTS / SERVICE**

+49 (0)951 96555-129

[CNC\\_SERVICE@STUERMER-MASCHINEN.DE](mailto:CNC_SERVICE@STUERMER-MASCHINEN.DE)  
(SERVICE)

[E.CNC@STUERMER-SERVICE.DE](mailto:E.CNC@STUERMER-SERVICE.DE)  
(SPARE PARTS)

You can contact us as follows:

Monday to Thursday: 7.00 am–4.30 pm

Friday: 7.00 am–1.30 pm



DISCOVER OUR PRODUCT VIDEOS NOW!

All our product videos are available on our YouTube channel.  
Subscribe to our YouTube channel to not miss any of the new videos.



## DEMONSTRATION CENTRE

You can experience many of our highlights live on a floor space of some 2 000 m<sup>2</sup> in our demonstration centre at our main facility in Hallstadt, near Bamberg, Germany. Four customer advisors are available to help you with their expert knowledge.

What you can look forward to:

- approx. 2 000 m<sup>2</sup> of training and exhibition floor space
- 150 machines from all fields of application are permanently available as demonstrators
- an excerpt of the most important machines from each sector of our product portfolio

OPTIMUM also provides product training for its retail partners at our company headquarters in Hallstadt. At our specially equipped training and presentation rooms, retailers learn the key facts about OPTIMUM products, and the unique selling points compared with third-party products.

Many machines are presented, demonstrated and explained in our exhibition space. Hands-on training is guaranteed.



## MAKE AN APPOINTMENT DEMONSTRATION CENTRE

For faster and less complicated registration  
Send us an e-mail with complete data  
to: [beratung@optimum-maschinen.de](mailto:beratung@optimum-maschinen.de)



DISCOVER THE VIDEO ABOUT OUR  
DEMONSTRATION CENTRE

On our YouTube channel





## TRAINING

**OPTIMUM offers dealer training and product training such as Sinumerik Operate training, 3-D printing basic training, 3-D printing advanced seminar at the company location in Hallstadt and Pettstadt for its trade partners.** Please note the training courses offered from page 340

Our aim is to give you a practical and technical understanding of our products so that you can advise and sell more expertly to your customers on site.

In the specially equipped training and demonstration rooms, the specialist dealers are given important specialist knowledge about the OPTIMUM products as well as the differences to competitor products.

You and your employees will benefit from being able to experience our machines live.



Practice-oriented training



The company's own bistro for a cosy end to meetings, discussions and training sessions.

# DISTRIBUTION SYSTEM



## PRODUCTION OF CNC MACHINES FOR CRAFTSMAN

### Our customers are our focus

To implement these goals in the best possible way, we liaise directly with the customer. This proximity puts us in a position to identify strategic topics in good time and find the right response. Thanks to decades of experience, high quality and reliability in manufacture and delivery, we can guarantee mature engineering to our customers.

Our engineers in Germany plan and develop new and innovative CNC machines driven by the experience of our customers. Always with the premise of optimising machines and existing solutions down to the final detail. Our products are manufactured at the OPTIMUM factory in Yangzhou China. To monitor the quality process end-to-end, all machines are first accepted by our expert CNC team after their arrival in Germany. An OPTIMUM CNC machine is not delivered to the customer until strict checks have been completed.

### We also manufacture on our own CNC machines

The OPTIMUM machine factory in China is the first to put our new developments through their paces. Due to the wide variety of tasks in manufacturing drilling and milling machines, and lathes of all types, the required performance spectrum is unrivalled. We do not release the newly developed CNC machines for sale on the market until they have been successfully deployed in our OPTIMUM factory. Because we constantly use our own machines, we are continually discovering new approaches and potentials for improvement.

The CNC machines on the market right now have a level of maturity that reflects the current state of the art.



Only original with the pink stripe





# PREMIUM

## PRODUCTION OF CNC INDUSTRIAL MACHINES

### Strictest requirements

We set the highest standards for the production of OPTIMUM **PREMIUM** CNC machines, which have to withstand the harsh reality of three-shift operation. Our partner company has more than 35 years' experience in the CNC field and thus offers the best conditions for fulfilling the tasks set by the market in collaboration with us.

Our end customers' experiences are analysed by our CNC specialists. This information is adopted into the production process. While doing so, we also influence the most important components of each machine. Of course, only brand-name components by manufacturers of international repute are used for our machines. In the sensitive area of industrial bearings, linear guides, rotating spindles and main spindles in particular, we set great store by meeting the continually increasing requirements of the market. This is what characterises our machines and sets us apart from our competitors.

Demand-oriented stock management enables the permanent availability and prompt delivery of a large number of the required spare and wear parts. Thanks to an on-going training process, the CNC team both guarantees orderly processing of repairs or maintenance, while at the same time training your staff for future tasks. We spell Service with a capital S.

Original only with the blue **PREMIUM** stripes



## CIVIL/MILITARY OCCUPATIONAL TRAINING CENTRE IN TUNISIA

### GERMANY'S FEDERAL GOVERNMENT DEPLOYS OPTIMUM CNC MACHINES IN DEVELOPMENT PROJECT IN TUNISIA

The Federal Ministry of Defence requested a total of five OPTIMUM machines from Hallstadt-based Stürmer Maschinen for a development project in Tunisia. Now the machines have been successfully commissioned at the Military Vocational Training Centre in Northern Tunisia under the meticulous supervision of Stürmer technicians.

The scope of delivery included both CNC-controlled and conventional Optimum milling and turning machines as well as an OPTidrill drilling machine and a METALLKRAFT metal band saw. The order also included a large volume of accessories. Stürmer has already implemented many projects on a similar scale. However, due to the SIEMENS NX CAD system integrated on this occasion, and the fact that virtual twins were created, this technology project is extraordinary in every respect and will be trend-setting for the future. This is because the advanced technology supplied by Stürmer will in future prevent tool collisions and thus damage of up to €10,000 that can occur on running in the programs. This is made possible by software that imitates the machines with all their controllers and drive units 1:1 and visualises them on a PC.

The installation of the machines at the civil-military occupational training centre has now been completed and the machines can be used in future for training purposes for Tunisian armed forces. In January 2020, training courses were held by Stürmer and SIEMENS to instruct local personnel in the use of the machines. The official inauguration and commissioning ceremony also took place within this framework.



OPTIMUM PREMIUM CNC slant bed lathe S 620 with counter spindle.



Three-axis OPTIMUM PREMIUM F150 HSC milling machine



OPTIMUM CNC technician



## TRAINING WORKSHOP AT THE TYRE MANUFACTURER MICHELIN

*THE RAPID PACE OF TECHNOLOGICAL PROGRESS POSES MAJOR CHALLENGES FOR TRAINERS, YET MANY COMPANIES AND VOCATIONAL SCHOOLS STILL USE OUTDATED MACHINE TOOLS FOR TEACHING PURPOSES.*



From left to right: Alois Penzkofer (SIEMENS AG), Witali Reiswich (Michelin Reifenwerke AG & Co. KGaA), Martin Trepesch (Optimum Maschinen Germany GmbH)

Modern car tyres are high-tech products. Manufactured in complex production processes, they ensure traction and short braking distances in all weather conditions, are extremely resilient and help to save fuel. More than 22 000 tyres in sizes ranging from 16 to 18 inches leave the Michelin plant in Hallstadt near Bamberg, Franconia, every day, employing over 900 people. In order to meet the demand for skilled personnel, 45 young women and men are currently undergoing their three-and-a-half year training as industrial mechanics and electronics technicians in the training workshop. "We train for our own needs and, if possible, take on all trainees.

CNC technology has been of little importance here so far. It was only part of the vocational school education, but not relevant to the examinations in careers where we offer apprenticeships. However, we wanted to strengthen this part in order to better prepare our trainees for the future and to keep Michelin competitive as a training company in the long term," explains trainer Witali Reiswich. But, there is one obstacle on the way to this goal: money.

### Special leasing solution for training workshops

The central workshop in Hallstadt, manufactures precision knives on a toolmaking machine equipped with a Sinumerik 840D sl; the tool are used in tyre production. The programs - both for series production and for the many prototypes - are developed in a tool chain with SolidWorks and Sinumerik. On this machine, the trainees occasionally created smaller programs and workpieces such as cups. However, the machine's increasing degree of utilisation no longer permitted this. "We then examined the investment in a 3-axis milling machine for the training workshop. However, this could not be realised at first for economic reasons.

Our biggest fear was that the technology would rapidly become obsolete. Because training on an outdated machine is counterproductive," says Witali Reiswich summing up. "Fortunately for us, we then held talks with machine tool manufacturer Optimum. We were thus able to benefit from its solution for schools and training workshops." Optimum Maschinen offers machine commissioning, initial training and multiple-day training courses for instructors and users. Optimum Maschinen Germany GmbH has agreed a cooperation partnership with SIEMENS for CNC training and can therefore also issue SIEMENS certificates to trained customers.





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# ***01 - MILLING STANDARD MACHINES***



OPTImill F 150E





OPTImill F 50



OPTImill F 105

# F 50

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**Ideal for training and prototyping, minimal space requirement**

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## **SIEMENS CONTROL SINUMERIK 808D ADVANCED**

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- Machine with cast stand design for good stiffness values
- Carousel tool changer with eight tool stations
- All linear guides with covers
- Automatic centralised lubrication
- .SIEMENS main spindle motor
- .SIEMENS servo drives on all axes (closed control circuit)
- Maximum spindle speed of 10,000 rpm
- The portable, electronic handwheel with enabling switch and emergency stop pushbutton makes it much easier to run in programmes.
- Coolant unit with 70 litre coolant tank
- Tool change occurs automatically or at the push of a button (electropneumatic tool clamping device)
- Massive, exact milling table - large dimensioned and precisely surface machined.
- Access doors very generously designed to reduce cleaning and maintenance times to a minimum
- LED machine lamp for complete illumination of the workspace
- Additional package SIEMENS material defects liability and free on-site service OSS see page 19
- For information on maintenance contracts see page 333





## TECHNICAL DATA

| Model                                  | F 50                 |
|----------------------------------------|----------------------|
| Article no.                            | 3501050              |
| <b>Machine data</b>                    |                      |
| Electrical connection                  | 400 V / 3 Ph ~50 Hz  |
| Total connected load                   | 10 kVA               |
| <b>Milling spindle</b>                 |                      |
| Drive motor S1 operation               | 3.7 kW               |
| Torque drive motor S1 operation        | 24 Nm                |
| Drive motor S6 30 % operation          | 5.5 kW               |
| Torque drive motor S6 30 % operation   | 36 Nm                |
| Spindle seat                           | BT 30                |
| <b>Cooling lubricant system</b>        |                      |
| Coolant pump output                    | 450 W                |
| Tank capacity                          | 70 litres            |
| <b>Milling precision</b>               |                      |
| Repeat accuracy                        | 0.015 mm             |
| Positioning accuracy                   | 0.015 mm             |
| <b>Tool changer</b>                    |                      |
| Type                                   | Carousel             |
| Number of tool slots                   | 8 slots              |
| Max. tool diameter                     | 100 mm               |
| Tool length                            | 200 mm               |
| Max. tool weight                       | 6 kg                 |
| Tool change time according to VDI 2852 | 7 seconds            |
| <b>Travel</b>                          |                      |
| X axis                                 | 330 mm               |
| Y axis                                 | 220 mm               |
| Z axis                                 | 320 mm               |
| <b>Feed drive</b>                      |                      |
| Rapid traverse X/Y/Z axis              | 15 m/min.            |
| <b>Motor torque</b>                    |                      |
| X axis                                 | 3.5 Nm               |
| Y axis                                 | 6 Nm                 |
| Z axis                                 | 6 Nm                 |
| <b>Speed range</b>                     |                      |
| Speeds*                                | 10 000 rpm           |
| <b>Pneumatics</b>                      |                      |
| Compressed air                         | 6 bar                |
| <b>Milling table</b>                   |                      |
| Clearance spindle to table             | 90 - 410 mm          |
| Spindle - column distance              | 280 mm               |
| Table length x width                   | 690 x 225 mm         |
| T-slot size / amount / distance        | 14 mm / 3 / 63 mm    |
| Maximum payload                        | 150 kg               |
| <b>Dimensions</b>                      |                      |
| Length x width x height                | 2030 x 1,600 x 1,980 |
| Overall weight                         | 1900 kg              |

\* Please note that the maximum spindle speed must be reduced by approx. 20 % in continuous operation

# SINUMERIK 808D ADVANCED

## CNC TECHNOLOGY FROM THE TECHNOLOGY LEADER

- The SINUMERIK 808D ADVANCED control is a panel-based CNC control. The compact and user-friendly entry-level solution is deployed in simple milling applications. Features such as easy operation, commissioning and maintenance are the perfect basis for equipping CNC machines.
- With its technology-specific variants, the SINUMERIK 808D ADVANCED control is perfectly preconfigured for milling. And with its hardware and software enhancements, the SINUMERIK 808D ADVANCED also offers sufficient performance for simple milling functionalities in mould and tool making.

### SINUMERIK 808D ON PC

- Control-identical software package that further simplifies handling of the machine tool. Download free of charge at <https://xcelerator.siemens.com/global/en/industries/machinebuilding/machine-tools/cnc4you/808d-on-pc.html>

### COMPACT AND ROBUST

- Thanks to a panel-based CNC design with very few interfaces and an IP65 protected control panel, the SINUMERIK 808D ADVANCED is perfectly prepared for deployment in tough environments.



### OVERALL PACKAGE

- RJ45 Ethernet port
- Ready for remote maintenance
- AST function gives users an easy optimisation option in case of stricter dynamic and precision requirements
- Absolute encoder / no referencing move required
- Greater precision

### CONTROL

- 8.4" LCD colour display with a resolution of 800x600

### ADDITIONAL PACKAGE SIEMENS OSS

- 12 months; Article no. 3589010
- 36 months; Article no. 3589012

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal  
- Siemens WW



## LINEAR GUIDE



- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement
- Consistent precision with long service life

## HANDWHEEL



- Portable
- Electronic
- Substantially facilitates running in of programs
- Emergency stop button
- Confirm button

## SIGNAL LIGHT



- Visually displays the machine status
- Very bright and with a long service life

## TOOL CHANGER



- Carousel tool changer
- 8 tool slots
- Tool change time: 7 seconds

## CONTROL CABINET



- Clearly-arranged
- Standards-compliant setup
- Drives by **SIEMENS**

## CENTRALISED LUBRICATION SYSTEM



- Automatic
- Prevents wear, repair costs and unnecessary downtime to a major extent

## SINUMERIK 808D ON PC



- With SINUMERIK 808D on PC, **SIEMENS** offers a control-identical software package that further simplifies the handling of the machine tool. Use as a hands-on training software program to program and simulate workpieces offline.  
Download for free on  
<https://xcelerator.siemens.com/global/en/industries/machinebuilding/machine-tools/cnc4you/808d-on-pc.html>

### Training and learning

- SINUMERIK Operate BASIC operations can be explored on a PC without additional hardware
- Simple and convenient learning experience with a user interface identical to that of the control

### Offline CNC programming:

- Boosts productivity by programming directly on a PC
- Test sub-routines on the PC with the integrated simulator

### Professional CNC presentations:

- Present the SINUMERIK Operate BASIC user interface on the PC – at any time and anywhere without additional hardware
- Covers the comprehensive SINUMERIK Operate BASIC feature set incl. program-GUIDE BASIC



### TOOL MEASURING SYSTEM

| Article no.                                                                             |                               |                                                                                   |                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 350108580*                                                                              | <b>RENISHAW<br/>Primo set</b> |  | <ul style="list-style-type: none"> <li>• Tool measuring probe Radio Part Setter</li> <li>• Tool probe</li> <li>• Radio 3D Tool</li> <li>• Primo Interface</li> <li>• GoProbe Software</li> <li>• Collet BT 30</li> <li>• Guarantee protection for a secure feeling</li> <li>• License for six months</li> </ul> |
| <p>➡ Information on the Primo set also available ex warehouse Germany, see page 298</p> |                               |                                                                                   |                                                                                                                                                                                                                                                                                                                 |

### 3-D PRINTING PREPARATION

| Article no.                                        |                                       |                                                                                     |                                                                                                                                                                                                                                                    |
|----------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 350108590*                                         | <b>Motor upgrade<br/>3-D PRINTING</b> |    | <ul style="list-style-type: none"> <li>• Main spindle motor with high-resolution encoder</li> <li>• 20 bit absolute value encoder instead of incremental encoder</li> </ul>                                                                        |
| 350108591*                                         | <b>3-D printing interface</b>         |  | <ul style="list-style-type: none"> <li>• Plug connector on milling head for printing head</li> <li>• Power supply is installed in control cabinet</li> <li>• Prepared for connecting open circuit monitoring</li> <li>• Filament holder</li> </ul> |
| <p>➡ Information on 3-D printing from page 273</p> |                                       |                                                                                     |                                                                                                                                                                                                                                                    |

### STARTER SET

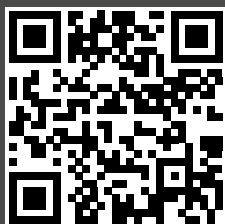
| Article no.                                      |                              |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3536107                                          | <b>Starter set<br/>BT 30</b> |  | <ul style="list-style-type: none"> <li>• 1 pc. cutter head tool holder</li> <li>• 1 pc. drill chuck</li> <li>• 2 each Weldon 6 mm and 20 mm</li> <li>• 1 each Weldon 8 / 10 / 12 / 16 mm</li> <li>• 1 pc. Adapter BT 30</li> <li>• 4 pcs. Collet chuck holder ER 32</li> <li>• 1 pc. Collet chuck spanner ER 32</li> <li>• 18-part collet chuck set ER 32</li> <li>• 1 pc. Height-adjuster</li> <li>• 1 pc. Assembly and tool adjustment gauge</li> <li>• 14 pcs. pull stud</li> <li>• 1 pc. taper squeegee</li> </ul> |
| <p>➡ Information on the starter set page 288</p> |                              |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

# F 80

Ideal for part production, prototype and jig building

## SIEMENS CONTROL SINUMERIK 808D ADVANCED

- Machine with cast stand design for good stiffness values
- Carousel tool changer with 12 tool places
- All linear guides with covers
- Automatic centralised lubrication
- .SIEMENS main spindle motor
- .SIEMENS servo drives on all axes (closed control circuit)
- Maximum spindle speed of 10,000 rpm
- The portable, electronic handwheel with enabling switch and emergency stop pushbutton makes it much easier to run in programmes.
- Coolant unit with 80 litre coolant tank
- Tool change occurs automatically or at the push of a button (electropneumatic tool clamping device)
- Massive, exact milling table - large dimensioned and precisely surface machined.
- Access doors very generously designed to reduce cleaning and maintenance times to a minimum
- LED machine lamp for complete illumination of the workspace
- Additional package SIEMENS material defects liability and free on-site service OSS see page 25
- For information on maintenance contracts see page 333



Subscribe





## TECHNICAL DATA

| Model                                | F 80                  |
|--------------------------------------|-----------------------|
| Article no.                          | 3501081               |
| <b>Machine data</b>                  |                       |
| Electrical connection                | 400 V / 3 Ph ~50 Hz   |
| Total connected load                 | 12 kVA                |
| <b>Milling spindle</b>               |                       |
| Drive motor S1 operation             | 3.7 kW                |
| Torque drive motor S1 operation      | 24 Nm                 |
| Drive motor S6 30 % operation        | 5.5 kW                |
| Torque drive motor S6 30 % operation | 36 Nm                 |
| Spindle seat                         | BT 40                 |
| <b>Cooling lubricant system</b>      |                       |
| Coolant pump output                  | 450 W                 |
| Tank capacity                        | 80 litres             |
| <b>Milling precision</b>             |                       |
| Repeat accuracy                      | ± 0.005 mm            |
| Positioning accuracy                 | ± 0.005 mm            |
| <b>Tool changer</b>                  |                       |
| Type                                 | Carousel              |
| Number of tool slots                 | 12                    |
| Max. tool diameter                   | 95 mm                 |
| Tool length                          | 300 mm                |
| Max. tool weight                     | 8 kg                  |
| Time tool change chip to chip        | 7 seconds             |
| <b>Travel</b>                        |                       |
| X axis                               | 450 mm                |
| Y axis                               | 260 mm                |
| Z axis                               | 450 mm                |
| <b>Feed drive</b>                    |                       |
| Rapid traverse X/Y/Z axis            | 20 m/min.             |
| <b>Motor torque</b>                  |                       |
| X axis                               | 6 Nm                  |
| Y axis                               | 6 Nm                  |
| Z axis                               | 11 Nm                 |
| <b>Speed range</b>                   |                       |
| Speeds*                              | 50 - 10000 rpm        |
| <b>Pneumatics</b>                    |                       |
| Compressed air                       | 7 bar                 |
| <b>Milling table</b>                 |                       |
| Clearance spindle to table           | 100 - 550 mm          |
| Spindle - column distance            | 370 mm                |
| Table length x width                 | 800 x 260 mm          |
| T-slot size / amount / distance      | 16 mm / 5 / 50 mm     |
| Maximum payload                      | 200 kg                |
| <b>Dimensions</b>                    |                       |
| Length x width x height              | 2150 x 1680 x 2470 mm |
| Overall weight                       | 2300 kg               |

\* Please note that the maximum spindle speed must be reduced by approx. 20 % in continuous operation

# SINUMERIK 808D ADVANCED

## CNC TECHNOLOGY FROM THE TECHNOLOGY LEADER

- The SINUMERIK 808D ADVANCED control is a panel-based CNC control. The compact and user-friendly entry-level solution is deployed in simple milling applications. Features such as easy operation, commissioning and maintenance are the perfect basis for equipping CNC machines.
- With its technology-specific variants, the SINUMERIK 808D ADVANCED control is perfectly preconfigured for milling. And with its hardware and software enhancements, the SINUMERIK 808D ADVANCED also offers sufficient performance for simple milling functionalities in mould and tool making.

### SINUMERIK 808D ON PC

- Control-identical software package that further simplifies handling of the machine tool. Download free of charge at <https://xcelerator.siemens.com/global/en/industries/machinebuilding/machine-tools/cnc4you/808d-on-pc.html>

### COMPACT AND ROBUST

- Thanks to a panel-based CNC design with very few interfaces and an IP65 protected control panel, the SINUMERIK 808D ADVANCED is perfectly prepared for deployment in tough environments.



### OVERALL PACKAGE

- RJ45 Ethernet port
- Ready for remote maintenance
- AST function gives users an easy optimisation option in case of stricter dynamic and precision requirements
- Absolute encoder / no referencing move required
- Greater precision

### CONTROL

- 8.4" LCD colour display with a resolution of 800x600

### ADDITIONAL PACKAGE SIEMENS OSS

- 12 months; Article no. 3589010
- 36 months; Article no. 3589012

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal  
- Siemens WW



## LINEAR GUIDE



- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement
- Consistent precision with long service life

## HANDWHEEL



- Portable
- Electronic
- Substantially facilitates running in of programs
- Emergency stop button
- Confirm button

## SIGNAL LIGHT



- Visually displays the machine status
- Very bright and with a long service life

## TOOL CHANGER



- Carousel tool changer
- 12 tool slots
- Tool change time: 7 seconds

## CONTROL CABINET



- Clearly-arranged
- Standards-compliant setup
- Drives by **SIEMENS**

## CENTRALISED LUBRICATION SYSTEM



- Automatic
- Prevents wear, repair costs and unnecessary downtime to a major extent

## SINUMERIK 808D ON PC



- With SINUMERIK 808D on PC, **SIEMENS** offers a control-identical software package that further simplifies the handling of the machine tool. Use as a hands-on training software program to program and simulate workpieces offline.

Download for free on

<https://xcelerator.siemens.com/global/en/industries/machinebuilding/machine-tools/cnc4you/808d-on-pc.html>

### Training and learning

- SINUMERIK Operate BASIC operations can be explored on a PC without additional hardware
- Simple and convenient learning experience with a user interface identical to that of the control

### Offline CNC programming:

- Boosts productivity by programming directly on a PC
- Test sub-routines on the PC with the integrated simulator

### Professional CNC presentations:

- Present the SINUMERIK Operate BASIC user interface on the PC – at any time and anywhere without additional hardware
- Covers the comprehensive SINUMERIK Operate BASIC feature set incl. program-GUIDE BASIC

#### TOOL MEASURING SYSTEM

| Article no.                                                                      |                           |                                                                                   |                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------|---------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 350108580*                                                                       | <b>RENISHAW Primo set</b> |  | <ul style="list-style-type: none"> <li>• Tool measuring probe Radio Part Setter</li> <li>• Tool probe</li> <li>• Radio 3D Tool</li> <li>• Primo Interface</li> <li>• GoProbe Software</li> <li>• Collet BT 30</li> <li>• Guarantee protection for a secure feeling</li> <li>• License for six months</li> </ul> |
| ➞ Information on the Primo set also available ex warehouse Germany, see page 298 |                           |                                                                                   |                                                                                                                                                                                                                                                                                                                 |

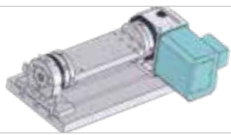
#### 3-D PRINTING PREPARATION

| Article no.                                 |                                   |                                                                                    |                                                                                                                                                                                                                                                    |
|---------------------------------------------|-----------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 350108590*                                  | <b>Motor upgrade 3-D PRINTING</b> |   | <ul style="list-style-type: none"> <li>• Main spindle motor with high-resolution encoder</li> <li>• 20 bit absolute value encoder instead of incremental encoder</li> </ul>                                                                        |
| 350108591*                                  | <b>3-D printing interface</b>     |  | <ul style="list-style-type: none"> <li>• Plug connector on milling head for printing head</li> <li>• Power supply is installed in control cabinet</li> <li>• Prepared for connecting open circuit monitoring</li> <li>• Filament holder</li> </ul> |
| ➞ Information on 3-D printing from page 339 |                                   |                                                                                    |                                                                                                                                                                                                                                                    |

#### STARTER SET

| Article no.                                        |                          |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3536108                                            | <b>Starter set BT 40</b> |  | <ul style="list-style-type: none"> <li>• 1 pc. cutter head tool holder</li> <li>• 1 pc. quick clamping drill chuck 1 - 13 mm</li> <li>• 2 each Weldon 6 mm and 20 mm</li> <li>• 1 each Weldon 8 / 10 / 12 / 16 mm</li> <li>• 1 pc. Adapter BT 40 to MT 3</li> <li>• 4 pcs. Collet chuck holder ER 32</li> <li>• 1 pc. Collet chuck spanner ER 32</li> <li>• 18-part collet chuck set ER 32</li> <li>• 1 pc. Height-adjuster</li> <li>• 1 pc. Assembly and tool adjustment gauge</li> <li>• 15 pcs. pull stud</li> <li>• 1 pc. taper squeegee</li> </ul> |
| ➞ For Information on the starter set, see page 289 |                          |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

#### FOURTH AXIS

| Article no.                                                                     |                                        |                                                                                     |                                                                                                                                                                    |
|---------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 350108502*                                                                      | <b>Preparation for the fourth axis</b> |  |                                                                                                                                                                    |
| 350108503*                                                                      | <b>Fourth axis Complete set</b>        |  | <ul style="list-style-type: none"> <li>• Rotary indexing table Ø 80 mm</li> <li>• Three-jaw lathe chuck 75 mm</li> <li>• Including installation</li> </ul>         |
| 350108504*                                                                      | <b>Swivel bridge</b>                   |  | <ul style="list-style-type: none"> <li>• Size 160 x 85 mm</li> <li>• with counterholder</li> <li>• Enables multi-sided machining with multiple clamping</li> </ul> |
| ➞ You can find information on the fourth axis rotary dividing table on page 284 |                                        |                                                                                     |                                                                                                                                                                    |



# F 105

The compact solution for small batch production in medium-sized companies

## SIEMENS CONTROL SINUMERIK 808D ADVANCED

- Rugged design
- Carousel tool changer with 12 tool slots
- All linear guides with covers
- Automatic centralised lubrication
- .SIEMENS main spindle motor
- SIEMENS servo drives on all axes (closed control circuit)
- Maximum spindle speed of 10,000 rpm
- The portable, electronic handwheel with enabling switch and emergency stop pushbutton makes it much easier to run in programmes.
- Coolant unit with 120 litre coolant tank
- Tool change occurs automatically or at the push of a button (electropneumatic tool clamping device)
- Solid, precision milling table, generously dimensioned with precision surface finish
- Access doors very generously designed to reduce cleaning and maintenance times to a minimum
- LED machine lamp for complete illumination of the workspace
- Additional package SIEMENS material defects liability and free on-site service OSS see page 31
- For information on maintenance contracts see page 333



Follow this for the video presentation of our Optimum milling machine F 105

Subscribe to our YouTube channel, to avoid missing any of the new videos: [www.youtube.com/user/OptimumMaschinen](http://www.youtube.com/user/OptimumMaschinen)



Fig. with optional accessories  
(vice, milling cutter, chuck)

## TECHNICAL DATA

| Model                                | F 105                 |
|--------------------------------------|-----------------------|
| Article no.                          | 3501100               |
| <b>Machine data</b>                  |                       |
| Electrical connection                | 400 V / 3 Ph ~50 Hz   |
| Total connected load                 | 15 kVA                |
| <b>Milling spindle</b>               |                       |
| Drive motor S1 operation             | 7.5 kW                |
| Torque drive motor S1 operation      | 48 Nm                 |
| Drive motor S6 30 % operation        | 11 kW                 |
| Torque drive motor S6 30 % operation | 70 Nm                 |
| Spindle seat                         | BT 40                 |
| <b>Cooling lubricant system</b>      |                       |
| Coolant pump output                  | 650 W                 |
| Tank capacity                        | 120 litres            |
| <b>Milling precision</b>             |                       |
| Repeat accuracy                      | ± 0.008 mm            |
| Positioning accuracy                 | ± 0.008 mm            |
| <b>Tool changer</b>                  |                       |
| Type                                 | Carousel              |
| Number of tool slots                 | 12                    |
| Max. tool diameter                   | 70 mm                 |
| Max. tool length                     | 300 mm                |
| Max. tool weight                     | 6 kg                  |
| Tool change time                     | 7 seconds             |
| <b>Travel</b>                        |                       |
| X axis                               | 550 mm                |
| Y axis                               | 305 mm                |
| Z axis                               | 460 mm                |
| <b>Feed drive</b>                    |                       |
| Rapid traverse X/Y/Z axis            | 15 m/min.             |
| <b>Motor torque</b>                  |                       |
| X axis                               | 8 Nm                  |
| Y axis                               | 8 Nm                  |
| Z axis                               | 11 Nm                 |
| <b>Speed range</b>                   |                       |
| Speeds*                              | 10 - 10000 rpm        |
| <b>Pneumatics</b>                    |                       |
| Compressed air                       | 7 bar                 |
| <b>Milling table</b>                 |                       |
| Clearance spindle to table           | 100 - 600 mm          |
| Table length x width                 | 800 x 320 mm          |
| T-slot size / amount / distance      | 14 mm / 3 / 100 mm    |
| Maximum payload                      | 300 kg                |
| <b>Dimensions</b>                    |                       |
| Length x width x height              | 2164 x 1860 x 2200 mm |
| Overall weight                       | 2800 kg               |

\* Please note that the maximum spindle speed must be reduced by approx. 20 % in continuous operation

# SINUMERIK 808D ADVANCED

## CNC TECHNOLOGY FROM THE TECHNOLOGY LEADER

- The SINUMERIK 808D ADVANCED control is a panel-based CNC control. The compact and user-friendly entry-level solution is deployed in simple milling applications. Features such as easy operation, commissioning and maintenance are the perfect basis for equipping CNC machines.
- With its technology-specific variants, the SINUMERIK 808D ADVANCED control is perfectly preconfigured for milling. And with its hardware and software enhancements, the SINUMERIK 808D ADVANCED also offers sufficient performance for simple milling functionalities in mould and tool making.

### SINUMERIK 808D ON PC

- Control-identical software package that further simplifies handling of the machine tool. Download free of charge at <https://xcelerator.siemens.com/global/en/industries/machinebuilding/machine-tools/cnc4you/808d-on-pc.html>

### COMPACT AND ROBUST

- Thanks to a panel-based CNC design with very few interfaces and an IP65 protected control panel, the SINUMERIK 808D ADVANCED is perfectly prepared for deployment in tough environments.



### OVERALL PACKAGE

- RJ45 Ethernet port
- Ready for remote maintenance
- AST function gives users an easy optimisation option in case of stricter dynamic and precision requirements
- Absolute encoder / no referencing move required
- Greater precision

### CONTROL

- 8.4" LCD colour display with a resolution of 800x600

### ADDITIONAL PACKAGE SIEMENS OSS

- 12 months; Article no. 3589010
- 36 months; Article no. 3589012

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal  
- Siemens WW





## LINEAR GUIDE



- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement
- Consistent precision with long service life

## HANDWHEEL



- Portable
- Electronic
- Substantially facilitates running in of programs
- Emergency stop button
- Confirm button

## MAIN SPINDLE



- Spindle speed from 10 to 10000 rpm

## TOOL CHANGER



- Carousel tool changer
- 12 tool slots
- Tool change time: 7 seconds

## CONTROL CABINET



- Clearly-arranged
- Standards-compliant setup
- With SIEMENS servo drive

## CENTRALISED LUBRICATION SYSTEM



- Automatic
- Prevents wear, repair costs and unnecessary downtime to a major extent

## SINUMERIK 808D ON PC



- With SINUMERIK 808D on PC, SIEMENS offers a control-identical software package that further simplifies the handling of the machine tool. Use as a hands-on training software program to program and simulate workpieces offline.

Download for free on  
<https://xcelerator.siemens.com/global/en/industries/machinebuilding/machine-tools/cnc4you/808d-on-pc.html>

### Training and learning

- SINUMERIK Operate BASIC operations can be explored on a PC without additional hardware
- Simple and convenient learning experience with a user interface identical to that of the control

### Offline CNC programming:

- Boosts productivity by programming directly on a PC
- Test sub-routines on the PC with the integrated simulator

### Professional CNC presentations:

- Present the SINUMERIK Operate BASIC user interface on the PC – at any time and anywhere without additional hardware
- Covers the comprehensive SINUMERIK Operate BASIC feature set incl. program-GUIDE BASIC

#### TOOL MEASURING SYSTEM

| Article no. |                               |                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                 |
|-------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 350110080*  | <b>RENISHAW<br/>Primo set</b> |   | <ul style="list-style-type: none"> <li>• Tool measuring probe Radio Part Setter</li> <li>• Tool probe</li> <li>• Radio 3D Tool</li> <li>• Primo Interface</li> <li>• GoProbe Software</li> <li>• Collet BT 40</li> <li>• Guarantee protection for a secure feeling</li> <li>• License for six months</li> </ul> |

➞ Information on the Primo set also available ex warehouse Germany, see page 298

#### 3-D PRINTING PREPARATION

| Article no. |                                       |                                                                                    |                                                                                                                                                                                                                                                    |
|-------------|---------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 350110090*  | <b>Motor upgrade<br/>3-D PRINTING</b> |   | <ul style="list-style-type: none"> <li>• Main spindle motor with high-resolution encoder</li> <li>• 20 bit absolute value encoder instead of incremental encoder</li> </ul>                                                                        |
| 350110091*  | <b>3-D printing interface</b>         |  | <ul style="list-style-type: none"> <li>• Plug connector on milling head for printing head</li> <li>• Power supply is installed in control cabinet</li> <li>• Prepared for connecting open circuit monitoring</li> <li>• Filament holder</li> </ul> |

➞ Information on 3-D printing and accessories can be found on page 273

#### STARTER SET

| Article no. |                              |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------|------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3536108     | <b>Starter set<br/>BT 40</b> |  | <ul style="list-style-type: none"> <li>• 1 pc. cutter head tool holder</li> <li>• 1 pc. quick clamping drill chuck 1 - 13 mm</li> <li>• 2 each Weldon 6 mm and 20 mm</li> <li>• 1 each Weldon 8 / 10 / 12 / 16 mm</li> <li>• 1 pc. Adapter BT 40 to MT 3</li> <li>• 4 pcs. Collet chuck holder ER 32</li> <li>• 1 pc. Collet chuck spanner ER 32</li> <li>• 18-part collet chuck set ER 32</li> <li>• 1 pc. Height-adjuster</li> <li>• 1 pc. Assembly and tool adjustment gauge</li> <li>• 15 pcs. pull stud</li> <li>• 1 pc. taper squeegee</li> </ul> |

➞ For Information on the starter set, see page 289

#### FOURTH AXIS

| Article no. |                                            |                                                                                                                                               |                                                                                                                                                                                                   |
|-------------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 350110002*  | <b>Preparation<br/>for the fourth axis</b> |                                                            |                                                                                                                                                                                                   |
| 350110003*  | <b>Fourth axis<br/>Complete set</b>        |                                                            | <ul style="list-style-type: none"> <li>• Rotary indexing table Ø 125 mm</li> <li>• Three-jaw lathe chuck 100 mm</li> <li>• Tailstock with MT 2 quill</li> <li>• Including installation</li> </ul> |
| 350110004*  | <b>Swivel bridge</b>                       | <p>Illustration similar and with optional fourth axis</p>  | <ul style="list-style-type: none"> <li>• Size 260 x 130 mm</li> <li>• with counterholder</li> <li>• Enables multi-page editing</li> </ul>                                                         |

➞ You can find information on the fourth axis rotary dividing table on page 282

# F 150E

The compact solution for small batch production in medium-sized companies

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## SIEMENS CONTROL SINUMERIK 808D ADVANCED

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- Carousel tool changer with 16 tool slots
- All linear guides with covers
- Automatic centralised lubrication
- SIEMENS main spindle motor
- SIEMENS servo drives on all axes (closed control circuit)
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- Maximum spindle speed of 10,000 rpm
- The portable, electronic handwheel with enabling switch and emergency stop pushbutton makes it much easier to run in programmes.
- Coolant unit with 190 litre coolant tank
- Tool change occurs automatically or at the push of a button (electropneumatic tool clamping device)
- Solid, precision milling table, generously dimensioned with precision surface finish
- Access doors very generously designed to reduce cleaning and maintenance times to a minimum
- Six levelling feet
- LED machine lamp for complete illumination of the workspace
- Additional package SIEMENS material defects liability and free on-site service OSS see page 37
- For information on maintenance contracts see page 333

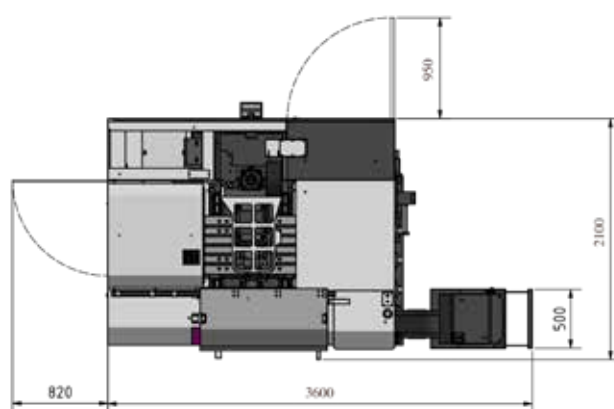
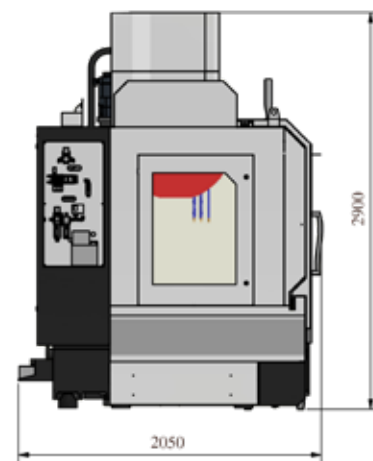
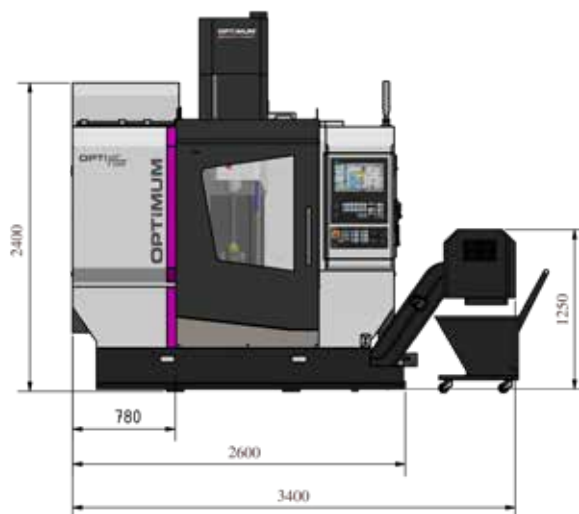


Fig. with optional accessories  
(milling cutter, chuck)



## TECHNICAL DATA

| Model                                                | F 150E                      |
|------------------------------------------------------|-----------------------------|
| Article no.                                          | 3501150                     |
| Drive                                                | Belt drive                  |
| <b>Machine data</b>                                  |                             |
| Electrical connection                                | 400 V / 3 Ph ~50 Hz         |
| Total connected load                                 | 15 kW                       |
| <b>Milling spindle</b>                               |                             |
| Drive motor S1 operation                             | 7.5 kW                      |
| Torque drive motor S1 operation                      | 48 Nm                       |
| Drive motor S6 30 % operation                        | 11.25 kW                    |
| Torque drive motor S6 30 % operation                 | 72 Nm                       |
| Spindle seat                                         | BT 40                       |
| <b>Cooling lubricant system</b>                      |                             |
| Coolant pump output                                  | 370 W                       |
| Tank capacity                                        | 190 litres                  |
| <b>Milling precision</b>                             |                             |
| Repeat accuracy                                      | ± 0.008 mm                  |
| Positioning accuracy                                 | ± 0.008 mm                  |
| <b>Tool changer</b>                                  |                             |
| Type                                                 | Carousel                    |
| Number of tool slots                                 | 16                          |
| Max. tool diameter                                   | 90 mm                       |
| Max. tool diameter (tools slots beside not occupied) | 180 mm                      |
| Max. tool length                                     | 250 mm                      |
| Max. tool weight                                     | 8 kg                        |
| Time tool change chip to chip                        | 20 seconds                  |
| <b>Travel</b>                                        |                             |
| X axis                                               | 750 mm                      |
| Y axis                                               | 500 mm                      |
| Z axis                                               | 500 mm                      |
| <b>Feed drive</b>                                    |                             |
| Rapid traverse X/Y/Z axis                            | 20 m/min.                   |
| <b>Motor torque</b>                                  |                             |
| X, Y, Z axis                                         | 9.55 Nm / 9.55 Nm / 16.7 Nm |
| <b>Speed range</b>                                   |                             |
| Speeds*                                              | 10 - 10000 rpm              |
| <b>Pneumatics</b>                                    |                             |
| Compressed air                                       | 6 bar                       |
| <b>Milling table</b>                                 |                             |
| Clearance spindle to table                           | 100 - 600 mm                |
| Table length x width                                 | 900 x 500 mm                |
| T-slot size / amount / distance                      | 18 / 5 / 80 mm              |
| Maximum payload                                      | 350 kg                      |
| <b>Dimensions</b>                                    |                             |
| Length x width x height                              | 3420 x 2050 x 2400 mm       |
| Overall weight                                       | 4500 kg                     |



\* Please note that the maximum spindle speed must be reduced by approx. 20 % in continuous operation

# SINUMERIK 808D ADVANCED

## CNC TECHNOLOGY FROM THE TECHNOLOGY LEADER

- The SINUMERIK 808D ADVANCED control is a panel-based CNC control. The compact and user-friendly entry-level solution is deployed in simple milling applications. Features such as easy operation, commissioning and maintenance are the perfect basis for equipping CNC machines.
- With its technology-specific variants, the SINUMERIK 808D ADVANCED control is perfectly preconfigured for milling. And with its hardware and software enhancements, the SINUMERIK 808D ADVANCED also offers sufficient performance for simple milling functionalities in mould and tool making.

### SINUMERIK 808D ON PC

- Control-identical software package that further simplifies handling of the machine tool. Download free of charge at <https://xcelerator.siemens.com/global/en/industries/machinebuilding/machine-tools/cnc4you/808d-on-pc.html>

### COMPACT AND ROBUST

- Thanks to a panel-based CNC design with very few interfaces and an IP65 protected control panel, the SINUMERIK 808D ADVANCED is perfectly prepared for deployment in tough environments.



### OVERALL PACKAGE

- RJ45 Ethernet port
- Ready for remote maintenance
- AST function gives users an easy optimisation option in case of stricter dynamic and precision requirements
- Absolute encoder / no referencing move required
- Greater precision

### CONTROL

- 8.4" LCD colour display with a resolution of 800x600

### ADDITIONAL PACKAGE SIEMENS OSS

- 12 months; Article no. 3589010
- 36 months; Article no. 3589012

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal  
- Siemens WW



## CONTROL CABINET



- Closed, uncluttered switch cabinet with integrated heat exchanger ensures optimal temperature
- With **SIEMENS** servo drive
- Standards-compliant setup

## HANDWHEEL



- Portable
- Electronic
- Substantially facilitates running in of programs
- Emergency stop button
- Confirm button

## BALL SCREW



- Ball screws for high rapid traverse speeds in all axes.
- High positioning and repeat accuracy
- Less wear

## TOOL CHANGER



- Carousel tool changer
- 16 tool slots
- Tool change time: 6 seconds

## CENTRAL LUBRICATION



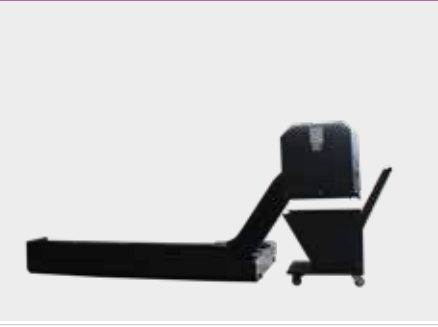
- Prevents wear, repair costs and unnecessary downtime to a major extent

## LINEAR GUIDE



- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement
- Consistent precision with long service life

## CHIP CONVEYOR/CHIP CARRIAGE



- Conveyor version
- For efficient chip discharge

## OIL SEPARATOR

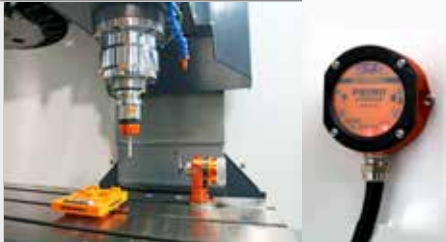


- Reliably removes floating tramp oils and finest chip abrasion from cooling lubricants.
- Collection container easily removable

## MILLING TABLE



- Solid, precision milling table with five T-grooves, generously dimensioned with precision surface finish

| TOOL MEASURING SYSTEM                                                            |                               |                                                                                   |                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Article no.<br>350110080*                                                        | <b>RENISHAW<br/>Primo set</b> |  | <ul style="list-style-type: none"> <li>• Tool measuring probe Radio Part Setter</li> <li>• Tool probe</li> <li>• Radio 3D Tool</li> <li>• Primo Interface</li> <li>• GoProbe Software</li> <li>• Collet BT 40</li> <li>• Guarantee protection for a secure feeling</li> <li>• License for six months</li> </ul> |
| ➡ Information on the Primo set also available ex warehouse Germany, see page 298 |                               |                                                                                   |                                                                                                                                                                                                                                                                                                                 |

| 3-D PRINTING PREPARATION                                               |                                       |                                                                                   |                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------|---------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Article no.<br>350110090*                                              | <b>Motor upgrade<br/>3-D PRINTING</b> |  | <ul style="list-style-type: none"> <li>• Main spindle motor with high-resolution encoder</li> <li>• 20 bit absolute value encoder instead of incremental encoder</li> </ul>                                                                        |
| Article no.<br>350110091*                                              | <b>3-D printing interface</b>         |  | <ul style="list-style-type: none"> <li>• Plug connector on milling head for printing head</li> <li>• Power supply is installed in control cabinet</li> <li>• Prepared for connecting open circuit monitoring</li> <li>• Filament holder</li> </ul> |
| ➡ Information on 3-D printing and accessories can be found on page 273 |                                       |                                                                                   |                                                                                                                                                                                                                                                    |

| MISCELLANEOUS             |                           |                                                                                     |                                                                                                                                                                                                                                                                                                                    |
|---------------------------|---------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Article no.<br>350115010* | <b>Spindle oil cooler</b> |  | <ul style="list-style-type: none"> <li>• Continuous precision</li> <li>• Optimal heat dissipation and dimensional stability</li> <li>• Prevents deviation of the spindle centre line or thermal deformation of the machine</li> <li>• Extends the machine's service life</li> <li>• Higher productivity</li> </ul> |

| STARTER SET                                        |                              |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Article no.<br>3536108                             | <b>Starter set<br/>BT 40</b> |  | <ul style="list-style-type: none"> <li>• 1 pc. cutter head tool holder</li> <li>• 1 pc. quick clamping drill chuck 1 - 13 mm</li> <li>• 2 each Weldon 6 mm and 20 mm</li> <li>• 1 each Weldon 8 / 10 / 12 / 16 mm</li> <li>• 1 pc. Adapter BT 40 to MT 3</li> <li>• 4 pcs. Collet chuck holder ER 32</li> <li>• 1 pc. Collet chuck spanner ER 32</li> <li>• 18-part collet chuck set ER 32</li> <li>• 1 pc. Height-adjuster</li> <li>• 1 pc. Assembly and tool adjustment gauge</li> <li>• 15 pcs. pull stud</li> <li>• 1 pc. taper squeegee</li> </ul> |
| ➡ For Information on the starter set, see page 289 |                              |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| FOURTH AXIS                                                                     |                                            |                                                                                                                                           |                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Article no.<br>350110002*                                                       | <b>Preparation<br/>for the fourth axis</b> |                                                        |                                                                                                                                                                                                   |
| Article no.<br>350110003*                                                       | <b>Fourth axis<br/>Complete set</b>        | <br>Illustration similar and with optional fourth axis | <ul style="list-style-type: none"> <li>• Rotary indexing table Ø 125 mm</li> <li>• Three-jaw lathe chuck 100 mm</li> <li>• Tailstock with MT 2 quill</li> <li>• Including installation</li> </ul> |
| Article no.<br>350110004*                                                       | <b>Swivel bridge</b>                       |                                                        | <ul style="list-style-type: none"> <li>• Size 260 x 130 mm</li> <li>• with counterholder</li> <li>• Enables multi-page editing</li> </ul>                                                         |
| ➡ You can find information on the fourth axis rotary dividing table on page 282 |                                            |                                                                                                                                           |                                                                                                                                                                                                   |



# ***01 - TURNING STANDARD MACHINES***



OPTi turn L 34HS

# L 34HS

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CNC-controlled lathe with linear guide

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**SIEMENS** CONTROL SINUMERIK 808D ADVANCED

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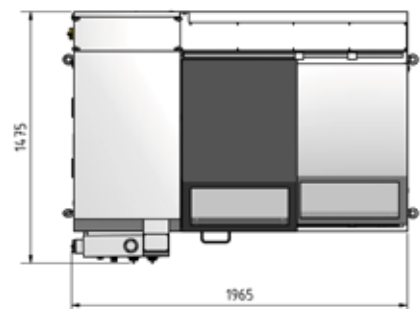
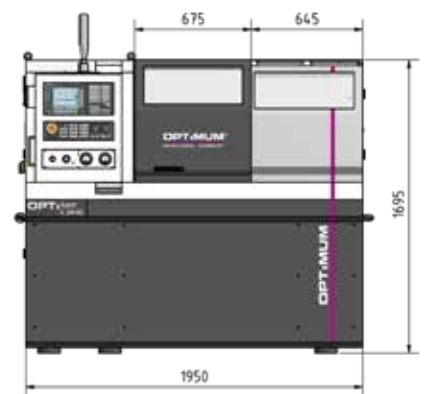
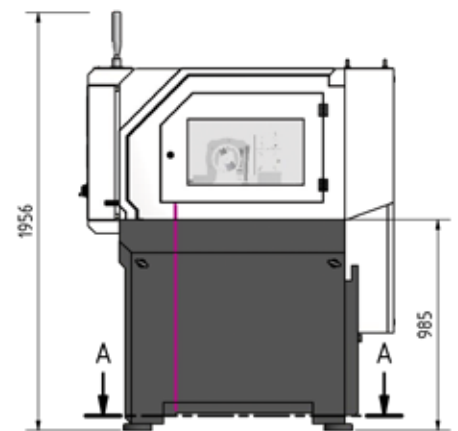
- Precise workmanship
- Spindle and servo motors by **SIEMENS**
- Braced machine bed made from grey cast-iron
- Maintenance-friendly protective housing
- Ground ball screw spindles
- Complex spindle bearing
- Linear guides on both axes
- Emergency stop button
- Central lubrication
- Access flap on rear for maintenance
- Safety switch on front sliding door
- Turret located behind the lathe centre (left turning tool)
- Additional package SIEMENS material defects liability and free on-site service OSS on page 45
- For information on maintenance contracts see page 333





## TECHNICAL DATA

| Model                                  | L 34HS                  |
|----------------------------------------|-------------------------|
| Article no.                            | 3504232                 |
| <b>Machine data</b>                    |                         |
| Electrical connection                  | 400 V / 3 Ph ~50 Hz     |
| Total connected load                   | 6.5 kVA                 |
| <b>Spindle</b>                         |                         |
| Drive motor S1 operation               | 3.7 kW                  |
| Torque drive motor S1 operation        | 23.6 Nm                 |
| Torque at the spindle                  | 40 Nm                   |
| Spindle seat                           | ISO 702-1 No. 4 form A2 |
| Spindle bore                           | Ø 46 mm                 |
| Chuck passage                          | Ø 42 mm                 |
| Lathe chuck                            | Ø 160 mm                |
| <b>Cooling lubricant system</b>        |                         |
| Coolant pump output                    | 95 W                    |
| Tank capacity                          | 75 litres               |
| Pump delivery rate max.                | 6 l/min                 |
| Max. delivery head                     | 3 m                     |
| <b>Machine data</b>                    |                         |
| Centre height                          | 165 mm                  |
| Centre width                           | 540 mm                  |
| Swing Ø above cross slide              | 146 mm                  |
| Swing Ø above machine bed              | 350 mm                  |
| Bed width                              | 208 mm                  |
| <b>Speed range</b>                     |                         |
| Speeds*                                | 30 - 3 500 rpm          |
| <b>Tool changer</b>                    |                         |
| Type                                   | electrical              |
| Number of tool slots                   | 6                       |
| Mounting height x width of square max. | 16 x 16 mm              |
| Max. chuck diameter drilling rod       | 16 mm                   |
| Tool change time                       |                         |
| Tool to tool in the spindle            | 1.5 seconds             |
| <b>Accuracy</b>                        |                         |
| Repeat accuracy                        | ± 0.01 mm               |
| Positioning accuracy                   | ± 0.01 mm               |
| <b>Travel</b>                          |                         |
| X axis                                 | 185 mm                  |
| Z axis                                 | 750 mm                  |
| <b>Feed speed</b>                      |                         |
| X axis                                 | 6 m/min.                |
| Z axis                                 | 8 m/min.                |
| <b>Motor torque</b>                    |                         |
| X axis                                 | 4 Nm                    |
| Z axis                                 | 6 Nm                    |
| <b>Tailstock</b>                       |                         |
| Shank                                  | MT 3                    |
| Spindle sleeve diameter                | 45 mm                   |
| Spindle sleeve stroke                  | 120 mm                  |
| <b>Dimensions</b>                      |                         |
| Length x width x height                | 1950 x 1475 x 1956 mm   |
| Overall weight                         | 1200 kg                 |



# SINUMERIK 808D ADVANCED

## CNC TECHNOLOGY FROM THE TECHNOLOGY LEADER

- The SINUMERIK 808D ADVANCED control is a panel-based CNC control. The compact and user-friendly entry-level solution is used for simple turning applications. Features such as easy operation, commissioning and maintenance are the perfect basis for equipping CNC machines.
- With its technology-specific variants, the SINUMERIK 808D ADVANCED control is perfectly preconfigured for turning. And with its hardware and software enhancements, the SINUMERIK 808D ADVANCED also offers sufficient performance for simple turning functionalities in mould and tool making.

### SINUMERIK 808D ON PC

- Control-identical software package that further simplifies handling of the machine tool. Download free of charge at <https://xcelerator.siemens.com/global/en/industries/machinebuilding/machine-tools/cnc4you/808d-on-pc.html>



### OVERALL PACKAGE

- RJ45 Ethernet port
- Ready for remote maintenance
- AST function gives users an easy optimisation option in case of stricter dynamic and precision requirements
- Absolute encoder / no referencing move required
- Greater precision

### CONTROL

- 8.4" LCD colour display with a resolution of 800x600

### ADDITIONAL PACKAGE SIEMENS OSS

- 12 months; Article no. 3589010
- 36 months; Article no. 3589012

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal  
- Siemens WW



### TOOL CHANGER



- For 6 tool slots

### SPINDLE



- Incremental encoder for spindle positioning (thread tapping)
- Large spindle bore

### LINEAR GUIDE



- High permissible load and high stiffness
- Low coefficient of friction
- Greater precision of the machine

### COOLANT SYSTEM



- Pulls out
- Easy chip disposal

### MACHINE LAMP



- Full illumination of the workspace

### CENTRALISED LUBRICATION SYSTEM



- Guarantees regular and automatic lubrication
- Lubricating points that are connected to the central lubricating system have a longer service life

### SINUMERIK 808D ON PC



- Software package identical to control
- Facilitates the handling of the machine tool
- The workpieces can be programmed and simulated offline.

Download for free on  
<https://xcelerator.siemens.com/global/en/industries/machinebuilding/machine-tools/cnc4you/808d-on-pc.html>

#### Training and learning

- SINUMERIK Operate BASIC operations can be explored on a PC without additional hardware.
- Easy and convenient learning experience with a user interface identical to that of the control

#### Offline CNC programming:

- Boosts productivity by programming directly on a PC
- Test sub-routines on the PC with the integrated simulator

#### Professional CNC presentations:

- Present the SINUMERIK Operate BASIC user interface on the PC – at any time and anywhere without additional hardware

## LATHE CHUCK

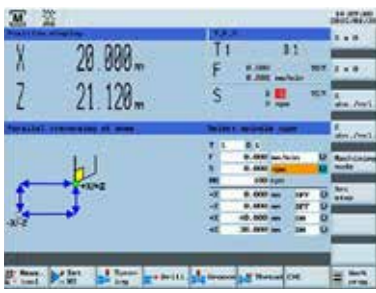
Article no.

|         |                                        |                                                                                    |                                                                                                                                                                                                                             |
|---------|----------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3450232 | <b>BISON</b><br>Three-jaw lathe chuck  |   | <ul style="list-style-type: none"> <li>• Cast, Ø 160 mm DIN 6350</li> <li>• Hard jaws, single-part, with outside-inside clamping</li> <li>• Chuck key</li> <li>• Runout accuracy: 0.03 mm</li> </ul>                        |
| 3450412 | <b>BISON</b><br>monobloc jaw set, soft |                                                                                    | <ul style="list-style-type: none"> <li>• for three-jaw lathe chuck Ø 160 mm</li> </ul>                                                                                                                                      |
| 3450236 | <b>BISON</b><br>Four-jaw lathe chuck   |   | <ul style="list-style-type: none"> <li>• Cast, Ø 160 mm DIN 6350</li> <li>• Hard jaws, single-part, with outside-inside clamping</li> <li>• Chuck key</li> <li>• Runout accuracy: 0.03 mm</li> </ul>                        |
| 3450422 | <b>BISON</b><br>monobloc jaw set, soft |                                                                                    | <ul style="list-style-type: none"> <li>• for four-jaw lathe chuck Ø 160 mm</li> </ul>                                                                                                                                       |
| 3450241 | Chuck flange                           |   | <ul style="list-style-type: none"> <li>• for lathe chuck Ø 160 mm</li> <li>• for collet chuck 16C (Article no. 3450245)</li> </ul>                                                                                          |
| 3450245 | Collet chuck 16C                       |  | <ul style="list-style-type: none"> <li>• Ø 160 mm</li> <li>• Chuck flange needed (Article no. 3450246)</li> <li>• Manually operated chuck for distortion-free clamping of workpieces</li> <li>• Steel chuck body</li> </ul> |

## MISCELLANEOUS

|           |                                            |                                                                                     |                                                                                                                                     |
|-----------|--------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 3441215   | Lathe tool set HM 16 mm                    |  | <ul style="list-style-type: none"> <li>• 4-part</li> </ul>                                                                          |
| 3535170   | Cylindrical seat<br>Ø16 mm                 |  | <ul style="list-style-type: none"> <li>• for drill chuck B16</li> </ul>                                                             |
| 350422010 | Boring bar holder<br>round, up to 20 mm    |  | <ul style="list-style-type: none"> <li>• for tool changer</li> <li>• Info: The hole is to be drilled by the user himself</li> </ul> |
| 350422011 | Lathe tool holder<br>crosswise up to 16 mm |                                                                                     | <ul style="list-style-type: none"> <li>• for tool changer</li> </ul>                                                                |

## SOFTWARE

|          |                                                                     |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3584150* | <b>SIEMENS</b><br>Manual Machine Plus (MM+)<br>Simple cycle control |  | <p>The software enables the transition from conventional machines to CNC programming. The machine can be operated by means of hand wheels like a conventional machine, but with the advantages of CNC-supported technology cycles. Functions:</p> <ul style="list-style-type: none"> <li>• Axis-parallel traverse, taper turning, radius turning, centre drilling, tapping, groove cycle, tapping, pre-turning of contours</li> </ul> |
|----------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

➡ For more information, see on page 323

# ***02 - MILLING PRODUCTION MACHINES***

OPTImill F 600HSC





OPTImill F 110HSC



# F 120X

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CNC Drilling and thread tapping machine with full milling capability

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SIEMENS CONTROL 828D with PPU 290

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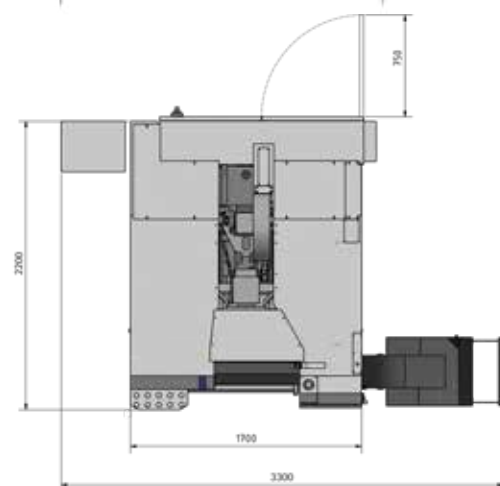
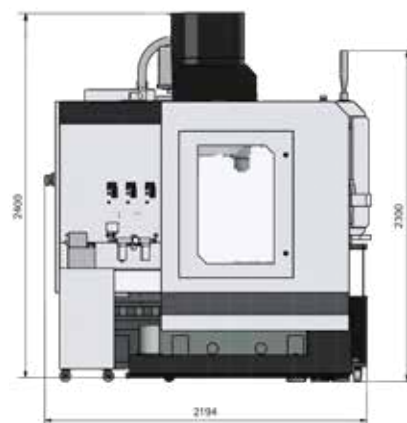
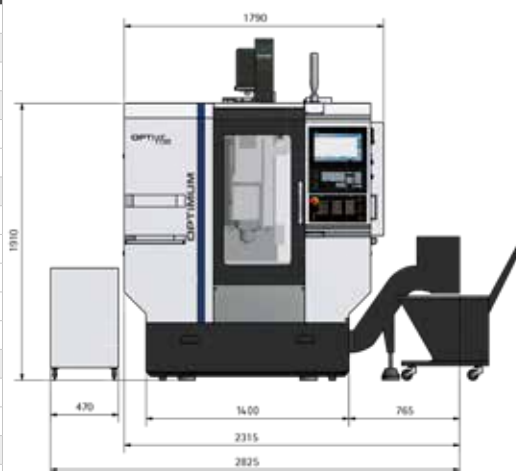
- Rugged design
- Servo tool changer with 21 tool slots
- All linear guides with covers
- Automatic centralised lubrication
- SIEMENS main spindle motor
- SIEMENS servo drives on all axes (closed control circuit)
- Inline spindle with max. spindle speed of 16 000 rpm
- Hardened and precision ground ball screws for high rapid traverse speeds in all axes
- Portable, electronic handwheel with enabling switch and emergency stop button that significantly facilitates the running-in of programmes
- Coolant unit with 120 litre coolant tank
- Solid, precision milling table with precision surface finish
- Access doors very generously designed to reduce cleaning and maintenance times to a minimum
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- Oil cooler ensures thermal stability of the spindle
- LED machine lamp for complete illumination of the workspace
- Additional package SIEMENS material liability for defects and free online/on-site service OSS Plus see page 65
- For information on maintenance contracts see page 333



Fig. with optional accessories  
(vice, milling cutter, chuck)

## TECHNICAL DATA

| Model                                          | F 120X                |
|------------------------------------------------|-----------------------|
| Article no.                                    | 3515120               |
| Spindle                                        | Inline spindle        |
| <b>Machine data</b>                            |                       |
| Electrical connection                          | 400 V / 3 Ph ~50 Hz   |
| Total connected load                           | 45 kVA                |
| <b>Milling spindle</b>                         |                       |
| Drive motor S1 operation                       | 12 kW                 |
| Torque drive motor S1 operation                | 38 Nm                 |
| Drive motor S6 30 % operation                  | 22.8 kW               |
| Torque drive motor S6 30 % operation           | 116 Nm                |
| Spindle seat                                   | BT 30                 |
| <b>Cooling lubricant system</b>                |                       |
| Coolant pump output                            | 370 W                 |
| Tank capacity                                  | 120 litres            |
| <b>Milling accuracy according to ISO 230-2</b> |                       |
| Repeat accuracy                                | ± 0.006 mm            |
| Positioning accuracy                           | ± 0.005 mm            |
| <b>Tool changer</b>                            |                       |
| Type                                           | Servo                 |
| Number of tool slots                           | 21                    |
| Max. tool diameter                             | 80 mm                 |
| Max. tool length                               | 80 mm                 |
| Max. tool weight                               | 3 kg                  |
| Time tool change chip to chip                  | 7.33 seconds          |
| <b>Travel</b>                                  |                       |
| X axis                                         | 500 mm                |
| Y axis                                         | 400 mm                |
| Z axis                                         | 300 mm                |
| <b>Feed drive (X / Y / Z axis)</b>             |                       |
| Rapid traverse                                 | 40 m/min.             |
| Acceleration                                   | 2 m/s <sup>2</sup>    |
| <b>Motor torque (X / Y / Z axis)</b>           |                       |
| Drive motor S1 operation                       | 2.32 / 2.32 / 3.3 kW  |
| Torque drive motor S1 operation                | 7.4 / 7.4 / 10.5 Nm   |
| Drive motor S6 30 % operation                  | 4.1 / 4.1 / 6.5 kW    |
| Torque drive motor S6 30 % operation           | 14 / 14 / 21 Nm       |
| <b>Speed range</b>                             |                       |
| Speeds*                                        | 16,000 rpm            |
| <b>Pneumatics</b>                              |                       |
| Compressed air                                 | 6 bar                 |
| <b>Milling table</b>                           |                       |
| Spindle centre to Z axis cover                 | 400 mm                |
| Clearance spindle to table                     | 150 - 450 mm          |
| Table length x width                           | 650 x 400 mm          |
| T-slot size / amount / distance                | 14 mm / 3 / 125 mm    |
| Maximum payload                                | 250 kg                |
| <b>Dimensions</b>                              |                       |
| Length (with chip conveyor) x width x height   | 2315 x 2194 x 2325 mm |
| Overall weight                                 | 3800 kg               |



\* Please note that the maximum spindle speed must be reduced by approx. 20 % in continuous operation

# SINUMERIK 828D

## THE POWER PACK IN THE COMPACT CLASS OF CNC CONTROLS

Robust hardware architecture and intelligent control algorithms as well as top-class drive and motor technology ensure the highest dynamics and precision during machining. Advanced software-controlled compensation functions ensure additional quality in surface machining and high availability of the machine tool. With SINUMERIK Operate, all machining technologies, from standard to complex, can be operated intuitively and with a uniform "look & feel".



### Multi-touch operation with PPU 290:

The 15.6" panel is robust even in harsh environments. The SINUMERIK Operate user interface is optimised for touch-sensitive operation

Proximity/distance sensor for smart display control

### Rugged and maintenance-free

Front panel made of die-cast magnesium with scratchproof glass front  
Can be operated while wearing gloves

Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)

## SIEMENS SAFETY INTEGRATED

SET UP WORK WITH OPEN DOORS

### Functional safety also provides protection against high costs!

Machine and plant safety is not only important because strict regulations must be observed. When everything runs safely, you benefit from time savings in engineering, higher system availability and more investment security.

## CONTROL

- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function

## SYSTEM SOFTWARE

### SW 28x

10 MB CNC memory  
1 ms Block change time  
150 Look Ahead  
512 tools

## OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- ShopMill work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording
- System software SW 28x

## ADDITIONAL PACKAGE SIEMENS OSS PLUS

12 months; Article no. 3589020  
24 months; Article no. 3589021  
36 months; Article no. 3589022

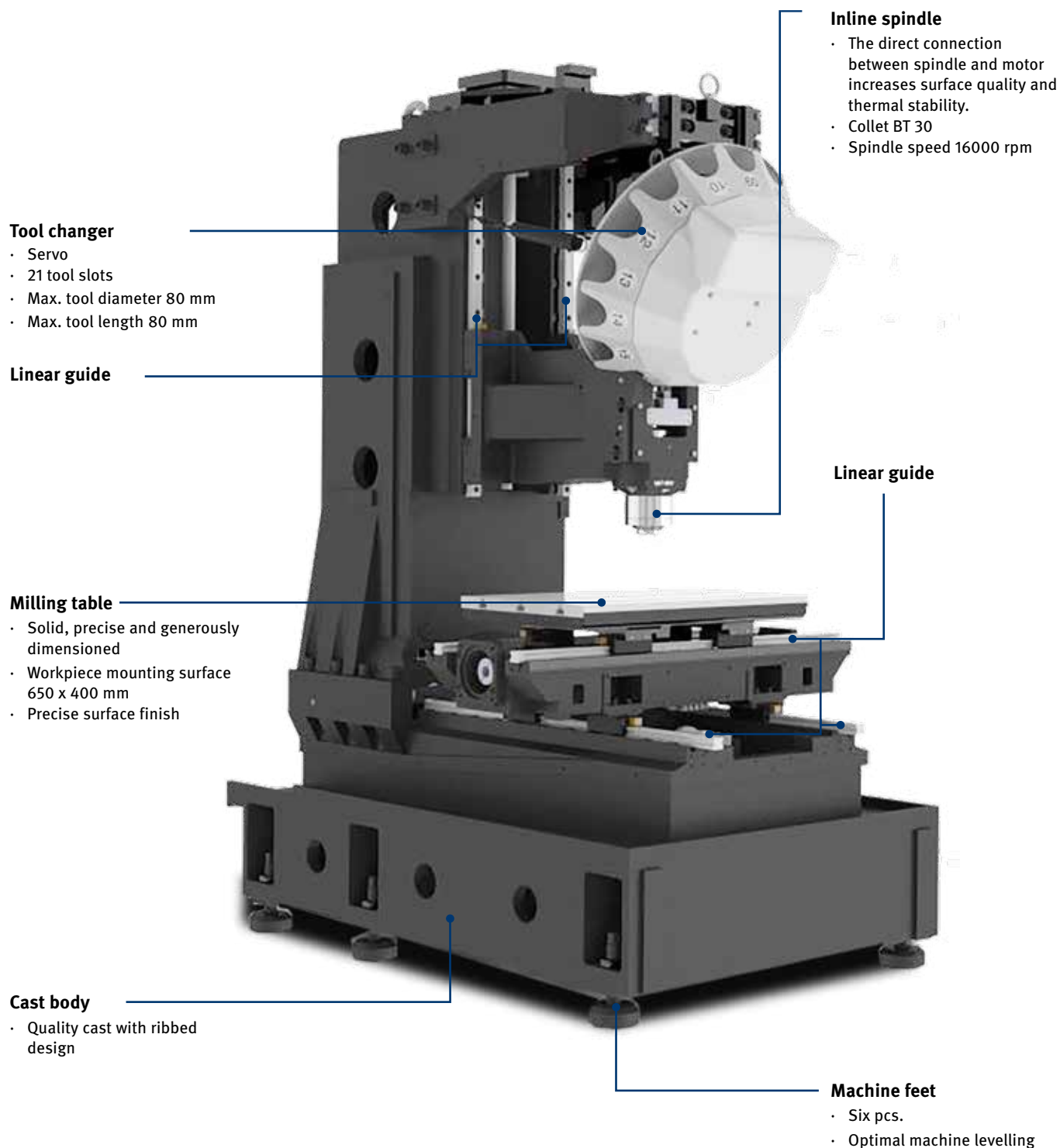
Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal - Siemens WW





## RUGGED DESIGN

Dynamics, precision and ergonomics



## COOLANT PUMP



- Powerful 370 W coolant pump
- Tank capacity 120 litres
- Maximum flow rate 4 m³/h (66 litres per minute)

## HANDWHEEL



- Portable
- Electronic
- Substantially facilitates running in of programs
- Emergency stop button
- Confirm button

## SPINDLE OIL COOLER



- Prevents deviation of the spindle centre line or thermal deformation of the machine
- Optimal heat dissipation and dimensional stability
- Extends the machine's service life

## TOOL CHANGER



- Servo
- 21 tool slots
- Tool change time, tool to tool in the spindle: 0.5 seconds

## CONTROL CABINET



- With SIEMENS servo drive
- Standards-compliant setup
- Wiring with individual wire labelling and enclosed circuit diagram facilitates maintenance work and diagnostics

## LINEAR GUIDE



- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement
- Consistent precision with long service life

## COMPARTMENTS



- Storage compartment
- Tool compartment for clean and clear-cut storage of tools
- Within reach on the machine

## INLINE SPINDLE



- Spindle speed up to 16 000 rpm
- The direct connection between spindle and motor increases surface quality and thermal stability.

## CENTRAL LUBRICATION SYSTEM



- Prevents wear, repair costs and unnecessary downtime to a considerable extent.

TOOL MEASURING / WORKPIECE MEASURING

➞ For information on tool/workpiece measurement ex warehouse Germany, see page 295.

MISCELLANEOUS

|            |   |                                                  |                                                                                                                                                                                                                                                    |                                 |
|------------|---|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| 3536107    | 1 | Starter set<br>BT 30                             |  Informations on page 288                                                                                                                                       |                                 |
| 351512010* | 3 | Coolant through spindle CTS                      | <ul style="list-style-type: none"><li>• Pump pressure 30 bars</li><li>• Integrated unit</li></ul>                                                                                                                                                  | we<br>recommend<br>a<br>suction |
| 351512011* |   |                                                  | <ul style="list-style-type: none"><li>• Pump pressure 70 bars</li><li>• External power unit</li><li>• Tank capacity 168 litres</li></ul>                                                                                                           |                                 |
| 351512016* | 2 | Double contact spindle system<br>BIG-PLUS® BT 30 | <ul style="list-style-type: none"><li>• BIG-PLUS® is an extremely stable connection between the machine spindle and the tool holder, which is achieved by simultaneous taper and face contact of the tool holder in the machine spindle.</li></ul> |                                 |

FOURTH AXIS

|            |   |                                          |                                                                                                                                                                                                                                                                                                                  |
|------------|---|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 351512002* | 4 | <b>Fourth axis rotary indexing table</b> | <ul style="list-style-type: none"> <li>• Preparation</li> </ul>                                                                                                                                                                                                                                                  |
| 351512003* |   |                                          | <ul style="list-style-type: none"> <li>• Rotary indexing table Ø 120 mm</li> <li>• Three-jaw lathe chuck 100 mm</li> <li>• Tailstock</li> <li>• Installation</li> </ul>                                                                                                                                          |
| 350110004* | 5 | <b>Swivel bridge</b>                     | <ul style="list-style-type: none"> <li>• 260 x 130 mm</li> <li>• with counterholder</li> <li>• Enables multi-sided machining with multiple clamping</li> <li>• With a quadruple clamping, the proportion of tool change time per workpiece is therefore only a quarter compared to a single clamping.</li> </ul> |

➞ For details on the fourth axis for the rotary indexing table, see page 284

SOFTWARE

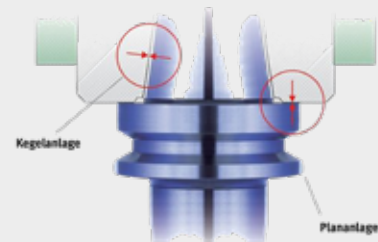
|         |   |                                                  |                                                                                                                                                                                                                                                                                                                                                              |
|---------|---|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3584014 | 6 | <b>DXF Reader for SIEMENS SINUMERIK controls</b> | <ul style="list-style-type: none"> <li>• from version 4.7</li> <li>• For importing DXF files</li> <li>• Hiding graphics layers</li> <li>• Automatic contour tracking</li> <li>• Arbitrary workpiece zero point per contour/drilling point</li> </ul>                                                                                                         |
| 3584012 | 7 | <b>Top surface for SIEMENS SINUMERIK control</b> | <ul style="list-style-type: none"> <li>• The NC data from the CAM system are optimised online during processing</li> <li>• The result is excellent surface quality while milling complex free-form surfaces. This is particularly beneficial for geometrically complex mould parts in automobile or aerospace applications or in power generation</li> </ul> |

## 1 STARTER SET



- 1) Cutter head holder
- 2) Quick-action drill chuck 13 mm
- 3) 2 each Weldon 6/20 mm
- 3) 1 each Weldon 8/10/12/16 mm
- 4) Adapter BT 30
- 5) 4 pcs. Collet chuck holder ER 32
- 6) Collet spanner ER 32
- 7) 18-part collet chuck set ER 32
- 8) Height adjustment device
- 9) Assembly and tool setting aid
- 10) 14 pcs. pull stud
- 11) Taper squeegee

## 2 DOUBLE CONTACT SPINDLE SYSTEM BIG-PLUS®



### The advantages

- Improve surface quality and dimensional accuracy
- Longer service life of the tools
- Prevents fretting corrosion during heavy machining
- Maximum change accuracy with the tool changer
- No axial offset at high speeds
- Improved concentricity in drilling work
- Improved flat surface contact  
(BT 30: BIG-PLUS Ø 46 mm - conventional Ø 31.75 mm)

## 3 COOLANT THROUGH SPINDLE



- Guarantees optimal service life
- Higher cooling and lubrication effect at the cutting zone

## 4 PREPARATION



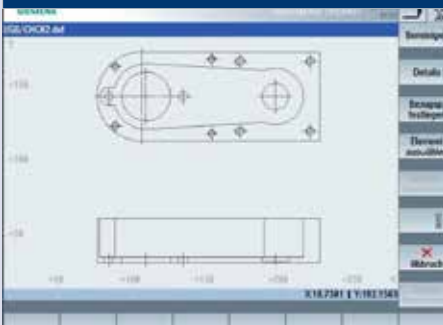
- Preparation for fourth axis

## 5 FOURTH AXIS



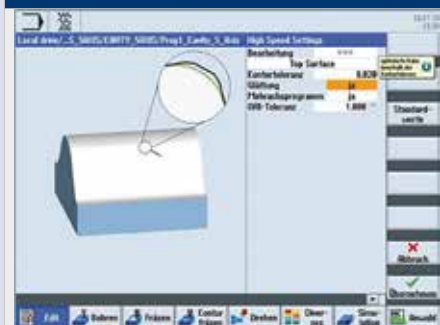
- Rigid design thanks to single-part front plate and spindle design
- A combination of high-precision worm wheel and bronze/nickel housing. The screw made of hardened steel

## 6 DXF READER



- DXF data can be converted into NC programs for drilling patterns and contours.

## 7 TOP SURFACE



The SINUMERIK Top Surface function produces the finest surfaces, largely independent of the quality of the CAD/CAM data. At the same time, the machine is protected thanks to harmonious tool guidance and minimised vibration excitation.



- Excellent surface quality and form precision
- Fast and precise machining thanks to new technology
- Complete machining fully integrated in Sinumerik Operate

# F 110HSC

**Excellent precision, solid design, effectiveness and efficiency**

**SIEMENS CONTROL SINUMERIK 828D mit PPU 290** and 15.6 inch touch display

- Heavy duty version
- High productivity
- High reliability
- Torsion free machine base thanks to strong ribbing
- Profile rail with ball screw for fast rapid motion speeds on all axes
- High-torque servo drives on all three axes
- Telescopic guide rail covers on all three axes
- Automatic lubrication
- Solid, precise milling table with three T-slots, large dimensions and precision-ground
- The portable, electronic handwheel with enabling switch and emergency stop push button makes it much easier to run in programmes.
- Coolant device with chip flushing system and cleaning gun
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- RJ45 connection and 230 V power connection
- Closed switch cabinet with integrated heat exchanger; ensures optimal temperature even in case of high ambient temperatures; prevents dirt particle penetration
- Machine lamp in the workspace
- Additional package SIEMENS material liability for defects and free online/on-site service OSS Plus see page 67
- 1 year maintenance contract Basic included in DE/A/CH see page 333





## TECHNICAL DATA

| Model                                                | F 110HSC                    |
|------------------------------------------------------|-----------------------------|
| Article no.                                          | 3511410                     |
| Milling spindle                                      | Inline spindle              |
| <b>Machine data</b>                                  |                             |
| Electrical connection                                | 400 V / ~50 Hz              |
| Total connected load                                 | 15 kVA                      |
| <b>Milling spindle</b>                               |                             |
| Drive motor S1 operation                             | 9 kW                        |
| Torque drive motor S1 operation                      | 57 Nm                       |
| Drive motor S6 30 % operation                        | 21.2 kW                     |
| Torque drive motor S6 30 % operation                 | 135 Nm                      |
| Spindle seat                                         | SK 40 / DIN 69871           |
| <b>Coolant through spindle option**</b>              |                             |
| Drive motor S1 operation                             | 10.5 kW                     |
| Torque drive motor S1 operation                      | 50 Nm                       |
| Drive motor S6 30 % operation                        | 26.4 kW                     |
| Torque drive motor S6 30 % operation                 | 125 Nm                      |
| <b>Cooling lubricant system</b>                      |                             |
| Coolant pump power, 2 pieces                         | 900 W                       |
| Delivery rate max.                                   | 35 l/min.                   |
| Tank capacity                                        | 116 litres                  |
| <b>Cleaning pump</b>                                 |                             |
| Cleaning pump output                                 | 530 W                       |
| <b>Milling precision</b>                             |                             |
| Repeat accuracy                                      | ± 0.005 mm                  |
| Positioning accuracy                                 | ± 0.005 mm                  |
| <b>Tool changer</b>                                  |                             |
| Type                                                 | Double arm gripper          |
| Number of tool stations                              | 20                          |
| Max. tool diameter                                   | 78 mm                       |
| Max. tool diameter (tools slots beside not occupied) | 120 mm                      |
| Tool length                                          | 300 mm                      |
| Max. tool weight                                     | 8 kg                        |
| Tool change time: Tool to tool                       | 2.5 seconds                 |
| <b>Travel</b>                                        |                             |
| X axis                                               | 650 mm                      |
| Y axis                                               | 400 mm                      |
| Z axis                                               | 500 mm                      |
| <b>Feed drive</b>                                    |                             |
| Rapid motion X, Y, Z axis                            | 48 / 48 / 32 m/min.         |
| <b>Motor torque</b>                                  |                             |
| X / Y / Z axis                                       | 11 Nm / 11 Nm / 20 Nm       |
| <b>Feed forces</b>                                   |                             |
| X / Y / Z axis                                       | 3.67 kN / 3.67 kN / 6.68 kN |
| <b>Speed range</b>                                   |                             |
| Speeds*                                              | 12 000 rpm                  |
| <b>Pneumatics</b>                                    |                             |
| Compressed air                                       | 6 bar                       |
| Air consumption per hour                             | 6 - 8 kg/m³                 |
| <b>Milling table</b>                                 |                             |
| Clearance spindle to table                           | 100 - 600 mm                |
| Table length x width                                 | 850 x 400 mm                |
| T-slot size / amount / distance                      | 18 mm / 3 / 100 mm          |
| Maximum payload                                      | 400 kg                      |
| <b>Dimensions</b>                                    |                             |
| Length x width x height                              | 2100 x 2300 x 2750 mm       |
| Overall weight                                       | 4300 kg                     |

\* Please note that the maximum spindle speed must be reduced by approx. 20 % in continuous operation

\*\* The option must be ordered with the basic machine. Cannot be retrofitted.

# SINUMERIK 828D

## THE POWER PACK IN THE COMPACT CLASS OF CNC CONTROLS

Robust hardware architecture and intelligent control algorithms as well as top-class drive and motor technology ensure the highest dynamics and precision during machining. Advanced software-controlled compensation functions ensure additional quality in surface machining and high availability of the machine tool. With SINUMERIK Operate, all machining technologies, from standard to complex, can be operated intuitively and with a uniform "look & feel".



### Multi-touch operation with PPU 290:

The 15.6" panel is robust even in harsh environments. The SINUMERIK Operate user interface is optimised for touch-sensitive operation

Proximity/distance sensor for smart display control

### Rugged and maintenance-free

Front panel made of die-cast magnesium with scratchproof glass front  
Can be operated while wearing gloves

Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)

## SIEMENS SAFETY INTEGRATED

SET UP WORK WITH OPEN DOORS

### Functional safety also provides protection against high costs!

Machine and plant safety is not only important because strict regulations must be observed. When everything runs safely, you benefit from time savings in engineering, higher system availability and more investment security.

## CONTROL

- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function

## SYSTEM SOFTWARE

### SW 28x

10 MB CNC memory  
1 ms Block change time  
150 Look Ahead  
512 tools

## OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- ShopMill work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording
- System software SW 28x

## ADDITIONAL PACKAGE SIEMENS OSS PLUS

12 months; Article no. 3589020  
24 months; Article no. 3589021  
36 months; Article no. 3589022

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal - Siemens WW



#### **Inline spindle**

- The direct connection between spindle and motor increases surface quality and thermal stability.
- SK 40 / DIN 69871 seat
- Spindle speed 12 000 rpm

#### **Linear guide**

- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement

#### **Milling table**

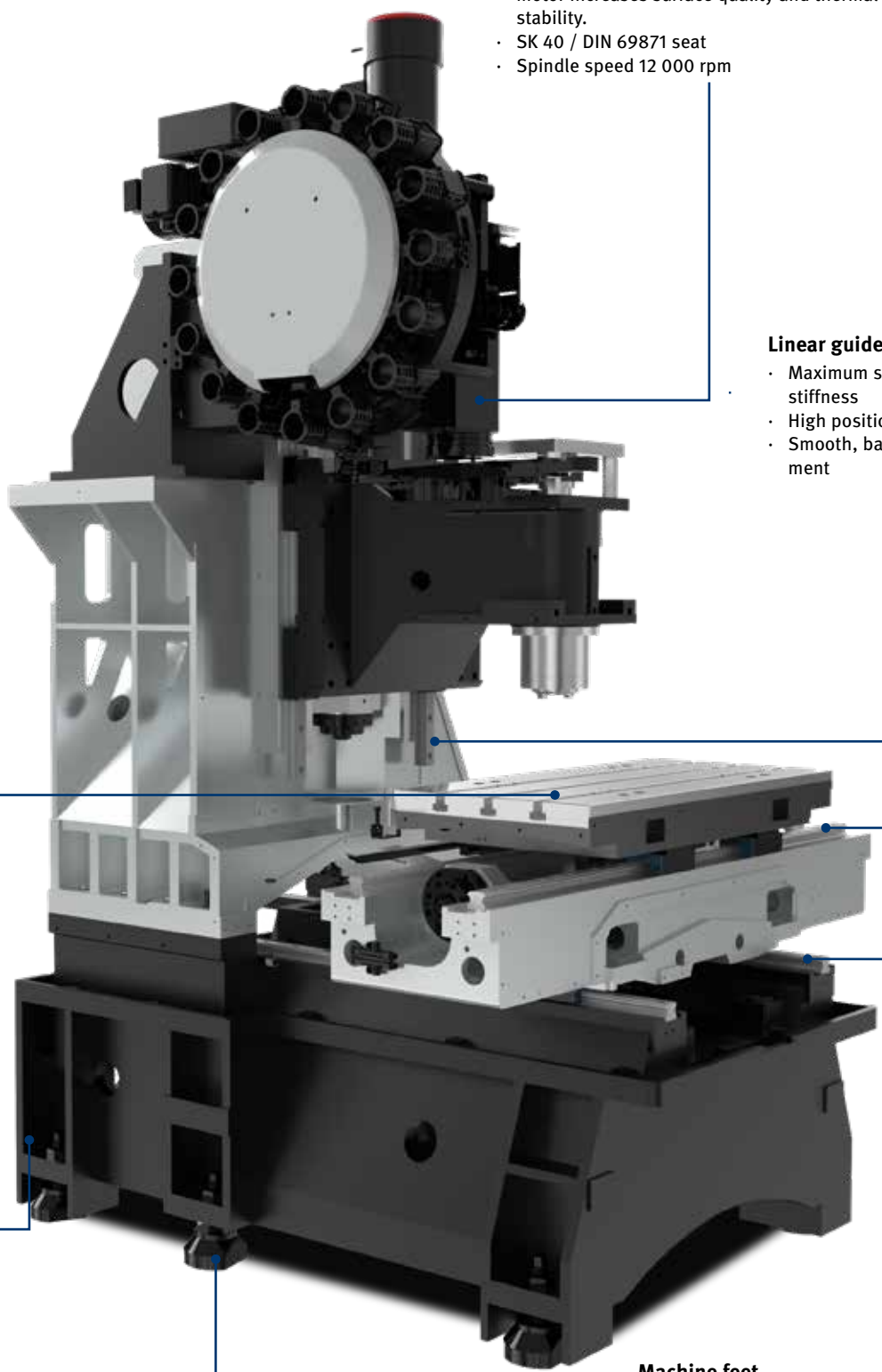
- Solid, precise and generously dimensioned
- Clamping surface 850 x 400 mm
- Precisely surface-finished

#### **Cast body**

- Quality cast with ribbed design

#### **Machine feet**

- Six pcs.
- Optimum alignment of the machine



## CLEANING GUN



- Easy cleaning of the workspace

## BALL SCREWS AND LINEAR GUIDEWAYS FROM THK



- Accuracy class C3
- For high positioning and repeat accuracy
- Less wear
- Ball screw with servo motor

## TOOL CHANGER SYSTEM



- Double arm grab with 20 tool slots
- Maximum tool length 300 mm
- Tool-to-tool change in 2.5 seconds

## COOLANT



- Adjustable and individually switchable coolant nozzles direct the coolant specifically into the machining area to be lubricated and remove the chips produced during machining at the same time

## CONTROL CABINET



- Closed, clearly arranged control cabinet
- With **SIEMENS** servo drive
- Standards-compliant setup

## CHIP CONVEYOR



- Belt design
- For efficient chip discharge

## COOLING LUBRICANT SYSTEM



- Two coolant pumps with 900 W each
- Max. flow rate 35 l/min.
- A cleaning pump

## SPINDLE OIL COOLER



- for the longevity of the spindle



| TOOL MEASURING / WORKPIECE MEASURING                                                                                                                                     |   |                                                 |                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3511409 080                                                                                                                                                              |   | <b>BLUM TC52IR</b><br>Universal measuring probe | <ul style="list-style-type: none"> <li>Switching point repetition accuracy from 0.3µm 2σ at 2 m/ min. measuring speed</li> <li>Wear-free and durably stable</li> <li>Very compact probe with 40 mm diameter</li> </ul> |
| 3511409 081                                                                                                                                                              |   | <b>BLUM ZX-Speed</b><br>3-D probe               | <ul style="list-style-type: none"> <li>Universal 3-D probe for toolmaking and tool break monitoring</li> </ul>                                                                                                         |
| 3584010                                                                                                                                                                  | 5 | <b>Siemens Measuring cycle</b>                  | <ul style="list-style-type: none"> <li>Measurement cycles are general sub-programmes for solving specific measurement tasks that can be adapted to the specific problem using parameters.</li> </ul>                   |
| <p>➡ Only necessary for measuring system from the manufacturer<br/>Information on Blum workpiece/tool measurement also ex stock Germany can be found in the page 295</p> |   |                                                 |                                                                                                                                                                                                                        |

| 3-D PRINTING                                                                  |  |                               |                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------|--|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3562411                                                                       |  | <b>3-D printing interface</b> | <ul style="list-style-type: none"> <li>Plug connector on milling head for OPTImill 3X/5X printing head</li> <li>Power supply is installed in control cabinet</li> <li>Preparation for wire breakage monitoring and filament holder</li> </ul> |
| <p>➡ Information on 3-D printing and accessories can be found on page 273</p> |  |                               |                                                                                                                                                                                                                                               |

| MISCELLANEOUS |   |                                      |                                                                                                                                                             |
|---------------|---|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3536109       | 1 | <b>Starter set SK 40 / DIN 69871</b> | ➡ For Information on the starter set, see page 290                                                                                                          |
| 3511409010    | 2 | <b>Coolant through spindle CTS</b>   | <ul style="list-style-type: none"> <li>Unit 20 bar integrated</li> <li>Motor is changed to 10.5 kW</li> </ul>                                               |
| 3511409011    |   |                                      | <ul style="list-style-type: none"> <li>Unit 70 bar external tank</li> <li>Motor is changed to 10.5 kW</li> </ul>                                            |
| 3511409012    |   |                                      | <ul style="list-style-type: none"> <li>Internal motor preparation is changed to 10.5 kW</li> </ul>                                                          |
| 3511409013    |   |                                      | <ul style="list-style-type: none"> <li>Upgrade from 20 bar internal to 70 bar external</li> </ul>                                                           |
| 3511409031    | 3 | <b>Air conditioner</b>               | <ul style="list-style-type: none"> <li>Instead of the standard equipment › heat exchanger</li> </ul>                                                        |
| 3511409030    | 4 | <b>Oil Separator</b>                 | <ul style="list-style-type: none"> <li>Oil separator reliably removes floating foreign oils and the finest chip abrasion from cooling lubricants</li> </ul> |

| FOURTH AXIS AND 5-AXIS ROTARY/SWIVEL TABLE                                                                             |   |                                                                                     |                                                                                                |
|------------------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 3511409040                                                                                                             | 5 | <b>Fourth axis rotary indexing table complete set</b><br>(Axis licence is required) | <ul style="list-style-type: none"> <li>Preparation</li> </ul>                                  |
| 3511409050                                                                                                             |   |                                                                                     | <ul style="list-style-type: none"> <li>Three-jaw lathe chuck Ø 120 mm and tailstock</li> </ul> |
| 3511409041                                                                                                             | 6 | <b>5-axis rotary/swivelling table</b><br>(Axis licence is required)                 | <ul style="list-style-type: none"> <li>Preparation</li> </ul>                                  |
| 3511409052                                                                                                             |   |                                                                                     | <ul style="list-style-type: none"> <li>Three-jaw lathe chuck 100 mm</li> </ul>                 |
| 3511409042                                                                                                             |   | <b>Additional Siemens axis licence</b>                                              |                                                                                                |
| <p>➡ For details on the fourth axis for the rotary indexing table and 5-axis rotary/swivelling table, see page 282</p> |   |                                                                                     |                                                                                                |

| SOFTWARE |   |                                                  |                                                                                                                                                                                                        |
|----------|---|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3584014  | 7 | <b>DXF Reader for SIEMENS SINUMERIK controls</b> | <ul style="list-style-type: none"> <li>From version 4.7</li> <li>For importing DXF files</li> <li>Hiding graphics layers</li> <li>Automatic contour tracking</li> </ul>                                |
| 3584012  | 8 | <b>Top surface for SIEMENS SINUMERIK control</b> | <ul style="list-style-type: none"> <li>The NC data from the CAM system is optimised online during processing. The result is a high surface quality when milling complex free-form surfaces.</li> </ul> |

## 2 COOLANT THROUGH SPINDLE



- Guarantees optimal service life
- Higher cooling and lubrication effect at the cutting zone
- 25µ filter accuracy

## 1 STARTER SET SK 40 / DIN 69871



- 1) Cutter head holder with 27 mm receptacle
- 2) Quick-action drill chuck 13 mm
- 3) 2 each Weldon 6/20 mm
- 3) 1 each Weldon 8/10/12/16 mm
- 4) Adapter SK 40 to MT 3
- 5) 4 pcs. Collet chuck holder ER 32

- 6) Collet spanner ER 32
- 7) 18-part collet chuck set ER 32
- 8) Height adjustment device
- 9) Assembly and tool setting aid
- 10) 14 pcs. pull stud
- 11) Taper squeegee

## 3 AIR CONDITIONING



- Instead of heat exchanger
- The air conditioner permanently and constantly cools the control cabinet to the set temperature.

## 4 OIL SEPARATOR



- Oil separator reliably removes floating foreign oils and the finest chip abrasion from cooling lubricants. It ensures that the oil remains clean and reusable or can be disposed of in an environmentally friendly manner

## 5 FOURTH AXIS



- Table diameter 120 mm
- Vertical table centre height 115 mm
- Total vertical height without motor cover 193 mm
- Horizontal table height 170 mm

## 6 FIFTH AXIS



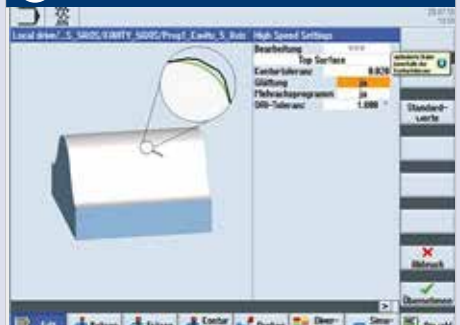
- Compact design
- Possible machining Ø 120 mm
- Vertical table centre height 150 mm
- Vertical table overall height 235 mm
- Through bore Ø 30<sup>H7</sup>mm
- Slot nut width 14<sup>H7</sup>mm

## 7 DXF READER



- DXF data can be converted to NC programs for drilling patterns and contours.

## 8 TOP SURFACE



- Excellent surface quality and form precision
- Fast and precise machining thanks to new technology
- Complete machining fully integrated with Sinumerik Operate

# F 200HSC

**Excellent precision, solid design, effectiveness and efficiency**

**SIEMENS CONTROL SINUMERIK 828D mit PPU 290** and 15.6 inch touch display

- Heavy duty version
- High productivity
- High reliability
- Torsion free machine base thanks to strong ribbing
- Profile rail with roller recirculation for high rapid traverse speeds in all axes
- High-torque servo drives on all three axes
- Telescopic guide rail covers on all three axes
- Automatic lubrication
- Solid, precision milling table with five T-grooves, generously dimensioned with precision surface finish
- The portable, electronic handwheel with enabling switch and emergency stop push button makes it much easier to run in programmes.
- Coolant device with chip flushing system and cleaning gun
- Coolant Through Spindle with 20 bars
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- RJ45 connection and 230 V power connection
- Closed switch cabinet with integrated heat exchanger; ensures optimal temperature even in case of high ambient temperatures; prevents dirt particle penetration
- Machine lamp in the workspace
- Additional package SIEMENS material defect liability and free online/on-site service OSS Plus see page 69
- 1 year maintenance contract Basic included in DE/A/CH see page 333



PREMIUM

## TECHNICAL DATA

| Model                                                | F 200HSC                    |
|------------------------------------------------------|-----------------------------|
| Article no.                                          | 3511420                     |
| Milling spindle                                      | Inline spindle              |
| <b>Machine data</b>                                  |                             |
| Electrical connection                                | 400 V / ~50 Hz              |
| Total connected load                                 | 20 kVA                      |
| <b>Milling spindle</b>                               |                             |
| Drive motor S1 operation                             | 10.5 kW                     |
| Torque drive motor S1 operation                      | 50 Nm                       |
| Drive motor S6 30 % operation                        | 26.4 kW                     |
| Torque drive motor S6 30 % operation                 | 125 Nm                      |
| Spindle seat                                         | SK 40 / DIN 69871           |
| <b>Cooling lubricant system</b>                      |                             |
| Coolant pump power, 3 pieces                         | 1 kW                        |
| Pump capacity                                        | 35 l/min.                   |
| Tank capacity                                        | 200 litres                  |
| <b>Cleaning pump</b>                                 |                             |
| Cleaning pump output                                 | 530 W                       |
| <b>Milling precision</b>                             |                             |
| Repeat accuracy                                      | ± 0.005 mm                  |
| Positioning accuracy                                 | ± 0.005 mm                  |
| <b>Tool changer</b>                                  |                             |
| Type                                                 | Double arm gripper          |
| Number of tool stations                              | 24                          |
| Max. tool diameter                                   | 78 mm                       |
| Max. tool diameter (tools slots beside not occupied) | 120 mm                      |
| Tool length                                          | 300 mm                      |
| Max. tool weight                                     | 8 kg                        |
| Tool change time: Tool to tool                       | 2.5 seconds                 |
| <b>Travel</b>                                        |                             |
| X axis                                               | 850 mm                      |
| Y axis                                               | 500 mm                      |
| Z axis                                               | 550 mm                      |
| <b>Feed drive</b>                                    |                             |
| Rapid traverse X/Y/Z axis                            | 48 m/min.                   |
| <b>Motor torque</b>                                  |                             |
| X / Y / Z axis                                       | 16 Nm / 16 Nm / 20 Nm       |
| <b>Feed forces</b>                                   |                             |
| X / Y / Z axis                                       | 5.34 kN / 5.34 kN / 6.68 kN |
| <b>Speed range</b>                                   |                             |
| Speeds*                                              | 12 000 rpm                  |
| <b>Pneumatics</b>                                    |                             |
| Compressed air                                       | 6 - 8 bar                   |
| Air consumption per hour                             | 6 - 8 kg/m³                 |
| <b>Milling table</b>                                 |                             |
| Clearance spindle to table                           | 100 - 650 mm                |
| Table length x width                                 | 1000 x 500 mm               |
| T-slot size / amount / distance                      | 18 mm / 5 / 100 mm          |
| Maximum payload                                      | 500 kg                      |
| <b>Dimensions</b>                                    |                             |
| Length x width x height                              | 2400 x 2355 x 2860 mm       |
| Overall weight                                       | 5500 kg                     |

\* Please note that the maximum spindle speed must be reduced by approx. 20 % in continuous operation



# SINUMERIK 828D

## THE POWER PACK IN THE COMPACT CLASS OF CNC CONTROLS

Robust hardware architecture and intelligent control algorithms as well as top-class drive and motor technology ensure the highest dynamics and precision during machining. Advanced software-controlled compensation functions ensure additional quality in surface machining and high availability of the machine tool. With SINUMERIK Operate, all machining technologies, from standard to complex, can be operated intuitively and with a uniform "look & feel".



### Multi-touch operation with PPU 290:

The 15.6" panel is robust even in harsh environments. The SINUMERIK Operate user interface is optimised for touch-sensitive operation

Proximity/distance sensor for smart display control

### Rugged and maintenance-free

Front panel made of die-cast magnesium with scratchproof glass front  
Can be operated while wearing gloves

Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)

## SIEMENS SAFETY INTEGRATED

SET UP WORK WITH OPEN DOORS

### Functional safety also provides protection against high costs!

Machine and plant safety is not only important because strict regulations must be observed. When everything runs safely, you benefit from time savings in engineering, higher system availability and more investment security.

## CONTROL

- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function

## SYSTEM SOFTWARE

### SW 28x

10 MB CNC memory  
1 ms Block change time  
150 Look Ahead  
512 tools

## OVERALL PACKAGE

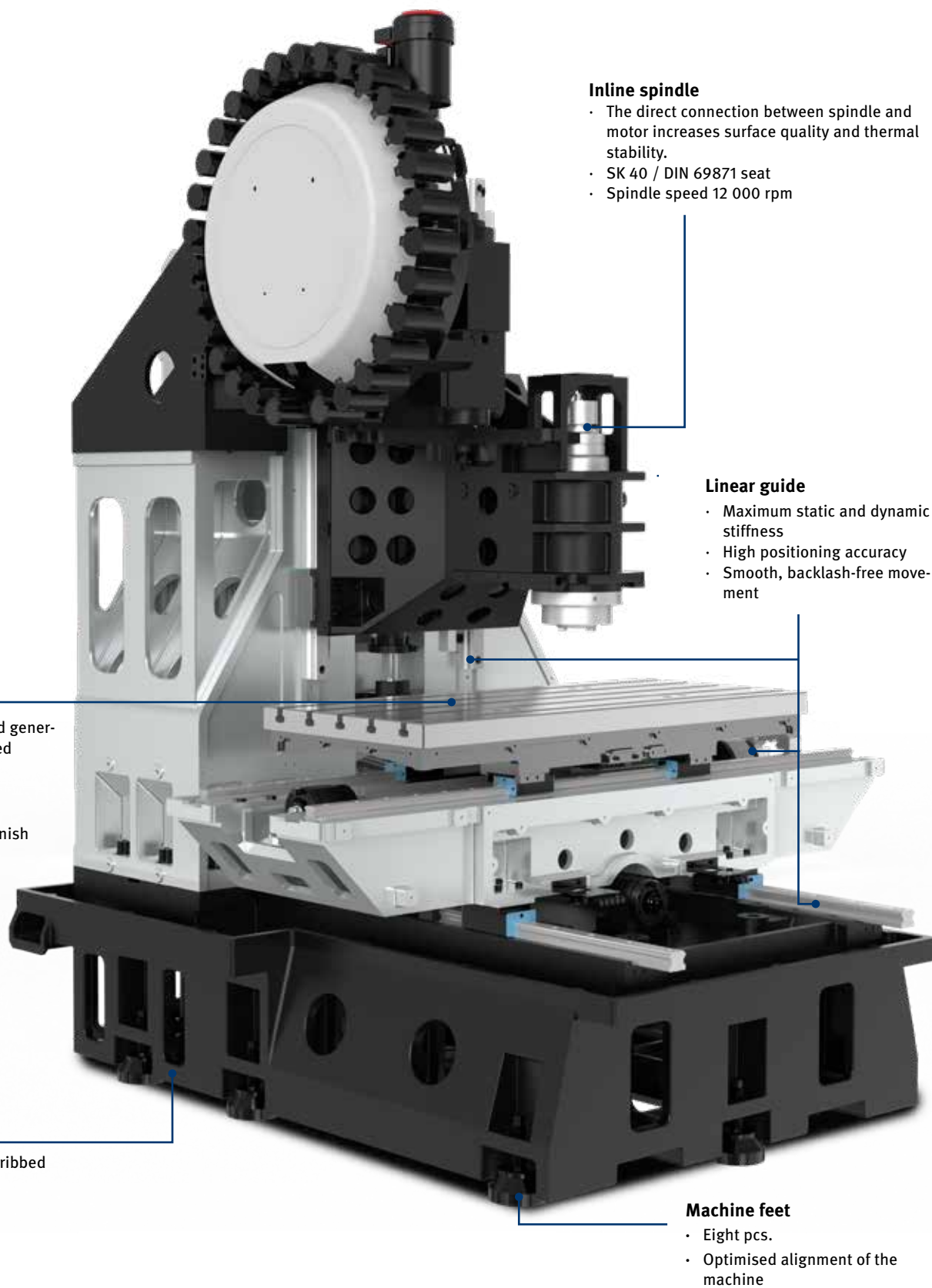
- Safety Integrated
- Residual material detection and machining
- ShopMill work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording
- System software SW 28x

## ADDITIONAL PACKAGE SIEMENS OSS PLUS

12 months; Article no. 3589020  
24 months; Article no. 3589021  
36 months; Article no. 3589022

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal - Siemens WW





## COOLANT PUMPS



- Powerful coolant pumps
- Guarantees optimal service life
- Higher cooling and lubrication effect at the cutting zone
- 25µ filter accuracy

## BALL SCREWS AND LINEAR GUIDEWAYS FROM THK



- Accuracy class C3
- For high positioning and repeat accuracy
- Less wear
- Ball screw with servo motor

## TOOL CHANGER SYSTEM



- Double arm grab with 24 tool slots
- Maximum tool length 300 mm
- Tool-to-tool change in 2.5 seconds

## COOLANT



- Adjustable and individually switchable coolant nozzles direct the coolant specifically into the machining area to be lubricated and remove the chips produced during machining at the same time

## CONTROL CABINET



- Closed, clearly arranged control cabinet
- With **SIEMENS** servo drive
- Standards-compliant setup

## CHIP CONVEYOR



- Conveyor version
- For efficient chip discharge

## SPINDLE OIL COOLER



- Cools the main spindle, enabling it to work at higher speeds for longer
- Optimum heat dissipation and dimensional stability
- Extends the service life of the machine

## CENTRAL LUBRICATION SYSTEM



- Prevents wear, repair costs and unnecessary downtime to a major extent

| TOOL MEASURING / WORKPIECE MEASURING                                                                                                                                        |  |                                                 |                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3511409080                                                                                                                                                                  |  | <b>BLUM TC52IR</b><br>Universal measuring probe | <ul style="list-style-type: none"> <li>Switching point repetition accuracy from 0.3µm 2σ at 2 m/ min. measuring speed</li> <li>Wear-free and durably stable</li> <li>Very compact probe with 40 mm diameter</li> </ul> |
| 3511409081                                                                                                                                                                  |  | <b>BLUM ZX-Speed</b><br>3-D probe               | <ul style="list-style-type: none"> <li>Universal 3-D probe for toolmaking and tool break monitoring</li> </ul>                                                                                                         |
| 3584010                                                                                                                                                                     |  | <b>Siemens Measuring cycle</b>                  | <ul style="list-style-type: none"> <li>Measurement cycles are general sub-programmes for solving specific measurement tasks that can be adapted to the specific problem using parameters.</li> </ul>                   |
| <p>➡ Only necessary for measuring system from the manufacturer</p> <p>Information on Blum workpiece/tool measurement also ex stock Germany can be found in the page 295</p> |  |                                                 |                                                                                                                                                                                                                        |

| 3-D PRINTING                                                           |  |                               |                                                                                                                                                                                                                                               |
|------------------------------------------------------------------------|--|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3562411                                                                |  | <b>3-D printing interface</b> | <ul style="list-style-type: none"> <li>Plug connector on milling head for OPTImill 3X/5X printing head</li> <li>Power supply is installed in control cabinet</li> <li>Preparation for wire breakage monitoring and filament holder</li> </ul> |
| ➡ Information on 3-D printing and accessories can be found on page 273 |  |                               |                                                                                                                                                                                                                                               |

| MISCELLANEOUS |   |                                                    |                                                                                                                                                             |
|---------------|---|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3536109       | 1 | <b>Starter set SK 40 / DIN 69871</b>               | ➡ For Information on the starter set, see page 290                                                                                                          |
| 3511409013    | 2 | <b>Coolant through spindle CTS 70 bar external</b> | <ul style="list-style-type: none"> <li>Instead of the standard equipment › Coolant through spindle 20 bar internal</li> </ul>                               |
| 3511409031    | 3 | <b>Air conditioner</b>                             | <ul style="list-style-type: none"> <li>Instead of the standard equipment › heat exchanger</li> </ul>                                                        |
| 3511409020    |   | <b>Tool changer 30 tools</b>                       | <ul style="list-style-type: none"> <li>Instead of standard equipment › tool changer 24 tools</li> </ul>                                                     |
| 3511409030    | 4 | <b>Oil Separator</b>                               | <ul style="list-style-type: none"> <li>Oil separator reliably removes floating foreign oils and the finest chip abrasion from cooling lubricants</li> </ul> |

| FOURTH AXIS AND 5-AXIS ROTARY/SWIVEL TABLE                                                                      |   |                                                                                     |                                                                                                |
|-----------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 3511409040                                                                                                      | 5 | <b>Fourth axis rotary indexing table complete set</b><br>(Axis licence is required) | <ul style="list-style-type: none"> <li>Preparation</li> </ul>                                  |
| 3511409050                                                                                                      |   |                                                                                     | <ul style="list-style-type: none"> <li>Three-jaw lathe chuck Ø 120 mm and tailstock</li> </ul> |
| 3511409041                                                                                                      | 6 | <b>5-axis rotary/swivelling table</b><br>(Axis licence is required)                 | <ul style="list-style-type: none"> <li>Preparation</li> </ul>                                  |
| 3511409052                                                                                                      |   |                                                                                     | <ul style="list-style-type: none"> <li>Three-jaw lathe chuck 100 mm</li> </ul>                 |
| 3511409042                                                                                                      |   | <b>Additional Siemens axis licence</b>                                              |                                                                                                |
| ➡ For details on the fourth axis for the rotary indexing table and 5-axis rotary/swivelling table, see page 282 |   |                                                                                     |                                                                                                |

| SOFTWARE |   |                                                  |                                                                                                                                                                                                        |
|----------|---|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3584014  | 7 | <b>DXF Reader for SIEMENS SINUMERIK controls</b> | <ul style="list-style-type: none"> <li>From version 4.7</li> <li>For importing DXF files</li> <li>Hiding graphics layers</li> <li>Automatic contour tracking</li> </ul>                                |
| 3584012  | 8 | <b>Top surface for SIEMENS SINUMERIK control</b> | <ul style="list-style-type: none"> <li>The NC data from the CAM system is optimised online during processing. The result is a high surface quality when milling complex free-form surfaces.</li> </ul> |

## 2 COOLANT THROUGH SPINDLE



- Guarantees optimal service life
- Higher cooling and lubrication effect at the cutting zone
- 25µ filter accuracy

## 1 STARTER SET SK 40 / DIN 69871



- 1) Cutter head holder with 27 mm receptacle
- 2) Quick-action drill chuck 13 mm
- 3) 2 each Weldon 6/20 mm
- 3) 1 each Weldon 8/10/12/16 mm
- 4) Adapter SK 40 to MT 3
- 5) 4 pcs. Collet chuck holder ER 32

- 6) Collet spanner ER 32
- 7) 18-part collet chuck set ER 32
- 8) Height adjustment device
- 9) Assembly and tool setting aid
- 10) 14 pcs. pull stud
- 11) Taper squeegee

## 3 AIR CONDITIONING



- Instead of heat exchanger
- The air conditioner permanently and constantly cools the control cabinet to the set temperature.

## 4 OIL SEPARATOR



- Oil separator reliably removes floating foreign oils and the finest chip abrasion from cooling lubricants. It ensures that the oil remains clean and reusable or can be disposed of in an environmentally friendly manner

## 5 FOURTH AXIS



- Table diameter 120 mm
- Vertical table centre height 115 mm
- Total vertical height without motor cover 193 mm
- Horizontal table height 170 mm

## 6 FIFTH AXIS



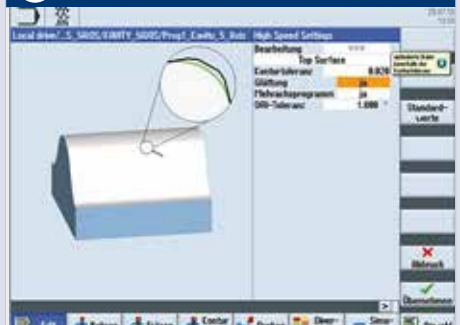
- Compact design
- Possible machining Ø 100 mm
- Slot nut width 14<sup>H7</sup>mm

## 7 DXF READER



- DXF data can be converted to NC programs for drilling patterns and contours.

## 8 TOP SURFACE



- Excellent surface quality and form precision
- Fast and precise machining thanks to new technology
- Complete machining fully integrated with Sinumerik Operate



# F 300HSC

Power, speed, precision and a long service life

**SIEMENS CONTROL SINUMERIK 828D mit PPU 290** and 15.6 inch touch display

- Heavy duty version
- High productivity
- High reliability
- Torsion free machine base thanks to strong ribbing
- Profile rail with recirculating rollers on all axes for high load bearing capacity
- High-torque servo drives mounted directly on the ball screws on all three axes
- Precision-ground, preloaded high-performance ball screw for high rapid traverse speeds in all axes
- Telescopic guide rail covers on all three axes
- Main spindle SK40 with spindle speed up to 15000 rpm with inline spindle
- Solid, precision milling table with five T-grooves, generously dimensioned with precision surface finish
- The portable, electronic handwheel with enabling switch and emergency stop pushbutton makes it much easier to run in programmes.
- Tool changer, double arm grab with 30 tool slots
- Coolant device with chip flushing system and cleaning gun
- Coolant through spindle with 20 bars
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- RJ45 connection and 230 V power connection
- Closed switch cabinet with integrated heat exchanger; ensures optimal temperature even in case of high ambient temperatures; prevents dirt particle penetration
- Oil separator Manual
- Machine lamp in the workspace
- Additional package SIEMENS material defect liability and free online/on-site service OSS Plus see page 77
- 1 year maintenance contract Basic included in DE/A/CH see page 333



## TECHNICAL DATA

| Model                                                | F 300HSC                     |
|------------------------------------------------------|------------------------------|
| Article no.                                          | 3511430                      |
| Spindle                                              | Inline spindle               |
| <b>Machine data</b>                                  |                              |
| Electrical connection                                | 400 V / ~50 Hz               |
| Total connected load                                 | 30 kVA                       |
| <b>Milling spindle</b>                               |                              |
| Drive motor S1 operation                             | 20 kW                        |
| Torque drive motor S1 operation                      | 96 Nm                        |
| Drive motor S6 30 % operation                        | 52.4 kW                      |
| Torque drive motor S6 30 % operation                 | 250 Nm                       |
| Spindle seat                                         | SK 40 DIN 69871              |
| <b>Cooling lubricant system</b>                      |                              |
| Coolant pump power, 3 pieces                         | 1 kW                         |
| Delivery rate max.                                   | 35 l/min.                    |
| Tank capacity                                        | 260 litres                   |
| <b>Cleaning pump</b>                                 |                              |
| Cleaning pump output                                 | 530 W                        |
| <b>Milling precision</b>                             |                              |
| Repeat accuracy                                      | ± 0.005 mm                   |
| Positioning accuracy                                 | ± 0.005 mm                   |
| <b>Tool changer</b>                                  |                              |
| Type                                                 | Double arm gripper           |
| Number of tool stations                              | 30                           |
| Max. tool diameter                                   | 78 mm                        |
| Max. tool diameter (tools slots beside not occupied) | 120 mm                       |
| Tool length                                          | 300 mm                       |
| Max. tool weight                                     | 8 kg                         |
| Tool change time: Tool to tool                       | 2.5 seconds                  |
| <b>Travel</b>                                        |                              |
| X axis                                               | 1000 mm                      |
| Y axis                                               | 620 mm                       |
| Z axis                                               | 630 mm                       |
| <b>Feed drive</b>                                    |                              |
| Rapid traverse X, Y, Z axis                          | 36 / 36 / 32 m/min.          |
| <b>Motor torque</b>                                  |                              |
| X / Y / Z axis                                       | 20 Nm / 20 Nm / 36 Nm        |
| <b>Feed forces</b>                                   |                              |
| X / Y / Z axis                                       | 6.68 kN / 6.68 kN / 12.01 kN |
| <b>Speed range</b>                                   |                              |
| Speeds*                                              | 15 000 rpm                   |
| <b>Pneumatics</b>                                    |                              |
| Compressed air                                       | 6 bar                        |
| Air consumption per hour                             | 6 - 8 kg/m³                  |
| <b>Milling table</b>                                 |                              |
| Clearance spindle to table                           | 120 - 750 mm                 |
| Table length x width                                 | 1200 x 600 mm                |
| T-slot size / amount / distance                      | 18 mm / 5 / 100 mm           |
| Maximum payload                                      | 800 kg                       |
| <b>Dimensions</b>                                    |                              |
| Length x width x height                              | 2856 x 2300 x 2850 mm        |
| Overall weight                                       | 6500 kg                      |

\* Please note that the maximum spindle speed must be reduced by approx. 20 % in continuous operation

# SINUMERIK 828D

## THE POWER PACK IN THE COMPACT CLASS OF CNC CONTROLS

Robust hardware architecture and intelligent control algorithms as well as top-class drive and motor technology ensure the highest dynamics and precision during machining. Advanced software-controlled compensation functions ensure additional quality in surface machining and high availability of the machine tool. With SINUMERIK Operate, all machining technologies, from standard to complex, can be operated intuitively and with a uniform "look & feel".



### Multi-touch operation with PPU 290.5:

The 15.6" panel is robust even in harsh environments. The SINUMERIK Operate user interface is optimised for touch-sensitive operation

Proximity/distance sensor for smart display control

### Rugged and maintenance-free

Front panel made of die-cast magnesium with scratchproof glass front  
Can be operated while wearing gloves

Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)

## SIEMENS SAFETY INTEGRATED

SET UP WORK WITH OPEN DOORS

### Functional safety also provides protection against high costs!

Machine and plant safety is not only important because strict regulations must be observed. When everything runs safely, you benefit from time savings in engineering, higher system availability and more investment security.

## CONTROL

- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function

## SYSTEM SOFTWARE

### SW 28x

10 MB CNC memory  
1 ms Block change time  
150 Look Ahead  
512 tools

## OVERALL PACKAGE

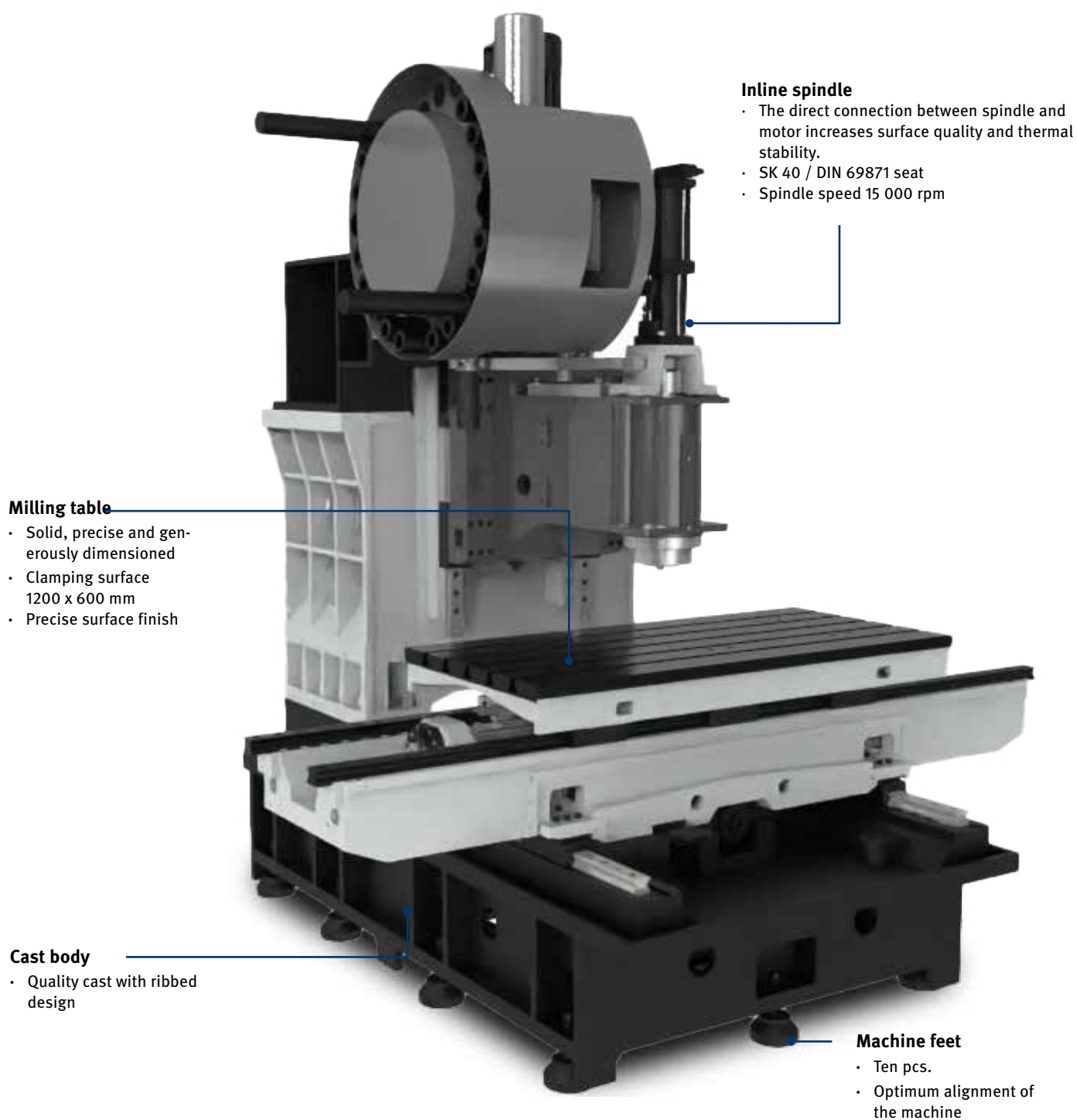
- Safety Integrated
- Residual material detection and machining
- ShopMill work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording
- System software SW 28x

## ADDITIONAL PACKAGE SIEMENS OSS PLUS

12 months; Article no. 3589020  
24 months; Article no. 3589021  
36 months; Article no. 3589022

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal - Siemens WW







## HEAT EXCHANGER



- Closed switch cabinet with smart cooling management
- Optimal temperature even in case of high ambient temperatures

## THK BALL SCREW



- Accuracy class C3
- For high positioning and repeat accuracy
- Less wear
- Ball screw drive with servo motor

## COOLANT THROUGH SPINDLE



- Coolant is fed directly into the spindle to control the temperature of the tool and prevent overheating. This keeps the spindle at the optimum operating temperature, which increases precision and service life
- Filter accuracy 25µ with external tank
- 20 bar pressure

## TOOL CHANGER



- Double-arm gripper with 30 tool stations (img. with 25 tools)
- Maximum tool length 300 mm
- Tool-to-tool change in 2 seconds

## MAIN SPINDLE



- Inline spindle 15 000 rpm
- Powerful
- SK40 DIN 69871
- Spindle from OKADA

## LINEAR GUIDE FROM THK



- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement
- Consistent precision with long service life

## CHIP CONVEYOR



- Conveyor version
- For efficient chip discharge

## COOLING LUBRICANT SYSTEM



- Two coolant pumps with 1 010 Watt each
- Coolant device with chip flushing system and cleaning gun

## CENTRAL LUBRICATION SYSTEM



- Prevents wear, repair costs and unnecessary downtime to a considerable extent.

TOOL MEASURING / WORKPIECE MEASURING

|                                                                                                                                                                             |   |                                                 |                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3511409080                                                                                                                                                                  |   | <b>BLUM TC52IR</b><br>Universal measuring probe | <ul style="list-style-type: none"> <li>Switching point repetition accuracy from 0.3µm 2σ at 2 m/ min. measuring speed</li> <li>Wear-free and durably stable</li> <li>Very compact probe with 40 mm diameter</li> </ul> |
| 3511409081                                                                                                                                                                  |   | <b>BLUM ZX-Speed</b><br>3-D probe               | <ul style="list-style-type: none"> <li>Universal 3-D probe for toolmaking and tool break monitoring</li> </ul>                                                                                                         |
| 3584010                                                                                                                                                                     | 5 | <b>Siemens Measuring cycle</b>                  | <ul style="list-style-type: none"> <li>Measurement cycles are general sub-programmes for solving specific measurement tasks that can be adapted to the specific problem using parameters.</li> </ul>                   |
| <p>➡ Only necessary for measuring system from the manufacturer</p> <p>Information on Blum workpiece/tool measurement also ex stock Germany can be found in the page 295</p> |   |                                                 |                                                                                                                                                                                                                        |

3-D PRINTING

|                                                                               |   |                               |                                                               |
|-------------------------------------------------------------------------------|---|-------------------------------|---------------------------------------------------------------|
| 3562411                                                                       | 1 | <b>3-D printing interface</b> | <ul style="list-style-type: none"> <li>Preparation</li> </ul> |
| <p>➡ Information on 3-D printing and accessories can be found on page 273</p> |   |                               |                                                               |

MISCELLANEOUS

|             |   |                                             |                                                                                                             |                                |
|-------------|---|---------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------|
| 3536109     | 2 | Starter set SK 40 / DIN 69871               | ➡ For Information on the starter set, see page 290                                                          |                                |
| 3511409013  | 3 | Coolant through spindle CTS 70 bar external | • Instead of the standard equipment › Coolant through spindle 20 bar internal                               | An extraction unit is required |
| 3511409 031 | 4 | Air conditioner                             | • Instead of the standard equipment › heat exchanger                                                        |                                |
| 3511409030  |   | Motorized oil separator                     | • Oil separator reliably removes floating foreign oils and the finest chip abrasion from cooling lubricants |                                |
| 3511409060  |   | Grease lubrication                          |                                                                                                             |                                |
| 3511409061  |   | Heidenhain glass scales                     | • Heidenhain glass scales 3 axes                                                                            |                                |

FOURTH AXIS AND 5-AXIS ROTARY/SWIVEL TABLE

|                                                                                                                        |   |                                                                                     |                                                                                                     |  |
|------------------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--|
| 3511409040                                                                                                             | 6 | <b>Fourth axis rotary indexing table complete set</b><br>(Axis licence is required) | <ul style="list-style-type: none"> <li>Preparation</li> </ul>                                       |  |
| 3511409050                                                                                                             |   |                                                                                     | <ul style="list-style-type: none"> <li>Three-jaw lathe chuck Ø 120 mm, tailstock</li> </ul>         |  |
| 3511409051                                                                                                             |   |                                                                                     | <ul style="list-style-type: none"> <li>Three-jaw lathe chuck Ø 200 mm, tailstock, drive,</li> </ul> |  |
| 3511409041                                                                                                             | 7 | <b>5-axis rotary/swivelling table</b><br>(Axis licence is required)                 | <ul style="list-style-type: none"> <li>Preparation</li> </ul>                                       |  |
| 3511409052                                                                                                             |   |                                                                                     | <ul style="list-style-type: none"> <li>Three-jaw lathe chuck 100 mm</li> </ul>                      |  |
| 3511409042                                                                                                             |   | <b>Additional Siemens axis licence</b>                                              | <ul style="list-style-type: none"> <li>For the 4. and 5. axis</li> </ul>                            |  |
| <p>➡ For details on the fourth axis for the rotary indexing table and 5-axis rotary/swivelling table, see page 282</p> |   |                                                                                     |                                                                                                     |  |

SOFTWARE

|         |   |                                                  |                                                                                                                                                                                                        |
|---------|---|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3584014 | 8 | <b>DXF Reader for SIEMENS SINUMERIK controls</b> | <ul style="list-style-type: none"> <li>From version 4.7, Import of DXF files</li> <li>Hiding graphics layers</li> <li>Automatic contour tracking</li> </ul>                                            |
| 3584012 |   | <b>Top surface for SIEMENS SINUMERIK control</b> | <ul style="list-style-type: none"> <li>The NC data from the CAM system is optimised online during processing. The result is a high surface quality when milling complex free-form surfaces.</li> </ul> |

## 1 3-D PRINTING INTERFACE



- Plug connector on milling head for OPTImill 3X/5X printing head
- Power supply is installed in control cabinet
- Preparation for wire breakage monitoring and filament holder

## 2 STARTER SET SK 40 / DIN 69871



- 1) Cutter head holder with 27 mm receptacle
- 2) Quick-action drill chuck 13 mm
- 3) 2 each Weldon 6/20 mm
- 3) 1 each Weldon 8/10/12/16 mm
- 4) Adapter SK 40 to MT 3
- 5) 4 pcs. Collet chuck holder ER 32

- 6) Collet spanner ER 32
- 7) 18-part collet chuck set ER 32
- 8) Height adjustment device
- 9) Assembly and tool setting aid
- 10) 14 pcs. pull stud
- 11) Taper squeegee

## 3 EXTERNAL CTS



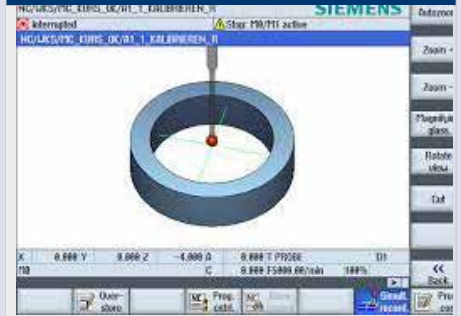
- With 70 bar pressure
- Guarantees optimal service life
- Higher cooling and lubrication effect at the cutting zone
- 25µ filter accuracy

## 4 AIR CONDITIONING



- Instead of heat exchanger
- The air conditioner permanently and constantly cools the control cabinet to the set temperature.

## 5 SIEMENS MEASURING CYCLE



- Measurement cycles are general sub-programmes for solving specific measurement tasks that can be adapted to the specific problem using parameters.

## 6 FOURTH AXIS



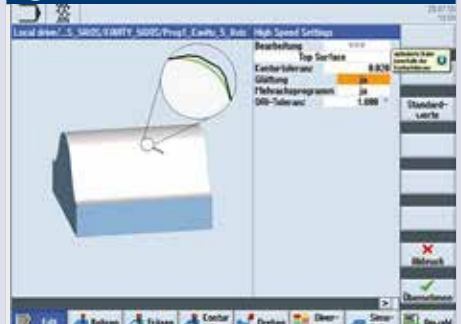
- Table diameter 120 mm
- Vertical table centre height 115 mm
- Total vertical height without motor cover 193 mm
- Horizontal table height 170 mm

## 7 FIFTH AXIS



- Compact design
- Possible machining Ø 100 mm
- Slot nut width 14<sup>h7</sup>mm

## 8 TOP SURFACE



- Excellent surface quality and form precision
- Fast and precise machining thanks to new technology
- Complete machining fully integrated with Sinumerik Operate

# F 500HSC

Top quality and an excellent price-performance ratio; an investment that keeps its value

**SIEMENS** CONTROL SINUMERIK 828D mit PPU 290 and 15.6 inch touch display

- Heavy duty version
- High productivity
- High reliability
- Torsion free machine base thanks to strong ribbing
- Profile rail with recirculating rollers on all axes for high load bearing capacity
- High-torque servo drives mounted directly on the ball screws on all three axes
- Precision-ground, preloaded high-performance ball screw for high rapid traverse speeds in all axes
- Telescopic guide rail covers on all three axes
- Main spindle SK40 up to 12000 rpm with inline spindle
- Solid, precision milling table with five T-grooves, generously dimensioned with precision surface finish
- The portable, electronic handwheel with enabling switch and emergency stop push button makes it much easier to run in programmes.
- Tool changer double arm gripper for 30 tool stations
- Coolant device with chip flushing system and cleaning gun
- Coolant through spindle with 20 bars
- Chip conveyor with two augers and belt conveyor ensure efficient chip removal.
- RJ45 connection and 230 V power connection
- Closed switch cabinet with integrated heat exchanger; ensures optimal temperature even in case of high ambient temperatures; prevents dirt particle penetration
- Oil Separator
- Machine lamp in the workspace
- Additional package SIEMENS material defect liability and free online/on-site service OSS Plus see page 85
- 1 year maintenance contract Basic included in DE/A/CH see page 333





## TECHNICAL DATA

| Model                                | F 500HSC                |
|--------------------------------------|-------------------------|
| Article no.                          | 3511450                 |
| Drive                                | Inline spindle          |
|                                      |                         |
| <b>Machine data</b>                  |                         |
| Electrical connection                | 400 V / ~50 Hz          |
| Total connected load                 | 35 kVA                  |
| <b>Milling spindle</b>               |                         |
| Drive motor S1 operation             | 20 kW                   |
| Torque drive motor S1 operation      | 96 Nm                   |
| Drive motor S6 30 % operation        | 52.4 kW                 |
| Torque drive motor S6 30 % operation | 250 Nm                  |
| Spindle seat                         | SK 40 DIN 69871         |
| <b>Cooling lubricant system</b>      |                         |
| Coolant pump power, 3 pieces         | 1 kW each               |
| Delivery rate max.                   | 65 l/min.               |
| Tank capacity                        | 460 litres              |
| <b>Cleaning pump</b>                 |                         |
| Cleaning pump output                 | 530 W                   |
| <b>Milling precision</b>             |                         |
| Repeat accuracy                      | ± 0.005 mm              |
| Positioning accuracy                 | ± 0.005 mm              |
| <b>Tool changer</b>                  |                         |
| Type                                 | Double arm gripper      |
| Number of tool stations              | 30                      |
| Max. tool diameter                   | 80 mm                   |
| Tool length                          | 300 mm                  |
| Max. tool weight                     | 8 kg                    |
| Tool change time: Tool to tool       | 3.5 seconds             |
| <b>Travel</b>                        |                         |
| X axis                               | 1400 mm                 |
| Y axis                               | 700 mm                  |
| Z axis                               | 700 mm                  |
| <b>Feed drive</b>                    |                         |
| Rapid traverse X, Y, Z axis          | 24 / 24 / 20 m/min.     |
| <b>Motor torque</b>                  |                         |
| X / Y / Z axis                       | 36 Nm / 36 Nm / 48 Nm   |
| <b>Feed forces</b>                   |                         |
| X / Y / Z axis                       | 16 kN / 16 kN / 21.7 kN |
| <b>Speed range</b>                   |                         |
| Speeds*                              | 12 000 rpm              |
| <b>Pneumatics</b>                    |                         |
| Compressed air                       | 6 bar                   |
| Air consumption per hour             | 6 - 8 kg/m³             |
| <b>Milling table</b>                 |                         |
| Clearance spindle to table           | 150 - 850 mm            |
| Table length x width                 | 1600 x 700 mm           |
| T-slot size / amount / distance      | 18 mm / 5 / 125 mm      |
| Maximum payload                      | 1100 kg                 |
| <b>Dimensions</b>                    |                         |
| Length x width x height              | 5050 x 2965 x 3350 mm   |
| Overall weight                       | 10000 kg                |

Please note: The machine is delivered partially disassembled and must be assembled on site by our service team.

\* Please note that the maximum spindle speed must be reduced by approx. 20 % in continuous operation

# SINUMERIK 828D PPU290.5

COMPACT REVOLUTION

DIGITALLY TRANSFORMED, INNOVATIVELY DESIGNED, ENHANCED PERFORMANCE



**PPU.5 CPU power  
Upgrade  
>40 %**

**Comprehensive improvement**  
⇒ Programme buffer and processing time  
⇒ Simulation efficiency  
⇒ HMI switch-over time

**SINUMERIK OPERATE  
identical to the latest  
SINUMERIK ONE control**

## DIGITAL TWIN:

Create / Run MyVirtual Machine now available for 828D

- Minimise the set-up and run-in time on the real machine.
- Precise simulation reduces the risk of collision and accelerates part programme optimisation.

## HIGHER PERFORMANCE:

CPU performance improved by >40 %  
40 % shorter programme buffer and processing time  
25 % higher simulation efficiency  
50 % faster HMI switch-over time

- Improved efficiency, shorter waiting times and smooth operation

## MODERN PANEL DESIGN:

Innovative 16:10-inch panel with modern design  
SINUMERIK 828D MCP with laser-engraved characters, mechanical keys, service life of override keys increased by 400 %

- Clearer display and improved user-friendliness
- Excellent haptics and wear-resistant buttons, greater robustness and longer service life

## SUSTAINABILITY & SAFETY:

New Ctrl-E Advanced Analysis function  
Maintenance-free (without fan, without battery)  
Safety functions: Security archive, user administration

- Simple transparency of energy consumption
- Protection of customer know-how against manipulation and piracy

**SIEMENS  
SAFETY**

**INTEGRATED**

SET UP WORK WITH OPEN DOORS

**Functional safety also provides protection against high costs!**

Machine and plant safety is not only important because strict regulations must be observed. When everything runs safely, you benefit from time savings in engineering, higher system availability and more investment security.

## CONTROL

- 10.4" colour display
- 4:3 format
- User-friendly SINUMERIK Operate software

## SYSTEM SOFTWARE

**SW28**

**10 MB CNC memory**  
**1 ms Block change time**  
**150 Look Ahead**  
**512 tools**

## OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- ShopMill work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording

## ADDITIONAL PACKAGE SIEMENS OSS PLUS

12 months; Article no. 3589020  
24 months; Article no. 3589021  
36 months; Article no. 3589022

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service -  
SiePortal - Siemens WW



#### Spindle

- Directly coupled
- High positioning accuracy

#### Inline spindle

- The direct connection between spindle and motor increases surface quality and thermal stability.
- ISO 40 / DIN 69871 seat
- Spindle speed 12 000 rpm

#### Linear guide

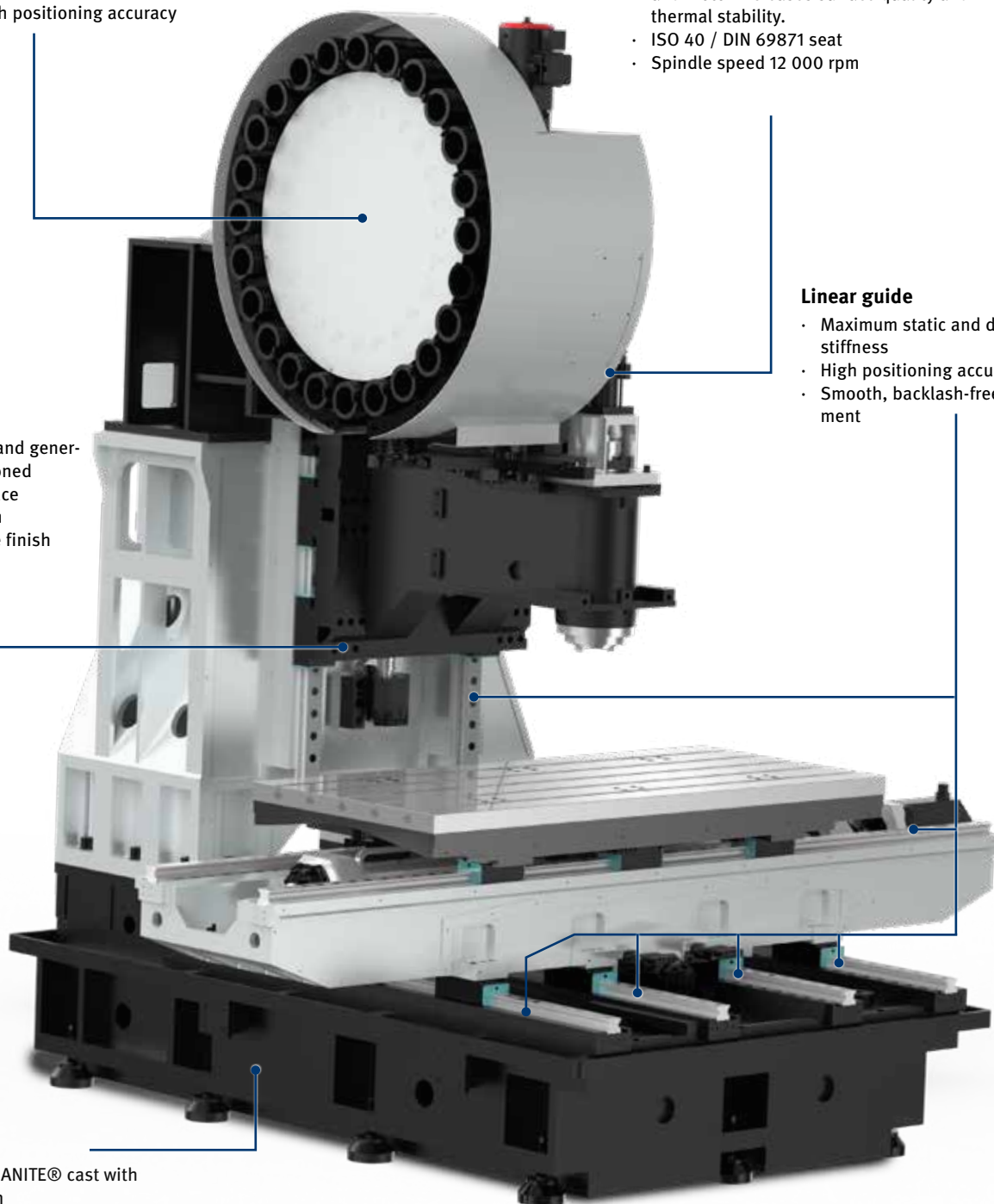
- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement

#### Milling table

- Solid, precise and generously dimensioned
- Clamping surface 1600 x 700 mm
- Precise surface finish

#### Cast body

- Quality MEEHANITE® cast with ribbed design
- Excellent rigidity for maximum load



#### HEAT EXCHANGER



- Closed switch cabinet with smart cooling management
- Optimal temperature even in case of high ambient temperatures

#### THK BALL SCREW



- Accuracy class C3
- High rapid traverse speeds in all axes
- Less wear
- For high positioning and repeat accuracy

#### TOOL CHANGER



- Double-arm gripper with 30 tool stations (*Img. with 25 tools*)
- Maximum tool length 300 mm
- Tool-to-tool change in 3.5 seconds

#### COOLING



- Adjustable and individually switchable coolant nozzles direct the coolant specifically into the machining area to be lubricated and remove the chips produced during machining at the same time

#### LINEAR GUIDE FROM THK



- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement
- Consistent precision with long service life

#### CHIP CONVEYOR



- Conveyor version
- For efficient chip discharge

#### COOLING LUBRICANT SYSTEM



- Three coolant pumps with 1 kW each
- Coolant device with chip flushing system and cleaning gun

#### CENTRAL LUBRICATION SYSTEM



- Prevents wear, repair costs and unnecessary downtime to a considerable extent.

| TOOL MEASURING / WORKPIECE MEASURING                                                                                                                                        |   |                                                 |                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3511409080                                                                                                                                                                  |   | <b>BLUM TC52IR</b><br>Universal measuring probe | <ul style="list-style-type: none"> <li>Switching point repetition accuracy from 0.3µm 2σ at 2 m/ min. measuring speed</li> <li>Wear-free and durably stable</li> <li>Very compact probe with 40 mm diameter</li> </ul> |
| 3511409081                                                                                                                                                                  |   | <b>BLUM ZX-Speed</b><br>3-D probe               | <ul style="list-style-type: none"> <li>Universal 3-D probe for toolmaking and tool break monitoring</li> </ul>                                                                                                         |
| 3584010                                                                                                                                                                     | 5 | <b>Siemens Measuring cycle</b>                  | <ul style="list-style-type: none"> <li>Measurement cycles are general sub-programmes for solving specific measurement tasks that can be adapted to the specific problem using parameters.</li> </ul>                   |
| <p>➡ Only necessary for measuring system from the manufacturer</p> <p>Information on Blum workpiece/tool measurement also ex stock Germany can be found in the page 295</p> |   |                                                 |                                                                                                                                                                                                                        |

| 3-D PRINTING                                                           |   |                               |                                                                                                                                                                                                                                               |
|------------------------------------------------------------------------|---|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3562411                                                                | 1 | <b>3-D printing interface</b> | <ul style="list-style-type: none"> <li>Plug connector on milling head for OPTImill 3X/5X printing head</li> <li>Power supply is installed in control cabinet</li> <li>Preparation for wire breakage monitoring and filament holder</li> </ul> |
| ➡ Information on 3-D printing and accessories can be found on page 273 |   |                               |                                                                                                                                                                                                                                               |

| MISCELLANEOUS |   |                                                    |                                                                                                                                                              |
|---------------|---|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3536109       | 2 | <b>Starter set SK 40 / DIN 69871</b>               | ➡ For Information on the starter set, see page 290                                                                                                           |
| 3511409013    | 3 | <b>Coolant through spindle CTS 70 bar external</b> | <ul style="list-style-type: none"> <li>Instead of the standard equipment › Coolant through spindle 20 bar internal</li> </ul> An extraction unit is required |
| 3511409031    | 4 | <b>Air conditioner</b>                             | <ul style="list-style-type: none"> <li>Instead of the standard equipment › heat exchanger</li> </ul>                                                         |
| 3511409030    |   | <b>Oil Separator</b>                               | <ul style="list-style-type: none"> <li>Oil separator reliably removes floating foreign oils and the finest chip abrasion from cooling lubricants</li> </ul>  |

| FOURTH AXIS AND 5-AXIS ROTARY/SWIVELL TABLE                                                                     |   |                                                                                     |                                                                                                |
|-----------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 3511409040                                                                                                      | 6 | <b>Fourth axis rotary indexing table complete set</b><br>(Axis licence is required) | <ul style="list-style-type: none"> <li>Preparation</li> </ul>                                  |
| 3511409051                                                                                                      |   |                                                                                     | <ul style="list-style-type: none"> <li>Three-jaw lathe chuck Ø 200 mm and tailstock</li> </ul> |
| 3511409053                                                                                                      |   |                                                                                     | <ul style="list-style-type: none"> <li>Three-jaw lathe chuck Ø 250 mm and tailstock</li> </ul> |
| 3511409041                                                                                                      | 7 | <b>5-axis rotary/swivelling table</b><br>(Axis licence is required)                 | <ul style="list-style-type: none"> <li>Preparation</li> </ul>                                  |
| 3511409052                                                                                                      |   |                                                                                     | <ul style="list-style-type: none"> <li>Three-jaw lathe chuck 100 mm</li> </ul>                 |
| 3511409055                                                                                                      |   |                                                                                     | <ul style="list-style-type: none"> <li>Three-jaw lathe chuck 200 mm</li> </ul>                 |
| 3511409042                                                                                                      |   | <b>Additional Siemens axis licence</b>                                              |                                                                                                |
| ➡ For details on the fourth axis for the rotary indexing table and 5-axis rotary/swivelling table, see page 282 |   |                                                                                     |                                                                                                |

| SOFTWARE |   |                                                  |                                                                                                                                                                                                        |
|----------|---|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3584014  | 8 | <b>DXF Reader for SIEMENS SINUMERIK controls</b> | <ul style="list-style-type: none"> <li>From version 4.7</li> <li>For importing DXF files</li> <li>Hiding graphics layers</li> <li>Automatic contour tracking</li> </ul>                                |
| 3584012  |   | <b>Top surface for SIEMENS SINUMERIK control</b> | <ul style="list-style-type: none"> <li>The NC data from the CAM system is optimised online during processing. The result is a high surface quality when milling complex free-form surfaces.</li> </ul> |



## 1 3-D PRINTING INTERFACE



- Plug connector on milling head for OPTImill 3X/5X printing head
- Power supply is installed in control cabinet
- Preparation for wire breakage monitoring and filament holder

## 2 STARTER SET SK 40 / DIN 69871



- 1) Cutter head holder with 27 mm receptacle
- 2) Quick-action drill chuck 13 mm
- 3) 2 each Weldon 6/20 mm
- 3) 1 each Weldon 8/10/12/16 mm
- 4) Adapter SK 40 to MT 3
- 5) 4 pcs. Collet chuck holder ER 32

- 6) Collet spanner ER 32
- 7) 18-part collet chuck set ER 32
- 8) Height adjustment device
- 9) Assembly and tool setting aid
- 10) 14 pcs. pull stud
- 11) Taper squeegee

## 3 EXTERNAL CTS



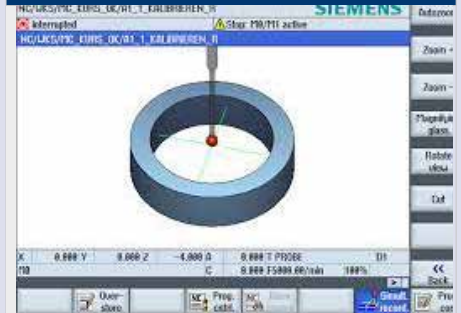
- With 70 bar pressure
- Guarantees optimal service life
- Higher cooling and lubrication effect at the cutting zone
- 25µ filter accuracy

## 4 AIR CONDITIONING



- Instead of heat exchanger
- The air conditioner permanently and constantly cools the control cabinet to the set temperature.

## 5 SIEMENS MEASURING CYCLE



- Measurement cycles are general sub-programmes for solving specific measurement tasks that can be adapted to the specific problem using parameters.

## 6 FOURTH AXIS



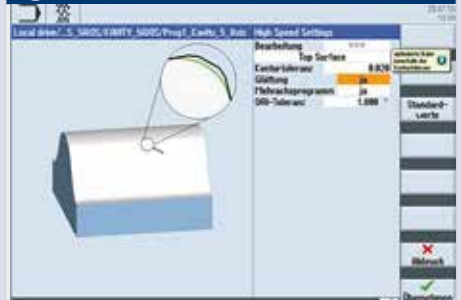
- Table diameter 120 mm
- Vertical table centre height 115 mm
- Total vertical height without motor cover 193 mm
- Horizontal table height 170 mm

## 7 FIFTH AXIS



- Compact design
- Possible machining Ø 100 mm
- Slot nut width 14<sup>h7</sup>mm

## 8 TOP SURFACE



- Excellent surface quality and form precision
- Fast and precise machining thanks to new technology
- Complete machining fully integrated with Sinumerik Operate

# F 600HSC

Top quality and an excellent price-performance ration; an investment that keeps its value

**SIEMENS CONTROL SINUMERIK 828D** mit **PPU 290** and 15.6 inch touch display

- Heavy duty version
- High productivity
- High reliability
- All components and the entire machine frame were analysed with ANSYS Mechanical (= Finite Element Analysis (FEA) tool) to solve difficult mechanical problems in the complex product architecture
- Profile rail with recirculating rollers on all axes for high load bearing capacity
- High-torque servo drives mounted directly on the ball screws on all three axes
- Precision-ground, preloaded high-performance ball screw for high rapid traverse speeds in all axes
- Telescopic guide rail covers on all three axes
- Solid, precision milling table with five T-grooves, generously dimensioned with precision surface finish
- The portable, electronic handwheel with enabling switch and emergency stop pushbutton makes it much easier to run in programmes.
- Tool changer, double arm grab with 30 tool slots
- The machine hood is opened to load the machine with a crane
- Chip conveyor with two augers and belt conveyor ensure efficient chip removal.
- RJ45 connection and 230 V power connection
- Coolant device with chip flushing system and cleaning gun
- Coolant through spindle with 20 bars
- Closed switch cabinet with integrated heat exchanger; ensures optimal temperature even in case of high ambient temperatures; prevents dirt particle penetration
- Machine lamp in the workspace
- Additional package SIEMENS material defect liability and free online/on-site service OSS Plus see page 93
- 1 year maintenance contract Basic included in DE/A/CH see page 333



## TECHNICAL DATA

| Model                                                | F 600HSC                |
|------------------------------------------------------|-------------------------|
| Article no.                                          | 3511460                 |
| Spindle                                              | Inline spindle          |
| <b>Machine data</b>                                  |                         |
| Electrical connection                                | 400 V / ~50 Hz          |
| Total connected load                                 | 35 kVA                  |
| <b>Milling spindle</b>                               |                         |
| Drive motor S1 operation                             | 20 kW                   |
| Torque drive motor S1 operation                      | 96 Nm                   |
| Drive motor S6 30 % operation                        | 52.4 kW                 |
| Torque drive motor S6 30 % operation                 | 250 Nm                  |
| Spindle seat                                         | SK 40 DIN 69871         |
| Distance spindle to Z axis                           | 887 mm                  |
| <b>Cooling lubricant system</b>                      |                         |
| Coolant pump output                                  | 3 x 1 kW each           |
| Delivery rate max.                                   | 70 l/min.               |
| Tank capacity                                        | 640 litres              |
| <b>Cleaning pump</b>                                 |                         |
| Cleaning pump output                                 | 530 W                   |
| <b>Milling precision</b>                             |                         |
| Repeat accuracy                                      | ± 0.005 mm              |
| Positioning accuracy                                 | ± 0.005 mm              |
| <b>Tool changer</b>                                  |                         |
| Type                                                 | Double arm gripper      |
| Number of tool stations                              | 30                      |
| Max. tool diameter                                   | 78 mm                   |
| Max. tool diameter (tools slots beside not occupied) | 120 mm                  |
| Tool length                                          | 300 mm                  |
| Max. tool weight                                     | 8 kg                    |
| Tool change time                                     | 3.5 seconds             |
| Tool to tool in the spindle                          |                         |
| <b>Travel</b>                                        |                         |
| X axis                                               | 1700 mm                 |
| Y axis                                               | 800 mm                  |
| Z axis                                               | 800 mm                  |
| <b>Feed drive</b>                                    |                         |
| Rapid motion X, Y, Z axis                            | 24 m/min.               |
| <b>Motor torque</b>                                  |                         |
| X / Y / Z axis                                       | 36 kN / 36 kN / 48 kN   |
| <b>Feed forces</b>                                   |                         |
| X / Y / Z axis                                       | 16 kN / 16 kN / 21.7 kN |
| <b>Speed range</b>                                   |                         |
| Speeds*                                              | 12 000 rpm              |
| <b>Pneumatics</b>                                    |                         |
| Compressed air                                       | 6 bar                   |
| Air consumption per hour                             | 6 - 8 kg/m³             |
| <b>Milling table</b>                                 |                         |
| Clearance spindle to table                           | 180 - 980 mm            |
| Table length x width                                 | 1900 x 800 mm           |
| T-slot size / amount / distance                      | 22 mm / 5 / 160 mm      |
| Maximum payload                                      | 1300 kg                 |
| <b>Dimensions</b>                                    |                         |
| Length x width x height                              | 5500 x 3250 x 3500 mm   |
| Overall weight                                       | 16000 kg                |

Please note: The machine is delivered partially disassembled and must be assembled on site by our service team.

\* Please note that the maximum spindle speed must be reduced by approx. 20 % in continuous operation

# SINUMERIK 828D PPU290.5

COMPACT REVOLUTION

DIGITALLY TRANSFORMED, INNOVATIVELY DESIGNED, ENHANCED PERFORMANCE



**PPU.5 CPU power  
Upgrade  
>40 %**

Comprehensive improvement  
⇒ Programme buffer and processing time  
⇒ Simulation efficiency  
⇒ HMI switch-over time

**SINUMERIK OPERATE  
identical to the latest  
SINUMERIK ONE control**

## DIGITAL TWIN:

Create / Run MyVirtual Machine now available for 828D

- Minimise the set-up and run-in time on the real machine.
- Precise simulation reduces the risk of collision and accelerates part programme optimisation.

## HIGHER PERFORMANCE:

CPU performance improved by >40 %  
40 % shorter programme buffer and processing time  
25 % higher simulation efficiency  
50 % faster HMI switch-over time

- Improved efficiency, shorter waiting times and smooth operation

## MODERN PANEL DESIGN:

Innovative 16:10-inch panel with modern design  
SINUMERIK 828D MCP with laser-engraved characters, mechanical keys, service life of override keys increased by 400 %

- Clearer display and improved user-friendliness
- Excellent haptics and wear-resistant buttons, greater robustness and longer service life

## SUSTAINABILITY & SAFETY:

New Ctrl-E Advanced Analysis function  
Maintenance-free (without fan, without battery)  
Safety functions: Security archive, user administration

- Simple transparency of energy consumption
- Protection of customer know-how against manipulation and piracy

## SIEMENS SAFETY INTEGRATED

SET UP WORK WITH OPEN DOORS

**Functional safety also provides protection against high costs!**

Machine and plant safety is not only important because strict regulations must be observed. When everything runs safely, you benefit from time savings in engineering, higher system availability and more investment security.

## CONTROL

- 10.4" colour display
- 4:3 format
- User-friendly SINUMERIK Operate software

## SYSTEM SOFTWARE

### PU290

10 MB CNC memory  
1 ms Block change time  
150 Look Ahead  
512 tools

## OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- ShopMill work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording

## ADDITIONAL PACKAGE SIEMENS OSS PLUS

12 months; Article no. 3589020  
24 months; Article no. 3589021  
36 months; Article no. 3589022

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service -  
SiePortal - Siemens WW





#### Spindle

- Directly coupled
- High positioning accuracy

#### Inline spindle

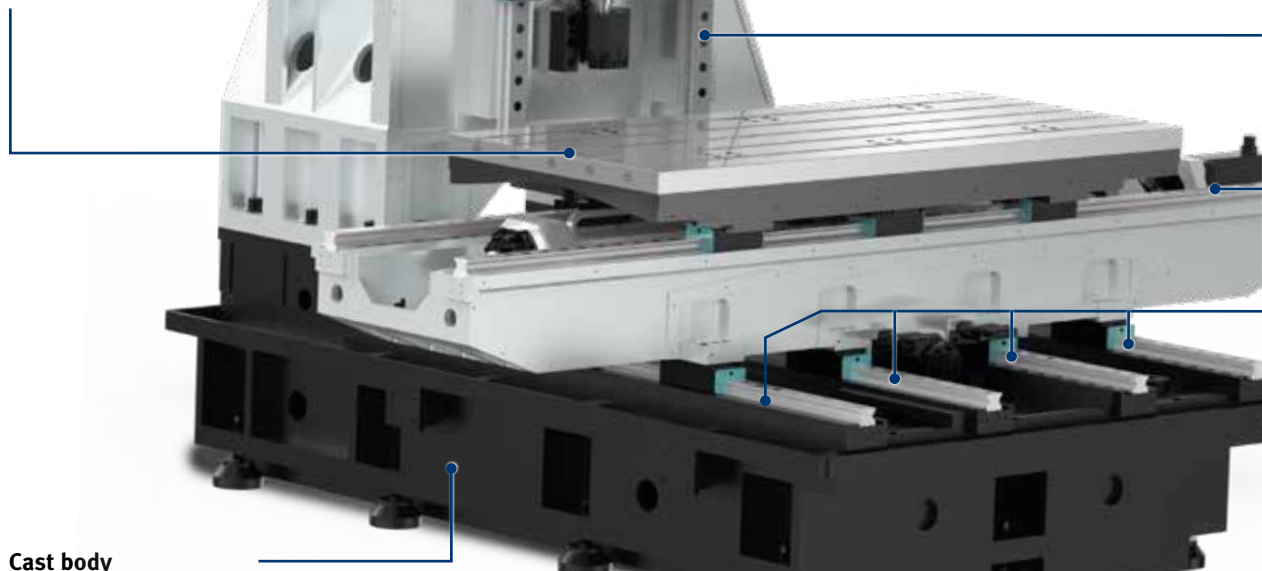
- The direct connection between spindle and motor increases surface quality and thermal stability.
- ISO 40 / DIN 69871 seat
- Spindle speed 12 000 rpm

#### Linear guide

- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement

#### Milling table

- Solid, precise and generously dimensioned
- Workpiece mounting surface 1,900 x 800 mm
- Precise surface finish



#### Cast body

- Quality MEEHANITE® cast with ribbed design
- Excellent rigidity for maximum load

## HEAT EXCHANGER



- Closed switch cabinet with smart cooling management
- Optimal temperature even in case of high ambient temperatures

## BALL SCREW



- Accuracy class C3
- For high positioning and repeat accuracy
- Less wear
- Ball screw with servo motor

## OKADA MAIN SPINDLE



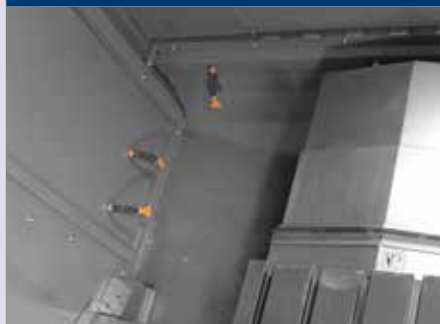
- High dynamic rotation accuracy
- Low vibration
- Easy to modularise
- High stability
- Short housing length, low inertia

## TOOL CHANGER



- Double-arm gripper with 30 tool stations (Img. with 25 tools)
- Maximum tool length 300 mm
- Tool-to-tool change in 1.94 seconds

## CHIP FLUSHING SYSTEM



- Powerful chip flushing system for cleaning the workspace and workpiece

## LINEAR GUIDE



- 4 linear guides on the Y axis to ensure maximum rigidity
- Profile rails with ball roller

## CHIP CONVEYOR



- Conveyor version
- For efficient chip discharge

## COOLING LUBRICANT SYSTEM



- Powerful 3 x 1 kW coolant pump with a large 980 litre tank

## CENTRAL LUBRICATION SYSTEM



- Prevents wear, repair costs and unnecessary downtime to a considerable extent.

| TOOL MEASURING / WORKPIECE MEASURING                                                                                                                                                  |   |                                                 |                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3511409080                                                                                                                                                                            |   | <b>BLUM TC52IR</b><br>Universal measuring probe | <ul style="list-style-type: none"> <li>Switching point repetition accuracy from 0.3µm 2σ at 2 m/ min. measuring speed</li> <li>Wear-free and durably stable</li> <li>Very compact probe with 40 mm diameter</li> </ul> |
| 3511409081                                                                                                                                                                            |   | <b>BLUM ZX-Speed</b><br>3-D probe               | <ul style="list-style-type: none"> <li>Universal 3-D probe for toolmaking and tool break monitoring</li> </ul>                                                                                                         |
| 3584010                                                                                                                                                                               | 5 | <b>Siemens Measuring cycle</b>                  | <ul style="list-style-type: none"> <li>Measurement cycles are general sub-programmes for solving specific measurement tasks that can be adapted to the specific problem using parameters.</li> </ul>                   |
| <p>➡ Only necessary for machines with measuring system from manufacturer</p> <p>Information on Blum workpiece/tool measurement also ex stock Germany can be found in the page 295</p> |   |                                                 |                                                                                                                                                                                                                        |

| 3-D PRINTING                                                           |   |                               |                                                                                                                                                                                                                                               |
|------------------------------------------------------------------------|---|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3562411                                                                | 1 | <b>3-D printing interface</b> | <ul style="list-style-type: none"> <li>Plug connector on milling head for OPTImill 3X/5X printing head</li> <li>Power supply is installed in control cabinet</li> <li>Preparation for wire breakage monitoring and filament holder</li> </ul> |
| ➡ Information on 3-D printing and accessories can be found on page 273 |   |                               |                                                                                                                                                                                                                                               |

| MISCELLANEOUS |   |                                                    |                                                                                                                                                              |
|---------------|---|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3536109       | 2 | <b>Starter set SK 40 / DIN 69871</b>               | ➡ For Information on the starter set, see page 290                                                                                                           |
| 3511409013    | 3 | <b>Coolant through spindle CTS 70 bar external</b> | <ul style="list-style-type: none"> <li>Instead of the standard equipment › Coolant through spindle 20 bar internal</li> </ul> An extraction unit is required |
| 3511409031    | 4 | <b>Air conditioner</b>                             | <ul style="list-style-type: none"> <li>Instead of the standard equipment › heat exchanger</li> </ul>                                                         |
| 3511409030    |   | <b>Oil Separator</b>                               | <ul style="list-style-type: none"> <li>Oil separator reliably removes floating foreign oils and the finest chip abrasion from cooling lubricants</li> </ul>  |

| FOURTH AXIS AND 5-AXIS ROTARY/SWIVELL TABLE                                                                     |   |                                                                                     |                                                                                                |
|-----------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 3511409040                                                                                                      | 6 | <b>Fourth axis rotary indexing table complete set</b><br>(Axis licence is required) | <ul style="list-style-type: none"> <li>Preparation</li> </ul>                                  |
| 3511409051                                                                                                      |   |                                                                                     | <ul style="list-style-type: none"> <li>Three-jaw lathe chuck Ø 200 mm and tailstock</li> </ul> |
| 3511409054                                                                                                      |   |                                                                                     | <ul style="list-style-type: none"> <li>Three-jaw lathe chuck Ø 320 mm and tailstock</li> </ul> |
| 3511409041                                                                                                      | 7 | <b>5-axis rotary/swivelling table</b><br>(Axis licence is required)                 | <ul style="list-style-type: none"> <li>Preparation</li> </ul>                                  |
| 3511409052                                                                                                      |   |                                                                                     | <ul style="list-style-type: none"> <li>Three-jaw lathe chuck 100 mm</li> </ul>                 |
| 3511409056                                                                                                      |   |                                                                                     | <ul style="list-style-type: none"> <li>Three-jaw lathe chuck 250 mm</li> </ul>                 |
| 3511409042                                                                                                      |   | <b>Additional Siemens axis licence</b>                                              |                                                                                                |
| ➡ For details on the fourth axis for the rotary indexing table and 5-axis rotary/swivelling table, see page 282 |   |                                                                                     |                                                                                                |

| SOFTWARE |   |                                                  |                                                                                                                                                                                                        |
|----------|---|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3584014  | 8 | <b>DXF Reader for SIEMENS SINUMERIK controls</b> | <ul style="list-style-type: none"> <li>From version 4.7</li> <li>For importing DXF files</li> <li>Hiding graphics layers</li> <li>Automatic contour tracking</li> </ul>                                |
| 3584012  |   | <b>Top surface for SIEMENS SINUMERIK control</b> | <ul style="list-style-type: none"> <li>The NC data from the CAM system is optimised online during processing. The result is a high surface quality when milling complex free-form surfaces.</li> </ul> |

## 1 3-D PRINTING INTERFACE



- Plug connector on milling head for OPTImill 3X/5X printing head
- Power supply is installed in control cabinet
- Preparation for wire breakage monitoring and filament holder

## 2 STARTER SET SK 40 / DIN 69871



- 1) Cutter head holder with 27 mm receptacle
- 2) Quick-action drill chuck 13 mm
- 3) 2 each Weldon 6/20 mm
- 3) 1 each Weldon 8/10/12/16 mm
- 4) Adapter SK 40 to MT 3
- 5) 4 pcs. Collet chuck holder ER 32

- 6) Collet spanner ER 32
- 7) 18-part collet chuck set ER 32
- 8) Height adjustment device
- 9) Assembly and tool setting aid
- 10) 14 pcs. pull stud
- 11) Taper squeegee

## 3 EXTERNAL CTS



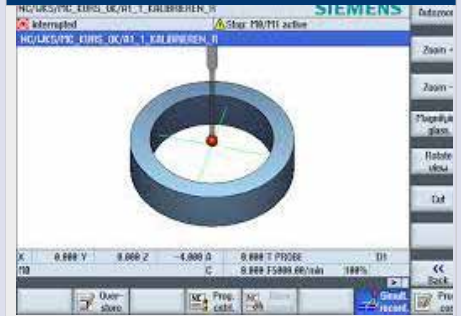
- With 70 bar pressure
- Guarantees optimal service life
- Higher cooling and lubrication effect at the cutting zone
- 25µ filter accuracy

## 4 AIR CONDITIONING



- Instead of heat exchanger
- The air conditioner permanently and constantly cools the control cabinet to the set temperature.

## 5 SIEMENS MEASURING CYCLE



- Measurement cycles are general sub-programmes for solving specific measurement tasks that can be adapted to the specific problem using parameters.

## 6 FOURTH AXIS



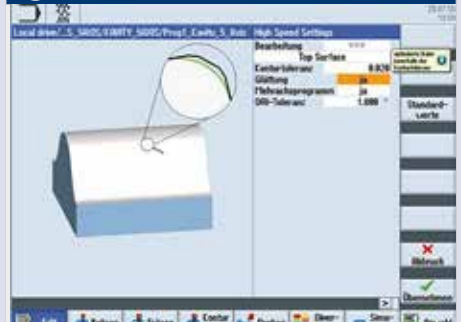
- Table diameter 120 mm
- Vertical table centre height 115 mm
- Total vertical height without motor cover 193 mm
- Horizontal table height 170 mm

## 7 FIFTH AXIS



- Compact design
- Possible machining Ø 100 mm
- Slot nut width 14<sup>h7</sup>mm

## 8 TOP SURFACE



- Excellent surface quality and form precision
- Fast and precise machining thanks to new technology
- Complete machining fully integrated with Sinumerik Operate

# ***02 - TURNING PRODUCTION MACHINES***

OPTIturn S 400HSC







**OPTIturn L44**



**OPTIturn S 600**

# L 44

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## OPTIMUM PREMIUM CNC lathe with cycle control

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### SIEMENS CONTROL SINUMERIK 828D

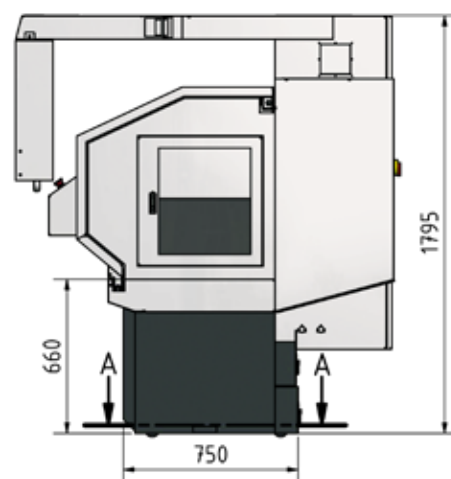
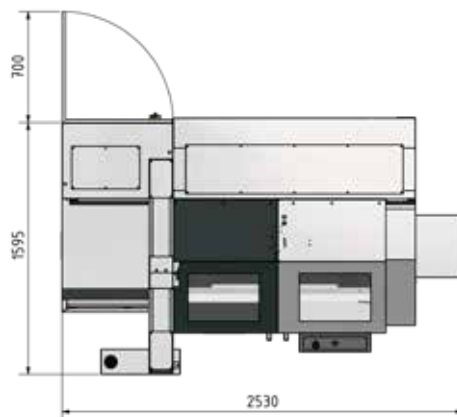
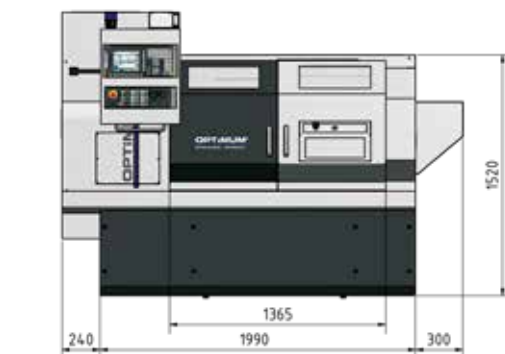
---

- Spindle and servo motors by **SIEMENS**
- Fully cladded with safety device
- Maximum spindle speed of 3 000 rpm as standard
- Automatic centralised lubrication
- Swivelling operating unit
- Tailstock cover
- Electronic handwheels for the X and Z axis
- Coolant unit with 90 litre coolant tank
- RJ45 plug-in connection, USB connection and power connection 230 V
- EMC Electromagnetic compatibility
- Six levelling feet
- Operating tool
- Additional package SIEMENS material defect liability and free online/on-site service OSS Plus on page 103
- For information on maintenance contracts see page 333



## TECHNICAL DATA

| Model                                | L 44                  |
|--------------------------------------|-----------------------|
| Article no.                          | 3514330               |
| <b>Machine data</b>                  |                       |
| Electrical connection                | 400 V / 3 Ph ~50 Hz   |
| Total connected load                 | 23 kVA                |
| <b>Spindle</b>                       |                       |
| Drive motor S1 operation             | 7 kW                  |
| Torque drive motor S1 operation      | 33 Nm                 |
| Drive motor S6 30 % operation        | 16 kW                 |
| Torque drive motor S6 30 % operation | 80 Nm                 |
| Spindle seat                         | DIN ISO 702-1 No. 5   |
| Spindle torque                       | 87 Nm                 |
| Spindle bore *                       | Ø 52 mm               |
| Chuck passage                        | Ø 40 mm               |
| Hydraulic lathe chuck                | Ø 150 mm              |
| <b>Cooling lubricant system</b>      |                       |
| Coolant pump output                  | 270 W                 |
| Tank capacity                        | 90 litres             |
| <b>Hydraulic system</b>              |                       |
| Hydraulic pump power                 | 750 W                 |
| Tank capacity                        | 50 litres             |
| <b>Machine data</b>                  |                       |
| Max. turning diameter                | 223 mm                |
| Centre width                         | 850 mm                |
| Swing Ø above cross slide            | 240 mm                |
| Swing Ø above machine bed            | 446 mm                |
| Swing Ø in the bed bridge            | 520 mm                |
| Bed width                            | 300 mm                |
| <b>Speed range</b>                   |                       |
| Rotational speeds                    | 10 - 3,000 rpm        |
| <b>Tool changer</b>                  |                       |
| Shank                                | VDI 30                |
| Type                                 | Hydraulic             |
| Number of tool slots                 | 8                     |
| Mounting height square max.          | 20 mm                 |
| Max. chuck diameter drilling rod     | 25 mm                 |
| <b>Accuracy</b>                      |                       |
| Repeat accuracy                      | ± 0.005 mm            |
| Positioning accuracy                 | ± 0.005 mm            |
| <b>Travel</b>                        |                       |
| X axis                               | 250 mm                |
| Z axis                               | 760 mm                |
| <b>Feed speed</b>                    |                       |
| X axis/Y axis                        | 15 m/min.             |
| <b>Motor torque</b>                  |                       |
| X/Z axis                             | 6 Nm / 8.5 Nm         |
| <b>Feed forces</b>                   |                       |
| X/Z axis                             | 7.5 kN / 5.3 kN       |
| <b>Tailstock</b>                     |                       |
| Shank                                | MT 4                  |
| Spindle sleeve diameter              | 52 mm                 |
| Spindle sleeve stroke, hydraulic     | 165 mm                |
| <b>Dimensions</b>                    |                       |
| Length x width x height              | 2530 x 1595 x 1795 mm |
| Overall weight                       | 2600 kg               |



\* depending on installed chuck

# SINUMERIK 828D

## HIGH-TECH FOR THE COMPACT CLASS

The use of two autonomously operating tools makes 4-axis turning - balance cutting - possible. New features include multi-channel capability with Shop-Turn, which allows programmes to be synchronised with programSYNC, among others. The new software offers the possibility of running two channels simultaneously in turning and grinding machines.

SINUMERIK CNC control Sinumerik 828D Basic sets standards in all aspects of machining performance. Whether accuracy and speed, whether reduction of cycle times or energy efficiency and safety - the SINUMERIK sets the pace.

### Communicative:

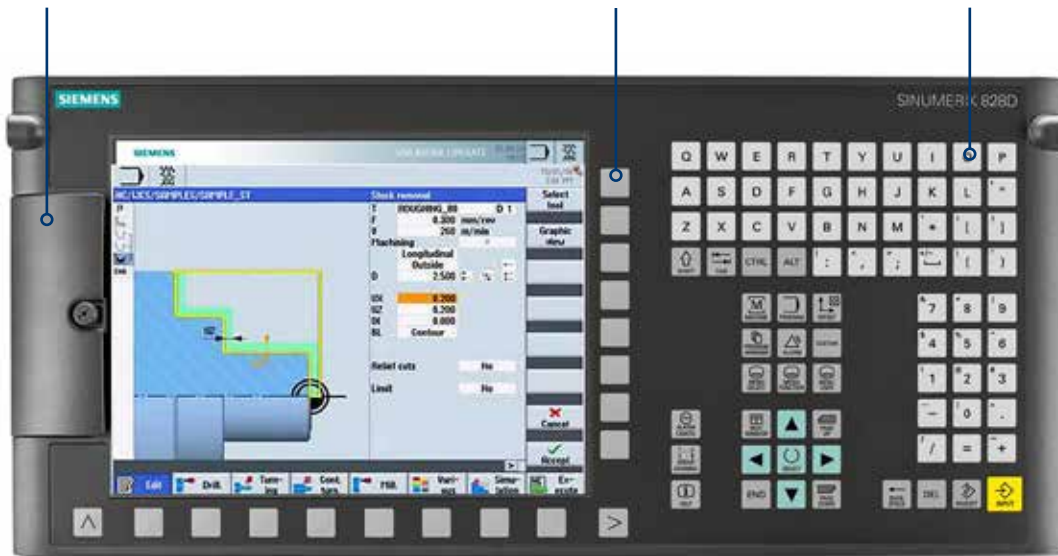
Front interfaces: Front USB 2.0, RJ45 Ethernet, Compact Flash (CF) Card

### 16 function keys:

The 8 horizontal and 8 vertical soft keys take the user to all control windows with just a few key presses

### User-friendly:

- Full QWERTY keyboard  
- Hard buttons with protective film  
- IP65 protection class



## SIEMENS SAFETY INTEGRATED

SET UP WORK WITH OPEN DOORS

### Functional safety also provides protection against high costs!

Machine and plant safety is not only important because strict regulations must be observed. When everything runs safely, you benefit from time savings in engineering, higher system availability and more investment security.

## CONTROL

- 10.4" colour display
- 4:3 format
- User-friendly SINUMERIK Operate software

## SYSTEM SOFTWARE

PPU 271 SW 24

3 MB CNC memory  
3 ms Block change time  
50 Look Ahead  
128 tools

## OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- Shopturn work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording

## ADDITIONAL PACKAGE SIEMENS OSS PLUS

12 months; Article no. 3589020  
24 months; Article no. 3589021  
36 months; Article no. 3589022

Information on this additional package and conditions for utilisation can be found at: Material Defects Liability and On-Site Service - SiePortal - Siemens WW





**Main spindle**

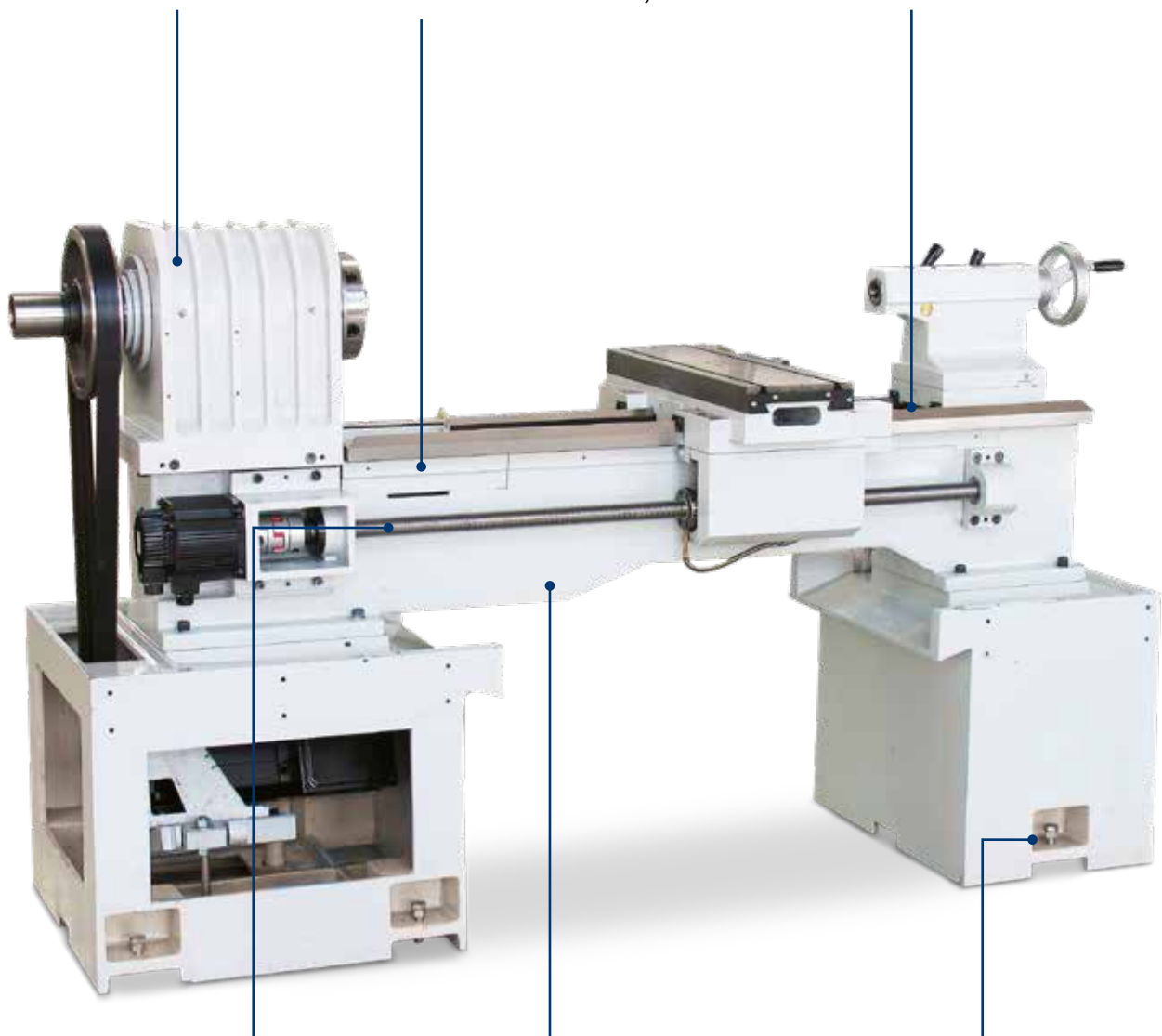
- Solid design

**horizontal / vertical**

- With pronounced ribbing
- Excellent stiffness and durability

**Guides**

- Rugged flat bed guide



**Ball screw**

- for high rapid traverse speeds in all axes
- Less wear
- For high positioning and repeat accuracy

**Cast body**

- Tempered HRC48-52 and heat-treated

**Machine feet**

- Six pcs.
- Optimal machine leveling

#### HEAT EXCHANGER



- Closed switch cabinet with smart cooling management
- Optimal temperature even in case of high ambient temperatures

#### TOOL CHANGER



- Eight tool slots
- Hydraulic VDI30 tool changer
- Max. mounting height 20 mm

#### TAILSTOCK



- Generously dimensioned
- Slide with ball screw and pre-stressed nut

#### HYDRAULIC POWER UNIT



- Motor power 750 W
- Tank capacity 50 litres
- Clamping pressure/operating pressure 2 500 - 2 942 kPa

#### THREE-JAW CHUCK



- Hydraulic three-jaw lathe chuck Ø 150 mm
- Hydraulic release and clamping via foot-switch
- Easy workpiece clamping
- Hard and soft block jaws

#### CENTRAL LUBRICATION SYSTEM



- Automatic interval supply
- Reduces the wear on bearings, rails and ball screw drives
- With float switch. If the oil level is too low, an audible signal is output

#### HAND WHEELS



- Joystick for moving the X, Z axis
- Handwheel for moving the X axis and Z axis manually
- Emergency stop button
- Confirm button

#### COOLANT TANK



- Pull-out chip tray
- Pull-out cooling lubricant tank
- Level indicator
- Tank capacity 90 litres

#### FOOT PEDAL



- For releasing and clamping the lathe chuck
- Optional tailstock sleeve extends/retracts hydraulically

| STEADY RESTS |   |                    |  |
|--------------|---|--------------------|--|
| 351433002*   | 1 | Fixed steady rest  |  |
| 351433003*   |   | Follow steady rest |  |

| BAR FEEDER                                                                                                                                                                |  |                                   |                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------|--------------------------------------------------------|
| 351433026*                                                                                                                                                                |  | Bar feeder interface              |                                                        |
| 351433012*                                                                                                                                                                |  | Bar feeder Pro V 65E 1.2 metres   | Including bar feeder interface (article no. 351433026) |
| 351433019*                                                                                                                                                                |  | Bar feeder Pro Conqueror 3 metres | Including bar feeder interface (article no. 351433026) |
|  For information on bar feeders, and more bar feeders ex warehouse Germany, see page 304 |  |                                   |                                                        |

| MISCELLANEOUS                                                                    |   |                                            |                                                                             |
|----------------------------------------------------------------------------------|---|--------------------------------------------|-----------------------------------------------------------------------------|
| 3536115                                                                          | 2 | Starter set VDI 30                         | For more information see „VDI 30“ on page 299                               |
| 3544190                                                                          |   | Turning tool set left                      | • HM 20 mm / 6-parts                                                        |
| 351433001*                                                                       | 3 | Hydraulic tailstock quill                  | • for fast machining<br>• Quill can be extended and retracted hydraulically |
| 351433011*                                                                       |   | Fast change tool holder Multifix 4         | • Instead of standard equipment › hydraulic tool changer VDI30              |
| 351433009*                                                                       | 4 | Portable electronic handwheel              | • Instead of the standard equipment › Joystick                              |
| 351433013*                                                                       | 5 | Power transformer                          | • for custom voltage<br>• Weight 147 kg                                     |
| 3511294601*                                                                      | 6 | HPRA Renishaw High Precision Measuring Arm | • for the Ø 150 mm lathe chuck<br>• Tool measurement and breakage control   |
| ➡ Information on the measuring arm ex warehouse Germany can be found at page 312 |   |                                            |                                                                             |

| LATHE CHUCK |  |                                          |                                                                                                                                                  |
|-------------|--|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 351433015*  |  | Three-jaw lathe chuck manual Ø 200 mm    | • Instead of standard equipment › three-jaw lathe chuck hydraulic Ø 150 mm                                                                       |
| 351433016*  |  | Four-jaw lathe chuck manual Ø 250 mm     | • Instead of standard equipment › three-jaw lathe chuck hydraulic Ø 150 mm                                                                       |
| 351433018*  |  | Three-jaw lathe chuck hydraulic Ø 200 mm | • Instead of standard equipment › three-jaw lathe chuck hydraulic Ø 150 mm                                                                       |
| 351433020*  |  | Hydraulic four-jaw lathe chuck Ø 200 mm  | • Instead of standard equipment › three-jaw lathe chuck hydraulic Ø 150mm                                                                        |
| 3519706     |  | Soft top jaw                             | • for the › hydraulic three-jaw lathe chuck Ø 150 mm - included in the standard equipment                                                        |
| 3519726     |  | Hard top jaw                             | • for the › hydraulic three-jaw lathe chuck Ø 150 mm - included in the standard equipment                                                        |
| 3519712     |  | Autogrip Soft top jaw                    | • for the hydraulic three-jaw lathe chuck Ø 200 mm (art. no. 351433018)<br>• for the four-jaw lathe chuck hydraulic Ø 200 mm (art.no. 351433020) |
| 3519732     |  | Autogrip Hard top jaw set                | • for the hydraulic three-jaw lathe chuck Ø 200 mm (art. no. 351433018)                                                                          |
| 3519733     |  | Autogrip Hard top jaw set                | • for the hydraulic four-jaw lathe chuck Ø 200 mm ( art. no. 351433020)                                                                          |
| 351433024*  |  | Collet chuck                             | • for the › hydraulic three-jaw lathe chuck Ø 150 mm - included in the standard equipment                                                        |

| SOFTWARE |   |                            |                                                                                                           |
|----------|---|----------------------------|-----------------------------------------------------------------------------------------------------------|
| 3584014  | 7 | Software DXF Viewer/Reader | • from version 4.7<br>• For importing DXF files<br>• Hiding of graphic layers, automatic contour tracking |

## 1 STEADY RESTS



### Fixed steady rest

- Passage Ø 10 mm to Ø 130 mm

### Follow steady rest

- Passage Ø 10 mm to Ø 100 mm

## 2 VDI 30 STARTER SET



- 1) 3 pcs. square transverse holder
- 2) 1 pc. square transverse overhead holder
- 3) 1 pc. square longitudinal holder
- 4) 5 pcs. drill bar holder Ø 10 / 12 / 16 / 20 / 25 mm
- 5) 1 pc. tool holder

- 6) 1 pc. square longitudinal holder
- 7) 18-part collet chuck set ER 32
- 8) 1 pc. collet chuck holder ER 25
- 9) 1 piece collet spanner ER 25
- 10) 1 pc. drill chuck
- 11) 3 pcs. sealing caps

## 3 TAILSTOCK SPINDLE SLEEVE



- Retract and extend hydraulically via foot pedal

## 4 HANDWHEEL



- Portable, electronic
- Substantially facilitates running in of programs
- Emergency stop button
- Confirm button

## 5 POWER TRANSFORMER



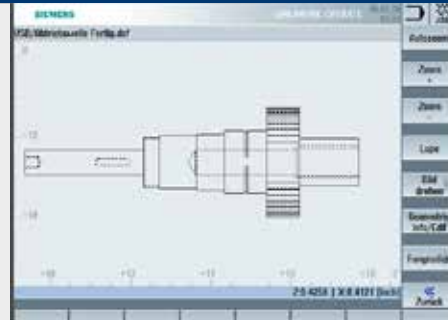
- For custom voltage
- Weight 147 kg

## 6 MEASURING ARM



- Up to 90 % faster tool measuring
- Typical positioning accuracy of 5 µm 2σ
- LED displays the probe status and the operational readiness of the arm
- IPX8 protected (static)
- TSI2 Interface

## 7 DXF VIEWER/READER SOFTWARE



- **from version 4.7**
- Imports eDrawings, 3-D objects as well as SolidWorks and AutoCad files in the formats DWG and DXF, EASM and PDM. The tool offers various functions for displaying, simulating and printing the drawings and 3D projects.

# S 400HSC

**OPTIMUM PREMIUM CNC slant-bed lathe that stands out for its high speed, performance, precision and durability**

## **SIEMENS** SINUMERIK 828D CONTROL

- Heavy duty version
- Compact design
- **SIEMENS** servo motors on all axes
- Renishaw tool measuring arm for tool measuring
- All servomotors with integrated encoder for maximum precision
- Main spindle designed as motorised spindle
- 45° slant bed design for particularly large machining diameters and unhindered chip flow into the chip tray
- Hydraulic three-jaw lathe chuck Ø 170 mm with soft jaws
- Servo tool changer VDI 30 with 12 tool stations
- Hardened and precision ground ball screws for high rapid traverse speeds in all axes
- Faster tool change speed
- High hydraulic clamping force
- Heavy-duty machining without vibration, for realising machining automation and high efficiency in extreme cases
- Dimensionally stable linear guides ensure a long service thanks to maximum static and dynamic stiffness
- Device for manual tool measuring
- Heat exchanger
- Portable, electronic handwheel with enabling switch and emergency stop button that significantly facilitates the running-in of programmes
- Chip conveyor, belt type ensures efficient chip discharge
- Working light for complete illumination of the working area
- Coolant device with cleaning gun
- RJ45 and power interface
- EMC Electromagnetic compatibility
- Additional package SIEMENS material defect liability and free online/on-site service OSS Plus see page 111
- 1 year maintenance contract Basic included in D/A/CH see page 267





PREMIUM

# OPTITURN S 400HSC

## TECHNICAL DATA

| Model                                | S 400HSC              |
|--------------------------------------|-----------------------|
| Article no.                          | 3515175               |
| <b>Machine data</b>                  |                       |
| Electrical connection                | 400 V / 3 Ph ~50 Hz   |
| Total connected load                 | 25 kVA                |
| <b>Spindle</b>                       |                       |
| Drive motor S1 operation             | 11.6 kW               |
| Torque drive motor S1 operation      | 65 Nm                 |
| Drive motor S6 30 % operation        | 14.4 kW               |
| Torque drive motor S6 30 % operation | 81 Nm                 |
| Spindle seat                         | A2-5                  |
| Spindle bore*                        | Ø 56 mm               |
| Chuck passage                        | Ø 45 mm               |
| Hydraulic lathe chuck                | Ø 170 mm              |
| <b>Cooling lubricant system</b>      |                       |
| Coolant pump output                  | 700 W                 |
| Tank capacity                        | 160 litres            |
| <b>Hydraulic system</b>              |                       |
| Output of hydraulic pump             | 1.5 kW                |
| Tank capacity                        | 36 litres             |
| <b>Machine data</b>                  |                       |
| Turning Ø max.                       | 220 mm                |
| Turning length                       | 320 mm                |
| Swing Ø above cross slide            | 300 mm                |
| Swing Ø above machine bed            | 500 mm                |
| Slant bed                            | 45°                   |
| <b>Speed range</b>                   |                       |
| Spindle speeds*                      | 30 - 6 000 rpm        |
| <b>Tool changer</b>                  |                       |
| Type                                 | Servo VDI 30          |
| Number of tool stations              | 12                    |
| <b>Accuracy</b>                      |                       |
| Repeat accuracy                      | ± 0.004 mm            |
| Positioning accuracy                 | ± 0.004 mm            |
| <b>Travel</b>                        |                       |
| X axis                               | 180 mm                |
| Z axis                               | 350 mm                |
| <b>Dynamic feed force</b>            |                       |
| X axis                               | 3.6 kN                |
| Z axis                               | 3.6 kN                |
| <b>Feed speed</b>                    |                       |
| X axis/Y axis                        | 30 m/min.             |
| <b>Motor torque</b>                  |                       |
| X axis/Y axis                        | 6 Nm                  |
| <b>Dimensions</b>                    |                       |
| Length x width x height              | 2000 x 2250 x 1550 mm |
| Overall weight                       | 2600 kg               |

\* depending on the chuck installed \*\* other spindle bores and spindle speeds on request

# SINUMERIK 828D

## HIGH-TECH FOR THE COMPACT CLASS

The use of two autonomously operating tools makes 4-axis turning - balance cutting - possible. New features include multi-channel capability with Shop-Turn, which allows programmes to be synchronised with programSYNC, among others. The new software offers the possibility of running two channels simultaneously in turning and grinding machines.

SINUMERIK CNC control Sinumerik 828D Basic sets standards in all aspects of machining performance. Whether accuracy and speed, whether reduction of cycle times or energy efficiency and safety - the SINUMERIK sets the pace.

### Communicative:

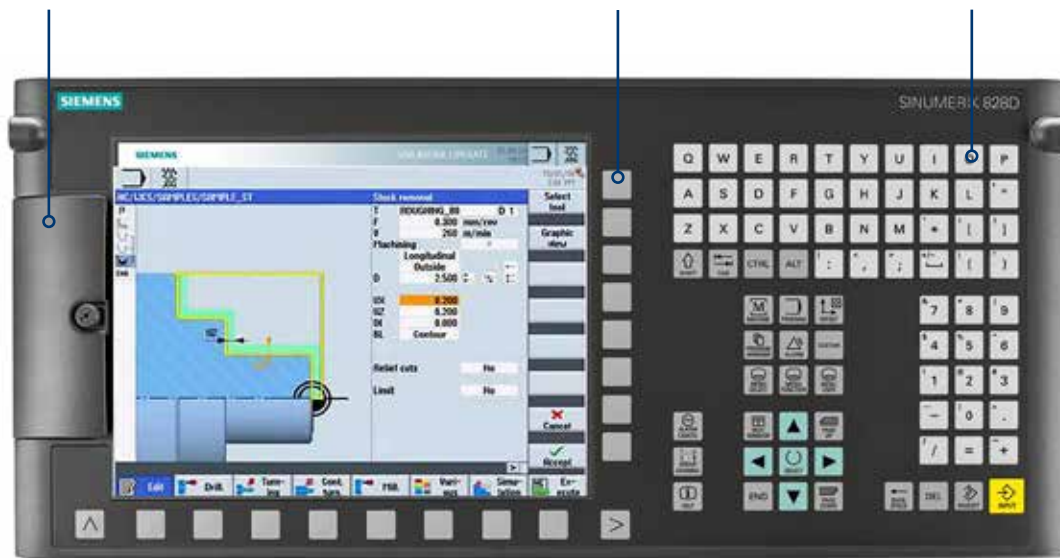
Front interfaces: Front USB 2.0, RJ45 Ethernet, Compact Flash (CF) Card

### 16 function keys:

The 8 horizontal and 8 vertical soft keys take the user to all control windows with just a few key presses

### User-friendly:

- Full QWERTY keyboard  
- Hard buttons with protective film  
- IP65 protection class



## SIEMENS SAFETY INTEGRATED

SET UP WORK WITH OPEN DOORS

### Functional safety also provides protection against high costs!

Machine and plant safety is not only important because strict regulations must be observed. When everything runs safely, you benefit from time savings in engineering, higher system availability and more investment security.

## CONTROL

- 10.4" colour display
- 4:3 format
- User-friendly SINUMERIK Operate software

## SYSTEM SOFTWARE

PPU 271 SW 24

3 MB CNC memory  
3 ms Block change time  
50 Look Ahead  
128 tools

## OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- Shopturn work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording

## ADDITIONAL PACKAGE SIEMENS OSS PLUS

12 months; Article no. 3589020  
24 months; Article no. 3589021  
36 months; Article no. 3589022

Information on this additional package and conditions for utilisation can be found at: Material Defects Liability and On-Site Service - SiePortal - Siemens WW



**Finite element analysis (FEA)**

- for optimisation for excellent rigidity, heat dissipation and vibration damping

**Spindle**

- High spindle speed and stability
- All spindle bearings with grease lubrication, good precision retention, longer service life

**Linear guide**

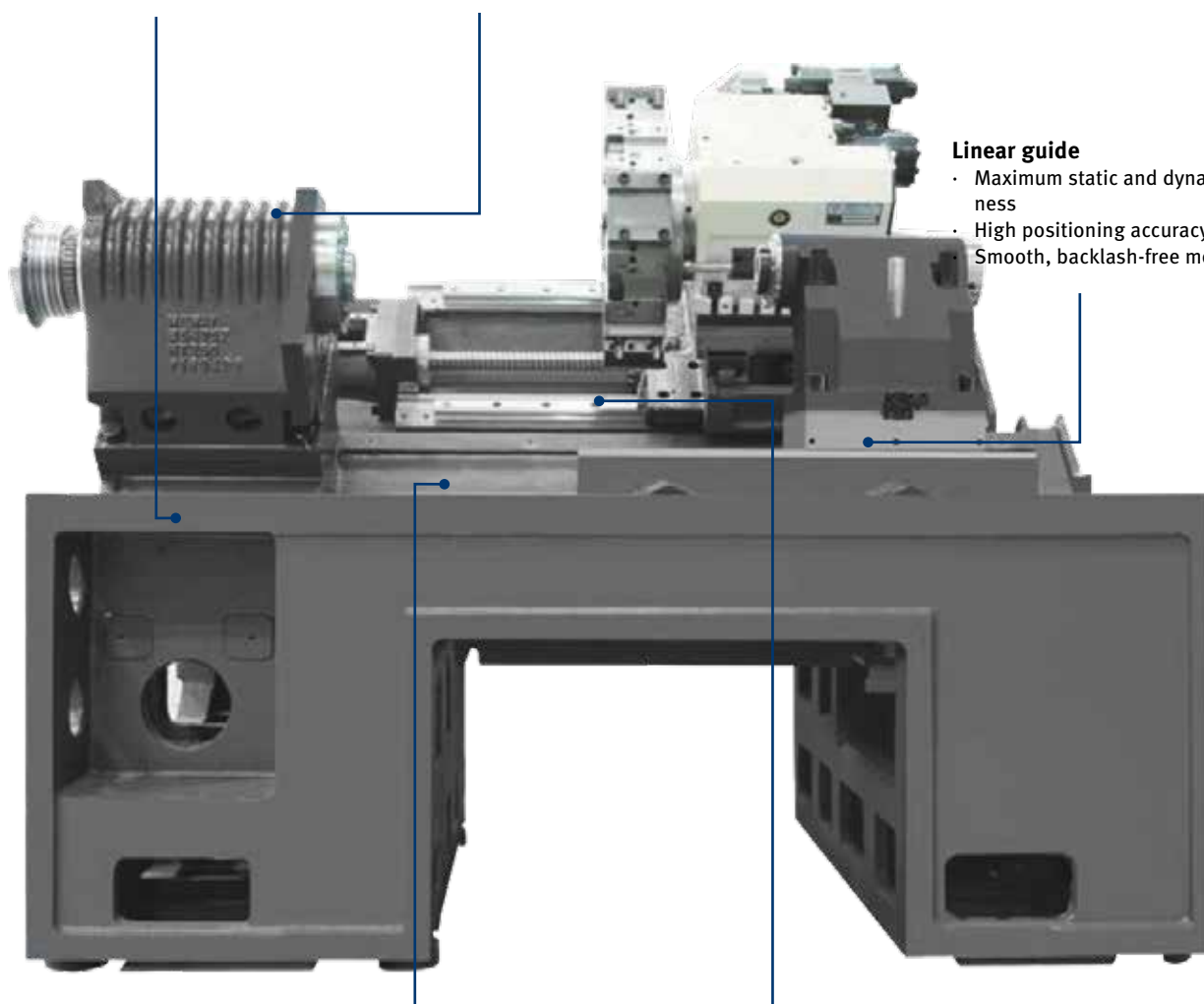
- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement

**Machine bed**

- Pronounced ribbing
- 45-degree slope
- Excellent stiffness and durability

**Linear guide**

- Low maintenance
- Quiet and smooth operation
- Long system service life



## LINEAR GUIDE



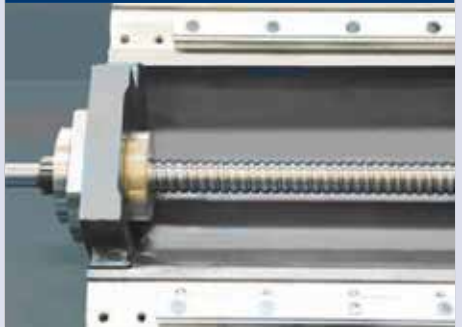
- High precision
- Increases the speed of the movement speed and improve the cutting performance

## TOOL CHANGER



- 12 tool stations
- Servo VDI30

## BALL SCREW SPINDLE



- The ball screw is fixed at both ends and is adjusted so that it runs as parallel as possible to the guideways. The ball screw nuts eliminate the backlash by means of a preload treatment.

## DIRECTLY DRIVEN SERVOMOTOR



- The servomotor is connected directly to the ball screw via the coupling, which significantly improves the positioning accuracy.

## SPINDLE MOTOR



- Direct drive
- Better running behaviour
- Smooth running as no belt

## WATER COOLING



- for main spindle motor
- Better heat dissipation than air heat sinks

## CHIP CONVEYOR



- For the disposal of chips
- rear-mounted

## AIR CONDITIONER



- Cools the control cabinet permanently and constantly to the set temperature.

## MEASURING ARM



- Up to 90 % faster tool measuring
- Typical positioning accuracy of 5  $\mu\text{m}$  2 $\sigma$
- LED displays the probe status and the operational readiness of the arm
- TS12 Interface



| ENCODER                                                                                                                                                                   |   |                               |                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3515175001                                                                                                                                                                | 1 | Heidenhain encoder ERM 2480   | <ul style="list-style-type: none"><li>Scanning head for incremental modular encoder with magnetoresistive scanning</li><li>Mounted directly on the main spindle</li></ul> |
|                                                                                                                                                                           |   |                               |                                                                                                                                                                           |
| STARTER SET                                                                                                                                                               |   |                               |                                                                                                                                                                           |
| 3536115                                                                                                                                                                   | 2 | Starter set VDI 30            | <ul style="list-style-type: none"><li>Information VDI 30, page 299</li></ul>                                                                                              |
|                                                                                                                                                                           |   |                               |                                                                                                                                                                           |
| BAR FEEDER                                                                                                                                                                |   |                               |                                                                                                                                                                           |
| 3511599093*                                                                                                                                                               | 3 | Bar feeder interface          |                                                                                                                                                                           |
| 3511599101                                                                                                                                                                |   | Fedek GT 326 3 m bar feeder   | <ul style="list-style-type: none"><li>Ø 3 - 26 mm / length max. 3000 mm / Incl. bar feeder interface</li></ul>                                                            |
| 3511599102                                                                                                                                                                |   | Fedek DH 65L 1.5 m bar feeder | <ul style="list-style-type: none"><li>Ø 5 - 65 mm / length max. 1500 mm / Incl. bar feeder interface</li></ul>                                                            |
| 3511599103                                                                                                                                                                |   | Fedek DH 65 1.25 m bar feeder | <ul style="list-style-type: none"><li>Ø 5 - 65 mm / length max. 1250 mm / Incl. bar feeder interface</li></ul>                                                            |
| 3511599104                                                                                                                                                                |   | Fedek SN 551 3.2 m bar feeder | <ul style="list-style-type: none"><li>Ø 5 - 51 mm / length max. 3200 mm / Incl. bar feeder interface</li></ul>                                                            |
|  For information on bar feeders, and more bar feeders ex warehouse Germany, see page 304 |   |                               |                                                                                                                                                                           |
|                                                                                                                                                                           |   |                               |                                                                                                                                                                           |
| JAWS FOR LATHE CHUCKS                                                                                                                                                     |   |                               |                                                                                                                                                                           |
| 3519739                                                                                                                                                                   |   | Soft jaws Ø 160 mm 3 pieces   | <ul style="list-style-type: none"><li>for the hydraulic three-jaw lathe chuck Ø 160 mm - included in the standard equipment</li></ul>                                     |
| 3519749                                                                                                                                                                   |   | Hard jaws Ø 160 mm 3 pieces   | <ul style="list-style-type: none"><li>for the hydraulic three-jaw lathe chuck Ø 160 mm - included in the standard equipment</li></ul>                                     |
|                                                                                                                                                                           |   |                               |                                                                                                                                                                           |
| MISCELLANEOUS                                                                                                                                                             |   |                               |                                                                                                                                                                           |
| 3511599094*                                                                                                                                                               | 4 | Coolant through spindle       | <ul style="list-style-type: none"><li>External unit, 10 bar</li></ul>                                                                                                     |
| 3511599095*                                                                                                                                                               |   | Coolant through spindle       | <ul style="list-style-type: none"><li>External unit, 20 bar</li></ul>                                                                                                     |
| 3511599091                                                                                                                                                                | 5 | Oil Separator                 | <ul style="list-style-type: none"><li>Longer service life of the cooling lubricants</li></ul>                                                                             |
| 3511599090                                                                                                                                                                |   | Part grippers                 |                                                                                                                                                                           |
| 3544190                                                                                                                                                                   |   | Lathe tool set Carbide 20 mm  | <ul style="list-style-type: none"><li>6-part</li><li>see page 302</li></ul>                                                                                               |
|                                                                                                                                                                           |   |                               |                                                                                                                                                                           |
| SOFTWARE                                                                                                                                                                  |   |                               |                                                                                                                                                                           |
| 3584014                                                                                                                                                                   | 6 | Software DXF Viewer/Reader    | <ul style="list-style-type: none"><li>from version 4.7</li></ul>                                                                                                          |

## 1 ENCODER ERM 2480



- Incremental angle encoder with magnetic scanning - scanning head
- Continuous operation at high speeds
- Robust and dirt-resistant
- Pitch accuracy:  $\pm 2.5''$  to  $\pm 72''$

## 2 VDI 30 STARTER SET



- 1) 3 pcs. square transverse holder
- 2) 1 pc. square transverse overhead holder
- 3) 1 pc. square longitudinal holder
- 4) 5 pcs. drill bar holder  $\varnothing 10 / 12 / 16 / 20 / 25$  mm
- 5) 1 pc. tool holder

- 6) 1 pc. square longitudinal holder
- 7) 18-part collet chuck set ER 32
- 8) 1 pc. collet chuck holder ER 25
- 9) 1 piece collet spanner ER 25
- 10) 1 pc. drill chuck
- 11) 3 pcs. sealing caps

## 3 BAR FEEDER DH 65



- The bar feeders are also very reliable and easy to operate, so you can be sure that they will provide years of reliable service.

## 3 BAR FEEDER GT 326



- Convenient parameter setting without programme changes
- The length of the remaining material can be adjusted as required
- Short residual length reduces material waste to a minimum

## 4 COOLANT THROUGH SPINDLE



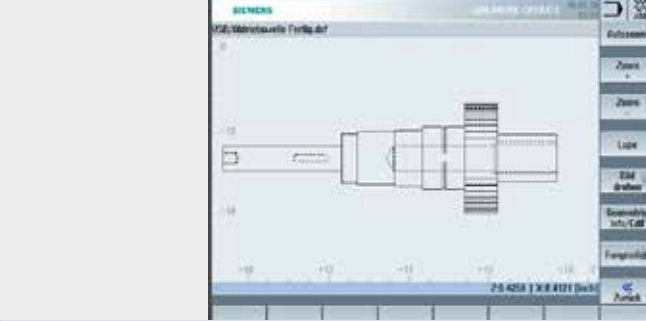
- Coolant is fed directly into the spindle to control the temperature of the tool and prevent overheating. This keeps the spindle at the optimum operating temperature, which increases precision and service life

## 5 OIL SEPARATOR



- Oil separator reliably removes floating foreign oils and the finest chip abrasion from cooling lubricants. It ensures that the oil remains clean and reusable or can be disposed of in an environmentally friendly manner

## 6 DXF VIEWER/READER SOFTWARE



- **from version 4.7**  
Imports eDrawings, 3-D objects as well as SolidWorks and AutoCad files in the formats DWG and DXF, EASM and PDM. The tool offers various functions for displaying, simulating and printing the drawings and 3D projects.

# S 600

**OPTIMUM PREMIUM CNC slant-bed lathe that stands out for its high speed, performance, precision and durability**

**SIEMENS CONTROL SINUMERIK 828D PPU 271**

- Heavy duty version
- Compact design
- **SIEMENS** servo motors on all axes
- Renishaw measuring arm for manual tool measurement
- All servomotors with integrated encoder for maximum precision
- Slant bed design 45° for particularly large machining diameter
- Better unobstructed chip flow into the chip tray
- Sliding door easy to clean, no chip accumulation
- Swivelling control unit: Convenient rotation to the optimum viewing position
- Convenient reading and setting of pressure gauges
- Access window on the front of the headstock: easy to maintain and repair
- Inspection window: simple inspection of hydraulics and pneumatics.
- MPG with magnet: Attachment to any metal surface
- Renishaw measuring arm for manual tool measurement
- Hydraulic three-jaw lathe chuck Ø 200 mm with soft jaws
- Standard tool changer Hydraulic VDI 30 with 12 tool stations
- Hardened and precision ground ball screws for high rapid traverse speeds in all axes
- Dimensionally stable linear guides ensure a long service thanks to maximum static and dynamic stiffness. Tailstock with hydraulic quill
- Heat exchanger
- The portable electronic handwheel, which has an enable button and an emergency stop toggle switch, makes setting up the programmes much easier.
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- Working light for complete illumination of the working area
- Coolant system
- EMC Electromagnetic compatibility
- Additional package SIEMENS material defect liability and free online/on-site service OSS Plus see page 119
- 1 year maintenance contract Basic included in D/A/CH see page 267



| Model                                  |                            | S 600                         |
|----------------------------------------|----------------------------|-------------------------------|
| Article no.                            |                            | 3515180                       |
| <b>Machine data</b>                    |                            |                               |
| Electrical connection                  |                            | 400 V / 3 Ph ~50 Hz           |
| Total connected load                   |                            | 30 kVA                        |
| <b>Spindle</b>                         |                            |                               |
| Drive motor S1 operation               |                            | 11 kW                         |
| Torque drive motor S1 operation        |                            | 140 Nm                        |
| Drive motor S6 30 % operation          |                            | 14.3 kW                       |
| Torque drive motor S6 30 % operation   |                            | 182 Nm                        |
| Spindle bore                           |                            | Ø 76 mm                       |
| Chuck passage                          |                            | Ø 65 mm                       |
| Spindle seat                           |                            | DIN ISO 702-1 No. 6           |
| Chuck size                             |                            | Ø 200 mm                      |
| <b>Spindle options of main spindle</b> |                            |                               |
| Option 1                               | <b>Art no. 3515187021</b>  |                               |
|                                        | Spindle bore               | Ø 62 mm                       |
|                                        | Chuck passage              | Ø 51 mm (with Ø 200 mm chuck) |
|                                        | Spindle seat               | A 2-6                         |
|                                        | Rotational speeds          | 30 - 5000 rpm                 |
| Option 2                               | <b>Art. no. 3515187024</b> |                               |
|                                        | Spindle bore               | Ø 92 mm                       |
|                                        | Chuck passage              | Ø 80 mm (with 250 mm chuck)   |
|                                        | Spindle seat               | A 2-8                         |
|                                        | Rotational speeds          | 30 - 3 000 rpm                |
| <b>Cooling lubricant system</b>        |                            |                               |
| Coolant pump output                    |                            | 0.55 kW                       |
| Tank capacity                          |                            | 220 litres                    |
| <b>Hydraulic system</b>                |                            |                               |
| Output of hydraulic pump               |                            | 1.5 kW                        |
| Tank capacity                          |                            | 20 litres                     |
| <b>Machine data</b>                    |                            |                               |
| Turning diameter                       |                            | 320 mm                        |
| Turning length                         |                            | 550 mm                        |
| Swing Ø above cross slide              |                            | 370 mm                        |
| Swing Ø above machine bed              |                            | 550 mm                        |
| Slant bed                              |                            | 45°                           |
| <b>Speed range</b>                     |                            |                               |
| Spindle speeds*                        |                            | 30 - 4 000 rpm                |
| <b>Tool changer</b>                    |                            |                               |
| Type                                   |                            | Hydraulic VDI 30              |
| Number of tool stations                |                            | 12                            |
| <b>Accuracy</b>                        |                            |                               |
| Positioning accuracy                   |                            | ± 0.003 mm                    |
| Repeat accuracy                        |                            | ± 0.002 mm                    |
| <b>Travel</b>                          |                            |                               |
| X axis                                 |                            | 240 mm                        |
| Z axis                                 |                            | 550 mm                        |
| <b>Rapid traverse</b>                  |                            |                               |
| X axis                                 |                            | 30 m/min.                     |
| Z axis                                 |                            | 36 m/min.                     |
| <b>Motor torque</b>                    |                            |                               |
| X axis/Y axis                          |                            | 12 Nm                         |
| <b>Feed forces</b>                     |                            |                               |
| X axis/Y axis                          |                            | 6.75 kN / 5.652 kN            |
| <b>Tailstock</b>                       |                            |                               |
| Shank                                  |                            | MT 4                          |
| Spindle sleeve diameter                |                            | 75 mm                         |
| Spindle sleeve stroke, hydraulic       |                            | 80 mm                         |
| <b>Dimensions</b>                      |                            |                               |
| Length x width x height                |                            | 4050 x 1870 x 2000 mm         |
| Overall weight                         |                            | 3800 kg                       |



# SINUMERIK 828D PPU271.5

COMPACT REVOLUTION

DIGITALLY TRANSFORMED, INNOVATIVELY DESIGNED, ENHANCED PERFORMANCE



**PPU.5 CPU power Upgrade**  
**>40 %**

Comprehensive improvement  
⇒ Programme buffer and processing time  
⇒ Simulation efficiency  
⇒ HMI switch-over time

**SINUMERIK OPERATE**  
identical to the latest  
**SINUMERIK ONE** control

## DIGITAL TWIN:

Create / Run MyVirtual Machine now available for 828D

- Minimise the set-up and run-in time on the real machine.
- Precise simulation reduces the risk of collision and accelerates part programme optimisation.

## HIGHER PERFORMANCE:

CPU performance improved by >40 %  
40 % shorter programme buffer and processing time  
25 % higher simulation efficiency  
50 % faster HMI switch-over time

- Improved efficiency, shorter waiting times and smooth operation

## MODERN PANEL DESIGN:

Innovative 16:10-inch panel with modern design  
SINUMERIK 828D MCP with laser-engraved characters, mechanical keys, service life of override keys increased by 400 %

- Clearer display and improved user-friendliness
- Excellent haptics and wear-resistant buttons, greater robustness and longer service life

## SUSTAINABILITY & SAFETY:

New Ctrl-E Advanced Analysis function  
Maintenance-free (without fan, without battery)  
Safety functions: Security archive, user administration

- Simple transparency of energy consumption
- Protection of customer know-how against manipulation and piracy

## SIEMENS SAFETY INTEGRATED

SET UP WORK WITH OPEN DOORS

**Functional safety also provides protection against high costs!**

Machine and plant safety is not only important because strict regulations must be observed. When everything runs safely, you benefit from time savings in engineering, higher system availability and more investment security.

## CONTROL

- 12.1" colour display
- 4:3 format
- User-friendly SINUMERIK Operate software

## SYSTEM SOFTWARE

- **PPU 271 SW 24**  
**3 MB** CNC memory  
**3 ms** Block change time  
**50** Look Ahead  
**128** tools

## OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- Shopturn work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording

## ADDITIONAL PACKAGE SIEMENS OSS PLUS

12 months; Article no. 3589020  
24 months; Article no. 3589021  
36 months; Article no. 3589022

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal - Siemens WW



**Linear guide**

- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement

**Tool turret**

- Standard tool changer Hydraulic VDI 30 with 12 tool stations

**Spindle**

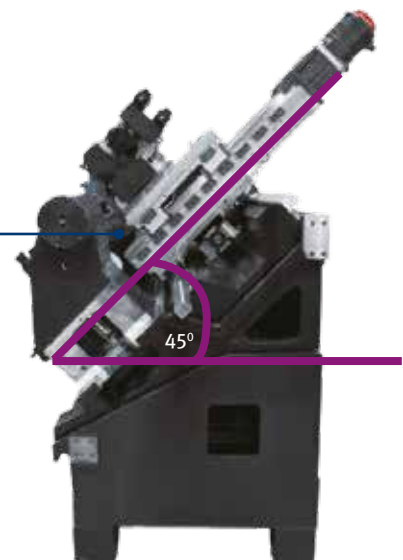
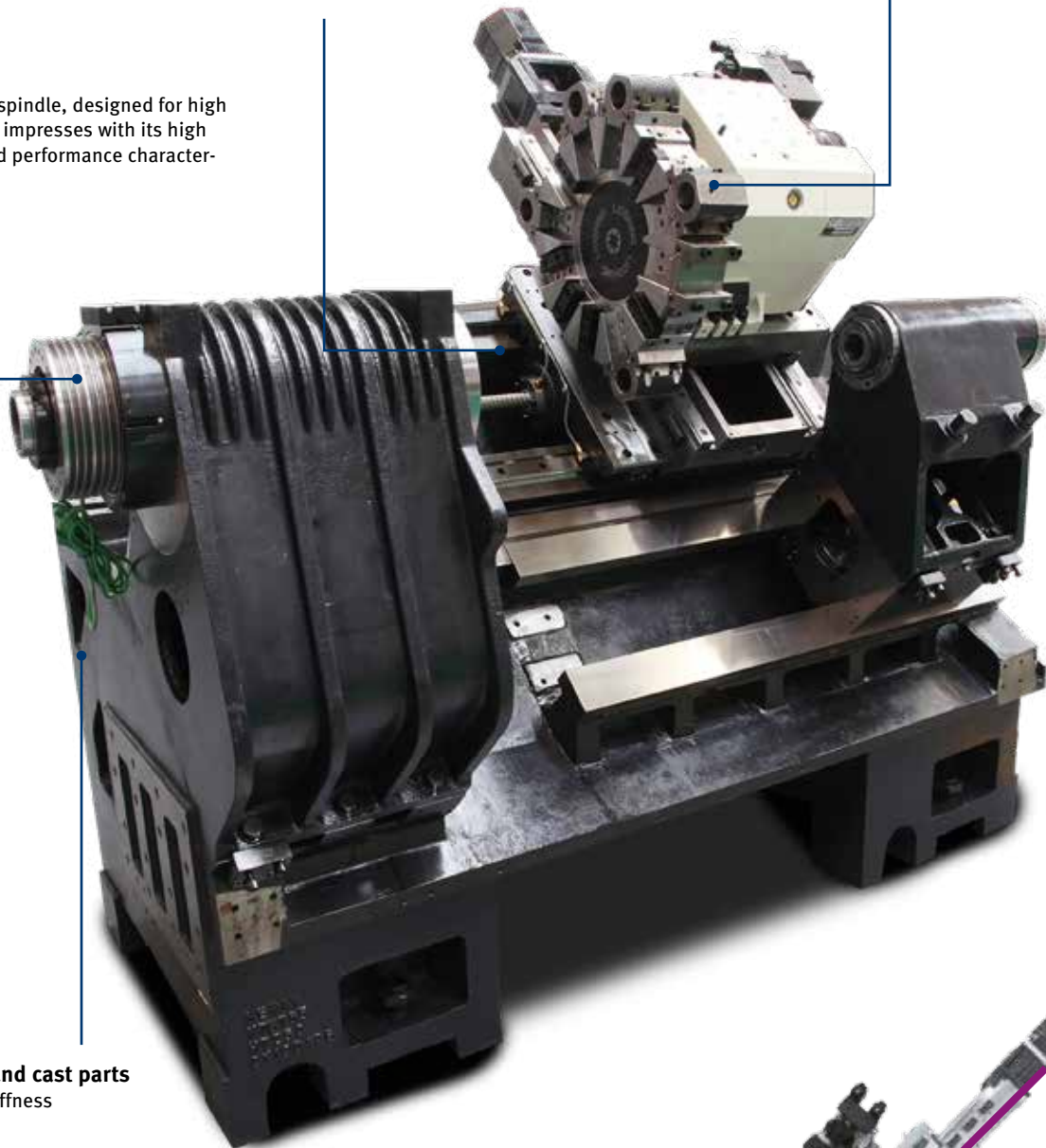
- The main spindle, designed for high precision, impresses with its high torque and performance characteristics

**Components and cast parts**

- Guarantee stiffness

**Machine bed**

- Pronounced ribbing
- 45-degree slope
- Excellent stiffness and durability
- Facilitates chip removal



## LINEAR GUIDE



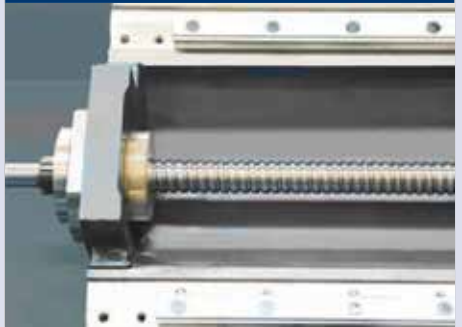
- High precision
- Increases the speed of the movement speed and improve the cutting performance

## TOOL CHANGER



- 12 tool stations
- Servo VDI30

## BALL SCREW SPINDLE



- The ball screw is fixed at both ends and is adjusted so that it runs as parallel as possible to the guideways. The ball screw nuts eliminate the backlash by means of a preload treatment.

## DIRECTLY DRIVEN SERVOMOTOR



- The servomotor is connected directly to the ball screw via the coupling, which significantly improves the positioning accuracy.

## SPINDLE MOTOR



- Spindle is driven by a belt

## MEASURING ARM



- Up to 90 % faster tool measuring
- Typical positioning accuracy of 5  $\mu\text{m}$  2 $\sigma$
- LED displays the probe status and the operational readiness of the arm
- TS12 Interface

## CHIP CONVEYOR



- For the disposal of chips
- rear-mounted

## AIR CONDITIONER



- Cools the control cabinet permanently and constantly to the set temperature.

## CONTROL CABINET



- With SIEMENS servo drive
- Standards-compliant setup
- Wiring with individual wire labelling and enclosed circuit diagram facilitates maintenance work and diagnostics

| ENCODER                                                                                                                                                                   |   |                                              |                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3515180001                                                                                                                                                                | 1 | Heidenhain encoder ERM 2480                  | <ul style="list-style-type: none"><li>• Scanning head for incremental modular encoder with magnetoresistive scanning</li><li>• Mounted directly on the main spindle</li></ul> |
|                                                                                                                                                                           |   |                                              |                                                                                                                                                                               |
| STARTER SET                                                                                                                                                               |   |                                              |                                                                                                                                                                               |
| 3536115                                                                                                                                                                   | 2 | Starter set VDI 30                           | <ul style="list-style-type: none"><li>• Information VDI 30, page 299</li></ul>                                                                                                |
|                                                                                                                                                                           |   |                                              |                                                                                                                                                                               |
| BAR FEEDER                                                                                                                                                                |   |                                              |                                                                                                                                                                               |
| 3511599093*                                                                                                                                                               | 3 | Bar feeder interface                         |                                                                                                                                                                               |
| 3511599101                                                                                                                                                                |   | Fedek GT 326 3 m bar feeder                  | <ul style="list-style-type: none"><li>• Ø 3 - 26 mm / length max. 3000 mm / Incl. bar feeder interface</li></ul>                                                              |
| 3511599102                                                                                                                                                                |   | Fedek DH 65L 1.5 m bar feeder                | <ul style="list-style-type: none"><li>• Ø 5 - 65 mm / length max. 1500 mm / Incl. bar feeder interface</li></ul>                                                              |
| 3511599103                                                                                                                                                                |   | Fedek DH 65 1.25 m bar feeder                | <ul style="list-style-type: none"><li>• Ø 5 - 65 mm / length max. 1250 mm / Incl. bar feeder interface</li></ul>                                                              |
| 3511599104                                                                                                                                                                |   | Fedek SN 551 3.2 m bar feeder                | <ul style="list-style-type: none"><li>• Ø5 - 51 mm / length max. 3200 mm / Incl. bar feeder interface</li></ul>                                                               |
|  For information on bar feeders, and more bar feeders ex warehouse Germany, see page 304 |   |                                              |                                                                                                                                                                               |
|                                                                                                                                                                           |   |                                              |                                                                                                                                                                               |
| CHUCK                                                                                                                                                                     |   |                                              |                                                                                                                                                                               |
| 3515180010                                                                                                                                                                |   | Three-jaw lathechuck Ø 250 mm incl. cylinder | <ul style="list-style-type: none"><li>• Instead of standard equipment › three-jaw lathe chuck hydraulic Ø 200 mm</li></ul>                                                    |
| 3519740                                                                                                                                                                   |   | Soft jaws Ø 200 mm 3 pieces                  | <ul style="list-style-type: none"><li>• for the hydraulic three-jaw lathe chuck Ø 250 mm - included in the standard equipment</li></ul>                                       |
| 3519750                                                                                                                                                                   |   | Hard jaws Ø 200 mm 3 pieces                  | <ul style="list-style-type: none"><li>• for the hydraulic three-jaw lathe chuck Ø 250 mm - included in the standard equipment</li></ul>                                       |
| 3519741                                                                                                                                                                   |   | Soft jaws Ø 250 mm 3 pieces                  | <ul style="list-style-type: none"><li>• for the three-jaw hydraulic lathe chuck Ø 250 mm</li></ul>                                                                            |
| 3519751                                                                                                                                                                   |   | Hard jaws Ø 250 mm 3 pieces                  | <ul style="list-style-type: none"><li>• for the three-jaw hydraulic lathe chuck Ø 250 mm</li></ul>                                                                            |
|                                                                                                                                                                           |   |                                              |                                                                                                                                                                               |
| MISCELLANEOUS                                                                                                                                                             |   |                                              |                                                                                                                                                                               |
| 3511599095                                                                                                                                                                | 4 | Coolant through spindle                      | <ul style="list-style-type: none"><li>• External unit, 20 bar</li></ul>                                                                                                       |
| 3511599094                                                                                                                                                                |   | Coolant through spindle                      | <ul style="list-style-type: none"><li>• External unit, 10 bar</li></ul>                                                                                                       |
| 3511599091                                                                                                                                                                | 5 | Oil Separator                                | <ul style="list-style-type: none"><li>• Longer service life of the cooling lubricants</li></ul>                                                                               |
| 3511599090                                                                                                                                                                | 6 | Part grippers                                |                                                                                                                                                                               |
| 3511599092                                                                                                                                                                |   | Air conditioner                              | <ul style="list-style-type: none"><li>• Instead of the standard equipment › heat exchanger</li></ul>                                                                          |
| 3544200                                                                                                                                                                   |   | Lathe tool set Carbide 25 mm                 | <ul style="list-style-type: none"><li>• 6-part</li><li>• see page 302</li></ul>                                                                                               |
|                                                                                                                                                                           |   |                                              |                                                                                                                                                                               |
| SPINDLE OPTION                                                                                                                                                            |   |                                              |                                                                                                                                                                               |
| 3515180021                                                                                                                                                                |   | Spindle option 1                             | <ul style="list-style-type: none"><li>• Spindle bore Ø 62 mm/ chuck opening Ø 51 mm Holder A 2-6</li></ul>                                                                    |
| 3515180024                                                                                                                                                                |   | Spindle option 2                             | <ul style="list-style-type: none"><li>• Spindle bore Ø 92 mm/ chuck opening Ø 80 mm Holder A 2-8</li></ul>                                                                    |
|                                                                                                                                                                           |   |                                              |                                                                                                                                                                               |
| SOFTWARE                                                                                                                                                                  |   |                                              |                                                                                                                                                                               |
| 3584014                                                                                                                                                                   | 7 | Software DXF Viewer/Reader                   | <ul style="list-style-type: none"><li>• from version 4.7</li></ul>                                                                                                            |



## 1 ENCODER ERM 2480



- Incremental angle encoder with magnetic scanning - scanning head
- Continuous operation at high speeds
- Robust and dirt-resistant
- Pitch accuracy:  $\pm 2.5''$  to  $\pm 72''$

## 2 VDI 30 STARTER SET



- 1) 3 pcs. square transverse holder
- 2) 1 pc. square transverse overhead holder
- 3) 1 pc. square longitudinal holder
- 4) 5 pcs. drill bar holder  $\varnothing 10 / 12 / 16 / 20 / 25$  mm
- 5) 1 pc. tool holder

- 6) 1 pc. square longitudinal holder
- 7) 18-part collet chuck set ER 32
- 8) 1 pc. collet chuck holder ER 25
- 9) 1 piece collet spanner ER 25
- 10) 1 pc. drill chuck
- 11) 3 pcs. sealing caps

## 3 BAR FEEDER DH 65



- The bar feeders are also very reliable and easy to operate, so you can be sure that they will provide years of reliable service.

## 3 BAR FEEDER GT 326



- Convenient parameter setting without programme changes
- The length of the remaining material can be adjusted as required
- Short residual length reduces material waste to a minimum

## 4 COOLANT THROUGH SPINDLE



- Coolant is fed directly into the spindle to control the temperature of the tool and prevent overheating. This keeps the spindle at the optimum operating temperature, which increases precision and service life

## 5 OIL SEPARATOR



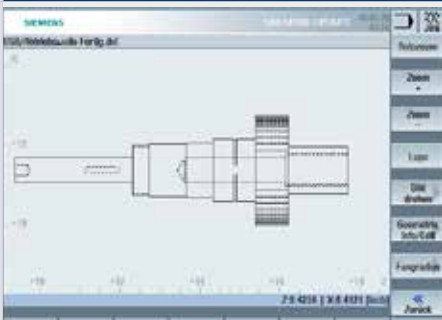
- Oil separator reliably removes floating foreign oils and the finest chip abrasion from cooling lubricants. It ensures that the oil remains clean and reusable or can be disposed of in an environmentally friendly manner

## 6 PARTS CATCHER



- The parts catcher significantly reduces set-up and processing times, as workpieces can be handled more quickly and efficiently
- It reduces the need for manual intervention

## 7 DXF-VIEWER SOFTWARE



- **from version 4.7**  
Imports eDrawings, 3-D objects as well as SolidWorks and AutoCad files in the formats DWG and DXF, EASM and PDM. The tool offers various functions for displaying, simulating and printing the drawings and 3D projects.

# S 600M

**OPTIMUM PREMIUM CNC slant-bed lathe with C axis, that stands out for its high speed, performance, precision and durability**

## **SIEMENS CONTROL SINUMERIK 828D PPU 270**

- Heavy duty version
- Compact design
- Renishaw measuring arm for manual tool measurement
- The entire bed design has many reinforcing ribs that have been optimised through finite element analysis, ensuring high rigidity, better heat dissipation (thermal symmetry) and more precise machining
- Ball screw with improved accuracy, rigidity and heat resistance.
- **SIEMENS** servo motors on all axes
- All servomotors with integrated encoder for maximum precision
- The motor is located on the side of the machine and prevents heat transfer and vibrations caused by the motor.
- Slant bed design 45° for particularly large machining diameter
- Better unobstructed chip flow into the chip tray
- Hydraulic three-jaw lathe chuck Ø 200 mm with soft jaws
- Sauter tool changer VDI 40 with 12 tool positions and driven tool
- Hardened and precision ground ball screws for high rapid traverse speeds in all axes
- Dimensionally stable linear guides ensure a long service thanks to maximum static and dynamic stiffness
- Device for manual tool measuring
- Encoder mounted directly on main spindle for high accuracy
- Tailstock with hydraulic quill
- Heat exchanger
- Portable, electronic handwheel with enabling switch and emergency stop button that significantly facilitates the running-in of programmes
- Chip conveyor, belt type ensures efficient chip discharge
- Working light for complete illumination of the working area
- Coolant device with cleaning gun
- RJ45 , power interface
- Tools Scope of delivery:
  - 2 axial driven tool holders,
  - Driven radial tool holder,
  - 3 pc. B1 tool holder
  - B3 tool holder
  - C1 tool holder
  - Round mount Ø 20 mm
  - Round mount Ø 25 mm
  - Round mount Ø 32 mm
  - ER 32 collet set ( 6 , 8 , 10 , 12 , 16 , 20 mm)
- EMC Electromagnetic compatibility
- Additional package SIEMENS material defect liability and free online/on-site service OSS Plus see page 127
- 1 year maintenance contract Basic included in D/A/CH see page 267





| Model                                  | S 600M                                       |
|----------------------------------------|----------------------------------------------|
| Article no.                            | 3515185                                      |
| <b>Machine data</b>                    |                                              |
| Electrical connection                  | 400 V / 3 Ph ~50 Hz                          |
| Total connected load                   | 40 kVA                                       |
| <b>Spindle</b>                         |                                              |
| Drive motor S1 operation               | 11 kW                                        |
| Torque drive motor S1 operation        | 70 Nm                                        |
| Drive motor S6 30 % operation          | 22 kW                                        |
| Torque drive motor S6 30 % operation   | 140 Nm                                       |
| Spindle seat                           | DIN ISO 702-1 No. 8                          |
| Spindle bore*                          | Ø 86 mm                                      |
| Chuck passage                          | Ø 74 mm                                      |
| Chuck size                             | 250 mm                                       |
| <b>Spindle options of main spindle</b> |                                              |
| <b>Option 1</b>                        | <b>Art no. 3515185021</b>                    |
|                                        | Spindle bore Ø 62 mm                         |
|                                        | Chuck passage Ø51 mm (with Ø 200 mm chuck)   |
|                                        | Spindle seat A 2-6                           |
|                                        | Rotational speeds 30 - 5000 rpm              |
| <b>Option 2</b>                        | <b>Art. No. 3515185025</b>                   |
|                                        | Spindle bore Ø 102 mm                        |
|                                        | Chuck passage Ø 90 mm (with Ø 300 mm chuck)  |
|                                        | Spindle seat A 2-8                           |
|                                        | Rotational speeds 30 - 3 000 rpm             |
| <b>Option 3</b>                        | <b>Art. No. 3515185026</b>                   |
|                                        | Spindle bore Ø 116 mm                        |
|                                        | Chuck passage Ø 105 mm (with Ø 300 mm chuck) |
|                                        | Spindle seat A 2-8                           |
|                                        | Rotational speeds 30 - 2 500 rpm             |

|                                                      |                        |
|------------------------------------------------------|------------------------|
| <b>Cooling lubricant system</b>                      |                        |
| Coolant pump output                                  | 0.55 kW                |
| Tank capacity                                        | 350 litres             |
| <b>Hydraulic system</b>                              |                        |
| Output of hydraulic pump                             | 2.2 kW                 |
| Tank capacity                                        | 36 litres              |
| <b>Machine data</b>                                  |                        |
| Turning diameter                                     | 320 mm                 |
| Turning length                                       | 475 mm                 |
| Swing Ø above cross slide                            | 400 mm                 |
| Swing Ø above machine bed                            | 570 mm                 |
| Slant bed                                            | 45°                    |
| <b>Speed range</b>                                   |                        |
| Spindle speeds*                                      | 30 - 3 500 rpm         |
| <b>Sauter tool changer with driven tools DIN5480</b> |                        |
| Type                                                 | Servo VDI 40 - DIN5480 |
| Number of tool stations                              | 12                     |
| Rotational speeds                                    | max. 6000 rpm          |
| Output                                               | 4.82 kW                |
| Torque                                               | 20 Nm                  |
| <b>Accuracy</b>                                      |                        |
| Positioning accuracy                                 | ± 0.002 mm             |
| Repeat accuracy                                      | ± 0.004 mm             |
| C-axis accuracy                                      | 51''                   |
| C axis repeat accuracy                               | 20''                   |
| <b>Travel</b>                                        |                        |
| X axis                                               | 235 mm                 |
| Z axis                                               | 530 mm                 |
| <b>Rapid traverse</b>                                |                        |
| X axis                                               | 24 m/min.              |
| Z axis                                               | 30 m/min.              |
| <b>Motor torque</b>                                  |                        |
| X axis/Y axis                                        | 11 Nm                  |
| <b>Feed forces</b>                                   |                        |
| X axis/Y axis                                        | 8.4 kN / 5.6 kN        |
| <b>Tailstock</b>                                     |                        |
| Shank                                                | MT 5                   |
| Spindle sleeve diameter                              | 100 mm                 |
| Spindle sleeve stroke, hydraulic                     | 100 mm                 |
| <b>Dimensions</b>                                    |                        |
| Length x width x height                              | 4570 x 1845 x 1955 mm  |
| Overall weight                                       | 4200 kg                |

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**3 ms** Block change time  
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**128** tools

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- Managing network drives
- 3-D simulation
- Simultaneous recording

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24 months; Article no. 3589021  
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#### Linear guide

- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement

#### Tool turret

- VDI 30 Servo tool changer
- All 12 stations are driven by an integrated motor designed for speeds of up to 6000 rpm .

#### Spindle

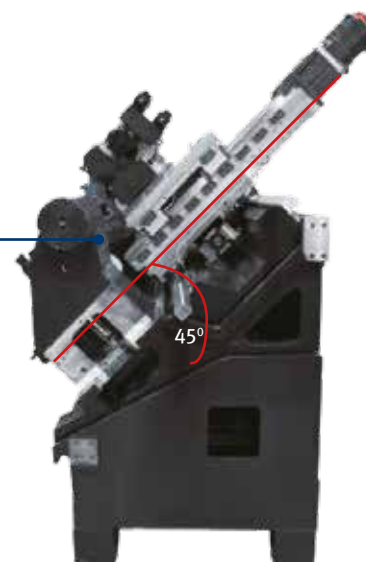
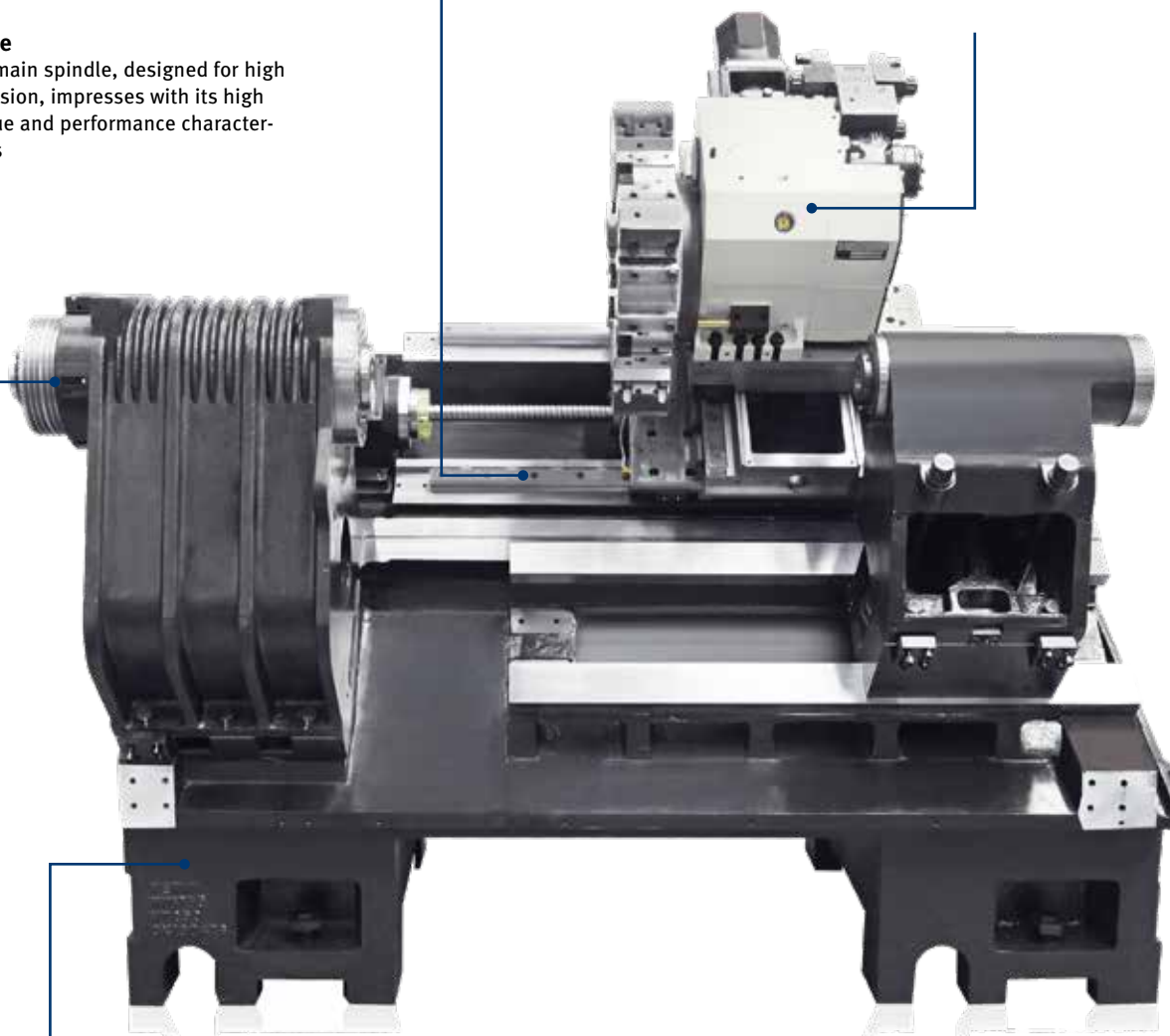
- The main spindle, designed for high precision, impresses with its high torque and performance characteristics

#### Components and cast parts

- Guarantee stiffness

#### Machine bed

- Pronounced ribbing
- 45-degree slope
- Excellent stiffness and durability
- Facilitates chip removal





## LINEAR GUIDE AND BALL SCREW



- High precision
- Increases the speed of the movement speed and improve the cutting performance

## TAILSTOCK



- with hydraulic quill

## SAUTER TURRET HEAD WITH DRIVEN TOOL



- Equipped with a high-performance turret head with milling and drilling function.

## TWO C-AXIS INDEX POSITIONING FUNCTION



- C-axis and driven turret can perform multiple functions such as turning, milling, drilling and tapping with high efficiency and precision

## MEASURING ARM



- Up to 90 % faster tool measuring
- Typical positioning accuracy of 5 µm 2σ
- LED displays the probe status and the operational readiness of the arm
- TS12 Interface

## CENTRAL LUBRICATION



- Prevents wear, repair costs and unnecessary downtime to a considerable extent

## AIR CONDITIONER



- Cools the control cabinet permanently and constantly to the set temperature.

## CHIP CONVEYOR



- For the disposal of chips
- rear-mounted

## HYDRAULIC UNIT



- Cools the control cabinet permanently and constantly to the set temperature.

## CONTROL CABINET



- With SIEMENS servo drive
- Standards-compliant setup
- Wiring with individual wire labelling and enclosed circuit diagram facilitates maintenance work and diagnostics



| STARTER SET                                                                               |   |                                                            |                                                                            |
|-------------------------------------------------------------------------------------------|---|------------------------------------------------------------|----------------------------------------------------------------------------|
| 3536116                                                                                   | 1 | Starter set VDI 40                                         | • Information VDI 40, see page 309                                         |
| BAR FEEDER                                                                                |   |                                                            |                                                                            |
| 3511599093*                                                                               |   | Bar feeder interface                                       |                                                                            |
| 3511599101                                                                                |   | Fedek GT 326 3 m bar feeder                                | • Ø 3 - 26 mm / length max. 3000 mm / Incl. bar feeder interface           |
| 3511599102                                                                                | 2 | Fedek DH 65L 1.5 m bar feeder                              | • Ø 5 - 65 mm / length max. 1500 mm / Incl. bar feeder interface           |
| 3511599103                                                                                |   | Fedek DH 65 1.25 m bar feeder                              | • Ø 5 - 65 mm / length max. 1250 mm / Incl. bar feeder interface           |
| 3511599104                                                                                |   | Fedek SN 551 3.2 m bar feeder                              | • Ø 5 - 51 mm / length max. 3200 mm / Incl. bar feeder interface           |
| ➡ For information on bar feeders, and more bar feeders ex warehouse Germany, see page 304 |   |                                                            |                                                                            |
| CHUCK                                                                                     |   |                                                            |                                                                            |
| 3519740                                                                                   |   | Soft jaws 200 mm 3 pieces                                  | • for standard equipment › Three-jaw hydraulic lathe chuck Ø 200 mm        |
| 3519750                                                                                   |   | Hard jaws 200 mm 3 pieces                                  | • for standard equipment › Three-jaw hydraulic lathe chuck Ø 200 mm        |
| 3515185010                                                                                |   | Three-jaw lathe chuck Ø 250 mm incl. cylinder              | • Instead of standard equipment › three-jaw lathe chuck hydraulic Ø 200 mm |
| 3519741                                                                                   |   | Soft jaws 250 mm 3 pieces                                  | • for the three-jaw hydraulic lathe chuck Ø 250 mm                         |
| 3519751                                                                                   |   | Hard jaws 250 mm 3 pieces                                  | • for the three-jaw hydraulic lathe chuck Ø 250 mm                         |
| 3515195011                                                                                |   | Hydraulic four-jaw lathe chuck Ø 200 mm including cylinder | • Instead of standard equipment › three-jaw lathe chuck hydraulic Ø 200 mm |
| 3519743                                                                                   |   | Soft jaws Ø 200 mm 4 pieces                                | • for the four-jaw hydraulic lathe chuck Ø 250 mm                          |
| 3519753                                                                                   |   | Hard jaws Ø 200 mm 4 pieces                                | • for the four-jaw hydraulic lathe chuck Ø 250 mm                          |
| 3515195012                                                                                |   | Hydraulic four-jaw lathe chuck Ø 250 mm including cylinder | • Instead of standard equipment › three-jaw lathe chuck hydraulic Ø 200 mm |
| 3519744                                                                                   |   | Soft jaws Ø 250 mm 4 pieces                                | • for the four-jaw hydraulic lathe chuck Ø 250 mm                          |
| 3519754                                                                                   |   | Hard jaws Ø 250 mm 4 pieces                                | • for the four-jaw hydraulic lathe chuck Ø 250 mm                          |
| MISCELLANEOUS                                                                             |   |                                                            |                                                                            |
| 3511599095                                                                                | 3 | Coolant through spindle                                    | • External unit, 20 bar                                                    |
| 3511599094                                                                                |   | Coolant through spindle                                    | • External unit, 10 bar                                                    |
| 3511599091                                                                                | 4 | Oil Separator                                              | • Longer service life of the cooling lubricants                            |
| 3511599090                                                                                | 5 | Part grippers                                              |                                                                            |
| 3511599110                                                                                |   | Tool holder VDI40 axially driven                           | • DIN5480                                                                  |
| 3511599111                                                                                |   | Tool holder VDI40 radially driven                          | • DIN5480                                                                  |
| 3511599112                                                                                |   | VDI40 tool holder, radially recessed                       | • DIN5480                                                                  |
| 3544200                                                                                   |   | Lathe tool set Carbide 25 mm                               | • 6-part<br>• see page 302                                                 |
| SPINDLE OPTION                                                                            |   |                                                            |                                                                            |
| 3515185021                                                                                |   | Spindle option 1                                           | • Spindle bore Ø 62 mm/ chuck opening Ø 51 mm Holder A 2-6                 |
| 3515185025                                                                                |   | Spindle option 2                                           | • Spindle bore Ø 102 mm/ chuck opening Ø 90 mm Holder A 2-8                |
| 3515185026                                                                                |   | Spindle option 3                                           | • Spindle bore Ø 116 mm/ chuck opening Ø 105 mm Holder A 2-8               |
| SOFTWARE                                                                                  |   |                                                            |                                                                            |
| 3584030                                                                                   | 6 | Groove pushing                                             | • Information can be found on the page 330                                 |
| 3584014                                                                                   | 7 | Software DXF Viewer/Reader                                 | • from version 4.7                                                         |

## 4 OIL SEPARATOR



- Oil separator reliably removes floating foreign oils and the finest chip abrasion from cooling lubricants. It ensures that the oil remains clean and reusable or can be disposed of in an environmentally friendly manner

## 1 VDI 40 STARTER SET



- 1) 3 pcs. square transverse holder
- 2) 1 pc. square transverse overhead holder
- 3) 1 pc. square longitudinal holder
- 4) 5 pcs. drill bar holder Ø 10 / 12 / 16 / 20 / 25 mm
- 5) 1 pc. tool holder

- 6) 1 pc. square longitudinal holder
- 7) 18-part collet chuck set ER 32
- 8) 1 pc. collet chuck holder ER 25
- 9) 1 piece collet spanner ER 25
- 10) 1 pc. drill chuck
- 11) 3 pcs. sealing caps

## 2 BAR FEEDER DH 65



- The bar feeders are also very reliable and easy to operate, so you can be sure that they will provide years of reliable service.

## 2 BAR FEEDER GT 326



- Convenient parameter setting without programme changes
- The length of the remaining material can be adjusted as required
- Short residual length reduces material waste to a minimum

## 4 COOLANT THROUGH SPINDLE



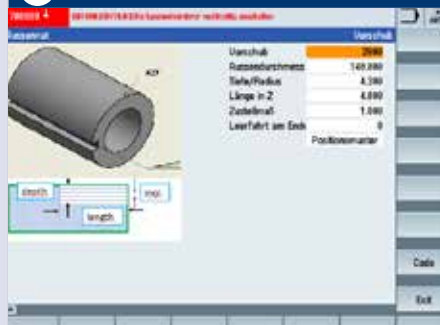
- Coolant is fed directly into the spindle to control the temperature of the tool and prevent overheating. This keeps the spindle at the optimum operating temperature, which increases precision and service life

## 5 PARTS CATCHER



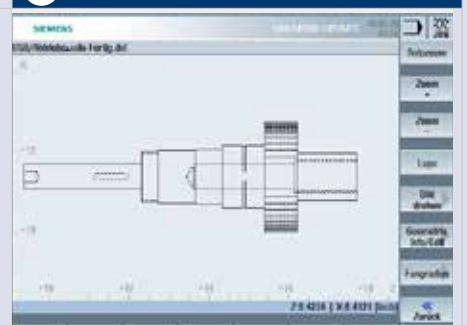
- The parts catcher significantly reduces set-up and processing times, as workpieces can be handled more quickly and efficiently
- It reduces the need for manual intervention

## 6 BROACHING



- Special processes such as broaching or grooving are generally used to produce internal and external profiles. Groove pushing can also be carried out economically on CNC lathes without special units.

## 7 DXF-VIEWER SOFTWARE



- **from version 4.7**  
Imports eDrawings, 3-D objects as well as SolidWorks and AutoCad files in the formats DWG and DXF, EASM and PDM. The tool offers various functions for displaying, simulating and printing the drawings and 3D projects.

# S 600MY

**OPTIMUM PREMIUM CNC slant-bed lathe with Y axis and C axis, that stands out for its high speed, performance, precision and durability**

**SIEMENS CONTROL SINUMERIK 828D PPU 270**

- Heavy duty version
- Compact design
- Renishaw measuring arm for manual tool measurement
- Directly mounted main spindle encoder for higher accuracy
- Ball screw with improved accuracy, rigidity and heat resistance.
- **SIEMENS** servo motors on all axes
- All servomotors with integrated encoder for maximum precision
- The motor is located on the side of the machine and prevents heat transfer and vibrations caused by the motor.
- Slant bed design 30° for particularly large machining diameter
- Better unobstructed chip flow into the chip tray
- Hydraulic three-jaw lathe chuck Ø 170 mm with soft jaws
- Hardened and precision ground ball screws for high rapid traverse speeds in all axes
- Dimensionally stable linear guides ensure a long service thanks to maximum static and dynamic stiffness
- Device for manual tool measuring
- Servo tailstock for optimised machining
- Heat exchanger
- Portable, electronic handwheel with enabling switch and emergency-stop pushbutton, makes it much easier to run in programmes.
- Chip conveyor, belt type ensures efficient chip discharge
- Working light for complete illumination of the working area
- Coolant device with cleaning gun
- RJ45 , power interface
- Tools Scope of delivery:
  - Driven axial tool holder
  - 2 pieces driven radial tool holders
  - 3 pieces drilling tool holder
  - 5 pieces OD-tool holder
  - Face tool holder
  - Round mount Ø 20 mm
  - Round mount Ø 25 mm
  - Round mount Ø 32 mm
- EMC Electromagnetic compatibility
- Additional package SIEMENS material defect liability and free online/on-site service OSS Plus see page 135
- 1 year maintenance contract Basic included in D/A/CH see page 267



## TECHNICAL DATA

| Model                                  | S 600MY                       |
|----------------------------------------|-------------------------------|
| Article no.                            | 3515186                       |
| <b>Machine data</b>                    |                               |
| Electrical connection                  | 400 V / 3 Ph ~50 Hz           |
| Total connected load                   | 45 kVA                        |
| <b>Spindle</b>                         |                               |
| Drive motor S1 operation               | 11 kW                         |
| Torque drive motor S1 operation        | 105 Nm                        |
| Drive motor S6 30 % operation          | 14.3 kW                       |
| Torque drive motor S6 30 % operation   | 136 Nm                        |
| Spindle seat                           | DIN ISO 702-1 No. 6           |
| Spindle bore*                          | Ø 56 mm                       |
| Chuck passage                          | Ø 44 mm                       |
| Chuck size                             | 170 mm                        |
| <b>Spindle options of main spindle</b> |                               |
| <b>Art no. 3515186027</b>              |                               |
| Spindle bore                           | Ø 92 mm                       |
| Chuck passage                          | Ø 80 mm (with Ø 250 mm chuck) |
| Spindle seat                           | A 2-8                         |
| Rotational speeds                      | 30 - 3000 rpm                 |

Option 1

|                                               |                        |
|-----------------------------------------------|------------------------|
| <b>Cooling lubricant system</b>               |                        |
| Coolant pump output                           | 0.55 kW                |
| Tank capacity                                 | 350 litres             |
| <b>Hydraulic system</b>                       |                        |
| Output of hydraulic pump                      | 2.2 kW                 |
| Tank capacity                                 | 36 litres              |
| <b>Machine data</b>                           |                        |
| Turning diameter                              | 300 mm                 |
| Turning length                                | 550 mm                 |
| Swing Ø above cross slide                     | 410 mm                 |
| Swing Ø above machine bed                     | 620 mm                 |
| Slant bed                                     | 30°                    |
| <b>Speed range</b>                            |                        |
| Spindle speeds*                               | 30 - 4 000 rpm         |
| <b>Tool changer</b>                           |                        |
| Type                                          | Servo BMT 55 - DIN1809 |
| Number of tool stations                       | 12                     |
| Rotational speeds                             | max. 4000 rpm          |
| Output                                        | 2.8 kW                 |
| Torque                                        | 12 Nm                  |
| <b>Accuracy</b>                               |                        |
| Positioning accuracy X axis / Y axis / Z axis | ± 0.008 mm             |
| Repeat accuracy X axis / Y axis / Z axis      | ± 0.004 mm             |
| C-axis accuracy                               | 51''                   |
| C axis repeat accuracy                        | 20''                   |
| <b>Travel</b>                                 |                        |
| X axis                                        | 210 mm                 |
| Y axis                                        | ± 52.5 mm              |
| Z axis                                        | 600 mm                 |
| Z2 axis                                       | 550 mm                 |
| <b>Rapid traverse</b>                         |                        |
| X axis                                        | 30 m/min.              |
| Y axis                                        | 10 m/min.              |
| Z axis                                        | 30 m/min.              |
| <b>Motor torque</b>                           |                        |
| X axis / Y axis / Z axis                      | 11 Nm                  |
| <b>Feed forces</b>                            |                        |
| X axis dynamic                                | 6.7 kN                 |
| Y axis dynamic                                | 8.4 kN                 |
| Z axis dynamic                                | 6.7 kN                 |
| <b>Tailstock</b>                              |                        |
| Shank                                         | MT 4                   |
| Travel                                        | 550 mm                 |
| Rapid traverse                                | 10 m/min.              |
| Traverse path with servo                      | 550 mm                 |
| <b>Dimensions</b>                             |                        |
| Length x width x height                       | 4105 x 1970 x 1955 mm  |
| Overall weight                                | 4200 kg                |



# SINUMERIK 828D PPU271.5

COMPACT REVOLUTION

DIGITALLY TRANSFORMED, INNOVATIVELY DESIGNED, ENHANCED PERFORMANCE



**PPU.5 CPU power Upgrade**  
**>40 %**

Comprehensive improvement  
⇒ Programme buffer and processing time  
⇒ Simulation efficiency  
⇒ HMI switch-over time

**SINUMERIK OPERATE**  
identical to the latest  
**SINUMERIK ONE** control

## DIGITAL TWIN:

Create / Run MyVirtual Machine now available for 828D

- Minimise the set-up and run-in time on the real machine.
- Precise simulation reduces the risk of collision and accelerates part programme optimisation.

## HIGHER PERFORMANCE:

CPU performance improved by >40 %  
40 % shorter programme buffer and processing time  
25 % higher simulation efficiency  
50 % faster HMI switch-over time

- Improved efficiency, shorter waiting times and smooth operation

## MODERN PANEL DESIGN:

Innovative 16:10-inch panel with modern design  
SINUMERIK 828D MCP with laser-engraved characters, mechanical keys, service life of override keys increased by 400 %

- Clearer display and improved user-friendliness
- Excellent haptics and wear-resistant buttons, greater robustness and longer service life

## SUSTAINABILITY & SAFETY:

New Ctrl-E Advanced Analysis function  
Maintenance-free (without fan, without battery)  
Safety functions: Security archive, user administration

- Simple transparency of energy consumption
- Protection of customer know-how against manipulation and piracy

## SIEMENS SAFETY INTEGRATED

SET UP WORK WITH OPEN DOORS

**Functional safety also provides protection against high costs!**

Machine and plant safety is not only important because strict regulations must be observed. When everything runs safely, you benefit from time savings in engineering, higher system availability and more investment security.

## CONTROL

- 12.1" colour display
- 4:3 format
- User-friendly SINUMERIK Operate software

## SYSTEM SOFTWARE

- **PPU 271 SW 24**  
**3 MB** CNC memory  
**3 ms** Block change time  
**50** Look Ahead  
**128** tools

## OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- Shopturn work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording

## ADDITIONAL PACKAGE SIEMENS OSS PLUS

12 months; Article no. 3589020  
24 months; Article no. 3589021  
36 months; Article no. 3589022

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal - Siemens WW

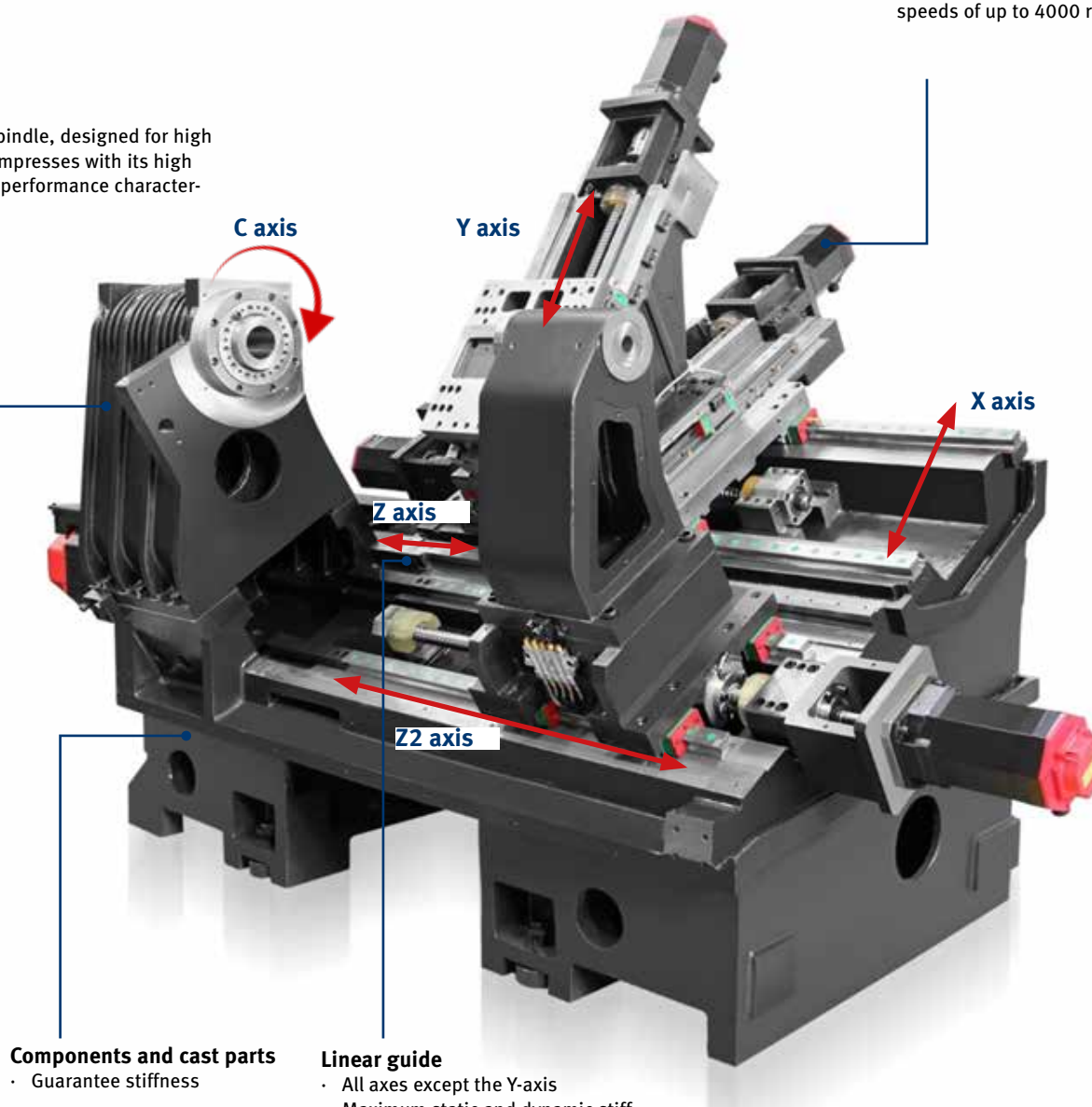


### Spindle

- The main spindle, designed for high precision, impresses with its high torque and performance characteristics

### Tool turret

- Hydraulic tool turret BMT 55
- All 12 stations are driven by an integrated motor designed for speeds of up to 4000 rpm .



### Components and cast parts

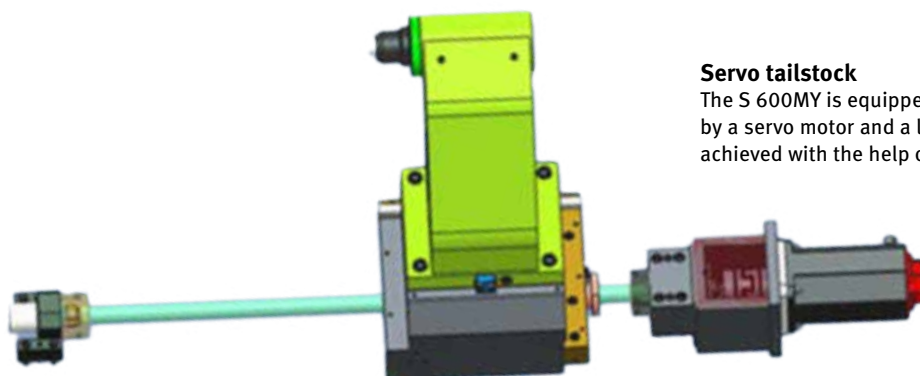
- Guarantee stiffness

### Linear guide

- All axes except the Y-axis
- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement
- Y-axis with box guide

### Servo tailstock

The S 600MY is equipped with a servo tailstock, which is driven by a servo motor and a lead screw. High positioning accuracy is achieved with the help of the linear guide



## LINEAR GUIDE AND BALL SCREW



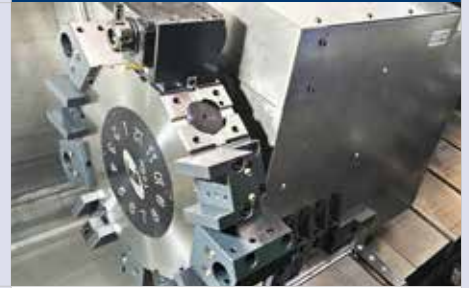
- High precision
- Increases the speed of the movement speed and improve the cutting performance

## TAILSTOCK



- with hydraulic quill

## TURRET HEAD WITH DRIVEN TOOL



- Equipped with a high-performance turret head with milling and drilling function.

## TWO C-AXIS INDEX POSITIONING FUNCTION



- C-axis and driven turret can perform multiple functions such as turning, milling, drilling and tapping with high efficiency and precision

## MEASURING ARM



- Up to 90 % faster tool measuring
- Typical positioning accuracy of 5  $\mu\text{m}$  2 $\sigma$
- LED displays the probe status and the operational readiness of the arm
- TS12 Interface

## CENTRAL LUBRICATION



- Prevents wear, repair costs and unnecessary downtime to a considerable extent

## AIR CONDITIONER



- Cools the control cabinet permanently and constantly to the set temperature.

## CONTROL CABINET



- With SIEMENS servo drive
- Standards-compliant setup
- Wiring with individual wire labelling and enclosed circuit diagram facilitates maintenance work and diagnostics

## CHIP CONVEYOR



- For the disposal of chips
- rear-mounted

## HYDRAULIC UNIT



- Cools the control cabinet permanently and constantly to the set temperature.

| STARTER SET                                                                               |   |                                 |                                                                     |
|-------------------------------------------------------------------------------------------|---|---------------------------------|---------------------------------------------------------------------|
| 3519602                                                                                   | 1 | Starter set BMT 55              | For information see page page 301                                   |
|                                                                                           |   |                                 |                                                                     |
| BAR FEEDER                                                                                |   |                                 |                                                                     |
| 3511599093*                                                                               |   | Bar feeder interface            |                                                                     |
| 3511599101                                                                                | 2 | Fedek GT 326 3 m bar feeder     | · Ø 3 - 26 mm / length max. 3000 mm / Incl. bar feeder interface    |
| 3511599102                                                                                |   | Fedek DH 65L 1.5 m bar feeder   | · Ø 5 - 65 mm / length max. 1500 mm / Incl. bar feeder interface    |
| 3511599103                                                                                |   | Fedek DH 65 1.25 m bar feeder   | · Ø 5 - 65 mm / length max. 1250 mm / Incl. bar feeder interface    |
| 3511599104                                                                                |   | Fedek SN 551 3.2 m bar feeder   | · Ø 5 - 51 mm / length max. 3200 mm / Incl. bar feeder interface    |
| ➡ For information on bar feeders, and more bar feeders ex warehouse Germany, see page 304 |   |                                 |                                                                     |
|                                                                                           |   |                                 |                                                                     |
| CHUCK                                                                                     |   |                                 |                                                                     |
| 3519745                                                                                   |   | Soft jaws Ø 200 mm 3 pieces     | · for standard equipment › Three-jaw hydraulic lathe chuck Ø 200 mm |
| 3519755                                                                                   |   | Hard jaws Ø 200 mm 3 pieces     | · for standard equipment › Three-jaw hydraulic lathe chuck Ø 200 mm |
| 3519742                                                                                   |   | Soft jaws Ø 250 mm 3 pieces     | · for spindle option 2 › Three-jaw hydraulic lathe chuck Ø 250 mm   |
| 3519752                                                                                   |   | Hard jaws Ø 250 mm 3 pieces     | · for spindle option 2 › Three-jaw hydraulic lathe chuck Ø 250 mm   |
|                                                                                           |   |                                 |                                                                     |
| MISCELLANEOUS                                                                             |   |                                 |                                                                     |
| 3511599094                                                                                | 3 | Coolant through spindle         | · External unit, 10 bar                                             |
| 3511599095                                                                                |   | Coolant through spindle         | · External unit, 20 bar                                             |
| 3511599091                                                                                | 4 | Oil Separator                   | · Longer service life of the cooling lubricants                     |
| 3511599092                                                                                | 5 | Air conditioner                 | · Instead of the standard equipment › heat exchanger                |
| 3511599090                                                                                | 6 | Part grippers                   |                                                                     |
| 3544200                                                                                   |   | Lathe tool set<br>Carbide 25 mm | · 6-part<br>· see page 302                                          |
|                                                                                           |   |                                 |                                                                     |
| SPINDLE OPTION                                                                            |   |                                 |                                                                     |
| 3515186027                                                                                |   | Spindle option 1                | · Spindle bore Ø 92 mm/ chuck opening Ø 80 mm Holder A 2-8          |
|                                                                                           |   |                                 |                                                                     |
| SOFTWARE                                                                                  |   |                                 |                                                                     |
| 3584030                                                                                   | 7 | Groove pushing                  | · Information can be found on the page 330                          |
| 3584014                                                                                   | 8 | Software DXF Viewer/Reader      | · from version 4.7                                                  |



## 1 BMT 55 STARTER SET



- 4 x tool holder U25T55X65
- 2 x tool holder UAD20T55x84
- Tool holder B40T55X40
- Tool holder BN20T55X95
- Tool holder BN25T55X95
- Tool holder BN32T55X95
- Adapter VDI 30/BMT 55

## 2 BAR FEEDER GT 326



- Convenient parameter setting without programme changes
- The length of the remaining material can be adjusted as required
- Short residual length reduces material waste to a minimum

## 3 COOLANT THROUGH SPINDLE



- Coolant is fed directly into the spindle to control the temperature of the tool and prevent overheating. This keeps the spindle at the optimum operating temperature, which increases precision and service life

## 4 OIL SEPARATOR



- Oil separator reliably removes floating foreign oils and the finest chip abrasion from cooling lubricants. It ensures that the oil remains clean and reusable or can be disposed of in an environmentally friendly manner

## 5 AIR CONDITIONING



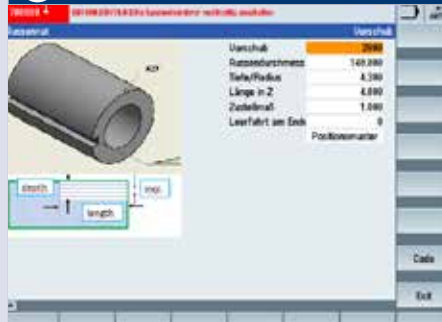
- Instead of heat exchanger
- The air conditioner permanently and constantly cools the control cabinet to the set temperature.

## 6 PARTS CATCHER



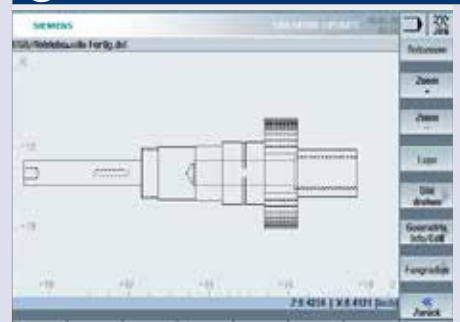
- The parts catcher significantly reduces set-up and processing times, as workpieces can be handled more quickly and efficiently
- It reduces the need for manual intervention

## 7 BROACHING



- Special processes such as broaching or grooving are generally used to produce internal and external profiles. Groove pushing can also be carried out economically on CNC lathes without special units.

## 8 DXF-VIEWER SOFTWARE



- **from version 4.7**  
Imports eDrawings, 3-D objects as well as SolidWorks and AutoCad files in the formats DWG and DXF, EASM and PDM. The tool offers various functions for displaying, simulating and printing the drawings and 3D projects.



**New**

# S 600MSY

**OPTIMUM PREMIUM CNC slant-bed lathe with counter spindle and Y/C axis, characterised by high speed, performance, precision and service life**

**SIEMENS CONTROL SINUMERIK 828D PPU 270**

- Heavy duty version
- Compact design
- Renishaw measuring arm for manual tool measurement
- Directly mounted main spindle encoder for higher accuracy
- Ball screw with improved accuracy, rigidity and heat resistance.
- **SIEMENS** servo motors on all axes
- All servomotors with integrated encoder for maximum precision
- The motor is located on the side of the machine and prevents heat transfer and vibrations caused by the motor.
- Slant bed design 30° for particularly large machining diameter
- Better unobstructed chip flow into the chip tray
- Hydraulic three-jaw lathe chuck Ø 250 mm for the main spindle and Ø 150 mm for the counter spindle
- Hardened and precision ground ball screws for high rapid traverse speeds in all axes
- Dimensionally stable linear guides ensure a long service thanks to maximum static and dynamic stiffness
- Device for manual tool measuring
- Heat exchanger
- Portable, electronic handwheel with enabling switch and emergency-stop pushbutton, makes it much easier to run in programmes.
- Chip conveyor, belt type ensures efficient chip discharge
- Working light for complete illumination of the working area
- Coolant device with cleaning gun
- RJ45 , power interface
- Tools Scope of delivery:
  - Driven axial tool holder
  - 2 pieces driven radial tool holders
  - 3 pieces drilling tool holder
  - 5 pieces OD-tool holder
  - Face tool holder
  - Round mount Ø 20 mm
  - Round mount Ø 25 mm
  - Round mount Ø 32 mm
- EMC Electromagnetic compatibility
- Additional package SIEMENS material defect liability and free online/on-site service OSS Plus see „Additional package SIEMENS OSS Plus“ on page 143
- 1 year maintenance contract Basic included in D/A/CH see page 267



## TECHNICAL DATA

| Model                                  | S 600MSY                                    |
|----------------------------------------|---------------------------------------------|
| Article no.                            | 3515187                                     |
| <b>Machine data</b>                    |                                             |
| Electrical connection                  | 400 V / 3 Ph ~50 Hz                         |
| Total connected load                   | 45 kVA                                      |
| <b>Spindle</b>                         |                                             |
| Drive motor S1 operation               | 15 kW                                       |
| Torque drive motor S1 operation        | 268 Nm                                      |
| Drive motor S6 30 % operation          | 19.5 kW                                     |
| Torque drive motor S6 30 % operation   | 349 Nm                                      |
| Spindle seat                           | DIN ISO 702-1 No. 6                         |
| Spindle bore*                          | Ø 86 mm                                     |
| Chuck passage                          | Ø 74 mm                                     |
| Chuck size                             | Ø 250 mm                                    |
| <b>Counter spindle</b>                 |                                             |
| Drive motor S1 operation               | 5.5 kW                                      |
| Torque drive motor S1 operation        | 43 Nm                                       |
| Drive motor S6 30 % operation          | 7.5 kW                                      |
| Torque drive motor S6 30 % operation   | 79 Nm                                       |
| Spindle seat                           | DIN ISO 702-1 No. 5                         |
| Chuck passage                          | Ø 44 mm                                     |
| Chuck size                             | Ø 150 mm                                    |
| <b>Spindle options of main spindle</b> |                                             |
| Option 1                               | <b>Art no. 3515187021</b>                   |
|                                        | Spindle bore Ø 62 mm                        |
|                                        | Chuck passage Ø51 mm (with Ø 200 mm chuck)  |
|                                        | Spindle seat A 2-6                          |
|                                        | Rotational speeds 30 - 5000 rpm             |
| Option 2                               | <b>Art. No. 3515187025</b>                  |
|                                        | Spindle bore Ø 102 mm                       |
|                                        | Chuck passage Ø 90 mm (with Ø 300 mm chuck) |
|                                        | Spindle seat A 2-8                          |
|                                        | Rotational speeds 30 - 3 000 rpm            |
| Option 3                               | <b>Art. No. 3515187026</b>                  |
|                                        | Spindle bore Ø 116 mm                       |
|                                        | Chuck passage Ø105 mm (with Ø 250 mm chuck) |
|                                        | Spindle seat A 2-8                          |
|                                        | Rotational speeds 30 - 2 500 rpm            |

|                                 |                         |
|---------------------------------|-------------------------|
| <b>Cooling lubricant system</b> |                         |
| Coolant pump output             | 700 W                   |
| Tank capacity                   | 240 litres              |
| <b>Hydraulic system</b>         |                         |
| Output of hydraulic pump        | 2.2 kW                  |
| Tank capacity                   | 36 litres               |
| <b>Machine data</b>             |                         |
| Turning diameter                | 300 mm                  |
| Turning length                  | 600 mm                  |
| Swing Ø above cross slide       | 480 mm                  |
| Swing Ø above machine bed       | 660 mm                  |
| Slant bed                       | 30°                     |
| <b>Speed range</b>              |                         |
| Spindle speeds*                 | 30 -3500 rpm            |
| <b>Tool changer</b>             |                         |
| Type                            | BMT 55                  |
| Number of tool stations         | 12                      |
| Rotational speeds               | 4000                    |
| Output                          | 4.8 kW                  |
| Torque                          | 20 Nm                   |
| <b>Accuracy</b>                 |                         |
| X/Z axis repeat accuracy        | ± 0.002 mm              |
| Y axis repeat accuracy          | ± 0.003 mm              |
| X/Z axis repeat accuracy        | ± 0.004 mm              |
| Y axis positioning accuracy     | ± 0.005 mm              |
| C-axis accuracy                 | 51''                    |
| C axis repeat accuracy          | 20''                    |
| <b>Travel</b>                   |                         |
| X axis                          | 220 mm                  |
| Y axis                          | ± 50 mm                 |
| Z axis                          | 700 mm                  |
| Z2 axis                         | 600 mm                  |
| <b>Rapid traverse</b>           |                         |
| X axis                          | 24 m/min.               |
| Y axis                          | 10 m/min.               |
| Z axis                          | 30 mm                   |
| Z2 axis                         | 30 mm                   |
| <b>Motor torque</b>             |                         |
| X axis/Y axis                   | 11 Nm                   |
| Y axis                          | 12 Nm                   |
| <b>Feed forces</b>              |                         |
| X axis / Y axis / Z axis        | 8.4 kN / 18 kN / 6.7 kN |
| <b>Dimensions</b>               |                         |
| Length x width x height         | 4490 x 1880 x 1900 mm   |
| Overall weight                  | 4500 kg                 |

# SINUMERIK 828D PPU271.5

COMPACT REVOLUTION

DIGITALLY TRANSFORMED, INNOVATIVELY DESIGNED, ENHANCED PERFORMANCE



**PPU.5 CPU power Upgrade**  
**>40 %**

Comprehensive improvement  
⇒ Programme buffer and processing time  
⇒ Simulation efficiency  
⇒ HMI switch-over time

**SINUMERIK OPERATE**  
identical to the latest  
**SINUMERIK ONE** control

## DIGITAL TWIN:

Create / Run MyVirtual Machine now available for 828D

- Minimise the set-up and run-in time on the real machine.
- Precise simulation reduces the risk of collision and accelerates part programme optimisation.

## HIGHER PERFORMANCE:

CPU performance improved by >40 %  
40 % shorter programme buffer and processing time  
25 % higher simulation efficiency  
50 % faster HMI switch-over time

- Improved efficiency, shorter waiting times and smooth operation

## MODERN PANEL DESIGN:

Innovative 16:10-inch panel with modern design  
SINUMERIK 828D MCP with laser-engraved characters, mechanical keys, service life of override keys increased by 400 %

- Clearer display and improved user-friendliness
- Excellent haptics and wear-resistant buttons, greater robustness and longer service life

## SUSTAINABILITY & SAFETY:

New Ctrl-E Advanced Analysis function  
Maintenance-free (without fan, without battery)  
Safety functions: Security archive, user administration

- Simple transparency of energy consumption
- Protection of customer know-how against manipulation and piracy

## SIEMENS SAFETY INTEGRATED

SET UP WORK WITH OPEN DOORS

**Functional safety also provides protection against high costs!**

Machine and plant safety is not only important because strict regulations must be observed. When everything runs safely, you benefit from time savings in engineering, higher system availability and more investment security.

## CONTROL

- 12.1" colour display
- 4:3 format
- User-friendly SINUMERIK Operate software

## SYSTEM SOFTWARE

- **PPU 271 SW 24**  
**3 MB** CNC memory  
**3 ms** Block change time  
**50** Look Ahead  
**128** tools

## OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- Shopturn work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording

## ADDITIONAL PACKAGE SIEMENS OSS PLUS

12 months; Article no. 3589020  
24 months; Article no. 3589021  
36 months; Article no. 3589022

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal - Siemens WW

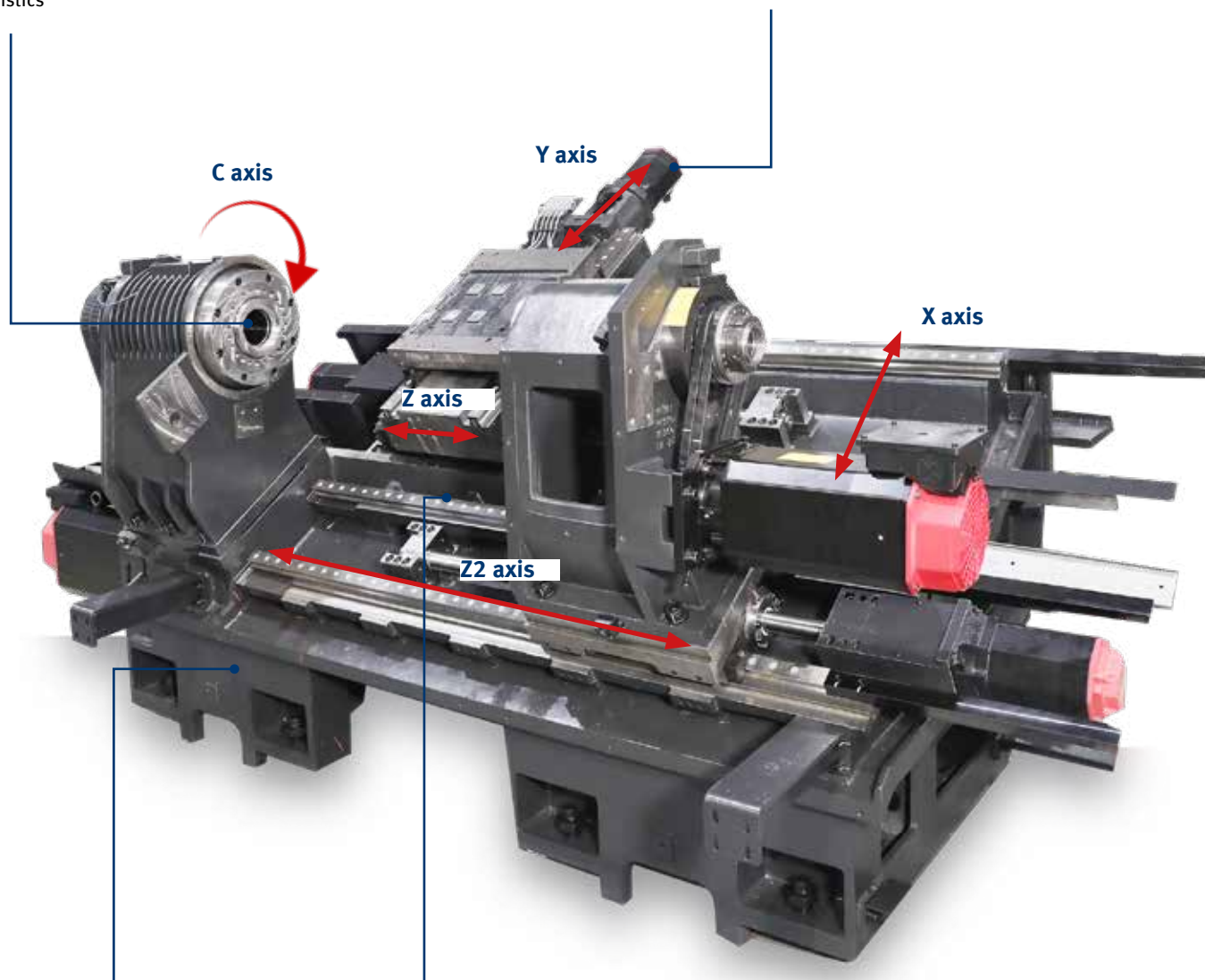


### Spindle

- The main spindle, designed for high precision, impresses with its high torque and performance characteristics

### Tool turret

- Hydraulic tool turret BMT 55
- All 12 stations are driven by an integrated motor designed for speeds of up to 3500 rpm .



### Components and cast parts

- Guarantee stiffness

### Linear guide

- All axes except the Y-axis
- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement
- Y-axis with box guide



## LINEAR GUIDE AND BALL SCREW



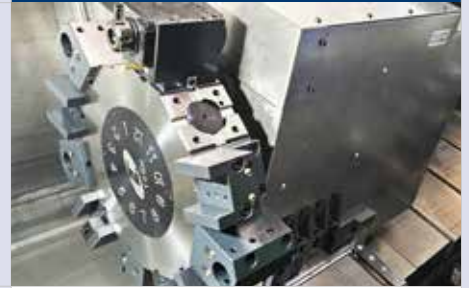
- High precision
- Increases the speed of the movement speed and improve the cutting performance

## COUNTER SPINDLE



- The counter spindle is positioned opposite the main spindle.
- The counter spindle adds another 100% spindle to the functionality of a machine.
- 100% spindle

## TURRET HEAD WITH DRIVEN TOOL



- Equipped with a high-performance turret head with milling and drilling function.

## TWO C-AXIS INDEX POSITIONING FUNCTION



- C-axis and driven turret can perform multiple functions such as turning, milling, drilling and tapping with high efficiency and precision

## CENTRAL LUBRICATION



- Prevents wear, repair costs and unnecessary downtime to a considerable extent

## AIR CONDITIONER



- Cools the control cabinet permanently and constantly to the set temperature.

## MEASURING ARM



- Up to 90 % faster tool measuring
- Typical positioning accuracy of 5  $\mu\text{m}$  2 $\sigma$
- LED displays the probe status and the operational readiness of the arm
- TS12 Interface

## CONTROL CABINET



- With SIEMENS servo drive
- Standards-compliant setup
- Wiring with individual wire labelling and enclosed circuit diagram facilitates maintenance work and diagnostics

## CHIP CONVEYOR



- For the disposal of chips
- rear-mounted

## HYDRAULIC UNIT



- Cools the control cabinet permanently and constantly to the set temperature.

| STARTER SET                                                                               |   |                                                  |                                                                    |
|-------------------------------------------------------------------------------------------|---|--------------------------------------------------|--------------------------------------------------------------------|
| 3519602                                                                                   | 1 | <b>Starter set BMT 55</b>                        | For information see page page 301                                  |
| BAR FEEDER                                                                                |   |                                                  |                                                                    |
| 3511599093*                                                                               |   | <b>Bar feeder interface</b>                      |                                                                    |
| 3511599101                                                                                | 2 | <b>Fedek GT 326 3 m bar feeder</b>               | · Ø 3 - 26 mm / length max. 3000 mm / Incl. bar feeder interface   |
| 3511599102                                                                                |   | <b>Fedek DH 65L 1.5 m bar feeder</b>             | · Ø 5 - 65 mm / length max. 1500 mm / Incl. bar feeder interface   |
| 3511599103                                                                                |   | <b>Fedek DH 65 1.25 m bar feeder</b>             | · Ø 5 - 65 mm / length max. 1250 mm / Incl. bar feeder interface   |
| 3511599104                                                                                |   | <b>Fedek SN 551 3.2 m bar feeder</b>             | · Ø 5 - 51 mm / length max. 3200 mm / Incl. bar feeder interface   |
| ➡ For information on bar feeders, and more bar feeders ex warehouse Germany, see page 304 |   |                                                  |                                                                    |
| CHUCK                                                                                     |   |                                                  |                                                                    |
| 3515187010                                                                                |   | <b>Four-jaw lathe chuck Ø 250 mm</b>             | · Instead of standard equipment › three-jaw lathe chuck Ø 250 mm   |
| 3515187011                                                                                |   | <b>Four-jaw lathe chuck Ø 250 mm</b>             |                                                                    |
| 3515187013                                                                                |   | <b>4-Jaw lathe chuck Ø 300 mm incl. cylinder</b> |                                                                    |
| 3519739                                                                                   |   | <b>Soft jaws Ø 150 mm 3 pieces</b>               | · for the standard equipment › counter chuck Ø 150 mm              |
| 3519749                                                                                   |   | <b>Hard jaws Ø 150 mm 3 pieces</b>               | · for the standard equipment › counter chuck Ø 150 mm              |
| 3519745                                                                                   |   | <b>Soft jaws Ø 200 mm 3 pieces</b>               | · for the three-jaw lathe chuck Ø 200 mm of spindle option 1 and 2 |
| 3519755                                                                                   |   | <b>Hard jaws Ø 200 mm 3 pieces</b>               | · for the three-jaw lathe chuck Ø 200 mm of spindle option 1 and 2 |
| 3519741                                                                                   |   | <b>Soft jaws Ø 250 mm 3 pieces</b>               | · for the standard equipment › three-jaw lathe chuck Ø 250 mm      |
| 3519751                                                                                   |   | <b>Hard jaws Ø 250 mm 3 pieces</b>               | · for the standard equipment › three-jaw lathe chuck Ø 250 mm      |
| 3519741                                                                                   |   | <b>Soft jaws Ø 250 mm 4 pieces</b>               | · for the four-jaw lathe chuck Ø 250 mm                            |
| 3519751                                                                                   |   | <b>Hard jaws Ø 250 mm 4 pieces</b>               | · for the four-jaw lathe chuck Ø 250 mm                            |
| 3519745                                                                                   |   | <b>Soft jaws Ø 300 mm 4 pieces</b>               | · for the four-jaw hydraulic lathe chuck Ø 300 mm                  |
| 3519755                                                                                   |   | <b>Hard jaws Ø 300 mm 4 pieces</b>               | · for the four-jaw hydraulic lathe chuck Ø 300 mm                  |
| MISCELLANEOUS                                                                             |   |                                                  |                                                                    |
| 3511599094                                                                                | 3 | <b>Coolant through spindle</b>                   | · External unit, 10 bar                                            |
| 3511599095                                                                                |   | <b>Coolant through spindle</b>                   | · External unit, 20 bar                                            |
| 3511599091                                                                                | 4 | <b>Oil Separator</b>                             | · Longer service life of the cooling lubricants                    |
| 3511599092                                                                                | 5 | <b>Air conditioner</b>                           | · Instead of the standard equipment › heat exchanger               |
| 3511599090                                                                                | 6 | <b>Part grippers</b>                             |                                                                    |
| 3544200                                                                                   |   | <b>Lathe tool set HM 25 mm</b>                   | · 6-piece set see page 302                                         |
| SPINDLE OPTION                                                                            |   |                                                  |                                                                    |
| 3515187021                                                                                |   | <b>Spindle option 1</b>                          | · Spindle bore Ø 62 mm/ chuck opening Ø 51 mm Holder A 2-6         |
| 3515187025                                                                                |   | <b>Spindle option 2</b>                          | · Spindle bore Ø 102 mm/ chuck opening Ø 90 mm Holder A 2-8        |
| 3515187026                                                                                |   | <b>Spindle option 3</b>                          | · Spindle bore Ø 116 mm/ chuck opening Ø 102 mm Holder A 2-8       |
| SOFTWARE                                                                                  |   |                                                  |                                                                    |
| 3584030                                                                                   | 7 | <b>Groove pushing</b>                            | · Information can be found on the page 330                         |
| 3584014                                                                                   | 8 | <b>Software DXF Viewer/Reader</b>                | · from version 4.7                                                 |

## 1 BMT 55 STARTER SET



- 4 x tool holder U25T55X65
- 2 x tool holder UAD20T55x84
- Tool holder B40T55X40
- Tool holder BN20T55X95
- Tool holder BN25T55X95
- Tool holder BN32T55X95
- Adapter VDI 30/BMT 55

## 2 BAR FEEDER GT 326



- Convenient parameter setting without programme changes
- The length of the remaining material can be adjusted as required
- Short residual length reduces material waste to a minimum

## 3 COOLANT THROUGH SPINDLE



- Coolant is fed directly into the spindle to control the temperature of the tool and prevent overheating. This keeps the spindle at the optimum operating temperature, which increases precision and service life

## 4 OIL SEPARATOR



- Oil separator reliably removes floating foreign oils and the finest chip abrasion from cooling lubricants. It ensures that the oil remains clean and reusable or can be disposed of in an environmentally friendly manner

## 5 AIR CONDITIONING



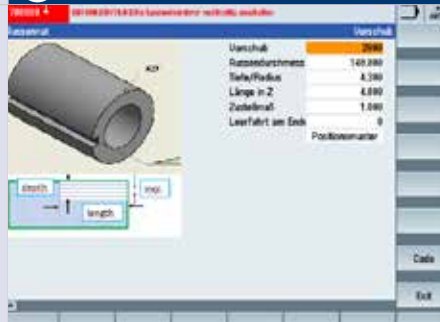
- Instead of heat exchanger
- The air conditioner permanently and constantly cools the control cabinet to the set temperature.

## 6 PARTS CATCHER



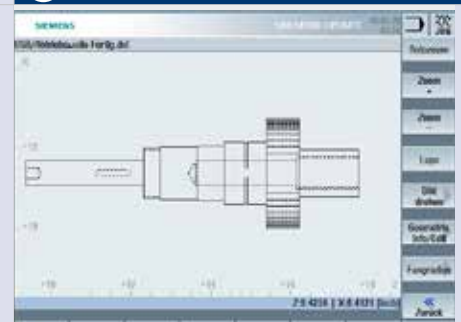
- The parts catcher significantly reduces set-up and processing times, as workpieces can be handled more quickly and efficiently
- It reduces the need for manual intervention

## 7 BROACHING



- Special processes such as broaching or grooving are generally used to produce internal and external profiles. Groove pushing can also be carried out economically on CNC lathes without special units.

## 8 DXF-VIEWER SOFTWARE



- **from version 4.7**  
Imports eDrawings, 3-D objects as well as SolidWorks and AutoCad files in the formats DWG and DXF, EASM and PDM. The tool offers various functions for displaying, simulating and printing the drawings and 3D projects.

# S 750

**OPTIMUM PREMIUM CNC slant-bed lathe that stands out for its high speed, performance, precision and durability**

## **SIEMENS CONTROL SINUMERIK 828D**

- Heavy duty version
- Compact design
- Renishaw measuring arm for manual tool measurement
- The entire bed design has many reinforcing ribs that have been optimised through finite element analysis, ensuring high rigidity, better heat dissipation (thermal symmetry) and more precise machining
- Ball screw with improved accuracy, rigidity and heat resistance.
- **SIEMENS** servo motors on all axes
- All servomotors with integrated encoder for maximum precision
- The motor is located on the side of the machine and prevents heat transfer and vibrations caused by the motor.
- Slant bed design 30° for particularly large machining diameter
- Better unobstructed chip flow into the chip tray
- Hydraulic three-jaw lathe chuck Ø 250 mm with soft jaws
- Servo tool changer VDI 40 with 12 tool stations
- Hardened and precision ground ball screws for high rapid traverse speeds in all axes
- Dimensionally stable linear guides ensure a long service thanks to maximum static and dynamic stiffness
- Part grippers
- Device for manual tool measuring
- Tailstock with hydraulic quill
- Heat exchanger
- Portable, electronic handwheel with enabling switch and emergency-stop pushbutton, makes it much easier to run in programmes.
- Chip conveyor, belt type ensures efficient chip discharge
- Working light for complete illumination of the working area
- Coolant device with cleaning gun
- RJ45 , power interface
- EMC Electromagnetic compatibility
- Additional package SIEMENS material defect liability and free online/on-site service OSS Plus see „Additional package SIEMENS OSS Plus“ on page 151
- 1 year maintenance contract Basic included in D/A/CH see page 267





## TECHNICAL DATA

| Model                                  |                            | S 750                         |
|----------------------------------------|----------------------------|-------------------------------|
| Article no.                            |                            | 3515200                       |
| <b>Machine data</b>                    |                            |                               |
| Electrical connection                  |                            | 400 V / 3 Ph ~50 Hz           |
| Total connected load                   |                            | 35 kVA                        |
| <b>Spindle</b>                         |                            |                               |
| Drive motor S1 operation               |                            | 15 kW                         |
| Torque drive motor S1 operation        |                            | 268 Nm                        |
| Drive motor S6 30 % operation          |                            | 19.5 kW                       |
| Torque drive motor S6 30 % operation   |                            | 349 Nm                        |
| Spindle seat                           |                            | A2-8                          |
| Spindle bore                           |                            | Ø 86 mm                       |
| Chuck passage                          |                            | Ø 74 mm                       |
| Hydraulic lathe chuck                  |                            | Ø 250 mm                      |
| <b>Spindle options of main spindle</b> |                            |                               |
| Option 1                               | <b>Art no. 3515187021</b>  |                               |
|                                        | Spindle bore               | Ø 62 mm                       |
|                                        | Chuck passage              | Ø 51 mm (with Ø 200 mm chuck) |
|                                        | Spindle seat               | A 2-6                         |
|                                        | Rotational speeds          | 30 - 4500 rpm                 |
| Option 2                               | <b>Art. No. 3515187025</b> |                               |
|                                        | Spindle bore               | Ø 102 mm                      |
|                                        | Chuck passage              | Ø 90 mm (with 300 mm chuck)   |
|                                        | Spindle seat               | A 2-8                         |
|                                        | Rotational speeds          | 30 - 3 000 rpm                |
| <b>Cooling lubricant system</b>        |                            |                               |
| Coolant pump output                    |                            | 700 W 1.8 bar                 |
| Tank capacity                          |                            | 320 litres                    |
| <b>Hydraulic system</b>                |                            |                               |
| Output of hydraulic pump               |                            | 2.2 kW                        |
| Tank capacity                          |                            | 36 litres                     |
| <b>Machine data</b>                    |                            |                               |
| Turning diameter                       |                            | 500 mm                        |
| Turning length                         |                            | 1250 mm                       |
| Swing Ø above cross slide              |                            | 480 mm                        |
| Swing Ø above machine bed              |                            | 660 mm                        |
| Slant bed                              |                            | 30°                           |
| <b>Speed range</b>                     |                            |                               |
| Spindle speeds*                        |                            | 30 - 3 500 rpm                |
| <b>Tool changer</b>                    |                            |                               |
| Type                                   |                            | VDI 40 Servo                  |
| Number of tool stations                |                            | 12                            |
| <b>Accuracy</b>                        |                            |                               |
| Positioning accuracy                   |                            | ± 0.004 mm                    |
| Repeat accuracy                        |                            | ± 0.008 mm                    |
| <b>Travel</b>                          |                            |                               |
| X axis                                 |                            | 280 mm                        |
| Z axis                                 |                            | 1280 mm                       |
| <b>Rapid traverse</b>                  |                            |                               |
| X axis                                 |                            | 24 m/min.                     |
| Z axis                                 |                            | 30 m/min.                     |
| <b>Motor torque</b>                    |                            |                               |
| X axis/Y axis                          |                            | 12 Nm                         |
| <b>Feed forces</b>                     |                            |                               |
| X axis/Y axis                          |                            | 8.4 kN / 6.7 kN               |
| <b>Tailstock</b>                       |                            |                               |
| Shank                                  |                            | MT 5                          |
| Spindle sleeve diameter                |                            | 100 mm                        |
| Spindle sleeve stroke, hydraulic       |                            | 100 mm                        |
| <b>Dimensions</b>                      |                            |                               |
| Length x width x height                |                            | 5040 x 1880 x 1840 mm         |
| Overall weight                         |                            | 4600 kg                       |

\* depending on the chuck installed \*\* other spindle bores and spindle speeds on request

# SINUMERIK 828D PPU271.5

COMPACT REVOLUTION

DIGITALLY TRANSFORMED, INNOVATIVELY DESIGNED, ENHANCED PERFORMANCE



**PPU.5 CPU power Upgrade**  
**>40 %**

Comprehensive improvement  
⇒ Programme buffer and processing time  
⇒ Simulation efficiency  
⇒ HMI switch-over time

**SINUMERIK OPERATE**  
identical to the latest  
**SINUMERIK ONE** control

## DIGITAL TWIN:

Create / Run MyVirtual Machine now available for 828D

- Minimise the set-up and run-in time on the real machine.
- Precise simulation reduces the risk of collision and accelerates part programme optimisation.

## HIGHER PERFORMANCE:

CPU performance improved by >40 %  
40 % shorter programme buffer and processing time  
25 % higher simulation efficiency  
50 % faster HMI switch-over time

- Improved efficiency, shorter waiting times and smooth operation

## MODERN PANEL DESIGN:

Innovative 16:10-inch panel with modern design  
SINUMERIK 828D MCP with laser-engraved characters, mechanical keys, service life of override keys increased by 400 %

- Clearer display and improved user-friendliness
- Excellent haptics and wear-resistant buttons, greater robustness and longer service life

## SUSTAINABILITY & SAFETY:

New Ctrl-E Advanced Analysis function  
Maintenance-free (without fan, without battery)  
Safety functions: Security archive, user administration

- Simple transparency of energy consumption
- Protection of customer know-how against manipulation and piracy

## SIEMENS SAFETY INTEGRATED

SET UP WORK WITH OPEN DOORS

**Functional safety also provides protection against high costs!**

Machine and plant safety is not only important because strict regulations must be observed. When everything runs safely, you benefit from time savings in engineering, higher system availability and more investment security.

## CONTROL

- 12.1" colour display
- 4:3 format
- User-friendly SINUMERIK Operate software

## SYSTEM SOFTWARE

- **PPU 271 SW 24**  
**3 MB** CNC memory  
**3 ms** Block change time  
**50** Look Ahead  
**128** tools

## OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- Shopturn work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording

## ADDITIONAL PACKAGE SIEMENS OSS PLUS

12 months; Article no. 3589020  
24 months; Article no. 3589021  
36 months; Article no. 3589022

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal - Siemens WW

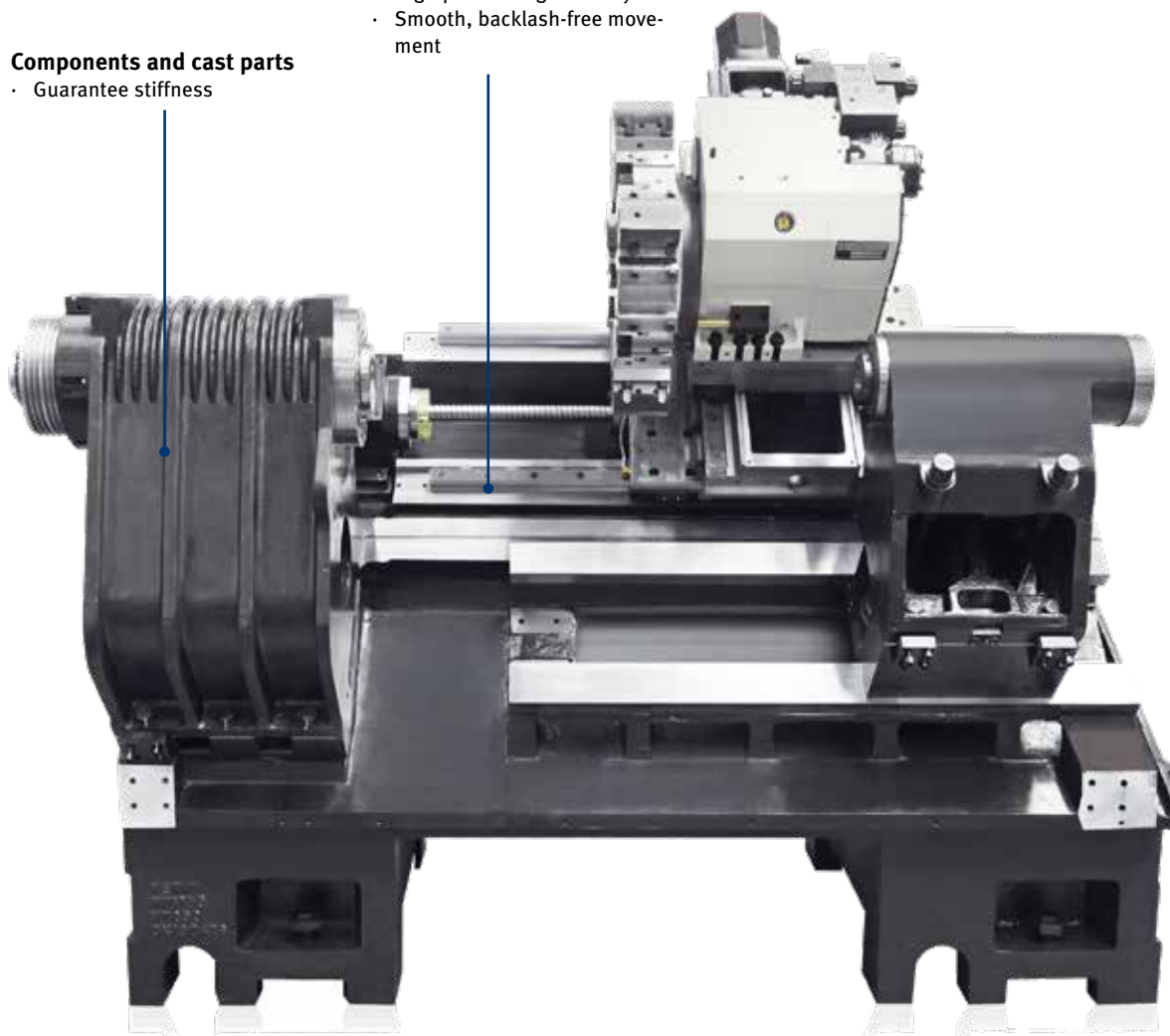


**Components and cast parts**

- Guarantee stiffness

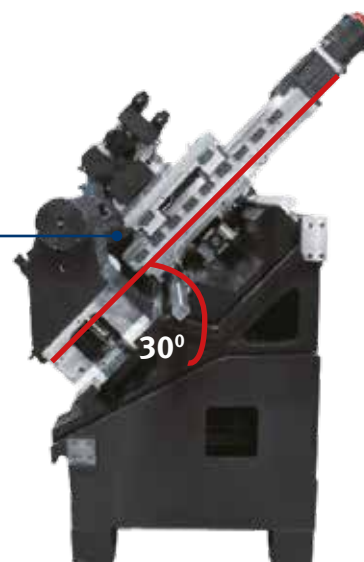
**Linear guide**

- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement



**Machine bed**

- Pronounced ribbing
- Excellent stiffness and durability
- Facilitates chip removal



## LINEAR GUIDE



- High precision
- Increases the speed of the movement speed and improve the cutting performance

## TOOL CHANGER



- Turret head
- VDI 40
- Equipped with a high-performance turret head with milling and drilling function.

## TAILSTOCK



- with hydraulic quill

## CENTRAL LUBRICATION



- Prevents wear, repair costs and unnecessary downtime to a considerable extent

## HYDRAULIC UNIT



- Power of the hydraulic unit 1.5 kW (S 500) 2.2 kW (S 750)

## MEASURING ARM



- Up to 90 % faster tool measuring
- Typical positioning accuracy of 5  $\mu\text{m}$  2 $\sigma$
- LED displays the probe status and the operational readiness of the arm
- TS12 Interface

## CHIP CONVEYOR



- For the disposal of chips
- rear-mounted

## AIR CONDITIONER



- Cools the control cabinet permanently and constantly to the set temperature.

## CONTROL CABINET



- With SIEMENS servo drive
- Standards-compliant setup
- Wiring with individual wire labelling and enclosed circuit diagram facilitates maintenance work and diagnostics

| ENCODER                                                                                                                                                                   |   |                                              |                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3515190001                                                                                                                                                                | 1 | Heidenhain encoder ERM 2480                  | <ul style="list-style-type: none"><li>Scanning head for incremental modular encoder with magnetoresistive scanning</li><li>Mounted directly on the main spindle</li></ul> |
|                                                                                                                                                                           |   |                                              |                                                                                                                                                                           |
| STARTER SET                                                                                                                                                               |   |                                              |                                                                                                                                                                           |
| 3536115                                                                                                                                                                   | 2 | Starter set VDI 30                           | <ul style="list-style-type: none"><li>Information VDI 30, page 299</li></ul>                                                                                              |
|                                                                                                                                                                           |   |                                              |                                                                                                                                                                           |
| BAR FEEDER                                                                                                                                                                |   |                                              |                                                                                                                                                                           |
| 3511599093*                                                                                                                                                               | 3 | Bar feeder interface                         |                                                                                                                                                                           |
| 3511599101                                                                                                                                                                |   | Fedek GT 326 3 m bar feeder                  | <ul style="list-style-type: none"><li>Ø 3 - 26 mm / length max. 3000 mm / Incl. bar feeder interface</li></ul>                                                            |
| 3511599102                                                                                                                                                                |   | Fedek DH 65L 1.5 m bar feeder                | <ul style="list-style-type: none"><li>Ø 5 - 65 mm / length max. 1500 mm / Incl. bar feeder interface</li></ul>                                                            |
| 3511599103                                                                                                                                                                |   | Fedek DH 65 1.25 m bar feeder                | <ul style="list-style-type: none"><li>Ø 5 - 65 mm / length max. 1250 mm / Incl. bar feeder interface</li></ul>                                                            |
| 3511599104                                                                                                                                                                |   | Fedek SN 551 3.2 m bar feeder                | <ul style="list-style-type: none"><li>Ø 5 - 51 mm / length max. 3200 mm / Incl. bar feeder interface</li></ul>                                                            |
|  For information on bar feeders, and more bar feeders ex warehouse Germany, see page 304 |   |                                              |                                                                                                                                                                           |
|                                                                                                                                                                           |   |                                              |                                                                                                                                                                           |
| CHUCK                                                                                                                                                                     |   |                                              |                                                                                                                                                                           |
| 351520011                                                                                                                                                                 |   | Four-jaw lathe chuck Ø 250 mm including jaws | <ul style="list-style-type: none"><li>Instead of standard equipment › hydraulic three-jaw lathe chuck Ø 250 mm</li></ul>                                                  |
| 351520012                                                                                                                                                                 |   | Four-jaw lathe chuck Ø 250 mm including jaws | <ul style="list-style-type: none"><li>In addition to the standard equipment</li></ul>                                                                                     |
| 351520010                                                                                                                                                                 |   | Three-jaw lathechuck Ø 300 mm incl. cylinder | <ul style="list-style-type: none"><li>for the three-jaw hydraulic lathe chuck Ø 250 mm</li></ul>                                                                          |
| 3519740                                                                                                                                                                   |   | Soft jaws Ø 200 mm 3 pieces                  | <ul style="list-style-type: none"><li>for the three-jaw lathe chuck Ø 200 mm of spindle option 1 and 2</li></ul>                                                          |
| 3519750                                                                                                                                                                   |   | Hard jaws Ø 200 mm 3 pieces                  | <ul style="list-style-type: none"><li>for the three-jaw lathe chuck Ø 200 mm of spindle option 1 and 2</li></ul>                                                          |
| 3519741                                                                                                                                                                   |   | Soft jaws Ø 250 mm 3 pieces                  | <ul style="list-style-type: none"><li>for the three-jaw hydraulic lathe chuck Ø 250 mm</li></ul>                                                                          |
| 3519751                                                                                                                                                                   |   | Hard jaws Ø 250 mm 3 pieces                  | <ul style="list-style-type: none"><li>for the three-jaw hydraulic lathe chuck Ø 250 mm</li></ul>                                                                          |
| 3519742                                                                                                                                                                   |   | Soft jaws Ø 300 mm 3 pieces                  | <ul style="list-style-type: none"><li>for the three-jaw hydraulic lathe chuck Ø 300 mm</li></ul>                                                                          |
| 3519752                                                                                                                                                                   |   | Hard jaws Ø 300 mm 3 pieces                  | <ul style="list-style-type: none"><li>for the three-jaw hydraulic lathe chuck Ø 300 mm</li></ul>                                                                          |
|                                                                                                                                                                           |   |                                              |                                                                                                                                                                           |
| MISCELLANEOUS                                                                                                                                                             |   |                                              |                                                                                                                                                                           |
| 3511599094                                                                                                                                                                | 4 | Coolant through spindle                      | <ul style="list-style-type: none"><li>External unit, 10 bar</li></ul>                                                                                                     |
| 3511599095                                                                                                                                                                | 5 | Coolant through spindle                      | <ul style="list-style-type: none"><li>External unit, 20 bar</li></ul>                                                                                                     |
| 3511599091                                                                                                                                                                |   | Oil Separator                                | <ul style="list-style-type: none"><li>Longer service life of the cooling lubricants</li></ul>                                                                             |
| 3511599090                                                                                                                                                                |   | Part grippers                                |                                                                                                                                                                           |
| 3544200                                                                                                                                                                   |   | Lathe tool set HM 25 mm                      | <ul style="list-style-type: none"><li>6-piece set see page 302</li></ul>                                                                                                  |
|                                                                                                                                                                           |   |                                              |                                                                                                                                                                           |
| SPINDLE OPTION                                                                                                                                                            |   |                                              |                                                                                                                                                                           |
| 3515187021                                                                                                                                                                |   | Spindle option 1                             | <ul style="list-style-type: none"><li>Spindle bore Ø 62 mm/ chuck opening Ø 51 mm Holder A 2-6</li></ul>                                                                  |
| 3515187025                                                                                                                                                                |   | Spindle option 2                             | <ul style="list-style-type: none"><li>Spindle bore Ø 102 mm/ chuck opening Ø 90 mm Holder A 2-8</li></ul>                                                                 |
|                                                                                                                                                                           |   |                                              |                                                                                                                                                                           |
| SOFTWARE                                                                                                                                                                  |   |                                              |                                                                                                                                                                           |
| 3584014                                                                                                                                                                   | 6 | Software DXF Viewer/Reader                   | <ul style="list-style-type: none"><li>from version 4.7</li></ul>                                                                                                          |



## 1 ENCODER ERM 2480



- Incremental angle encoder with magnetic scanning - scanning head
- Continuous operation at high speeds
- Robust and dirt-resistant
- Pitch accuracy:  $\pm 2.5''$  to  $\pm 72''$

## 2 VDI 30 STARTER SET



- 1) 3 pcs. square transverse holder
- 2) 1 pc. square transverse overhead holder
- 3) 1 pc. square longitudinal holder
- 4) 5 pcs. drill bar holder  $\varnothing 10 / 12 / 16 / 20 / 25$  mm
- 5) 1 pc. tool holder

- 6) 1 pc. square longitudinal holder
- 7) 18-part collet chuck set ER 32
- 8) 1 pc. collet chuck holder ER 25
- 9) 1 piece collet spanner ER 25
- 10) 1 pc. drill chuck
- 11) 3 pcs. sealing caps

## 3 BAR FEEDER DH 65



- The bar feeders are also very reliable and easy to operate, so you can be sure that they will provide years of reliable service.

## 3 BAR FEEDER GT 326



- Convenient parameter setting without programme changes
- The length of the remaining material can be adjusted as required
- Short residual length reduces material waste to a minimum

## 4 COOLANT THROUGH SPINDLE



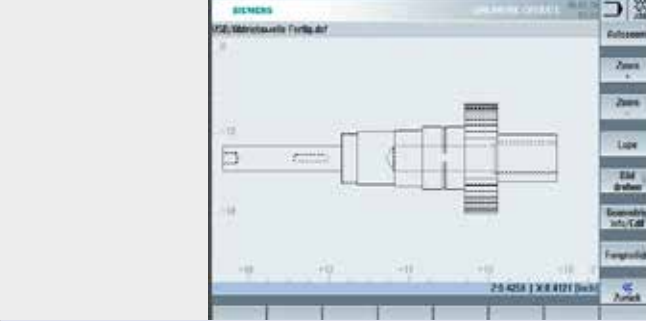
- Coolant is fed directly into the spindle to control the temperature of the tool and prevent overheating. This keeps the spindle at the optimum operating temperature, which increases precision and service life

## 5 OIL SEPARATOR



- Oil separator reliably removes floating foreign oils and the finest chip abrasion from cooling lubricants. It ensures that the oil remains clean and reusable or can be disposed of in an environmentally friendly manner

## 6 DXF VIEWER/READER SOFTWARE



- **from version 4.7**  
Imports eDrawings, 3-D objects as well as SolidWorks and AutoCad files in the formats DWG and DXF, EASM and PDM. The tool offers various functions for displaying, simulating and printing the drawings and 3D projects.

# S 750M

**OPTIMUM PREMIUM CNC slant-bed lathe that stands out for its high speed, performance, precision and durability**

## **SIEMENS CONTROL SINUMERIK 828D PPU 270**

- Heavy duty version
- Compact design
- Renishaw measuring arm for manual tool measurement
- The entire bed design has many reinforcing ribs that have been optimised through finite element analysis, ensuring high rigidity, better heat dissipation (thermal symmetry) and more precise machining
- Ball screw with improved accuracy, rigidity and heat resistance.
- **SIEMENS** servo motors on all axes
- All servomotors with integrated encoder for maximum precision
- The motor is located on the side of the machine and prevents heat transfer and vibrations caused by the motor.
- Encoder directly on main spindle for increased accuracy
- Slant bed design 30° for particularly large machining diameter
- Better unobstructed chip flow into the chip tray
- Hydraulic three-jaw lathe chuck Ø 250 mm with soft jaws
- Sauter tool changer VDI 40 with 12 tool positions and driven tools
- Linear guides ensure a long service life thanks to maximum static and dynamic rigidity.
- Device for manual tool measuring
- Tailstock with hydraulic quill
- Air conditioner
- Portable, electronic handwheel with enabling switch and emergency-stop pushbutton, makes it much easier to run in programmes.
- Chip conveyor, belt type ensures efficient chip discharge
- Working light for complete illumination of the working area
- Coolant device with cleaning gun
- RJ45 , power interface
- Tools Scope of delivery:
  - Driven axial tool holders,
  - Driven radial tool holder,
  - Boring bar holder
  - OD-tool holder
  - End face tool holder
  - Boring bar Ø 20mm
  - Boring bar Ø 25mm
  - Boring bar Ø 32mm
- EMC Electromagnetic compatibility
- Additional package SIEMENS material liability for defects and free online/on-site service OSS Plus see page 135
- 1 year maintenance contract Basic included in D/A/CH see page 267



### TECHNICAL DATA

| Model                                  |                            | S 750M                        |
|----------------------------------------|----------------------------|-------------------------------|
| Article no.                            |                            | 3515205                       |
| <b>Machine data</b>                    |                            |                               |
| Electrical connection                  |                            | 400 V / 3 Ph ~50 Hz           |
| Total connected load                   |                            | 35 kVA                        |
| <b>Spindle</b>                         |                            |                               |
| Drive motor S1 operation               |                            | 15 kW                         |
| Torque drive motor S1 operation        |                            | 268 Nm                        |
| Drive motor S6 30 % operation          |                            | 19.5 kW                       |
| Torque drive motor S6 30 % operation   |                            | 349 Nm                        |
| Spindle seat                           |                            | A2-8                          |
| Spindle bore                           |                            | Ø 86 mm                       |
| Chuck passage                          |                            | Ø 74 mm                       |
| Hydraulic lathe chuck                  |                            | Ø 250 mm                      |
| <b>Spindle options of main spindle</b> |                            |                               |
| Option 1                               | <b>Art no. 3515187021</b>  |                               |
|                                        | Spindle bore               | Ø 62 mm                       |
|                                        | Chuck passage              | Ø 51 mm (with Ø 200 mm chuck) |
|                                        | Spindle seat               | A 2-6                         |
|                                        | Rotational speeds          | 30 - 4500 rpm                 |
| Option 2                               | <b>Art. No. 3515187025</b> |                               |
|                                        | Spindle bore               | Ø 102 mm                      |
|                                        | Chuck passage              | Ø 90 mm (with 300 mm chuck)   |
|                                        | Spindle seat               | A 2-8                         |
|                                        | Rotational speeds          | 30 - 3 000 rpm                |
| Option 3                               | <b>Art no. 3515187026</b>  |                               |
|                                        | Spindle bore               | Ø 116 mm                      |
|                                        | Chuck passage              | Ø 105 mm (with 300 mm chuck)  |
|                                        | Spindle seat               | A 2-8                         |
|                                        | Rotational speeds          | 2500 rpm                      |

|                                    |                       |
|------------------------------------|-----------------------|
| <b>Cooling lubricant system</b>    |                       |
| Coolant pump output                | 700 W 1.8 bar         |
| Tank capacity                      | 320 litres            |
| <b>Hydraulic system</b>            |                       |
| Output of hydraulic pump           | 2.2 kW                |
| Tank capacity                      | 36 litres             |
| <b>Machine data</b>                |                       |
| Turning diameter                   | 500 mm                |
| Turning length                     | 1250 mm               |
| Swing Ø above cross slide          | 480 mm                |
| Swing Ø above machine bed          | 660 mm                |
| Slant bed                          | 30°                   |
| <b>Speed range</b>                 |                       |
| Spindle speeds*                    | 30 - 3 500 rpm        |
| <b>Tool changer</b>                |                       |
| Type                               | Sauter VDI 40         |
| Number of tool stations            | 12                    |
| Permissible speed at tool coupling | max. 4000 rpm         |
| Power of the tools                 | 4.8 kW                |
| Max. tool torque                   | 20 Nm                 |
| <b>Accuracy</b>                    |                       |
| X axis/Y axis repeat accuracy      | ± 0.004 mm            |
| X axis/Y axis positioning accuracy | ± 0.008 mm            |
| Angular accuracy of the C-axis     | 51''                  |
| C axis repeat accuracy             | 20''                  |
| <b>Travel</b>                      |                       |
| X axis                             | 280 mm                |
| Z axis                             | 1280 mm               |
| <b>Rapid traverse</b>              |                       |
| X axis                             | 24 m/min.             |
| Z axis                             | 30 m/min.             |
| <b>Motor torque</b>                |                       |
| X axis/Y axis                      | 12 Nm                 |
| <b>Feed forces</b>                 |                       |
| X axis/Y axis                      | 8.4 kN / 6.7 kN       |
| <b>Tailstock</b>                   |                       |
| Shank                              | MT 5                  |
| Spindle sleeve diameter            | 100 mm                |
| Spindle sleeve stroke, hydraulic   | 100 mm                |
| <b>Dimensions</b>                  |                       |
| Length x width x height            | 5040 x 1880 x 1840 mm |
| Overall weight                     | 4600 kg               |

# SINUMERIK 828D PPU271.5

COMPACT REVOLUTION

DIGITALLY TRANSFORMED, INNOVATIVELY DESIGNED, ENHANCED PERFORMANCE



**PPU.5 CPU power Upgrade**  
**>40 %**

Comprehensive improvement  
⇒ Programme buffer and processing time  
⇒ Simulation efficiency  
⇒ HMI switch-over time

**SINUMERIK OPERATE**  
identical to the latest  
**SINUMERIK ONE** control

## DIGITAL TWIN:

Create / Run MyVirtual Machine now available for 828D

- Minimise the set-up and run-in time on the real machine.
- Precise simulation reduces the risk of collision and accelerates part programme optimisation.

## HIGHER PERFORMANCE:

CPU performance improved by >40 %  
40 % shorter programme buffer and processing time  
25 % higher simulation efficiency  
50 % faster HMI switch-over time

- Improved efficiency, shorter waiting times and smooth operation

## MODERN PANEL DESIGN:

Innovative 16:10-inch panel with modern design  
SINUMERIK 828D MCP with laser-engraved characters, mechanical keys, service life of override keys increased by 400 %

- Clearer display and improved user-friendliness
- Excellent haptics and wear-resistant buttons, greater robustness and longer service life

## SUSTAINABILITY & SAFETY:

New Ctrl-E Advanced Analysis function  
Maintenance-free (without fan, without battery)  
Safety functions: Security archive, user administration

- Simple transparency of energy consumption
- Protection of customer know-how against manipulation and piracy

## SIEMENS SAFETY INTEGRATED

SET UP WORK WITH OPEN DOORS

**Functional safety also provides protection against high costs!**

Machine and plant safety is not only important because strict regulations must be observed. When everything runs safely, you benefit from time savings in engineering, higher system availability and more investment security.

## CONTROL

- 12.1" colour display
- 4:3 format
- User-friendly SINUMERIK Operate software

## SYSTEM SOFTWARE

- **PPU 271 SW 24**  
**3 MB** CNC memory  
**3 ms** Block change time  
**50** Look Ahead  
**128** tools

## OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- Shopturn work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording

## ADDITIONAL PACKAGE SIEMENS OSS PLUS

12 months; Article no. 3589020  
24 months; Article no. 3589021  
36 months; Article no. 3589022

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal - Siemens WW



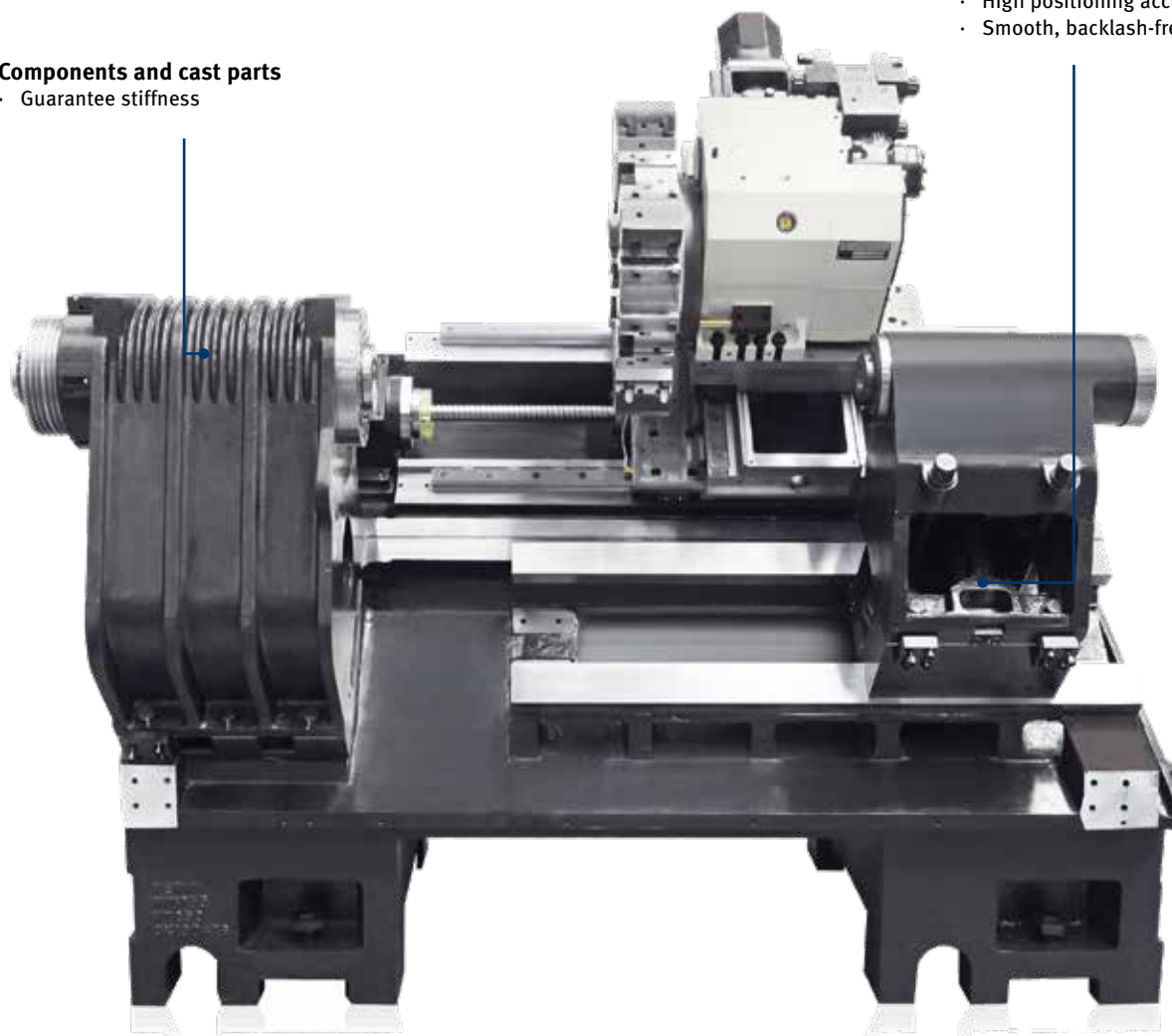


**Components and cast parts**

- Guarantee stiffness

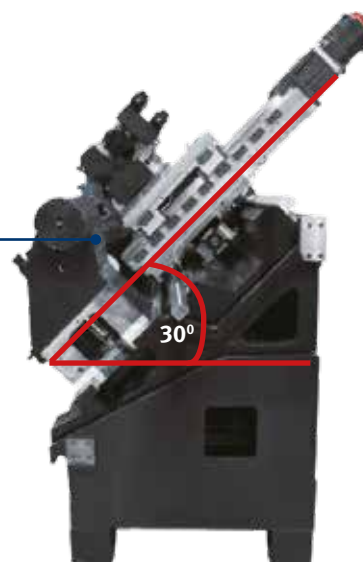
**Box guide**

- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement



**Machine bed**

- Pronounced ribbing
- 30-degree slope
- Excellent stiffness and durability
- Facilitates chip removal



## BALL SCREW



- High precision
- Increases the speed of the movement speed and improve the cutting performance

## TAILSTOCK



- with hydraulic quill

## TURRET HEAD WITH DRIVEN TOOL



- Equipped with a high-performance turret head with milling and drilling function.

## TWO C-AXIS INDEX POSITIONING FUNCTION



- C-axis and driven turret can perform multiple functions such as turning, milling, drilling and tapping with high efficiency and precision

## MEASURING ARM



- Up to 90 % faster tool measuring
- Typical positioning accuracy of 5 µm 2σ
- LED displays the probe status and the operational readiness of the arm
- TS12 Interface

## CENTRAL LUBRICATION



- Prevents wear, repair costs and unnecessary downtime to a considerable extent

## AIR CONDITIONER



- Cools the control cabinet permanently and constantly to the set temperature.

## CONTROL CABINET



- With SIEMENS servo drive
- Standards-compliant setup
- Wiring with individual wire labelling and enclosed circuit diagram facilitates maintenance work and diagnostics

## CHIP CONVEYOR



- For the disposal of chips
- rear-mounted

## HYDRAULIC UNIT



- Cools the control cabinet permanently and constantly to the set temperature.

| STARTER SET                                                                               |   |                                               |                                                                            |
|-------------------------------------------------------------------------------------------|---|-----------------------------------------------|----------------------------------------------------------------------------|
| 3536116                                                                                   | 2 | Starter set VDI 40                            | • Information VDI 40, page 309                                             |
|                                                                                           |   |                                               |                                                                            |
| BAR FEEDER                                                                                |   |                                               |                                                                            |
| 3511599093*                                                                               | 3 | Bar feeder interface                          |                                                                            |
| 3511599101                                                                                |   | Fedek GT 326 3 m bar feeder                   | • Ø 3 - 26 mm / length max. 3000 mm / Incl. bar feeder interface           |
| 3511599102                                                                                |   | Fedek DH 65L 1.5 m bar feeder                 | • Ø 5 - 65 mm / length max. 1500 mm / Incl. bar feeder interface           |
| 3511599103                                                                                |   | Fedek DH 65 1.25 m bar feeder                 | • Ø 5 - 65 mm / length max. 1250 mm / Incl. bar feeder interface           |
| 3511599104                                                                                |   | Fedek SN 551 3.2 m bar feeder                 | • Ø 5 - 51 mm / length max. 3200 mm / Incl. bar feeder interface           |
| 🔄 For information on bar feeders, and more bar feeders ex warehouse Germany, see page 304 |   |                                               |                                                                            |
|                                                                                           |   |                                               |                                                                            |
| CHUCK                                                                                     |   |                                               |                                                                            |
| 351525011                                                                                 |   | Four-jaw lathe chuck Ø 250 mm including jaws  | • Instead of standard equipment › three-jaw lathe chuck hydraulic Ø 250 mm |
| 351525012                                                                                 |   | Four-jaw lathe chuck Ø 250 mm including jaws  | • In addition to the standard equipment                                    |
| 351520510                                                                                 |   | Three-jaw lathe chuck Ø 300 mm incl. cylinder | • Instead of standard equipment › three-jaw lathe chuck hydraulic Ø 250 mm |
| 3519740                                                                                   |   | Soft jaws Ø 200 mm 3 pieces                   | • for the three-jaw lathe chuck Ø 200 mm of spindle option 1 and 2         |
| 3519750                                                                                   |   | Hard jaws Ø 200 mm 3 pieces                   | • for the three-jaw lathe chuck Ø 200 mm of spindle option 1 and 2         |
| 3519741                                                                                   |   | Soft jaws Ø 250 mm 3 pieces                   | • for the three-jaw hydraulic lathe chuck Ø 250 mm                         |
| 3519751                                                                                   |   | Hard jaws Ø 250 mm 3 pieces                   | • for the three-jaw hydraulic lathe chuck Ø 250 mm                         |
| 3519744                                                                                   |   | Soft jaws Ø 250 mm 4 pieces                   | • for the four-jaw hydraulic lathe chuck Ø 250 mm                          |
| 3519754                                                                                   |   | Hard jaws Ø 250 mm 4 pieces                   | • for the four-jaw hydraulic lathe chuck Ø 250 mm                          |
| 3519745                                                                                   |   | Soft jaws Ø 300 mm 4 pieces                   | • for the four-jaw hydraulic lathe chuck Ø 300 mm                          |
| 3519755                                                                                   |   | Hard jaws Ø 300 mm 4 pieces                   | • for the four-jaw hydraulic lathe chuck Ø 300 mm                          |
|                                                                                           |   |                                               |                                                                            |
| MISCELLANEOUS                                                                             |   |                                               |                                                                            |
| 3511599094                                                                                |   | Coolant through spindle                       | • External unit, 10 bar                                                    |
| 3511599095                                                                                |   | Coolant through spindle                       | • External unit, 20 bar                                                    |
| 3511599091                                                                                | 4 | Oil Separator                                 | • Longer service life of the cooling lubricants                            |
| 3511599090                                                                                | 1 | Part grippers                                 |                                                                            |
| 3511599098                                                                                |   | Hydraulic steady rest                         |                                                                            |
| 3511599110                                                                                |   | Tool holder VDI40 axially driven              | • DIN5480                                                                  |
| 3511599111                                                                                |   | Tool holder VDI40 radially driven             | • DIN5480                                                                  |
| 3511599112                                                                                |   | VDI40 tool holder, radially recessed          | • DIN5480                                                                  |
| 3544200                                                                                   |   | Lathe tool set HM 25 mm                       | • 6-piece set see page 302                                                 |
|                                                                                           |   |                                               |                                                                            |
| SPINDLE OPTION                                                                            |   |                                               |                                                                            |
| 3515187021                                                                                |   | Spindle option 1                              | • Spindle bore Ø 62 mm/ chuck opening Ø 51 mm Holder A 2-6                 |
| 3515187025                                                                                |   | Spindle option 2                              | • Spindle bore Ø 102 mm/ chuck opening Ø 90 mm Holder A 2-8                |
| 3515187026                                                                                |   | Spindle option 3                              | • Spindle bore Ø 116 mm/ chuck opening Ø 105 mm Holder A 2-8               |
|                                                                                           |   |                                               |                                                                            |
| SOFTWARE                                                                                  |   |                                               |                                                                            |
| 3584030                                                                                   | 5 | Grooving                                      | • Information can be found on the page 330                                 |
| 3584014                                                                                   | 6 | Software DXF Viewer/Reader                    | • from version 4.7                                                         |

\*Delivered ex works. Must be ordered with the basic machine

## 1 OIL SEPARATOR



- Oil separator reliably removes floating foreign oils and the finest chip abrasion from cooling lubricants. It ensures that the oil remains clean and reusable or can be disposed of in an environmentally friendly manner

## 2 VDI 40 STARTER SET



- 1) 3 pcs. square transverse holder
- 2) 1 pc. square transverse overhead holder
- 3) 1 pc. square longitudinal holder
- 4) 5 pcs. drill bar holder  $\varnothing 10 / 12 / 16 / 20 / 25$  mm
- 5) 1 pc. tool holder
- 6) 1 pc. square longitudinal holder
- 7) 18-part collet chuck set ER 32
- 8) 1 pc. collet chuck holder ER 25
- 9) 1 piece collet spanner ER 25
- 10) 1 pc. drill chuck
- 11) 3 pcs. sealing caps

## 3 BAR FEEDER DH 65



- The bar feeders are also very reliable and easy to operate, so you can be sure that they will provide years of reliable service.

## 3 BAR FEEDER GT 326



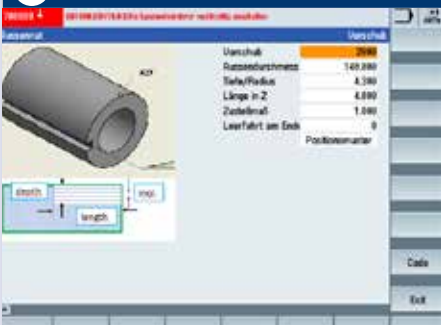
- Convenient parameter setting without programme changes
- The length of the remaining material can be adjusted as required
- Short residual length reduces material waste to a minimum

## 4 COOLANT THROUGH SPINDLE



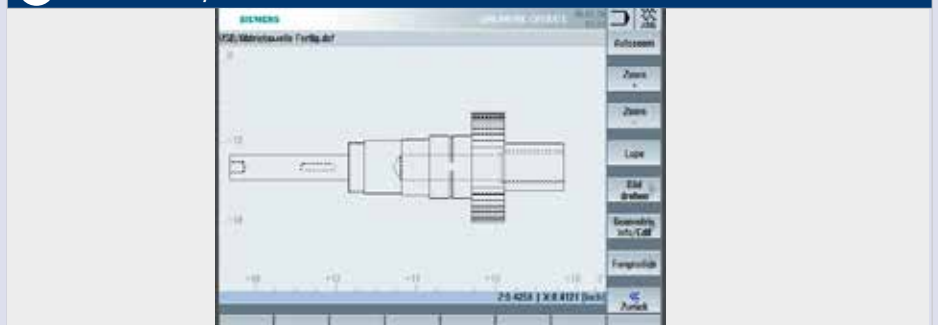
- Coolant is fed directly into the spindle to control the temperature of the tool and prevent overheating. This keeps the spindle at the optimum operating temperature, which increases precision and service life

## 5 BROACHING



- Special processes such as broaching or grooving are generally used to produce internal and external profiles. Groove pushing can also be carried out economically on CNC lathes without special units.

## 6 DXF VIEWER/READER SOFTWARE



- **from version 4.7**  
Imports eDrawings, 3-D objects as well as SolidWorks and AutoCad files in the formats DWG and DXF, EASM and PDM. The tool offers various functions for displaying, simulating and printing the drawings and 3D projects.

**New**

# S 750MY

The OPTIMUM PREMIUM CNC slant bed lathe with Y-axis and driven tools impresses with its high speeds, precision and efficiency

## SIEMENS CONTROL SINUMERIK 828D PPU 270

- Heavy duty version
- Compact design
- Renishaw measuring arm for manual tool measurement
- Encoder on main spindle for increased accuracy
- The entire bed design has many reinforcing ribs that have been optimised through finite element analysis, ensuring high rigidity, better heat dissipation (thermal symmetry) and more precise machining
- Ball screw with improved accuracy, rigidity and heat resistance.
- .SIEMENS servo motors on all axes
- All servomotors with integrated encoder for maximum precision
- The motor is located on the side of the machine and prevents heat transfer and vibrations caused by the motor.
- Slant bed design 30° for particularly large machining diameter
- Better unobstructed chip flow into the chip tray
- Hydraulic three-jaw lathe chuck Ø 250 mm with soft jaws
- BMT55 tool changer with 12 tool stations and driven tools
- Hardened and precision-ground ball screws for high rapid traverse speeds in all linear guided axes, except Y-axis which has a box guide
- Device for manual tool measuring
- Tailstock with hydraulic quill
- Air conditioner
- Portable, electronic handwheel with enabling switch and emergency stop button that significantly facilitates the running-in of programmes
- Chip conveyor, belt type ensures efficient chip discharge
- Working light for complete illumination of the working area
- Coolant device with cleaning gun
- RJ45 , power interface
- Tools Scope of delivery:
  - Driven axial tool holders,
  - Driven radial tool holder,
  - Boring bar holder
  - OD-tool holder
  - End face tool holder
  - Boring bar Ø 20mm
  - Boring bar Ø 25mm
  - Boring bar Ø 32mm
- EMC Electromagnetic compatibility
- Additional package SIEMENS material liability for defects and free online/on-site service OSS Plus see page 135
- 1 year maintenance contract Basic included in D/A/CH see page 267





## TECHNICAL DATA

| Model                                  |                            | S 750MY                       |
|----------------------------------------|----------------------------|-------------------------------|
| Article no.                            |                            | 3515206                       |
| <b>Machine data</b>                    |                            |                               |
| Electrical connection                  |                            | 400 V / 3 Ph ~50 Hz           |
| Total connected load                   |                            | 35 kVA                        |
| <b>Spindle</b>                         |                            |                               |
| Drive motor S1 operation               |                            | 15 kW                         |
| Torque drive motor S1 operation        |                            | 268 Nm                        |
| Drive motor S6 30 % operation          |                            | 19.5 kW                       |
| Torque drive motor S6 30 % operation   |                            | 349 Nm                        |
| Spindle seat                           |                            | A2-8                          |
| Spindle bore                           |                            | Ø 86 mm                       |
| Chuck passage                          |                            | Ø 74 mm                       |
| Hydraulic lathe chuck                  |                            | Ø 250 mm                      |
| <b>Spindle options of main spindle</b> |                            |                               |
| Option 1                               | <b>Art no. 3515187021</b>  |                               |
|                                        | Spindle bore               | Ø 62 mm                       |
|                                        | Chuck passage              | Ø 51 mm (with Ø 200 mm chuck) |
|                                        | Spindle seat               | A 2-6                         |
| Option 2                               | <b>Art. No. 3515187025</b> |                               |
|                                        | Spindle bore               | Ø 102 mm                      |
|                                        | Chuck passage              | Ø 90 mm (with 300 mm chuck)   |
|                                        | Spindle seat               | A 2-8                         |
|                                        | Rotational speeds          | 30 - 3 000 rpm                |

|                                    |                       |
|------------------------------------|-----------------------|
| <b>Cooling lubricant system</b>    |                       |
| Coolant pump output                | 700 W 1.8 bar         |
| Tank capacity                      | 320 litres            |
| <b>Machine data</b>                |                       |
| Turning diameter                   | 500 mm                |
| Turning length                     | 1250 mm               |
| Swing Ø above cross slide          | 480 mm                |
| Swing Ø above machine bed          | 660 mm                |
| Slant bed                          | 30°                   |
| <b>Speed range</b>                 |                       |
| Spindle speeds*                    | 30 - 3 500 rpm        |
| <b>Tool changer</b>                |                       |
| Type                               | BMT55                 |
| Number of tool stations            | 12                    |
| Permissible speed at tool coupling | max. 4000 rpm         |
| Power of the tools                 | 4.8 kW                |
| Max. tool torque                   | 20 Nm                 |
| <b>Accuracy</b>                    |                       |
| X axis/Y axis repeat accuracy      | ± 0.004 mm            |
| Y axis repeat accuracy             | ± 0.01 mm             |
| X axis/Y axis positioning accuracy | ± 0.008 mm            |
| Y axis repeat accuracy             | ± 0.005 mm            |
| Angular accuracy of the C-axis     | 51''                  |
| C axis repeat accuracy             | 20''                  |
| <b>Travel</b>                      |                       |
| X axis                             | 280 mm                |
| Z axis                             | 1280 mm               |
| Y axis                             | ± 50 mm               |
| <b>Rapid traverse</b>              |                       |
| X axis                             | 24 m/min.             |
| Y axis                             | 10 m/min.             |
| Z axis                             | 30 m/min.             |
| <b>Motor torque</b>                |                       |
| X axis/Y axis                      | 12 Nm                 |
| <b>Feed forces</b>                 |                       |
| X axis dynamic                     | 8.4 kN                |
| Y axis dynamic                     | 18 kN                 |
| Z axis dynamic                     | 6.7 kN                |
| <b>Tailstock</b>                   |                       |
| Shank                              | MT 5                  |
| Spindle sleeve diameter            | 100 mm                |
| Spindle sleeve stroke, hydraulic   | 100 mm                |
| <b>Dimensions</b>                  |                       |
| Length x width x height            | 5040 x 1880 x 1990 mm |
| Overall weight                     | 4700 kg               |

# SINUMERIK 828D PPU271.5

COMPACT REVOLUTION

DIGITALLY TRANSFORMED, INNOVATIVELY DESIGNED, ENHANCED PERFORMANCE



**PPU.5 CPU power Upgrade**  
**>40 %**

Comprehensive improvement  
⇒ Programme buffer and processing time  
⇒ Simulation efficiency  
⇒ HMI switch-over time

**SINUMERIK OPERATE**  
identical to the latest  
**SINUMERIK ONE** control

## DIGITAL TWIN:

Create / Run MyVirtual Machine now available for 828D

- Minimise the set-up and run-in time on the real machine.
- Precise simulation reduces the risk of collision and accelerates part programme optimisation.

## HIGHER PERFORMANCE:

CPU performance improved by >40 %  
40 % shorter programme buffer and processing time  
25 % higher simulation efficiency  
50 % faster HMI switch-over time

- Improved efficiency, shorter waiting times and smooth operation

## MODERN PANEL DESIGN:

Innovative 16:10-inch panel with modern design  
SINUMERIK 828D MCP with laser-engraved characters, mechanical keys, service life of override keys increased by 400 %

- Clearer display and improved user-friendliness
- Excellent haptics and wear-resistant buttons, greater robustness and longer service life

## SUSTAINABILITY & SAFETY:

New Ctrl-E Advanced Analysis function  
Maintenance-free (without fan, without battery)  
Safety functions: Security archive, user administration

- Simple transparency of energy consumption
- Protection of customer know-how against manipulation and piracy

## SIEMENS SAFETY INTEGRATED

SET UP WORK WITH OPEN DOORS

**Functional safety also provides protection against high costs!**

Machine and plant safety is not only important because strict regulations must be observed. When everything runs safely, you benefit from time savings in engineering, higher system availability and more investment security.

## CONTROL

- 12.1" colour display
- 4:3 format
- User-friendly SINUMERIK Operate software

## SYSTEM SOFTWARE

- **PPU 271 SW 24**  
**3 MB** CNC memory  
**3 ms** Block change time  
**50** Look Ahead  
**128** tools

## OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- Shopturn work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording

## ADDITIONAL PACKAGE SIEMENS OSS PLUS

12 months; Article no. 3589020  
24 months; Article no. 3589021  
36 months; Article no. 3589022

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal - Siemens WW



### Spindle

- The main spindle, designed for high precision, impresses with its high torque and performance characteristics

C axis

Y axis

### Tool turret

- Hydraulic tool turret BMT 55
- All 12 stations are driven by an integrated motor designed for speeds of up to 4000 rpm .

X axis

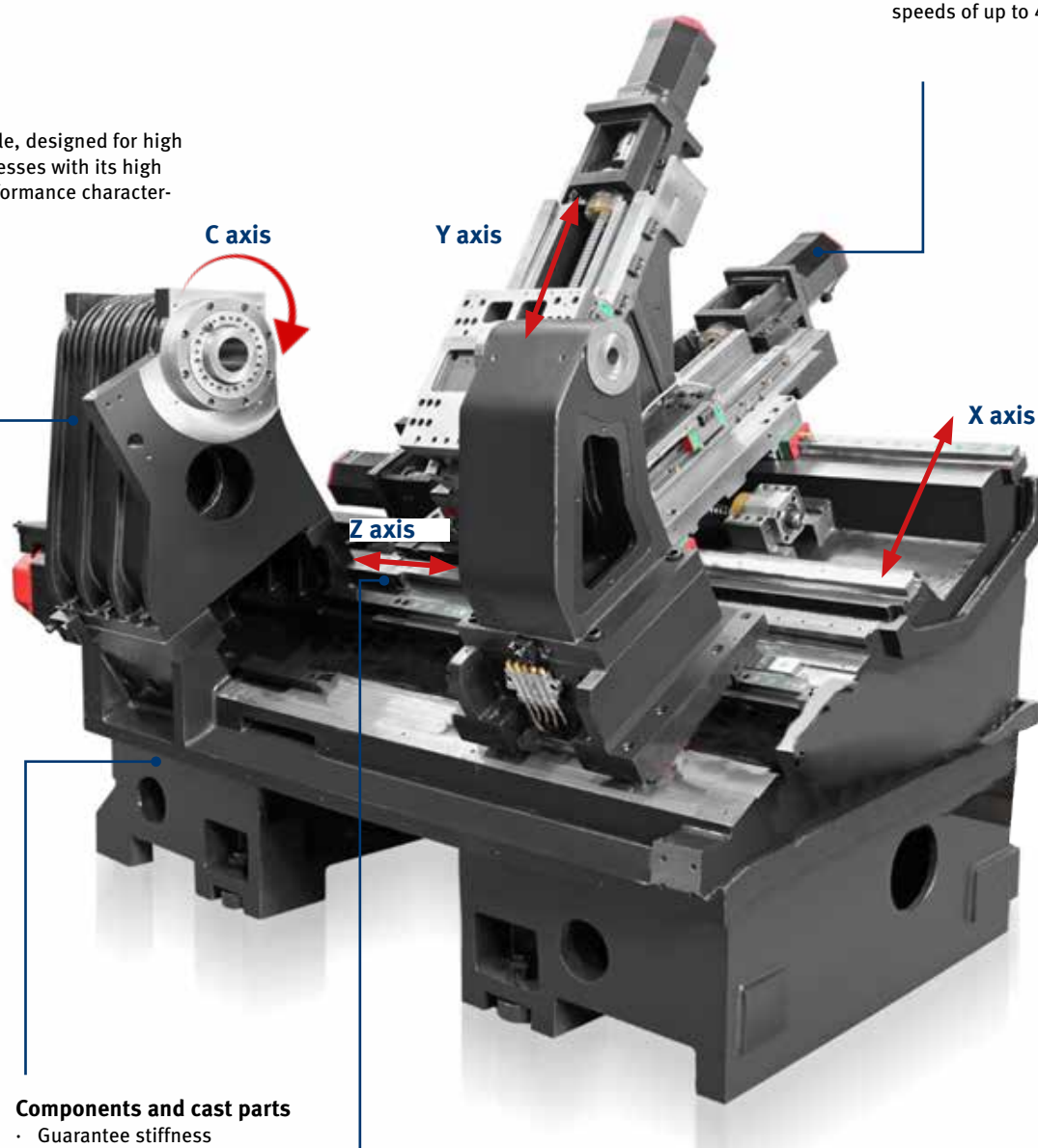
Z axis

### Components and cast parts

- Guarantee stiffness

### Linear guide

- All axes except the Y-axis
- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement
- Y-axis with box guide



## BALL SCREW



- High precision
- Increases the speed of the movement speed and improve the cutting performance

## TAILSTOCK



- with hydraulic quill

## SAUTER TURRET HEAD WITH DRIVEN TOOL



- Equipped with a high-performance turret head with milling and drilling function.

## TWO C-AXIS INDEX POSITIONING FUNCTION



- C-axis and driven turret can perform multiple functions such as turning, milling, drilling and tapping with high efficiency and precision

## MEASURING ARM



- Up to 90 % faster tool measuring
- Typical positioning accuracy of 5 µm 2σ
- LED displays the probe status and the operational readiness of the arm
- TS12 Interface

## CENTRAL LUBRICATION



- Prevents wear, repair costs and unnecessary downtime to a considerable extent

## AIR CONDITIONER



- Cools the control cabinet permanently and constantly to the set temperature.

## CONTROL CABINET



- With SIEMENS servo drive
- Standards-compliant setup
- Wiring with individual wire labelling and enclosed circuit diagram facilitates maintenance work and diagnostics

## CHIP CONVEYOR



- For the disposal of chips
- rear-mounted

## HYDRAULIC UNIT



- Cools the control cabinet permanently and constantly to the set temperature.



| STARTER SET                                                                               |   |                                               |                                                                            |
|-------------------------------------------------------------------------------------------|---|-----------------------------------------------|----------------------------------------------------------------------------|
| 3519602                                                                                   | 1 | Starter set BMT 55                            | For information see page page 301                                          |
|                                                                                           |   |                                               |                                                                            |
| BAR FEEDER                                                                                |   |                                               |                                                                            |
| 3511599093*                                                                               | 2 | Bar feeder interface                          |                                                                            |
| 3511599101                                                                                |   | Fedek GT 326 3 m bar feeder                   | • Ø 3 - 26 mm / length max. 3000 mm / Incl. bar feeder interface           |
| 3511599102                                                                                |   | Fedek DH 65L 1.5 m bar feeder                 | • Ø 5 - 65 mm / length max. 1500 mm / Incl. bar feeder interface           |
| 3511599103                                                                                |   | Fedek DH 65 1.25 m bar feeder                 | • Ø 5 - 65 mm / length max. 1250 mm / Incl. bar feeder interface           |
| 3511599104                                                                                |   | Fedek SN 551 3.2 m bar feeder                 | • Ø 5 - 51 mm / length max. 3200 mm / Incl. bar feeder interface           |
| ➡ For information on bar feeders, and more bar feeders ex warehouse Germany, see page 304 |   |                                               |                                                                            |
|                                                                                           |   |                                               |                                                                            |
| CHUCK                                                                                     |   |                                               |                                                                            |
| 351520611                                                                                 |   | Four-jaw lathe chuck Ø 250 mm including jaws  | • Instead of standard equipment › three-jaw lathe chuck hydraulic Ø 250 mm |
| 351520612                                                                                 |   | Four-jaw lathe chuck Ø 250 mm including jaws  | • In addition to the standard equipment                                    |
| 351520610                                                                                 |   | Three-jaw lathe chuck Ø 300 mm incl. cylinder |                                                                            |
| 3519740                                                                                   |   | Soft jaws Ø 200 mm 3 pieces                   | • for the three-jaw lathe chuck Ø 200 mm of spindle option 1 and 2         |
| 3519750                                                                                   |   | Hard jaws Ø 200 mm 3 pieces                   | • for the three-jaw lathe chuck Ø 200 mm of spindle option 1 and 2         |
| 3519741                                                                                   |   | Soft jaws Ø 250 mm 3 pieces                   | • for the three-jaw hydraulic lathe chuck Ø 250 mm                         |
| 3519751                                                                                   |   | Hard jaws Ø 250 mm 3 pieces                   | • for the three-jaw hydraulic lathe chuck Ø 250 mm                         |
| 3519744                                                                                   |   | Soft jaws Ø 250 mm 4 pieces                   | • for the four-jaw hydraulic lathe chuck Ø 250 mm                          |
| 3519754                                                                                   |   | Hard jaws Ø 250 mm 4 pieces                   | • for the four-jaw hydraulic lathe chuck Ø 250 mm                          |
| 3519745                                                                                   |   | Soft jaws Ø 300 mm 4 pieces                   | • for the four-jaw hydraulic lathe chuck Ø 300 mm                          |
| 3519755                                                                                   |   | Hard jaws Ø 300 mm 4 pieces                   | • for the four-jaw hydraulic lathe chuck Ø 300 mm                          |
|                                                                                           |   |                                               |                                                                            |
| SPINDLE OPTION                                                                            |   |                                               |                                                                            |
| 3515187021                                                                                |   | Spindle option 1                              | • Spindle bore Ø 62 mm/ chuck opening Ø 51 mm Holder A 2-6                 |
| 3515187025                                                                                |   | Spindle option 2                              | • Spindle bore Ø 102 mm/ chuck opening Ø 90 mm Holder A 2-8                |
|                                                                                           |   |                                               |                                                                            |
| MISCELLANEOUS                                                                             |   |                                               |                                                                            |
| 3511599094                                                                                | 3 | Coolant through spindle                       | • External unit, 10 bar                                                    |
| 3511599095                                                                                | 4 | Coolant through spindle                       | • External unit, 20 bar                                                    |
| 3511599091                                                                                |   | Oil Separator                                 | • Longer service life of the cooling lubricants                            |
| 3511599090                                                                                |   | Part grippers                                 |                                                                            |
| 3544200                                                                                   |   | Lathe tool set<br>Carbide 25 mm               | • 6-part<br>• see page 302                                                 |
|                                                                                           |   |                                               |                                                                            |
| SOFTWARE                                                                                  |   |                                               |                                                                            |
| 3584014                                                                                   | 5 | Grooving                                      | • Information can be found on the page 330                                 |
| 3584030                                                                                   | 6 | Software DXF Viewer/Reader                    | • from version 4.7                                                         |

## 1 BMT 55 STARTER SET



- 4 x tool holder U25T55X65
- 2 x tool holder UAD20T55x84
- Tool holder B40T55X40
- Tool holder BN20T55X95
- Tool holder BN25T55X95
- Tool holder BN32T55X95
- Adapter VDI 30/BMT 55

## 2 BAR FEEDER GT 326



- Convenient parameter setting without programme changes
- The length of the remaining material can be adjusted as required
- Short residual length reduces material waste to a minimum

## 3 COOLANT THROUGH SPINDLE



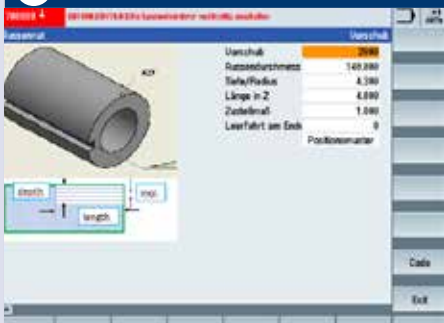
- Coolant is fed directly into the spindle to control the temperature of the tool and prevent overheating. This keeps the spindle at the optimum operating temperature, which increases precision and service life

## 4 OIL SEPARATOR



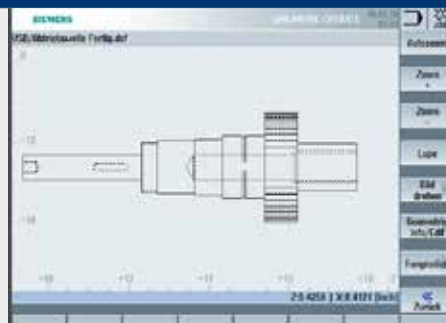
- Oil separator reliably removes floating foreign oils and the finest chip abrasion from cooling lubricants. It ensures that the oil remains clean and reusable or can be disposed of in an environmentally friendly manner

## 5 BROACHING



- Special processes such as broaching or grooving are generally used to produce internal and external profiles. Groove pushing can also be carried out economically on CNC lathes without special units.

## 6 DXF VIEWER/READER SOFTWARE



- **from version 4.7**  
Imports eDrawings, 3-D objects as well as SolidWorks and AutoCad files in the formats DWG and DXF, EASM and PDM. The tool offers various functions for displaying, simulating and printing the drawings and 3D projects.

# BALTEC IN KAUNAS

## TRAINING AND PRODUCTION CENTRE IN LITHUANIA

### CURRENTLY USES 35 OPTIMUM CNC MACHINES



*Baltec CNC Technologies company headquarters in Kaunas*

Under the meticulous eye of highly qualified specialists, these machines produce around 36 000 milled parts a year, the majority of which are exported to Western and Northern Europe, e.g. to Germany, Sweden, Norway and Switzerland. The company also specialises in welding, CNC bending, flame cutting, powder coating and the assembly of subassemblies. Production is optimised for machining individual workpieces made of steel, aluminium, titanium and plastic.

Thus far, Baltec CNC Technologies has used OPTIMUM machines

For eight years now, Baltec CNC Technologies, a manufacturer of precision mechanical components in Lithuania, has relied on OPTIMUM lathes and milling machines. Now the cooperation is being taken to a new level: Since March 2020, the company's own training centre has also been equipped with OPTIMUM machines.

The milled parts specialist, which was founded in 1995 in central Lithuania, currently has around 45 CNC machines in operation, all of which run in 2-shift and, if required, 3-shift operation. Two thirds of these are OPTIMUM brand machines.



*OPTIMUM machinery at the Baltec CNC Technologies production facility*



*Turned and milled parts manufactured on OPTIMUM machines*



*OPTIMUM service technicians on site performing maintenance in Production*

exclusively for the production processes. A total of **35 CNC-controlled OPTIMUM machines** are used to manufacture components for the automotive industry, universal mechanical engineering, printing machine technology and the energy sector. To achieve the best possible results, Baltec CNC Technologies is already working with the new 3D printing head 3X technology, which supports the production of medical components by means of 3D printing processes. Since March 2020, the company has not only been using OPTIMUM machines in its production facilities, but has also equipped its in-house training centre with OPTIMUM machines. The company uses this facility, which has an accredited training program, to serve professional development needs of its employees, who can take courses in CNC production techniques there.





*Seven F 150 CNC milling machines and two F 310HSC and one F 500HSC CNC milling machines in one of Baltec's production shops*



*Automatic production with robots*

In order to further expand its leading position in the production of milled parts in Lithuania, Baltec has even developed its own automation cell featuring a robot for the OPTIMUM CNC machines in recent years. Parts are automatically provided to the robot on three levels; they are delivered from the workpiece table to the OPTIMUM CNC machine workpiece table. A Blum measuring system checks the part which is returned to the material workstation after completion. In the future, the company will not only be using these products for its own production but will also offer them to other companies using OPTIMUM CNC machines. The Lithuanian manufacturer of milled parts, which is also a reseller of CNC-controlled machines in the Baltic States, is thus extending its product range to include further innovative solutions.

*OPTIMUM lathes and milling machines at Baltec CNC Technologies in Lithuania*



*Maintenance system for monitoring machine utilisation*



*OPTIMUM CNC machines coupled to robots*

**03**

# **5-AXIS MACHINES**

OPTImill FU 6





OPTImill FU 5HSC



# FU 4

New

## 5-AXIS SIMULTANEOUS MACHINING CENTRE FOR MAXIMUM PRODUCTIVITY

### SIEMENS CONTROL SINUMERIK ONE

---

- Heavy duty version
- High productivity
- Telescopic guideway cover
- Precision-ground, preloaded high-performance ball screws for high rapid traverse speeds
- Spindle borne on P5 precision bearings and permanently lubricated
- High-torque servo drives on all five axes
- Precision linear guides
- Heidenhain glass scales for higher accuracy
- Fast rapid motion speed of up to 36 m/min.
- B axis C axis with screw drive for high torque during tilting actions
- The portable, electronic handwheel with enabling switch and emergency stop pushbutton makes it much easier to run in programmes.
- Double arm gripper tool changer with 24 tool stations in standard scope of delivery
- Coolant unit with 300 litre coolant tank, including chip flushing system and cleaning gun
- Automatic centralised lubrication
- RJ45 plug-in connection, USB connection and 230 V power connection
- Additional USB interface on the control panel
- Oil cooler for the main spindle
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- Heat exchanger
- EMC Electromagnetic compatibility
- Two years' **SIEMENS** repair service contract included. Extension of the **SIEMENS** Supplementary Repair Service Contract (RSV) page 199
- Information on maintenance contracts, page 333



## TECHNICAL DATA

| Models                                               | FU 4                  |
|------------------------------------------------------|-----------------------|
| Article no.                                          | 3521340               |
| <b>Spindle</b>                                       | <b>Inline spindle</b> |
| <b>Machine data</b>                                  |                       |
| Electrical connection                                | 400 V / 3 Ph ~50 Hz   |
| Total connected load                                 | 40 kVA                |
| <b>Milling spindle</b>                               |                       |
| Drive motor S1 operation                             | 10.5 kW               |
| Torque drive motor S1 operation                      | 50 Nm                 |
| Drive motor S6 30 % operation                        | 26.4 kW               |
| Torque drive motor S6 30 % operation                 | 125 Nm                |
| Spindle seat                                         | BT 40                 |
| <b>Milling precision</b>                             |                       |
| Repeat accuracy                                      | ± 0.004 mm            |
| Positioning accuracy                                 | ± 0.003 mm            |
| (B/C) Repeatability                                  | 8''                   |
| (B/C) Positioning accuracy                           | 10''                  |
| <b>Tool changer</b>                                  |                       |
| Type                                                 | Double arm gripper    |
| Number of tool stations                              | 24 slots              |
| Max. tool diameter                                   | 78 mm                 |
| Max. tool diameter (adjacent slots free)             | 120 mm                |
| Tool length                                          | 300 mm                |
| Max. tool weight                                     | 8 kg                  |
| Tool change time, chip to chip                       | 2.5 seconds           |
| <b>Travel</b>                                        |                       |
| X axis                                               | 700 mm                |
| Y axis                                               | 360 mm                |
| Z axis                                               | 400 mm                |
| <b>Feed drive</b>                                    |                       |
| Rapid traverse X / Y / Z axis                        | 36 m/min.             |
| <b>Motor torque</b>                                  |                       |
| X axis                                               | 27 Nm                 |
| Y / Z axis                                           | 36 Nm                 |
| <b>Feed forces</b>                                   |                       |
| X, Y axis                                            | 10.2 kN               |
| Z axis                                               | 16 kN                 |
| <b>Speed range</b>                                   |                       |
| Speeds*                                              | 12 000 rpm            |
| <b>Pneumatics</b>                                    |                       |
| Compressed air                                       | 6 bar                 |
| <b>Cooling systems</b>                               |                       |
| Tank capacity cooling lubricant tank                 | 300 litres            |
| Pump motor chip flushing/delivery rate               | 0,48 kW               |
| Pump motor cleaning gun/delivery rate                | 0,48 kW               |
| <b>Inclining and rotating table</b>                  |                       |
| Table diameter                                       | 400 mm                |
| T-slot size / amount                                 | 14 mm / 8             |
| Maximum payload                                      | 200 kg                |
| <b>Axis C</b>                                        |                       |
| Rotating axis                                        | 360°                  |
| Hydraulic clamping torque                            | 6.5 bar               |
| Maximum rotational speed (worm gear)                 | max. 40 rpm           |
| <b>B axis</b>                                        |                       |
| Tilting axis                                         | ± 120°                |
| Hydraulic clamping torque of tilting axis            | 6,5 bar               |
| Max. permissible torque (S1 operation/ S6 operation) | 640 Nm                |
| Maximum tilting speed (torque motor)                 | max. 30 rpm           |
| <b>Dimensions/weight</b>                             |                       |
| Length x width x height                              | 3650 x 3500 x 2500 mm |
| Overall weight                                       | 9000 kg               |

# SINUMERIK ONE

SINUMERIK ONE, the digital native CNC, brings your ideas to life. SINUMERIK ONE is the trendsetting CNC system for highly productive machine tools. For undreamt-of new possibilities, ideas and business models. For faster innovations through the seamless interaction of the virtual and real worlds. And: SINUMERIK ONE is much more than a powerful hardware innovation. Through its digital twin, it is the key element for digital transformation and helps to simulate and test work processes completely virtually.



## THE ADVANTAGES OF SINUMERIK ONE AT A GLANCE

### MAXIMISE PRODUCTIVITY

SINUMERIK ONE sets standards in machining speed and quality. The CNC system maximises machine tool productivity through the highest PLC and CNC performance. The integrated SIMATIC S7-1500F PLC enables up to 10 times faster PLC cycle times than the predecessor PLC. SINUMERIK ONE makes machine tools more productive - and thus more flexible, faster and more efficient.

### PURSUE NEW WAYS OF THINKING- INSPIRE DIGITALLY

Run MyVirtual Machine, the digital twin of machining, optimises machine tool utilisation. Unproductive times at the machine are reduced to a minimum and consistently shifted to work preparation. This creates space for new ways of thinking. And with the right business model, the digital twin can generate additional business around the machine tool.

#### RSV warranty

With the warranty, you protect your machine against warranty damage for 24 or 36 months. (must be purchased with the purchase of the machine)

24 months; Article no. 3589036

36 months; Article no. 3589037

Siemens connection guarantee 12 months based on warranty RSV

24 or 36 months Article no. 3589038

Information on the warranty can be found at [www.optimum-maschinen.de](http://www.optimum-maschinen.de)

### RUN MYVIRTUAL MACHINE 3D

With its product Run MyVirtual Machine, Siemens AG has developed an ideal platform for creating and operating a digital twin. Especially in vocational training, training on virtual machines has proven its worth. The trainee can safely test and optimise his NC programs without causing damage to a real machine. Moreover, educational institutions often lack the resources to run more than one CNC machine. The decision to teach the machining process turning or milling is no longer necessary when training on the digital twin - almost every machine type and every kinematics can be simulated.

for school education only

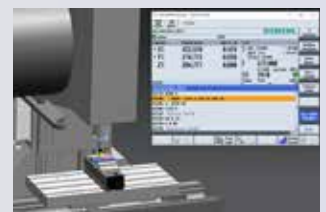
Article no.: 3584855 Operate

Article no.: 3584156 3 D machine

### DIGITAL TWIN

in training and production- protects your machine from expensive damage.

The digital twin contains a virtual image of the machine from the original machine data with animated tool change and the VNCK (Virtual NC Core). Tools and set-ups can be managed by the machine user himself. On request





## AN END-TO-END SOLUTION ALONG THE VALUE CHAIN RAISES NEW POTENTIAL FOR MACHINE OPERATORS

### ELEGANT DESIGN

- Ergonomic, modern operating hardware in "Blackline plus" design
- Metal design provides a premium look and feel
- Operate intuitively and efficiently
- Attractive front design
- High-quality workmanship for smooth continuous operation

### FEATURE / FUNCTION

- SINUMERIK blackline plus Panel
- Slim, robust aluminium housing
- Horizontally and vertically applicable
- Scratch-resistant, continuous glass front
- Projected capacitive multi-touch technology
- Recognise 5 fingers at the same time

### BENEFITS

- Operate intuitively and efficiently
- Attractive front design
- High-quality workmanship for smooth continuous operation

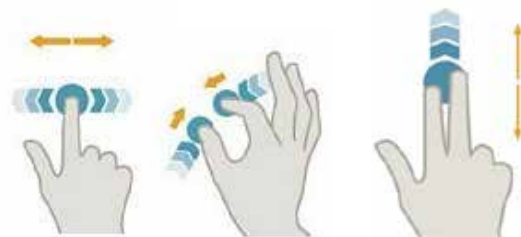
### NCU 1750

- 31 Axes/spindles
- PLC S7-1500F



**Excerpt from the gestures of multitouch operation**  
Intelligent gesture operation with touch panels, even with working gloves  
Capacitive touch for industrial use  
Palm recognition  
Detection of liquids and impurities

15 inch  
Full HD  
1080



### SINUMERIK ONE - 50% INCREASED NCK PERFORMANCE COMPARED TO 840D SL



Reduction of the block cycle time by 50%

➔ Reduced production time of the component

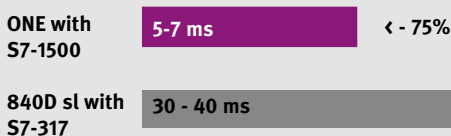
### SINUMERIK ONE - 10 X INCREASED PLC PERFORMANCE COMPARED TO 840D SL



Significant reduction of non-productive time due to 10x faster PLC

➔ Improved surface quality, as the milling paths are processed more cleanly

### REDUCTION OF THE PLC CYCLE TIME BY UP TO 75%



## STANDARD EQUIPMENT SINUMERIK ONE

### SINUMERIK ONE "ONE DYNAMICS" INCLUDED

- 3D tool radius correction
- Measure kinematics
- Shopmill
- DXF Reader
- Residual material detection and processing
- 3D simulation
- Simultaneous recording
- TRANSMIT/cylinder surface transformation
- Advanced surface
- Top surface
- Top speed plus
- Measuring cycles
- HMI user memory, extended to SD card of the NCU/PPU
- Processing external memories EES

### SINUMERIK ONE DYNAMICS

#### THE ALL-ROUND CAREFREE PACKAGES FOR THE MACHINE OPERATOR

- + Efficient programming in the workshop
- + Best surface quality from CAD-CAM chain generated NC programs
- + High dynamics and speed for a sustainable increase in productivity
- + Scalable and expandable by machine builders with machine-specific functions

**SINUMERIK ONE Dynamics = Maximum comfort and productivity for the machine operator**

### PROTECT MyMACHINE

- Protect MyMachine
- Integrated collision avoidance with 3D primitives
- Machine protection
- Monitoring the minimum distance of protected areas from each other
- Describe protective areas by means of basic bodies
- Multi-channel capable
- Cost-effective entry to protect the machine
- Cross-channel protection of machine components
- Reduced computational load on the CNC, thus no loss of performance

### PROTECT MYMACHINE/3D PRIMITIVES

**S03**

#### Machine protection

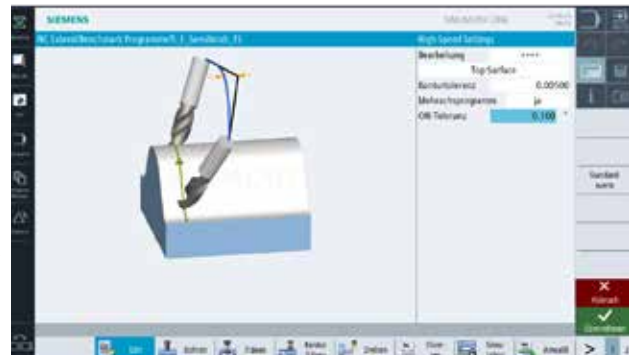
- Protected area elements
  - Cuboid, cylinder, sphere, truncated cone
  - Up to 34 elements
  - Up to 17 protected areas
  - Up to 10 collision pairs
- **Single-channel**
- HMI visualisation

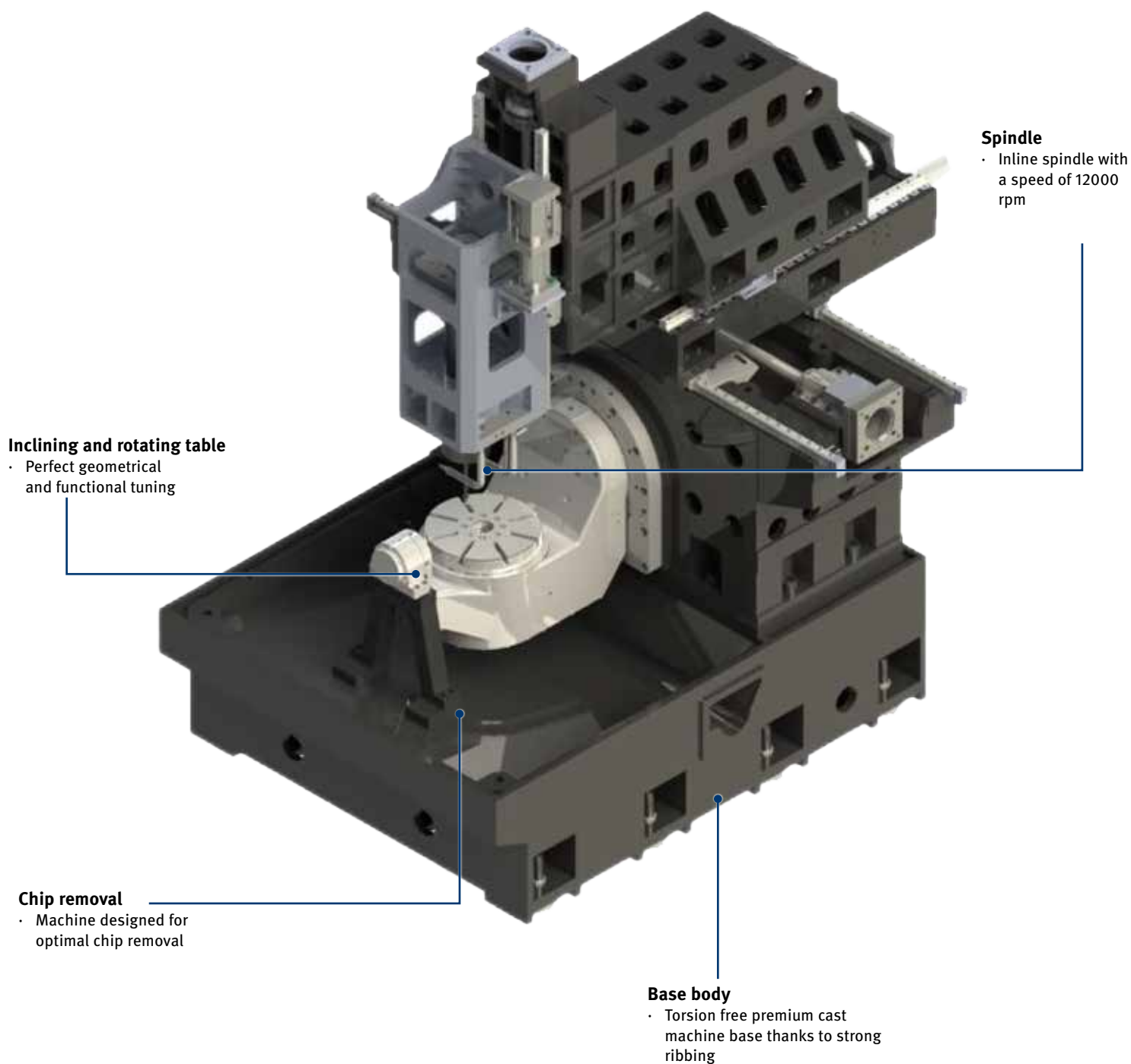
**Art.no: 352134015**

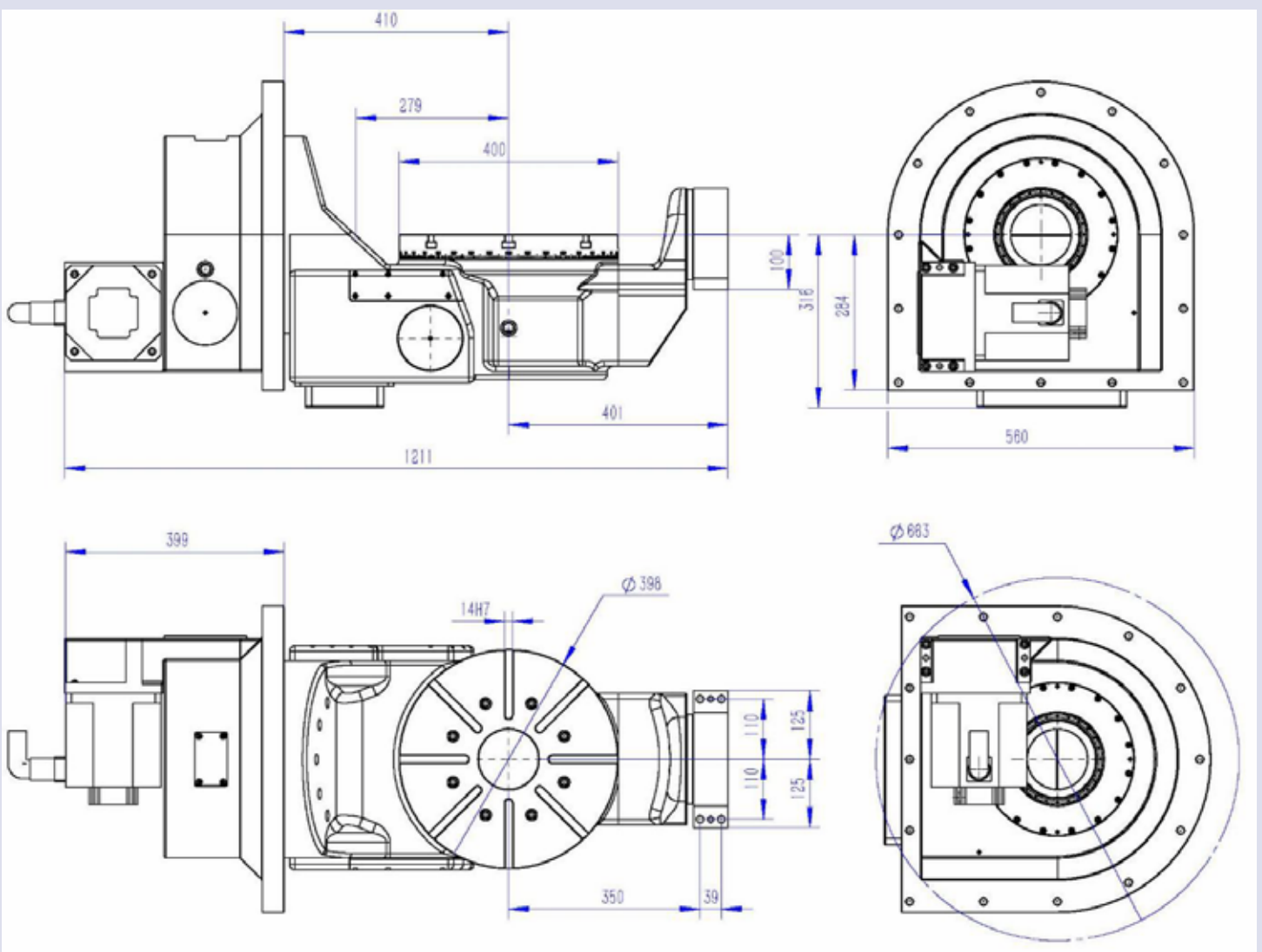
### TOP SPEED PLUS

- Significant increase in machining speed in mould making
- "New, innovative filter technology allows higher jerk for each machine axis and thus an increase in dynamics for 3 / 5-axis simultaneous machining"
- High contour accuracy without excitation of machine vibrations

- Extension of technology G-Code group 59 by DYNPREC
- Expansion of technology G-Code Group 39 CPRECON and CPRECOF (programmable contour accuracy)







| STARTER SET |   |                         |                                                         |
|-------------|---|-------------------------|---------------------------------------------------------|
| 3536108     | 1 | <b>Starter set BT40</b> | Information on the starter set can be found at page 292 |

| TOOL MEASURING / WORKPIECE MEASURING                                                           |   |                                                                    |                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------|---|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 352134006                                                                                      | 2 | <b>BLUM TC52</b><br>Universal measuring probe                      | <ul style="list-style-type: none"> <li>Switching point repeatability of 0.3µm 2σ at 2 m/min. Measuring speed</li> <li>Wear-free and durably stable</li> <li>Very compact probe with 40 mm diameter</li> </ul>            |
| 352134008                                                                                      | 3 | <b>BLUM ZX-Speed</b>                                               |                                                                                                                                                                                                                          |
| 352134009                                                                                      | 4 | <b>Renishaw OMP 60</b><br>Probes with optical signal transmission  | <ul style="list-style-type: none"> <li>For testing and setting up workpieces on machining centres</li> <li>Compact, touch-sensitive 3D touch probe.</li> <li>Reliably modulated, optical signal transmission.</li> </ul> |
| 352134010                                                                                      | 5 | <b>Renishaw TS 27R</b><br>Touch probe for tactile tool measurement | <ul style="list-style-type: none"> <li>Tool breakage check</li> <li>Compact, tactile 3D tool probe with wired signal transmission</li> </ul>                                                                             |
| Information on Renishaw laser systems and measuring probes also ex stock Germany from page 288 |   |                                                                    |                                                                                                                                                                                                                          |

| SOFTWARE  |  |                                 |  |
|-----------|--|---------------------------------|--|
| 352134015 |  | <b>S03 Collision monitoring</b> |  |



## 1 BT 40 STARTER SET



- 1 pc. cutter head tool holder
- 1 pc. quick clamping drill chuck 1 - 13 mm
- 2 each Weldon 6 mm and 20 mm
- 1 each Weldon 8 / 10 / 12 / 16 mm
- 1 pc. Adapter BT 40 to MT 3
- 4 pcs. Collet chuck holder ER 32
- 1 pc. Collet chuck spanner ER 32
- 18-part collet chuck set ER 32
- 1 pc. Height-adjuster
- 1 pc. Assembly and tool adjustment gauge
- 15 pcs. pull stud
- 1 pc. taper squeegee

## 2 BLUM TC 52



- Universal measuring probe for the shortest measuring times under the harshest conditions. Unrivalled precision and fast work-piece measuring thanks to modern, multi-directional measuring system with optical/electronic switching signal generation.

## 3 BLUM ZX SPEED



- Economical solutions for tool length and radius adjustment and tool break monitoring. Precise and reliable measurements thanks to state-of-the-art measuring technology with optoelectronic switching signal generation.

## 4 RENISHAW OMP 60



- The OMP60 is a compact 3D touch probe with optical signal transmission that can be optimally configured for a wide range of applications
- The integrated voltage converter allows any type of rechargeable battery or battery pack to be used

## 5 RENISHAW TS 27R



- Proven kinematic design.
- Interference-resistant, wired communication
- Cost-effective tool measurement for all types of machining centres.
- Repeat accuracy of 1.00 µm (2)



# FU 450

## 5-AXIS SIMULTANEOUS MACHINING CENTRE FOR MAXIMUM PRODUCTIVITY

### SIEMENS CONTROL SINUMERIK ONE

---

- Heavy duty version
- High productivity
- Telescopic guideway cover
- Precision-ground, preloaded high-performance ball screws for high rapid traverse speeds
- Spindle borne on P5 precision bearings and permanently lubricated
- High-torque servo drives on all five axes
- Precision linear guides
- Heidenhain glass scales for higher accuracy
- Fast rapid motion speed of up to 40 m/min.
- A and C-axis with torque motor for maximum speed and lifetime accuracy
- The portable, electronic handwheel with enabling switch and emergency stop pushbutton makes it much easier to run in programmes.
- Double arm gripper tool changer with 40 tool stations in standard scope of delivery
- Coolant unit with 500 litre coolant tank, including chip flushing system and cleaning gun
- Automatic centralised lubrication
- RJ45 plug-in connection, USB connection and 230 V power connection
- Additional USB interface on the control panel
- Water circuit cooling unit for the main spindle and main spindle motor
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- Collision Avoidance - Software for collision avoidance
- Coolant through spindle, 40 bar with internal tank (an extraction unit is required)
- Air conditioner
- Encoder for A and C axis
- EMC Electromagnetic compatibility
- Two years' SIEMENS repair service contract included. Extension of the SIEMENS Supplementary Repair Service Contract (RSV) page 199
- Information on maintenance contracts, page 333



## TECHNICAL DATA

| Models                                               | FU 450                |
|------------------------------------------------------|-----------------------|
| Article no.                                          | 3522100               |
| <b>Spindle</b>                                       | <b>Motor spindle</b>  |
| <b>Machine data</b>                                  |                       |
| Electrical connection                                | 400 V / 3 Ph ~50 Hz   |
| Total connected load                                 | 35 kVA                |
| <b>Milling spindle</b>                               |                       |
| Drive motor S1 operation                             | 15 kW                 |
| Torque drive motor S1 operation                      | 33.2 Nm               |
| Drive motor S6 30 % operation                        | 18.5 kW               |
| Torque drive motor S6 30 % operation                 | 45.2 Nm               |
| Spindle seat                                         | HSK 63                |
| <b>Milling precision</b>                             |                       |
| Repeat accuracy                                      | ± 0.003 mm            |
| Positioning accuracy                                 | ± 0.004 mm            |
| (A/C) Repeatability                                  | 4''                   |
| (A/C) Positioning accuracy                           | 8''                   |
| <b>Tool changer</b>                                  |                       |
| Type                                                 | Double arm gripper    |
| Number of tool stations                              | 40 slots              |
| Max. tool diameter                                   | 80 mm                 |
| Max. tool diameter (adjacent slots free)             | 120 mm                |
| Tool length                                          | 300 mm                |
| Max. tool weight                                     | 8 kg                  |
| Tool change time, chip to chip                       | 3.5 seconds           |
| <b>Travel</b>                                        |                       |
| X axis                                               | 450 mm                |
| Y axis                                               | 500 mm                |
| Z axis                                               | 400 mm                |
| <b>Feed drive</b>                                    |                       |
| X axis rapid traverse                                | 48 m/min.             |
| Y axis rapid traverse                                | 40 m/min.             |
| <b>Motor torque</b>                                  |                       |
| X axis                                               | 10 Nm                 |
| Y / Z axis                                           | 15.5 Nm               |
| <b>Speed range</b>                                   |                       |
| Speeds*                                              | 10 - 18000 rpm        |
| <b>Pneumatics</b>                                    |                       |
| Compressed air                                       | 6 bar                 |
| <b>Cooling systems</b>                               |                       |
| Tank capacity cooling lubricant tank                 | 500 litres            |
| Tank capacity of external CTS unit                   | 230 L                 |
| Pump motor front/left chip flushing/delivery rate    | 3 kW                  |
| Pump motor cleaning gun/delivery rate                | 0,55 kW               |
| <b>Inclining and rotating table</b>                  |                       |
| Table diameter                                       | 450 mm                |
| T-slot size / amount                                 | 14 mm / 8             |
| Maximum payload                                      | 300 kg                |
| <b>Axis C</b>                                        |                       |
| Rotating axis                                        | 360°                  |
| Hydraulic clamping torque                            | 650 Nm                |
| Max. permissible torque (S1 operation/ S6 operation) | 340 Nm                |
| Maximum rotational speed (worm gear)                 | max. 80 rpm           |
| <b>A axis</b>                                        |                       |
| Tilting axis                                         | ± 120°                |
| Hydraulic clamping torque of tilting axis            | 2500 Nm               |
| Max. permissible torque (S1 operation/ S6 operation) | 1200 Nm               |
| Maximum tilting speed (torque motor)                 | max. 50 rpm           |
| <b>Dimensions/weight</b>                             |                       |
| Length x width x height                              | 3400 x 3500 x 2940 mm |
| Overall weight                                       | 8000 kg               |

# SINUMERIK ONE

SINUMERIK ONE, the digital native CNC, brings your ideas to life. SINUMERIK ONE is the trendsetting CNC system for highly productive machine tools. For undreamt-of new possibilities, ideas and business models. For faster innovations through the seamless interaction of the virtual and real worlds. And: SINUMERIK ONE is much more than a powerful hardware innovation. Through its digital twin, it is the key element for digital transformation and helps to simulate and test work processes completely virtually.



## THE ADVANTAGES OF SINUMERIK ONE AT A GLANCE

### MAXIMISE PRODUCTIVITY

SINUMERIK ONE sets standards in machining speed and quality. The CNC system maximises machine tool productivity through the highest PLC and CNC performance. The integrated SIMATIC S7-1500F PLC enables up to 10 times faster PLC cycle times than the predecessor PLC. SINUMERIK ONE makes machine tools more productive - and thus more flexible, faster and more efficient.

### PURSUE NEW WAYS OF THINKING- INSPIRE DIGITALLY

Run MyVirtual Machine, the digital twin of machining, optimises machine tool utilisation. Unproductive times at the machine are reduced to a minimum and consistently shifted to work preparation. This creates space for new ways of thinking. And with the right business model, the digital twin can generate additional business around the machine tool.

#### RSV warranty

With the warranty, you protect your machine against warranty damage for 24 or 36 months. (must be purchased with the purchase of the machine)

24 months; Article no. 3589036

36 months; Article no. 3589037

Siemens connection guarantee 12 months based on warranty RSV

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Information on the warranty can be found at [www.optimum-maschinen.de](http://www.optimum-maschinen.de)

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With its product Run MyVirtual Machine, Siemens AG has developed an ideal platform for creating and operating a digital twin. Especially in vocational training, training on virtual machines has proven its worth. The trainee can safely test and optimise his NC programs without causing damage to a real machine. Moreover, educational institutions often lack the resources to run more than one CNC machine. The decision to teach the machining process turning or milling is no longer necessary when training on the digital twin - almost every machine type and every kinematics can be simulated.

for school education only

Article no.: 3584855 Operate

Article no.: 3584156 3 D machine

### DIGITAL TWIN

in training and production- protects your machine from expensive damage.

The digital twin contains a virtual image of the machine from the original machine data with animated tool change and the VNCK (Virtual NC Core). Tools and set-ups can be managed by the machine user himself. On request





## AN END-TO-END SOLUTION ALONG THE VALUE CHAIN RAISES NEW POTENTIAL FOR MACHINE OPERATORS

### ELEGANT DESIGN

- Ergonomic, modern operating hardware in "Blackline plus" design
- Metal design provides a premium look and feel
- Operate intuitively and efficiently
- Attractive front design
- High-quality workmanship for smooth continuous operation

### FEATURE / FUNCTION

- SINUMERIK blackline plus Panel
- Slim, robust aluminium housing
- Horizontally and vertically applicable
- Scratch-resistant, continuous glass front
- Projected capacitive multi-touch technology
- Recognise 5 fingers at the same time

### BENEFITS

- Operate intuitively and efficiently
- Attractive front design
- High-quality workmanship for smooth continuous operation

### NCU 1750

- 31 Axes/spindles
- PLC S7-1500F

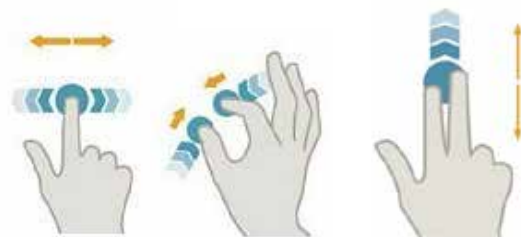


### Excerpt from the gestures of multitouch operation

Intelligent gesture operation with touch panels, even with working gloves  
Capacitive touch for industrial use  
Palm recognition  
Detection of liquids and impurities

19 inch

Full HD  
1080



### SINUMERIK ONE - 50% INCREASED NCK PERFORMANCE COMPARED TO 840D SL



Reduction of the block cycle time by 50%

Reduced production time of the component

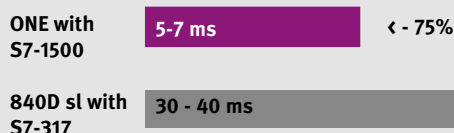
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Significant reduction of non-productive time due to 10x faster PLC

Improved surface quality, as the milling paths are processed more cleanly

### REDUCTION OF THE PLC CYCLE TIME BY UP TO 75%



## STANDARD EQUIPMENT SINUMERIK ONE

### SINUMERIK ONE "ONE DYNAMICS" INCLUDED

- 3D tool radius correction
- Measure kinematics
- Shopmill
- DXF Reader
- Residual material detection and processing
- 3D simulation
- Simultaneous recording
- TRANSMIT/cylinder surface transformation
- Advanced surface
- Top surface
- Top speed plus
- Measuring cycles
- HMI user memory, extended to SD card of the NCU/PPU
- Processing external memories EES

### SINUMERIK ONE DYNAMICS

#### THE ALL-ROUND CAREFREE PACKAGES FOR THE MACHINE OPERATOR

- + Efficient programming in the workshop
- + Best surface quality from CAD-CAM chain generated NC programs
- + High dynamics and speed for a sustainable increase in productivity
- + Scalable and expandable by machine builders with machine-specific functions

**SINUMERIK ONE Dynamics = Maximum comfort and productivity for the machine operator**

### PROTECT MyMACHINE

- Protect MyMachine
- Integrated collision avoidance with 3D primitives
- Machine protection
- Monitoring the minimum distance of protected areas from each other
- Describe protective areas by means of basic bodies
- Multi-channel capable
- Cost-effective entry to protect the machine
- Cross-channel protection of machine components
- Reduced computational load on the CNC, thus no loss of performance

### PROTECT MYMACHINE/3D PRIMITIVES

**S03**

Art. Nr.: 3522100011

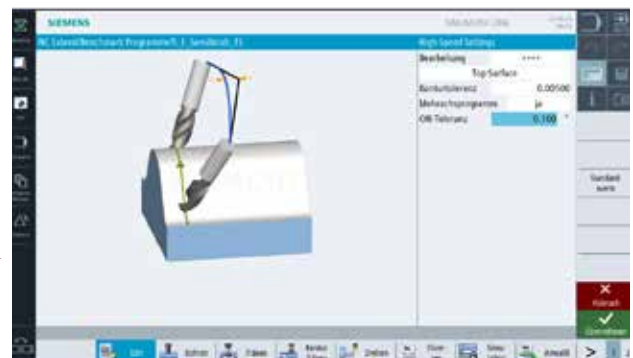
#### Machine protection

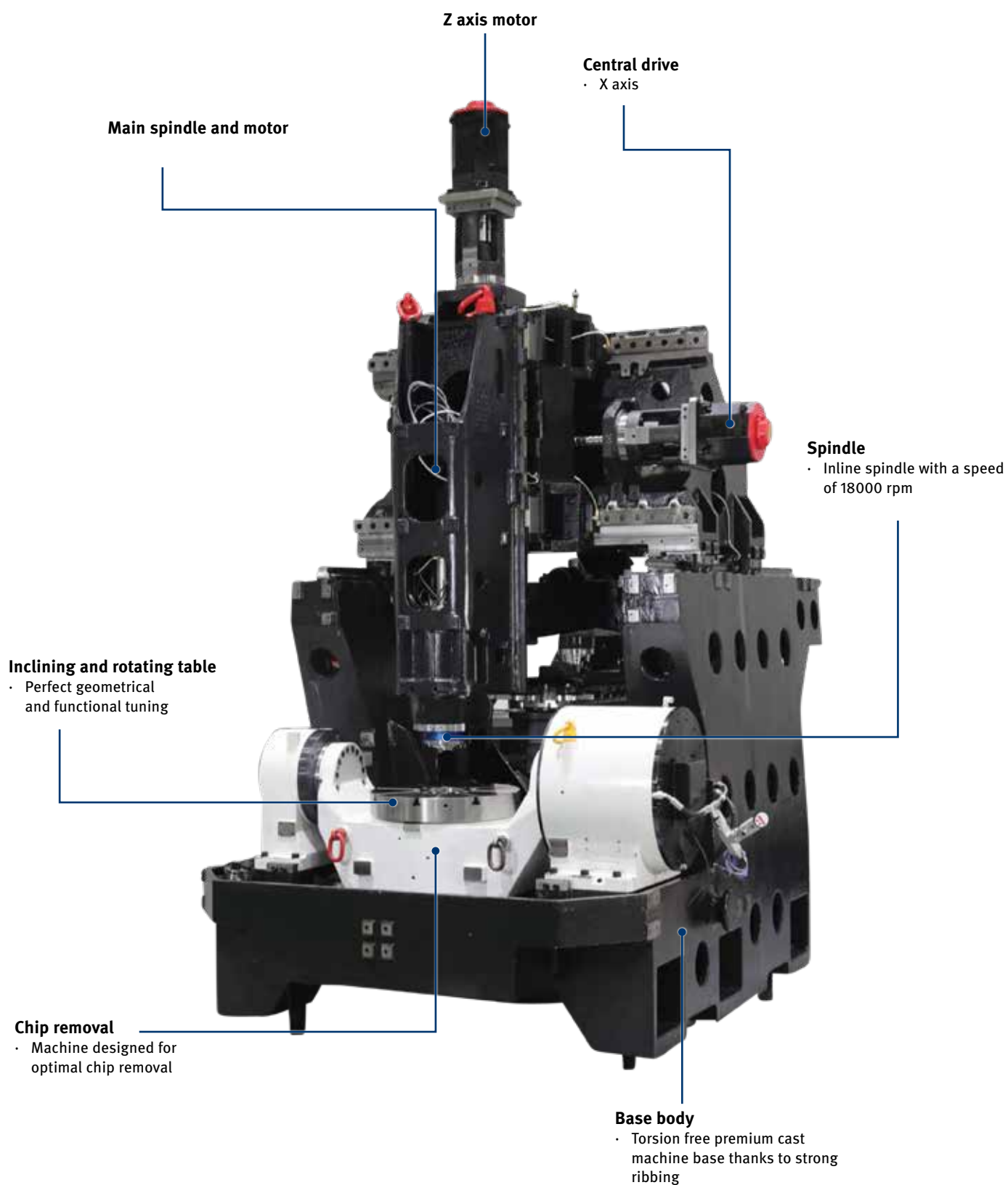
- Protected area elements
  - Cuboid, cylinder, sphere, truncated cone
  - Up to 34 elements
  - Up to 17 protected areas
  - Up to 10 collision pairs
- **Single-channel**
- HMI visualisation

### TOP SPEED PLUS

- Significant increase in machining speed in mould making
- "New, innovative filter technology allows higher jerk for each machine axis and thus an increase in dynamics for 3 / 5-axis simultaneous machining"
- High contour accuracy without excitation of machine vibrations

- Extension of technology G-Code group 59 by DYNPREC
- Expansion of technology G-Code Group 39 CPRECON and CPRECOF (programmable contour accuracy)



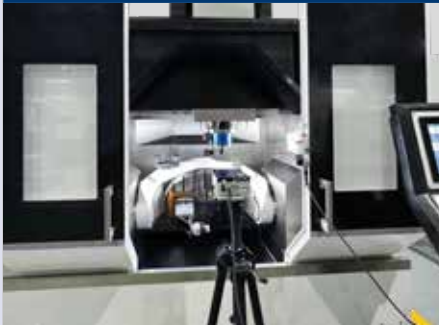


#### INCLINING AND ROTATING TABLE



- Table diameter Ø 450 mm
- Table load 300 kg
- (A/C) Repeatability 4“
- (A/C) Positioning accuracy 8“
- 360° axis of rotation
- Tilting axis ± 120°

#### SURVEYING



- Geometry measurement before delivery to ensure the quality and reliability of the machine

#### CTS SYSTEM



- Coolant through spindle. With coolant through the spindle, coolant is fed directly to the cutting edge of the tool or to the machining zone via the spindle. This ensures effective heat dissipation, which prevents overheating and the associated damage to the tool and workpiece

#### WATER COOLING



- for motor and spindle
- Water cooling enables effective dissipation of the heat generated during operation.
- The constant operating temperature contributes to the stability of the machining processes. This is particularly important for precise CNC applications

#### CENTRAL LUBRICATION



- Continuous and even lubrication helps to extend the service life of the machine and its components
- Centralised lubrication systems make maintenance easier

| STARTER SET |   |                             |                                                         |
|-------------|---|-----------------------------|---------------------------------------------------------|
| 3536110     | 1 | <b>Starter set HSK A-63</b> | Information on the starter set can be found at page 292 |

| TOOL MEASURING / WORKPIECE MEASURING                                                             |   |                                                                    |                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------|---|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3522095005*                                                                                      | 2 | <b>BLUM TC52</b><br>Universal measuring probe                      | <ul style="list-style-type: none"><li>• Switching point repeatability of 0.3µm 2σ at 2 m/min. Measuring speed</li><li>• Wear-free and durably stable</li><li>• Very compact probe with 40 mm diameter</li></ul>            |
| 3522095006*                                                                                      |   | <b>BLUM LaserControl LC50 -DIGILOG</b><br>Laser measuring system   | <ul style="list-style-type: none"><li>• Highly dynamic measurements of all tool characteristics</li><li>• Non-contact measurement<br/>Detection of geometry changes, such as cutting edge wear</li></ul>                   |
| 3522095002                                                                                       | 4 | <b>Renishaw OMP 60</b><br>Probes with optical signal transmission  | <ul style="list-style-type: none"><li>• For testing and setting up workpieces on machining centres</li><li>• Compact, touch-sensitive 3D touch probe.</li><li>• Reliably modulated, optical signal transmission.</li></ul> |
| 3522095003                                                                                       | 5 | <b>Renishaw TS 27R</b><br>Touch probe for tactile tool measurement | <ul style="list-style-type: none"><li>• Tool breakage check</li><li>• Compact, tactile 3D tool probe with wired signal transmission</li></ul>                                                                              |
| 3522095004                                                                                       |   | <b>Renishaw NC 4</b><br>Laser system for tool measurement          | <ul style="list-style-type: none"><li>• Non-contact tool inspection system NC4 is a high-precision, extremely fast solution for tool measurement and breakage control</li></ul>                                            |
| ➡ Information on Renishaw laser systems and measuring probes also ex stock Germany from page 288 |   |                                                                    |                                                                                                                                                                                                                            |

| SPINDLE    |  |                                      |                                                                                               |
|------------|--|--------------------------------------|-----------------------------------------------------------------------------------------------|
| 3522095001 |  | <b>Main spindle HSK63, 24000 rpm</b> | <ul style="list-style-type: none"> <li>instead of the standard equipment 18000 rpm</li> </ul> |

| MAINTENANCE |  |                                               |                                                                    |
|-------------|--|-----------------------------------------------|--------------------------------------------------------------------|
| 3589180     |  | <b>Liquid cooling maintenance</b>             | <ul style="list-style-type: none"> <li>without material</li> </ul> |
| 3589200     |  | <b>Material for maintenance water cooling</b> | <ul style="list-style-type: none"> <li>at cost</li> </ul>          |

| SOFTWARE   |   |                                           |                                                                                                                                                                 |
|------------|---|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3522095009 |   | <b>Function S16- Spline interpolation</b> | <ul style="list-style-type: none"> <li>Spline interpolation (A, B and C splines)*</li> </ul>                                                                    |
| 3522095011 |   | <b>Collision Avoidance</b>                | <ul style="list-style-type: none"> <li>Software for collision avoidance</li> </ul>                                                                              |
| 3522095010 | 6 | <b>NCU1760 upgrade</b>                    |                                                                                                                                                                 |
| 3522095008 | 7 | <b>Function S22 - Jerk adjustment</b>     | <ul style="list-style-type: none"> <li>Jerk adjustment. Increase in axle dynamics outside machining combined with a reduction in non-productive time</li> </ul> |



## 1 HSK 63 STARTER SET



- Cutter head holder with 27 mm receptacle 1
- Chuck 1 - 13 mm 3
- Weldon 6 / 8 / 10 / 12 / 16 / 20 mm 4
- Adapter HSK63 to MT 3 2
- Collet spanner 5
- Collet set 6
- Swivelling mounting block 7
- Taper squeegee 8

## 2 BLUM TC52



- Unrivalled precision and fast workpiece measuring thanks to modern, multidirectional measuring system with optical/electronic switching signal generation.

## 3 LASERCONTROL LC50 -DIGILOG



- Premium laser measuring system for tool measurement and tool monitoring
- The most advanced laser measuring system worldwide**
- Highly dynamic measurements of all tool characteristics
- Detection of geometry changes, such as cutting edge wear

## 4 RENISHAW OMP 60



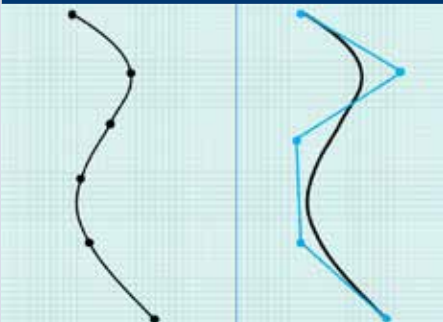
- The OMP60 is a compact 3D touch probe with optical signal transmission that can be optimally configured for a wide range of applications
- The integrated voltage converter allows any type of rechargeable battery or battery pack to be used

## 5 RENISHAW TS 27R



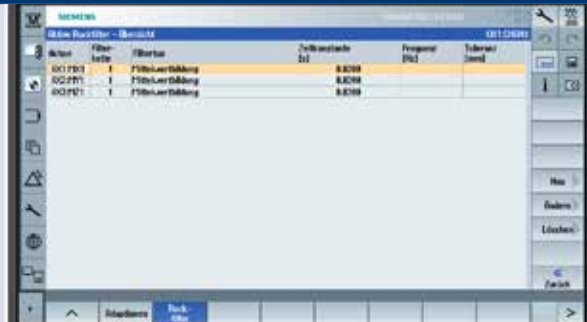
- Proven kinematic design.
- Interference-resistant, wired communication
- Cost-effective tool measurement for all types of machining centres.
- Repeat accuracy of 1.00 µm (2)

## 6 FUNCTION S16- SPLINE INTERPOLATION



- With the COMPCAD compressor, it is possible to approximate such smooth curves within the compressor tolerance (parallel tool paths) and thus obtain optically high-quality surfaces even with larger tolerances.

## 7 FUNCTION S22 - JERK ADJUSTMENT



- Shorter processing times due to condition-dependent dynamic adjustment
- Automatic position setpoint filter switching at G00 with simultaneous dynamic increase
- Flexible and individual position setpoint filter switching through explicit programming

# FU 5HSC

## 5-AXIS SIMULTANEOUS MACHINING CENTRE FOR MAXIMUM PRODUCTIVITY

### SIEMENS CONTROL SINUMERIK ONE

- Heavy duty version
- ~~High productivity~~
- Telescopic guideway cover
- Precision-ground, preloaded high-performance ball screws for high rapid traverse speeds
- Spindle borne on P5 precision bearings and permanently lubricated
- High-torque servo drives on all five axes
- Precision linear guides
- Heidenhain glass scales for higher accuracy
- Fast rapid motion speed of up to 36 m/min.
- C-axis with torque motor for maximum speed and lifetime accuracy
- A axis with screw drive for high torque during tilting actions
- Z-axis feed motor reinforced
- The portable, electronic handwheel with enabling switch and emergency stop pushbutton makes it much easier to run in programmes.
- Double arm gripper tool changer with 32 tool stations in standard scope of delivery
- Coolant unit with 380 litre coolant tank, including chip flushing system and cleaning gun
- Automatic centralised lubrication
- RJ45 plug-in connection, USB connection and 230 V power connection
- Additional USB interface on the control panel
- Water circuit cooling unit for the main spindle and main spindle motor
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- Collision Avoidance - Software for collision avoidance
- Coolant through spindle, 40 bar with internal tank (an extraction unit is required)
- Air conditioner
- TSC Thermal spindle compensation
- DCM Dynamic Collision Monitoring
- EMC Electromagnetic compatibility
- Two years' SIEMENS repair service contract included. Extension of the SIEMENS Supplementary Repair Service Contract (RSV) page 199
- Information on maintenance contracts, page 333



Follow this for the video presentation of our Optimum FU 5 milling machine

Subscribe to our YouTube channel, to avoid missing any of the new videos: [www.youtube.com/user/OptimumMaschinen](http://www.youtube.com/user/OptimumMaschinen)



Illustration with optional  
SCHUNK vice

## TECHNICAL DATA

| Models                                               | FU 5 HSC                                         |
|------------------------------------------------------|--------------------------------------------------|
| Article no.                                          | 3521100                                          |
| <b>Spindle</b>                                       | <b>Inline spindle</b>                            |
| <b>Machine data</b>                                  |                                                  |
| Electrical connection                                | 400 V / 3 Ph ~50 Hz                              |
| Total connected load                                 | 70 kVA                                           |
| <b>Milling spindle</b>                               |                                                  |
| Drive motor S1 operation                             | 25 kW                                            |
| Torque drive motor S1 operation                      | 105 Nm                                           |
| Drive motor S6 30 % operation                        | 40 kW                                            |
| Torque drive motor S6 30 % operation                 | 261 Nm                                           |
| Spindle seat                                         | SK 40 DIN 69871                                  |
| <b>Milling precision</b>                             |                                                  |
| Repeat accuracy                                      | ± 0.004 mm                                       |
| Positioning accuracy                                 | ± 0.008 mm                                       |
| <b>Tool changer</b>                                  |                                                  |
| Type                                                 | Double arm gripper                               |
| Number of tool stations                              | 32 slots                                         |
| Max. tool diameter                                   | 78 mm                                            |
| Max. tool diameter (adjacent slots free)             | 120 mm                                           |
| Tool length                                          | 300 mm                                           |
| Max. tool weight                                     | 7 kg                                             |
| Tool change time, chip to chip                       | 9.33 seconds                                     |
| <b>Travel</b>                                        |                                                  |
| X axis                                               | 600 mm                                           |
| Y axis                                               | 600 mm (+500 mm und -100 mm)                     |
| Z axis                                               | 500 mm                                           |
| <b>Feed drive</b>                                    |                                                  |
| Acceleration X, Y, Z axis                            | 7 m/s <sup>2</sup>                               |
| Rapid traverse X/Y/Z axis                            | 36 m/min.                                        |
| <b>Motor torque</b>                                  |                                                  |
| X, Y axis                                            | 22 Nm                                            |
| Z axis                                               | 27 Nm                                            |
| <b>Feed forces</b>                                   |                                                  |
| X, Y axis                                            | 10 kN                                            |
| Z axis                                               | 13.5 kN                                          |
| <b>Speed range</b>                                   |                                                  |
| Speeds*                                              | 15 000 rpm                                       |
| <b>Pneumatics</b>                                    |                                                  |
| Compressed air                                       | 6 bar                                            |
| <b>Cooling systems</b>                               |                                                  |
| Tank capacity cooling lubricant tank                 | 380 litres                                       |
| Tank capacity of external CTS unit                   | 165 litres                                       |
| Pump motor chip flushing/delivery rate               | 0.85 kW / 150 l/min                              |
| Pump motor front/left chip flushing/delivery rate    | 1.08 kW / 150 l/min                              |
| Pump motor cleaning gun/delivery rate                | 0.53 kW / 58 l/min                               |
| <b>Inclining and rotating table</b>                  |                                                  |
| Table diameter                                       | 600 mm                                           |
| T-slot size / amount / distance                      | 14 mm / 7 / 75 mm                                |
| Maximum payload                                      | 600 kg                                           |
| <b>Axis C</b>                                        |                                                  |
| Rotating axis                                        | 360°                                             |
| Hydraulic clamping torque                            | 1200 Nm (at 50 bar hydraulic operating pressure) |
| Maximum rotational speed (worm gear)                 | max. 90 rpm                                      |
| <b>A axis</b>                                        |                                                  |
| Tilting axis                                         | ± 120°                                           |
| Hydraulic clamping torque of tilting axis            | 2900 Nm (at 50 bar hydraulic operating pressure) |
| Max. permissible torque (S1 operation/ S6 operation) | 393 Nm / 707 Nm                                  |
| Maximum tilting speed (torque motor)                 | max. 16.6 rpm                                    |
| <b>Dimensions</b>                                    |                                                  |
| Length x width x height                              | 3015 x 4440 x 3000 mm                            |
| Overall weight                                       | 9150 kg                                          |

\* Please note that the maximum spindle speed must be reduced by approx. 20 % in continuous operation

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Article no.: 3584156 3 D machine

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### NCU 1760

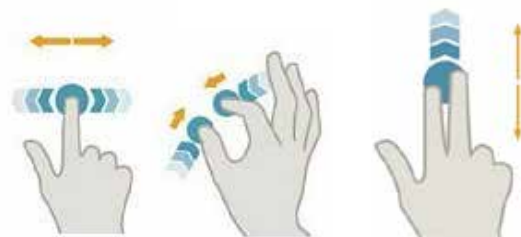
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Full HD  
1080



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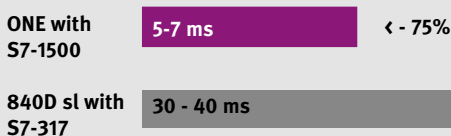
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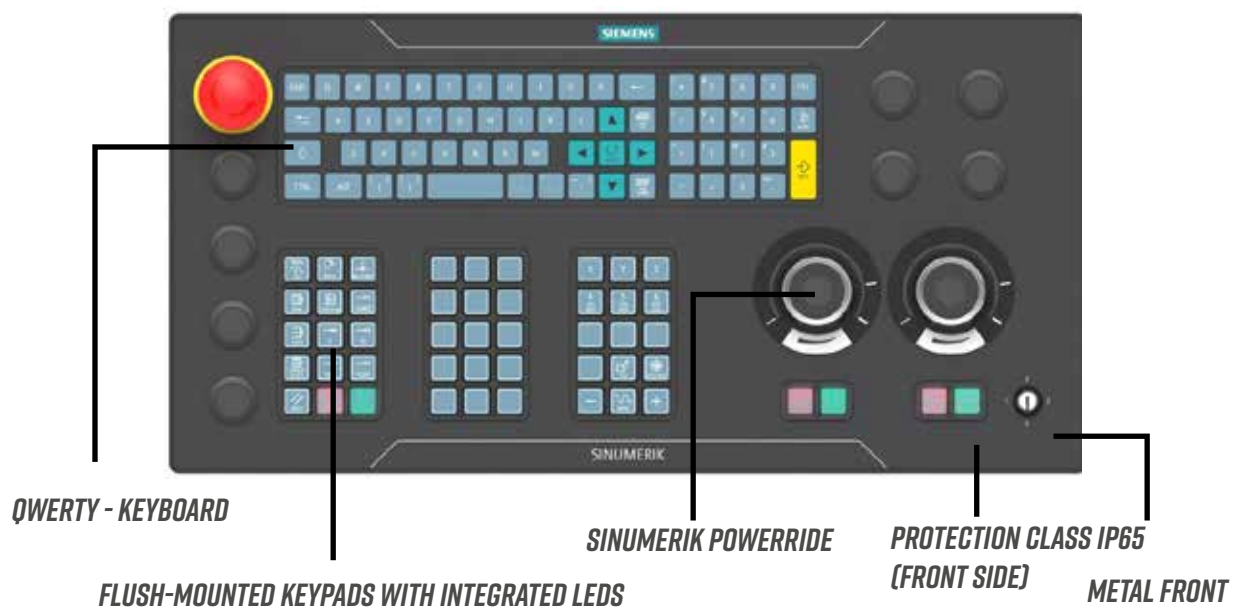
### REDUCTION OF THE PLC CYCLE TIME BY UP TO 75%



## SINUMERIK ONE MCP COMPONENT ARRANGEMENT

### MCP

- Ergonomic and elegant design
- Robust and narrow metal front
- IP65 front
- Powerride as a standard component
- SINUMERIK Powerride combines override switch and NC start button in one operating component
- SINUMERIK Powerride rotary knob without end position with haptic feedback when defined limit value is exceeded
- Configurable hold
- Free installation spaces are prepared
- QWERTY keyboard as standard component
- Keypads with integrated RGB LED lighting



Standard layout optimised for SINUMERIK, based on US configuration  
Layout with 4 lines for complete alphabetical part and for numerical part

## SINUMERIK POWERRIDE

### INNOVATIVE TECHNOLOGY

- SINUMERIK Powerride as standard component
- Combines override switch and NC start button in one operating component
- Noble, innovative design
- Concave shape of the knob
- Integrated LED scale for visualisation of the current ACTUAL values
- Automatic reset of the feed after the end of the set only if configurable stop (CST) is selected
- Rotary knob without end position
- Haptic feedback when defined limit values are exceeded
- Configured stop



| Feature / Function                                                                                                                                                      | Benefits                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Combines override switch and NC start button in one operating component                                                                                                 | Simple and efficient set-up                                                                                                                                  |
| Noble, innovative design<br>Concave shape of the knob                                                                                                                   | Realisation of innovative operating concepts<br>Improving ergonomics                                                                                         |
| Integrated LED scale for visualisation of the current ACTUAL values<br>Automatic reset of the feed after the end of the set only if configurable stop (CST) is selected | Faster recognition of the current actual value<br>More effective and easier operation                                                                        |
| Rotary knob without end position<br>Haptic feedback when defined limit values are exceeded                                                                              | Increased awareness of the defined limits<br>Supports blind operation                                                                                        |
| Configured stop                                                                                                                                                         | No additional licence costs<br>Fine tuning possible<br>Configured stop (CST)<br>Additional high safety during run-in in combination with SINUMERIK Powerride |

## STANDARD EQUIPMENT SINUMERIK ONE

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- 3D tool radius correction
- Measure kinematics
- Shopmill
- DXF Reader
- Residual material detection and processing
- 3D simulation
- Simultaneous recording
- TRANSMIT/cylinder surface transformation
- Advanced surface
- Top surface
- Top speed plus
- Measuring cycles
- HMI user memory, extended to SD card of the NCU/PPU
- Processing external memories EES
- Protect MyMachine S03

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**SINUMERIK ONE Dynamics = Maximum comfort and productivity for the machine operator**

### PROTECT MyMACHINE

- Protect MyMachine
- Integrated collision avoidance with 3D primitives
- Machine protection
- Monitoring the minimum distance of protected areas from each other
- Describe protective areas by means of basic bodies
- Multi-channel capable
- Cost-effective entry to protect the machine
- Cross-channel protection of machine components
- Reduced computational load on the CNC, thus no loss of performance

### PROTECT MYMACHINE/3D PRIMITIVES

**S03**

Art. Nr: 3522100011

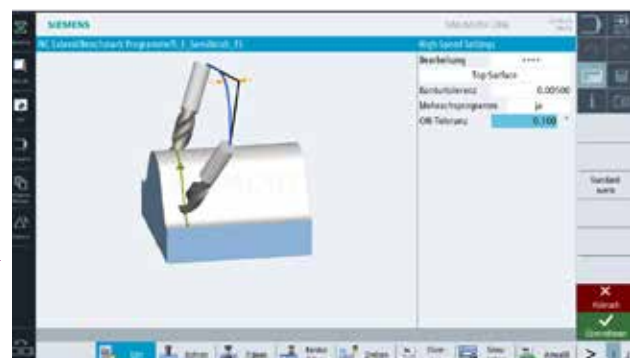
#### Machine protection

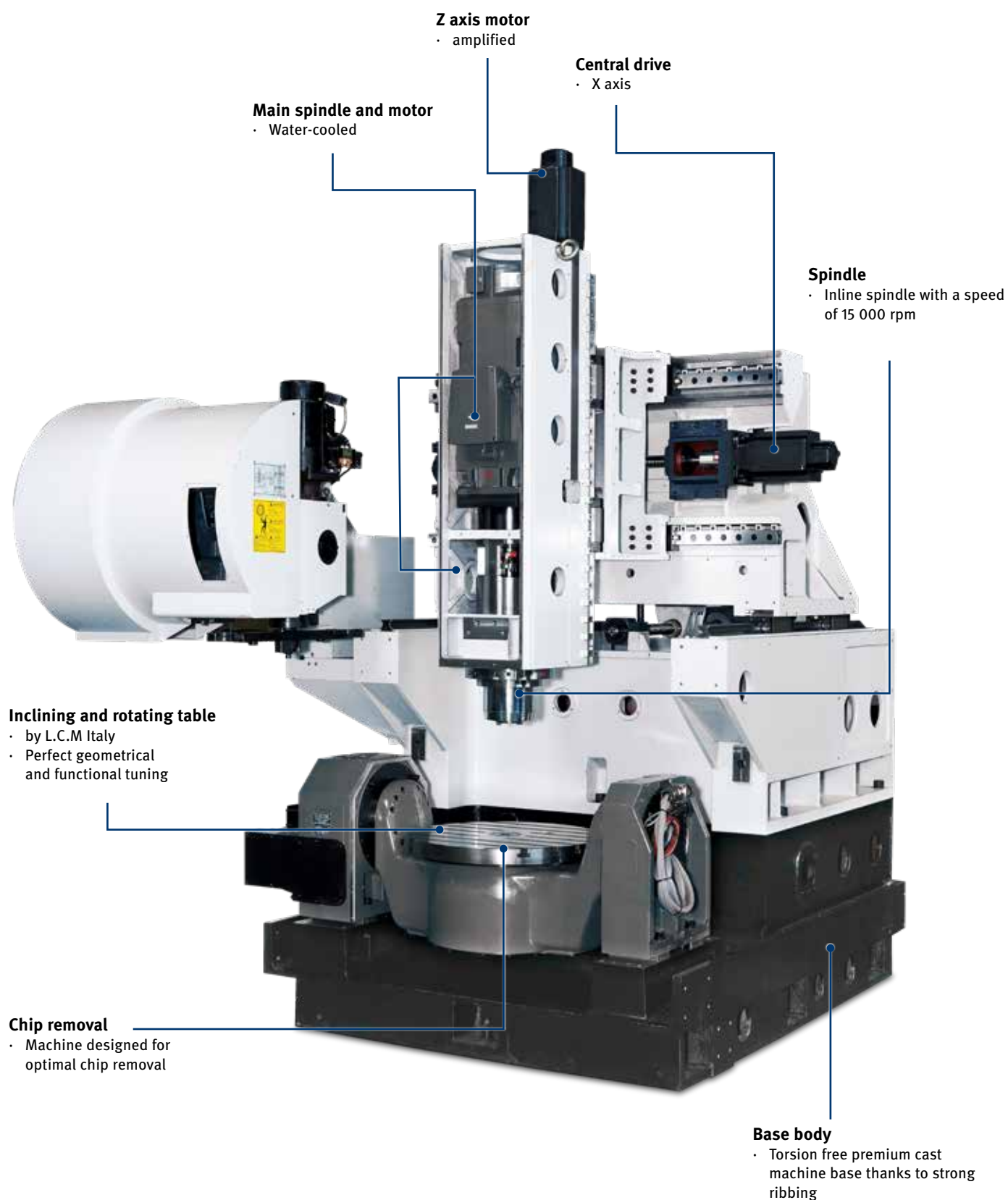
- Protected area elements
  - Cuboid, cylinder, sphere, truncated cone
  - Up to 34 elements
  - Up to 17 protected areas
  - Up to 10 collision pairs
- **Single-channel**
- HMI visualisation

### TOP SPEED PLUS

- Significant increase in machining speed in mould making
- "New, innovative filter technology allows higher jerk for each machine axis and thus an increase in dynamics for 3 / 5-axis simultaneous machining"
- High contour accuracy without excitation of machine vibrations

- Extension of technology G-Code group 59 by DYNPREC
- Expansion of technology G-Code Group 39 CPRECON and CPRECOF (programmable contour accuracy)







## INCLINING AND ROTATING TABLE



- Max. rotational speed 90 rpm
- Max. tilt speed 16.6 rpm
- 3x hydraulic and 1x pneumatic connections (without valves)
- High-precision A axis & C axis
- Maximum table load 600 kg

## FEED AXES



- direct driven
- Rapid traverse X, Y, Z axis 36 m/min.

## TOOL CHANGER



- Double arm gripper
- Drum magazine
- 32 tool slots
- Tool diameter max. 78 mm
- Tool length 300 mm
- Tool weight max. 7 kg
- Tool change time, chip to chip 9.33 seconds

## GREASE LUBRICATION



- Reduces wear
- High load-bearing capacity
- Excellent lubricant film
- Low maintenance
- Good adhesion properties

## OIL SEPARATOR / OIL SKIMMER



- Oil separator reliably removes floating foreign oils and the finest chip abrasion from cooling lubricants. It ensures that the oil remains clean and reusable or can be disposed of in an environmentally friendly manner

## GUIDES



- high-precision roller guides on all three axes
- Front linear guides contain additional guide carriages to ensure dynamic stability

## CONTROL



- Next generation control panel with new machine control options
- Modern Multitouch screen interface

## CHIP CONVEYOR



- Conveyor version
- for efficient chip discharge

## WATER CIRCULATION UNIT



- Main spindle and main spindle motor cooling

| STARTER SET |   |                                      |                                                           |
|-------------|---|--------------------------------------|-----------------------------------------------------------|
| 3536109     | 1 | <b>Starter set SK 40 / DIN 69871</b> | ➔ Information on the starter set can be found at page 296 |
| 3536110     |   | <b>Starter set HSK A-63</b>          | ➔ Information on the starter set can be found at page 292 |

| TOOL MEASURING / WORKPIECE MEASURING |   |                                                                  |                                                                                                                                                                                                               |
|--------------------------------------|---|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 352110020*                           | 2 | <b>BLUM TC52IR</b><br>Universal measuring probe                  | <ul style="list-style-type: none"> <li>Switching point repeatability of 0.3µm 2σ at 2 m/min. Measuring speed</li> <li>Wear-free and durably stable</li> <li>Very compact probe with 40 mm diameter</li> </ul> |
| 352110021*                           |   | <b>BLUM LaserControl LC50 -DIGILOG</b><br>Laser measuring system | <ul style="list-style-type: none"> <li>Highly dynamic measurements of all tool characteristics</li> <li>Non-contact measurement</li> <li>Detection of geometry changes, such as cutting edge wear</li> </ul>  |
| 3582051                              |   | <b>Kinematic reference sphere</b>                                | <ul style="list-style-type: none"> <li>High-precision reference ball made of stainless solid carbide</li> </ul>                                                                                               |

| MISCELLANEOUS |   |                                                     |                                                                                                                                                                                   |
|---------------|---|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 352110005     | 3 | <b>Spindle upgrade HSK 63</b>                       | <ul style="list-style-type: none"> <li>Instead of standard equipment › Instead of spindle SK40</li> </ul>                                                                         |
| 352110015*    |   | <b>Coolant through spindle CTS</b>                  | <ul style="list-style-type: none"> <li>External power unit, pump pressure 70 bar, tank capacity 165 litres, delivery rate 30 l/min - an extraction unit is recommended</li> </ul> |
| 352110016*    |   |                                                     | <ul style="list-style-type: none"> <li>External unit, Grundfos high pressure 70 bar, with paper filter and cooling unit</li> </ul>                                                |
| 352110018*    |   | <b>Hood for machine work space</b>                  |                                                                                                                                                                                   |
| 352110017*    |   | <b>Air through spindle with valve for actuation</b> |                                                                                                                                                                                   |
| 351138017*    |   | <b>Valve control for table</b>                      |                                                                                                                                                                                   |
| 351138015     |   | <b>Motorex Coolant- Lubricant</b>                   | <ul style="list-style-type: none"> <li>for inline spindles</li> </ul>                                                                                                             |
| 354590050     |   | <b>Grease cartridge LHL - X100-7</b>                | <ul style="list-style-type: none"> <li>for grease lubrication - 700 ml / 680 g grease</li> </ul>                                                                                  |

| TOOL CHANGER                                                                                                                                                                                                                                  |  |                                                                              |                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>If the option tool changer with 60 tool magazine is selected, the tools can be easily changed from the left side during automatic operation to avoid idle times between the switch-on time.</li> </ul> |  |                                                                              |                                                                                                                                                                                                                               |
| 352110011*                                                                                                                                                                                                                                    |  | <b>Double arm gripper tool changer with 60 tool stations for HSK spindle</b> | <ul style="list-style-type: none"> <li>Instead of the standard equipment › Double-arm gripper tool changer with 32 tool stations and SK spindle</li> <li>Required: Spindle upgrade HSK 63 - Article no.: 352110005</li> </ul> |
| 352110010*                                                                                                                                                                                                                                    |  | <b>Double arm gripper tool changer with 60 tool stations</b>                 | <ul style="list-style-type: none"> <li>Instead of standard equipment › Double-arm gripper tool changer with 32 tool stations</li> </ul>                                                                                       |

| MAINTENANCE |  |                                               |                                                                    |
|-------------|--|-----------------------------------------------|--------------------------------------------------------------------|
| 3589180     |  | <b>Liquid cooling maintenance</b>             | <ul style="list-style-type: none"> <li>without material</li> </ul> |
| 3589200     |  | <b>Material for maintenance water cooling</b> | <ul style="list-style-type: none"> <li>at cost</li> </ul>          |

| SOFTWARE  |   |                                           |                                                                                                                                                                 |
|-----------|---|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 352110081 | 5 | <b>Function S16- Spline interpolation</b> | <ul style="list-style-type: none"> <li>Spline interpolation (A, B and C splines)*</li> </ul>                                                                    |
| 352110080 | 6 | <b>Function S22 - Jerk adjustment</b>     | <ul style="list-style-type: none"> <li>Jerk adjustment. Increase in axle dynamics outside machining combined with a reduction in non-productive time</li> </ul> |

**1 STARTER SET SK 40 / DIN 69871**



- Milling head holder 27 mm seat 1
- Chuck 1 - 13 mm 2
- Pull stud 3
- 2 each Weldon 6 mm and 4 mm
- 2 each Weldon 8 / 10 / 12 / 16 mm
- Adapter SK 40 to MT 3 5
- Collet chuck holder ER 32 6
- Collet spanner ER 32 7
- Collet set ER 32 8
- Assembly and tool adjustment gauge 9
- Height-adjuster 10
- Taper squeegee 11

### 3 COOLANT THROUGH SPINDLE



- Guarantees optimal service life
- External unit
- Also with Grundfos high pressure pump
- Pump pressure 20 bars or 70 bars

## 2 KINEMATIC REFERENCE SPHERE



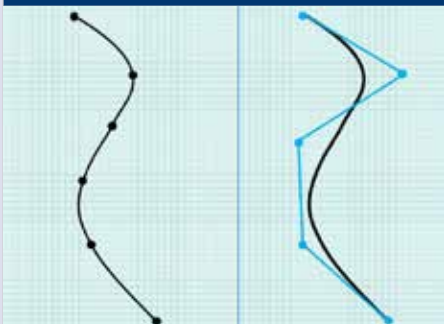
- High-precision reference ball made of stainless solid carbide
- For exact calculation of the positions of the machine axes of the 5-axis machining centre. In order to be able to manufacture sustainably with the highest precision and to detect and rectify possible coordinate errors in the machine after collisions or any errors.

## 4 HOOD



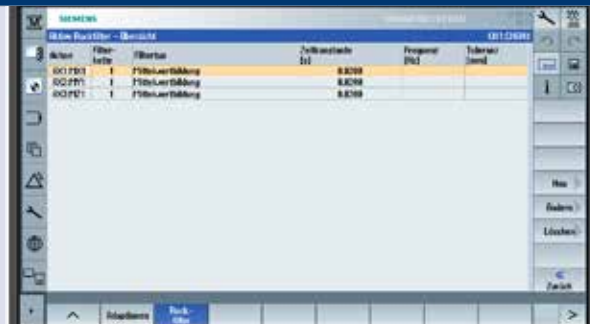
- Easy loading and unloading of heavy and bulky workplaces with a crane
- Top machine space cover
- For oil mist extraction

## 6 FUNCTION S16- SPLINE INTERPOLATION



- With the COMPCAD compressor, it is possible to approximate such smooth curves within the compressor tolerance (parallel tool paths) and thus obtain optically high-quality surfaces even with larger tolerances.

## 7 FUNCTION S22 - JERK ADJUSTMENT



- Shorter processing times due to condition-dependent dynamic adjustment
- Automatic position setpoint filter switching at G00 with simultaneous dynamic increase
- Flexible and individual position setpoint filter switching through explicit programming

# FU 6

## 5-AXIS SIMULTANEOUS MACHINING CENTRE FOR MAXIMUM PRODUCTIVITY

### SIEMENS CONTROL SINUMERIK ONE

- Heavy duty version
- High productivity
- Telescopic guideway cover
- Precision-ground, preloaded high-performance ball screws for high rapid traverse speeds
- Spindle borne on P5 precision bearings and permanently lubricated
- High-torque servo drives on all five axes
- Precision linear guides
- Heidenhain glass scales for higher accuracy
- Fast rapid motion speed of up to 24 m/min.
- A / C axis with torque motor for maximum speed and lifetime accuracy
- The portable, electronic handwheel with enabling switch and emergency stop pushbutton makes it much easier to run in programmes.
- Double arm gripper tool changer with 60 tool stations in standard scope of delivery
- Coolant unit with 480 litre coolant tank, including chip flushing system and cleaning gun
- Automatic centralised lubrication
- RJ45 plug-in connection, USB connection and 230 V power connection
- Additional USB interface on the control panel
- Water circuit cooling unit for the main spindle and main spindle motor as well as for the A and C axes
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- Collision Avoidance - Software for collision avoidance
- Coolant through spindle, 70 bar with internal tank (an extraction unit is required)
- Heat exchanger
- EMC Electromagnetic compatibility
- Two years' **SIEMENS** repair service contract included. Extension of the **SIEMENS** Supplementary Repair Service Contract (RSV) page 199
- Information on maintenance contracts, page 333



Follow this for the video presentation of our Optimum FU 5 milling machine

Subscribe to our YouTube channel, to avoid missing any of the new videos: [www.youtube.com/user/OptimumMaschinen](http://www.youtube.com/user/OptimumMaschinen)





## TECHNICAL DATA

| Models                                            | FU 6                                            |
|---------------------------------------------------|-------------------------------------------------|
| Article no.                                       | 3521360                                         |
| <b>Spindle</b>                                    | <b>Inline spindle</b>                           |
| <b>Machine data</b>                               |                                                 |
| Electrical connection                             | 400 V / 3 Ph ~50 Hz                             |
| Total connected load                              | 70 kVA                                          |
| <b>Milling spindle</b>                            |                                                 |
| Drive motor S1 operation                          | 25 kW                                           |
| Torque drive motor S1 operation                   | 105 Nm                                          |
| Drive motor S6 30 % operation                     | 40 kW                                           |
| Torque drive motor S6 30 % operation              | 261 Nm                                          |
| Spindle seat                                      | HSK 63                                          |
| <b>Milling precision</b>                          |                                                 |
| Repeat accuracy                                   | ± 0.004 mm                                      |
| Positioning accuracy                              | ± 0.010 mm                                      |
| <b>Tool changer</b>                               |                                                 |
| Type                                              | Double arm gripper                              |
| Number of tool stations                           | 60 slots                                        |
| Max. tool diameter                                | 78 mm                                           |
| Max. tool diameter (adjacent slots free)          | 90 mm                                           |
| Tool length                                       | 300 mm                                          |
| Max. tool weight                                  | 8 kg                                            |
| Tool change time, chip to chip                    | 3 seconds                                       |
| <b>Travel</b>                                     |                                                 |
| X axis                                            | 800 mm                                          |
| Y axis                                            | 800 mm                                          |
| Z axis                                            | 600 mm                                          |
| <b>Feed drive</b>                                 |                                                 |
| Rapid traverse X/Y/Z axis                         | 24 m/min.                                       |
| <b>Motor torque</b>                               |                                                 |
| X, Y axis                                         | 22 Nm                                           |
| Z axis                                            | 27 Nm                                           |
| <b>Feed forces</b>                                |                                                 |
| X, Y axis                                         | 10 kN                                           |
| Z axis                                            | 13.5 kN                                         |
| <b>Speed range</b>                                |                                                 |
| Speeds*                                           | 15 000 rpm                                      |
| <b>Pneumatics</b>                                 |                                                 |
| Compressed air                                    | 6 bar                                           |
| <b>Cooling systems</b>                            |                                                 |
| Tank capacity cooling lubricant tank              | 480 litres                                      |
| Tank capacity of external CTS unit                | 165 litres                                      |
| Coolant pump                                      | 1.2 kW / 600 l/h                                |
| Pump motor for the CTS system                     | 1 kW / 400 l/h                                  |
| CTS system                                        | 4 kW / 1,440 l/h                                |
| Pump motor front/left chip flushing/delivery rate | 1.2 kW / 600 l/h                                |
| Pump motor cleaning gun/delivery rate             | 1 kW / 400 l/h                                  |
| <b>Inclining and rotating table</b>               |                                                 |
| Table diameter                                    | 600 mm x 500 mm                                 |
| T-slot size / amount / distance                   | 14 mm                                           |
| Maximum payload                                   | 400 kg                                          |
| <b>Axis C</b>                                     |                                                 |
| Rotating axis                                     | 360°                                            |
| Hydraulic clamping torque                         | 850 Nm (at 50 bar hydraulic operating pressure) |
| Maximum rotational speed (worm gear)              | max. 120 rpm                                    |
| <b>A axis</b>                                     |                                                 |
| Tilting axis                                      | ± 120°                                          |
| Hydraulic clamping torque of tilting axis         | 850 Nm (at 50 bar hydraulic operating pressure) |
| Maximum tilting speed (torque motor)              | max. 100 rpm                                    |
| <b>Dimensions</b>                                 |                                                 |
| Length x width x height                           | 2880 x 4290 x 3480 mm                           |
| Overall weight                                    | 14500 kg                                        |

\* Please note that the maximum spindle speed must be reduced by approx. 20 % in continuous operation

# SINUMERIK ONE

SINUMERIK ONE, the digital native CNC, brings your ideas to life. SINUMERIK ONE is the trendsetting CNC system for highly productive machine tools. For undreamt-of new possibilities, ideas and business models. For faster innovations through the seamless interaction of the virtual and real worlds. And: SINUMERIK ONE is much more than a powerful hardware innovation. Through its digital twin, it is the key element for digital transformation and helps to simulate and test work processes completely virtually.



## THE ADVANTAGES OF SINUMERIK ONE AT A GLANCE

### MAXIMISE PRODUCTIVITY

SINUMERIK ONE sets standards in machining speed and quality. The CNC system maximises machine tool productivity through the highest PLC and CNC performance. The integrated SIMATIC S7-1500F PLC enables up to 10 times faster PLC cycle times than the predecessor PLC. SINUMERIK ONE makes machine tools more productive - and thus more flexible, faster and more efficient.

### PURSUE NEW WAYS OF THINKING- INSPIRE DIGITALLY

Run MyVirtual Machine, the digital twin of machining, optimises machine tool utilisation. Unproductive times at the machine are reduced to a minimum and consistently shifted to work preparation. This creates space for new ways of thinking. And with the right business model, the digital twin can generate additional business around the machine tool.

#### RSV warranty

With the warranty, you protect your machine against warranty damage for 24 or 36 months. (must be purchased with the purchase of the machine)

24 months; Article no. 3589036

36 months; Article no. 3589037

Siemens connection guarantee 12 months based on warranty RSV

24 or 36 months Article no. 3589038

Information on the warranty can be found at [www.optimum-maschinen.de](http://www.optimum-maschinen.de)

### RUN MYVIRTUAL MACHINE 3D

With its product Run MyVirtual Machine, Siemens AG has developed an ideal platform for creating and operating a digital twin. Especially in vocational training, training on virtual machines has proven its worth. The trainee can safely test and optimise his NC programs without causing damage to a real machine. Moreover, educational institutions often lack the resources to run more than one CNC machine. The decision to teach the machining process turning or milling is no longer necessary when training on the digital twin - almost every machine type and every kinematics can be simulated.

for school education only

Article no.: 3584855 Operate

Article no.: 3584156 3 D machine

### DIGITAL TWIN

in training and production- protects your machine from expensive damage.

The digital twin contains a virtual image of the machine from the original machine data with animated tool change and the VNCK (Virtual NC Core). Tools and set-ups can be managed by the machine user himself. On request



## AN END-TO-END SOLUTION ALONG THE VALUE CHAIN RAISES NEW POTENTIAL FOR MACHINE OPERATORS

### ELEGANT DESIGN

- Ergonomic, modern operating hardware in "Blackline plus" design
- Metal design provides a premium look and feel
- Operate intuitively and efficiently
- Attractive front design
- High-quality workmanship for smooth continuous operation

### FEATURE / FUNCTION

- SINUMERIK blackline plus Panel
- Slim, robust aluminium housing
- Horizontally and vertically applicable
- Scratch-resistant, continuous glass front
- Projected capacitive multi-touch technology
- Recognise 5 fingers at the same time

### BENEFITS

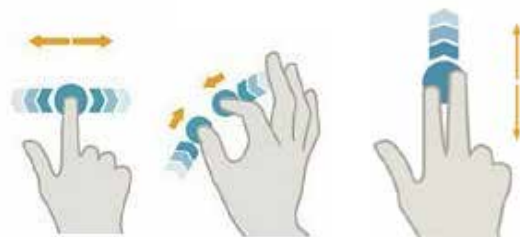
- Operate intuitively and efficiently
- Attractive front design
- High-quality workmanship for smooth continuous operation



### Excerpt from the gestures of multitouch operation

Intelligent gesture operation with touch panels, even with working gloves  
Capacitive touch for industrial use  
Palm recognition  
Detection of liquids and impurities

21.5 inch  
Full HD  
1080



### NCU 1760

- 31 Axes/spindles
- PLC S7-1500F



### SINUMERIK ONE - 50% INCREASED NCK PERFORMANCE COMPARED TO 840D SL



Reduction of the block cycle time by 50%

➔ Reduced production time of the component

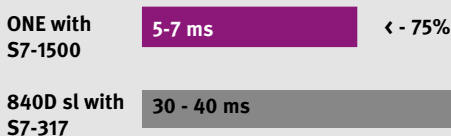
### SINUMERIK ONE - 10 X INCREASED PLC PERFORMANCE COMPARED TO 840D SL



Significant reduction of non-productive time due to 10x faster PLC

➔ Improved surface quality, as the milling paths are processed more cleanly

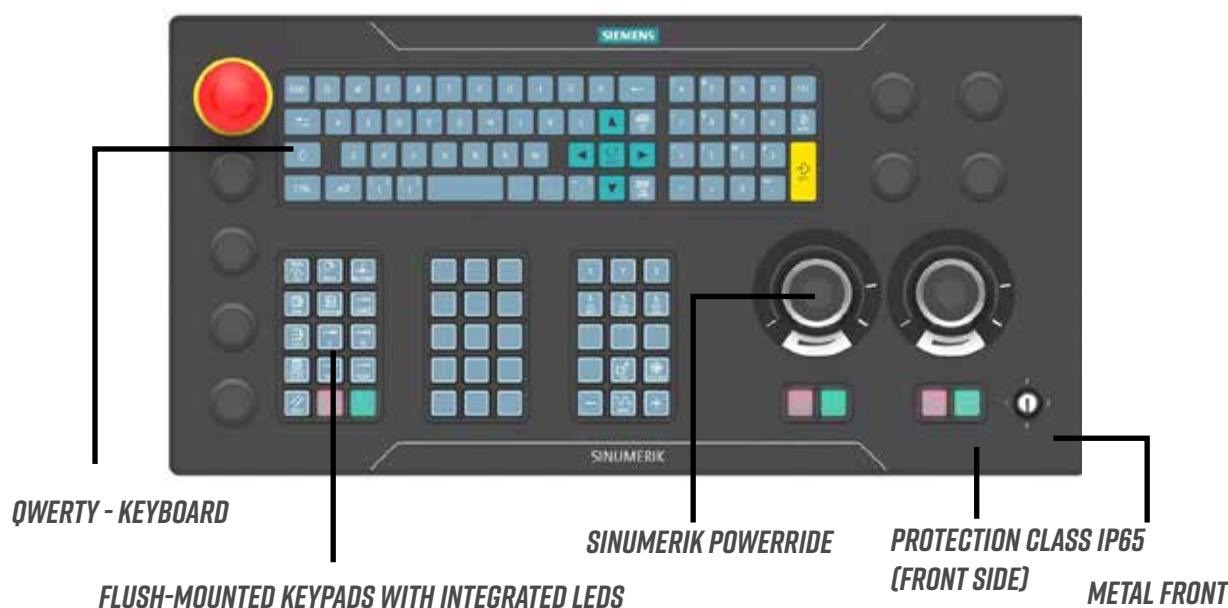
### REDUCTION OF THE PLC CYCLE TIME BY UP TO 75%



## SINUMERIK ONE MCP COMPONENT ARRANGEMENT

### MCP

- Ergonomic and elegant design
- Robust and narrow metal front
- IP65 front
- Powerride as a standard component
- SINUMERIK Powerride combines override switch and NC start button in one operating component
- SINUMERIK Powerride rotary knob without end position with haptic feedback when defined limit value is exceeded
- Configurable hold
- Free installation spaces are prepared
- QWERTY keyboard as standard component
- Keypads with integrated RGB LED lighting



Standard layout optimised for SINUMERIK, based on US configuration  
Layout with 4 lines for complete alphabetical part and for numerical part

## SINUMERIK POWERRIDE

### INNOVATIVE TECHNOLOGY

- SINUMERIK Powerride as standard component
- Combines override switch and NC start button in one operating component
- Noble, innovative design
- Concave shape of the knob
- Integrated LED scale for visualisation of the current ACTUAL values
- Automatic reset of the feed after the end of the set only if configurable stop (CST) is selected
- Rotary knob without end position
- Haptic feedback when defined limit values are exceeded
- Configured stop



| Feature / Function                                                                                                                                                      | Benefits                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Combines override switch and NC start button in one operating component                                                                                                 | Simple and efficient set-up                                                                                                                                  |
| Noble, innovative design<br>Concave shape of the knob                                                                                                                   | Realisation of innovative operating concepts<br>Improving ergonomics                                                                                         |
| Integrated LED scale for visualisation of the current ACTUAL values<br>Automatic reset of the feed after the end of the set only if configurable stop (CST) is selected | Faster recognition of the current actual value<br>More effective and easier operation                                                                        |
| Rotary knob without end position<br>Haptic feedback when defined limit values are exceeded                                                                              | Increased awareness of the defined limits<br>Supports blind operation                                                                                        |
| Configured stop                                                                                                                                                         | No additional licence costs<br>Fine tuning possible<br>Configured stop (CST)<br>Additional high safety during run-in in combination with SINUMERIK Powerride |



## STANDARD EQUIPMENT SINUMERIK ONE

### SINUMERIK ONE "ONE DYNAMICS" INCLUDED

- 3D tool radius correction
- Measure kinematics
- Shopmill
- DXF Reader
- Residual material detection and processing
- 3D simulation
- Simultaneous recording
- TRANSMIT/cylinder surface transformation
- Advanced surface
- Top surface
- Top speed plus
- Measuring cycles
- HMI user memory, extended to SD card of the NCU/PPU
- Processing external memories EES
- Protect MyMachine S03

### SINUMERIK ONE DYNAMICS

#### THE ALL-ROUND CAREFREE PACKAGES FOR THE MACHINE OPERATOR

- + Efficient programming in the workshop
- + Best surface quality from CAD-CAM chain generated NC programs
- + High dynamics and speed for a sustainable increase in productivity
- + Scalable and expandable by machine builders with machine-specific functions

**SINUMERIK ONE Dynamics = Maximum comfort and productivity for the machine operator**

### PROTECT MyMACHINE

- Protect MyMachine
- Integrated collision avoidance with 3D primitives
- Machine protection
- Monitoring the minimum distance of protected areas from each other
- Describe protective areas by means of basic bodies
- Multi-channel capable
- Cost-effective entry to protect the machine
- Cross-channel protection of machine components
- Reduced computational load on the CNC, thus no loss of performance

### PROTECT MYMACHINE/3D PRIMITIVES

**S03**

Art. Nr: 3522100011

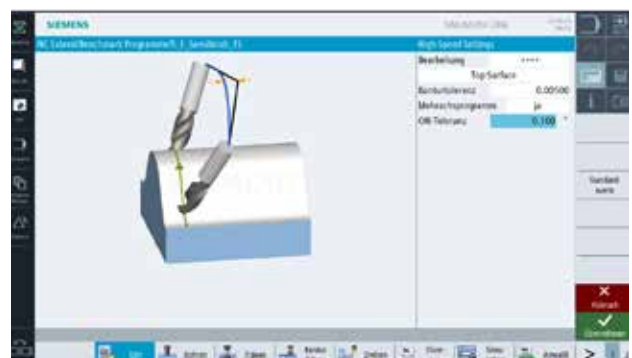
#### Machine protection

- Protected area elements
  - Cuboid, cylinder, sphere, truncated cone
  - Up to 34 elements
  - Up to 17 protected areas
  - Up to 10 collision pairs
- **Single-channel**
- HMI visualisation

### TOP SPEED PLUS

- Significant increase in machining speed in mould making
- "New, innovative filter technology allows higher jerk for each machine axis and thus an increase in dynamics for 3 / 5-axis simultaneous machining"
- High contour accuracy without excitation of machine vibrations

- Extension of technology G-Code group 59 by DYNPREC
- Expansion of technology G-Code Group 39 CPRECON and CPRECOF (programmable contour accuracy)



**Inclining and rotating table**

- Perfect geometrical and functional tuning

**Spindle**

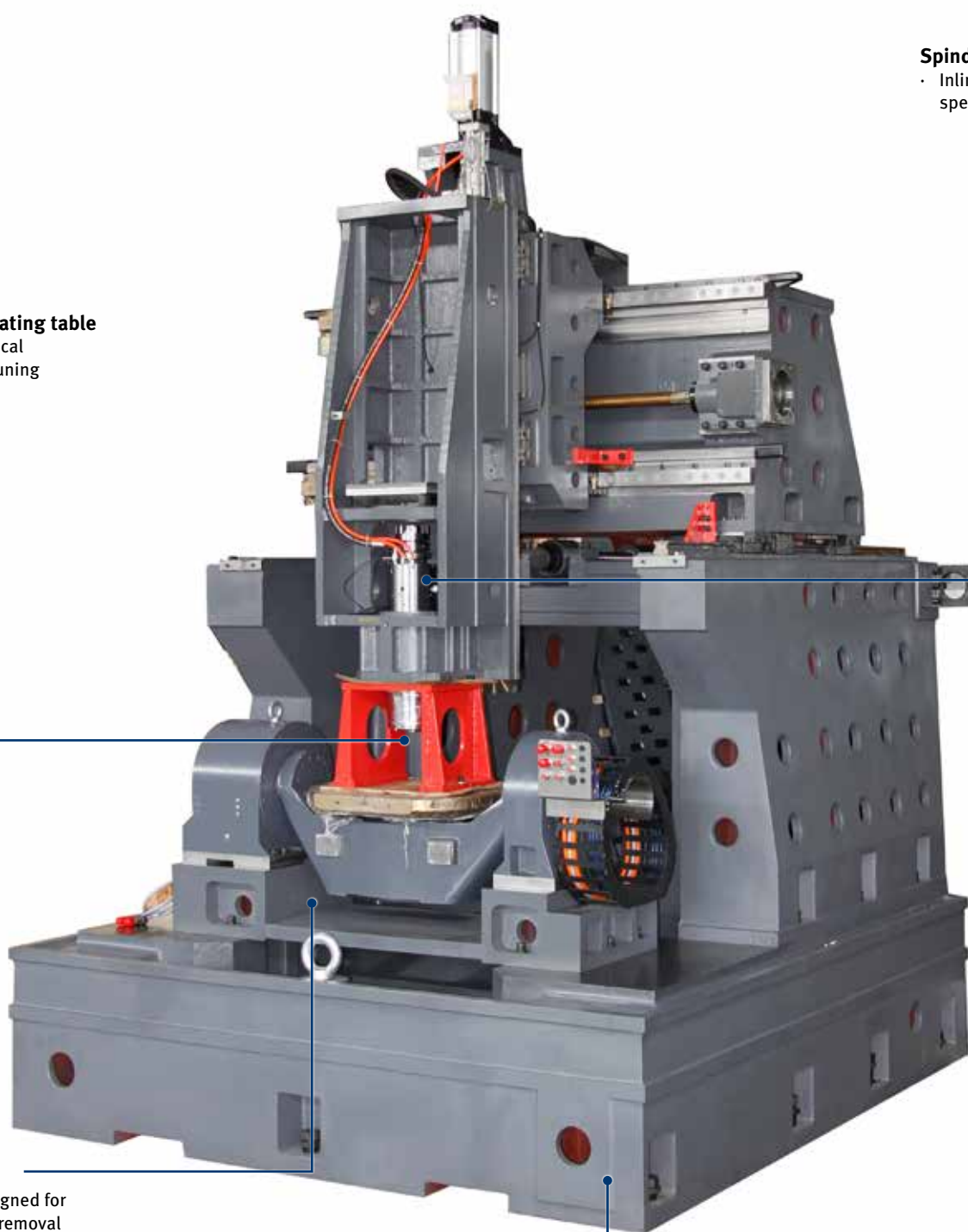
- Inline spindle with a speed of 15 000 rpm

**Chip removal**

- Machine designed for optimal chip removal

**Base body**

- Torsion free premium cast machine base thanks to strong ribbing



## COMPRESSED AIR DISTRIBUTION



- Clearly organised compressed air distribution
- The various components and lines for the compressed air are clearly structured and easily visible
- Makes maintenance, troubleshooting and operation much easier

## FEED AXES



- direct driven
- Rapid traverse X, Y, Z axis 36 m/min.

## TOOL CHANGER



- Double arm gripper
- Drum magazine
- 60 tool slots
- Tool diameter max. 78 mm
- Tool length 300 mm
- Tool weight max. 8 kg
- Tool change time, chip to chip 3 seconds

## INCLINING AND ROTATING TABLE



- Our rotary swivelling table is built with a servo motor and precise drive.
- The bearing is generously dimensioned.

## OIL SEPARATOR / OIL SKIMMER



- Oil separator reliably removes floating foreign oils and the finest chip abrasion from cooling lubricants. It ensures that the oil remains clean and reusable or can be disposed of in an environmentally friendly manner

## GUIDES



- high-precision roller guides on all three axes
- Front linear guides contain additional guide carriages to ensure dynamic stability

## CONTROL



- Next generation control panel with new machine control options
- Modern Multitouch screen interface

## CABINET



- Conveyor version
- for efficient chip discharge

## WATER CIRCULATION UNIT



- The water circulation unit ensures continuous and uniform cooling of the main spindle and motor, which extends the service life of the components.

| STARTER SET |   |                             |                                                           |
|-------------|---|-----------------------------|-----------------------------------------------------------|
| 3536110     | 1 | <b>Starter set HSK A-63</b> | → Information on the starter set can be found at page 292 |

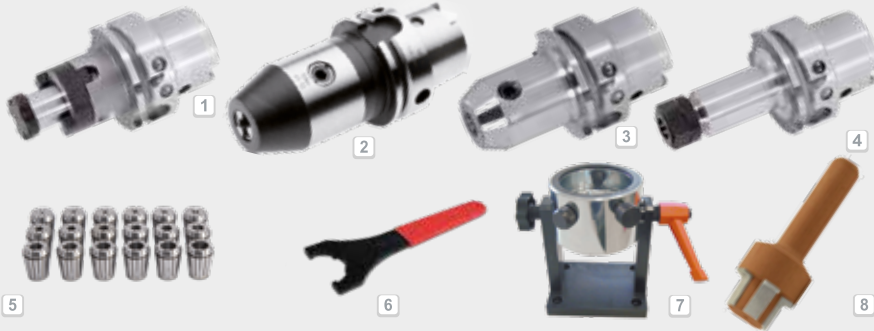
| TOOL MEASURING / WORKPIECE MEASURING |   |                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------|---|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 352136006                            | 2 | <b>BLUM TC50IR</b><br><b>Universal measuring probe</b>          | <ul style="list-style-type: none"> <li>• Faster, more economical, more accurate. The multidirectional probes impress with the latest measuring technologies with optoelectronic signal generation, maximum measuring speeds and perfect, rotationally symmetrical probing behavior without a preferred direction.</li> <li>• Determination of the workpiece position</li> <li>• Correction of the workpiece position</li> <li>• Measurement of workpiece features</li> <li>• Detection of machining errors</li> <li>• Temperature compensation of the machine tool</li> <li>• Measurement of free-form surfaces</li> </ul> |
| 3582051                              | 3 | <b>Kinematic reference sphere</b>                               | <ul style="list-style-type: none"> <li>• High-precision reference ball made of stainless solid carbide</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 352136009                            | 4 | <b>BLUM LaserControl NTA 2</b><br><b>Laser measuring system</b> | <ul style="list-style-type: none"> <li>• Highly dynamic measurements of all tool characteristics</li> <li>• Non-contact measurement</li> <li>• Detection of geometry changes, such as cutting edge wear</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                         |

| MISCELLANEOUS |   |                                    |                                                                                                                                                                                     |
|---------------|---|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 352136001     | 5 | <b>Coolant through spindle CTS</b> | <ul style="list-style-type: none"> <li>• External power unit, pump pressure 70 bar, tank capacity 165 litres, delivery rate 30 l/min - an extraction unit is recommended</li> </ul> |
| 354590005     |   | <b>Motorex Coolant- Lubricant</b>  | <ul style="list-style-type: none"> <li>• for inline spindles</li> </ul>                                                                                                             |

| MAINTENANCE |  |                                               |                                                                      |
|-------------|--|-----------------------------------------------|----------------------------------------------------------------------|
| 3589180     |  | <b>Liquid cooling maintenance</b>             | <ul style="list-style-type: none"> <li>• without material</li> </ul> |
| 3589200     |  | <b>Material for maintenance water cooling</b> | <ul style="list-style-type: none"> <li>• at cost</li> </ul>          |

| SOFTWARE   |   |                                           |                                                                                                                                                                   |
|------------|---|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3522096008 | 6 | <b>Function S22 - Jerk adjustment</b>     | <ul style="list-style-type: none"> <li>• Jerk adjustment. Increase in axle dynamics outside machining combined with a reduction in non-productive time</li> </ul> |
| 3522096009 | 7 | <b>Function S16- Spline interpolation</b> | <ul style="list-style-type: none"> <li>• Spline interpolation (A, B and C splines)*</li> </ul>                                                                    |

## 1 STARTER SET HSK A-63



- Cutter head tool holder with 27 mm mounting. 1
- Chuck 1 - 13 mm 2
- Weldon 6 mm 3
- Weldon 8 mm 3
- Weldon 10 mm 3
- Weldon 12 mm 3
- Weldon 16 mm 3
- Weldon 20 mm 3
- Collet chuck holder ER 32 4
- 18-part collet set ER 32 5
- Collet spanner ER 32 6
- Swivelling mounting block 7
- Taper squeegee 8

## 2 BLUM TC50IR



- Reliable and proven transmission technology
- Equipped with infrared technology:
- Very fast and secure transmission
- Sequential control of 2 IR measuring systems with one receiver
- Reliable measurement even under the influence of coolant

## 3 KINEMATIC REFERENCE SPHERE



- High-precision reference ball made of stainless solid carbide
- For exact calculation of the positions of the machine axes of the 5-axis machining centre. In order to be able to manufacture sustainably with the highest precision and to detect and rectify possible coordinate errors in the machine after collisions or any errors.

## 4 BLUM LASERCONTROL NTA 2



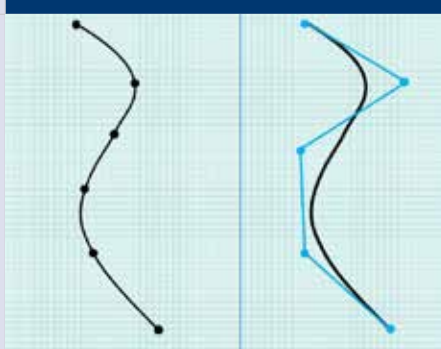
- Laser measuring system for non-contact tool measurement and monitoring. Unbeatable precision and reliability thanks to high-quality laser optics, intelligent NT electronics and unique BLUM protection system.

## 5 COOLANT THROUGH SPINDLE



- Guarantees optimal service life
- External unit
- Also with Grundfos high pressure pump
- Pump pressure 20 bars or 70 bars

## 6 SPLINE INTERPOLATION



- With the COMPCAD compressor, it is possible to approximate such smooth curves within the compressor tolerance (parallel tool paths) and thus obtain optically high-quality surfaces even with larger tolerances.

## 7 JERK ADJUSTMENT



- Shorter processing times due to condition-dependent dynamic adjustment
- Automatic position setpoint filter switching at G00 with simultaneous dynamic increase



**New**

# FU 650

## 5-AXIS SIMULTANEOUS MACHINING CENTRE FOR MAXIMUM PRODUCTIVITY

### SIEMENS CONTROL SINUMERIK ONE

---

- Heavy duty version
- High productivity
- Telescopic guideway cover
- Precision-ground, preloaded high-performance ball screws for high rapid traverse speeds
- Spindle borne on P5 precision bearings and permanently lubricated
- High-torque servo drives on all five axes
- Precision linear guides
- Heidenhain glass scales for higher accuracy
- Fast rapid motion speed of up to 40 m/min.
- A / C axis with torque motor for maximum speed and lifetime accuracy
- The portable, electronic handwheel with enabling switch and emergency stop pushbutton makes it much easier to run in programmes.
- Double arm gripper tool changer with 40 tool stations in standard scope of delivery
- Coolant unit with 280 litre coolant tank, including chip flushing system and cleaning gun
- Automatic centralised lubrication
- RJ45 plug-in connection, USB connection and 230 V power connection
- Additional USB interface on the control panel
- Water circuit cooling unit for the main spindle and main spindle motor
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- Coolant through spindle, 20 bar with internal tank (an extraction unit is required)
- Heat exchanger
- EMC Electromagnetic compatibility
- Two years' **SIEMENS** repair service contract included. Extension of the **SIEMENS** Supplementary Repair Service Contract (RSV) page 199
- Information on maintenance contracts, page 333



## TECHNICAL DATA

| Models                                    | FU 650                |
|-------------------------------------------|-----------------------|
| Article no.                               | 3522200               |
| <b>Spindle</b>                            | <b>Inline spindle</b> |
| <b>Machine data</b>                       |                       |
| Electrical connection                     | 400 V / 3 Ph ~50 Hz   |
| Total connected load                      | 50 kVA                |
| <b>Milling spindle</b>                    |                       |
| Drive motor S1 operation                  | 22 kW                 |
| Torque drive motor S1 operation           | 172 Nm                |
| Drive motor S6 30 % operation             | 40 kW                 |
| Torque drive motor S6 30 % operation      | 380 Nm                |
| Spindle seat                              | HSK 63                |
| <b>Milling precision</b>                  |                       |
| Repeat accuracy                           | ± 0.003 mm            |
| Positioning accuracy                      | ± 0.003 mm            |
| (A/C) Repeatability                       | 6''                   |
| (A/C) Positioning accuracy                | 10''                  |
| <b>Tool changer</b>                       |                       |
| Type                                      | Double arm gripper    |
| Number of tool stations                   | 40 slots              |
| Max. tool diameter                        | 75 mm                 |
| Max. tool diameter (adjacent slots free)  | 125 mm                |
| Tool length                               | 300 mm                |
| Max. tool weight                          | 8 kg                  |
| Tool change time, chip to chip            | 2.5 seconds           |
| <b>Travel</b>                             |                       |
| X axis                                    | 700 mm                |
| Y axis                                    | 720 mm                |
| Z axis                                    | 500 mm                |
| <b>Feed drive</b>                         |                       |
| Rapid traverse X / Y / Z axis             | 40 m/min.             |
| <b>Motor torque</b>                       |                       |
| X , Z axis                                | 27 Nm                 |
| Y axis                                    | 36 Nm                 |
| <b>Feed forces</b>                        |                       |
| X axis                                    | 6,4 kN                |
| Y axis                                    | 7,6 kN                |
| Z axis                                    | 8,5 kN                |
| <b>Speed range</b>                        |                       |
| Speeds*                                   | 10 - 15000 rpm        |
| <b>Pneumatics</b>                         |                       |
| Compressed air                            | 6 bar                 |
| <b>Cooling systems</b>                    |                       |
| Tank capacity cooling lubricant tank      | 280 litre             |
| Pump motor chip flushing/delivery rate    | 0,58 kW / 100 l/min.  |
| Pump motor cooling lubricant motor        | 0,58 kW / 100 l/min.  |
| <b>Inclining and rotating table</b>       |                       |
| Table diameter                            | 650 mm                |
| T-slot size / amount / distance           | 18 mm                 |
| Maximum payload                           | 900 kg                |
| <b>Axis C</b>                             |                       |
| Rotating axis                             | 360°                  |
| Hydraulic clamping torque                 | 2.400 Nm              |
| Maximum rotational speed (torque motor)   | max. 100 rpm          |
| <b>A axis</b>                             |                       |
| Tilting axis                              | -90° +120°            |
| Hydraulic clamping torque of tilting axis | 2.400 Nm              |
| Maximum tilting speed (torque motor)      | max. 100 rpm          |
| <b>Dimensions</b>                         |                       |
| Length x width x height                   | 5300 x 3560 x 3000 mm |
| Overall weight                            | 15000 kg              |

# SINUMERIK ONE

SINUMERIK ONE, the digital native CNC, brings your ideas to life. SINUMERIK ONE is the trendsetting CNC system for highly productive machine tools. For undreamt-of new possibilities, ideas and business models. For faster innovations through the seamless interaction of the virtual and real worlds. And: SINUMERIK ONE is much more than a powerful hardware innovation. Through its digital twin, it is the key element for digital transformation and helps to simulate and test work processes completely virtually.



## THE ADVANTAGES OF SINUMERIK ONE AT A GLANCE

### MAXIMISE PRODUCTIVITY

SINUMERIK ONE sets standards in machining speed and quality. The CNC system maximises machine tool productivity through the highest PLC and CNC performance. The integrated SIMATIC S7-1500F PLC enables up to 10 times faster PLC cycle times than the predecessor PLC. SINUMERIK ONE makes machine tools more productive - and thus more flexible, faster and more efficient.

### PURSUE NEW WAYS OF THINKING- INSPIRE DIGITALLY

Run MyVirtual Machine, the digital twin of machining, optimises machine tool utilisation. Unproductive times at the machine are reduced to a minimum and consistently shifted to work preparation. This creates space for new ways of thinking. And with the right business model, the digital twin can generate additional business around the machine tool.

#### RSV warranty

With the warranty, you protect your machine against warranty damage for 24 or 36 months. (must be purchased with the purchase of the machine)

24 months; Article no. 3589036

36 months; Article no. 3589037

Siemens connection guarantee 12 months based on warranty

RSV 24 or 36 months Article no. 3589038

Information on the warranty can be found at [www.optimum-maschinen.de](http://www.optimum-maschinen.de)

### RUN MYVIRTUAL MACHINE 3D

With its product Run MyVirtual Machine, Siemens AG has developed an ideal platform for creating and operating a digital twin. Especially in vocational training, training on virtual machines has proven its worth. The trainee can safely test and optimise his NC programs without causing damage to a real machine. Moreover, educational institutions often lack the resources to run more than one CNC machine. The decision to teach the machining process turning or milling is no longer necessary when training on the digital twin - almost every machine type and every kinematics can be simulated.

for school education only

Article no.: 3584855 Operate

Article no.: 3584156 3 D machine

### DIGITAL TWIN

in training and production- protects your machine from expensive damage.

The digital twin contains a virtual image of the machine from the original machine data with animated tool change and the VNCK (Virtual NC Core). Tools and set-ups can be managed by the machine user himself. On request



## AN END-TO-END SOLUTION ALONG THE VALUE CHAIN RAISES NEW POTENTIAL FOR MACHINE OPERATORS

### ELEGANT DESIGN

- Ergonomic, modern operating hardware in "Blackline plus" design
- Metal design provides a premium look and feel
- Operate intuitively and efficiently
- Attractive front design
- High-quality workmanship for smooth continuous operation

### FEATURE / FUNCTION

- SINUMERIK blackline plus Panel
- Slim, robust aluminium housing
- Horizontally and vertically applicable
- Scratch-resistant, continuous glass front
- Projected capacitive multi-touch technology
- Recognise 5 fingers at the same time

### BENEFITS

- Operate intuitively and efficiently
- Attractive front design
- High-quality workmanship for smooth continuous operation

### NCU 1750

- 31 Axes/spindles
- PLC S7-1500F

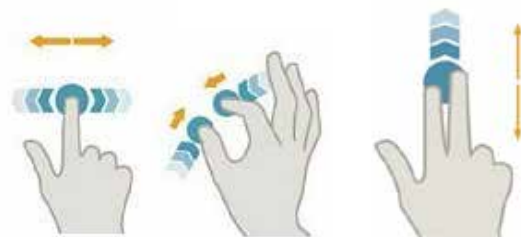


### Excerpt from the gestures of multitouch operation

Intelligent gesture operation with touch panels, even with working gloves  
Capacitive touch for industrial use  
Palm recognition  
Detection of liquids and impurities

15 inch

Full HD  
1080



### SINUMERIK ONE - 50% INCREASED NCK PERFORMANCE COMPARED TO 840D SL



Reduction of the block cycle time by 50%

Reduced production time of the component

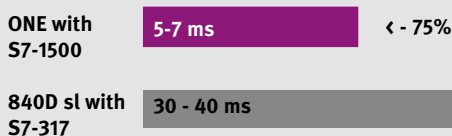
### SINUMERIK ONE - 10 X INCREASED PLC PERFORMANCE COMPARED TO 840D SL



Significant reduction of non-productive time due to 10x faster PLC

Improved surface quality, as the milling paths are processed more cleanly

### REDUCTION OF THE PLC CYCLE TIME BY UP TO 75%





## STANDARD EQUIPMENT SINUMERIK ONE

### SINUMERIK ONE "ONE DYNAMICS" INCLUDED

- 3D tool radius correction
- Measure kinematics
- Shopmill
- DXF Reader
- Residual material detection and processing
- 3D simulation
- Simultaneous recording
- TRANSMIT/cylinder surface transformation
- Advanced surface
- Top surface
- Top speed plus
- Measuring cycles
- HMI user memory, extended to SD card of the NCU/PPU
- Processing external memories EES

### SINUMERIK ONE DYNAMICS

#### THE ALL-ROUND CAREFREE PACKAGES FOR THE MACHINE OPERATOR

- + Efficient programming in the workshop
- + Best surface quality from CAD-CAM chain generated NC programs
- + High dynamics and speed for a sustainable increase in productivity
- + Scalable and expandable by machine builders with machine-specific functions

**SINUMERIK ONE Dynamics = Maximum comfort and productivity for the machine operator**

### PROTECT MyMACHINE

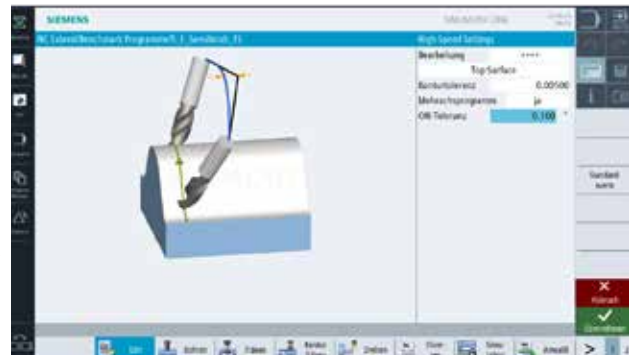
Art. Nr: 3522100011

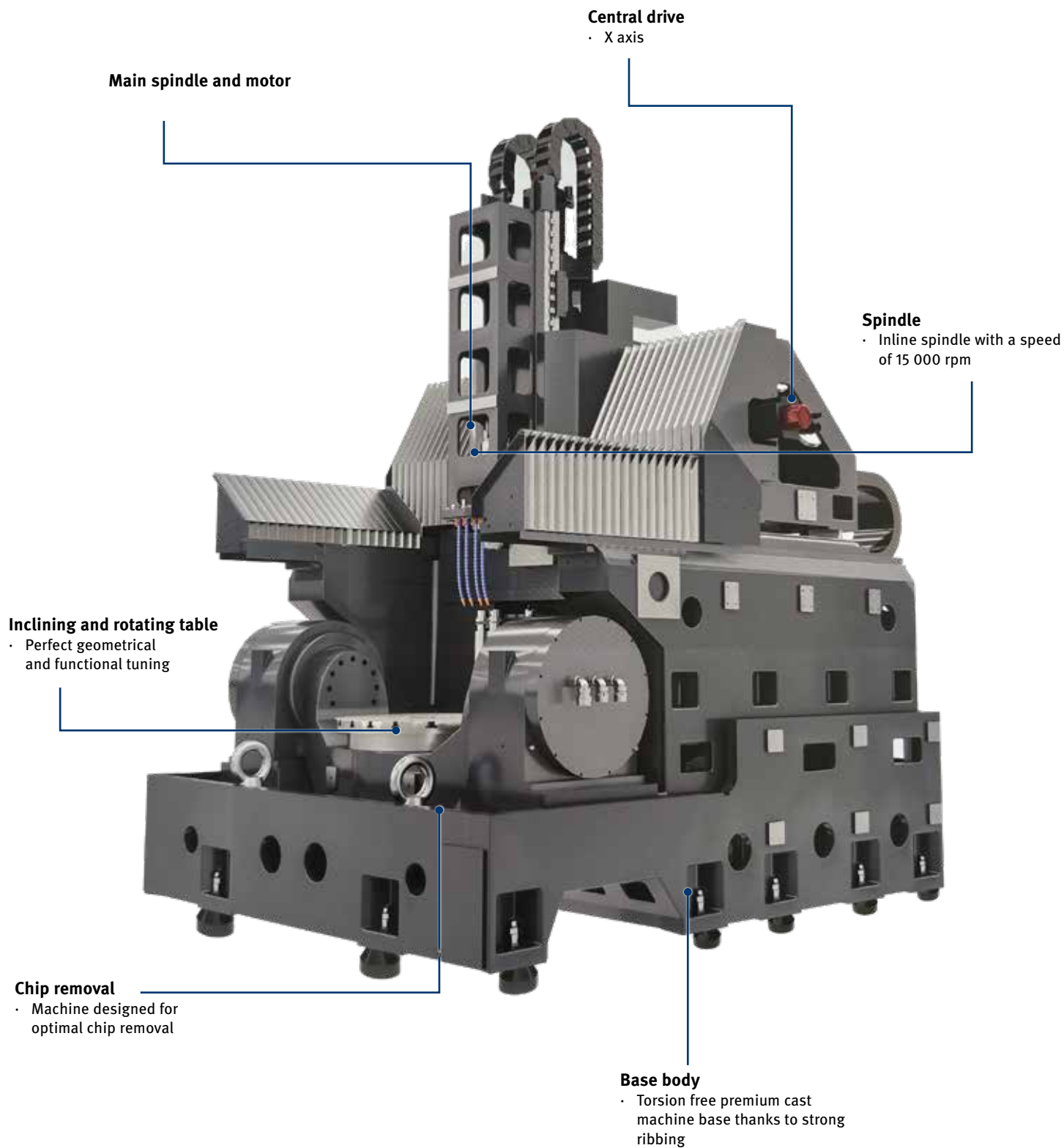
- Protect MyMachine
- Integrated collision avoidance with 3D primitives
- Machine protection
- Monitoring the minimum distance of protected areas from each other
- Describe protective areas by means of basic bodies
- Multi-channel capable
- Cost-effective entry to protect the machine
- Cross-channel protection of machine components
- Reduced computational load on the CNC, thus no loss of performance

### TOP SPEED PLUS

- Significant increase in machining speed in mould making
- "New, innovative filter technology allows higher jerk for each machine axis and thus an increase in dynamics for 3 / 5-axis simultaneous machining"
- High contour accuracy without excitation of machine vibrations

- Extension of technology G-Code group 59 by DYNPREC
- Expansion of technology G-Code Group 39 CPRECON and CPRECOF (programmable contour accuracy)



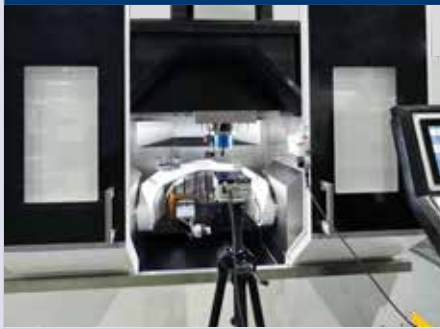


## INCLINING AND ROTATING TABLE



- Table diameter Ø 650 mm
- Table load 500 kg
- (A/C) Repeatability 4“
- (A/C) Positioning accuracy 8“
- 360° axis of rotation
- Tilting axis ± 120°

## SURVEYING



- Geometry measurement before delivery to ensure the quality and reliability of the machine

## CTS SYSTEM



- Coolant through spindle. With coolant through the spindle, coolant is fed directly to the cutting edge of the tool or to the machining zone via the spindle. This ensures effective heat dissipation, which prevents overheating and the associated damage to the tool and workpiece

## TOOL MAGAZINE



- the tool magazine is integrated directly into the vertical column
- Integration into the column ensures stable mounting, which can improve accuracy during tool changes and machining

## WATER COOLING



- for motor and spindle
- Water cooling enables effective dissipation of the heat generated during operation.
- The constant operating temperature contributes to the stability of the machining processes. This is particularly important for precise CNC applications

## CENTRAL LUBRICATION



- Continuous and even lubrication helps to extend the service life of the machine and its components
- Centralised lubrication systems make maintenance easier

## CONTROL CABINET



- With SIEMENS servo drive
- Standards-compliant setup
- Wiring with individual wire labelling and enclosed circuit diagram facilitates maintenance work and diagnostics

| STARTER SET |   |                             |                                                           |
|-------------|---|-----------------------------|-----------------------------------------------------------|
| 3536110     | 1 | <b>Starter set HSK A-63</b> | → Information on the starter set can be found at page 292 |

| TOOL MEASURING / WORKPIECE MEASURING                                                             |   |                                                                    |                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------|---|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3522095005                                                                                       | 2 | <b>BLUM TC52</b><br>Universal measuring probe                      | <ul style="list-style-type: none"> <li>Switching point repeatability of 0.3µm 2σ at 2 m/min. Measuring speed</li> <li>Wear-free and durably stable</li> <li>Very compact probe with 40 mm diameter</li> </ul>            |
| 3522095006                                                                                       | 3 | <b>BLUM LC 50</b><br>Laser measuring system                        | <ul style="list-style-type: none"> <li>Highly dynamic measurements of all tool characteristics</li> <li>Non-contact measurement</li> <li>Detection of geometry changes, such as cutting edge wear</li> </ul>             |
| 3522095002                                                                                       |   | <b>Renishaw OMP 60</b><br>Probes with optical signal transmission  | <ul style="list-style-type: none"> <li>For testing and setting up workpieces on machining centres</li> <li>Compact, touch-sensitive 3D touch probe.</li> <li>Reliably modulated, optical signal transmission.</li> </ul> |
| 3522095003                                                                                       | 4 | <b>Renishaw TS 27R</b><br>Touch probe for tactile tool measurement | <ul style="list-style-type: none"> <li>Tool breakage check</li> <li>Compact, tactile 3D tool probe with wired signal transmission</li> </ul>                                                                             |
| 3522095004                                                                                       | 5 | <b>Renishaw NC 4</b><br>Laser system for tool measurement          | <ul style="list-style-type: none"> <li>Non-contact tool inspection system NC4 is a high-precision, extremely fast solution for tool measurement and breakage control</li> </ul>                                          |
| → Information on Renishaw laser systems and measuring probes also ex stock Germany from page 288 |   |                                                                    |                                                                                                                                                                                                                          |

| MISCELLANEOUS |  |                                      |                                                                                               |
|---------------|--|--------------------------------------|-----------------------------------------------------------------------------------------------|
| 3522095001    |  | <b>Main spindle HSK63, 20000 rpm</b> | <ul style="list-style-type: none"> <li>instead of the standard equipment 15000 rpm</li> </ul> |

| MAINTENANCE |  |                                               |                                                                    |
|-------------|--|-----------------------------------------------|--------------------------------------------------------------------|
| 3589180     |  | <b>Liquid cooling maintenance</b>             | <ul style="list-style-type: none"> <li>without material</li> </ul> |
| 3589200     |  | <b>Material for maintenance water cooling</b> | <ul style="list-style-type: none"> <li>at cost</li> </ul>          |

| SOFTWARE   |   |                                           |                                                                                                                                                                                                                                                                                                           |
|------------|---|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3522095008 | 6 | <b>Function S22 - Jerk adjustment</b>     | <ul style="list-style-type: none"> <li>Jerk adjustment. Increase in axle dynamics outside machining combined with a reduction in non-productive time</li> </ul>                                                                                                                                           |
| 3522095009 | 7 | <b>Function S16- Spline interpolation</b> | <ul style="list-style-type: none"> <li>Spline interpolation (A, B and C splines)*</li> </ul>                                                                                                                                                                                                              |
| 3522096010 |   | <b>Safety Integrated</b>                  | <ul style="list-style-type: none"> <li>Consistent safety in production and process automation</li> <li>With Safety Integrated, we provide the intelligent answer to continuously increasing demands on the functional safety of a machine.</li> </ul>                                                     |
| 3522096011 |   | <b>Protect MyMachine/3D Primitives</b>    | <ul style="list-style-type: none"> <li>Machine protection</li> <li>Protected area elements</li> <li>Cuboid, cylinder, sphere, truncated cone</li> <li>Up to 34 elements</li> <li>Up to 17 protected areas</li> <li>Up to 10 collision pairs</li> <li>Single-channel</li> <li>HMI visualisation</li> </ul> |

## 1 STARTER SET HSK A-63



- Cutter head holder with 27 mm receptacle 1
- Chuck 1 - 13 mm 3
- Weldon 6 / 8 / 10 / 12 / 16 / 20 mm 4
- Adapter HSK63 to MT 3 2
- Collet spanner 5
- Collet set 6
- Swivelling mounting block 7
- Taper squeegee 8

## 2 BLUM TC52



- Unrivalled precision and fast workpiece measuring thanks to modern, multidirectional measuring system with optical/electronic switching signal generation.

## 3 LASERCONTROL LC 50



- Laser measuring system for non-contact tool measurement, measurement of tool wear and tool monitoring.
- Unbeatably fast, precise and reliable thanks to the latest DIGILOG technology, premium laser optics and perfected BLUM protection system

## 4 RENISHAW OMP 60



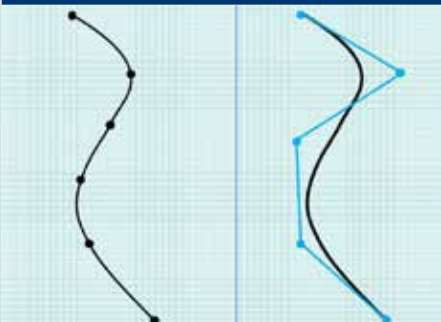
- The OMP60 is a compact 3D touch probe with optical signal transmission that can be optimally configured for a wide range of applications
- The integrated voltage converter allows any type of rechargeable battery or battery pack to be used

## 5 RENISHAW TS 27R



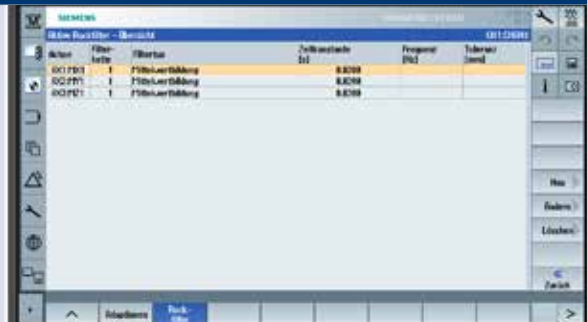
- Proven kinematic design.
- Interference-resistant, wired communication
- Cost-effective tool measurement for all types of machining centres.
- Repeat accuracy of 1.00 µm (2)

## 6 FUNCTION S16- SPLINE INTERPOLATION



- With the COMPCAD compressor, it is possible to approximate such smooth curves within the compressor tolerance (parallel tool paths) and thus obtain optically high-quality surfaces even with larger tolerances.

## 7 FUNCTION S22 - JERK ADJUSTMENT



- Shorter processing times due to condition-dependent dynamic adjustment
- Automatic position setpoint filter switching at G00 with simultaneous dynamic increase
- Flexible and individual position setpoint filter switching through explicit programming



## ENVIRONMENTAL CAMPUS BIRKENFELD

### OPTIMUM PROVIDES NEW CNC MACHINE FOR RESEARCH AND DEVELOPMENT



Just in time for the start of the winter semester 2019, the Hallstadt-based company Stürmer Maschinen GmbH provided the students at the Environmental Campus Birkenfeld with a new, state-of-the-art type OPTIMUM FU 5 CNC machine. The Environmental Campus specialises in environmental planning, technology and economics and is among the top ten in the world ranking list in the current GreenMetricRanking. The new OPTIMUM FU 5 milling machine is used for development work in the field of Industry 4.0 in order to achieve an optimised learning effect for the students, who can now demonstrate their developments with this machine.

The modern 5-axis machine with a weight of 10 tons and a value of approx. 240 000 euros was initially made available to the Environmental Campus free of charge for nine months. It will help employees and students at the Institute of Operations and Technology Management (ITB) to develop new methods of 3-D printing and thus provide new impetus in the fields of Industry 4.0 and the Digital Factory. The OPTIMUM FU5 milling machine is the ideal companion for this, as it enables filament printing on a 3-axis machine tool in combination with a modern software solution that can control the CNC machine via a Sinumerik control.

This project sees Stürmer continue its close cooperation with the Environmental Campus enabling employees and students to advance their research work in the field of 3-D printing with state-of-the-art technology. "Constant modernisation of the equipment in our laboratories in this area cannot be financed with internal resources. The loan shows that we have our finger on the pulse with our education and research programs, and we hope that we can expand this form of cooperation further," says Prof. Dr.-Ing. Peter Gutheil, Dean of the Department of Environmental Planning and Environmental Technology. Project manager Dipl.-Ing. (FH) Stefan Hirsch also sees the advantages: "The learning effect for the students involved is enormous and can have an extremely positive impact when starting a career."

A new milestone in progressive digitalisation of industrial production can be set thanks to support from Stürmer.

In January 2020, the Optimum FU 5 CNC milling machine, which had been made available to the Environmental Campus Birkenfeld a few months ago



## OPTIMILL FU 5 CNC MILLING MACHINE IMPRESSES IN TEST

for 3-D printing trials, was tested in the scope of a workshop. The 5-axis machining centre impressed across the board. Even under the camera microscope used in the workshop, it was virtually impossible to detect defects on the test workpieces milled by the Optimum machine.

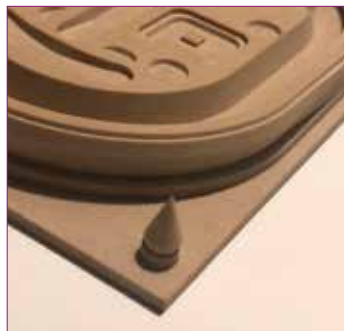
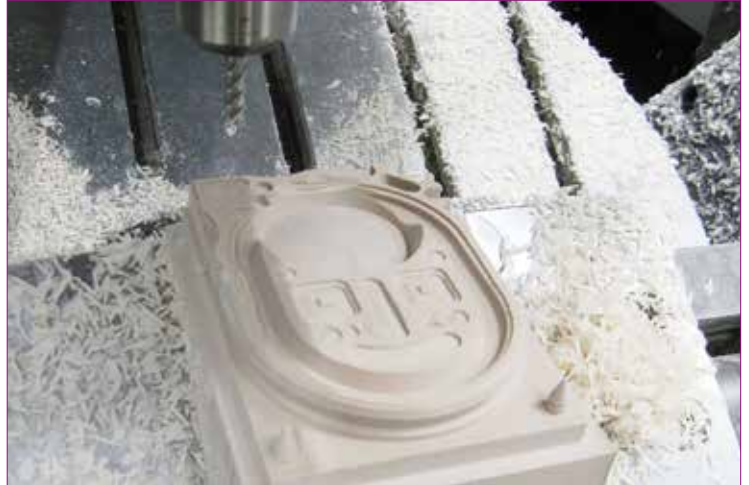
The CNC milling machine was tested using a test workpiece that the NC Gesellschaft e.V. had developed in 2005 to investigate the dynamic synchronisation of the machine axes and milling operations. The program data for this test part are now in the care of the Environmental Campus Birkenfeld, and were used to test the machine's machining precision. During a workshop with Hans Vogler, one of the developers of the test piece and a luminary in the field of NC control, the OPTImill FU5 was put through its paces at the Environmental Campus Birkenfeld in the presence of representatives from Optimum and SIEMENS AG. The many years of experience that Mr. Vogler has built up from his development and consulting activities from the beginnings of NC control to the present day proved to be massively beneficial for the participants.

In a first step, SIEMENS application engineer Wolfgang Reichert explained the special cycles for 5-axis programming on the SIEMENS 840 D control used. Subsequently, various adaptations of machine data and control parameters were tested directly on the machine and optimised to tune the test workpiece. Using these adapted parameters, Hans Vogler's team produced several test parts on the milling machine in a second step; the parts were then examined with regard to running time and potential geometric deviations.

Defects of the test pieces produced by the OPTImill FU5 were virtually undetectable, even using a camera microscope. To underline the precise operation of the OPTIMUM CNC machine, archive pictures with negative examples were finally used; this once again illustrated the outstanding results achieved by the OPTIMUM 5-axis machining centre.

### Conclusions:

With this perfectly manufactured test workpiece, the OPTImill FU5 stands up to any comparison with market competitors in terms of quality, precision and price-performance ratio.



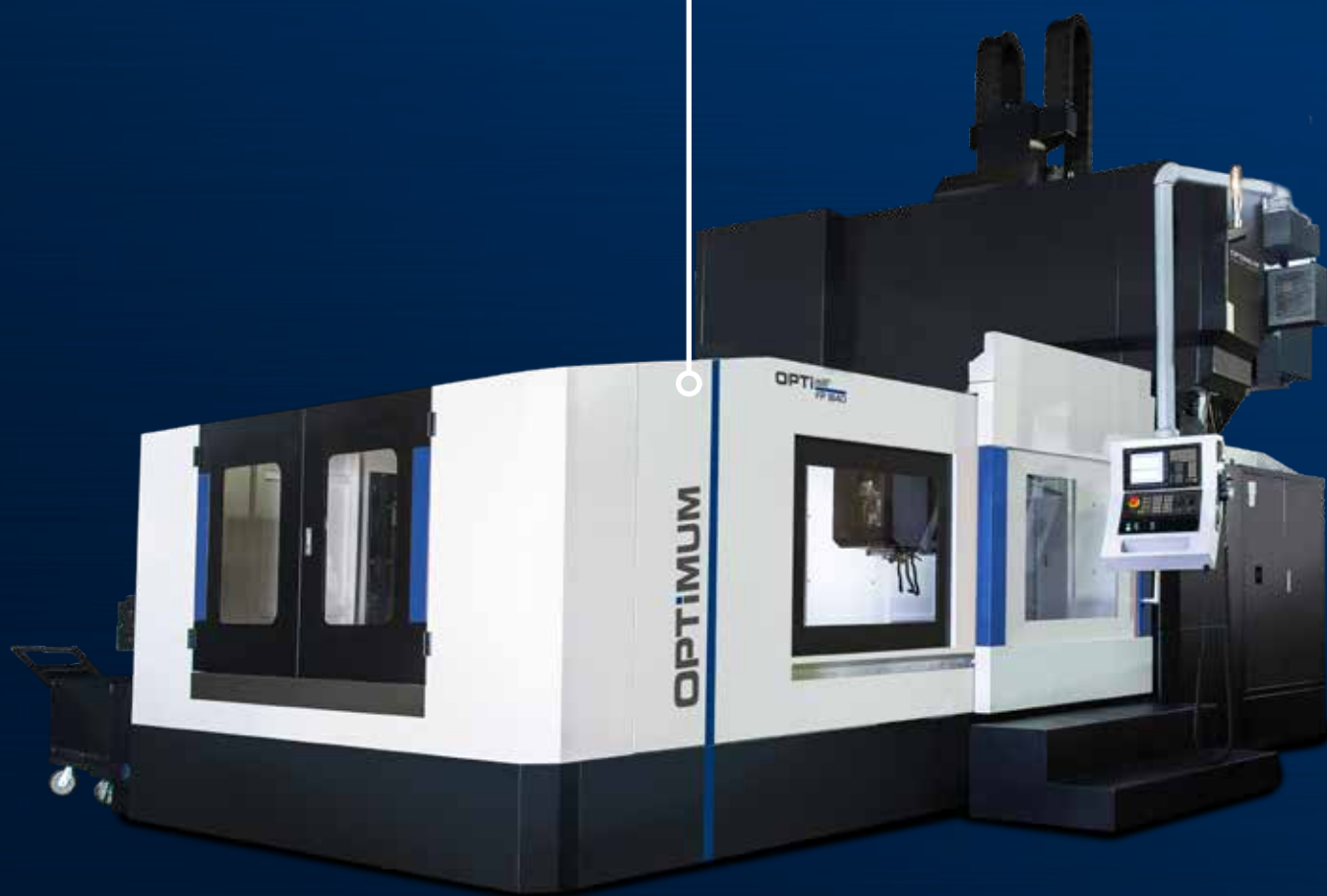
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**04**

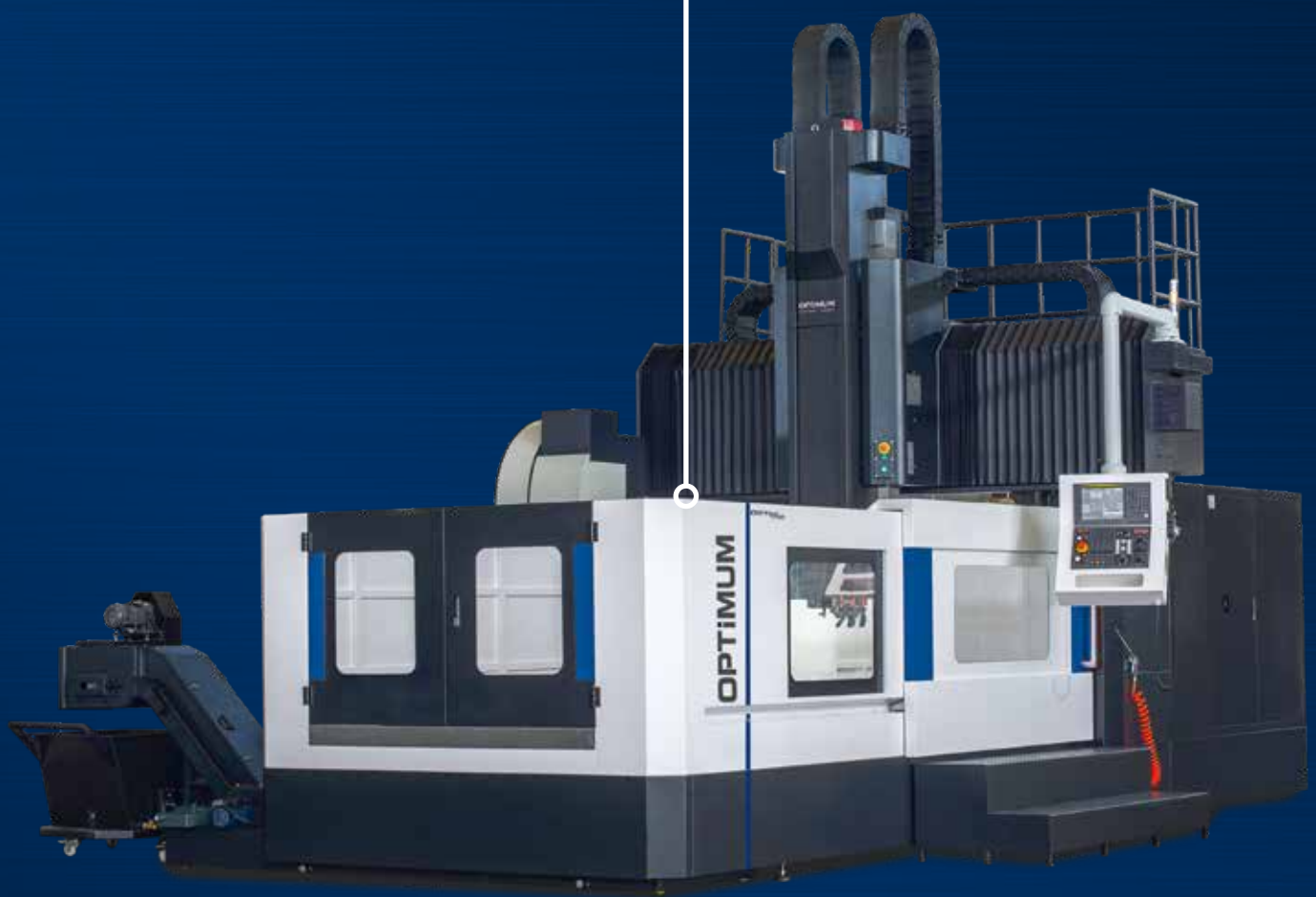
# ***PORTAL MILLING MACHINES***

FP 1840



OTHER MACHINE SIZES AVAILABLE ON REQUEST

FP 1325



# FP 1325 / FP 1530

## OPTIMUM PREMIUM CNC Portal milling machines

### SIEMENS CONTROL SINUMERIK 828D

- Perfect structures and a rugged design guarantee best possible rigidity and stability
- All main components - machine bed, worktable, machine column, crossbeam, saddle and head-stock are made of high quality MEEHANITE® cast iron.
- Generously dimensioned guides on the X, Y and Z axes
- All guide rails tempered and ground (HRC50 -HRC55)
- The X- and Y-axis are equipped with roller linear guides so that the axes move with the highest precision even at high speed
- Highest machining accuracy and high damping due to wide adjustable box way guides of the Z-axis for high drilling and milling performance with high spindle output torque
- Hardened and precision ground ball screws mounted in high precision bearings in all three axes for high rapid traverse speeds
- Cooling of the main spindle gearbox (gears, bearings, spindle) by means of an oil circulation system to reduce thermal expansion
- Operating status display (work end lamp)
- Axis covers
- Work lamp LED with alarm indicator
- Chip conveyor belt design with chip trolley
- Energy chain with strain relief and cable separation
- Spindle oil cooler
- Heat exchanger
- BT50 spindle mount with a maximum spindle speed of 6000 rpm for high precision
- Pneumatic counterbalance of the Z-axis ensures very high reliability and stability while several axes are working simultaneously. The SCBS system does not need an additional power supply or drive. This balance system helps to achieve high speeds and excellent machining
- Complete machine enclosure with wide opening doors for ergonomic workpiece handling
- Automatic lubrication system with pressure control system
- Separating system for lubricating oil and coolant
- Set-up elements
- Additional package SIEMENS material defect liability and free online/on-site service OSS Plus see page 237
- For information on maintenance contracts see page 333





# OPTIMILL FP 1325/FP 1530

## TECHNICAL DATA

| Model                                                | FP 1325                                      | FP 1530               |
|------------------------------------------------------|----------------------------------------------|-----------------------|
| Article no.                                          | 3511650                                      | 3511660               |
|                                                      |                                              |                       |
| Machine data                                         |                                              |                       |
| Electrical connection                                | 400 V / 3 Ph ~50 Hz                          |                       |
| Total connected load                                 | 60 KVA                                       |                       |
| Milling spindle                                      |                                              |                       |
| Drive motor S1 operation                             | 17 kW                                        |                       |
| Torque drive motor S1 operation                      | 162 Nm                                       |                       |
| Drive motor S6 30 % operation                        | 32.3 kW                                      |                       |
| Torque drive motor S6 30 % operation                 | 330 Nm                                       |                       |
| Spindle seat                                         | SK50 DIN 69871                               |                       |
|                                                      |                                              |                       |
| Cooling lubricant system                             |                                              |                       |
| Number of coolant pumps / power                      | 1 piece / 1.35 kW                            |                       |
| Tank capacity                                        |                                              |                       |
| Tool changer                                         |                                              |                       |
| Type                                                 | Double arm gripper                           |                       |
| Number of tool stations                              | 24 (Option** 30/32/40/60n tools)             |                       |
| Max. tool diameter                                   | 110 mm                                       |                       |
| Max. tool diameter (tools slots beside not occupied) | 220 mm                                       |                       |
| Tool length                                          | 350 mm                                       | 300 mm                |
| Max. tool weight                                     | 18 kg                                        |                       |
| Tool change time according to VDI 2852               | 4.5 sec.                                     |                       |
| Milling precision                                    |                                              |                       |
| Repeat accuracy                                      | ± 0.015 mm                                   |                       |
| Positioning accuracy                                 | ± 0.009 mm                                   |                       |
| Travel                                               |                                              |                       |
| X axis (linear guide)                                | 2600 mm                                      | 3100 mm               |
| Y axis (linear guide)                                | 1400 mm                                      | 1650 mm               |
| Z axis (flat guide)                                  | 800 mm (option ** 1 000 mm)                  |                       |
| Feed drive                                           |                                              |                       |
| X axis fast motion                                   | 10 m/min.                                    | 16 m/min.             |
| Y axis / Z axis rapid traverse                       | 10 m/min.                                    |                       |
| Motor torque                                         |                                              |                       |
| X, Y axis                                            | 80 Nm                                        |                       |
| Z axis                                               | 81 Nm                                        |                       |
| Feed forces                                          |                                              |                       |
| X / Y / Z axis                                       |                                              |                       |
| Speed range                                          |                                              |                       |
| Speeds*                                              | 6.000 min <sup>-1</sup> (Option** 8 000 rpm) |                       |
| Pneumatics                                           |                                              |                       |
| Compressed air                                       |                                              |                       |
| Milling table                                        |                                              |                       |
| Table length x width                                 | 2500 x 1300 mm                               | 3000 x 1500 mm        |
| T-slot size / amount / distance                      | 22 / 7 / 160 mm                              | 22 / 9 / 160 mm       |
| Maximum payload                                      | 6000 kg                                      | 7000 kg               |
| Spindle to table distance                            | 160 - 960 mm                                 |                       |
| Spindle to stand distance                            | 460 mm                                       |                       |
| Distance between the stands                          | 1400 mm                                      | 1650 mm               |
|                                                      |                                              |                       |
| Dimensions                                           |                                              |                       |
| Installation area                                    | 7800 x 5000 x 5000 mm                        | 8800 x 5000 x 5100 mm |
| Overall weight                                       | 22500 kg                                     | 26000 kg              |

\* Please note that the maximum spindle speed must be reduced by approx. 20 % in continuous operation

\*\* The option must be ordered with the basic machine. Cannot be retrofitted.

# SINUMERIK 828D PPU271.5

COMPACT REVOLUTION

DIGITALLY TRANSFORMED, INNOVATIVELY DESIGNED, ENHANCED PERFORMANCE



**PPU.5 CPU power Upgrade**  
**>40 %**

Comprehensive improvement  
⇒ Programme buffer and processing time  
⇒ Simulation efficiency  
⇒ HMI switch-over time

**SINUMERIK OPERATE**  
identical to the latest  
**SINUMERIK ONE** control

## DIGITAL TWIN:

Create / Run MyVirtual Machine now available for 828D

- Minimise the set-up and run-in time on the real machine.
- Precise simulation reduces the risk of collision and accelerates part programme optimisation.

## HIGHER PERFORMANCE:

CPU performance improved by >40 %  
40 % shorter programme buffer and processing time  
25 % higher simulation efficiency  
50 % faster HMI switch-over time

- Improved efficiency, shorter waiting times and smooth operation

## MODERN PANEL DESIGN:

Innovative 16:10-inch panel with modern design  
SINUMERIK 828D MCP with laser-engraved characters, mechanical keys, service life of override keys increased by 400 %

- Clearer display and improved user-friendliness
- Excellent haptics and wear-resistant buttons, greater robustness and longer service life

## SUSTAINABILITY & SAFETY:

New Ctrl-E Advanced Analysis function  
Maintenance-free (without fan, without battery)  
Safety functions: Security archive, user administration

- Simple transparency of energy consumption
- Protection of customer know-how against manipulation and piracy

## SIEMENS SAFETY INTEGRATED

SET UP WORK WITH OPEN DOORS

**Functional safety also provides protection against high costs!**

Machine and plant safety is not only important because strict regulations must be observed. When everything runs safely, you benefit from time savings in engineering, higher system availability and more investment security.

## CONTROL

- 12.1" colour display
- 4:3 format
- User-friendly SINUMERIK Operate software

## SYSTEM SOFTWARE

- **PPU 271 SW 24**  
**3 MB** CNC memory  
**3 ms** Block change time  
**50** Look Ahead  
**128** tools

## OVERALL PACKAGE

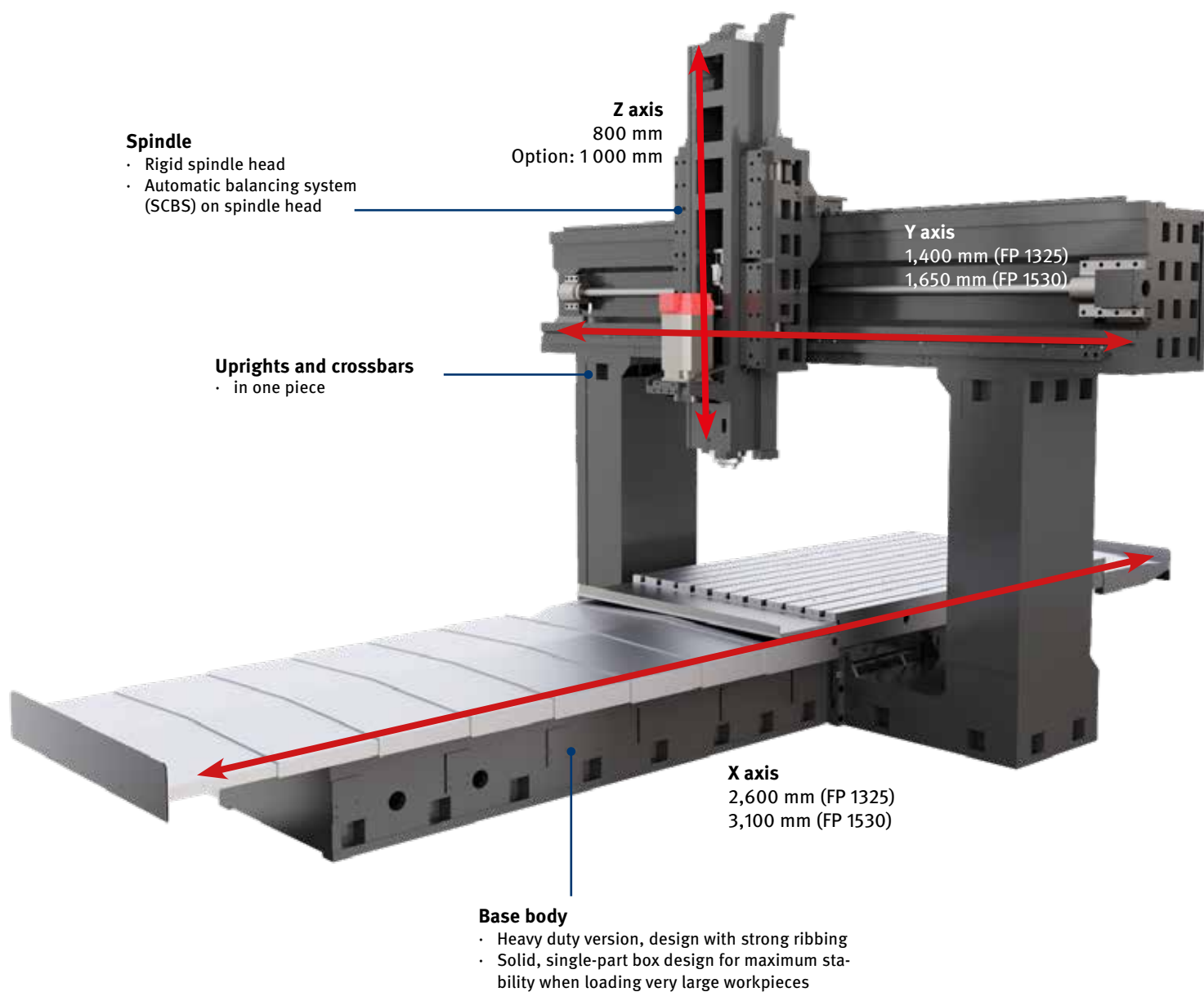
- Safety Integrated
- Residual material detection and machining
- ShopMill work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording

## ADDITIONAL PACKAGE SIEMENS OSS PLUS

12 months; Article no. 3589020  
24 months; Article no. 3589021  
36 months; Article no. 3589022

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal - Siemens WW





## CHIP DISPOSAL



- Auger conveyors on both sides of the machine base transport high volumes of chips to the chip conveyor

## GEARBOX



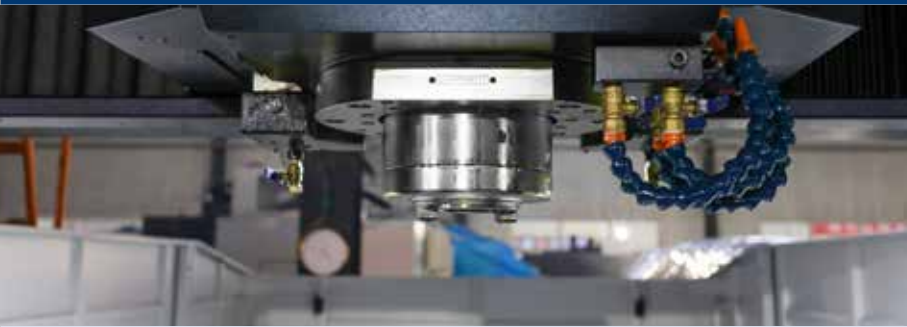
- Gearbox with high transmission ratio

## LINEAR GUIDE

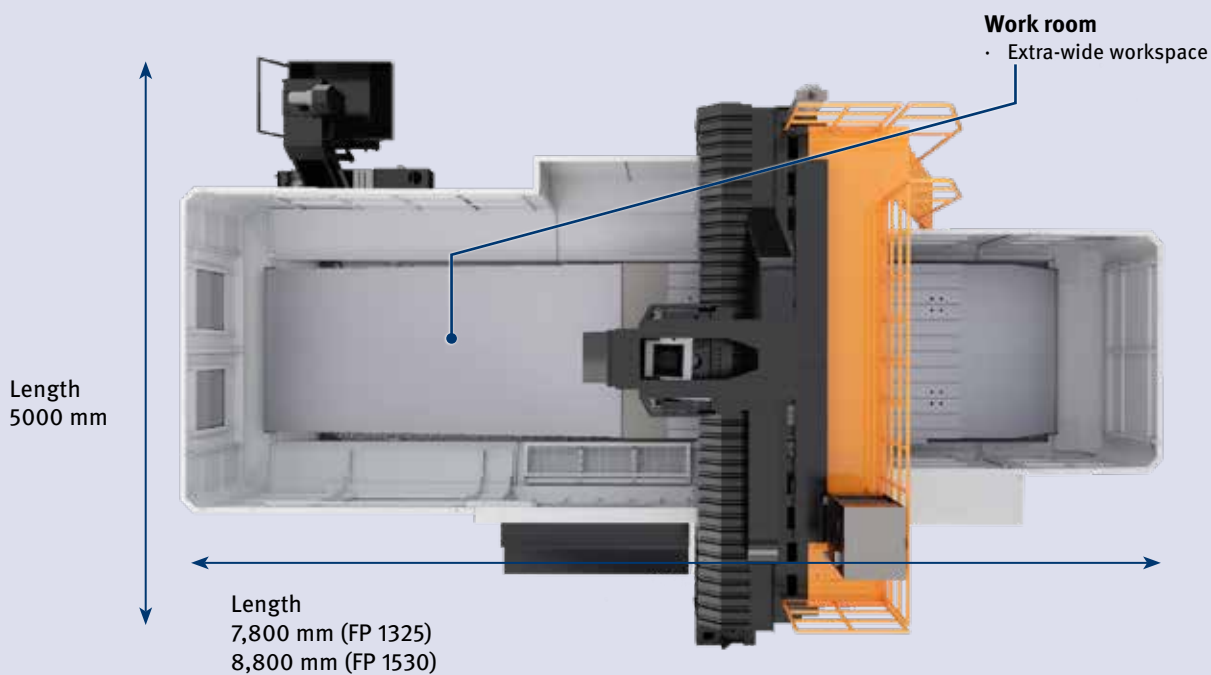


- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement
- Consistent precision with long service life

## SPINDLE



- High torque spindle ideal for high performance cutting applications
- Wide speed range up to 8 000 rpm for heavy machining and precision machining
- Automatic oil lubrication of spindles with cooling
- Spindle SK 50
- Cam gear





| TOOL MEASURING / WORKPIECE MEASURING                                                        |   |                                                                    |                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------|---|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3511652010*                                                                                 | 1 | <b>BLUM TC52</b><br>Universal measuring probe                      | <ul style="list-style-type: none"><li>• Switching point repeatability of 0,3µm 2σ at 2 m/min. Measuring speed</li><li>• Wear-free and durably stable</li><li>• Very compact probe with 40 mm diameter</li></ul> |
| 3511652011*                                                                                 |   | <b>BLUM ZX-Speed</b><br>3-D probe                                  | <ul style="list-style-type: none"><li>• Universal 3-D probe for toolmaking and tool break monitoring</li></ul>                                                                                                  |
| ➡ For information on Blum workpiece/tool measuring, also ex warehouse Germany, see page 295 |   |                                                                    |                                                                                                                                                                                                                 |
| 3511652041                                                                                  | 2 | <b>Manual milling head 90°</b>                                     |                                                                                                                                                                                                                 |
| 3511652042                                                                                  | 3 | <b>Manual milling head two sides 90°</b>                           |                                                                                                                                                                                                                 |
| 3511652043                                                                                  |   | <b>Universal milling head</b>                                      |                                                                                                                                                                                                                 |
| 3511652044                                                                                  | 4 | <b>90° milling head with automatic tool change and manual head</b> | <ul style="list-style-type: none"><li>• Installation</li></ul>                                                                                                                                                  |

| 3-D PRINTING                                                           |   |                               |                                                                                                                                                                                                                                               |
|------------------------------------------------------------------------|---|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3562411                                                                | 5 | <b>3-D printing interface</b> | <ul style="list-style-type: none"> <li>Plug connector on milling head for OPTImill 3X/5X printing head</li> <li>Power supply is installed in control cabinet</li> <li>Preparation for wire breakage monitoring and filament holder</li> </ul> |
| ➡ Information on 3-D printing and accessories can be found on page 273 |   |                               |                                                                                                                                                                                                                                               |

| MISCELLANEOUS         |   |                                           |                                                                                                                          |                             |
|-----------------------|---|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| 3536111               | 8 | <b>Starter set SK50 DIN69871</b>          | <ul style="list-style-type: none"> <li>For information see page page 291</li> </ul>                                      |                             |
| 3511650010* (FP 1325) | 6 | <b>Coolant through spindle CTS</b>        | <ul style="list-style-type: none"> <li>Integrated unit, 20 bar</li> </ul>                                                | We recommend a suction unit |
| 3511660010* (FP 1530) |   |                                           | <ul style="list-style-type: none"> <li>External unit; tank capacity 165 litres, 70 bars pump pressure</li> </ul>         |                             |
| 3511650011* (FP 1325) |   |                                           |                                                                                                                          |                             |
| 3511660011* (FP 1530) | 7 | <b>Air conditioner</b>                    | <ul style="list-style-type: none"> <li>Instead of the standard equipment › heat exchanger</li> </ul>                     |                             |
| 3511652005*           |   | <b>Linear guide</b>                       | <ul style="list-style-type: none"> <li>for Z axis</li> </ul>                                                             |                             |
| 3511650020* (FP 1325) |   | <b>Tool changer with 30 tool stations</b> | <ul style="list-style-type: none"> <li>Instead of the standard equipment › Tool changer with 24 tool stations</li> </ul> |                             |
| 3511660020* (FP 1530) |   |                                           |                                                                                                                          |                             |
| 3511650021* (FP 1325) |   | <b>Tool changer with 40 tool stations</b> | <ul style="list-style-type: none"> <li>Instead of the standard equipment › Tool changer with 24 tool stations</li> </ul> |                             |
| 3511660021* (FP 1530) |   |                                           |                                                                                                                          |                             |
| 3511650022* (FP 1325) |   | <b>Tool changer with 60 tool stations</b> | <ul style="list-style-type: none"> <li>Instead of the standard equipment › Tool changer with 24 tool stations</li> </ul> |                             |
| 3511660022 *(FP 1530) |   |                                           |                                                                                                                          |                             |
| 3511652001            |   | <b>Fourth axis preparation</b>            |                                                                                                                          |                             |
| 3511652020            |   | <b>Fourth axis</b>                        | <ul style="list-style-type: none"> <li>Including lathe chuck 320 mm and tailstock (air clamping)</li> </ul>              |                             |
| 3511652002            |   | <b>Fifth axis preparation</b>             |                                                                                                                          |                             |
| 3511652022            |   | <b>Fifth axis</b>                         | <ul style="list-style-type: none"> <li>Including lathe chuck 250 mm and tailstock (air clamping)</li> </ul>              |                             |

## 1 BLUM TC52/ ZX-SPEED



- 3D measuring probe with infrared transmission
- Precise, directionally independent approach behaviour
- Constant deflection forces
- No detrimental 3-leg principle with lobing effect

## 2 SEMI-AUTOMATIC MILLING HEAD 90°



- The 90 degree head enables large workpieces to be processed laterally without the need for repeated loading and unloading, thereby improving processing efficiency.

## 3 AUTOMATIC UNIVERSAL MILLING HEAD



C axis rotation

- The head is mounted on the spindle manually
- Head rotation with 50 indexing is achieved through manual and hydraulic locking.
- The tool is clamped and unclamped using the control knob

## 4 SEMI-AUTOMATIC UNIVERSAL MILLING HEAD

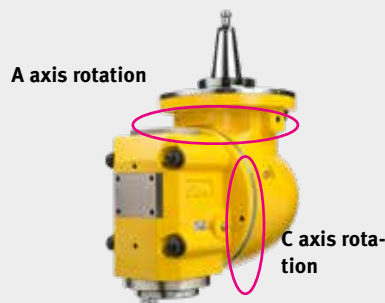


C axis rotation

A axis rotation

- Connects to the spindle part with an upper module, clamping and unclamping is automatically controlled by a CNC system. Angle indexing in the C axis is automatic. It is controlled by the CNC system. Standard indexing is 2.5°

## 5 AUTOMATIC UNIVERSAL MILLING HEAD



A axis rotation

C axis rotation

- Enables milling or drilling in any inclined plane
- The angle is adjusted by loosening the screws
- The tool is clamped/unclamped manually and is locked by a tension screw

## 6 COOLANT THROUGH SPINDLE



- Coolant is fed directly into the spindle to control the temperature of the tool and prevent overheating. This keeps the spindle at the optimum operating temperature, which increases precision and service life.

## 7 AIR CONDITIONING



- Instead of heat exchanger
- The air conditioner permanently and constantly cools the control cabinet to the set temperature.

## 8 STARTER SET SK 50 / DIN 69871



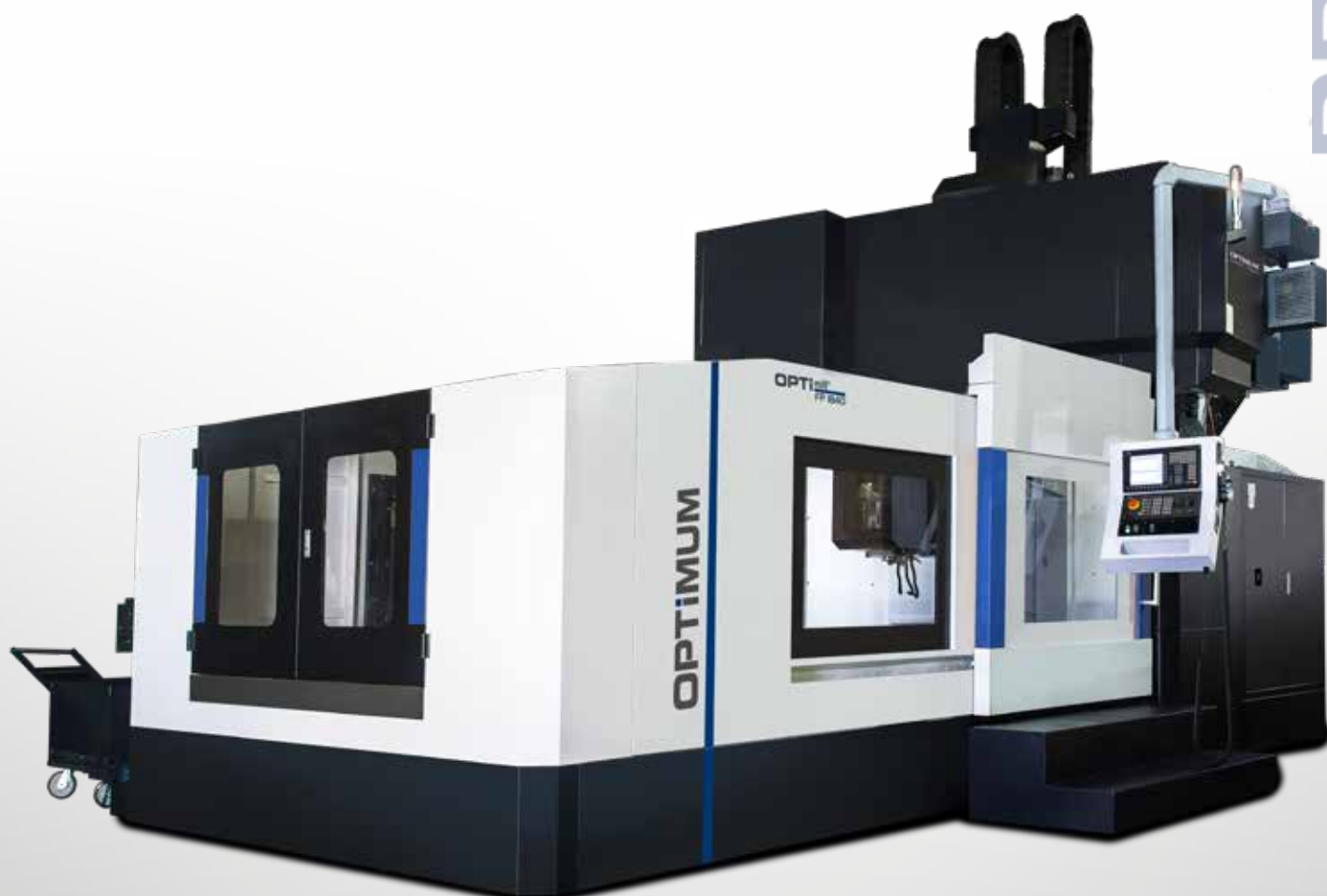
- 1 piece cutter head holder with 27 mm mounting
- 2 pieces Weldon 6 mm
- 1 each Weldon 8 / 10 / 12n / 16 mm
- 2 pieces Weldon 20 mm
- 1 piece adapter SK 50 to MT 3
- 4 pieces collet chuck holder ER 32
- 1 piece collet spanner ER 32
- 18-part collet set ER 32
- 1 piece height adjuster
- 1 piece taper squeegee
- 15 pieces pull studs

# FP 1840 / FP 2560

## OPTIMUM PREMIUM CNC Portal milling machine

### SIEMENS CONTROL SINUMERIK 828D

- Perfect structures and a rugged design guarantee best possible rigidity and stability
- All main components - machine bed, worktable, machine column, crossbeam, saddle and headstock are made of high quality MEEHANITE® cast iron.
- Generously dimensioned guides on the X, Y and Z axes
- All guide rails tempered and ground (HRC50 -HRC55)
- The X- and Y-axis are equipped with roller linear guides so that the axes move with the highest precision even at high speed
- Highest machining accuracy and high damping due to wide adjustable box way guides of the Z-axis for high drilling and milling performance with high spindle output torque
- Hardened and precision ground ball screws mounted in high precision bearings in all three axes for high rapid traverse speeds
- Cooling of the main spindle gear (gears, bearings, spindle) by oil circulation system. Reduction of thermal expansion
- Operating status display (work end lamp)
- Axis covers
- Work lamp LED with alarm indicator
- Chip conveyor belt design with chip trolley
- Energy chain with strain relief and cable separation
- Spindle oil cooler
- Heat exchanger
- BT50 spindle mount with a maximum spindle speed of 6000 rpm for high precision
- Pneumatic counterbalance of the Z-axis ensures very high reliability and stability while several axes are working simultaneously. The SCBS system does not need an additional power supply or drive. This balance system helps to achieve high speeds and excellent machining
- Complete machine enclosure with wide opening doors for ergonomic workpiece handling
- Automatic lubrication system with pressure control system
- Separating system for lubricating oil and coolant
- Set-up elements
- Additional package SIEMENS material defect liability and free online/on-site service OSS Plus see page 245



# OPTIMILL FP 1840 / FP 2560

## TECHNICAL DATA

| Model                                                | FP 1840                         | FP 2560                |
|------------------------------------------------------|---------------------------------|------------------------|
| Article no.                                          | 3511670                         | 3511680                |
|                                                      |                                 |                        |
| Machine data                                         |                                 |                        |
| Electrical connection                                | 400 V / 3 Ph ~50 Hz             |                        |
| Total connected load                                 | 60 KVA                          |                        |
| Milling spindle                                      |                                 |                        |
| Drive motor S1 operation                             | 17 kW                           | 22 kW                  |
| Torque drive motor S1 operation                      | 162 Nm                          | 140 Nm                 |
| Drive motor S6 30 % operation                        | 32.3 kW                         | 41.8 kW                |
| Torque drive motor S6 30 % operation                 | 330 Nm                          |                        |
| Spindle seat                                         | SK50 DIN 69871                  |                        |
|                                                      |                                 |                        |
| Cooling lubricant system                             |                                 |                        |
| Number of coolant pumps / power                      | 1 piece / 1.35 kW               |                        |
| Tank capacity                                        |                                 |                        |
| Tool changer                                         |                                 |                        |
| Type                                                 | Double arm gripper              |                        |
| Number of tool stations                              | 24 (Option** 30/32/40/60 tools) |                        |
| Max. tool diameter                                   | 110 mm                          |                        |
| Max. tool diameter (tools slots beside not occupied) | 220 mm                          |                        |
| Tool length                                          | 350 mm                          |                        |
| Max. tool weight                                     | 18 kg                           |                        |
| Tool change time according to VDI 2852               | 4.5 sec.                        |                        |
| Milling precision                                    |                                 |                        |
| Repeat accuracy                                      | ± 0.015 mm                      |                        |
| Positioning accuracy                                 | ± 0.009 mm                      |                        |
| Travel                                               |                                 |                        |
| X axis (linear guide)                                | 4200 mm                         | 6200 mm                |
| Y axis (linear guide)                                | 2400 mm                         | 3600 mm                |
| Z axis (box way)                                     | 1000 mm                         |                        |
| Feed drive                                           |                                 |                        |
| X axis fast motion                                   | 15 m/min.                       | 10 m/min.              |
| Y axis fast motion                                   | 15 m/min.                       |                        |
| Z axis rapid traverse                                | 10 m/min.                       |                        |
| Motor torque                                         |                                 |                        |
| X axis                                               | 80 Nm                           | 240 Nm                 |
| Y axis                                               | 100 Nm                          | 180 Nm                 |
| Z axis                                               | 81 Nm                           | 108 Nm                 |
| Feed forces                                          |                                 |                        |
| X / Y / Z axis                                       |                                 |                        |
| Speed range                                          |                                 |                        |
| Speeds*                                              | 6 000 rpm(Option** 8 000 rpm)   |                        |
| Pneumatics                                           |                                 |                        |
| Compressed air                                       |                                 |                        |
| Milling table                                        |                                 |                        |
| Table length x width                                 | 4000 x 1800 mm                  | 6000 x 2500 mm         |
| T-slot size / amount / distance                      | 22 / 9 / 200 mm                 | 28 / 11 / 200 mm       |
| Maximum payload                                      | 14000 kg                        | 25000 kg               |
| Clearance spindle to table                           | 220 - 1,220 mm                  |                        |
| Spindle to stand distance                            | 404 mm                          |                        |
| Distance between the stands                          | 2400 mm                         | 3600 mm                |
| Dimensions                                           |                                 |                        |
| Installation area                                    | 10800 x 6200 x 5500 mm          | 16000 x 7400 x 5700 mm |
| Overall weight                                       | 37500 kg                        | 54000 kg               |

\* Please note that the maximum spindle speed must be reduced by approx. 20 % in continuous operation

\*\* The option must be ordered with the basic machine. Cannot be retrofitted.



# SINUMERIK 828D PPU271.5

COMPACT REVOLUTION

DIGITALLY TRANSFORMED, INNOVATIVELY DESIGNED, ENHANCED PERFORMANCE



**PPU.5 CPU power Upgrade**  
**>40 %**

Comprehensive improvement  
⇒ Programme buffer and processing time  
⇒ Simulation efficiency  
⇒ HMI switch-over time

**SINUMERIK OPERATE**  
identical to the latest  
**SINUMERIK ONE** control

## DIGITAL TWIN:

Create / Run MyVirtual Machine now available for 828D

- Minimise the set-up and run-in time on the real machine.
- Precise simulation reduces the risk of collision and accelerates part programme optimisation.

## HIGHER PERFORMANCE:

CPU performance improved by >40 %  
40 % shorter programme buffer and processing time  
25 % higher simulation efficiency  
50 % faster HMI switch-over time

- Improved efficiency, shorter waiting times and smooth operation

## MODERN PANEL DESIGN:

Innovative 16:10-inch panel with modern design  
SINUMERIK 828D MCP with laser-engraved characters, mechanical keys, service life of override keys increased by 400 %

- Clearer display and improved user-friendliness
- Excellent haptics and wear-resistant buttons, greater robustness and longer service life

## SUSTAINABILITY & SAFETY:

New Ctrl-E Advanced Analysis function  
Maintenance-free (without fan, without battery)  
Safety functions: Security archive, user administration

- Simple transparency of energy consumption
- Protection of customer know-how against manipulation and piracy

## SIEMENS SAFETY INTEGRATED

SET UP WORK WITH OPEN DOORS

**Functional safety also provides protection against high costs!**

Machine and plant safety is not only important because strict regulations must be observed. When everything runs safely, you benefit from time savings in engineering, higher system availability and more investment security.

## CONTROL

- 12.1" colour display
- 4:3 format
- User-friendly SINUMERIK Operate software

## SYSTEM SOFTWARE

- **PPU 271 SW 24**  
**3 MB** CNC memory  
**3 ms** Block change time  
**50** Look Ahead  
**128** tools

## OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- ShopMill work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording

## ADDITIONAL PACKAGE SIEMENS OSS PLUS

12 months; Article no. 3589020  
24 months; Article no. 3589021  
36 months; Article no. 3589022

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal - Siemens WW



#### Tool changer

- Driven by precision cam for fast and accurate tool positioning
- The tools are transferred directly from the tool magazine to the spindle during the tool change by means of a double gripper
- Tool selection occurs bidirectionally via the shortest route.
- The tool magazine is located outside of the work area
- The cover on the tool magazine protects the tools against chips or coolant

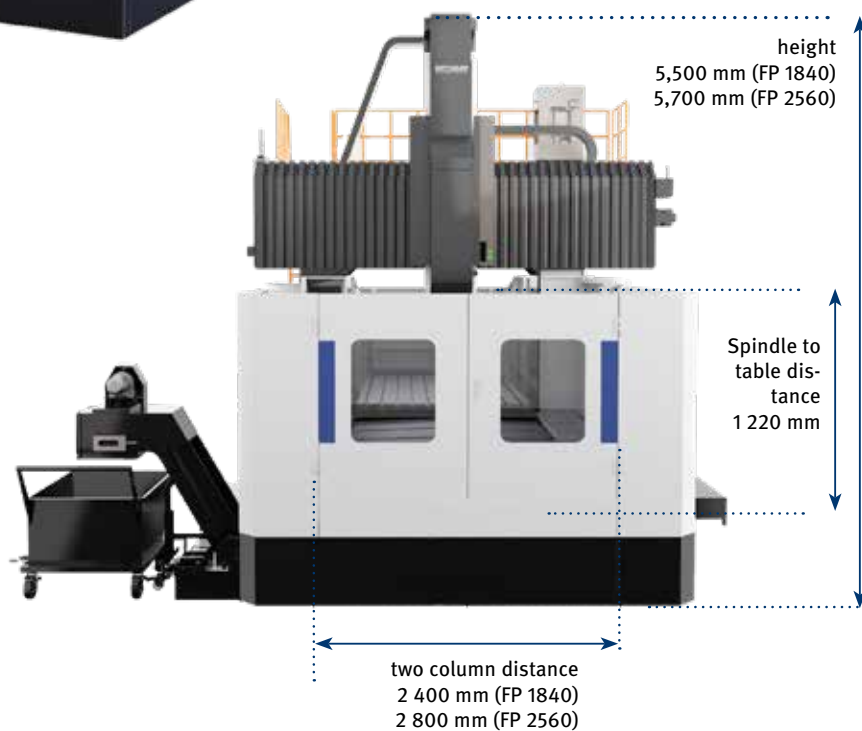
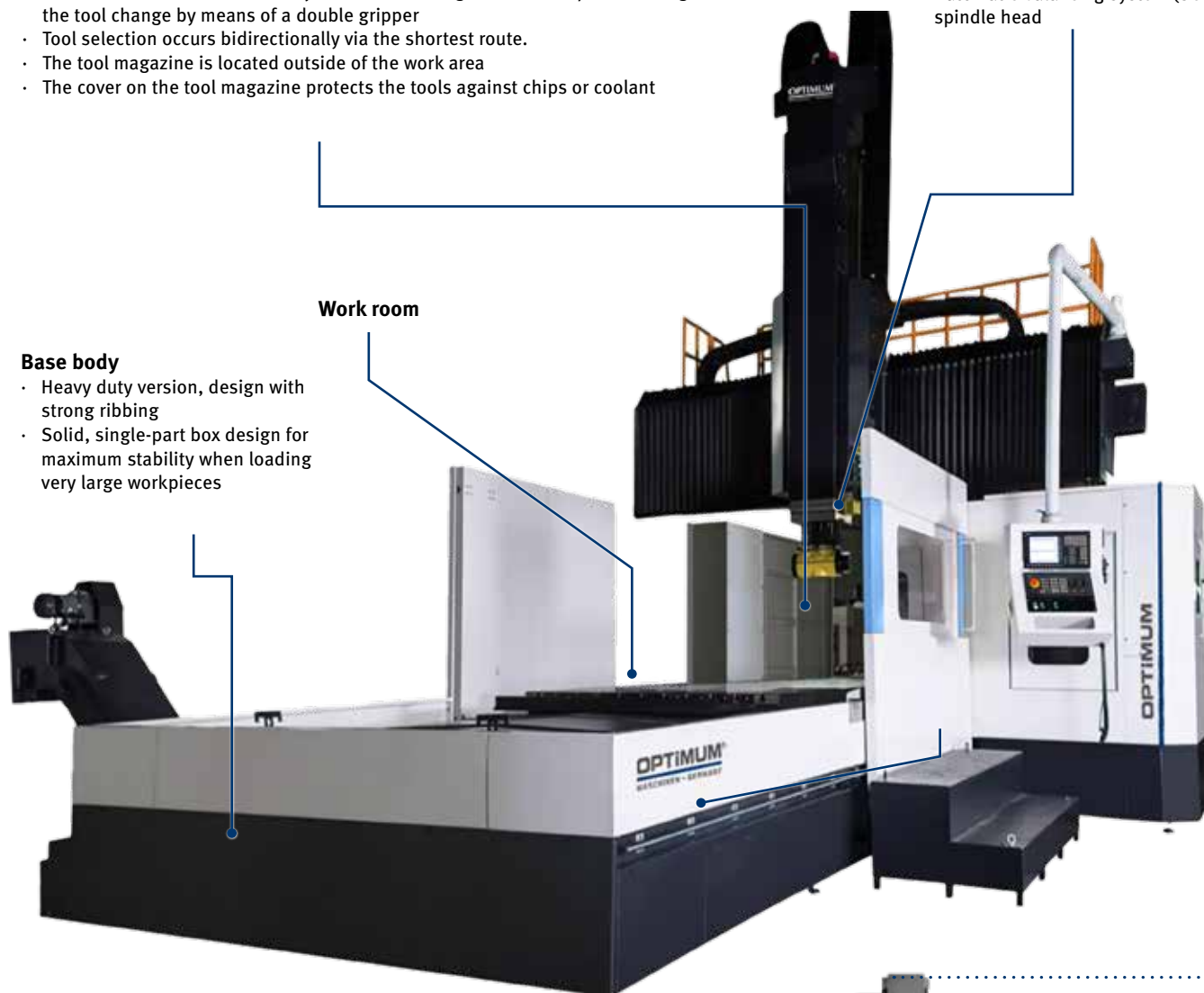
#### Spindle

- Rigid spindle head
- Automatic balancing system (SCBS) on spindle head

#### Work room

#### Base body

- Heavy duty version, design with strong ribbing
- Solid, single-part box design for maximum stability when loading very large workpieces



## CHIP DISPOSAL



- Auger conveyors on both sides of the machine base transport high volumes of chips to the chip conveyor

## GEARBOX



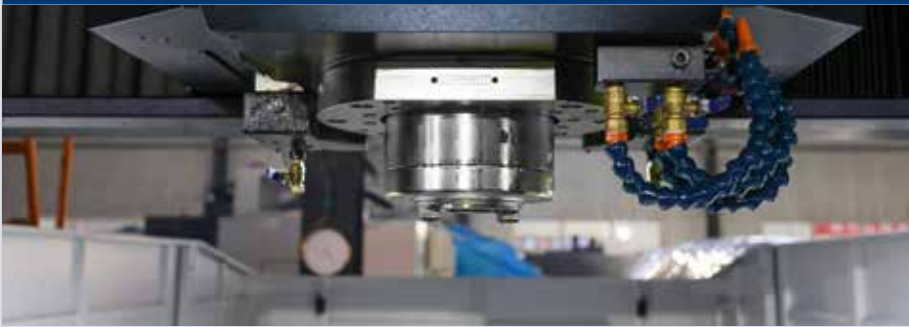
- Gearbox with high transmission ratio

## LINEAR GUIDE

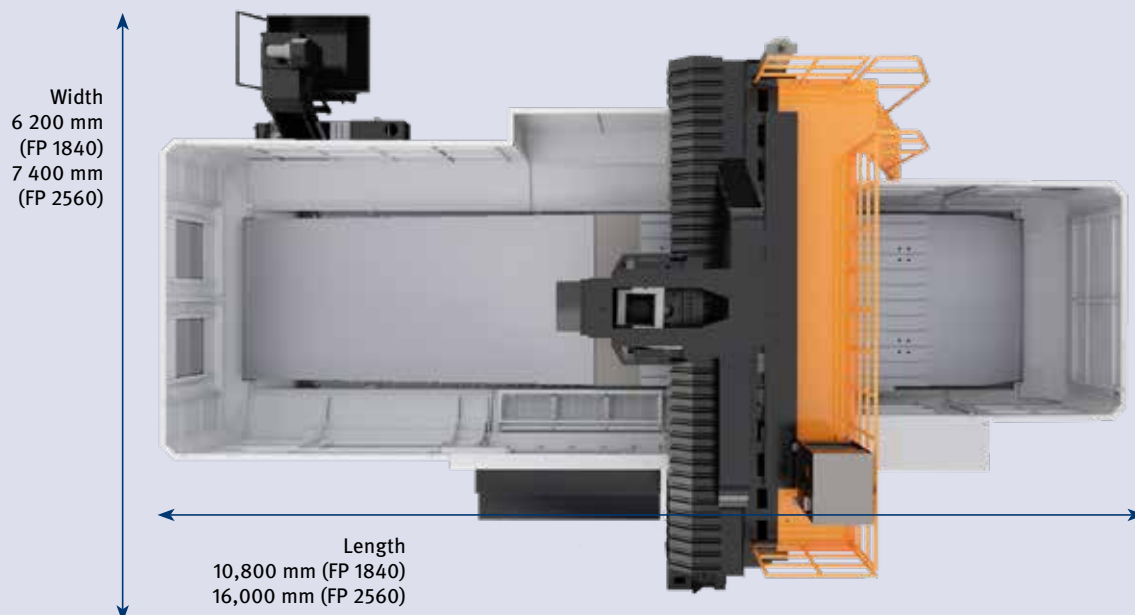


- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement
- Consistent precision with long service life

## SPINDLE



- High torque spindle ideal for high performance cutting applications
- Wide speed range up to 8 000 rpm for heavy machining and precision machining
- Automatic oil lubrication of spindles with cooling
- Spindle SK 50
- Cam gear



| TOOL MEASURING / WORKPIECE MEASURING                                                        |   |                                               |                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------|---|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3511652010*                                                                                 | 1 | <b>BLUM TC52</b><br>Universal measuring probe | <ul style="list-style-type: none"><li>• Switching point repeatability of 0,3µm 2σ at 2 m/min. Measuring speed</li><li>• Wear-free and durably stable</li><li>• Very compact probe with 40 mm diameter</li></ul> |
| 3511652010                                                                                  |   | <b>BLUM ZX-Speed</b><br>3-D probe             | <ul style="list-style-type: none"><li>• Universal 3-D probe for toolmaking and tool break monitoring</li></ul>                                                                                                  |
| ➡ For information on Blum workpiece/tool measuring, also ex warehouse Germany, see page 295 |   |                                               |                                                                                                                                                                                                                 |
| 3511652041                                                                                  | 3 | <b>Manual 90° milling head</b>                | <ul style="list-style-type: none"><li>• including flange</li></ul>                                                                                                                                              |
| 3511652042                                                                                  |   | <b>Manual two way 90° milling head</b>        | <ul style="list-style-type: none"><li>• including flange</li></ul>                                                                                                                                              |
| 3511652043                                                                                  |   | <b>Manual universal milling head</b>          | <ul style="list-style-type: none"><li>• including flange</li></ul>                                                                                                                                              |
| 3511652044                                                                                  | 2 | <b>Semi-automatic 90° milling head</b>        | <ul style="list-style-type: none"><li>• Automatic clamping tool, manual installation of the head and rotation (bracket on the table)</li></ul>                                                                  |
| 3511652045                                                                                  | 4 | <b>Semi-automatic universal milling head</b>  | <ul style="list-style-type: none"><li>• Holder on the table</li></ul>                                                                                                                                           |
| 3511652046                                                                                  | 5 | <b>Automatic 90° milling head</b>             | <ul style="list-style-type: none"><li>• Automatic tool magazine</li><li>• Direct and gearbox</li></ul>                                                                                                          |
| 3511652047                                                                                  | 6 | <b>Automatic universal milling head</b>       | <ul style="list-style-type: none"><li>• Automatic tool magazine</li><li>• Direct and gearbox</li></ul>                                                                                                          |

| 3-D PRINTING                                                           |  |                               |                                                                                                                                                                                                                                               |
|------------------------------------------------------------------------|--|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3562411                                                                |  | <b>3-D printing interface</b> | <ul style="list-style-type: none"> <li>Plug connector on milling head for OPTImill 3X/5X printing head</li> <li>Power supply is installed in control cabinet</li> <li>Preparation for wire breakage monitoring and filament holder</li> </ul> |
| ➡ Information on 3-D printing and accessories can be found on page 273 |  |                               |                                                                                                                                                                                                                                               |

| MISCELLANEOUS         |   |                                           |                                                                                                                          |                             |
|-----------------------|---|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| 3536111               | 8 | <b>Starter set SK 50 DIN69871</b>         |                                                                                                                          |                             |
| 3511670010* (FP 1840) | 6 | <b>Coolant through spindle CTS</b>        | <ul style="list-style-type: none"> <li>Integrated unit, 20 bar</li> </ul>                                                | We recommend a suction unit |
| 3511680010* (FP 2560) |   |                                           | <ul style="list-style-type: none"> <li>External unit; tank capacity 165 litres, 70 bars pump pressure</li> </ul>         |                             |
| 3511670011* (FP 1840) |   |                                           |                                                                                                                          |                             |
| 3511680011* (FP 2560) |   |                                           |                                                                                                                          |                             |
| 3511652005*           | 7 | <b>Air conditioner</b>                    | <ul style="list-style-type: none"> <li>Instead of the standard equipment › heat exchanger</li> </ul>                     |                             |
| 351161005*            |   | <b>Linear guide</b>                       | <ul style="list-style-type: none"> <li>for Z axis</li> </ul>                                                             |                             |
| 3511670020 (FP 1840)  |   | <b>Tool changer with 30 tool stations</b> | <ul style="list-style-type: none"> <li>Instead of the standard equipment › Tool changer with 24 tool stations</li> </ul> |                             |
| 3511680020 (FP 2560)  |   |                                           |                                                                                                                          |                             |
| 3511670021 (FP 1840)  |   | <b>Tool changer with 40 tool stations</b> | <ul style="list-style-type: none"> <li>Instead of the standard equipment › Tool changer with 24 tool stations</li> </ul> |                             |
| 3511680021 (FP 2560)  |   |                                           |                                                                                                                          |                             |
| 3511670022 (FP 1840)  |   | <b>Tool changer with 60 tool stations</b> | <ul style="list-style-type: none"> <li>Instead of the standard equipment › Tool changer with 24 tool stations</li> </ul> |                             |
| 3511680022 (FP 2560)  |   |                                           |                                                                                                                          |                             |
| 3511652001            |   | <b>Fourth axis preparation</b>            |                                                                                                                          |                             |
| 3511652020            |   | <b>Fourth axis</b>                        | <ul style="list-style-type: none"> <li>Including lathe chuck 120 mm and tailstock (air clamping)</li> </ul>              |                             |
| 3511652002            |   | <b>Fifth axis preparation</b>             |                                                                                                                          |                             |
| 3511652022            |   | <b>Fifth axis</b>                         | <ul style="list-style-type: none"> <li>Including lathe chuck 100 mm and tailstock (air clamping)</li> </ul>              |                             |

## 1 BLUM TC52/ ZX-SPEED



- 3D measuring probe with infrared transmission
- Precise, directionally independent approach behaviour
- Constant deflection forces
- No detrimental 3-leg principle with lobing effect

## 2 SEMI-AUTOMATIC MILLING HEAD 90°



- 90° angle head enables lateral processing of large workpieces without turning or repeated loading and unloading, which improves processing efficiency

## 3 AUTOMATIC UNIVERSAL MILLING HEAD



C axis rotation

- The head is mounted on the spindle manually
- The head rotation with 5° indexing is realised by manual and hydraulic locking
- The tool is clamped and unclamped using the control knob

## 4 SEMI-AUTOMATIC UNIVERSAL MILLING HEAD

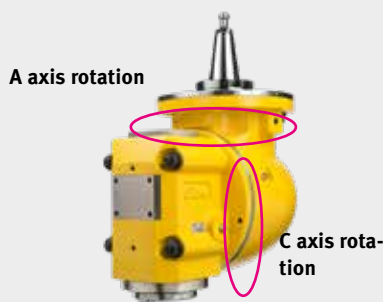


C axis rotation

A axis rotation

- Connects to the spindle part with an upper module, clamping and unclamping is automatically controlled by a CNC system. Angle indexing in the C axis is automatic. It is controlled by the CNC system. Standard indexing is 2.5°

## 5 AUTOMATIC UNIVERSAL MILLING HEAD



A axis rotation

C axis rotation

- Enables milling or drilling in any inclined plane
- The angle is adjusted by loosening the screws
- The tool is clamped/unclamped manually and is locked by a tension screw

## 6 COOLANT THROUGH SPINDLE



- Coolant is fed directly into the spindle to control the temperature of the tool and prevent overheating. This keeps the spindle at the optimum operating temperature, which increases precision and service life.

## 7 AIR CONDITIONING



- Instead of heat exchanger
- The air conditioner permanently and constantly cools the control cabinet to the set temperature.

## 8 STARTER SET SK 50 / DIN 69871



- 1 piece cutter head holder, 27 mm holder
- 2 pieces Weldon 6 mm
- 1 each Weldon 8 / 10 / 12n / 16 mm
- 2 pieces Weldon 20 mm
- 1 piece adapter SK 50 to MT 3
- 4 pieces collet chuck holder ER 32
- 1 piece collet spanner ER 32
- 18-part collet set ER 32
- 1 piece height adjuster
- 1 piece taper squeegee
- 15 pieces pull studs



## EYRING STAHL- UND METALLBAU UG

### THURINGIAN METAL CONSTRUCTION COMPANY EXPANDS MACHINERY WITH OPTIMUM CNC PORTAL MILLING MACHINE

Eyring Stahl- und Metallbau, based in Römhild, Thuringia, has been a major player in the production of steel and metal structures made of aluminium, stainless steel and brass since 1981. Now the family-run company has expanded its machinery with the OPTIMUM CNC portal milling machine OPTImill FP 3200, raising its manufacturing process to a new technological level.

#### Portal milling machine OPTImill FP 3200

On a production area of approx. 1.500 m<sup>2</sup> the company combines a wide variety of metalworking machines in order to be able to react quickly to individual needs and to offer tailor-made, innovative solutions at any time. They include bending machines, hydraulic presses, welding equipment, painting cabins, grinding machines, circular saws and gate shears. They are used to manufacture external and internal stairways, railings, canopies, fences and gates, balcony railings and special constructions. Now that the new OPTIMUM FP 3200 CNC Portal milling machine

has been integrated into its machine line-up, the company can rely on state-of-the-art technology to automate its manufacturing processes in a sustainable manner and meet the increased precision requirements in an even better way in the future.

#### SIEMENS Control SINUMERIK 828D

The OPTIMUM CNC portal milling machine, which was presented to the market only a few months ago, is equipped with a SIEMENS Control 828D, which enables intelligent motion control. This makes the machine especially suitable for the production of workpieces with a high dimensional accuracy and surface quality. 3-D simulation allows the manufacturing processes to be optimally controlled and adjusted where necessary. Due to its rigid, rugged design, made of high-quality MEEHANITE® quality



cast iron, and the milling head mounted on a cross beam, the Portal milling machine guarantees maximum stability and is ideally suited for machining large surfaces such as panels. Roller linear guides on the X and Y axis as well as a balance system in the Z axis ensure highest precision and reliability even at high speeds. The ball screws are mounted in high-precision bearings and allow for absolutely unbalance-free rotation of the spindle. In order to set the highest standards in safety, the portal milling machine is also equipped with the **SIEMENS** Safety Integrated function, which prevents injuries to persons, resulting in higher machine availability and thus increased productivity.

### High quality and reliable service

In addition to high quality and reliable service, the large dimensioned

clamping area was an important factor for the metal construction company Eyring when choosing the OPTIMUM CNC Portal milling machine. This is why the traditional Thuringian company will be using the machine especially for the production of large components such as welding frames in the future.



# ***05 - MILLING TRAINING MACHINES***



# 05

## TRAINING MACHINES

# F 3Pro

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Universal milling machines with servo drives

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**SIEMENS** CONTROL SINUMERIK 808D ADVANCED

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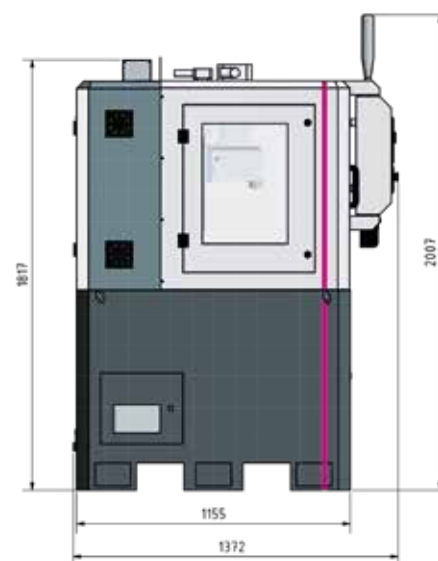
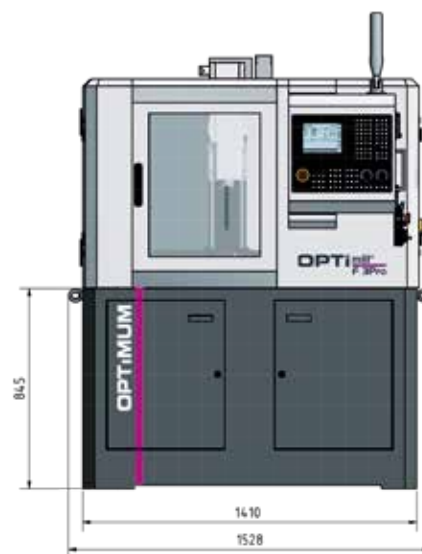
- Linear guides on all axes
- All axes with ball screws
- Servo drive on all axes (X, Y and Z axis)
- Tool change at the push of a button (electropneumatic tool clamping device)
- Coolant system
- Central lubrication
- Signal light
- Massive, exact milling table large dimensioned and precisely surface machined
- Swivelling control panel
- The portable, electronic handwheel with enabling switch and emergency stop push-button makes it much easier to run in programmes.
- Additional package SIEMENS material defects liability and free on-site service OSS see page 258
- For information on maintenance contracts, see page 258





## TECHNICAL DATA

| Model                                             | F 3Pro                |
|---------------------------------------------------|-----------------------|
| Article no.                                       | 3500415               |
| <b>Machine data</b>                               |                       |
| Electrical connection                             | 400 V / 3 Ph ~50 Hz   |
| Total connected load                              | 5 kVA                 |
| <b>Milling spindle</b>                            |                       |
| Drive motor S1 operation                          | 1.5 kW                |
| Torque drive motor S1 operation                   | 9.5 Nm                |
| Spindle seat                                      | ISO 30 / BT 30 x 45°  |
| <b>Cooling lubricant system</b>                   |                       |
| Coolant pump output                               | 95 W                  |
| Tank capacity                                     | 50 litres             |
| <b>Milling cutter size</b>                        |                       |
| Cutter head size max.                             | Ø 50 mm               |
| End mill size max.                                | Ø 25 mm               |
| <b>Milling precision</b>                          |                       |
| Repeat accuracy                                   | ± 0.02 mm             |
| Positioning accuracy                              | ± 0.01 mm             |
| <b>Tool changer</b>                               |                       |
| Number of tool positions                          | 8                     |
| Maximum tool diameter / free additional positions | 100 mm / 180 mm       |
| Maximum tool weight                               | 6 kg                  |
| Tool change time chip to chip                     | 6 Seconds             |
| <b>Travel</b>                                     |                       |
| X axis                                            | 360 mm                |
| Y axis                                            | 170 mm                |
| Z axis                                            | 250 mm                |
| <b>Feed speed</b>                                 |                       |
| X axis                                            | 15 m/min.             |
| Y axis                                            | 15 m/min.             |
| Z axis                                            | 10 m/min.             |
| <b>Speed range</b>                                |                       |
| Speeds*                                           | max. 6 000 rpm        |
| <b>Motor torque</b>                               |                       |
| X axis                                            | 3,5 Nm                |
| Y axis                                            | 3,5 Nm                |
| Z axis                                            | 6 Nm                  |
| <b>Milling table</b>                              |                       |
| Throat                                            | 270 mm                |
| Clearance spindle to table                        | 50 - 295 mm           |
| Table length x width                              | 460 x 200 mm          |
| T-slot size / amount / distance                   | 12 mm / 3 / 60 mm     |
| Maximum payload                                   | 50 kg                 |
| <b>Dimensions</b>                                 |                       |
| Length x width x height                           | 1410 x 1372 x 2007 mm |
| Overall weight                                    | 720 kg                |



### SINUMERIK 808D ADVANCED

- RJ45 Ethernet port
- 8.4" LCD colour display with a resolution of 800x600
- Network function
- Ready for remote maintenance
- AST function gives users an easy optimisation option in case of stricter dynamic and precision requirements
- Closed-loop control circuit
- Greater precision
- Incremental encoder/referencing move required

#### Warranty

With the warranty, you protect your machine against warranty damage for 12 or 36 months. (must be purchased with the purchase of the machine). Information on the warranty at [www.optimum-machines.com](http://www.optimum-machines.com)  
12 months; Art. no. 3589010; 36 months; Art. no. 3589012

#### WORK AREA



- Clearly visible from three sides
- Clear, resilient Makrolon panes

#### HANDWHEEL



- Portable
- Electronic
- Substantially facilitates running in of programs
- Emergency stop button
- Confirm button

#### SIGNAL LIGHT



- Visually displays the machine status
- Very bright and with a long service life

#### CONNECTIONS



- For easy access
- Easy to connect to the machine
- Data interfaces:
  - › Power connection
  - › RJ45 plug-in connection
  - › USB connection

#### LINEAR GUIDE



- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement
- Low coefficient of friction
- Excellent error compensation due to X layout

#### TOOL CHANGE



- Maximum static and dynamic stiffness
- High positioning accuracy
- Smooth, backlash-free movement
- Low coefficient of friction
- Excellent error compensation due to X layout

## OPTIONS

### STARTER SET BT 30

Article no. 3536107

Comprises:

- 1 piece cutter head tool holder <sup>1</sup>
- 1 piece drill chuck <sup>2</sup>
- 2 pieces each Weldon 6 mm / 20 mm <sup>3</sup>
- 1 piece, each Weldon 8 mm / 10 mm / 12 mm / 16 mm <sup>3</sup>
- 1 piece adapter BT 30 to MT 2 <sup>4</sup>
- 4 pieces collet chuck holder ER 32 <sup>5</sup>
- 1 piece collet spanner ER 32 <sup>6</sup>
- 18-part collet set ER 32 <sup>7</sup>
- 1 piece height adjuster <sup>8</sup>
- 1 piece assembly and tool setting aid <sup>9</sup>
- 14 pcs. pull studs <sup>10</sup>
- 1 pc. taper squeegee <sup>11</sup>



➤ More information can be found on page 288

# ***05 - TURNING TRAINING MACHINES***



OPTi turn L 28HS



# L 28HS

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CNC-controlled flat bed lathe with linear guide

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**SIEMENS** CONTROL SINUMERIK 808D ADVANCED

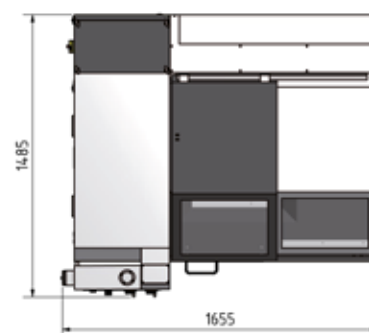
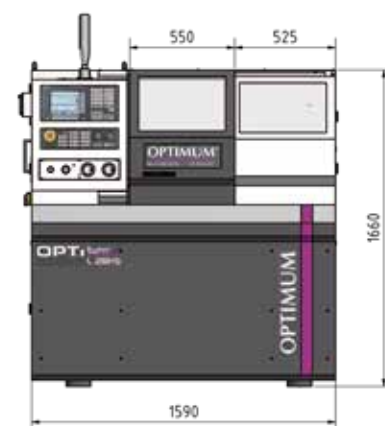
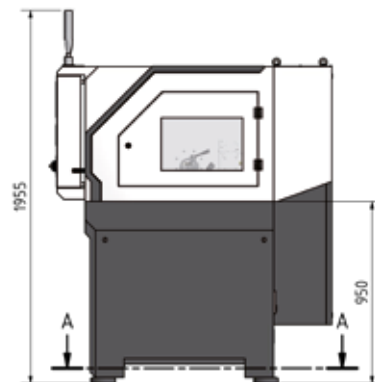
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- Braced machine bed made from grey cast-iron
- Complex spindle bearing
- Emergency stop button
- Central lubrication
- Reference switch
- Maintenance-friendly protective housing
- Feed motors from **SIEMENS**
- Access flap on rear for maintenance
- Safety switch on front sliding door
- Turret located behind the lathe centre (left turning tool)
- Linear guide
- Additional package SIEMENS material defects liability and free on-site service OSS on page 263
- For information on maintenance contracts see page 333



## TECHNICAL DATA

| Model                                  | L 28HS                |
|----------------------------------------|-----------------------|
| Article no.                            | 3504220               |
| <b>Machine data</b>                    |                       |
| Electrical connection                  | 400 V / 3 Ph ~50 Hz   |
| Total connected load                   | 3.75 kVA              |
| <b>Spindle</b>                         |                       |
| Drive motor S1 operation               | 2.2 kW                |
| Torque drive motor S1 operation        | 14 Nm                 |
| Torque at the spindle                  | 28 Nm                 |
| Spindle seat                           | DIN 6350 A2-3         |
| Spindle taper                          | 5C                    |
| Spindle bore                           | Ø 30 mm               |
| <b>Cooling lubricant system</b>        |                       |
| Coolant pump output                    | 95 W                  |
| Tank capacity                          | 25 litres             |
| Pump delivery rate max.                | 6 l/min               |
| Max. delivery head                     | 3 m                   |
| <b>Machine data</b>                    |                       |
| Centre height                          | 169 mm                |
| Centre width                           | 430 mm                |
| Swing Ø above cross slide              | 200 mm                |
| Swing Ø above machine bed              | 300 mm                |
| <b>Speed range</b>                     |                       |
| Spindle speeds                         | 40 - 4 000 rpm        |
| <b>Tool changer</b>                    |                       |
| Type                                   | electrical            |
| Number of tool slots                   | 6                     |
| Mounting height x width of square max. | 16 mm                 |
| Max. chuck diameter drilling rod       | 16 mm                 |
| <b>Accuracy</b>                        |                       |
| Repeat accuracy                        | ± 0.01 mm             |
| Positioning accuracy                   | ± 0.01 mm             |
| <b>Travel</b>                          |                       |
| X axis                                 | 145 mm                |
| Z axis                                 | 465 mm                |
| <b>Feed speed</b>                      |                       |
| X axis                                 | 10 m/min.             |
| Z axis                                 | 12 m/min.             |
| <b>Motor torque</b>                    |                       |
| X axis                                 | 1.3 Nm                |
| Z axis                                 | 2.4 Nm                |
| <b>Tailstock</b>                       |                       |
| Shank                                  | MT 2                  |
| Spindle sleeve diameter                | 30 mm                 |
| Spindle sleeve stroke                  | 120 mm                |
| <b>Dimensions</b>                      |                       |
| Length x width x height                | 1655 x 1590 x 1955 mm |
| Overall weight                         | 832 kg                |



# SINUMERIK 808D ADVANCED

## CNC TECHNOLOGY FROM THE TECHNOLOGY LEADER

- The SINUMERIK 808D ADVANCED control is a panel-based CNC control. The compact and user-friendly entry-level solution is used for simple turning applications. Features such as simple operation, commissioning and maintenance, but also an optimal cost position are the perfect basis for equipping entry-level CNC machines. With its technology-specific variants, the SINUMERIK 808D ADVANCED control is perfectly preconfigured for turning.

### Intelligent machine optimisation

- With the proven Auto Servo Tuning (AST) function, users can easily optimise the machine. By selecting the tuning strategy, the CNC and drive parameters are automatically optimised according to the machine condition. This allows the simple optimisation of standard machines for applications that require high dynamics.

#### Communicative:

- USB front panel (IP65)

#### 16 function keys:

The 8 horizontal and 8 vertical soft keys take the user to all control windows with just a few key presses

#### User-friendly:

- Technology-specific keyboard layout
- Hard keys with protective membrane



#### Communicative:

- RJ45 Ethernet on the rear

### CONTROL

- 8.4" LCD colour display with a resolution of 800x600
- SIMATIC S7-200 PLC-based
- MCP with rotary switch for feed and spindle override

### OVERALL PACKAGE

- RJ45 Ethernet port
- Ready for remote maintenance
- AST function gives users an easy optimisation option in case of stricter dynamic and precision requirements
- Greater precision
- Incremental encoder/referencing move required

### ADDITIONAL PACKAGE SIEMENS OSS

12 months; Article no. 3589010  
36 months; Article no. 3589012

Information on this additional package and conditions for utilisation can be found at:  
Liability for material defects and on-site service - SiePortal - Siemens WW

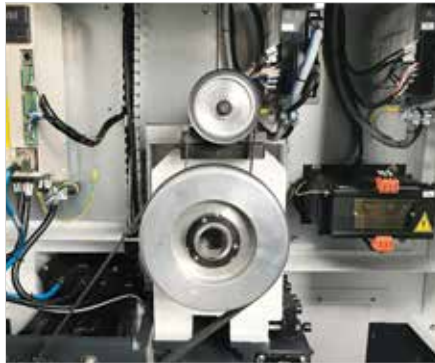


## TOOL CHANGER



- For 6 tool slots

## SPINDLE



- Incremental encoder for spindle positioning (thread tapping)
- Large spindle bore

## LINEAR GUIDE



- High permissible load and high stiffness
- High repetition accuracy
- Low coefficient of friction

## COOLANT SYSTEM



- Pulls out
- Easy chip disposal

## WORKING LAMP



- Full illumination of the work-space

## CENTRAL LUBRICATION SYSTEM



- Guarantees regular and automatic lubrication
- Lubricating points that are connected to the central lubricating system have a longer service life

## SINUMERIK 808D ON PC



- Software package identical to control
- Facilitates the handling of the machine tool
- The workpieces can be programmed and simulated offline.

### Training and learning

- SINUMERIK Operate BASIC operations can be explored on a PC without additional hardware.
- Easy and convenient learning experience with a user interface identical to that of the control

### Offline CNC programming:

- Boosts productivity by programming directly on a PC
- Test sub-routines on the PC with the integrated simulator

### Professional CNC presentations:

- Present the SINUMERIK Operate BASIC user interface on the PC – at any time and anywhere without additional hardware

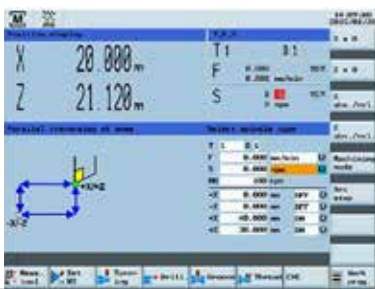
### Download for free on

<https://xcelerator.siemens.com/global/en/industries/machinebuilding/machine-tools/cnc4you/808d-on-pc.html>



| LATHE CHUCK                                              |                              |                                                                                    |                                                                                                                                                                                                      |
|----------------------------------------------------------|------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Article no.                                              |                              |                                                                                    |                                                                                                                                                                                                      |
| 3450230                                                  | Bison Three-jaw lathe chuck  |   | <ul style="list-style-type: none"> <li>• Cast, Ø 125 mm DIN 6350</li> <li>• Hard jaws, single-part, with outside-inside clamping</li> <li>• Chuck key</li> <li>• Runout accuracy: 0.03 mm</li> </ul> |
| 3450410                                                  | Bison monobloc jaw set, soft |                                                                                    | <ul style="list-style-type: none"> <li>• for three-jaw lathe chuck Ø 125 mm</li> </ul>                                                                                                               |
| 3450234                                                  | Bison Four-jaw lathe chuck   |   | <ul style="list-style-type: none"> <li>• Cast, Ø 125 mm DIN 6350</li> <li>• Hard jaws, single-part, with outside-inside clamping</li> <li>• Chuck key</li> <li>• Runout accuracy: 0.03 mm</li> </ul> |
| 3450420                                                  | Bison monobloc jaw set, soft |                                                                                    | <ul style="list-style-type: none"> <li>• for four-jaw lathe chuck Ø 125 mm</li> </ul>                                                                                                                |
| 3450240                                                  | Bison chuck flange           |   | <ul style="list-style-type: none"> <li>• for lathe chuck Ø 125 mm</li> <li>• for collet chuck 5C (Article no. 3450238)</li> </ul>                                                                    |
| 3450238                                                  | Collet chuck 5C              |  | <ul style="list-style-type: none"> <li>• Size Ø 25 mm</li> <li>• Chuck flange needed (Article no. 3450240)</li> </ul>                                                                                |
| Fig. with collet - not included in the scope of delivery |                              |                                                                                    |                                                                                                                                                                                                      |

| MISCELLANEOUS |                                         |                                                                                     |                                                                                                                                     |
|---------------|-----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 3441215       | Lathe tool set HM 16 mm                 |  | <ul style="list-style-type: none"> <li>• 4-part</li> </ul>                                                                          |
| 3535170       | Cylindrical seat Ø16 mm                 |  | <ul style="list-style-type: none"> <li>• for drill chuck B16</li> </ul>                                                             |
| 350422010     | Boring bar holder round, up to 20 mm    |  | <ul style="list-style-type: none"> <li>• for tool changer</li> <li>• Info: The hole is to be drilled by the user himself</li> </ul> |
| 350422011     | Lathe tool holder crosswise up to 16 mm |                                                                                     | <ul style="list-style-type: none"> <li>• for tool changer</li> </ul>                                                                |

| SOFTWARE                                |                                                        |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3584150*                                | SIEMENS Manual Machine Plus (MM+) Simple cycle control |  | <p>Enables the transition from conventional machines to CNC programming. The machine can be operated by means of hand wheels like a conventional machine, but with the advantages of CNC-supported technology cycles.</p> <p>Functions:</p> <ul style="list-style-type: none"> <li>• Axis-parallel traverse, taper turning, radius turning, centre drilling, tapping, groove cycle, tapping, pre-turning of contours</li> </ul> |
| ➔ For more information, see on page 323 |                                                        |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                 |

# 06 ROBOTS



CNC holder

DIGI-OPTIMA



**New**

## LOADING ROBOT

HALTER LOADASSISTANT - INCREASE THE FLEXIBILITY, EFFICIENCY AND PERFORMANCE OF YOUR MACHINES!

### WE OFFER YOU



### BASIC<sup>PRO</sup>

#### TURNING/MILLING

Workpieces up to 135 mm  
Industrial design at a price  
of a cobot system  
With 12 kg load capacity



### COMPACT, PREMIUM, BIG

#### TURNING/MILLING

Workpieces up to 300 mm  
With option for handling  
long shafts  
With 12, 25, 35 and 70 kg load capacity

### ARE YOU INTERESTED? GET IN TOUCH WITH US!



+49 (0)951 96555-334



BERATUNG@OPTIMUM-MASCHINEN.DE

## HALTER BASIC<sup>PRO</sup> TURNING/MILLING

- Efficient and affordable
- Industrial Fanuc robot and high-quality components for a long, reliable service life
- User-friendly HALTER SmartControl - set up in less than 5 minutes
- No compromises on safety - thanks to the use of a floor scanner and a safety zone
- For new and existing CNC machines
- Industrial technology for the price of a cobot system



- 1 HALTER SMARTCONTROL
- 2 HEIGHT-ADJUSTABLE GRID PLATE
- 3 FANUC INDUSTRIAL ROBOT ARM
- 4 ADJUSTABLE AIR PRESSURE FOR GRIPPER
- 5 SCHUNK DOUBLE GRIPPER SYSTEM
- 6 270° SAFETY SCANNER
- 7 HIGH-QUALITY INDUSTRIAL COMPONENTS INSIDE

As the world's leading automation partner, HALTER has more than 1000 installations, the company has proven that it delivers products of the highest quality. All this experience, knowledge and technology have now been incorporated into the BASIC Pro. With the user-friendly HALTER SmartControl, no robot experience is required and setting up a new workpiece only takes 5 minutes. High-quality components such as the Schunk double gripper package and the Fanuc industrial robot ensure a reliable and durable automation process. You get industrial technology at the price of a cobot system - without compromising on safety.

## WITH A HALTER LOADASSISTANT REALISE PROFIT DIRECTLY

A system with short changeover times and fast integration is required for small and medium batch sizes. HALTER CNC Automation has developed the HALTER LoadAssistant, which is based on many years of experience in the machining industry and in production automation. Compact, Premium and Big. All in a Universal (for turning and milling), TurnStacker (for turning) and MillStacker (for milling) version. Available with robots with 12, 25, 35 or 70 kg load capacity.

An intelligent and well thought-out system that does exactly what it is designed to do: Loading your CNC machine with small and medium batch sizes. The HALTER LoadAssistant is very fast and you don't need any robot knowledge to operate it. Would you like to increase your profits immediately, as many other companies in more than 25 countries around the world have already done? Do you want to invest in a system that will enable problem-free loading of your CNC machines for many years to come, even with smaller batch sizes? Then choose a HALTER LoadAssistant and contact us today!

### SIMPLE LOADING SYSTEM WITH SHORT CHANGE OVER TIMES

#### COMPACT 12

**UNIVERSAL COMPACT 12**  
TURNING/MILLING

**TURNSTACKER COMPACT 12**  
TURNING

**MILLSTACKER COMPACT 12**  
MILLING

- Minimum space requirement
- Simple relocation from one CNC machine to another
- Set up within 5 minutes
- Preparation of a new series while the robot is working



#### PREMIUM 25/35

**UNIVERSAL PREMIUM 25/35**  
TURNING/MILLING

**TURNSTACKER PREMIUM 25/35**  
TURNING

**MILLSTACKER PREMIUM 25/35**  
MILLING

- Most versatile system on the market
- Simple relocation from one CNC machine to another
- Set up within 5 minutes
- Preparation of a new series while the robot is working



#### BIG 35/70

**UNIVERSAL BIG 35/70**  
TURNING/MILLING

**TURNSTACKER BIG 35/70**  
TURNING

**MILLSTACKER BIG 35/70**  
MILLING

- High capacity for workpieces with large dimensions
- For loading heavy workpieces
- Set up within 5 minutes
- Preparation of a new series while the robot is working



**New**

## SIMPLE AUTOMATION OF YOUR CNC MACHINE



### ARE YOU INTERESTED?

GET IN TOUCH WITH US!

+49 (0)951 96555-334

BERATUNG@OPTIMUM-MASCHINEN.DE

#### 1 HALTER SMARTCONTROL

- No robotics knowledge required
- New programme in 12 steps
- High flexibility: Simple addition of new functions
- Conversion in less than 5 minutes

#### 2 ROTATING LOADING SYSTEM

##### UNIVERSAL:

- For turned and/or milled parts
- Grid plates are height-adjustable for workpieces
- Setting up a new series while the robot is working

##### MILLSTACKER:

- Stacking stations for milled parts
- High capacity on a small footprint, for flat workpieces
- Reversing station for double-sided machining of workpieces

##### TURNSTACKER:

- Stacking stations for turned parts
- High capacity on a small footprint, for flat workpieces
- Reversing station for double-sided machining of workpieces

#### 3 EASY RELOCATION AND COUPLING TO ANOTHER CNC MACHINE

- Can be moved with a pallet truck
- Positioning through self-centring anchors
- Automatic recognition of the CNC machine

#### 4 ACCESSIBLE AND SAFE

- CNC machine remains accessible for the machine operator, no safety fence required
- Floor scanner slows down and stops the robot
- No compromises when it comes to the safety of your operator

#### 5 FANUC 6-AXIS ROBOT

- Maximum load capacity: 12 kg, 25 kg, 35 kg or 70 kg
- Suitable for industrial ambient conditions
- Stable, accurate and durable

#### 6 UNIVERSAL GRIPPER SYSTEM

- 2- or 3-finger gripper
- Quickly adjustable gripper fingers
- Integrated safety sensors for end position monitoring
- Blow nozzle for blowing out the vice or chuck

#### 7 SETTING UP A NEW SERIES WHILE THE ROBOT IS RUNNING

- Thanks to the rotating loading system, a new series can be loaded at the rear while the production process continues.

#### 8 HIGH-QUALITY INDUSTRIAL COMPONENTS AND RELIABLE TECHNOLOGY

- Robust construction
- Industrial components exclusively from A-suppliers. Standardised and complete plug-and-play system.



## CNC MACHINE AND ROBOCELL SET REALISE PROFIT DIRECTLY



**User-friendly collaborative robot manipulator integrated with milling machine. The safest, most reliable and most compact solution for small and medium batch sizes.**

- Enables the efficiency of production processes to be increased while maintaining the same number of employees
- Saves time and reduces production costs (less downtime)
- Tackling the problem of the shortage of skilled labour
- Exploited night work without an operator
- Reduces the influence of the human factor and increases accuracy and reliability
- Easier production planning due to the mobility of the robot (easy transport to work with other devices)
- Improved working conditions (easier work for the operator, higher motivation, cleanliness and working methods)
- Optimum ergonomics and accessibility to the work area and switch cabinet thanks to side loading
- Multi-job function: Various parts on the workpiece holder
- Can be retrofitted (connection to existing CNC machines possible)
- On request, it can be offered for lathes and with other robot arms
- Technical support



**ARE YOU INTERESTED?**

GET IN TOUCH WITH US!



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## COMPLETE PACKAGE GET STARTED RIGHT AWAY

- OPTIMUM CNC milling machines
- Automated pneumatic door DIGIO-MD-D
- Robot arm
- Work table with workpiece matrix DIGIO-MD1-M40 (optional:  
Drawer module with workpiece matrix DIGIO-MD3-M40  
(100x100x100-15 places, 3 pieces)
- Pneumatic (SCHUNK KSP-Z plus 160)
- Reversible support jaws (SCHUNK TBA-D 160)
- Pneumatic gripper (SCHUNK PGN plus 125-1-KVZ)
- DIGIO MD-S jaws



The robot arm has 6 axis joints with a wide range of flexibility that mimic the range of movement of the human arm, so that everything is within a reach of up to 1 700 mm. In this way, production staff have more time available for other production steps, resulting in time savings and added value.

The collaborative robot arm can be easily integrated into existing production environments. Robocell set can be easily integrated into a monitoring system

## PROPERTIES

- User-friendly collaboration
- Easy to operate
- Long autonomous working hours without supervision
- Quick set-up (programme preparation for new workpiece in just 15 minutes)
- Interchangeable workpiece matrix for different part sizes
- Simple installation
- Graphic programming
- Programmes prepared for standardised part type
- Integrated into the milling machine
- Prepared for working with the SIEMENS Sinumeric 828D software package
- Compatible with multiple machines - mobile module



# 07

## 3-D PRINTING

OPTImill print head 3X



## OPTIMILL PRINT HEAD 3X /5X

THE OPTIMILL 3X AND OPTIMILL 5X PRINT HEADS ENABLE THE PRODUCTION OF TANGIBLE OBJECTS FROM DIGITAL 3-D FILES CREATED BY A CAD SYSTEM

### Printing instead of milling

Turn your CNC milling machine into a fully functional 3-D printer in just minutes.

The OPTIMUM OPTImill 3X and OPTImill 5X print heads turn your machine into a top class 3-D printer.

The supplied software can convert and load 3-D models and convert them into machine-compatible G-code. I.e. the components are programmed using the Cura Slice program and output to our machines using add-on software.

A very big advantage of our concept is that the wire feed is controlled by the spindle speed. So we can brake in corners and accelerate out, which leads to very good results. Thanks to the use of web preview and feed control, it is possible to print much faster than all other commercially available competitors while maintaining the same quality. More than three times the printing speed with the same or better print quality. The 5x print head can additionally print 5-axis on a 5-axis milling machine. The prerequisite for this is a CAD/CAM system that supports this function.

Setup times of maximum 20 minutes\* - easy integration on the machine thanks to 3-D interface.

### Think big – print big!

The installation space of your CNC machine allows you to print workpieces that commercial printers cannot produce. The advantage of our concept is that it is possible to machine on the CNC machine during the day, and convert your machine's normal downtime into cash by fully utilising the machine, for example, overnight.

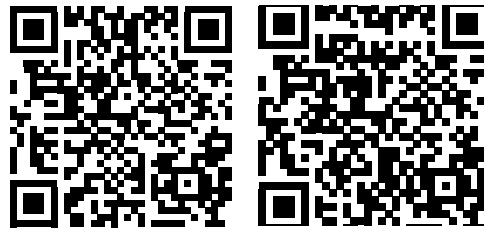
Thanks to the two heating elements on the print head of the Optimill 3x and the ring heater of the Optimill 5X, we achieve temperatures of up

to 300 °C, which means that a wide variety of filaments can be printed. Materials such as PA, PLA, ABS, nylon, and carbon are no problem for the printer.

### The OPTIMUM print heads OPTImill 3X and OPTImill 5X offer unlimited possibilities

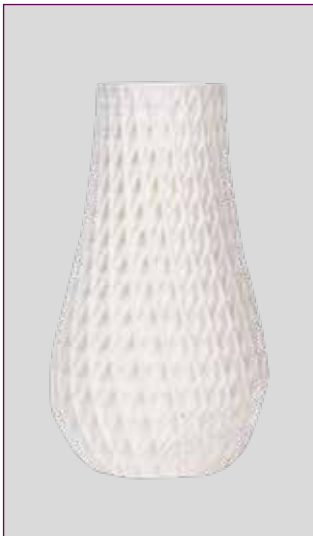
Whether you need large or small 3D prototypes or highly complex components, the flexibility and speed, together with the accuracy of your CNC machine, allows you to produce more cost-effectively and flexibly than ever before. For our programming we used the 3D software Cura, in the 5-axis machining we work with **SIEMENS NX** as programming software.

With the standard scope of supply filament with a thickness of 1.75 mm can be printed. A conversion kit for the print head is required for 2.85 mm filament. You will also benefit economically from our exchangeable printing nozzles. It is not necessary to replace the entire module, as is often the case with other manufacturers.



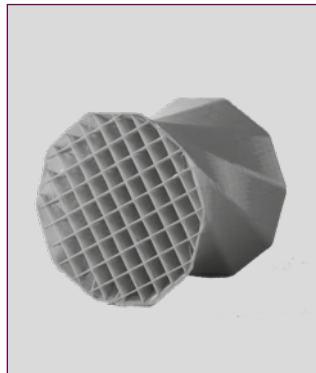
Product video showing the Optimum 3 X - 3-D Printer

## AREAS OF APPLICATION



### Models

Models are particularly useful for making designs tangible.



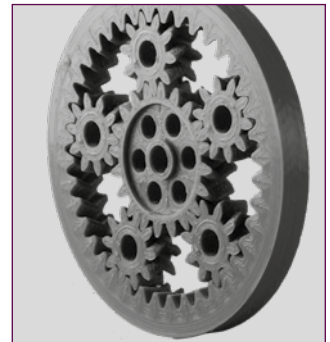
### Prototypes

Prototyping enables companies to significantly shorten the development time of new products. This allows errors to be corrected at an early stage and improvements to be made.



### Batch size one production

It is often only possible to produce components and models with complex geometries at very high cost or not at all using conventional, chip-removing manufacturing processes. Especially for small quantities, switching to additive production makes a lot of sense.



### Spare parts

Printing spare parts is a popular and inexpensive solution with fast availability. Possible improvements can also be integrated to extend the durability or offer additional benefits.

\* depending on the machine



## OPTIMILL PRINT HEAD

CAN BE ATTACHED TO ANY OPTIMUM CNC MILLING MACHINE WITH SIEMENS CONTROL SINUMERIK 808D/828D/840D SL/ SINUMERIK ONE. OTHER CONTROLS ON REQUEST



Fig. 3X print head



Fig. 5X print head

| OPTImill print head       | 3X                                                        | 5X                                      |
|---------------------------|-----------------------------------------------------------|-----------------------------------------|
| Article no.               | 3560010                                                   | 3560012                                 |
|                           | Milling machines with 3 axes                              | Milling machines with 3 axes and 5 axes |
| Extruder drive mount      | Ø 16 mm                                                   |                                         |
| Heating                   | 100 Watt at 24V                                           |                                         |
| Heating element           | 2 cartridge heaters                                       | Ring heating                            |
| control temperature range | 150° - 300 °C                                             |                                         |
| Temperature control       | PID (Proportional, Integral and Differential)             |                                         |
|                           | depending on the drive concept of the CNC milling machine |                                         |
| Extrusion speed           | ± 75 mm/s                                                 |                                         |
| Ambient temperature       | 20 °C to 30 °C                                            |                                         |
| relative humidity         | no condensation                                           |                                         |

### Scope of delivery:

- 2 feed rollers for filament 1.75 mm
- Filament holder
- Printing nozzle size 0.4 mm
- Print head with PID temperature control
- Power supply unit 230 V/24 V DC 15A
- Manual

Custom sizes on request

## HEATER PLATES

PREVENT FAST COOLING OF THE OBJECTS, THUS IMPROVING ADHESION. INCREASE ADHESION ESPECIALLY WITH LARGE COMPONENTS

| Heater plates                     |                                                       |
|-----------------------------------|-------------------------------------------------------|
| Size 1                            | 3560050                                               |
| suitable for OPTIMUM CNC machines | F 80 / F 105 / F 120X / F 150E / F110 HSC / F 200 HSC |
| Worktop                           | 600 x 245 mm                                          |
| Output                            | 500 W / 230 V ~50 Hz                                  |
| control temperature range         | 0 °C to 120 °C                                        |
| Size 2                            | 3560051                                               |
| suitable for OPTIMUM CNC machines | F 300HSC / F 400HSC / F500HSC / F 600 HSC             |
| Worktop                           | 980 x 500 mm                                          |
| Output                            | 2200 W / 230 V ~50 Hz                                 |
| control temperature range         | 0 °C to 120 °C                                        |
| Size 3                            | 3560052                                               |
| suitable for OPTIMUM CNC machines | FU 5                                                  |
| Worktop                           | 370 x 410 mm                                          |
| Output                            | 500 W / 230 V ~50 Hz                                  |
| control temperature range         | 0 °C to 120 °C                                        |



Includes separate temperature controller with magnetic holder





## Feed roller transfer shaft

- 2 pcs.
- High-quality design
- Milled carrier grooves

**Feed rollers for 1.75 mm filament** 3562202

**Feed rollers for 2.85 mm filament** 3562204

- Without coating

**Feed rollers for 1.75 mm filament** 3562212

**Feed rollers for 2.85 mm filament** 3562214

- with diamond coating



## Conversion kit to 2.85 mm Filament

- High-quality design

**FOR Optimill 3X** 3562220

**FOR Optimill 5X** 3562222

Including:

- Holder with press-on rollers
- Radiator body
- Screw connection for the insertion
- Two feed rollers with milled driving grooves for 2.85 mm filament
- Hotend bushing 2.85 mm
- Teflon hose
- Screwdriver



## Extruder nozzle sets, 3 pieces

- rugged and durable

**Stainless steel nozzle set for 1.75 mm filament** 3562302

- for nozzle size 0.4 mm / 0.6 mm / 0.8 mm

- suitable for PLA plastics or similar

**Stainless steel nozzle set for 2.85 mm filament** 3562308

- for nozzle size 0.8 mm / 1.0 mm / 1.2 mm

- suitable for PLA plastics or similar

**Titanium nozzle set for 1.75 mm filament** 3562312

- for nozzle size 0.4 mm / 0.6 mm / 0.8 mm

- suitable for carbon material

**Titanium nozzle set for 2.85 mm filament** 3562318

- for nozzle size 0.8 mm / 1.0 mm / 1.2 mm

- suitable for carbon material

**Brass nozzle set for 1.75 mm filament** 3562322

- for nozzle size 0.4 mm / 0.6 mm / 0.8 mm

- suitable for PLA material

**Brass nozzle set for 2.85 mm filament** 3562328

- for nozzle size 0.8 mm / 1.0 mm / 1.2 mm

- suitable for PLA material

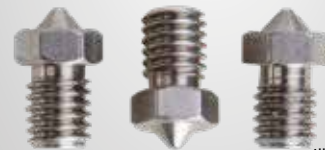


Illustration: stainless steel nozzle set

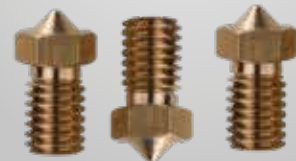


Illustration: brass nozzle set

## Hotend passageway

**1.75 mm filament** 3562401

**2.85 mm filament** 3562402



## Tool holder set 3-D print head

**BT 30** 3562188

- Collet chuck holder ER32 / BT 30
- Collet chuck spanner ER32
- Collet chuck ER32/16 mm
- Pull stud BT 30

**BT 40** 3562189

- Collet chuck holder ER32 / BT 40
- Collet chuck spanner ER32
- Collet chuck ER32/16 mm
- Pull stud BT 40

**SK40 DIN69871** 3562190

- Collet chuck holder ER32/SK40 DIN69871
- Collet chuck spanner ER32
- Collet chuck ER32/16 mm



**Cleaning scraper** 3562430

- Material: Stainless steel
- Colour: silver
- Protection due to complete retraction of the blade
- 40 mm blades
- 5 blades included



**Spare blades** 3562431

- 10 blades

## Software Cura 4.5

- <https://ultimaker.com/en/products/ultimaker-cura-software>
- Includes plugin via USB



**Top surface for SIEMENS control** 3584012

- The NC data from the CAM system are optimised online during processing.
- The result is excellent surface quality while milling complex free-form surfaces.
- All new functions are system integrated and available with Sinumerik Operate.



## Torque supports

- for fastening on the main spindle
- Custom sizes on request

|        |         |
|--------|---------|
| 100 mm | 3562522 |
| 120 mm | 3562511 |
| 125 mm | 3562512 |
| 130 mm | 3562513 |
| 140 mm | 3562514 |
| 150 mm | 3562521 |
| 155 mm | 3562515 |
| 160 mm | 3562516 |
| 200 mm | 3562520 |



## Nozzle cleaning kit

- Nozzle drill
- Cleaning drill

### Nozzle cleaning kit small

3562342

- for nozzle size 0.4 mm / 0.6 mm / 0.8 mm

### Nozzle cleaning kit large

3562344

- for nozzle size 0.8 mm / 1.0 mm / 1.2 mm



Fig. Nozzle cleaning kit, small

Fig. Nozzle cleaning kit, large

## Wire break monitoring

3562410

- Machine stops in case of wire break or at end of wire
- Error message is displayed on the control



## Infrared radiant heater

3562420

- Size: 600 x 600 x 17 mm
- Utilisation of complete construction area
- Optimisation of construction area temperature
- Heating output 300 Watt, protection type IP 44
- without fastener



## GRP permanent printing plate set

- 2x permanent printing plate set
- Fastening material
- Glass fibre black
- The printed part is removed from the printer with the plate.
- Bends easily to make removal of printed parts easier in cold state.
- Very strong adhesion to printed part in heated state
- Printed parts have a very smooth bottom surface
- Plate can be easily and thoroughly cleaned and is very durable

Size: 600 x 245 mm

3562260

Size: 980 x 500 mm

3562262

Size: 370 x 410 mm

3562264



## 3-D printing interface

3562411

- Connector plug on the milling head for the OPTImill 3X printhead and the 5X printhead
- The power supply is installed in control cabinet
- Prepared for connecting wire break monitoring
- Filament holder installed
- including installation ex warehouse Germany



## 3D PRINTING ON 5 AXES

### OPTIMILL 5X AS AN EXTENSION TO THE CNC MILLING MACHINE FU5

In cooperation with the University of Trier and a German engineering company, OPTIMUM Maschinen Germany GmbH has developed a new 3D print head that enables 5-axis 3D printing on the CNC milling machine OPTIMUM FU5 or another 5-axis milling machine with Siemens 840DSL control using Siemens NX software.

The new print head 5X is a further development of the well-known 3-axis print head Optimill 3X, which has already been successfully in use as a machine component for OPTIMUM's CNC milling machines since 2018. Compared to the 3-axis printing process, however, Optimill 5X offers a clear advantage: Printing on five axes not only saves time, but also achieves greater stability of the printed components. By adjusting the fourth and fifth axes, the Optimill 5X printhead eliminates the need for additional structures and allows the part to be printed in one piece without any additional supports. This improves the surfaces and avoids staircase effects.

Other components that have been optimised as part of this new development are the projection length of the hot end, which reduces interfering edges, and the heating, which in the toroidal core heating design now enables uniform and faster melting of the filament as well as large flow rates. This is necessary to speed up the printing process and/or to work with large nozzle diameters.

In order to exploit all the functionalities of the Optimill 5X printhead, it is recommended to use the Siemens NX software. In principle, however, other CAD/CAM systems are also capable of programming the complex 5-axis motion control.

Of course, you always have the option of performing ordinary 3-axis printing with the Optimill 5X printhead. To do this, you can use the Cura programming software.

### 5-axis printing using Siemens NX

In order to be able to carry out a complete simulation of the machine tool in Siemens NX, a 3D model of the machine tool must first be available,

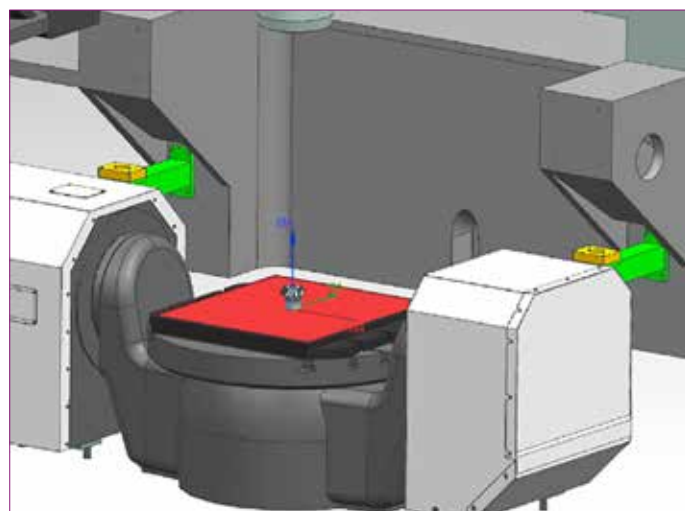
which has previously been kinematised and has a deposited postprocessor. In addition, the print head required for production must be stored as a model and the component to be printed must be created as a model. This can either be designed directly in NX or you can use alternative systems and file formats and then import the models into NX.

First, add both the print bed and the component to the machine in the production environment.

Then add the Optimill 5X 3D print head as a machine component.

Now load the nozzle with the appropriate diameter from the tool library into this machine component.

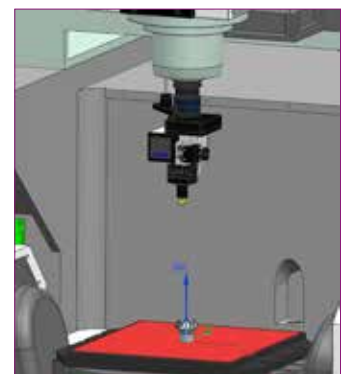
When printing



*Example: Printing of a cylindrical body.*

In the following example, we show you the individual work steps for producing a cylindrical body with the aid of the Optimill 5X 5-axis print head.

a cylindrical body, working with two operation



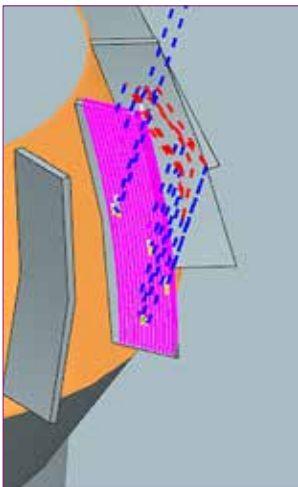


types is recommended. The operation "Planar Additive Spiral inwards and outwards" can be used for the basic body. This operation creates round toolpaths and is therefore ideal for cylindrical bodies. The picture opposite shows the toolpaths of the first operation.

For the sides of the part, a second operation is used, "freeform additive build", as the orientation of the machine tool table should be adjusted for this. The aim is that the tool always remains in its initial orientation.

In addition, many other types of operations are available. These include operations for zig-zag build-up, build-up movements and movements on free-form surfaces as well as special operations for the production of tubes.

The normal of the component surface can be selected for the output axis. After creation, the toolpaths are then displayed directly. In this operation, all other side surfaces can also be made after the check.



The simulation can now be carried out either as a whole or - as shown below - in individual steps.



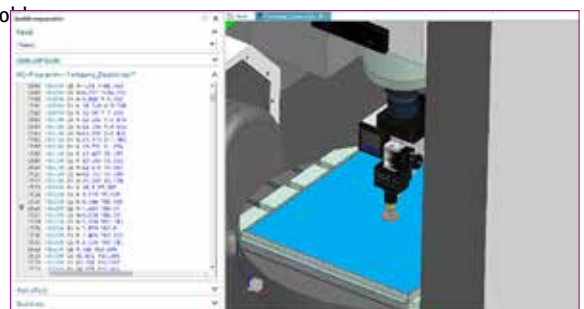
Once the simulation process has run smoothly and the toolpaths have been correctly integrated beforehand, the simulation process is immediately specified to match the machine. In this case, this results in a programme for the Sinumerik 828D or 840DSL.

The following illustration shows the simulation of the post-processor output. This eliminates any collisions that may occur later.

Afterwards, the created programme can be transferred to the machine without any problems.

The programme sequence is designed in such a way that the table is adjusted to a certain angle and also rotated. As the heating plate is connected to a cable, it is possible that a message will prompt you to briefly

disconnect the heating plate from the power supply so that the axis can swing over.





## FRANCONIAN INNOVATION HELPS FIGHT CORONA

### HALLSTADT-BASED COMPANY LAUNCHES PRODUCTION OF FACE SHIELDS FOR HOSPITALS USING INNOVATIVE 3-D PRINTING TECHNOLOGY

Optimum Maschinen Germany GmbH, in collaboration with a German engineering office and the University of Trier, has set up a 3-D print head that is ready for series production for industrial use in the production of urgently needed face shields. Since the end of last week, these visors, needed by doctors, hospital and nursing staff, can be produced using OPTIMUM brand CNC milling machines in a 3-D printing process. Starting next week, these visors will be made available free of charge to hospitals in the Bamberg area and northern Bavaria.

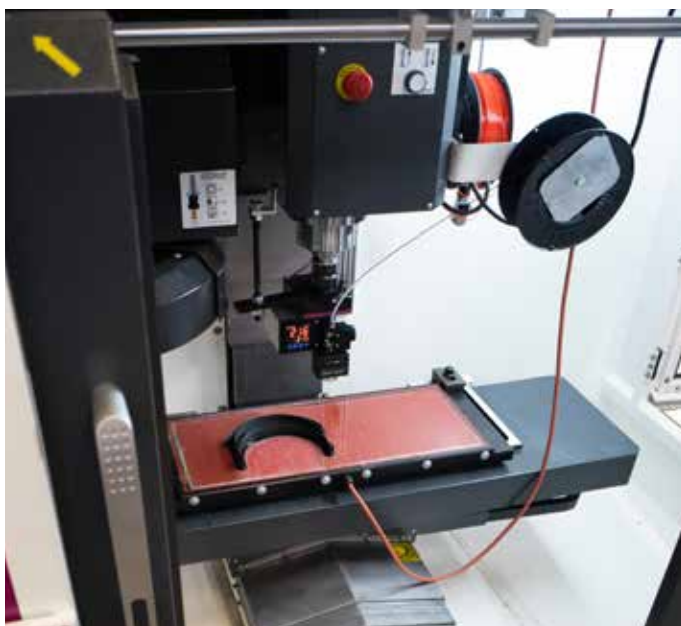
The great advantage of the technology used here is that such plastic parts can be additionally produced using the OPTIMUM OPTImill 3X 3-D print head in unmanned secondary shifts on standard CNC milling machines, which are used for other applications in the main shifts at the production plants. When the day shift starts, these parts, produced as a "positive side effect" can then be finished with very little manual effort and immediately distributed to the hospitals.

Although the quantities are not comparable to those achieved with conventional industrial plastics processing machines, for example, in injection moulding, the number of parts produced is still very high. However, there is no capital outlay for expensive moulds, and the additional costs for setup and machine operation are also extremely low. In addition, many different variants can be produced without any problems in line with individual requirements, even in the smallest batch sizes. All that is required is changes in the machine control programs, but no expensive plastics moulds, which would first have to be manufactured with a long lead time.

In the production of the plastic components, Optimum uses PLA filament,



Follow this for the video presentation



which is particularly suitable for the production of the required components due to its light weight and good flexibility. In addition, this material is obtained from renewable and natural raw materials and is therefore easily biodegradable.

Stürmer printed initial prototypes of these face shields on its OPTImill F 80 3-axis milling centre at its logistics centre in Pettstadt near Bamberg. The products are now being supplied to hospitals. The software required for this comes from Prusa Research a.s. in the Czech Republic, a company specialising in 3-D printing processes, which has made it available specifically for combating the corona pandemic. Kilian Stürmer, owner of the group, did not hesitate for a moment and was immediately enthusiastic about the idea of joining forces across national borders to tackle the pandemic and provide several milling machines for the production of these visors: "We are very happy to combine this great concept of our Czech neighbours with our know-how and decades of experience in the field of CNC milling and thus support those people who are currently working unconditionally for the health of all of us".

# 08 - ACCESSORIES



3D probe



BAR FEEDER XH 552

# FOURTH AXIS ROTARY INDEXING TABLE



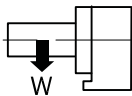
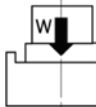
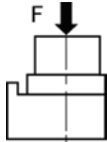
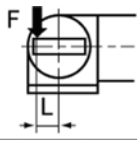
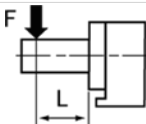
| Model                                                                                  |  | F 80              | F 105                    | F 120X                   | F 110HSC         | F 200HSC         | F 300HSC         |
|----------------------------------------------------------------------------------------|--|-------------------|--------------------------|--------------------------|------------------|------------------|------------------|
|                                                                                        |  | 350108503         | 350110003                | 351512003                | 3511409050       |                  |                  |
| Technical data                                                                         |  |                   |                          |                          |                  |                  |                  |
| Table diameter                                                                         |  | 80 mm             | 120 mm                   | 120 mm                   | 120 mm           | 120 mm           | 120 mm           |
| Vertical table centre height                                                           |  | 90 mm             | 110 mm                   | 110 mm                   | 115 mm           | 115 mm           | 115 mm           |
| Horizontal table height                                                                |  | 130 mm            | 150 mm                   | 150 mm                   | 170 mm           | 170 mm           | 170 mm           |
| Total vertical height without motor cover                                              |  | 200 mm            | 190 mm                   | 190 mm                   | 193 mm           | 193 mm           | 193 mm           |
| Through bore                                                                           |  | Ø 20 mm           | Ø 30 mm                  | Ø 30 mm                  | Ø 30 mm          | Ø 30 mm          | Ø 30 mm          |
| T-slot width                                                                           |  | 14 H7             | 12 H7                    | 12 H7                    | 10 H7            | 10 H7            | 10 H7            |
| Slot nut width                                                                         |  | 14 H7             | 14 H7                    | 14 H7                    | 14 H7            | 14 H7            | 14 H7            |
| Servo motor type                                                                       |  | SIEMENS           | SIEMENS                  | SIEMENS                  | SIEMENS          | SIEMENS          | SIEMENS          |
| Transmission ratio                                                                     |  | 1:60              | 1:60                     | 1:60                     | 1:60             | 1:60             | 1:60             |
| Minimum step width                                                                     |  | 0.001°            | 0.001°                   | 0.001°                   | 0.001°           | 0.001°           | 0.001°           |
| Maximum speed                                                                          |  | 100 rpm           | 44.4 with motor 4000 rpm | 44.4 with motor 4000 rpm | 33.3 rpm         | 33.3 rpm         | 33.3 rpm         |
| when connected to compressed air: pneumatic clamping force at 5 bar operating pressure |  | 78 Nm             | 118 Nm                   | 118 Nm                   | 120 Nm           | 120 Nm           | 120 Nm           |
| when connected to hydraulics: hydraulic clamping force at 20 bar operating pressure    |  |                   |                          |                          | 240 Nm           | 240 Nm           | 240 Nm           |
| Indexing accuracy                                                                      |  | 30''              | 60''                     | 60''                     | 30''             | 30''             | 30''             |
| Unidirectional repeatability                                                           |  | 4''               | +/- 2''                  | +/- 2''                  | 4''              | 4''              | 4''              |
| Bidirectional repeatability                                                            |  | 490 Nm            | 118 Nm                   | 118 Nm                   | 12''             | 12''             | 12''             |
| Net weight                                                                             |  | 25 kg             | 38 kg                    | 38 kg                    | 28 kg            | 28 kg            | 28 kg            |
| max. vertical tool weight                                                              |  | W = 20 kg         | W = 50 kg                | W = 50 kg                | W = 35 kg        | W = 35 kg        | W = 35 kg        |
| max. vertical tool weight                                                              |  | W = 50 kg         | W = 100 kg               | W = 100 kg               | W = 75 kg        | W = 75 kg        | W = 75 kg        |
| Max. radial load                                                                       |  | F = 50 kg         | F = 5.8 KN               | F = 5.8 KN               | F = 5.8 KN       | F = 5.8 KN       | F = 5.8 KN       |
|                                                                                        |  | F x L = 8 kg x m  | F x L = 147 Nm           | F x L = 147 Nm           | F x L = 78.5 Nm  | F x L = 78.5 Nm  | F x L = 78.5 Nm  |
|                                                                                        |  | F x L = 20 kg x m | F x L = 196 Nm           | F x L = 196 Nm           | F x L = 176.5 Nm | F x L = 176.5 Nm | F x L = 176.5 Nm |

Technical drawing of a mechanical part (Fig. 1.10) showing dimensions and tolerances. The drawing includes a top view and a side view. Key dimensions and tolerances are:

- Overall width: 140
- Distance from right edge to center of hole: 40
- Overall height: 150
- Distance from bottom edge to center of hole: 16
- Hole diameter:  $\varnothing 60$  with tolerance  $+0.02$  /  $0$
- Distance from center of hole to right edge:  $\varnothing 05$  with tolerance  $+0.005$  /  $-0.010$
- Distance from left edge to center of hole:  $\varnothing 30$

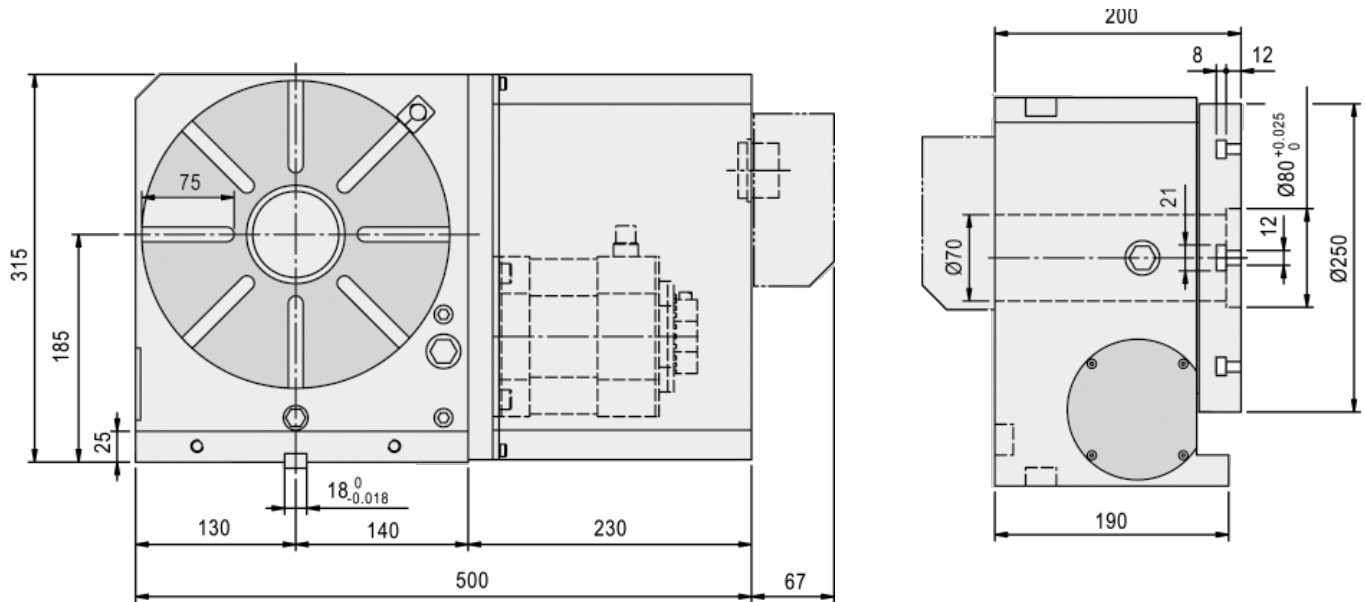
# FOURTH AXIS ROTARY INDEXING TABLE



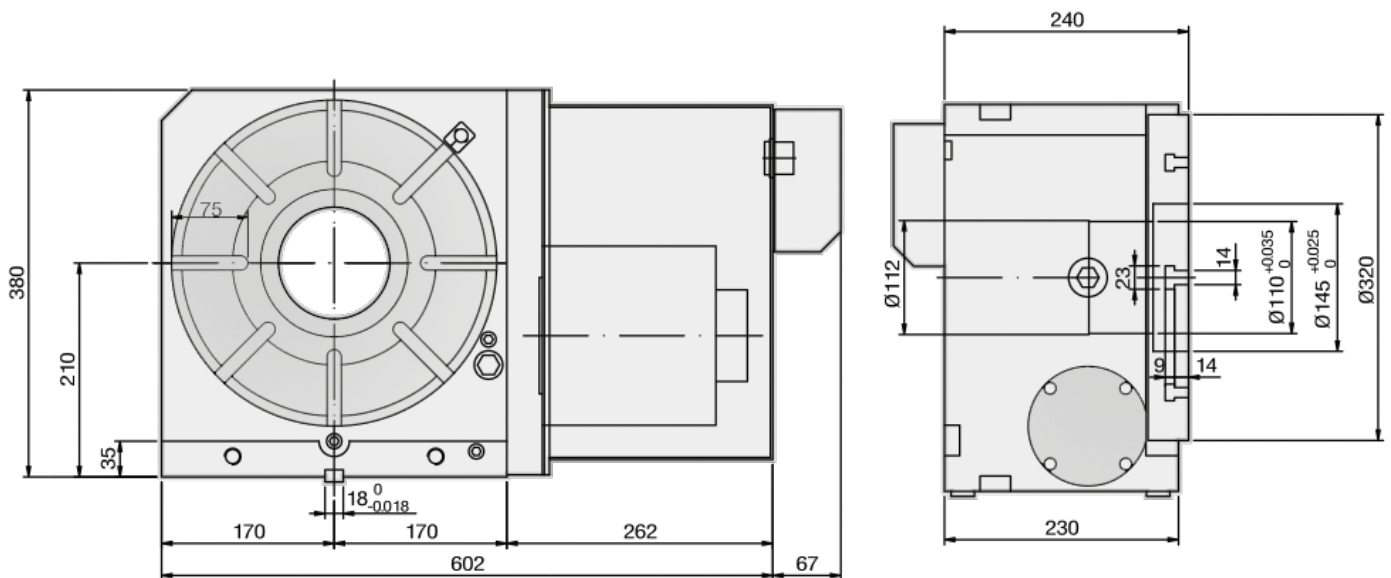
| Model                                                                                  |                                                                                     | F 400 HSC             | F 500HSC               |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------|------------------------|
| Article no.                                                                            |                                                                                     | 3511290211            | 3511290212             |
| Technical data                                                                         |                                                                                     |                       |                        |
| Table diameter                                                                         |                                                                                     | 250 mm                | 320 mm                 |
| Vertical table centre height                                                           |                                                                                     | 185 mm                | 210 mm                 |
| Horizontal table height                                                                |                                                                                     | 200 mm                | 240 mm                 |
| Total vertical height without motor cover                                              |                                                                                     | 315 mm                | 380 mm                 |
| Through bore                                                                           |                                                                                     | Ø 70 <sup>H7</sup> mm | Ø 110 <sup>H7</sup> mm |
| T-slot width                                                                           |                                                                                     | 12 <sup>H7</sup> mm   | 14 <sup>H7</sup> mm    |
| Slot nut width                                                                         |                                                                                     | 18 <sup>H7</sup> mm   | 18 <sup>H7</sup> mm    |
| Servo motor type                                                                       |                                                                                     | SIEMENS 1FK7060       | SIEMENS 1FK7083        |
| Transmission ratio                                                                     |                                                                                     | 1:180                 | 1:180                  |
| Minimum step width                                                                     |                                                                                     | 0.001°                | 0.001°                 |
| Maximum speed                                                                          |                                                                                     | 11.1/22.2 rpm         | 11.1/22.2 rpm          |
| when connected to compressed air: pneumatic clamping force at 5 bar operating pressure |                                                                                     | 250 Nm                |                        |
| when connected to hydraulics: hydraulic clamping force at 20 bar operating pressure    |                                                                                     | 500 Nm                |                        |
| Indexing accuracy                                                                      |                                                                                     | 15''                  | 15''                   |
| Unidirectional repeatability                                                           |                                                                                     | 4''                   | 4''                    |
| Bidirectional repeatability                                                            |                                                                                     | 50''                  | 50''                   |
| Net weight                                                                             |                                                                                     | 124 kg                | 210 kg                 |
| max. vertical tool weight                                                              |  | W = 150 kg            | W = 175 kg             |
| max. vertical tool weight                                                              |  | W = 300 kg            | W = 350 kg             |
| Max. radial load                                                                       |  | F=1450 kg             | F=2500 kg              |
|                                                                                        |  | F x L = 922 Nm        | FxL=142 kg x m         |
|                                                                                        |  | F x L =1770 Nm        | FxL=200 kg x m         |



## F 500HSC



## F 600HSC

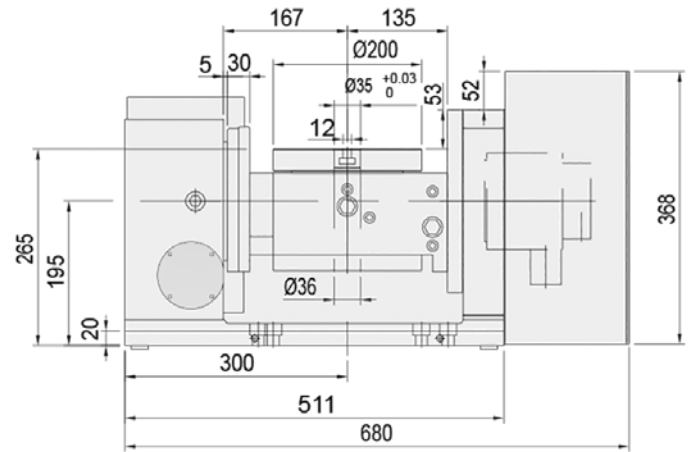
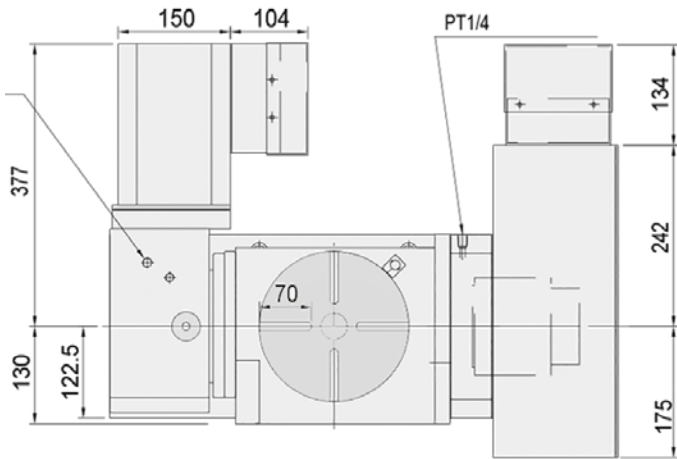


# FIFTH AXIS ROTARY/SWIVELLING TABLE

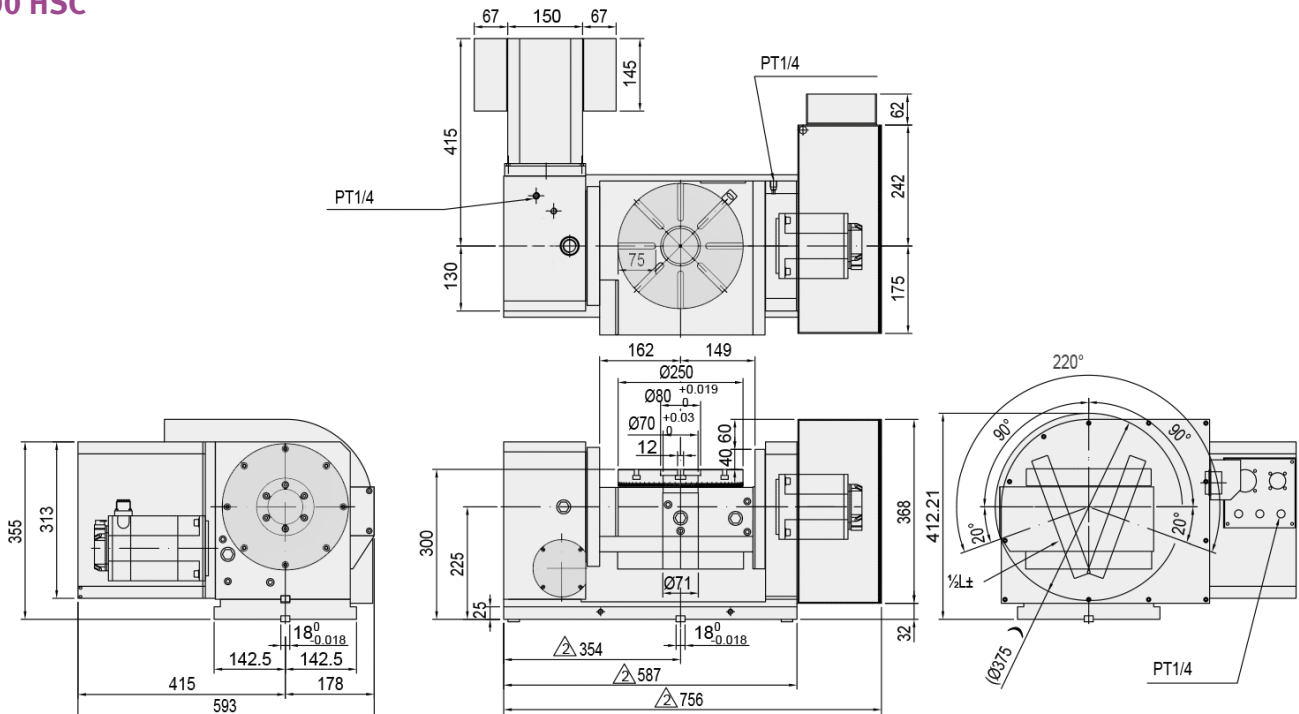


| Model                           |  |                                                                    |                                            |
|---------------------------------|--|--------------------------------------------------------------------|--------------------------------------------|
| Article No.                     |  | 3511409052<br>für F 110 HSC / F 200 HSC /<br>F 300 HSC / F 600 HSC | 3511409055<br>für<br>F 300 HSC / F 600 HSC |
|                                 |  |                                                                    | 3511409056<br>für<br>F 600 HSC             |
| Technical data                  |  |                                                                    |                                            |
| Possible machining diameter     |  | 120 mm                                                             | 200 mm                                     |
| Height of the tilting centre    |  | 150 mm                                                             | 195 mm                                     |
| Vertical overall height         |  | 235 mm                                                             | 360 mm                                     |
| Passageway                      |  | Ø 30 <sup>H7</sup> mm                                              | Ø 35 <sup>H7</sup> mm                      |
| T-groove size                   |  | 10 <sup>H7</sup> mm                                                | 12 <sup>H7</sup> mm                        |
| Slot nut width                  |  | 14 <sup>H7</sup> mm                                                | 18 <sup>H7</sup> mm                        |
| Rotate servo motor types        |  | SIEMENS 1FK7042                                                    | SIEMENS 1FK7060                            |
| Tilting servo motor types       |  | SIEMENS 1FK7042                                                    | SIEMENS 1FK7063                            |
| Rotate transmission ratio       |  | 1:72                                                               | 1:90                                       |
| Tilting transmission ratio      |  | 1:120                                                              | 1:180                                      |
| Minimum step width              |  | 0,001°                                                             | 0,001°                                     |
| Rotate / Tilting speed          |  | max. 27.8 rpm / 16.7 rpm                                           | max. 22.1 rpm / 11.1 rpm                   |
| Tilt angle                      |  | -20° ~ 120°                                                        | -110° ~ 110°                               |
| Rotate indexing accuracy        |  | 30''                                                               | 20''                                       |
| Tilting indexing accuracy       |  | 60''                                                               | 50''                                       |
| Net weight                      |  | 105 kg                                                             | 240 kg                                     |
| max.<br>vertical<br>tool weight |  | W = 20 kg                                                          | W = 50 kg                                  |
| max.<br>vertical<br>tool weight |  | W = 35 kg                                                          | W = 100 kg                                 |
| Max. radial load                |  | F = 3.9 KN                                                         | F = 4.9 KN                                 |
|                                 |  | F x L = 235 Nm                                                     | F x L = 161 Nm                             |
|                                 |  | F x L = 294 Nm                                                     | F x L = 147 Nm                             |

**F 110 HSC / F 200 HSC / F 300 HSC / F 600 HSC**



**F 600 HSC**



# STARTER SET

## BT 30

| Starter set BT 30                                 | 3536107 |
|---------------------------------------------------|---------|
| <b>Comprises:</b>                                 |         |
| • 1 piece cutter head tool holder                 |         |
| • 1 piece quick-action drill chuck 1.5 - 16 mm    |         |
| • 2 pcs. each Weldon 6 mm/ 20 mm                  |         |
| • 1 pcs. each Weldon 8 mm / 10 mm / 12 mm / 16 mm |         |
| • 1 pc. adapter BT 30 to MT 2                     |         |
| • 3 pc. collet chuck holder ER 32                 |         |
| • 1 piece collet spanner ER 32                    |         |
| • 18-part collet set ER 32                        |         |
| • 1 piece height adjuster                         |         |
| • 1 piece assembly and tool setting aid           |         |
| • 14 pcs. pull studs                              |         |
| • 1 pc. taper squeegee                            |         |

| Milling head holder | 3536306 |
|---------------------|---------|
| • 22 mm seat        |         |



| Chuck                      | 3536303 |
|----------------------------|---------|
| • Clamping range 1 - 13 mm |         |
| • Concentricity 0.03 mm    |         |
| • Maximum speed 12 000 rpm |         |



| Weldon holder |         |
|---------------|---------|
| Ø 6 mm        | 3536310 |
| Ø 8 mm        | 3536311 |
| Ø 10 mm       | 3536312 |
| Ø 12 mm       | 3536313 |
| Ø 16 mm       | 3536314 |
| Ø 20 mm       | 3536315 |



| Adapter        |         |
|----------------|---------|
| BT 30 to MT 2  | 3536305 |
| BT 30 to MT 3* | 3536316 |

\* not in starter set



| Holder BT 30 - B16*  | 3353308 |
|----------------------|---------|
| * not in starter set |         |



| Collet chuck holder ER 32 | 3536304 |
|---------------------------|---------|
|---------------------------|---------|



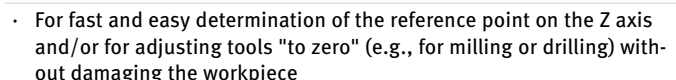
| Collet chuck spanner ER 32 | 3536307 |
|----------------------------|---------|
|----------------------------|---------|



| Collet set ER 32                            | 3441122 |
|---------------------------------------------|---------|
| • 18-part collet chuck set size Ø 1 - 16 mm |         |



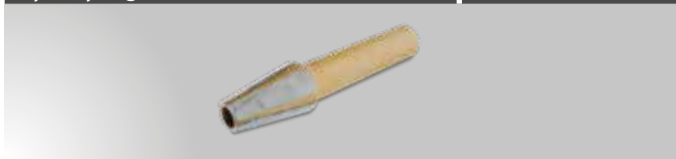
| Height-adjuster                                                                                                                                                            | 3536290 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| • Analogue version                                                                                                                                                         |         |
| • For fast and easy determination of the reference point on the Z axis and/or for adjusting tools "to zero" (e.g., for milling or drilling) without damaging the workpiece |         |



| Assembly and tool adjustment gauge                                  | 3536206 |
|---------------------------------------------------------------------|---------|
| • For easy and precise adjustment of tools                          |         |
| • Vertical and horizontal collet for tools with a steep-angle taper |         |



| Taper squeegee | 3536301 |
|----------------|---------|
|----------------|---------|



| Pull stud JIS B 6339 | 3536302 |
|----------------------|---------|
| • 30°                |         |



# BT 40

08 ACCESSORIES

| Starter set BT 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3536108 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| <b>Comprises:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         |
| <ul style="list-style-type: none"> <li>• 1 piece cutter head holder, 27 mm holder</li> <li>• 1 piece quick-action drill chuck 1.5 - 16 mm</li> <li>• 2 pieces each Weldon 6 mm / 20 mm</li> <li>• 1 piece each of Weldon 8 mm / 10 mm / 12 mm / 16 mm</li> <li>• 1 piece adapter BT 40 to MT 3</li> <li>• 4 pieces collet chuck holder ER 32</li> <li>• 1 piece collet spanner ER 32</li> <li>• 18-part collet set ER 32</li> <li>• 1 piece height adjuster</li> <li>• 1 piece assembly and tool setting aid</li> <li>• 15 pcs. pull studs</li> <li>• 1 pc. taper squeegee</li> </ul> |         |

| Milling head holder                                            | 3536336 |
|----------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>• 27 mm seat</li> </ul> |         |



| Chuck                                                                          | 3536333 |
|--------------------------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>• Clamping range 1.5 - 16 mm</li> </ul> |         |



| Weldon holder |         |
|---------------|---------|
| Ø 6 mm        | 3536340 |
| Ø 8 mm        | 3536341 |
| Ø 10 mm       | 3536342 |
| Ø 12 mm       | 3536343 |
| Ø 16 mm       | 3536344 |
| Ø 20 mm       | 3536345 |



| Adapter                                                           | 3536335 |
|-------------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>• BT 40 to MT 3</li> </ul> |         |



| Holder BT 40 - B16* | 3353338 |
|---------------------|---------|
|---------------------|---------|



| Collet chuck holder ER 32 | 3536334 |
|---------------------------|---------|
|---------------------------|---------|



| Collet chuck spanner ER 32 | 3536307 |
|----------------------------|---------|
|----------------------------|---------|



| Collet set ER 32 | 3441122 |
|------------------|---------|
|------------------|---------|

- 18 collet chucks; sizes Ø 1 - 16 mm



| Height-adjuster | 3536290 |
|-----------------|---------|
|-----------------|---------|

- Analogue version
- For fast and easy determination of the reference point on the Z axis and/or for adjusting tools "to zero" (e.g., for milling or drilling) without damaging the workpiece
- Housing height 50 mm

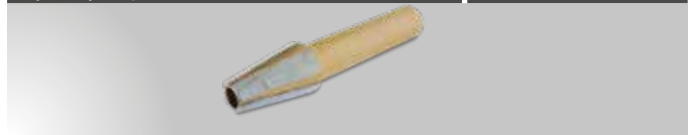


| Assembly and tool adjustment gauge | 3536205 |
|------------------------------------|---------|
|------------------------------------|---------|

- For easy and precise adjustment of tools
- Vertical and horizontal collet for tools with a steep-angle taper



| Taper squeegee | 3536331 |
|----------------|---------|
|----------------|---------|



| Pull stud JIS B 6339 | 3536332 |
|----------------------|---------|
|----------------------|---------|

- 30°





# STARTER SET

## SK 40 / DIN 69871

| Starter set SK 40 / DIN 69871                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 3536109 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| <b>Comprises:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |
| <ul style="list-style-type: none"> <li>• 1 piece cutter head holder, 27 mm holder</li> <li>• 1 piece quick-release drill chuck 1 - 13 mm</li> <li>• 2 pieces Weldon 6 mm</li> <li>• 1 pieces Weldon 8 mm</li> <li>• 1 pieces Weldon 10 mm</li> <li>• 1 pieces Weldon 12 mm</li> <li>• 1 pieces Weldon 16 mm</li> <li>• 2 pieces Weldon 20 mm</li> <li>• 1 piece adapter SK 40 to MT 3</li> <li>• 4 pieces collet chuck holder ER 32</li> <li>• 1 piece collet spanner ER 32</li> <li>• 18-part collet set ER 32</li> <li>• 1 piece height adjuster</li> <li>• 1 piece assembly and tool setting aid</li> <li>• 1 piece taper squeegee</li> <li>• 15 pieces pull studs</li> </ul> |         |

| Milling head holder                                            | 3536366 |
|----------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>• 27 mm seat</li> </ul> |         |



| Chuck                                                                        | 3536363 |
|------------------------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>• Clamping range 1 - 13 mm</li> </ul> |         |



| Weldon holder |         |
|---------------|---------|
| Ø 6 mm        | 3536370 |
| Ø 8 mm        | 3536371 |
| Ø 10 mm       | 3536372 |
| Ø 12 mm       | 3536373 |
| Ø 16 mm       | 3536374 |
| Ø 20 mm       | 3536375 |



| Adapter                                                           | 3536365 |
|-------------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>• SK 40 to MT 3</li> </ul> |         |



| Collet chuck holder ER 32 | 3536364 |
|---------------------------|---------|
|---------------------------|---------|



| Collet chuck spanner ER 32 | 3536307 |
|----------------------------|---------|
|----------------------------|---------|



| Collet set ER 32                                                                        | 3441122 |
|-----------------------------------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>• 18 collet chucks; sizes Ø 1 - 16 mm</li> </ul> |         |



| Height-adjuster                                                      | 3536290 |
|----------------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>• Analogue version</li> </ul> |         |

- For fast and easy determination of the reference point on the Z axis and/or for adjusting tools "to zero" (e.g., for milling or drilling) without damaging the workpiece
- Housing height 50 mm



| Assembly and tool adjustment gauge                                                                                                                                        | 3536205 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>• For easy and precise adjustment of tools</li> <li>• Vertical and horizontal collet for tools with a steep-angle taper</li> </ul> |         |



| Taper squeegee | 3536331 |
|----------------|---------|
|----------------|---------|



| Pull stud DIN 69872 | 3536362 |
|---------------------|---------|
|---------------------|---------|



# SK 50 / DIN 69871

08 ACCESSORIES

| Starter set SK 50 / DIN 69871                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 3536111 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| <b>Comprises:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |
| <ul style="list-style-type: none"> <li>• 1 piece cutter head holder, 27 mm holder</li> <li>• 2 pieces Weldon 6 mm</li> <li>• 1 pieces Weldon 8 mm</li> <li>• 1 pieces Weldon 10 mm</li> <li>• 1 pieces Weldon 12 mm</li> <li>• 1 pieces Weldon 16 mm</li> <li>• 2 pieces Weldon 20 mm</li> <li>• 1 piece adapter SK 50 to MT 3</li> <li>• 4 pieces collet chuck holder ER 32</li> <li>• 1 piece collet spanner ER 32</li> <li>• 18-part collet set ER 32</li> <li>• 1 piece height adjuster</li> <li>• 1 piece taper squeegee</li> <li>• 15 pieces pull studs</li> </ul> |         |

| Milling head holder                                            | 3536506 |
|----------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>• 27 mm seat</li> </ul> |         |



| Weldon holder |         |
|---------------|---------|
| Ø 6 mm        | 3536510 |
| Ø 8 mm        | 3536511 |
| Ø 10 mm       | 3536512 |
| Ø 12 mm       | 3536513 |
| Ø 16 mm       | 3536514 |
| Ø 20 mm       | 3536515 |



| Adapter                                                           | 3536505 |
|-------------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>• SK 50 to MT 3</li> </ul> |         |



| Collet chuck holder ER 32 | 3536504 |
|---------------------------|---------|
|---------------------------|---------|



| Collet chuck spanner ER 32 | 3536307 |
|----------------------------|---------|
|----------------------------|---------|



| Collet set ER 32 | 3441122 |
|------------------|---------|
|------------------|---------|

- 18 collet chucks; sizes Ø 1 - 16 mm



| Height-adjuster | 3536290 |
|-----------------|---------|
|-----------------|---------|

- Analogue version
- For fast and easy determination of the reference point on the Z axis and/or for adjusting tools "to zero" (e.g., for milling or drilling) without damaging the workpiece
- Housing height 50 mm



| Taper squeegee | 3536501 |
|----------------|---------|
|----------------|---------|



| Pull stud DIN 69872 | 3536502 |
|---------------------|---------|
|---------------------|---------|



# STARTER SET

## HSK A-63

| Starter set HSK A-63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3536110 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| <b>Comprises:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |
| <ul style="list-style-type: none"> <li>• 1 piece cutter head holder, 27 mm holder</li> <li>• 1 piece drill chuck 1 - 13 mm</li> <li>• 1 piece Weldon 6 mm</li> <li>• 1 pieces Weldon 8 mm</li> <li>• 1 pieces Weldon 10 mm</li> <li>• 1 pieces Weldon 12 mm</li> <li>• 1 pieces Weldon 16 mm</li> <li>• 1 pieces Weldon 20 mm</li> <li>• 1 pieces collet chuck holder ER 32</li> <li>• 18-part collet set ER 32</li> <li>• 1 piece spring collet spanner ER 32</li> <li>• 1 piece swivelling assembly block</li> <li>• 1 piece taper squeegee</li> </ul> |         |

| Milling head holder                                                                | 3536414 |
|------------------------------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>• 27 mm seat</li> </ul>                     |         |
|  |         |

| Chuck                                                                                                                                                                                                                                                                                                                                       | 3536411 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>• Clamping range 1 - 13 mm</li> <li>• Excellent precision and concentricity</li> <li>• Secure clamping of the workpiece thanks to mechanical clamping force booster</li> <li>• Avoids autonomous release of clamp while machining clockwise or anti-clockwise and in case of spindle stop</li> </ul> |         |
|                                                                                                                                                                                                                                                          |         |

| Weldon holder                                                                                                                    |  |         |
|----------------------------------------------------------------------------------------------------------------------------------|--|---------|
| <ul style="list-style-type: none"> <li>• For clamping tools with a lateral carrier</li> <li>• Extremely smooth action</li> </ul> |  |         |
| Ø 6 mm                                                                                                                           |  | 3536450 |
| Ø 8 mm                                                                                                                           |  | 3536451 |
| Ø 10 mm                                                                                                                          |  | 3536452 |
| Ø 12 mm                                                                                                                          |  | 3536453 |
| Ø 16 mm                                                                                                                          |  | 3536454 |
| Ø 20 mm                                                                                                                          |  | 3536455 |
|                                               |  |         |

| Collet chuck holder ER 32                                                                                                                                 | 3536412 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>• For clamping tools with a cylindrical shank in ER collet chucks</li> <li>• Clamping range 0.5 - 10 mm</li> </ul> |         |
|                                                                        |         |

| Collet chuck spanner ER 32                                                          | 3536307 |
|-------------------------------------------------------------------------------------|---------|
|  |         |

| Collet set ER 32                                                                        | 3441122 |
|-----------------------------------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>• 18 collet chucks; sizes Ø 1 - 16 mm</li> </ul> |         |
|     |         |

| Assembly block                                                                                                     | 3536415 |
|--------------------------------------------------------------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>• For easy and precise adjustment of tools</li> <li>• Swivelling</li> </ul> |         |
|                               |         |

| Taper squeegee                                                                                                                                   | 3536410 |
|--------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>• For cleaning the machine taper to remove dust, chips and soiling</li> <li>• Non-woven border</li> </ul> |         |
|                                                             |         |

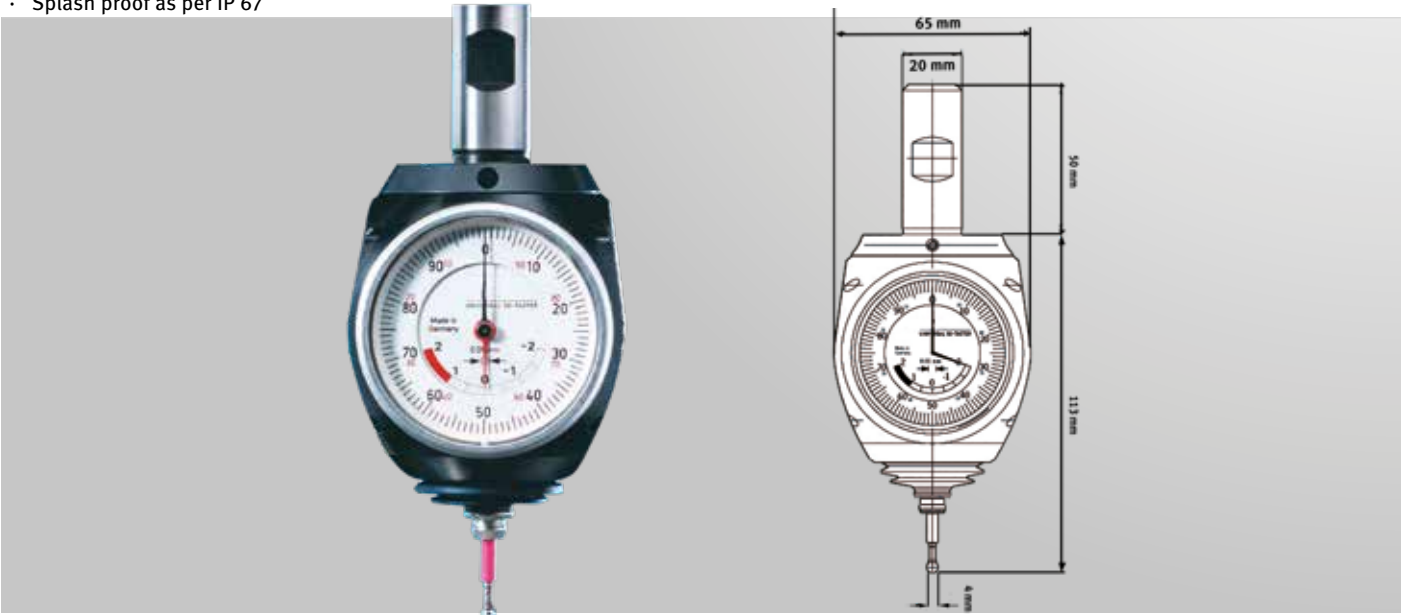
# 3D PROBE

08 ACCESSORIES

## Universal 3D probe

Article no. 354700201

- High-precision, versatile measuring device for milling and erosion machines
- Reduces overheads, improves productivity and reduces staff workload
- For fast and easy setting of workpiece zero points and for length measurement
- This is clamped in the cutter spindle or the drilling head and supports precise positioning of the spindle axis on the workpiece or jig edges
- Arbitrary touch direction (X, Y, Z axis)
- Dial gauge shows the clearance between the spindle axis and the workpiece
- Including short probe insert Ø 4 mm
- Probe inserts of different lengths available, interchangeable without tools
- To maximise measuring accuracy and precision, all Universal 3D probes are individually measured and calibrated in installation
- Meets all currently applicable safety regulations
- Splash proof as per IP 67



## Replacement tip for 3-D Haimer probe

Article no.

**short** Ø 4 mm

354700201S1

**long** Ø 8 mm

354700201S2

- › Short (ball Ø 4 mm) as well as long probe inserts (ball Ø 8 mm) are available for the probe, which can be changed without using tools.
- › After changing a probe insert, no recalibration of the probe is required.
- › The probe inserts are of course compatible with all HAIMER 3D probes.

## BLUM

### BLUM NOVOTEST FOR LC50-DIGILOG

PREMIUM LASER MEASURING SYSTEM FOR TOOL MEASUREMENT AND TOOL MONITORING



#### The most advanced laser measuring system worldwide

- Highly dynamic measurements of all tool characteristics
- Touchless measuring of all tool types, shapes and cutting materials
- Detection of geometry changes, such as cutting edge wear
- Continuously good part precision thanks to process-integrated temperature compensation
- Reliable compensation for spindle growth and orbital errors
- Automatic concentricity check detects poor tool holders and soiling
- Automated operation at low staffing levels



| LC50-DIGILOG                                      | 3582116 |
|---------------------------------------------------|---------|
| • Blum LC50 Digilog length 200 mm                 |         |
| • Smart Dock 1                                    |         |
| • Connecting cable 10 m                           |         |
| • Spiral hose 3 m                                 |         |
| • Interface                                       |         |
| • Software Laser NT SIE                           |         |
| • Max. tool diameter max. 80 mm                   |         |
| • Including installation                          |         |
| <i>Attention: Don't forget the reference tool</i> |         |

| Laser control and measuring system                           | Article no. |
|--------------------------------------------------------------|-------------|
| <b>TC 52IR and LC50-DIGILOG</b><br>- Infrared transmission   | 3582117     |
| <b>TC 62RC and LC50-DIGILOG</b> -<br>BRC wireless technology | 3582118     |
| • for tools up to 80 mm diameter                             |             |
| • <b>SIEMENS</b> license                                     |             |
| • Including installation                                     |             |

| Reference tool                | Article no. |
|-------------------------------|-------------|
| <b>SK 40</b> spindle mount*   | 3582121     |
| <b>HSK-A63</b> spindle mount* | 3582122     |

\* ex stock Germany - for milling machines with **SIEMENS** SINUMERIK 828D control only.



## BLUM

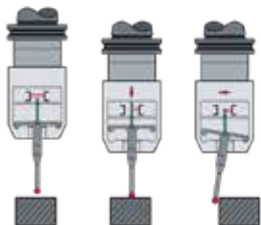
### TC 52IR / TC 62RC WORKPIECE TOUCH PROBE

#### COMPACT HIGH SPEED MEASURING PROBE FOR WORKPIECE MEASUREMENT

Unrivalled precision and fast workpiece measuring thanks to modern, multidirectional measuring system with optical/electronic switching signal generation.

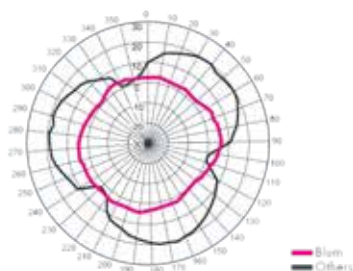
#### Wear-free, optical/electronic signal generation

- Switching signal generated by interrupting a miniature light barrier
- Switching point repeatability of  $0.3\mu\text{m } 2\sigma$  at 2 m/min measuring speed
- Wear-free and durably stable
- Very compact probe with  $\varnothing 40$  mm



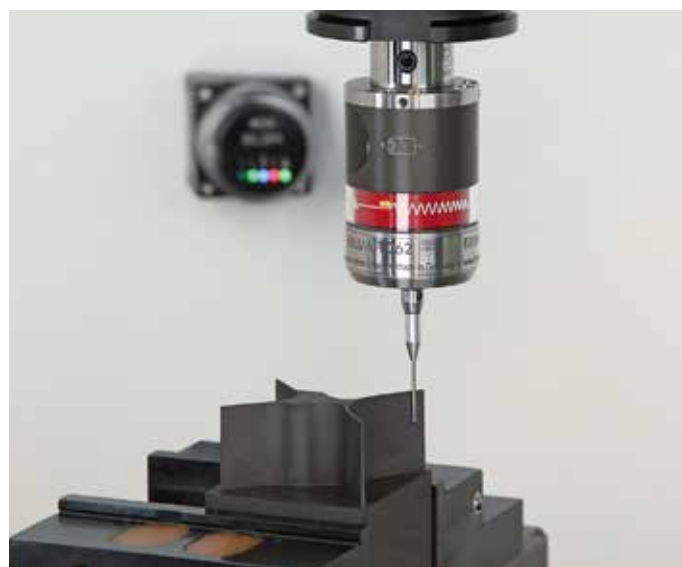
#### High-precision, rotationally symmetrical measuring system

- Precise, directionally independent approach behaviour
- Constant deflection forces
- Spindle orientation not required
- No detrimental 3-leg principle with lobing effect



For machines with a **SIEMENS** SINUMERIC 828D control system only

| Tool measuring probe TC                                     | Article no.<br>Ex warehouse<br>Germany | Article no.<br>ex works |
|-------------------------------------------------------------|----------------------------------------|-------------------------|
| TC 52IR - Infrared transmission                             | 3582102                                | 3511290604              |
| TC 62RC - BRC wireless technology<br>(without tool fitting) | 3582103                                | -                       |
| • <b>SIEMENS</b> license                                    |                                        |                         |
| • Including installation                                    |                                        |                         |



#### Reliable and proven transmission technology

- Sequential actuation of up to 2 measuring systems with one infrared receiver
- Switching on and off with M command



| Ruby measuring insert                    | Article no. |
|------------------------------------------|-------------|
| Length 30 mm, $\varnothing 3$ mm carbide | 3582140     |
| Length 30 mm, $\varnothing 5$ mm carbide | 3582141     |
| Length 50 mm, $\varnothing 3$ mm carbide | 3582142     |
| Length 50 mm, $\varnothing 5$ mm carbide | 3582143     |

| Accessories for TC 52IR / TC 62RC | Article no. |
|-----------------------------------|-------------|
| SK 40 spindle mount*              | 3582125     |
| HSK-A63 spindle mount*            | 3582126     |
| BT 30 spindle mount*              | 3582124     |
| BT 40 spindle mount*              | 3582127     |

\*To be ordered according to the spindle holder

## BLUM

### ZX-SPEED TOOL TOUCH PROBE

#### UNIVERSAL 3-D PROBE HEADS FOR TOOL ADJUSTMENT AND TOOL BREAK MONITORING

Economical solutions for tool length and radius adjustment and tool break monitoring Precise and process-assured measurements due to state-of-the-art metrology equipment with optoelectronic switching signal generation

#### Wear-free, optical/electronic signal generation

- Switching signal is generated by interrupting a miniature light barrier
- Allows for faster measuring speeds and measuring precision than comparable probes
- Reliable tool adjustment under the toughest conditions

#### High-precision state-of-the-art measuring equipment

- Precise, directionally independent switching behaviour
- Constant deflection forces
- Premium BLUM measuring equipment, latest generation
- No detrimental 3-leg principle
- No highly-sensitive switching elements

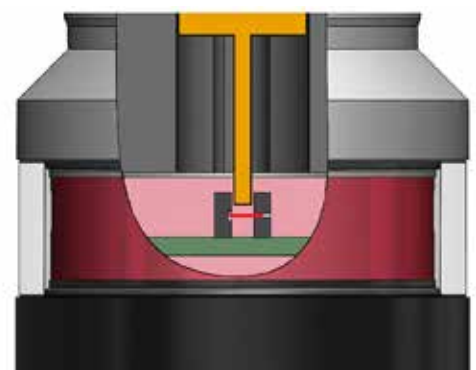
#### Latest transmission technologies

- ZX speed: Cable-connected
- ZX speed IR: Infrared transmission

| Tool measuring probe ZX-Speed                                                                         | Article no. |
|-------------------------------------------------------------------------------------------------------|-------------|
| IR - Infrared transmission                                                                            | 3582104     |
| RC - BRC wireless technology                                                                          | 3582105     |
| <ul style="list-style-type: none"> <li>• SIEMENS license</li> <li>• Including installation</li> </ul> |             |

| Workpiece and tool measuring probe                                                                    | Article no. |
|-------------------------------------------------------------------------------------------------------|-------------|
| TC 52IR and ZX-Speed IR infrared transmission                                                         | 3582108     |
| TC 62RC and ZX-Speed RC BRC wireless technology (without tool fitting)                                | 3582109     |
| <ul style="list-style-type: none"> <li>• SIEMENS license</li> <li>• Including installation</li> </ul> |             |

| Reference tool      | Article no. |
|---------------------|-------------|
| • without pull stud |             |
| BT 30               | 3582502     |
| BT 40               | 3582504     |
| SK 40               | 3582506     |



# RENISHAW

## OMP 40-2 /OMP 400 MEASURING PROBE

ULTRA-COMPACT WITH OPTICAL SIGNAL TRANSMISSION FOR WORKPIECE SET-UP AND TESTING

### OMP 40-2 measuring probe

- The OMP40-2 transmits signals over 360° at an angle of 90° to the spindle axis and with a range of up to 5 m
- Modulated optical signal transmission is also resilient to malfunctions caused by light interference
- The repetition accuracy in one direction is 1.0 µm (determined with an approach speed of 480 mm/min and 50 mm probe insert).
- The probe can be switched off by an M command or via a configurable switch-off time
- Protection class IPX8, developed for tough deployment in machining centres.
- Visible LED display diagnostics

### OMP 400 measuring probe

- Unrivalled 3D precision and repetition accuracy
- Reliably modulated, optical signal transmission
- Proven and patented Rengage technology
- Excellent resistance to light interference with modulated signal transmission
- 360° transmission range
- Ultra-compact design
- 3D measuring performance ideal for 5-axis machines
- Excellent 3D precision, specially for measuring 3D freeform surfaces
- High repetition accuracy independently of the probing direction
- Due to the very low probing force and probing uncertainty even long-

| Renishaw OMP 40-2           | Article no.    |
|-----------------------------|----------------|
| <b>Ex warehouse Germany</b> | <b>3582010</b> |
| • Including installation    |                |

| Workpiece and tool measuring probe | Article no.    |
|------------------------------------|----------------|
| <b>OMP 40-2 and OTS</b>            | <b>3582012</b> |
| • Includes assembly                |                |

- er probe inserts can be used
- Up to 10 times longer service life than with conventional switching probes
- Elimination of reset errors
- Switching on and off is possible in any spindle position

| Renishaw OMP 400            | Article no.    |
|-----------------------------|----------------|
| <b>Ex warehouse Germany</b> | <b>3582020</b> |
| • Including installation    |                |



## OTS - TACTILE 3-D TOOL MEASURING PROBE

FOR TOOL MEASURING AND TOOL BREAK MONITORING

### Contact switching 3-D measurements

- Compact, tactile 3-D tool probe with optical signal transmission for tool breakage checking and fast measurement of the tool length and diameter on a variety of different tools
- Compatible with Renishaw receivers with modulated optical signal transmission

### Benefits and features

- Proven kinematic design
- Excellent resistance to light interference with modulated signal transmission
- Directionally adjustable optical infrared module
- Cable-free for unrestricted machine movement and easy installation
- Repetition accuracy of 1.00 µm (2σ)



| Touch probe              | Article no.    |
|--------------------------|----------------|
| <b>OTS</b>               | <b>3582011</b> |
| • Including installation |                |

| Workpiece and tool measuring probe | Article no.    |
|------------------------------------|----------------|
| <b>OMP 40-2 and OTS</b>            | <b>3582012</b> |
| • Includes assembly                |                |

## RENISHAW

**PRIMO SET\* - Everything necessary is included.**

*START WITH AUTOMATIC WORKPIECE AND TOOL MEASUREMENT IN YOUR PRODUCTION ENVIRONMENT NOW AND ENJOY THE BENEFITS*

| Renishaw Primo Set                                                                                                                                                                                                                            | Article no. |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>with collet BT 30</b>                                                                                                                                                                                                                      | 3582030     |
| <b>with collet BT 40</b>                                                                                                                                                                                                                      | 3582031     |
| <ul style="list-style-type: none"> <li>• Radio Part Setter</li> <li>• Radio 3D Tool Setter</li> <li>• Primo Interface</li> <li>• GoProbe Software</li> <li>• Primo CREDIT-6 - Six month credit token including Primo Total Protect</li> </ul> |             |

| Primo Credit Token                    | Article no. |
|---------------------------------------|-------------|
| <b>Primo CREDIT-6 - Six months</b>    | 3582040     |
| • Includes Primo Total Protect (PTP)  |             |
| <b>Primo CREDIT-U - unlimited use</b> | 3582041     |

### Primo™ Radio Part Setter (Tool measuring probe)

This probe automatically determines the workpiece reference point before machining and performs in-process measurements of the roughing or finishing workpiece dimensions.



### Primo™ Radio 3D Tool Setter (Tool probe)

This measuring probe is used for automatic length and diameter measurement of a tool. It also enables tool breakage control during machining process.



### Primo™ Interface (Interface)

The interface communicates with the workpiece and tool measuring probe and the machine tool control via Renishaw's highly reliable Frequency Hopping Spread Spectrum (FHSS) radio transmission.



### Primo Credit Token (Credit token)

Each Primo Kit contains the first 6-month credit token. The 6-month credit token supports operation of the Primo System for six months. It offers flexibility in terms of credit payment, because you can postpone the purchase of a Primo credit token during quieter periods, until you need your Primo system back. The upgrade credit token - Primo CREDIT-U - offers unlimited use of the Primo system for a one-off payment.



### GoProbe Software

supports cycles for workpiece and tool measurement and calibration. All cycles use a single line of code, making the software quick to learn and easy to use in daily operations.

Including:  
Manual, programming disk, app, e-training, training workpiece, programming manual



### Primo Total Protect (PTP)\* (Primo total protection)

Primo Complete Protection is an extended guarantee to protect your investment when you have activated a credit token. If your Primo probe is accidentally damaged during this period, your Renishaw representative will supply you with a free replacement.

\*Renishaw's terms and conditions apply



## VDI 30

08 ACCESSORIES

|                           |         |
|---------------------------|---------|
| <b>VDI 30 starter set</b> | 3536115 |
|---------------------------|---------|

### Comprises:

- 3 pcs. square transverse holder
- 1 pc. square transverse overhead holder
- 1 pc. square longitudinal holder
- 5 pcs. boring bar holder Ø 10 / 12 / 16 / 20 / 25 mm
- 3 pcs. cap
- 1 pc. collet chuck holder ER 25
- 1 piece collet spanner ER 25
- 15-part collet set ER 25
- 1 pc. tool holder
- 1 pc. chuck

|                                 |         |
|---------------------------------|---------|
| <b>Square transverse holder</b> | 3536231 |
|---------------------------------|---------|

- Right-hand type, short
- DIN 69880
- Large adjustable conical tipped nozzle



|                                 |         |
|---------------------------------|---------|
| <b>Square transverse holder</b> | 3536232 |
|---------------------------------|---------|

- For overhead work
- Right-hand type, short
- DIN 69880
- Large adjustable conical tipped nozzle



|                                   |         |
|-----------------------------------|---------|
| <b>Square longitudinal holder</b> | 3536233 |
|-----------------------------------|---------|

- Right-hand type
- Large adjustable conical tipped nozzle



|                      |         |
|----------------------|---------|
| <b>Sealing cover</b> | 3536236 |
|----------------------|---------|

- Protects the tool changer against soiling



|                                  |         |
|----------------------------------|---------|
| <b>Collet chuck holder ER 25</b> | 3536237 |
|----------------------------------|---------|

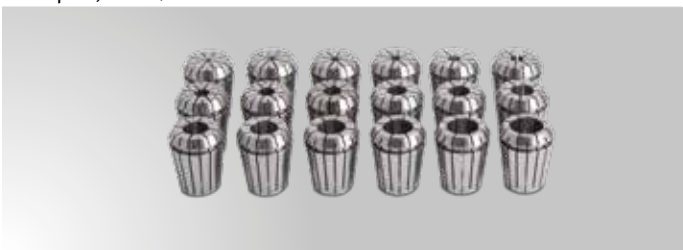


|                             |         |
|-----------------------------|---------|
| <b>Collet spanner ER 25</b> | 3536240 |
|-----------------------------|---------|



|                         |         |
|-------------------------|---------|
| <b>Collet set ER 25</b> | 3441109 |
|-------------------------|---------|

- 15 pcs.; sizes Ø 1 - 16 mm



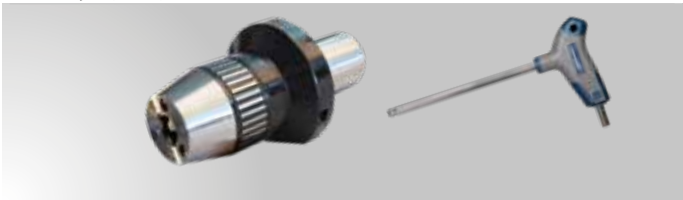
|                    |         |
|--------------------|---------|
| <b>Tool holder</b> | 3536238 |
|--------------------|---------|

- Pre-worked
- Round blank



|              |         |
|--------------|---------|
| <b>Chuck</b> | 3536239 |
|--------------|---------|

- Clamping range 1 - 13 mm



|                         |  |
|-------------------------|--|
| <b>Drill rod holder</b> |  |
|-------------------------|--|

|         |         |
|---------|---------|
| Ø 10 mm | 3536241 |
| Ø 12 mm | 3536242 |
| Ø 16 mm | 3536243 |
| Ø 20 mm | 3536244 |
| Ø 25 mm | 3536245 |





# STARTER SET

## VDI 40

|                           |         |
|---------------------------|---------|
| <b>Starter set VDI 40</b> | 3536116 |
|---------------------------|---------|

### Comprises:

- 3 pcs. square transverse holder
- 1 pc. square transverse overhead holder
- 1 pc. square longitudinal holder
- 5 pcs. boring bar holder Ø 10 / 12 / 16 / 20 / 25 mm
- 3 pcs. cap
- 1 pc. collet chuck holder ER 25
- 1 piece collet spanner ER 25
- 15-part collet chuck set ER 25
- 1 pc. tool holder
- 1 pc. chuck

|                                 |         |
|---------------------------------|---------|
| <b>Square transverse holder</b> | 3536251 |
|---------------------------------|---------|

- Right-hand type, short
- DIN 69880
- Large adjustable conical tipped nozzle



|                                 |         |
|---------------------------------|---------|
| <b>Square transverse holder</b> | 3536252 |
|---------------------------------|---------|

- For overhead work
- Right-hand type, short
- DIN 69880
- Large adjustable conical tipped nozzle



|                                   |         |
|-----------------------------------|---------|
| <b>Square longitudinal holder</b> | 3536253 |
|-----------------------------------|---------|

- Right-hand type
- Large adjustable conical tipped nozzle



|                      |         |
|----------------------|---------|
| <b>Sealing cover</b> | 3536256 |
|----------------------|---------|

- Protects the tool changer against soiling



|                                  |         |
|----------------------------------|---------|
| <b>Collet chuck holder ER 25</b> | 3536257 |
|----------------------------------|---------|



|                             |         |
|-----------------------------|---------|
| <b>Collet spanner ER 25</b> | 3536260 |
|-----------------------------|---------|



|                         |         |
|-------------------------|---------|
| <b>Collet set ER 25</b> | 3441109 |
|-------------------------|---------|

- 15 pcs.; sizes Ø 1 - 16 mm



|                    |         |
|--------------------|---------|
| <b>Tool holder</b> | 3536258 |
|--------------------|---------|

- Pre-worked
- Round blank



|              |         |
|--------------|---------|
| <b>Chuck</b> | 3536259 |
|--------------|---------|

- Clamping range 1 - 13 mm



|                         |  |
|-------------------------|--|
| <b>Drill rod holder</b> |  |
|-------------------------|--|

|         |         |
|---------|---------|
| Ø 10 mm | 3536261 |
| Ø 12 mm | 3536262 |
| Ø 16 mm | 3536263 |
| Ø 20 mm | 3536264 |
| Ø 25 mm | 3536265 |



# BMT 55

PREMIUM TOOL FROM



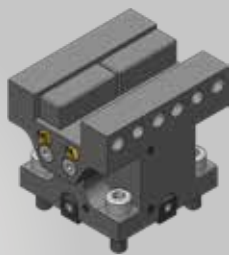
08 ACCESSORIES

| Starter set BMT 55          | 3519602 |
|-----------------------------|---------|
| <b>Comprises:</b>           |         |
| 4 x tool holder U25T55X65   |         |
| 2 x tool holder UAD20T55x84 |         |
| 1 x tool holder B40T55X40   |         |
| 1 x tool holder BN20T55X95  |         |
| 1 x tool holder BN25T55X95  |         |
| 1 x tool holder BN32T55X95  |         |
| 1 x Adapter VDI 30/BMT 55   |         |

| Tool holder BN25T55X95                                                              | 3519609 |
|-------------------------------------------------------------------------------------|---------|
|  |         |

| Tool holder U25T55X65                                                             | 3519605 |
|-----------------------------------------------------------------------------------|---------|
|  |         |

| Tool holder BN32T55X95                                                              | 3519610 |
|-------------------------------------------------------------------------------------|---------|
|  |         |

| Tool holder UAD20T55x84                                                             | 3519606 |
|-------------------------------------------------------------------------------------|---------|
|  |         |

| Adapter VDI 30/BMT 55                                                                 | 3519615 |
|---------------------------------------------------------------------------------------|---------|
|  |         |

| Tool holder B40T55X40                                                               | 3519607 |
|-------------------------------------------------------------------------------------|---------|
|  |         |

| Driven holder 0°                                                                      | 3519620 |
|---------------------------------------------------------------------------------------|---------|
|  |         |

| Tool holder BN20T55X95                                                              | 3519608 |
|-------------------------------------------------------------------------------------|---------|
|  |         |

| Driven holder 90°                                                                     | 3519622 |
|---------------------------------------------------------------------------------------|---------|
|  |         |

# PREMIUM TURNING TOOLS

## PREMIUM TURNING TOOLS FROM YG-1

### TURNING TOOL

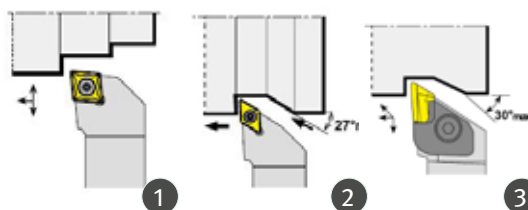
| Lathe tool set left                 | Article no. |
|-------------------------------------|-------------|
| HM 20 mm / 6-parts (without plates) | 3544190     |

| Lathe tool set left                 | Article no. |
|-------------------------------------|-------------|
| HM 25 mm / 6-parts (without plates) | 3544200     |



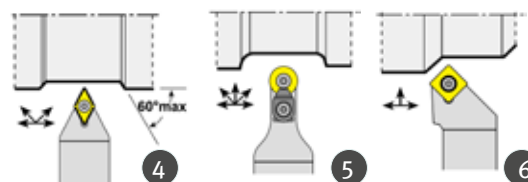
### CARBIDE PLATES 20 MM

| ISO |       |    |      |       |
|-----|-------|----|------|-------|
| ①   | SCLCL | 20 | K09  | 20 mm |
| ②   | SDJCL | 20 | K11  | 20 mm |
| ③   | CKJNL | 20 | K16  | 20 mm |
| ④   | SDNCN | 20 | K11  | 20 mm |
| ⑤   | SRDCN | 20 | K10C | 20 mm |
| ⑥   | SSSCL | 20 | K12  | 20 mm |



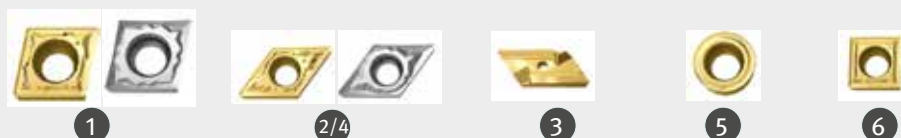
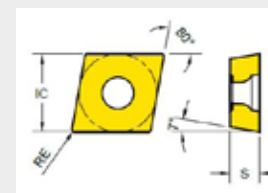
### CARBIDE PLATES 25 MM

| ISO |       |    |      |       |
|-----|-------|----|------|-------|
| ①   | SCLCL | 25 | M09  | 25 mm |
| ②   | SDJCL | 25 | M11  | 25 mm |
| ③   | CKJNL | 25 | M16  | 25 mm |
| ④   | SDNCN | 25 | M11  | 25 mm |
| ⑤   | SRDCN | 25 | M10C | 25 mm |
| ⑥   | SSSCL | 25 | M12  | 25 mm |



### CARBIDE REPLACEMENT INSERTS

| for DM no. | Article no. | PQ        | ISO                        | RE  | FN        | Ap      |
|------------|-------------|-----------|----------------------------|-----|-----------|---------|
| ①          | 3544210     | 10 pieces | CCMT 09T308-UG (Universal) | 0.8 | 0.15-0.3  | 0.8-2.5 |
| ①          | 3544211     | 10 pieces | CCGT 09T308-AL (Aluminium) | 0.8 | 0.1-0.35  | 1.0-1.0 |
| ② ④        | 3544212     | 10 pieces | DCMT 11T308-UG (Universal) | 0.8 | 0.05-0.25 | 1.0-2.0 |
| ② ④        | 3544213     | 10 pieces | DCGT 11T308 AL (Aluminium) | 0.8 | 0.1-0.3   | 1.0-2.5 |
| ③          | 3544214     | 10 pieces | RCMT 10T3M0 (Universal)    | 5.0 | 0.1-0.35  | 0.5-2.5 |
| ⑤          | 3544215     | 10 pieces | SCMT 120408-UG (Universal) | 0.8 | 0.15-0.35 | 1.5-3.0 |
| ⑥          | 3544216     | 10 pieces | KNUX 160405L (Universal)   | 0.5 | 0.3-0.6   | 1.0-6.0 |



**PREMIUM TURNING TOOLS FROM YG-1** 

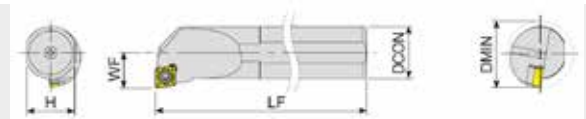
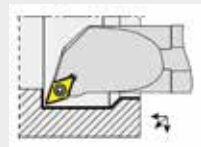
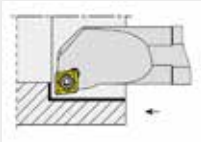
**INTERNAL TURNING TOOL**

| Internal turning tool, roughing left (without plates) | Article no. |
|-------------------------------------------------------|-------------|
| S08H-SCLCL/06                                         | 3544230     |
| S10K-SCLCL/06                                         | 3544231     |
| S12K-SCLCL/06                                         | 3544232     |
| S16P-SCLCL/06                                         | 3544233     |
| S20R-SCLCL/09                                         | 3544234     |
| S25S-SCLCL/09                                         | 3544235     |

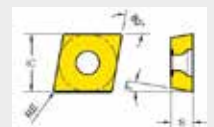
| No. | Indexable inserts          | Article no. |
|-----|----------------------------|-------------|
| ①   | CCMT 060204-UG (Universal) | 3544250     |
| ②   | CCGT 060204-AL (Aluminium) | 3544251     |

| Internal turning tool for finishing left (without plates) | Article no. |
|-----------------------------------------------------------|-------------|
| S10K-SDQCL/07                                             | 3544240     |
| S12K-SDQCL/07                                             | 3544241     |
| S16P-SDQCL/07                                             | 3544242     |
| S20R-SDQCL/07                                             | 3544243     |

| No. | Indexable inserts          | Article no. |
|-----|----------------------------|-------------|
| ③   | DCMT 070208-UG (Universal) | 3544252     |
| ④   | DCGT 070204-AL (Aluminium) | 3544253     |



|         | DMIN | DCON | H    | WF | LF  |
|---------|------|------|------|----|-----|
| 3544230 | 11   | 08   | 7.3  | 6  | 100 |
| 3544231 | 13   | 10   | 9    | 7  | 125 |
| 3544232 | 16   | 12   | 11   | 9  | 125 |
| 3544233 | 20   | 16   | 14.8 | 11 | 170 |
| 3544234 | 25   | 20   | 18.3 | 13 | 200 |
| 3544235 | 32   | 25   | 23   | 17 | 250 |
| 3544240 | 13   | 10   | 9    | 7  | 125 |
| 3544241 | 16   | 12   | 11   | 9  | 125 |
| 3544242 | 20   | 16   | 14.8 | 11 | 170 |
| 3544243 | 25   | 20   | 18.3 | 13 | 200 |



|         | RE  | FN        | Ap      |
|---------|-----|-----------|---------|
| 3544250 | 0.4 | 0.10-0.25 | 0.5-2.0 |
| 3544251 | 0.4 | 0.02-0.15 | 0.5-1.0 |
| 3544252 | 0.8 | 0.10-0.25 | 0.8-2.0 |
| 3544253 | 0.4 | 0.02-0.15 | 0.1-2.0 |

**CUT-OFF STEEL**

| Cut-off steel (without plates) | Article no. |
|--------------------------------|-------------|
| YTEL2020-3T30-C left           | 3544220     |
| YTEL2525-3T22-C left           | 3544221     |

| Plate                                          | Article no. |
|------------------------------------------------|-------------|
| Rectangular plate (TDY3E-0.4-GM-YG602G) (VE10) | 3544225     |
| Plate width 3 mm                               |             |
| For external and internal turning and grooving |             |
| First choice: Grooving and face turning        |             |
| For medium feed speed                          |             |

| Radius plate (TDY3E-1.5-RG-YG602G) (VE10)       | Article no. |
|-------------------------------------------------|-------------|
| Radius plate (TDY3E-1.5-RG-YG602G) (VE10)       | 3544226     |
| Plate width 3 mm                                |             |
| For external and internal turning and grooving  |             |
| Indexable insert with full radius for profiling |             |

|         | CW | CDX | H (HF) | B  | LF  | WF   |
|---------|----|-----|--------|----|-----|------|
| 3544220 | 3  | 30  | 20     | 20 | 125 | 20.4 |
| 3544221 | 3  | 25  | 25     | 25 | 150 | 25.4 |



## SHORT BAR FEEDER SL 80-S

The SL80S is designed for the automatic loading of short bars. This machine is especially suitable for work in all standard applications.

### Features:

- Commissioning and changing the bar diameter can be carried out in record time thanks to the intuitive control system.
- The user-friendly remote control ensures interaction between the bar loader and the CNC lathe.
- Advanced servo drive technology ensures precise rod control
- A standard retraction device for the X-axis enables easy replacement of the spindle bush and access to the rear of the lathe spindle.

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### User-friendly remote control

- Offers maximum ease of use
- Simple parameter settings enable optimum operation



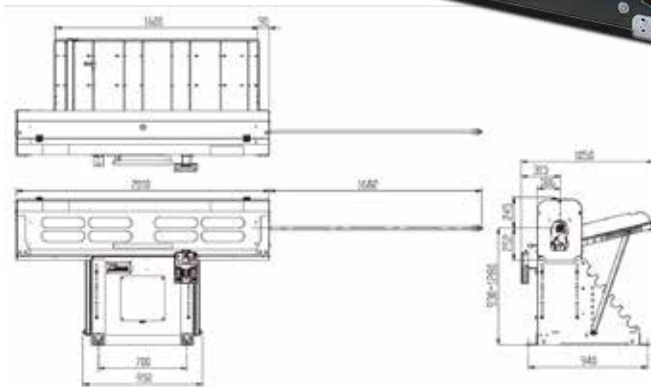
### User-friendly remote control

- High-quality linear actuator offers precise and quiet operation
- All movements are controlled and monitored by the PLC, which operates with a high degree of reliability.



### Quick changeover

- Extremely short cycle time for bar change, minimises unproductive time.
- Complete changeover from one diameter to another - quick and easy.



### SL 80-S

|                   |                                                                |
|-------------------|----------------------------------------------------------------|
| Bar diameter      | 6 - 80 mm<br>With bar preparation for some maximum diameters   |
| Magazine capacity | 10 mm x 65 pieces                                              |
| Bar length        | 360 - 1 600 mm<br>depending on the spindle length of the lathe |
| Spindle height    | 930~1 280 mm                                                   |
| Weight            | 360 kg                                                         |



**New**

08 ACCESSORIES

## SHORT BAR FEEDER DH 65L S2 1.5 METRES

- There is no speed limit for the lathes
- They are ideal for feeding raw materials without surface treatment and do not place any special requirements on the straightness of the bars.
- The intelligent man-machine interface enables user-friendly parameter setting.
- An alarm indicator ensures easy maintenance.
- The parameter settings are convenient and allow uncomplicated production changes.
- The electric control fulfils CE standards and is compatible with every CNC lathe.

### User-friendly remote control

- Ensures maximum ease of use.
- The uncomplicated parameter settings enable flexible operation.



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### DH 65L S2

|                   |                                                              |
|-------------------|--------------------------------------------------------------|
| Bar diameter      | 5 - 65 mm<br>With bar preparation for some maximum diameters |
| Magazine capacity | 5 mm x 114 pieces                                            |
| Bar length max.   | 1660 mm                                                      |
| Spindle height    | 850 - 1,250 mm                                               |
| Weight            | 298 kg                                                       |

### Increased efficiency

- Automate the feeding process of raw materials, which increases the production speed and maximises the efficiency of the machines.



**New**

## BAR FEEDER GT 326

### Features:

- The economical solution for automatic loading of bar stock with small diameters in lathes with long spindles.
- The GT 326-E is designed for production processes at optimum speed.
- High guide quality, low noise levels and effective vibration damping are guaranteed by moulded polyurethane guide channels.
- The GT 326-E is a highly productive and cost-effective automatic bar feeding system for bar stock diameters from 3 mm to 26 mm.
- The GT 326-E is also suitable for lathes with a fixed headstock.



### Easy adjustment

- The rod diameter is changed by simple manual adjustment using the changeover gauge, without the need for a tool.
- A four-stage scale allows you to visually display the new setting for precise and quick selection.



### User-friendly remote control

- Offers maximum ease of use
- Simple parameter settings enable optimum operation
- It displays alarm descriptions, the alarm history of operating errors and position tracking (inch/metric programming)



### GT 326

|                   |                                                              |
|-------------------|--------------------------------------------------------------|
| Bar diameter      | 3 - 26 mm<br>With bar preparation for some maximum diameters |
| Magazine capacity | 3 mm x 90 pieces                                             |
| Bar length max.   | 3230 mm                                                      |
| Spindle height    | 800 - 1,130 mm                                               |
| Weight            | 402 kg                                                       |

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## SHORT BAR FEEDER SN 551

The automatic bar feeder is suitable for various lathes. The products are characterised by their high technological content, fast charging speed and convenient operation.

### Features:

- Convenient parameter setting without programme changes
- The length of the remaining material can be adjusted as required
- Short residual length reduces material waste to a minimum
- The retraction stroke can be adjusted as required
- I/O interface with every CNC lathe
- Self-detection of abnormal movements and display on the LCD
- Remote control enables convenient running test and customisation
- Changing the diameter of the rod is quick and easy
- Compact model for high space savings
- Bar feeders automate the process of feeding raw materials, thereby increasing production speed and maximising machine efficiency.
- The automation of material transport reduces labour costs as less manual intervention is required.
- Ensures even and precise feeding of the material, which improves the quality of the end products and reduces waste.
- Reduces the physical strain on operators as it requires less manual handling of the material.
- The continuous supply of raw materials maximises machine running time and minimises downtimes.

### Self-recognition

- Self-detection of material that is too short or too long
- Empty rod magazine detection and warning



### DH 65L S2

|                   |                                                              |
|-------------------|--------------------------------------------------------------|
| Bar diameter      | 5 - 45 mm<br>With bar preparation for some maximum diameters |
| Magazine capacity | 10 mm x 28 pieces                                            |
| Bar length max.   | 3200 mm                                                      |
| Spindle height    | 900 - 1,195 mm                                               |
| Weight            | 975 kg                                                       |

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## BAR FEEDER SS 2220/ SS 2410 / SS 2500 / SS 2500 SHORT

### Features:

- Bar feeders are top-class material feeders designed for the best possible quality and performance. They are available in a variety of sizes and designs, so you can choose the one that best suits your requirements. The bar feeders are also highly reliable and easy to operate, ensuring they will provide years of dependable service.
- Here are some reasons to buy these bar feeders:
- High quality: The bar feeders are made of high-quality materials and components that are designed for durability.
- High performance: The bar feeders are designed for high performance, which means that our bar feeders can handle even the most demanding tasks.
- Reliability: The bar feeders are highly reliable and straightforward to operate, ensuring they will provide years of dependable service.



SS2220/ SS2410



SS2500



SS2500 Short

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|                          | SS2220                             | SS2410                             | SS2500                             | SS2500 SHORT                        |
|--------------------------|------------------------------------|------------------------------------|------------------------------------|-------------------------------------|
| Bar diameter             | 6-67 mm                            | 6 - 105                            | 6-80 mm                            | 6-80 mm                             |
| Rod dimensions - hexagon | 8-58 mm                            | 8 - 90 mm                          | 8-68 mm                            | 8-68 mm                             |
| Rod dimensions - square  | 8 - 47 mm                          | 8 - 74 mm                          | 8 - 55 mm                          | 8 - 55 mm                           |
| Magazine capacity        | 6 x 106 pieces up to 67 x 7 pieces | 6 x unlimited up to 105 x 3 pieces | 6 x 106 pieces up to 80 x 6 pieces | 16 x 106 pieces up to 80 x 6 pieces |
| Bar length max.          | 1525 mm                            | 1500 mm                            | 1525 mm                            | 1205 mm                             |
| Spindle height           | 825 - 1,175 mm                     | 825 - 1,175 mm                     | 825 - 1,175 mm                     | 825 - 1,175 mm                      |



## AUTOMATIC BAR GRAB GRIPPEX LIGHTWEIGHT AND COMPACT

### The Grippex bar grab boosts production and automation on your CNC lathe!

Only a small minority of all CNC lathes installed today is equipped with a bar feeder magazine. There are various reasons for this, such as the relatively high procurement costs or lack of space in the workshop. For small-batch production, however, a bar feeder that makes use of the existing conditions on the machine, such as hollow spindles and hollow clamping cylinders, is often sufficient. These devices only need to be supplemented with a guide tube and the GRIPPEX bar gripper. The Grippex bar gripper can be added to almost any lathe turret.

#### Benefits and main features of the GRIPPEX bar grab

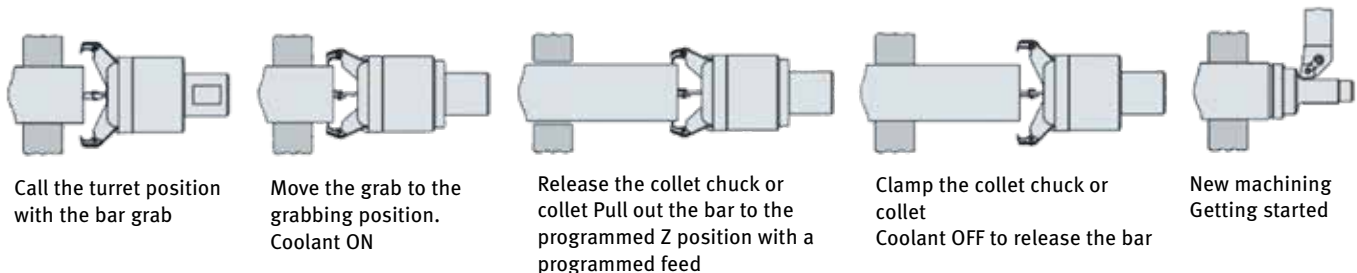
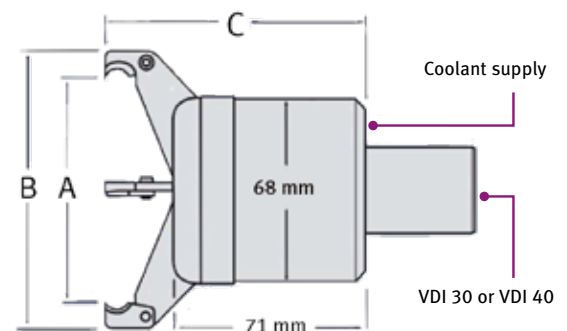
- Fast and easy installation - the grab's work range can be fully utilised without conversion
- Lightweight and compact - thus allowing the turret to be fully occupied
- Resists high coolant pressure (20 bar). No need for a pressure reduction valve
- Works reliably as of 0.5 bar coolant pressure
- Clamps directly at the chuck - resulting in stable cutting of the turned parts.
- Clamps with 3 legs - thus ensuring trouble-free processing of hexagonal bars at any angle to the spindle.
- Equipped with robot clamping jaws, the device can also be used as a workpiece grab.



| Grippex II          | VDI 30      | VDI 40      |
|---------------------|-------------|-------------|
|                     | Article no. | Article no. |
| Grab range 2-60 mm  | 354500100   | 354500103   |
| Grab range 3-80 mm  | 354500101   | 354500104   |
| Grab range 7-105 mm | 354500102   | 354500105   |

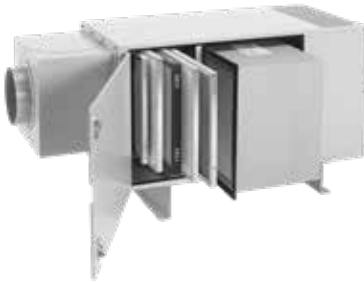
| Gripping ranges | A      | B      | C      |
|-----------------|--------|--------|--------|
| 2 - 60 mm       | 64 mm  | 83 mm  | 89 mm  |
| 3 - 80 mm       | 83 mm  | 102 mm | 94 mm  |
| 7 - 105 mm      | 110 mm | 129 mm | 108 mm |





## AFS- AIR PURIFICATION DEVICES AND CENTRAL EXTRACTION SYSTEMS FOR OIL AND EMULSION MISTS

DECENTRALISED INDIVIDUAL DEVICES FOR USE ON OR AT A MACHINE TOOL



### AFS 1100

Mechanical filters and separators for use with water-based cooling lubricants

- Preliminary decision: 5 stages, partially maintenance-free
- Post-filter: HEPA H13
- Separation performance: 99.95% for particles  $> 0.3 \mu\text{m}$
- volume flow:  $1100 \text{ m}^3/\text{h}$
- Connection: 3~, 380...480V, 50/60 Hz
- Power consumption 0.5 kW



### AFS 1600

Mechanical filters and separators for use with water-based cooling lubricants

- Preliminary decision: 5 stages, partially maintenance-free
- Post-filter: HEPA H13
- Separation performance: 99.95% for particles  $> 0.3 \mu\text{m}$
- volume flow:  $1600 \text{ m}^3/\text{h}$
- Connection: 3~, 380...480V, 50/60 Hz
- Power consumption 0.95 kW



### AFS 1000 E

Electrostatic 1-stage, for use with oil as cooling lubricant

- Pre-separation: 4 stages
- Main separation: Electrostatic
- volume flow:  $500 - 1\,800 \text{ m}^3/\text{h}$
- Connection: 3~, 380...480V, 50/60 Hz
- Power consumption 0.2 kW at  $1\,000 \text{ m}^3/\text{h}$
- GrindTec 2022 Innovation Award

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### Central AFS extraction systems

are the sensible alternative when there are several machine tools in a hall and high hall temperatures and humidity put a strain on employees and machines.

The systems can be designed as an exhaust air/recirculating air concept or in conjunction with a supply air system with heat recovery. Turnkey ready. AFS takes care of planning, design, installation and, if required, service.



## FLEXCAT 378 EOT-PRO

*SPECIAL VACUUM CLEANER FOR INDUSTRY WITH SPECIAL SIEVE INSERT FOR EXTRACTING COOLING LUBRICANTS, HIGHLY OILY LIQUIDS AND COARSE METAL CHIPS IN LARGE QUANTITIES*

- › Removable strainer insert for separate disposal of the metal swarf
- › Ball valve for draining fluids
- › Motors equipped with copper windings and motor protection
- › For exacting machine cleaning in professional metalworking
- › The special seal between the head and the tank is resistant against oil and chemical residues without compromising on flexibility
- › Oil-resistant suction hose resilient to heavy loads and any kind of twisting
- › Stainless steel container is insensitive to sharp-edged metal chips.
- › Side hose connection for improved suction power
- › Metal hose connection on tank with locking mechanism prevent

- › hose coming loose during cleaning
- › Suction motors with noise damping to ensure quiet operation

| Model                  | flexCAT 378 EOT-PRO |
|------------------------|---------------------|
| Article no.            | 7003380             |
| Vacuum cleaner type    | Wet & dry           |
| Rating                 | 3.3 kW 230 V ~50 Hz |
| Tank volume            | 78 l                |
| Tank material          | Stainless steel     |
| Dimensions (L x W x H) | 635 x 58 x 1 030 mm |
| Weight                 | 34 kg               |

- › For exacting machine cleaning in professional metalworking
- › Stainless-steel tank is not sensitive to damage from sharp edged metal chips
- › Hose connection on side to improve vacuuming performance



## FLEXCAT 3100 EOT-PRO

*SPECIAL VACUUM CLEANER FOR OIL-CONTAINING LIQUIDS AND METAL CHIPS*



- › Ball valve for draining fluids
- › Powder-coated steel frame as additional bump protection
- › Integrated screen strainer system
- › Stainless-steel tank is not sensitive to damage from sharp edged metal chips
- › Large swarf strainer for collecting dry metal swarf
- › Floatation switch for safe stop for full tank in wet vacuuming
- › Metal hose connection on tank with locking mechanism
- › With fill level display and visual fill level monitoring through transparent hose at side
- › Trolley with non-marking fixed rollers at rear, and steering rollers parking brake at front
- › With filter monitoring, power socket and automatic switch-on
- › The special seal between the head and the tank is resistant against oil and chemical residues without compromising on flexibility
- › Oil-resistant suction hose resilient to heavy loads and any

- › kind of twisting
- › Suction motors with noise damping to ensure quiet operation
- › Three motors can be separately engaged
- › Motors equipped with copper windings
- › Unit is supplied with 230V CEE plug

| Model                  | flexCAT 3100 EOT-PRO |
|------------------------|----------------------|
| Article no.            | 7003382              |
| Vacuum cleaner type    | Wet & dry            |
| Rating                 | 3.3 kW 230 V ~50 Hz  |
| Air volume             | 10 500 l/min         |
| Tank volume            | 100 l                |
| Hose diameter/length   | 50 mm / 3 m          |
| Sound pressure level   | 76 dB(A)             |
| Tank material          | Stainless steel      |
| Dimensions (L x W x H) | 850 x 650 x 1 350 mm |
| Weight                 | 65 kg                |

### Hose and nozzle set oil resistant Ø60mm



### Nozzle set 7013423

### 3m oil resistant suction hose

Art no. 7013435

### Floor nozzle

Art no. 7013436

### Rubber lip insert for floor nozzle

Art no. 7013437

### Rubber surface nozzle

Art no. 7013438

### Adapter cable 230V Schuko - CEE coupling 16A, 1.5m

Art no. 7013800

### Adapter cable 400V CEE plug - CEE coupling 16A, 1.5m

Art no. 7013805



## HIGH-PRECISION MANUALLY PIVOTING HPPA ARM WITH PROBE

FOR TOOL MEASUREMENT, FEATURING A 3-AXIS RP3 TOOL PROBE

### Why measure on the machine?

Your lathe represents a considerable investment. Fast machining of complicated workpieces is just one of the many benefits. However, this investment can only be profitable if your machines produce as many workpieces as possible.

But why do some machines stand still for hours? Quite simple: Tools are often set manually and workpieces are checked for dimensional accuracy outside the machine. In both cases an expensive piece of equipment is idle, and this inevitably leads to long, unprofitable and avoidable standstill periods.

### Reduce downtimes, avoid scrap

Manual tool measurement, position detection of workpieces and dimensional checks take a lot of time. In addition, these work steps offer no repetition accuracy and susceptible to operating errors. The use of measuring probes eliminates the need for set-up workpieces and expensive clamping fixtures. The measuring software automatically determines the diameter and length of the tools, detects the position of the workpiece and identifies allowances and dimensions of workpiece blanks. The use of measuring probe systems avoids unprofitable standstill periods and scrap.



**Renishaw measuring arm with probe  
for L44- Ø 150 mm lathe chuck**

Article no.  
3582080

- Including installation
- TSI2 Interface
- User Manual

### Arm/housing unit with probe

- The compact arm/housing unit is fully sealed.

### Probe protection housing

- A separate probe protection housing protects the probe when not in use.

### TSI2 Interface

- The interface processes signals between the probe and the machine control and thus supports easy integration. The unit is mounted on a DIN rail and has an "Easy Fit" installation mechanism. Two plugs are provided for easy wiring with the HPPA (3-pin) and machine control (25-pin SUB-D).

### Benefits

- Up to 90 % faster tool measuring.
- Recommended OEM arm configurations for all standard chuck sizes.
- Robust Renishaw design guarantees trouble-free operation even under the toughest ambient conditions in a tool machine.
- IPX8 protected (static)
- LED displays the probe status and the operational readiness of the arm
- Use of a probe with a predetermined breaking section protects the probe if the max. probe overrun is exceeded.

### System specification

|                                                       |                                                                                                      |            |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------|
| Application                                           | Tool measurement on CNC lathes                                                                       |            |
| Touch directions                                      | Measuring probe                                                                                      | ±X, ±Y, +Z |
|                                                       | Machine                                                                                              | ±X, ±Z, +Y |
| Typical position accuracy (measuring speed 36 mm/min) | 5 µm 2σ X/Z                                                                                          |            |
| Protection against environmental influences           | IPX8 (static)                                                                                        |            |
| Temperature range for operation                       | 5° C to 60° C                                                                                        |            |
| Arm pivoting angle                                    | 91°/90° (if the probe protection housing by Renishaw is not use, the max. arm pivoting angle is 91°) |            |

### Carbide milling cutter set

3352118

- › 18-part; 3 each in the sizes 3/4/6/8/10 and 12 mm
- › 4-cutting edge version
- › Coated solid carbide end mill (TiALN)
- › Centre cut for plunging
- › Chip angle 35 °

### PREMIUM MILLING TOOLS FROM YG-1



3 pc. each

### Radius milling cutter set

3352116

- › 9-part; 3 each in the sizes 4 mm / 6 mm / 8 mm
- › 2-cutting edge version
- › Coated solid carbide end mill (TiALN)
- › Face cutting geometry for plunging
- › Chip angle 30 °



3 pc. each

### Countersink set

3201050

- › As per standard DIN 335C
- › 6-part: 6/8/10/11.5/15/19 mm
- › Premium conical counterbores Burrs are nicely chamfered and removed without causing scratches
- › Compatible with popular battery-powered screwdrivers and drills, including upright drilling machines
- › Practical OPTIMUM plastic case





| HSS twist drill with morse taper          | Article no. |
|-------------------------------------------|-------------|
| › 9-part; 14.5/16/18/20/22/24/26/28/30 mm |             |
| › Long service life                       |             |
| › Good chip removal                       |             |
| › Right handed                            |             |
| <b>MT 2</b>                               | 3051002     |
| <b>MK 3</b>                               | 3051003     |



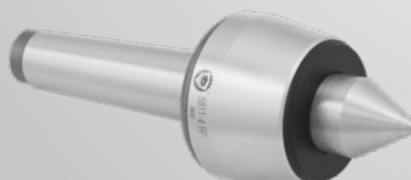
| Twist drill set                                                                                          | Article no. |
|----------------------------------------------------------------------------------------------------------|-------------|
| › As per DIN 338 HSS-CO 5 %                                                                              |             |
| › Tetrahedral 135° split point allows for excellent self-centring                                        |             |
| › High speed/feed properties                                                                             |             |
| › Strong core design optimises the structural strength of the bit and minimises the risk of bit breakage |             |
| › Practical OPTIMUM plastic case                                                                         |             |
| <b>25-part</b>                                                                                           | 3201010     |
| › 1- 13 mm                                                                                               |             |
| <b>41-part</b>                                                                                           | 3201021     |
| › 6 - 10 mm (in 0.1 mm increments)                                                                       |             |



| OPTIMUM Precision quick-action drill chuck | Article no. |
|--------------------------------------------|-------------|
| Concentricity better than 0.06 mm          |             |
| <b>1 - 8 mm; B16</b>                       | 3050608     |
| <b>1 - 10 mm; B16</b>                      | 3050610     |



| Travelling centre point                            | Article no. |
|----------------------------------------------------|-------------|
| Maximum concentricity deviation 0.005 mm           |             |
| <b>MT 2</b>                                        | 3451002     |
| › max. 7000 rpm; 2000 N max. radial load           |             |
| › NSK ball roller bearings and INA needle bearings |             |
| <b>MT 3</b>                                        | 3451003     |
| › max. 5000 rpm; 4000 N max. radial load           |             |
| › NSK ball roller bearings and INA needle bearings |             |
| <b>MT 4</b>                                        | 3451004     |
| › max. 3800 rpm; 8000 N max. radial load           |             |
| › NSK ball roller bearings and INA needle bearings |             |
| <b>MT 5</b>                                        | 3451005     |
| › max. 3000 rpm; 20000 N max radial load           |             |
| › 2-row SKF angular contact bearings               |             |



| Quick release chuck              | Article no. |
|----------------------------------|-------------|
| <b>DKC13 / 0-13 mm 4 800 rpm</b> | 3050632     |
| <b>DKC16 / 0-16 mm 4 000 rpm</b> | 3050633     |





| Clamping tool assortment SPW                                                                                                             | Article no. |
|------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| › Metric thread                                                                                                                          |             |
| › 58-part: 24 pcs. tightening bolts, 6 pcs. T-nuts, 6 pcs. nuts, 4 pcs. extension nuts, 6 pcs. clamping punches, 12 pcs. clamping blocks |             |
| <b>Size 8</b>                                                                                                                            | 3352015     |
| › T-slot nuts 10 mm; tightening thread M 8                                                                                               |             |
| <b>Size 10</b>                                                                                                                           | 3352016     |
| › T-slot nuts 12 mm; tightening thread M 10                                                                                              |             |
| <b>Size 12</b>                                                                                                                           | 3352017     |
| › T-slot nuts 14 mm; tightening thread M 12                                                                                              |             |
| <b>Size 14</b>                                                                                                                           | 3352018     |
| › T-slot nuts 16 mm; tightening thread M 14                                                                                              |             |
| <b>Size 16</b>                                                                                                                           | 3352019     |
| › T-slot nuts 18 mm; tightening thread M 16                                                                                              |             |



|                                                                                                                                                                                                                                                                                                                                 |                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <b>Clamping block set 16-05</b>                                                                                                                                                                                                                                                                                                 | <b>3440653</b> |
| <ul style="list-style-type: none"> <li>› 1 pc. clamping block SLTBN 16-05</li> <li>› 1 pc. parting off tool SLIH 26-2</li> <li>› 1 pc. parting off tool SLIH 26-3</li> <li>› 5 pcs. cutting plates GTN2 (cutting width 2.2 mm)</li> <li>› 5 pcs. cutting plates GTN3 (cutting width 3.1 mm)</li> <li>› Aluminium box</li> </ul> |                |

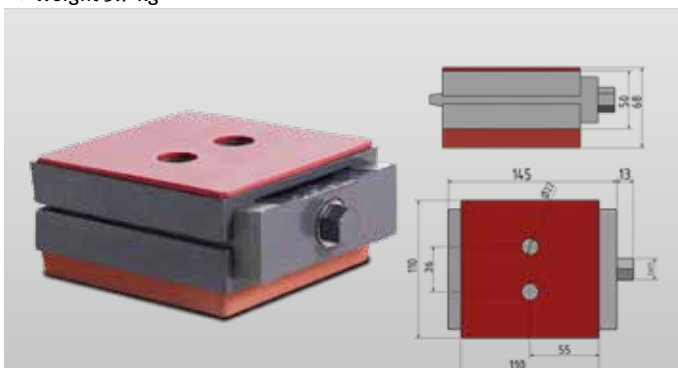
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| <b>Clamping block set 20-05</b>                                                                                                                                                                                                                                                                                                 | <b>3440654</b> |
| <ul style="list-style-type: none"> <li>› 1 pc. clamping block SLTBN 20-05</li> <li>› 1 pc. parting off tool SLIH 26-3</li> <li>› 1 pc. parting off tool SLIH 26-4</li> <li>› 5 pcs. cutting plates GTN3 (cutting width 3.1 mm)</li> <li>› 5 pcs. cutting plates GTN4 (cutting width 4.1 mm)</li> <li>› Aluminium box</li> </ul> |                |

|                                                                                                                                                                                                                                                                                                                                 |                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <b>Clamping block set 25-05</b>                                                                                                                                                                                                                                                                                                 | <b>3440655</b> |
| <ul style="list-style-type: none"> <li>› 1 pc. clamping block SLTBN 25-05</li> <li>› 1 pc. parting off tool SLIH 26-3</li> <li>› 1 pc. parting off tool SLIH 26-4</li> <li>› 5 pcs. cutting plates GTN3 (cutting width 3.1 mm)</li> <li>› 5 pcs. cutting plates GTN4 (cutting width 4.1 mm)</li> <li>› Aluminium box</li> </ul> |                |

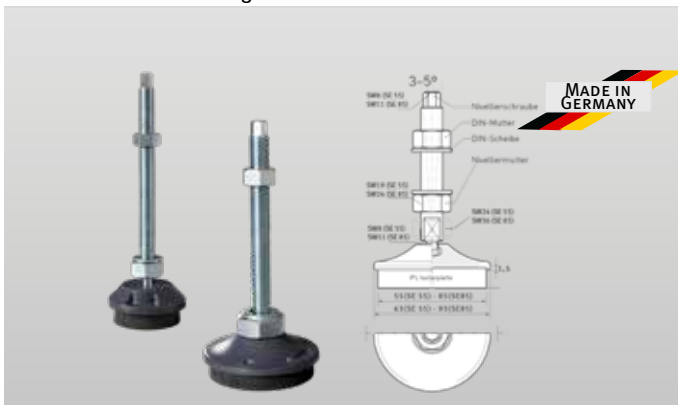


| Replacement cutting insert set (10 pieces) | Article no. |
|--------------------------------------------|-------------|
| for cutting insertsGTN 2                   | 3440663     |
| for cutting insertsGTN 3                   | 3440664     |
| for cutting insertsGTN 4                   | 3440665     |

| Precision machine shoe SEU1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3352985 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| <ul style="list-style-type: none"> <li>› Patented double spindle bearing</li> <li>› With slip-protection plate at top</li> <li>› Maximum load 60 kN</li> <li>› Suitable for M16 threaded rod</li> <li>› Vibration-insulation plate for particularly loads. Good structure-borne noise insulation</li> <li>› Adjustment range +5 / -4 mm</li> <li>› High-precision, jerk-free levelling even of heavy machines</li> <li>› Installation time savings of up to 50 % thanks to precision levelling and freedom of installation.</li> <li>› Improves the dynamic behaviour of machines while reducing noise</li> <li>› Weight 3.7 kg</li> </ul> |         |



| Vibration damper machine foot                                                                                                            | Article no.    |
|------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| › Excellent vibration and structure-borne noise insulation                                                                               |                |
| › Noise reduction                                                                                                                        |                |
| › Eliminates floor unevenness up to 5 <sup>o</sup>                                                                                       |                |
| › Precision levelling by means of a regular threaded screw                                                                               |                |
| › Better distribution of impact-like axial forces due to the geometrically larger contact surface with the screw                         |                |
| › No notching effect - like for example with conical screw tips                                                                          |                |
| › The levelling screw and the levelling disc are captively connected by a very simple system.                                            |                |
| › Problem-free changeover of the machine possible, as the complete levelling disc remains on the machine foot when the machine is lifted |                |
| <b>SE 55</b>                                                                                                                             | <b>3352981</b> |
| › Jackscrew M12 x 1 x 150                                                                                                                |                |
| › Maximum load: 600 kg                                                                                                                   |                |
| <b>SE 85</b>                                                                                                                             | <b>3352982</b> |
| › Levelling screw M16 x 150                                                                                                              |                |
| › Maximum load: 1500 kg                                                                                                                  |                |



| Thread repair assortment                                                                | 3202010 |
|-----------------------------------------------------------------------------------------|---------|
| › 5 pcs. twist drill (5.2 mm/6.3 mm/8.3 mm/10.4 mm/12.4 mm)                             |         |
| › 5 pcs. thread tap (M5 / M6 / M8 / M10 / M12)                                          |         |
| › 5 pcs. inserter for threaded inserts                                                  |         |
| › 5 pcs. tang breaker                                                                   |         |
| › 100 pcs. threaded inserts: 25 pcs. each M5x0.8 mm / M6x1.0 mm/ M8x1.25 mm/ M10x1.5 mm |         |
| › 10 pcs. threaded insert: M12x1.75 mm                                                  |         |
| › For repairing defective threads                                                       |         |
| › For reinforcing the thread on materials with a low shear strength                     |         |
| › Practical OPTIMUM metal case                                                          |         |



| Flax countersink set                                                                                           | 3201051 |
|----------------------------------------------------------------------------------------------------------------|---------|
| › As per standard 373                                                                                          |         |
| › 6-part: for M3 / M4 / M5 / M6 / M8 / M10 mm screws                                                           |         |
| › HSS                                                                                                          |         |
| › Piloted counterbore size 6.5 x 3.2 mm / 8 x 4.3 mm / 10 x 5.3 mm / 11 x 6.4 mm / 15 x 8.54 mm / 18 x 10.5 mm |         |
| › Fine grade for countersinking screws and nuts as per DIN 74                                                  |         |
| › Practical OPTIMUM plastic case                                                                               |         |



| Workpiece support   | Article no. |
|---------------------|-------------|
| Material S 45C      |             |
| WPS-1 height 40 mm  | 3354261     |
| WPS-2 height 70 mm  | 3354262     |
| WPS-3 height 150 mm | 3354263     |
| WPS-4 height 250 mm | 3354264     |

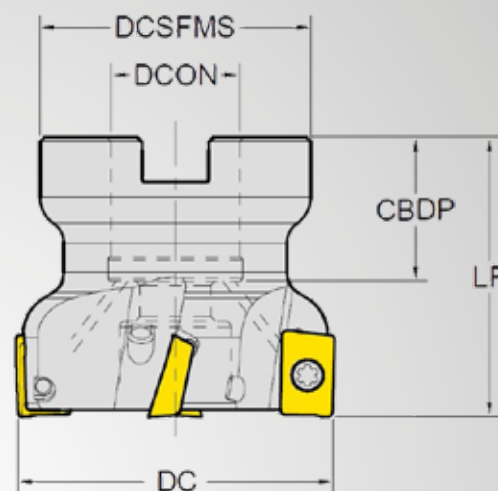


| Shank                                         | 3535170 |
|-----------------------------------------------|---------|
| · cylindrical seat Ø16 mm for B16 drill chuck |         |



| Indexable insert milling cutter (without inserts) | Article no. |
|---------------------------------------------------|-------------|
| 50mm- F90-APKT16-D50Z5S22                         | 3544255     |
| 80mm- F90-APKT16-D80Z7S27                         | 3544256     |

PREMIUM MILLING TOOLS FROM YG-I 



| Article no. | DC | Plates | LF | DCON | CBDP | DCSFMS |
|-------------|----|--------|----|------|------|--------|
| 3544255     | 50 | 5      | 40 | 22   | 20   | 45     |
| 3544256     | 80 | 7      | 50 | 27   | 20   | 50     |

| Indexable insert (10 pcs.) | Article no. |
|----------------------------|-------------|
| AGPT160408-AL (Aluminium)  | 3544260     |
| APKT160408PDTR (Universal) | 3544261     |



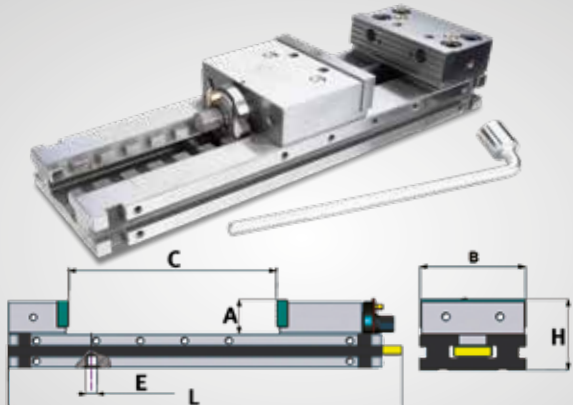
Fig.: AGPT160408-AL



Fig.: APKT160408PDTR

| Modular machine vice | Article no. |
|----------------------|-------------|
| <b>MVSP 150x200</b>  | 3530104     |
| <b>MVSP 150x300</b>  | 3530108     |
| <b>MVSP 150x400</b>  | 3530110     |
| <b>MVSP 175x300</b>  | 3530114     |
| <b>MVMP 150x300</b>  | 3530138     |

- Modular machine vice with high precision and repetition accuracy for series production and single-part machining on CNC milling machines and machining centres
- Modular machine vice made completely of NiCrMo steel with hardness HRC60, tolerance 0.0015 mm
- Mobile jaws with extra long guides to prevent lift-off and slingshot risk
- Guide surfaces tempered and polished
- Large clamping range due to lock bolts with various hole spacings
- Long service life thanks to high quality
- Includes spanner
- Model MVSP with fixed jaws, Model MVMP with pull-down jaws



| Tech. data   |    | A  | C   | E  | L   | B   | H   | kg   |
|--------------|----|----|-----|----|-----|-----|-----|------|
| MVSP 150x200 | mm | 50 | 205 | 16 | 480 | 149 | 100 | 34   |
| MVSP 150x300 | mm | 50 | 305 | 16 | 580 | 149 | 100 | 38.6 |
| MVSP 150x400 | mm | 50 | 405 | 16 | 680 | 149 | 100 | 45   |
| MVSP 175x300 | mm | 50 | 505 | 16 | 780 | 149 | 100 | 51.5 |
| MVMP 150x200 | mm | 60 | 305 | 16 | 636 | 174 | 118 | 58.5 |

| Clamping jaw set                | Article no. |
|---------------------------------|-------------|
| <b>150 mm - smooth for MVSP</b> | 3530216     |
| <b>175 mm - smooth for MVSP</b> | 3530217     |
| <b>150 mm - smooth for MVMP</b> | 3530256     |



| Clamping jaw set                 | Article no. |
|----------------------------------|-------------|
| <b>150 mm - knurled for MVSP</b> | 3530231     |
| <b>175 mm - knurled for MVSP</b> | 3530232     |
| <b>175 mm - knurled for MVMP</b> | 3530271     |



| Side clamping blocks          | Article no. |
|-------------------------------|-------------|
| <b>150 mm - soft (2 pcs.)</b> | 3530406     |
| <b>175 mm - soft (2 pcs.)</b> | 3530407     |



| Cylindrical T-slot nuts | Article no. |
|-------------------------|-------------|
| <b>Ø 12 mm (2 pcs.)</b> | 3530390     |
| <b>Ø 14 mm (2 pcs.)</b> | 3530391     |
| <b>Ø 16 mm (2 pcs.)</b> | 3530392     |
| <b>Ø 18 mm (2 pcs.)</b> | 3530393     |



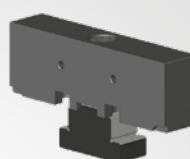
| T-slot nuts             | Article no. |
|-------------------------|-------------|
| <b>Ø 12 mm (2 pcs.)</b> | 3530380     |
| <b>Ø 14 mm (2 pcs.)</b> | 3530381     |
| <b>Ø 16 mm (2 pcs.)</b> | 3530382     |
| <b>Ø 18 mm (2 pcs.)</b> | 3530383     |



| A | mm | 12 | 14 | 16 | 18 |
|---|----|----|----|----|----|
|---|----|----|----|----|----|

| Intermediate jaw       | Article no. |
|------------------------|-------------|
| <b>150 mm - mobile</b> | 3530351     |
| <b>175 mm - mobile</b> | 3530352     |

For parallel workpieces



| Jaw |    | A   | B  | C  |
|-----|----|-----|----|----|
| 150 | mm | 149 | 30 | 50 |
| 175 | mm | 174 | 30 | 60 |

| Clamping jaw set                              | Article no. |
|-----------------------------------------------|-------------|
| <b>150 mm for extending the clamping area</b> | 3530361     |
| <b>175 mm for extending the clamping area</b> | 3530362     |



| Precision modular vices PNM | Article no. |
|-----------------------------|-------------|
| <b>PNM 100</b>              | 3355551     |
| <b>PNM 125</b>              | 3355553     |

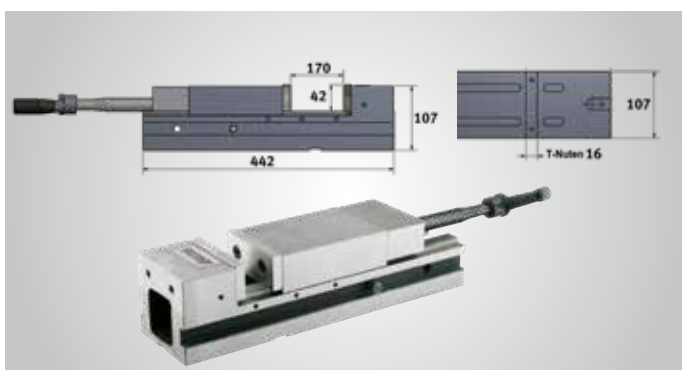
- Pull-down vice for series and single part machining on CNC milling machines and machining centres.
- Turntable
- Fast alignment via longitudinal and transverse grooves
- High precision
- High clamping force
- For horizontal and vertical use
- Low extension height
- Easy to use

| Technical data |    | A   | B   | C   | D   | E  | F  | G   | H  | kg   |
|----------------|----|-----|-----|-----|-----|----|----|-----|----|------|
| PNM 100        | mm | 180 | 100 | 270 | 85  | 20 | 30 | 95  | 35 | 10.3 |
| PNM 125        | mm | 226 | 125 | 345 | 103 | 23 | 40 | 150 | 40 | 18.2 |



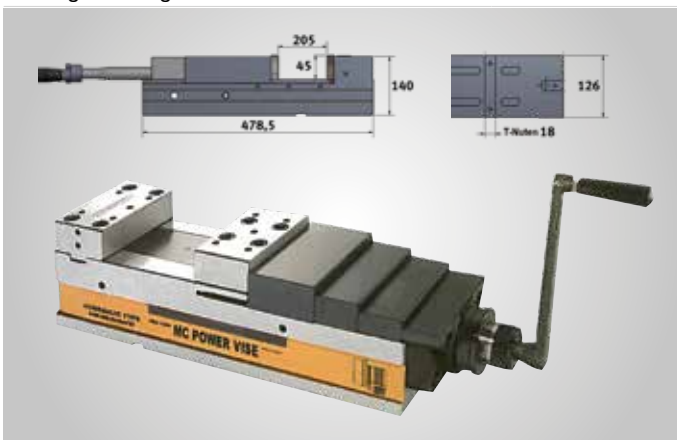
| Hydraulic machine vice HCV 105 | Article no. |
|--------------------------------|-------------|
| <b>HCV 105</b>                 | 3536210     |

- CNC hydraulic vice with high accuracy and repeatability for series and single part machining on CNC milling machines and machining centres.
- Robust design for milling
- Guide surfaces tempered and polished
- Booster system, requires little force, high pressure build-up during clamping
- Large clamping range due to lock bolts with various hole spacings
- Made of premium grade stainless steel
- Long service life thanks to high quality
- High clamping force
- Clamping pressure 24.5 Nm
- Clamping force 2 500 kg
- Weight 22 kg



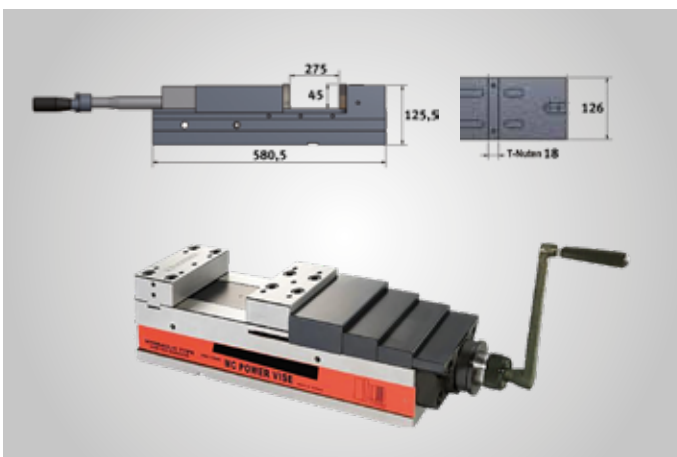
| Hydraulic machine vice HCV 125 | Article no. |
|--------------------------------|-------------|
| <b>HCV 125</b>                 | 3536214     |
| <b>Soft jaws 2 pcs.</b>        | 3536221     |
| <b>L jaws 2 pcs.</b>           | 3536222     |

- CNC hydraulic vice with high accuracy and repeatability for series and single part machining on CNC milling machines and machining centres.
- Robust design for milling
- Guide surfaces tempered and polished
- Booster system, requires little force, high pressure build-up during clamping
- Clamping pressure 40 Nm
- Clamping force 4 000 kg
- Weight 35.4 kg



| Hydraulic machine vice HCV 160 | Article no. |
|--------------------------------|-------------|
| <b>HCV 160</b>                 | 3536215     |
| <b>Soft jaws 2 pcs.</b>        | 3536225     |
| <b>L jaws 2 pcs.</b>           | 3536226     |

- CNC hydraulic vice for series and individual machining of workpieces on CNC milling centres and machining centres.
- Patented anti-lift mechanism
- Spindle is protected against soiling and chips
- Parallelism: 0.01/100 mm/ tolerance between bed and jaws: 0.02/100 mm
- Clamping pressure 60 Nm
- Clamping force 6 000 kg
- Weight 66 kg



## ROTOCLEAR<sup>®</sup> S3

### CLEAR VIEW AS ADHESION BONDING OR SCREW-TYPE VERSION

Clear view of all your production processes, proven at all times and under the toughest conditions wherever soiled panels prevent permanent monitoring of the work sequence. Suitable for all types of CNC milling machines and lathes, as well as machining centres and test beds.

#### Installation

The system is either integrated into the viewing glass by means of a screw-type flange or simply adhesion bonded without perforation. Untrained staff can do this without error thanks to a specially developed, process-assured adhesion bonding procedure assisted by a transparent step-by-step short guide. Installation can occur either during initial OEM installation or retroactively without any worries. We recommend the use of the screw-type version on milling machines (polycarbonate panels) and the adhesion bonded version on lathes (laminated safety glass panels).

#### The principle

A rotating panel spins off any water-miscible and non-water-miscible cooling lubricants and chips towards the outside. This gives the machine operator a permanently clear view of the machining workspace – operator safety is thus always ensured in line with currently applicable safety regulations..

#### The product

- The lowest installation depth worldwide - just 34 mm
- Maximises the clear view thanks to a larger view panel with a revolutionary drive concept
- Unobtrusive design
- Wear panel can be replaced with just one screw in less than 1 min without removing the entire device
- Easy assembly of the system thanks to screw-type or adhesion bonded version
- Improves functional safety thanks to integrate barrier air supply
- Low power consumption
- High torque for deployment under the toughest conditions



#### Rotoclear S3K

354700121

- Adhesion bonded version
- Rotoclear<sup>®</sup> S3 - Basic 460
- Adhesive flange with cover plate
- 2-component adhesive for adhesive flange 50 ml
- Dosing gun for 2-component adhesive
- Perforated positioning template
- Hose 1.6 m
- Compressed air hose 8.5 m
- Cable 2 x 0.75 mm<sup>2</sup> shielded 10 m
- Adapter electro-pneumatic for hose
- Threaded fitting for hose
- 2 x Threaded fitting for protective tube
- Screw-in bracket 90°
- Primer for PC pane 25 ml
- Swab for primer
- Adhesion bonding guide
- Without installation

#### Assembly Rotoclear S3S / S3K

354700129

- Assembly kit including installation



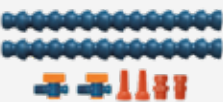
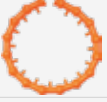
# COOLANT ACCESSORIES

|                                            |                  |
|--------------------------------------------|------------------|
| <b>Motorex coolant for spindle cooling</b> | <b>354590005</b> |
| › 5 litre cannister                        |                  |

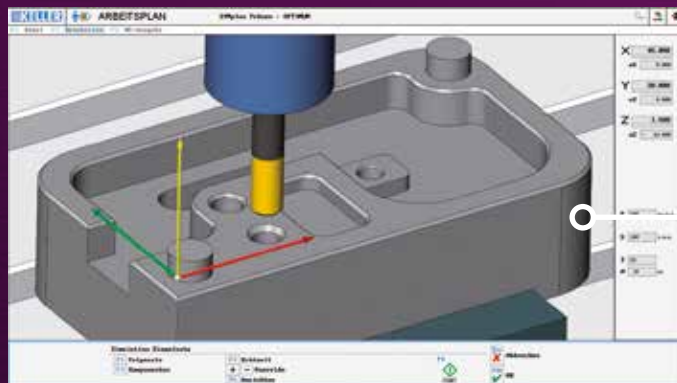
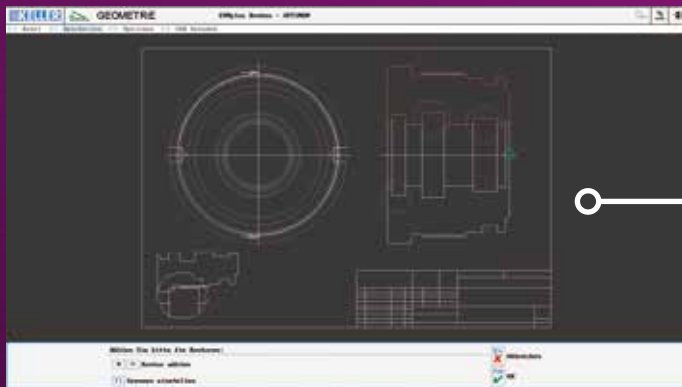
|                        |                  |
|------------------------|------------------|
| <b>Distilled water</b> | <b>354590020</b> |
| › 25 litre cannister   |                  |

|                                   |                  |
|-----------------------------------|------------------|
| <b>Motorex CS Cleaner</b>         | <b>354590010</b> |
| › 1 litres                        |                  |
| › System cleaner for CNC machines |                  |

|                                                                                     | Designation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Size | Article no. |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|
|    | <b>Coolant hoses basic equipment 1/4" - no. 1</b> <ul style="list-style-type: none"> <li>› 8 pcs. articulated hose 150 mm</li> <li>› 2 pcs. each round nozzle 1/16" / 1/8" / 1/4"</li> <li>› 2 pieces NPT connection 1/4" and 1/8"</li> <li>› 1 piece flat nozzle</li> <li>› 1 piece Y-distributor</li> <li>› 2 pieces stopcocks inside and outside</li> <li>› 2 pieces shut-off valve inside - 1/4"</li> <li>› 2 pieces NPT extension</li> <li>› 1 pc. magnetic base</li> <li>› 1 piece Flex sealing tape</li> </ul> | 1/4" | 3356704     |
|  | <b>Coolant hoses basic equipment 1/4" - no. 2</b> <ul style="list-style-type: none"> <li>› 6 pieces articulated hose 150 mm</li> <li>› 2 pieces each round nozzle 1/16" / 1/8" / 1/4"</li> <li>› 2 pieces each NPT connection 1/4" and 1/8"</li> <li>› 5 pieces flat nozzle</li> <li>› 4 pieces 90° nozzle</li> <li>› 1 piece Y-distributor</li> <li>› 1 piece stopcock inside and outside</li> <li>› 1 piece stopcock inside - 1/4"</li> <li>› 1 piece clamping tong</li> </ul>                                      | 1/4" | 3356705     |
|  | <b>Coolant hoses basic equipment 1/2" - no. 1</b> <ul style="list-style-type: none"> <li>› 6 pieces articulated hose 150 mm</li> <li>› 2 pieces each round nozzle 1/2" / 3/8" / 1/4"</li> <li>› 2 pieces each NPT connection 1/4" and 1/2"</li> <li>› 1 piece flat nozzle</li> <li>› 3 pieces 90° round nozzle 1/2" / 3/8" / 1/4"</li> <li>› 1 piece Y-distributor</li> <li>› 1 piece stopcock inside and outside</li> <li>› 1 piece shut-off valve, inside - 1/2"</li> <li>› 1 piece clamping tong</li> </ul>        | 1/2" | 3356800     |

|                                                                                     | Designation                                                                                                                                                | Size | Article no. |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|
|    | Coolant hose set<br>2 pcs. articulated hose; 300 mm<br>2 pcs. round nozzles, 1 pc. shut-off valve<br>1 pc. magnetic base                                   | 1/4" | 3356700     |
|                                                                                     |                                                                                                                                                            | 1/2" | 3356801     |
|    | Coolant hoses<br>4 pcs. articulated hose; 150 mm                                                                                                           | 1/4" | 3356701     |
|    | Coolant hose set<br>2 pcs. articulated hose; 150 mm<br>2 pcs. NPT connection 1/4" and 1/8"<br>3 pcs. round nozzle 1/16" / 1/8" / 1/4"<br>1 pc. flat nozzle | 1/4" | 3356702     |
|    | Coolant hose set<br>2 pcs. articulated hose; 150 mm<br>2 pcs. NPT connection 1/4" and 1/8"<br>3 pcs. round nozzle 1/16" / 1/8" / 1/4"                      | 1/2" | 3356802     |
|    | Coolant hose set<br>2 pcs. articulated hose; 150 mm<br>2 pcs. NPT connection 1/4" and 1/8"<br>2 pcs. round nozzle 1/8" / 1/4",<br>2 pcs. shut-off valve    | 1/4" | 3356703     |
|   | Grips                                                                                                                                                      | 1/4" | 3356710     |
|                                                                                     |                                                                                                                                                            | 1/2" | 3356810     |
|  | Articulated hose<br>Hose roll<br>15 metres                                                                                                                 | 1/4" | 3356711     |
|                                                                                     |                                                                                                                                                            | 1/2" | 3356811     |
|  | Circular nozzles                                                                                                                                           | 1/4" | 3356712     |
|                                                                                     |                                                                                                                                                            | 1/2" | 3356812     |
|  | Flat nozzles<br>5-hole<br>5 pcs.                                                                                                                           | 1/4" | 3356713     |
|                                                                                     |                                                                                                                                                            | 1/2" | 3356820     |
|  | Flat nozzles<br>5 pcs.                                                                                                                                     | 1/4" | 3356714     |
|                                                                                     |                                                                                                                                                            | 1/2" | 3356813     |
|  | Flat nozzle<br>75 mm wide<br>2 pcs.                                                                                                                        | 1/4" | 3356715     |
|                                                                                     |                                                                                                                                                            | 1/2" | 3356814     |
|  | Connector<br>Threaded connection RP3/8"<br>5 pcs.                                                                                                          | 1/4" | 3356716     |
|                                                                                     |                                                                                                                                                            | 1/2" | 3356815     |
|  | Connector<br>Threaded connection RP1/2"<br>5 pcs.                                                                                                          | 1/2" | 3356816     |
|  | Y connector<br>5 pcs. 1/4"<br>2 pcs. 1/2"                                                                                                                  | 1/4" | 3356717     |
|                                                                                     |                                                                                                                                                            | 1/2" | 3356817     |
|  | Cap<br>5 pcs.                                                                                                                                              | 1/4" | 3356718     |
|                                                                                     |                                                                                                                                                            | 1/2" | 3356818     |
|  | Shut-off valve for<br>articulated hose<br>2 pcs.                                                                                                           | 1/4" | 3356719     |
|                                                                                     |                                                                                                                                                            | 1/2" | 3356819     |

# 09 - SOFTWARE



SYMPLUS

## SIEMENS MANUAL MACHINE PLUS (MM+)

ENABLES THE TRANSITION FROM CONVENTIONAL MACHINES TO CNC PROGRAMMING. SIMPLE CYCLE CONTROL.

With the Manual Machine + (MM+) package, the SINUMERIK 808D offers you simple operation of the machine tool, in that all operating actions are supported by graphic help images and operation is as easy as with a conventional machine tool.

The functions provided give you a fast, practical machine setup for machining. This specifically includes determining the workpiece position in the machine and maintaining and measuring the tools used.

A comfortable DIN/ISO editor with complete GCode according to DIN66025 and ISO dialect is available for programming. Graphical input for technological machining cycles and contours supports you during programming.

With the SINUMERIK 808D, you have a powerful complete system at your disposal that covers all required applications without subsequent commissioning and training overhead:

- Intuitive user interface for all machine functions
- Flexible completion of individual machining actions without programming
- DIN/ISO programming on the machine
- DIN/ISO programming offline via CAD/CAM system
- Automatic measuring of the tool in setup mode

In Manual Machine operating mode, you can machine workpieces without having to create a part program. You have access to the following functions:

- Axis-parallel travel
- Taper turning
- Radius turning
- Centre drilling
- Thread tapping
- Grooving/Cutting off
- Thread tapping
- Machining of contours

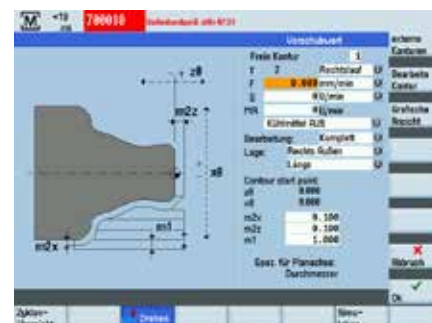
For the definition/parameterization of the function you are supported by comfortable input windows with images as an aid.

The cross slide is controlled via handwheels or axis direction switches/enabling switches or via the axis direction buttons. The spindle is controlled via spindle direction switches or via individual buttons for forward, stop and return.

Note: The machine manufacturer can define in which mode the start-up of the control should take place (MM+ or standard).

### The advantages at a glance

- Save time with simple machining operations, e.g., repairs or reworking of individual pieces, because no parts program is necessary
- Flexible design of work steps
- No programming skills needed



## SINUTRAIN FOR SINUMERIK OPERATE

THE NC PROGRAMMING WORKSTATION THAT IS IDENTICAL TO A CONTROL

SinuTrain, the NC programming workstation that is identical to a control, brings SINUMERIK Operate including a realistic animated machine control panel to the PC. This allows for convenient work preparation in your standard work environment. NC programs can be directly created and verified here thanks to the original SINUMERIK CNC kernel before they are uploaded to the physical machine. Users benefit from improved machine availability and safety. On top of this, SinuTrain is ideal for training users in SINUMERIK operations and programming, as well as for presentations and testing new SINUMERIK functions.



### Features - Technology overview

- Identical NC programming language scope of the SINUMERIK: Standard ISO / DIN & SINUMERIK CNC code, ShopMill / ShopTurn, programSYNC for multi-channel
- Full graphical CNC simulation and plotting
- Tutorials and programming guides
- Software-based machine control panel – easy to control with mouse and keyboard
- Integrated DXF reader for importing DXF files
- Printing function for DIN/ISO and ShopMill/ShopTurn work step programming
- Program transfer via network and USB
- Preconfigured machine examples
- Option: Customisation to match your physical machine

To make it easier for newcomers and trainees to learn the machine's functions, the computer-based training includes programming tasks that have to be worked through in various modules. This means that trainees can familiarise themselves with details such as control, workspace and tool change in the best possible way..



### For effective training

SinuTrain Software makes training more effective while substantially improving cost efficiency. In particular due to its excellent functionality and operational assurance, SinuTrain is appreciated by many training institutes as a top ranking solution for basic and on-going training. More than 25 000 licences are currently in use

### The advantages at a glance

#### • Safe:

Virtually 100 percent offline verification/evaluation of NC programs thanks to the original CNC kernel

#### • Tailor-made:

Use as an optimal programming workplace thanks to adaptation to match the physical machine (e.g., by the machine manufacturer)

#### • Flexible:

Perfectly tailored packages for training and work preparation

#### • Hands-on:

Operations and programming exactly like the genuine SINUMERIK

**SinuTrain for SINUMERIK Operate\***  
SIEMENS Sinutrain Operate

**V 4.9**  
**Article no.**

*\* Please quote the control software version with your order*

| SinuTrain Single                            | 3584108 |
|---------------------------------------------|---------|
| • Single station license                    |         |
| • commercial use                            |         |
| SinuTrain Trainer Package XL                | 3584114 |
| • commercial use                            |         |
| • 18 x single station license               |         |
| SinuTrain Trainer Package XL                | 3584132 |
| • Only for schools (not for commercial use) |         |
| • 18x single station licenses for students  |         |

SINUMERIK 808D on PC Download free of charge at  
<https://xcelerator.siemens.com/global/en/industries/machinebuilding/machine-tools/cnc4you/808d-on-pc.html>



## CNC TECHNOLOGY IN TRAINING

### CNC SIMULATION WITH THE DIGITAL TWIN

#### CAD/CAM/CNC PROCESS CHAIN - STEP BY STEP TO INDUSTRY 4.0

The CAD/CAM/CNC process chain combines component design, CNC programming and simulation as well as manufacturing on a CNC machine tool. In the CAM module, the production sequences are created, planned and simulated. If a machine model is available, the simulation can be used to check the generated NC program for errors or collisions. Through the combination of an integrated CAD/CAM system, the digital twin becomes a fully-fledged CAD/CAM-CNC process chain and offers you a solid basis for the practical implementation of Industry 4.0.

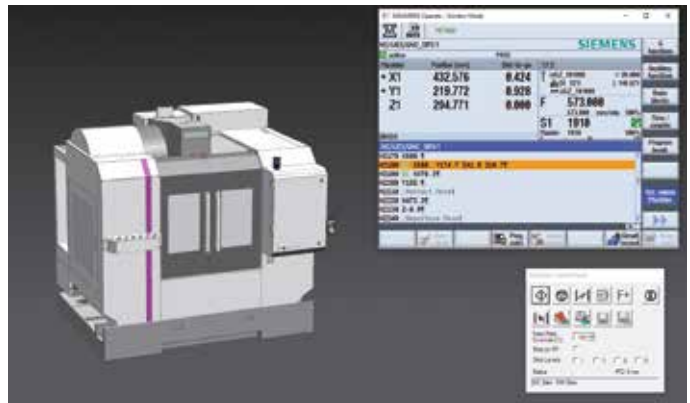


OPTImill F150 HSC without protective housing

#### TRUE-TO-LIFE DIGITAL IMAGE OF THE MACHINE TOOL

The digital twin is the true-to-life digital image of the real machine tool used in the workshop. The digital image contains all geometries of the machine, fixtures, tools and the controls used, including the version and all parameter settings. There are two possibilities for creating a digital twin:

1. The functionality of the machine is simulated or reproduced by software (CSE driver). This can be implemented for any controls and machines
2. The real system software is used (VNCK). With this approach, the Sinumerik Operate user interface is fully available.



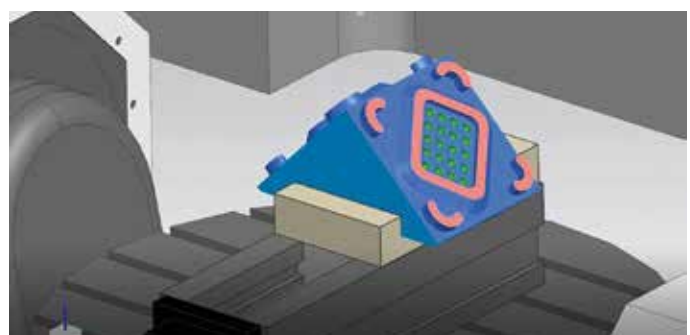
OPTImill F150 HSC with control simulation

#### TRAINING ON VIRTUAL CNC MACHINES

But how do you teach trainees the fascinating technology and the individual process steps that are necessary? - The best way is to let them work with it!

In vocational training, training on virtual machines has proven to be advantageous. The trainee can safely test and optimise his NC programs without causing damage to a real machine.

Moreover, educational institutions often lack the resources to run more than one CNC machine. The decision to teach the machining process turning or milling is no longer necessary when training on the digital twin - almost any type of machine, any control and any kinematics can be simulated.



#### WE WILL BE HAPPY TO ADVISE YOU PERSONALLY AND ADAPT THE DIGITAL TWIN TO YOUR INDIVIDUAL NEEDS.

We create the digital twin on the basis of Siemens NX or SINUMERIK ONE Run MyVirtual Machine .

#### OUR SERVICE INCLUDES THE FOLLOWING POINTS:

- Creation of a machine model (real existing CNC machine is modelled or reproduced in CAD)
- Creation of the simulation or machine kinematics
- Creation of the postprocessor
- Commissioning and instruction

#### ARE YOU INTERESTED?

GET IN TOUCH WITH US!



+49 (0)951 96555-334



BERATUNG@OPTIMUM-MASCHINEN.DE

## DIGITAL TWIN:

### SINUMERIK 828D /SINUMERIK ONE WITH NEW HARDWARE AND DIGITAL TWIN FOR MORE FLEXIBILITY, SUSTAINABILITY AND CYBER SECURITY

The digital twin is a fascinating and very useful concept in modern manufacturing and industry.

#### WHAT IS A DIGITAL TWIN?

- A digital twin is a virtual, digital representation of a physical object, system or process. It is based on data collected in real time from the real machine or system and reflects its condition, behaviour and performance.

#### HOW DOES A DIGITAL TWIN WORK?

- Data acquisition: Sensors on the real machine continuously collect data such as temperature, pressure, vibrations, positions and other relevant parameters.
- Data transmission: This data is transferred to a central platform or cloud in real time.
- Simulation and analysis: The digital twin uses this data to simulate, predict and analyse the current situation.
- Visualisation: The machine is visualised in a virtual environment, often with 3D models that show the current status.

#### THE BENEFITS OF THE DIGITAL TWIN:

The technology of the digital twin offers a whole range of valuable advantages. They offer a wide range of benefits in production, such as

- **Improved training opportunities:**

The digital twin makes it easy for operators and operating personnel to familiarise themselves with a piece of equipment in a virtual environment before they start working with the physical machine. This promotes the development of specialised knowledge, reduces training times and improves employee skills.

- **Optimised production output and quality:**

Manufacturers can use the digital twin to simulate various scenarios in order to optimise their production processes. Analysing real-time data from the physical product enables adjustments to be made to improve production performance.

- **More sustainability:**

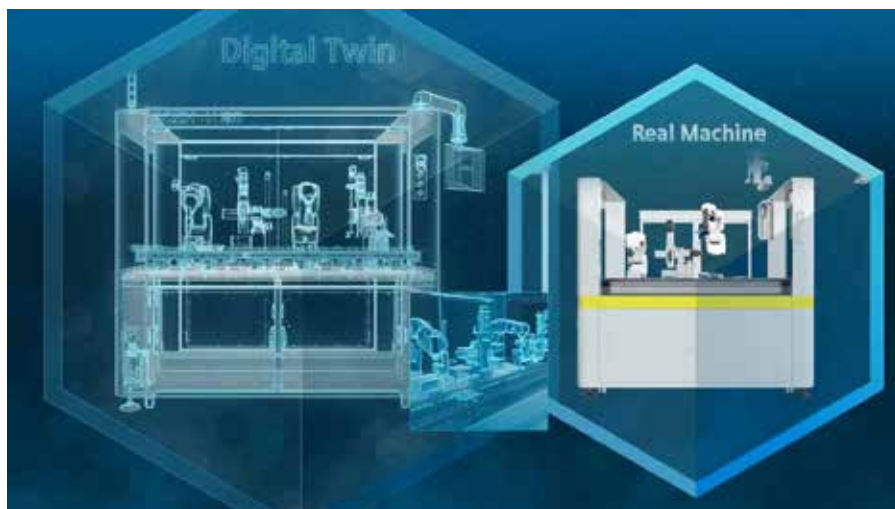
By monitoring energy consumption, resource utilisation and environmental impact, the digital twin can help manufacturing companies achieve their sustainability goals. The digital twin for dismantling can also make a decisive contribution to the sustainable disposal of a product or machine at the end of its service life.

- **Efficient troubleshooting:**

If deviations or malfunctions occur in the physical system, the digital twin can help diagnose the problem. To do this, it analyses data or software using processes that are virtually impossible on a physical machine. This speeds up the fault resolution process, minimises downtime and reduces the need for manual intervention.

- **Predictive maintenance:**

Downtimes in production cause financial losses. The digital twin of a machine or production line can help manufacturers to precisely predict maintenance requirements in order to optimise planned maintenance work.



| Digital twin   | Art. No.  |
|----------------|-----------|
| 2 axes         | 354901032 |
| 3 axes         | 354901033 |
| 4 axes or more | 354901034 |



09 SOFTWARE

## OPTi education FROM THE CLASSROOM VIA THE MACHINE DOOR TO THE REAL MACHINE

Simulation walls offer an innovative and effective solution for training students in machine operation and programming, helping to accurately predict maintenance requirements in order to optimise planned maintenance operations.

### *SIMULTANEOUS TRAINING:*

Several simulation walls can be used to train several students at the same time. This increases the efficiency of teaching and makes it possible to train more learners in less time.

### *FLEXIBILITY IN THE CLASSROOM:*

Simulation walls offer the possibility to simulate different scenarios and applications. It enables students to make mistakes without risk and to learn from them. This promotes a broader understanding of machine operation and the associated processes. Simulation walls promote interactive and hands-on learning methods that increase student engagement and make the learning process more effective

### *DIGITAL TWINS:*

We supply digital twins for all our Sinumerik 828 machines and Sinumerik One machines on customer request. These digital twins can be operated on the machine door and offer students a realistic and interactive learning environment. Of course, digital twins from other companies can also be operated on our machine door.

### *FUTURE SECURITY:*

By using simulation walls and digital twins, the students remain at the cutting edge of technology and are better prepared for the demands of the labour market.

### *INTERACTIVE LEARNING METHODS:*

Simulation walls promote interactive and hands-on learning methods that increase student engagement and make the learning process more effective.

### *CONTROL PANEL OF THE ORIGINAL MACHINES:*

The two screens can be operated by touch.

| OPTi education                                        | Art. No.  |
|-------------------------------------------------------|-----------|
| <b>OPTi education machine door</b>                    | 354901010 |
| <b>Run MyVirtual machine package for machine door</b> |           |
| for commercial use                                    | 3584210   |
| for commercial training                               | 3584211   |
| for educational use                                   | 3584215   |
| <b>Siemens Software maintenance annually</b>          |           |
| for 3584210                                           | 3589220   |
| for 3584211                                           | 3589221   |
| for 3584215                                           | 3589222   |

### *NOTE:*

The Run My Virtual Machine 3D software from Siemens and the corresponding digital twin to be simulated are required for operation.

- › 55-inch touch monitor with high-resolution display technology
- › 24-inch touchscreen with a high-quality, high-resolution display



- › Pen always to hand thanks to magnet



- › MCP 398 from Siemens



- › Drawer for keyboard



- › Powerful computer

- › Dimensions (L x W x H) 1,760 x 800 x 1,900 mm

- › Note: The machine door can be customised for an additional charge.

## SYMPLUS TURNING PLUSCARE™

IS THE IDEAL SOFTWARE SUPPLEMENT TO YOUR OPTIMUM CNC LATHE. WORKSHOP CAPABLE CAD/CAM SYSTEM WITH 802S TRAINING.

SYMplus with plusCARE™ is also available with the identical surface for turning technology (see left page).

Because you can work independently of a specific control, you only need to master one system to be able to flexibly spread the load across multiple machines. Integrated didactical components help you train new staff and prepare apprentices for their exams.

### System requirements for the plus systems:

- Supported operating systems: Microsoft Windows® 7/8/10 (32/64 Bit)
- Screen resolution min. 1024 x 768
- OpenGL-compatible 3D graphics card, e.g. GeForce GT 210 (1024 MB)
- RAM: min. 2 GB
- Approx. 2 GB free disc space per technology for system data

### Selection of licencing models:

- CodeMeter (licence is stored on USB dongle)
- CodeMeterWAN (licensing via internet connection, login with ID and password)

### ■ CAD - Geometry Creation

If you have a drawing in an electronic format, you can transfer the turning contour with just a few clicks or key presses.



You can precisely monitor the dimensional accuracy of the programming with the measuring function from within the 2D simulation (not shown). The cutting edge and tool holder are monitored for collisions. In the 3D simulation you can also monitor adjacent tools.

| CNC software SYMplus turning plusCARE™                                                                                                                                                                                                                        | Article no. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Turning</b>                                                                                                                                                                                                                                                | 3581012     |
| <ul style="list-style-type: none"> <li>• commercial use</li> <li>• Also available as a package for 2, 5, 10 or 20 users</li> <li>• Incl. post-processors for SINUMERIK 802C, 802D, 808D, 810D/840D, 840D sl/828D</li> <li>• Incl. 2 years plusCare</li> </ul> |             |

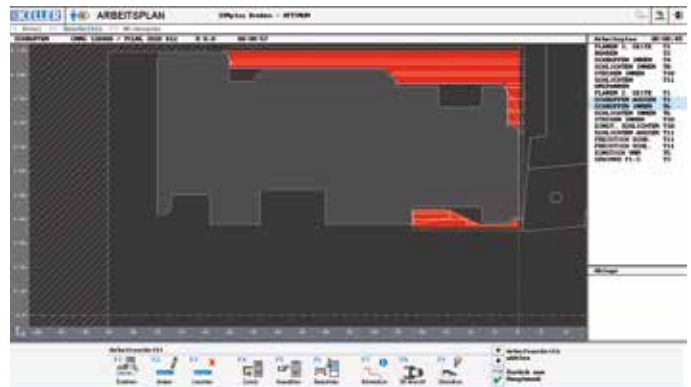
• For information on maintenance contracts see page 333

### plusCARE™

- annual charge includes regular updates, telephone and email support, and remote maintenance by the manufacturer

### ■ CAM - work schedule generation

Like in milling, you define the work steps in a graphical interface and benefit from residual material detection throughout the entire production process (incl. re-clamping).



Finally, you select the post-processor for the machine on which you will be producing, and transfer the program.

Of course, there is also a dialogue-based contour computer for transferring hard copy drawings.

SYMplus plusCARE™ Milling runs under Windows 7, 8 and 10 Further information and additional modules on request.



## SYMPLUS PLUSCARE<sup>™</sup> MILLING

IS THE IDEAL SOFTWARE ADD-IN FOR ALL SIEMENS CONTROLLED OPTIMUM MILLING MACHINES. FOR LOW-COST, FAST AND ECONOMIC WORK.

SymPlus CARE is SYMplus with plusCARE<sup>™</sup> a CAD/CAM system that is particularly easy to learn, with which you can save programming time, avoid crashes, reduce production time and also generate NC programs for different OPTIMUM machines or SIEMENS controls (802S, 808D, 828D, 840D, ...) with a uniform interface.

### System requirements for the plus systems:

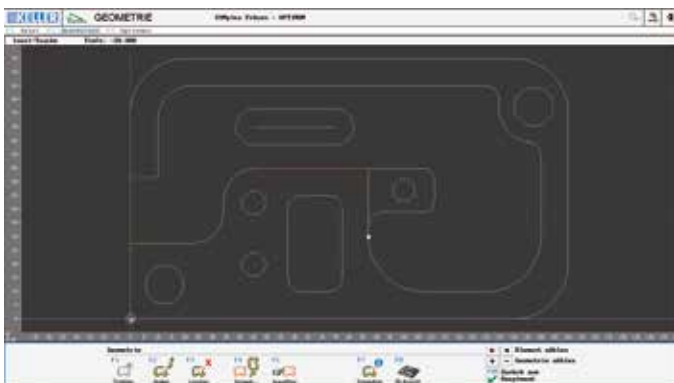
- Supported operating systems: Microsoft Windows® 7/8/10 (32/64 Bit)
- Screen resolution min. 1024 x 768
- OpenGL-compatible 3D graphics card, e.g. GeForce GT 210 (1024 MB)
- RAM: min. 2 GB
- Approx. 2 GB free disc space per technology for system data

### Selection of licencing models:

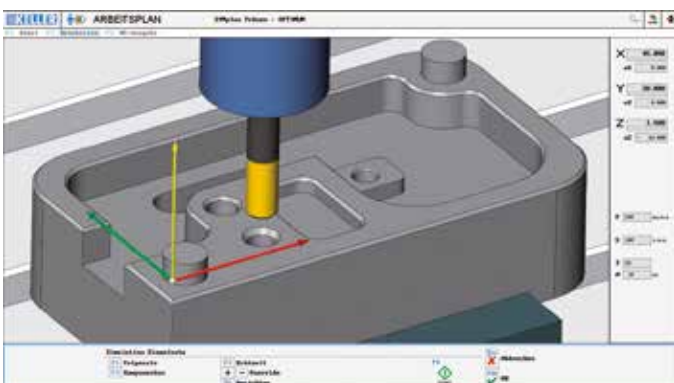
- CodeMeter (licence is stored on USB dongle)
- CodeMeterWAN (licensing via internet connection, login with ID and password)

### ■ CAD - Geometry Creation

Unmatched speed and simplicity allow you to graphically program workpieces with SYMplus with plusCARE<sup>™</sup>, even if the drawing is not NC-dimensioned.



2D simulation shows many details, such as allowances and the cutting path of every single milling run. You can also "capture" control dimensions (not shown). 3D simulation gives you the best possible overview of machining.



| CNC software SYMplus milling plusCARE <sup>™</sup>                                                                                                                                                                                                               | Article no. |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Milling</b>                                                                                                                                                                                                                                                   | 3581010     |
| <ul style="list-style-type: none"> <li>• commercial use</li> <li>• Also available as a package for 2, 5, 10 or 20 users</li> <li>• Includes post-processors for SINUMERIK 802C, 802D, 808D, 810D/840D, 840D sl/828D</li> <li>• Incl. 2 years plusCare</li> </ul> |             |

• For information on maintenance contracts see page 333

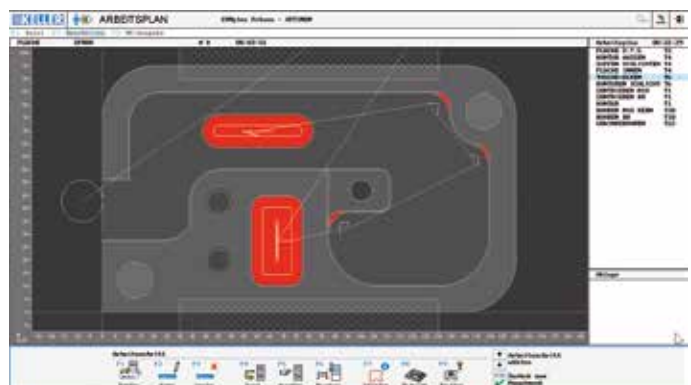
### plusCARE<sup>™</sup>

- annual charge includes regular updates, telephone and email support, and remote maintenance by the manufacturer

### ■ CAM - work schedule generation

Machining is also defined graphically using pictograms. You can conveniently compare production strategies and thus optimise machining. Timing computation helps you with costing.

The residual material detection refers to the entire process; the raw part is continuously tracked.



Alternatively, you can use CAD contours from DXF.

You create the NC program itself with just a few clicks and transfer it to the control, for example using a USB stick.

SYMplus plusCARE<sup>™</sup> Milling runs under Windows 7, 8 and 10 Further information and additional modules on request.





## GROOVE PUSHING

FOR OUR CNC LATHES

S 600M, S 600MY, S 600MSY, S 500M, S 500MY, S 750M UND S 750MY

Special processes such as broaching or grooving are generally used to produce internal and external profiles. Groove pushing can also be carried out economically on CNC lathes without special units.

### PROFILE PROCESSING BY GROOVE PUSHER

Normally, the workpiece rotates on CNC lathes, while stationary tools such as turning tools or drills ensure chip removal. However, for special turned parts with internal or external profiles, for example toothed hubs with keyways or splines, a stationary workpiece and moving tools are required. Conventional methods, such as groove pushing or broaching, are preferred for this purpose.

The disadvantage: You have to change the machine during processing and have higher production costs.

### OVERVIEW: CLASSIC METHODS FOR CREATING GROOVES

In large-scale production, optimised machines are used for each manufacturing process. For profile machining, a distinction is made between the four classic processes of grooving, slotting, broaching and wire EDM.

- The groove is drawn with a drawing knife, the shape and width of which is determined by the groove. The material is removed in several passes and is only suitable for through-holes.
- When grooving, the groove pusher chisel determines the shape and width of the groove. Here too, the material is removed in several passes and the process is also suitable for blind holes.
- The cutting tool used for broaching is a broach with several cutting edges arranged one above the other. The material is removed directly to the final dimension in a single stroke.
- Finally, wire erosion is carried out by means of spark erosion machining. This process is only suitable for electrically conductive materials.

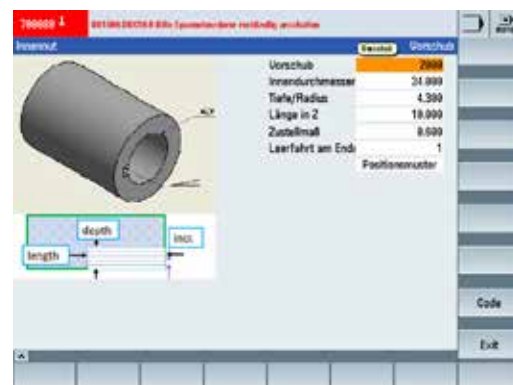
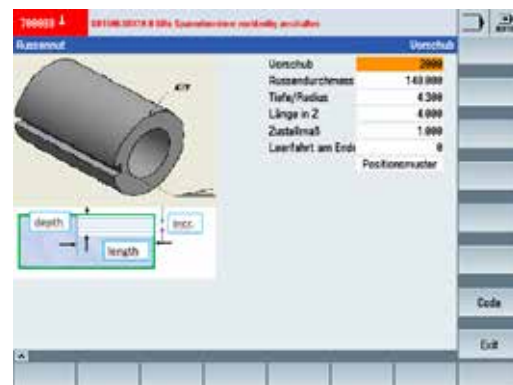
### GROOVE PUSHING ON THE LATHE

A good alternative to the classic methods is to cut the grooves or splines directly on the CNC lathe - especially for small batches. It should be noted that special requirements must be met by the machine during the grooving process. Modern CNC lathes are adapted to these loads through rapid axis movements and constant changes of direction, which are similar to those in thread cutting and the high cutting forces in solid drilling.

The main cutting movement during grooving takes place in the Z direction and is carried out by the firmly clamped tool at the programmed feed rate. The tool lifts off the groove base at the end of the feed movement, the return movement takes place as an idle stroke. The workpiece spindle is clamped in place.

The depth of the groove is set via the infeed of the X-axis, the width of the groove correlates with the width of the groove pusher tool. For groove widths greater than the tool width, the C-axis (main spindle) must be rotated. If the groove base is also to be level, a Y-axis is required for lateral offset.

The machine requires a programmable C-axis to produce several grooves on the inside or outside diameter. The tool used is a push chisel, which is defined in the tool management as a grooving chisel for the face, for example. If grooves are often cut on the lathe, it is advisable to equip the tool turret with special grooving units. The rotary movement generated by the turret drive is converted into a linear movement with a lift-off function.



# ***10- SERVICE & SUPPORT***



## SERVICE PACKAGES

### FOR PREVENTION AND AN ASSURED SUPPLY OF SPARE PARTS

Functional CNC machines with comprehensive equipment features and an attractive price-performance ratio - that's what OPTIMUM Maschinen Germany stands for. Each one of our products impresses with its quality, precision, long service life and value stability. In addition to our own manufacturing facilities, we have now produced throughout the more than 23 years of our existence at manufacturers capable of meeting our high quality requirements.

Before purchasing a CNC machine, it is especially important to also consider the indirect costs in addition to the cost of purchasing. This means, for example, maintenance, repairs, or taking CNC machine downtime into consideration. To ensure the profitability of your OPTIMUM CNC machine, we offer you maintenance options to help prevent time-consuming repairs, check-ups and comprehensive service packages.

In the case of a repair, you benefit from our reliable spare parts supply: one of the basic premises of our customer orientated service solution is fast availability of spare parts. We match planning, coordination and provision of parts in a targeted way. This improves economy, after all, machines repaired quickly can be quickly re-deployed on your lines.



## FAST & RELIABLE

### WITH DECADES OF EXPERIENCE

Whether it's a planned service appointment or quick help after a sudden machine failure: In the event of service, our intensively trained OPTIMUM technicians are at your disposal with their sound knowledge and many years of experience. They quickly and reliably take care of repairing your CNC machines. With our carefully considered service solution we help to keep your OPTIMUM CNC machine working in a trouble-free way.

Know-how for satisfied customers: Our Engineering department has a well-coordinated team of specialists with excellent engineering qualifications. We view the clear, technical orientation of our staff as the basis for a high level of customer satisfaction. This is what you can expect of us:

- Fast and comprehensive advice
- Expert on site service
- Reliable help with maintenance, servicing and incidents

Our preventive maintenance options, check-ups and service packages ensure trouble-free and economic use of your CNC machines. Our staff handle all of this in an expert way. Big plus: Regular maintenance and servicing by our service department increases the functional reliability and thus extends the service life of the machines!



## MAINTENANCE CONTRACTS

### COMFORT, MEDIUM OR BASIC

The objective of our service is to make maintaining and repairing make your OPTIMUM CNC machine a simple as possible. This is why OPTIMUM offers you a variety of maintenance contracts that you can tune to perfectly match your requirements and wishes.

You can choose between our Comfort, Medium and Basic maintenance contract options. You can be sure: Our technicians are there to help with any problem - whether on the phone, through remote maintenance via Teamviewer or in person.

The following options are available:

| Options *             | Comfort:    | Medium      | basic       |
|-----------------------|-------------|-------------|-------------|
|                       | Article no. | Article no. | Article no. |
| with less than 5 axes | 3589106     | 3589107     | 3589108     |
| 5 axes or more        | 3589120     | 3589121     | 3589122     |

| Response to a problem                                | within<br>1 working day | Within max.<br>2 working days | Within max.<br>3 working days |
|------------------------------------------------------|-------------------------|-------------------------------|-------------------------------|
| Technical troubleshooting by phone                   | ✓                       | ✓                             | ✓                             |
| Preventive maintenance measures                      | Every 6 months          | Annually                      | Annually                      |
| Remote maintenance via teamviewer <sup>(1)</sup>     | ✓                       | ✓                             |                               |
| Spare parts supply for non-wearing parts via express | ✓                       |                               |                               |

- incl. 400 km total (200 km one way)
- each additional kilometre is invoiced at EUR 0.80
- plus travel expenses at EUR 120.00 per hour or part thereof
- Accommodation costs and expenses at cost



(1) On the customer side, the prerequisites for this must be created



## MAINTENANCE WORK

### PREVENTIVE MAINTENANCE FOR BETTER ECONOMY

Just like your car's annual service, preventive maintenance of CNC machines in the form of a service ensures that the individual parts are kept in good shape. Our preventive maintenance options include planning and handling of maintenance for your OPTIMUM CNC machine. At the same time, they include preventive repairs and preventive part replacement. We want your CNC machine to work perfectly and to ensure its long service life. In work package or around eight hours, our engineers, for example, inspect the coolant, lubrication and compressed air systems and check the electrical and mechanical systems. The biggest advantage is that any weak points can be immediately eliminated – before extensive repairs are needed. The cost of preventive maintenance is quickly amortised as your CNC machine's efficiency increases. Take a look at the many measures that our inspections include:

#### Lubrication system:

- Check and/or replace filter units
- Check lines and screw connections for leak tightness
- Performing an function test of the central lubrication system

#### Compressed air system:

- Perform pressure test
- Performing of maintenance unit check
- Check and/or replace filters

#### For CNC lathes

- Replace oil filter on hydraulic unit
- Check hoses and screw connections for leak tightness

#### Electrical system:

- Clean switch cabinet
- Check terminals and connections
- Replace air filter
- Check limit switches and safety equipment

#### DETAILS:

- Work package approx. 8 working hours
- incl. 400 km total (200 km one way)
- each additional kilometre is invoiced at EUR 0.80 plus travel expenses at EUR 120.00 per hour or part thereof
- Accommodation costs and expenses at cost

|                                |         |
|--------------------------------|---------|
| Preventive maintenance options | 3589112 |
| Lathes / Milling machines      |         |

#### Mechanical system:

##### For CNC milling machines

- Geometric measurement of the machine with Renishaw QC20 test report
- Check and adjust levelling of machine
- Check reverse clearance of the X, Y, and Z axes and adjust electronically
- Check spindle positioning
- Check covers and scrapers
- Check concentricity of the spindle taper
- Check spindle taper for damage
- Check counterweight system or compressed air cylinders
- Check axis running noise
- Check spindle running noise
- Completely check/lubricate tool changer system
- Check drive belt on main spindle drive
- Visual check of lines and screw connections

##### For CNC lathes

- Check and adjust levelling of machine with Renishaw QC20 test report
- Check reverse clearance of the X, Y, and Z axes and adjust electronically, or adjust wedge rails
- Check covers and scrapers
- Measure concentricity of main spindle
- Check axis running noise
- Check main spindle running noise
- Completely check/lubricate tool changer system
- Check of main spindle belt drive and replace if needed
- Visual check of lines and screw connections
- Check and adjust turret alignment
- Check and adjust spindle alignment based on a sample part

## LIQUID COOLING MAINTENANCE

|                                        |         |
|----------------------------------------|---------|
| Maintenance of liquid cooling system   | 3589180 |
| Including:                             |         |
| • Motorex coolant concentrate 5 litres |         |
| • Motorex CS Cleaner 1 litre           |         |
| • Distilled water 25 litres            |         |

|                                                   |         |
|---------------------------------------------------|---------|
| Material for maintenance of liquid cooling system | 3589200 |
| if customer does not have material in stock       |         |
| Additional distilled water                        |         |
| • 25 litres                                       |         |



## SERVICE DATA BACKUP

WE OFFER VARIOUS SERVICE PACKAGES FOR MAINTAINING AND REPAIRING YOUR OPTIMUM CNC MACHINE. YOU CAN CHOOSE FROM VARIOUS OFFERS TO SUIT YOUR INDIVIDUAL REQUIREMENTS.

### MACHINE TYPE:

Lathes/Milling machines

Our state-of-the-art data backup fully backs up your machine data. This includes axis compensation values, parameters, NC and PLC data, zero points and CNC programs. This saves a huge amount of time, and thus money, for re-entering the data in case of data loss. Thanks to a data backup, your information can be simply and quickly restored. While restoring the data, our technician also checks the memory buffer battery\* and replaces it if needed.

### FEATURES:

- Backup of all relevant data
- Backup to a storage medium
- Buffer battery\* check and replacement if needed
- CNC program backup option

### Service data backup

3589110

Lathes / Milling machines

### YOUR BENEFITS:

- Prevents data loss as you have a backup of your machine data in case of a malfunction
- Avoids downtime

### DETAILS:

- Duration individual
- incl. 400 km total (200 km one way)
- each additional kilometre is invoiced at EUR 0.80
- plus travel expenses at EUR 120.00 per hour or part thereof
- Accommodation costs and expenses at cost



## SERVICE GEOMETRY CHECK

COMPLETELY CAREFREE!

### MACHINE TYPE:

Lathes/Milling machines

During the Service Geometry Check, our engineers precisely and comprehensively verify your machine's geometry. The measuring results are documented, thus allowing conclusions on any anomalies to be drawn. In case of problems, our staff give you expert advice, showing you where the problems lie and providing an inexpensive solution. The Service Geometry Check is especially useful in the scope of preventive maintenance to discover and compensate for wear at an early stage. This avoids malfunctions and machine failures

### FEATURES:

Geometry check

- Circular shape test with Renishaw QC20 (milling machines)
- Detailed test report of all measuring results
- Analysis and evaluation of the measuring results
- Quotation for eliminating any identified defects

### Geometry check

3589111

Lathes / Milling machines

### YOUR BENEFITS:

- Discovers wear at an early stage
- Machine maintenance can be scheduled in good time
- Boost production quality
- Plan your service costs
- Production assurance

### DETAILS:

- incl. 400 km total (200 km one way)
- each additional kilometre is invoiced at EUR 0.80
- plus travel expenses at EUR 120.00 per hour or part thereof
- Accommodation costs and expenses according to expenditure



\* if installed

## POWER CHECK 2

*IN ORDER TO BE ABLE TO GUARANTEE CONSISTENTLY PRECISE MACHINING RESULTS, MONITORING THE FEED FORCE IS AN ESSENTIAL PART OF QUALITY ASSURANCE IN MACHINE TOOL TECHNOLOGY*

### TOOL PULL-IN FORCE

The tool draw-in force is of essential importance for machining quality, machine availability and process reliability. If the force with which the tool is drawn into the spindle taper falls below a specified threshold value without being noticed, this can have far-reaching and cost-intensive consequences:

### PRODUCTION SCRAP

- Vibrations leave ugly machining marks on the workpiece.

### MACHINE FAILURE

- Malfunctions and repairs as a result of insufficient draw-in force cause unplanned downtimes.

### TOOL WEAR

- Tool life decreases due to increased wear and tool breakage

### SAFETY RISK

- Increasing risk potential for the operating personnel

### SPINDLE DAMAGE

- Micromovements can lead to bearing damage and corrosion of the spindle cone



In the form of Power Check 2 we offer a reliable and highly accurate testing technology for monitoring the tool draw-in force of a clamping system. The intelligent measuring device is used to regularly query status information and thus enables early detection of a loss of clamping force. Power Check 2 is suitable for all tool standards and tool clamping systems.

- Exchangeable adapters for all common taper standards
- Adapter with gripper groove for use in tool magazines
- Automatic mode for self-activation during tool change
- Energy saving mode for long battery life
- Adjusting sleeve for simulation of tool tolerances
- Memory with capacity for 4000 individual measurements

LED display to show the measured data

- USB port for reading the memory and charging the battery
- Software for recording and further processing of the measured values

**LONG-LIFE  
CLAMPING  
TECHNOLOGY  
INSIDE**



On request



Illustration: basic unit



Illustration: adapter

### Power Check 2

#### Basic unit:

Measuring range 2.5 – 20 kN  
Connection thread M16 x 1.5

#### Power Check Adapter:

BT 30 - DIN 69871/69872  
BT 40 - MAS 403-30°  
SK 40 - MAS 403-30°

# 11- ***TRAININGS***



## *YOUR TRAINERS*



**MARTIN TREPESCH**  
TECHNICAL MANAGER

 +49 (0)951 96555-850

 [M.TREPESCH@OPTIMUM-MASCHINEN.DE](mailto:M.TREPESCH@OPTIMUM-MASCHINEN.DE)



**THOMAS LASCHIMKE**  
DEPARTMENT MANAGER CNC

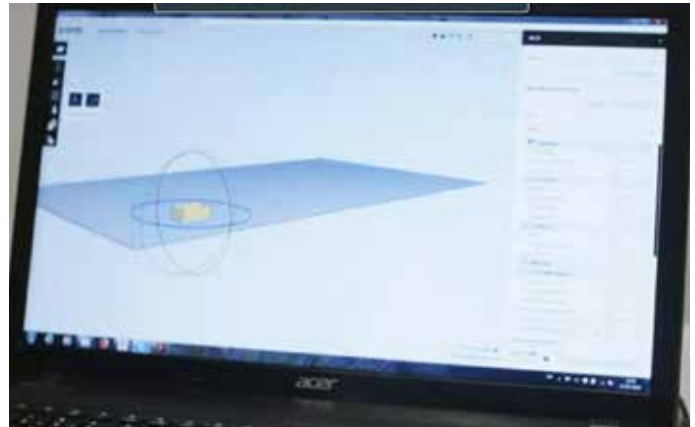
 +49 (0)951 96555-129

 [T.LASCHIMKE@STUERMER-MASCHINEN.DE](mailto:T.LASCHIMKE@STUERMER-MASCHINEN.DE)

## 3-D PRINTING BASIC TRAINING

### 3-DAY SEMINAR

Many companies have already recognised the great potential of 3-D printing and are benefitting from it. As materials and processing methods continue to evolve, industrial 3-D printing continues to qualify for an increasing number of applications.



## INHALT

### OVERVIEW

In this course you will discover the entire process chain of 3-D printing using concrete examples. From component preparation and machine operation to the production of your 3-D objects with final finishing, you will learn how to put your knowledge of industrial 3-D printing into practice.

### CONTENT

- Part preparation
- Getting to know relevant 3-D printing technologies and systems
- Getting to know our 3-D printing system
- Component creation
- 3-D printer operation
- Optimising parts and troubleshooting with the help of CAD tools
- Part reworking

### REQUIREMENT

- Basic knowledge of automation technology

### OBJECTIVES

- Our 3-D printing workshop prepares you optimally for your own practical application by taking you through the process chain of additive manufacturing and creating industry-relevant components.
- After a short theoretical introduction to the equipment used, you will learn how to select the appropriate print head (3x and 5x print head) based on given component data and material properties.
- In the second step, you will create your part and become familiar with the operation of the selected 3-D printing device. At the end of the workshop, the group will analyse the parts for errors and make optimisations using CAD tools to identify design difficulties.

### TARGET GROUP

- Parties interested in a purchase
- Engineers
- Technicians
- Industrial designers
- Professional 3-D printing users

Date

Course number

Subject to agreement

3D GS1

Trainers:

Martin Trepesch, Thomas Laschimke

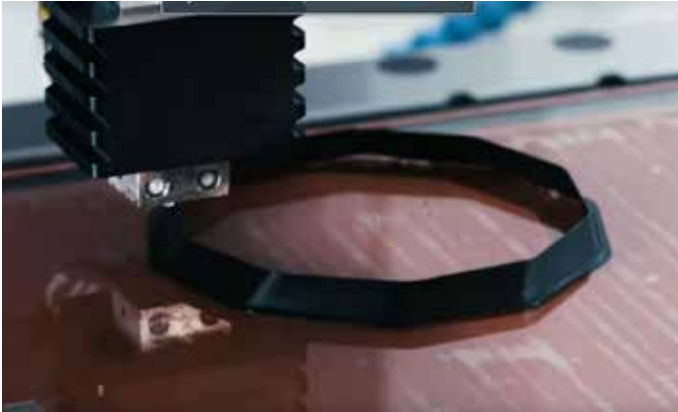


## 3-D PRINTING ADVANCED SEMINAR

### 2-DAY SEMINAR

Here you will acquire the basic knowledge of our CNC programme including 3D printing. In this way, they are later able to provide their clients with basic advice.

We then advise your potential client fully for you after their basic consultation.



## INHALT

### OVERVIEW

Our 3-D printing workshop prepares you optimally for your own practical application by taking you through the process chain of additive manufacturing and creating industry-relevant components.

### CONTENT

- Extended settings in CURA
- 5-axis printing. How the system works
- Avoiding printing errors
- Handling of various materials and accessories
- Time optimisation of components

### REQUIREMENT

- 3-D printing basic training

### OBJECTIVES

- In this course you will learn about common sources of error in 3D printing and we will give you practical tips on how to avoid errors.
- After a short theoretical introduction to the equipment used, you will learn how to select a suitable print head (3x and 5x print head) based on given component data and material properties.
- In the second step, you will create your part and become familiar with the operation of the selected 3-D printing device.
- At the end of the workshop, the group will analyse the parts for errors and make optimisations using CAD tools to identify design difficulties.

### TARGET GROUP

- Engineers
- Technicians
- Industrial designers
- Professional 3-D printing users

Date

Course number

Subject to agreement

3D GS2

Trainers:

Martin Trepesch, Thomas Laschimke



## RETAILER TRAINING

### 2-DAY SEMINAR

In the dealer training, you will acquire sound specialist knowledge in order to be able to advise your customers competently and professionally on OPTIMUM CNC machines. In this way, you create the basis for a firm integration of CNC-controlled machine concepts into your trade and, with the knowledge you have acquired, you can optimise existing structures so that your customers use the technology optimally and successfully.



## INHALT OVERVIEW

### CONTENT

- Recognising the versatile application possibilities of CNC machine tools
- Tools for understanding further production methods
- Knowledge of current developments, design and manufacturing processes with CNC technologies
- Selection, application and sale of the appropriate CNC machine
- Initial experience in the planning, design and manufacture of components using CNC milling and turning machines

### REQUIREMENT

- Basic knowledge of automation technology

### OBJECTIVES

- Getting to know new developments in the field of CNC technology
- Optimal preparation for the customer visit
- Acquire practical and technical product knowledge to be able to advise your customers even more expertly on site.
- Conduct sales talks with the existing sales documents
- Optimal needs assessment for the customer
- Getting to know the potential of CNC machines in production and logistics and selecting the appropriate technology.
- Consulting and concept development in a wide range of production areas.
- Understand differences to competitor products

Extended in-depth training available on customer request

### TARGET GROUP

- Resellers

| Date                 | Course number |
|----------------------|---------------|
| Subject to agreement | 3D GS3        |

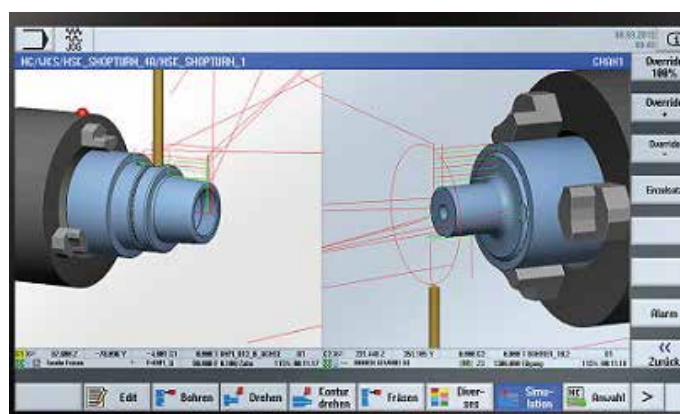
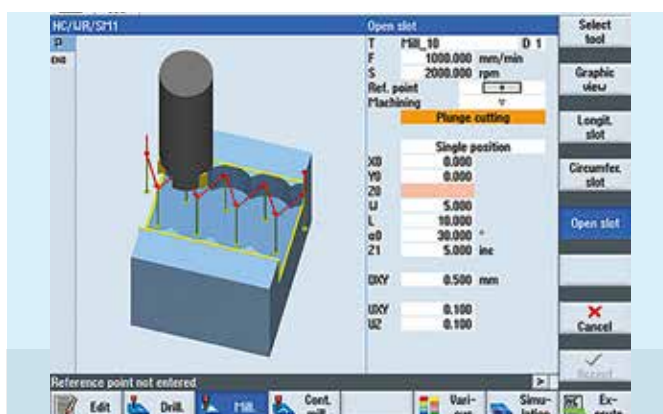
#### Trainers:

Martin Trepesch, Thomas Laschimke

# SINUMERIK OPERATE TRAINING

UP TO MAX 5 DAYS (TURNING OR MILLING)

SINUMERIK CNC controls offer the right solution for every machine concept - from simple CNC standard machines to standardized machine concepts and modular premium machine concepts



## INHALT

### OVERVIEW

This course familiarises you with the operation of SINUMERIK Operate, the machine guidance and the basics of programming part programs.

### CONTENT

- SINUMERIK system overview
- Machine operating and control panel
- Operating modes, operating areas, control elements
- File system, editor
- Cycle description with application examples
- Basics of programming
- Tool correction data and tool management
- Conversion and parametrisation of standard cycles
- Backing up program data
- Practical operating exercises based on existing NC programs on training equipment

### REQUIREMENT

- Basic knowledge of automation technology

### OBJECTIVES

- This course familiarises you with the operation of SINUMERIK Operate, the machine guidance and the basics of programming part programs.
- Practical operating exercises on our training devices using predefined part programs are an important part of the training.
- To make the exercises even more practice-oriented, we use the graphic simulation and the simultaneous recording function of SINUMERIK Operate. This allows knowledge to be conveyed even more clearly and learning success can be improved.
- After completing the course, you will be able to operate the SINUMERIK Operate with the standard user interface and make changes to sub-programs. This helps you gain confidence in handling machine tools while minimising the risk of operator error.

### TARGET GROUP

- Machine operators
- Operators
- CNC programmers

Date

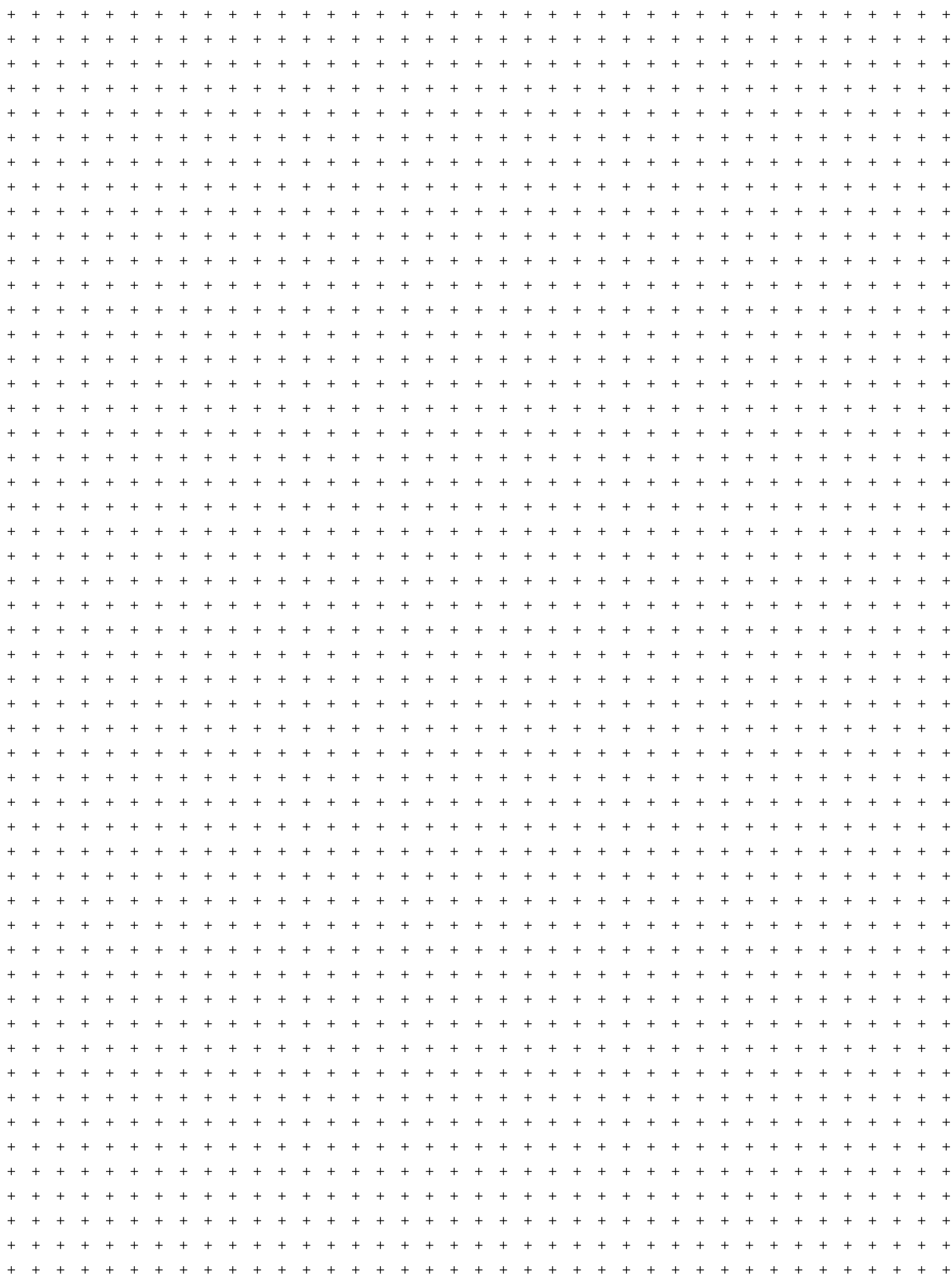
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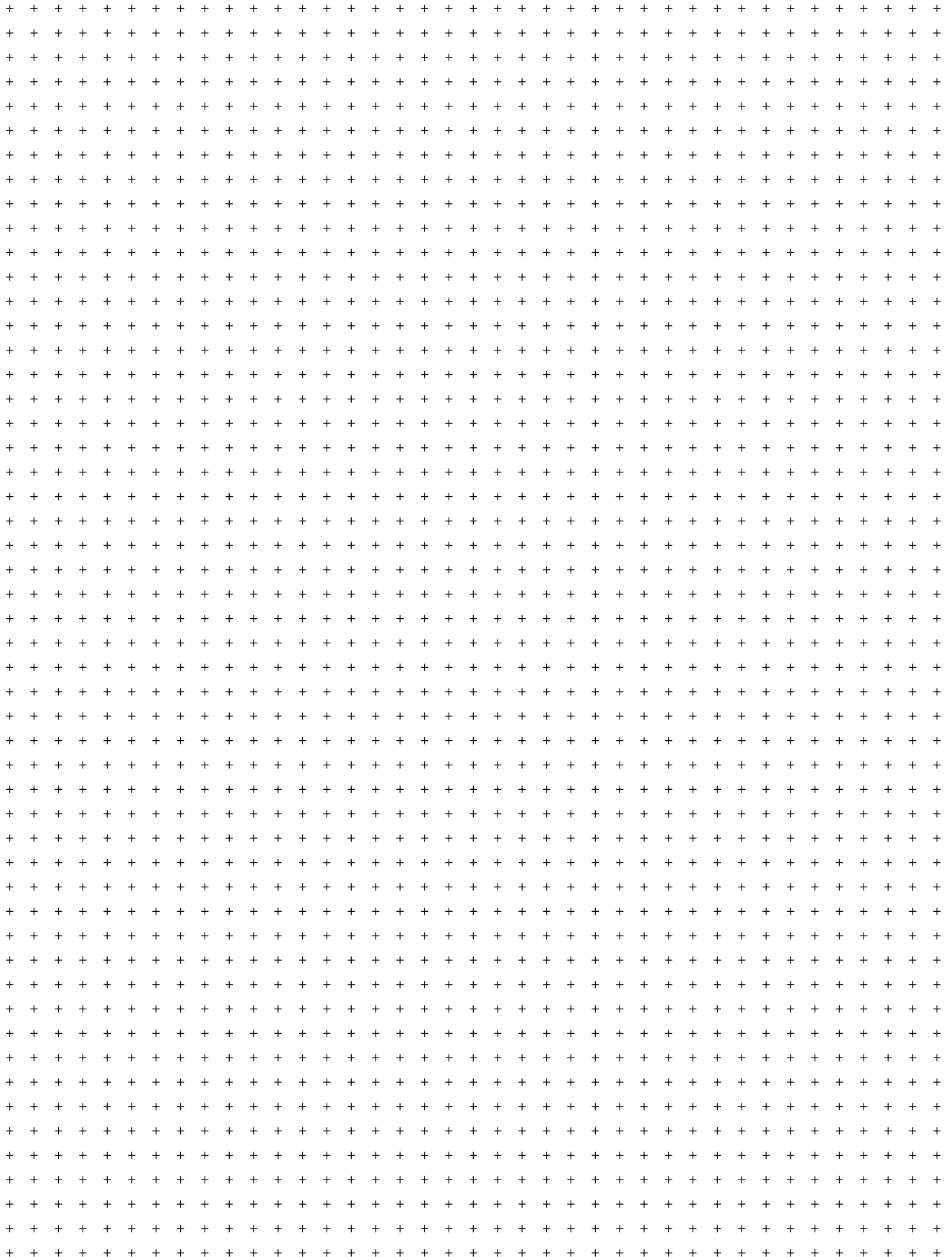
Subject to agreement

CNC GS1

Trainers:

Martin Trepesch, Thomas Laschimke





YOU WILL FIND MORE PRODUCTS IN OUR MAIN CATALOGUES



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Your specialist retailer:



## Sales Germany:

**Stürmer Maschinen GmbH**  
Dr. Robert-Pfleger-Str. 26  
96103 Hallstadt/Germany

**Phone:** +49 (0) 9 51 - 96 555 - 0

**email:** [info@stuermer-maschinen.de](mailto:info@stuermer-maschinen.de)

**Web:** [www.stuermer-maschinen.de](http://www.stuermer-maschinen.de)

## Distribution Austria:

**Aircraft Kompressorenbau GmbH**  
Gewerbestraße Ost 6  
4921 Hohenzell / Austria

**Phone:** +43 (0) 77 52 - 70 929 - 0

**email:** [info@aircraft.at](mailto:info@aircraft.at)

**Web:** [www.aircraft.at](http://www.aircraft.at)

## Export sales:

**OPTIMUM Maschinen Germany GmbH**  
Dr. Robert-Pfleger-Str. 26  
96103 Hallstadt/Germany

**Phone:** +49 (0) 9 51 - 96 555 - 0

**email:** [info@optimum-maschinen.de](mailto:info@optimum-maschinen.de)

**Web:** [www.optimum-maschinen.de](http://www.optimum-maschinen.de)



- This offer is aimed exclusively at entrepreneurs, dealers or traders who are acting in the exercise of their commercial or self-employed activity when concluding this purchase.
- This constitutes an express **CONDITION TO THE CONTRACT**. Excluded from the sale are consumers as defined by § 13 BGB (German Civil Code)
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- No liability is accepted for printing errors, mistakes or incorrect presentation.
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- Delivery shall be made exclusively in accordance with our terms of delivery and payment
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- The entire catalogue is protected by copyright. In addition, we register trade mark, patent and design rights to protect our products, insofar as this is possible in individual cases. We take strong action against any violation of our intellectual property.

## GENERAL NOTES ON OPERATING OUR MACHINES

- Our machines must be supervised at all times during operation. Leaving the machine during operations constitutes gross negligence.
- The details on machine precision are found in the technical data of the catalogue pages. If you do not find any values here, please contact [info@optimum-maschinen.de](mailto:info@optimum-maschinen.de) for more detailed information.
- The stated precisions are achieved under standardised conditions (correct installation of the machine and ambient temperature of 20 °C). The machines are not designed for continuous operation.
- Please note that operators are required to make conversions in the event of installing third-party chucks or flanged chucks to reach the stated, technically possible rotating diameter.