

Computer Numerical Control

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

CNC METAL WORKING MACHINERY

THE OPTIMUM IN TERMS OF QUALITY, PRICE-PERFORMANCE AND SERVICE



MAIN CATALOGUE 2019



Sales and service Germany in Hallstadt/Bamberg

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

Dear interested party,  
Dear Customer,

To support any conceivable metalworking application, we have composed an assortment in our OPTIMUM CNC Catalogue that covers many areas with suitable machines. Each of our products impresses with its quality, precision, long service life and value stability.

### Your requirements are our target

For more than 25 years, we have focused on the design, development and production of OPTIMUM machines, and for more than 10 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 relies on 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 propagate it to you our customers.



**Kilian Stürmer**  
Managing Directors



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 avoid missing any of the new videos.






Our professional OPTIMUM customer service gives every customer the ability to choose the performance they need from our comprehensive program of services at any time.


They can be broken down into the following four modules:

- Inventory and requirements analysis,
- System planning and consulting,
- Installation and commissioning
- Maintenance and repairs


The OPTIMUM service field force, and our service partners, ensure reliable, nationwide, on-site service for our customers.

 **SERVICE HOTLINE**  
(REPAIRS, WARRANTY CLAIMS)

Tel. +49 (0) 951/96 555 - 128 Fax +49 (0) 951/96 555 - 111  
e-Mail: [CNC\\_service@stuermer-maschinen.de](mailto:CNC_service@stuermer-maschinen.de)  
**You can contact us as follows:**  
Monday to Thursday: 7.00 am to 4.30 pm  
Friday: 7.00 am to 1.30 pm

 **APPOINTMENTS DEMO CENTRE**

For faster and less complicated registration, mail your complete data to: [cnc@stuermer-maschinen.de](mailto:cnc@stuermer-maschinen.de)  
Retailer/Customer name  
Reason for visit: demo, training in use, application training, interested in product

 **ON OUR PARTNER PORTAL**

RFQ      Repair status  
Availability      Fast service request  
24h service      Direct spare parts availability query  
Please request your access data here:  
<https://partnerportal.stuermer-maschinen.de>

## 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.

Today, OPTIMUM Maschinen Germany GmbH, German company, collaborates globally with professional partners from its headquarters in Hallstadt near Bamberg:

You will find OPTIMUM subsidiaries with strong dealers. 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!



# Future-proofing training

## THE TRAINING WORKSHOP AT THE TYRE MANUFACTURER MICHELIN IS BREAKING NEW GROUND IN CNC TECHNOLOGY

Rapid technological progress poses great challenges for trainers and many companies and vocational schools are still teaching on outdated machine tools.



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. For economic reasons, however, this was not possible at first.

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.





*»We already know that we will always have access to state-of-the-art technologies, machines, CNCs and tools in the apprentice workshop.«*

Witali Reiswich,  
 Instructor with tyre manufacturer Michelin

### Always state of the art

Cooperation between machine tool manufacturer Optimum and Siemens Financial Services then brought the breakthrough for the investment projects of the Michelin training workshop. With technology Leasing from Siemens Financial Services, Optimum was able to offer the tyre manufacturer an **OPTImill F150 with Sinumerik 828D**. The benefits are obvious, because instead of one-off high capital outlay, Michelin is now paying a fixed and calculable leasing instalments, which are also deductible as on-going costs. The term of the leasing contract is five years; Optimum then takes back the used machine in cooperation with Siemens Financial Services. Michelin receives the latest successor model, i.e., state-of-the-art technology and the leasing cycle starts all over again.

Instructor Witali Reiswich is delighted, especially for his trainees: "We already know that we will always have access to state-of-the-art technologies, machines, CNCs and tools in the apprentice workshop. This is an important benefit for our vocational training program." On top of this, the trainees can now work with Sinutrain on computers in the classroom and create and simulate programs away from the machine. Since the machines have the same user interface, thanks to Sinumerik Operate, and the programs are 100 percent compatible, the programs can also run in the training workshop. This offers the advantage that the training machine can be used for the production of precision knives in case of peak loads.

"The **OPTImill F150** was installed in the training workshop in October 2017. We are currently working on integration into the training

timetable and workshop operations as well as on specific training content. We are supported in this by the documents available on the Siemens Web site and additional certification possibilities via training at Optimum - especially since their site is in the immediate vicinity", says instructor Witali Reiswich.



### Complete solutions for state-of-the-art training

All you need for the training workshop from a single source.

"There is a massive need for modernisation in training worldwide. At the same time, companies are urgently looking for employees who understand digitalised workflows, modern machines and tool chains, and are able to operate them.

The shortage of qualified employees threatens to become a progress inhibitor. In cooperation with Siemens Financial Services, we offer solutions with which training can keep pace with with the technological progress and digitalisation", says Martin Trepesch, Head of the Engineering department at Optimum Maschinen Germany GmbH explaining the mechanical engineering company's commitment.

Information on the F 150 machine is available from page 58

# Demonstration and training centre



You too can benefit from the synergy effects that the large, comprehensive machine program offers, covering all our brands at our demonstration centre.

At our newly opened demonstration centre at our main facility in Hallstadt, near Bamberg, you can experience many of our highlights live on a floor space of some 2 000 m<sup>2</sup>. 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.



Up to 60 persons can be brought along to dealer-specific meetings and training sessions.

**"With brand-name products from the STÜRMER Group, you can always be sure of making the right purchasing decision."**

A price comparison among genuinely equivalent and comparable products offers you the assurance that purchasing a brand-name product by STÜRMER gives you a product that stands comparison in terms of ease of use, features, quality, engineering and price-performance and the right purchasing decision for you.

Expert advice before buying, after-sales service and a reliable supply of spare parts after purchase, protect the STÜRMER customer's investment for many years.



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





## COOPERATION PARTNER FOR CNC TRAINING IN BAVARIA

### ■ A strong team

Siemens has for many years been the system supplier of the control and drive technology for CNC-controlled lathes and milling machines by OPTIMUM Maschinen Germany GmbH. Due to our long-standing and successful collaboration, a cooperation partnership for CNC training in Bavaria was agreed in June 2012.

Target-group specific courses familiarise the participants of the training program with the various Sinumerik controls.

Optimum uses CNC machines with the Sinumerik 808D, 808 D Advanced, 828 D Basic T, 828D or 840 D sl controls for this. And the training offerings also include the "Sinumerik Operate" software with work step programming "ShopMill" and "ShopTurn". The machine operators learn rapid NC programming, work preparation and intuitive software handling. OPTIMUM Maschinen Germany GmbH trainers, who are Siemens-certified, train your employees either directly at their workplaces or at OPTIMUM headquarters in Hallstadt near Bamberg.



## PLANNING

As early as the planning phase our engineering department manages the development of new products, which are manufactured both our facility and facilities operated by our partners. Major benefits: this ensures that market factors and customer requirements are immediately adopted into our workflow, setting the stage for a successful product design.

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**Our Engineering department has a well-coordinated team of specialists with excellent engineering qualifications. Their established expertise allows flexible and creative implementation of all requirements posed for our products and services.**

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## DEVELOPMENT

Development relies exclusively on state-of-the-art 3D CAD software, which we use to create a virtual model of the machine. Besides ensuring optimum functionality of the machines, our development process also targets re-usability of the data generated during the development phase. These data are not only used for devising production documents and manuals, but are also used for computations, for computer-aided manufacturing, and for visualisation and animations.



## PRACTICAL TESTING

Our engineers combine theory and practice. To avoid leaving anything to chance in terms of product satisfaction, all of our machines and tools go through application engineering tests, and we also consistently involve selected customers in this process. This means that each new product is expected to prove itself in the daily grind before it comes a fixed part of our product range. Engineering analysis helps us to discover and eliminate any remaining weak points.





## SUPPLIER MANAGEMENT

Regular work meetings between our engineers and suppliers help to transfer our new developments and enhancements into series production at the manufacturing location in a targeted way. This direct support at our production facilities has been indispensable in manufacturing the quality products that our customers have trusted for more than 25 years.

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**We set great store by the fact our employees have a clear-cut engineering orientation. In addition to the premium quality of our products, and our expert service, this contributes to constantly high levels of customer satisfaction. And our focus on technically affine employees ensures our market success – today and looking forward!**

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## COPYRIGHT

To secure the rewards of our technical development work for both ourselves and our customers, patent and utility model protection is essential for our in-house developments. This helps us permanently keep the technical lead that OPTIMUM products have.

The entire catalogue is protected by copyright. Additionally, to protect our products, we register our rights to our brands, patents and designs where possible in each individual case. We take strong action against any violation of our intellectual property.



## TECHNICAL DOCUMENTATION AND RISK ANALYSES

Our technical authors again achieve a high standardised level that meets or even exceeds all requirements. These huge efforts exclusively serve the purpose of facilitating the process of familiarisation with the machine for our customers, and ensuring permanent and safe operations. Risk mitigation measures are developed to compensate for any safety risks identified in the scope of analysis. Following this, the residual risk is evaluated after implementing the measures.



## QUALITY MANAGEMENT INCOMING GOODS INSPECTION

Our quality managers from Germany are the first contacts for quality compliance on site. They are responsible for dimensional precision of the components, for validating this precision, and the quality of the production process. They collaborate closely with our Engineering department at head office in Germany, thus ensuring an optimal symbiosis.



## QUALITY MANAGEMENT, PRODUCTION AND INCOMING GOODS INSPECTION

In addition to adherence to delivery deadlines and service, the quality of our products is extremely important to us. Continuous checks by our quality managers on-site ensure our quality. Our comprehensive incoming goods inspection is performed in line with generally accepted technical guidelines.



## PRODUCTION

A team of employees directly influences the production process on site through regular training and checks. It is only through this intensive support at the production site that we are in a position to achieve the proverbial OPTIMUM.



## DIN EN ISO 9001

### ■ Excellent quality

OPTIMUM Yangzhou is DIN EN ISO 9001 certified. This means that all company departments and services are subject to strict quality requirements. And this means consistently high quality for you. The objective of high quality is thrilled customers. And it is this attitude that finally helps to achieve this demanding certification. The key to the long-term success of our enterprise is also a relationship of trust with customers and suppliers. This explains why it is just as important to us as the sustainable quality of our products.



## PRE-SALES SERVICE

In Pre-Sales Service, our CNC experts and sales staff elaborate individual machine and service solutions for you. In close collaboration with the customer, our Pre-Sales 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".



## AFTER-SALES-SERVICE

Our After-Sales service offers you both hotline support and support on-site from specially trained staff. Whether planned service or fast help after a sudden machine failure, our intensively trained OPTIMUM service engineers are ready to help you with their 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 for maintenance, repairs and interruptions



## DELIVERY AND TRANSPORT TO INSTALLATION SITE

Punctual delivery by our fleet of vehicles guarantees prompt and safe delivery of your machine. On request, we also offer complete solutions including delivering your machine to the final machine site.



## EQUIPMENT FOR SPECIAL-PURPOSE FACILITIES

### ■ We know what is important

In collaboration with the Dr.-Ing. Paul Christiani GmbH & Co. KG - Technisches Institut für Aus- und Weiterbildung (Technical Institute for Education and Training) - which has played an active role in education for more than 80 years, we plan and implement your entire special-purpose facility.

Whether you are looking to extend an existing special-purpose facility, or set up a new one, OPTIMUM Maschinen and Christiani are your partners for planning and implementing workrooms and laboratories for technical education and training. And naturally also for your production operations.

With our expertise, we will find a solution for your requirements.

### ■ Our services in cooperation with Christiani:

- Analysis of requirements
- Planning and consultancy
- Conceptualisation
- Implementation



[www.christiani-fachraum.de/en/](http://www.christiani-fachraum.de/en/)



## TRAINING

Our training gives your productivity genuine impetus. The success will become visible in your company after a very short period of time. In CNC training we rely on professional programming and the efficient setting up and operation of your OPTIMUM machines with SIEMENS control. Practical teaching of the training content by qualified and didactically certified CNC trainers and personal tuition in small groups guarantee that you will attain the highest levels of learning success with our support.

- Increased productivity thanks to shorter machine integration or reduced programming and set-up times
- Efficient programming and minimisation of operating errors



## CNC MACHINE SERVICE

Qualified CNC technicians offer you both the latest updates for your SIEMENS CNC control, and customer-specific adaptation and optimisation of your CNC machine tools. Supported among others by RENISHAW measuring systems or BLUM, clamping systems by SCHUNK and milling/drilling tools by EMUGE Franken



**OPTi**mill®  
**OPTi**turn®

SIEMENS control

SINUMERIK 808D ADVANCED

## TWO-STAGE DISTRIBUTION SYSTEM – PRODUCTION OF CNC MACHINES FOR TRADES

### ■ Our customers are important to us

To implement these goals in the best possible way, we liaise directly with the customer. This proximity puts 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, are 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 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.





**OPTi**mill<sup>®</sup>  
**OPTi**turn<sup>®</sup>

SIEMENS controls  
**SINUMERIK 828D Basic**  
**SINUMERIK 828D**  
**SINUMERIK 840D sl**

## TWO-STAGE DISTRIBUTION SYSTEM – PRODUCTION OF CNC MACHINES FOR INDUSTRY

### ■ Strictest requirements

We impose the strictest requirements for the production of OPTIMUM Premium CNC machines, which are required to thrive in the harsh environment of three-shift operations. 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.

**OPTIMUM customers are guaranteed requirements-driven stock levels, delivery capability and short-term availability of all required replacement 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.**

# PREMIUM



## CNC milling machines

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# MILLING

# FU 5

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## 5 axis simultaneous machining centre for high-performance complete machining

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### SIEMENS CONTROL 840D SL

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- Heavy duty version
- High productivity
- Double arm grab tool changer with 32 tool slots included in standard scope of delivery (optionally available with 48 or 60 tool slots)
- Heidenhain glass scales – additional measuring system ensures greater precision
- Chip carriage
- Precision linear guides
- High-torque servo drives on all five axes
- Fast rapid motion speed of 36 m/min.
- Telescopic guideway cover
- Precision ground, pre-stressed, high-performance ball screws
- Spindle borne on P5 precision bearings and permanently lubricated
- Coolant unit with chip flushing system and built-in coolant tank
- Cleaning gun
- CTS 20 bar internal tank (we recommend an extractor)
- Chip conveyor, belt type ensures efficient chip discharge
- Automatic centralised lubrication
- Portable, electronic handwheel
- RJ45 plug-in connection, USB connection and 230 V power connection
- Additional USB interface on control panel
- Water circulation cooling unit for rapid motion and ball screw spindle with ready-to-use coolant Prevents electrochemical corrosion and protects galvanised parts, aluminium, and ferrous and non-ferrous metals.
- Heat exchangers
- EMC Electromagnetic compatibility
- Two years' Siemens repair service contract included
- Information on „Extension Siemens repair service contracts (RSV)“ on page 20
- Information on „Maintenance contracts“ from page 175

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### 2 variants available:

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#### FU 5-600 HSC15

- Direct spindles (inline spindles) with direct connection to drive motor through a transmission mechanism.

#### FU 5-600 HSC18/24

- High-frequency (built-in) spindles running at 18 000 rpm spindle speed or Kessler (built-in spindle) at 24 000 rpm spindle speed
- With built-in drive motor that does not need a transmission mechanism and thus with low vibration and running noise levels even at high speeds.
- Includes anti-bacterial fluid in filter
- Includes coolant for the high-frequency spindle



Fig. FU 5 with optional  
SCHUNK vice

# TECHNICAL DATA

Models	FU 5-600 HSC 15	FU 5-600 HSC 18	FU 5-600 HSC 24
Article no.	3511382	3511384	3511386
<b>Machine data</b>			
<b>Spindle</b>	<b>In-line spindle</b>	<b>High frequency spindle</b> (Built-in spindle) by Kessler	<b>High frequency spindle</b> (Built-in spindle) by Kessler
Electrical connection	400 V / 3 Ph ~50 Hz		
Total connected load	70 kVA	77 kVA	
<b>Milling spindle</b>			
Drive motor S1 operation	20 kW	25 kW	
Drive motor torque S1	96 Nm	32 Nm	
Drive motor S6 30% operation	50 kW	35 kW	
Torque drive motor S6 30% operation	240 Nm	39 Nm	
Spindle seat	SK 40 DIN 69871	HSK A-63 DIN 69893	
<b>Milling precision</b>			
Repetition accuracy	± 0.004 mm		
Positioning accuracy	± 0.008 mm		
<b>Tool changer</b>			
Type	Double arm grab		
Number of tool slots	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 tool to tool	1.51 seconds		
<b>Travel</b>			
X axis	600 mm		
Y axis	600 mm		
Z axis	500 mm		
<b>Axis feed drive</b>			
Acceleration X, Y, Z axis	7 m/s <sup>2</sup>		
Rapid motion X, Y, Z axis	36 000 mm/min.		
<b>Speed range</b>			
Speeds*	15 000 rpm	18 000 rpm	24 000 rpm
<b>Pneumatics</b>			
Compressed air	6 bar		
<b>Cooling lubricant system</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/distance/no	14 mm / 7 / 75 mm		
Max. load bearing capacity	600 kg		
<b>Axis C</b>			
Rotating axis	360°		
Hydraulic clamping torque	1 200 Nm (at 50 bar hydraulic operating pressure)		
Maximum rotational speed (worm gear)	max. 90 rpm		
<b>Axis A</b>			
Tilting axis	± 120°		
Hydraulic clamping torque of tilting axis	2 900 Nm (at 50 bar hydraulic operating pressure)		
Max. permissible torque (S1)	393 Nm		
Max. permissible torque (S6)	707 Nm		
Maximum tilting speed (torque motor)	max. 16.6 rpm		
<b>Dimensions</b>			
Length x width x height	3 015 x 4 440 x 3 000 mm		
Overall weight	9 150 kg		

## Extension Siemens repair service contracts (RSV)

The Siemens Repair Service Contract (RSV) helps you protect your machine for a further 12, 24 or 36 months.

(can only be ordered within the two-year SIEMENS warranty)

12 months - Article no. 3589035

24 months - Article no. 3589036

36 months - Article no. 3589037

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

# SINUMERIK 840D sl with OP 019 black Multitouch control panel

## The right solution for any engineering challenge

- 18.5" diagonal industrial display
- Premium operating convenience: capacitive multitouch technology (up to 5 contact points at the same time)
- High resolution of 1 366 x 768 pixels in wide-screen format for convenient operation and monitoring
- Rugged: No wear of mechanical components thanks to multitouch technology
- Scratch-proof glass front
- Modern, intelligent design
- Can be operated while wearing gloves



Siemens  
**SAFETY INTEGRATED**  
Set up work with open doors

## INCLUDING

### ■ Safety functions SINUMERIK Safety Integrated

Avoiding the direct and indirect consequential cost of injuries  
Improved productivity thanks to increased machine availability  
less unplanned downtime and more trouble-free production

- Longer period of use for system
- Improvement in global competitiveness thanks to boosting the export capability of machines

### ■ Residual material detection and machining

- for contour niches and machining
- After roughing, the program automatically detects and removes remaining residual material

### ■ ShopMill work step programming

Control and programming software that supports convenient operation of the machine and easy programming of workpieces.

### ■ MDynamics 5-axis

Perfect usability and fast adaptation to the workpiece, tool and program handling  
Optimal machining thanks to flexible programming and thus shortest possible programming times. This guarantees best-in-class technology know-how in all industries along with maximum ease of use.

### ■ Managing network drives

### ■ 3-D simulation

Complete 3D visualisation shows the entire machining process, including the machine space on the CNC display

### ■ Advanced surface

For you as a user, this intelligent motion guidance means optimal surface quality and maximum machining speed at the same time

### ■ Spline interpolation

Spline interpolation concatenates multiple curves whose transitions are tangential. The individual nodes are interpolated by means of splines; this means that the individual nodes are connected in a smooth, harmonious curve line.

### ■ Transmit and sleeve surface transformation

### ■ Measuring cycles

SINUMERIK measuring cycles support machines in the field of 5-axis machining with reproducible precision

### ■ Logging

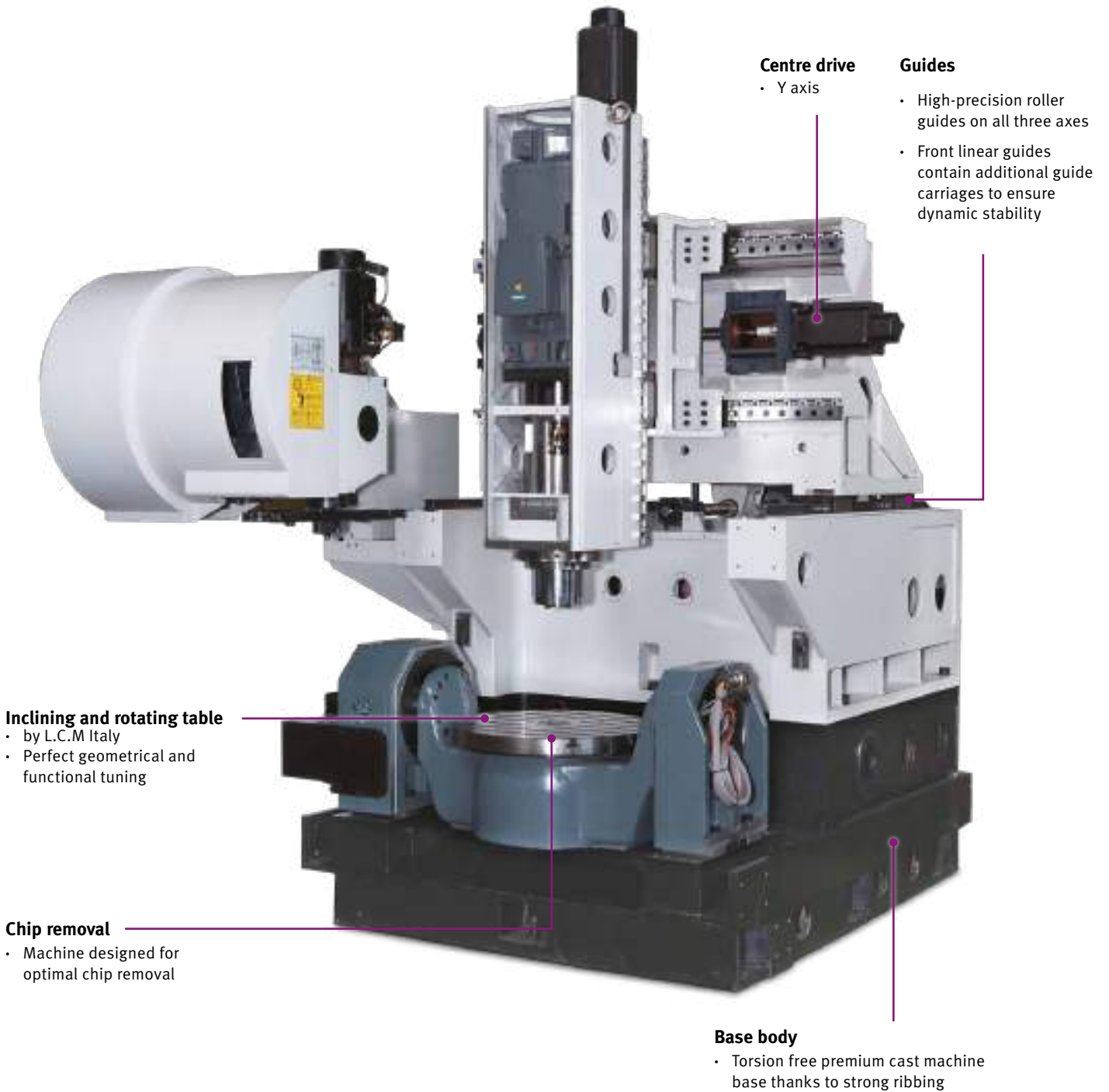
### ■ HMI user memory on CF card

### ■ 3D tool radius correction

Allows the milling radius to be corrected in arbitrary reworking in the machine space and thus the use of regrind tools for reworking and not just on planar surfaces.

### ■ Kinematics measuring cycle CYCLE996

Supports measuring of the axis kinematics on machine tools with multiple round axes without the previous considerable time and cost overheads.





### SPINDLE

Optionally

- Direct spindles (inline spindles) 15 000 rpm
- High-frequency spindles (built-in spindles) 18 000 rpm or 24 000 rpm



### INCLINING AND ROTATING TABLE

- Max. rotational speed 90 rpm
- Max. tilt speed 16.6 rpm
- 3 hydraulic connection and 1 pneumatic connection (without valves)



### TOOL CHANGER

- Double arm grab
- Drum magazine
- 32 tool slots
- Optionally with 48 or 60 tool slots



### LARGE WORK AREA

- Easy loading and unloading of the machine
- Machine designed for optimal chip removal



### OIL SEPARATOR / OIL SKIMMER

- Separation of non emulsified foreign oils by skimming
- Separation of solids by settling in the collection tank



### GUIDES

- High-precision roller guides on all three axes
- Front linear guides contain additional guide carriages to ensure dynamic stability



### CONTROL SYSTEM

- New generation control panel with new machine control options.
- State-of-the-art multitouch interface for even more user-friendly operation, monitoring and programming



### CHIP CONVEYOR

- Conveyor version
- For efficient chip discharge






### WATER CIRCULATION UNIT

- Cooling of rapid motion spindles and ball screw spindles

## OPTIMUM - OPTImill FU 5

### Special equipment

Tool measuring / workpiece measuring			
351138018*		<b>BLUM TC52 measuring system</b>	 <ul style="list-style-type: none"> <li>• Universal measuring probe for shortest measuring times</li> <li>• Switching signal is generated by interrupting a miniature light barrier</li> <li>• Switching point repetition accuracy from 0.3 µm<sup>2</sup> at 2000 mm/min measuring speed</li> <li>• Wear-free and durably stable</li> <li>• Very compact probe with 40 mm diameter</li> <li>• Ex works</li> </ul>
351138019*		<b>Renishaw OMP 60</b>	 <ul style="list-style-type: none"> <li>• Compact, touch-actuated 3D probe.</li> <li>• Reliably modulated, optical signal transmission.</li> <li>• Excellent measuring performance reduces scrap and boost profitability</li> <li>• 360° transmission range</li> <li>• Ex works</li> </ul>
351138006*		<b>Blum Laser Control NT 5A</b>	 <ul style="list-style-type: none"> <li>• Proven, high-precision laser measuring system</li> <li>• Carrier systems offer best possible precision</li> <li>• Laser diodes and lenses of the highest quality</li> <li>• Ex works</li> </ul>

Miscellaneous																			
3536109	1	<b>Starter set SK 40 / DIN 69871</b>	• Information on the starter set „SK 40 / DIN 69871“ on page 145																
3536110	2	<b>Starter set HSK A-63</b>	• Information on the starter set „HSK A-63“ on page 146																
351138003*	3	<b>Coolant through spindle (CTS)</b>	<table border="1"> <thead> <tr> <th>Power unit</th> <th>Tank capacity</th> <th>Pressure</th> <th>Outlet filter</th> <th>Pre filter pump</th> <th rowspan="3">We recommend an extraction unit</th> </tr> </thead> <tbody> <tr> <td>extern</td> <td>165 litres</td> <td>20 bar</td> <td>25 µm</td> <td>40 µm</td> </tr> <tr> <td>extern</td> <td>165 litres</td> <td>70 bar</td> <td>25 µm</td> <td>40 µm</td> </tr> </tbody> </table>	Power unit	Tank capacity	Pressure	Outlet filter	Pre filter pump	We recommend an extraction unit	extern	165 litres	20 bar	25 µm	40 µm	extern	165 litres	70 bar	25 µm	40 µm
Power unit			Tank capacity	Pressure	Outlet filter	Pre filter pump	We recommend an extraction unit												
extern			165 litres	20 bar	25 µm	40 µm													
extern	165 litres	70 bar	25 µm	40 µm															
351138004*			• Grundfos with oil separator, paper filter and cooling unit																
351138005*																			
351138002	4	<b>Air conditioner</b>	• Instead of standard equipment › heat exchanger																
351138016*	5	<b>Automatic roof for machine work space</b>	<ul style="list-style-type: none"> <li>• Pneumatic opening/closing</li> <li>• Top machine space cover</li> <li>• For oil mist extraction</li> </ul>																
351138017*		<b>Solenoid valve set for router table</b>	• For controlling three hydraulic connections and one pneumatic connection for workpiece clamping																

Tool changer			
351138009*		<b>Double arm grab tool changer 48 tool slots</b>	• Instead of standard equipment › double arm grab tool changer with 32 tool slots
351138010*		<b>Double arm grab tool changer 60 tool slots</b>	• Instead of standard equipment › double arm grab tool changer with 32 tool slots

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> <li>• Multiple contours/drilling points can be selected at the same time</li> <li>• Generate and convert contours or drilling points for ShopMill</li> <li>• Displays the contours/drilling points created in the geometry processor</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> <li>• All new functions are system integrated and available with Sinumerik Operate</li> </ul>
351138014	8	<b>Collision avoidance with SINUMERIK</b>	<ul style="list-style-type: none"> <li>• Complex machining with risk of collision</li> <li>• Reliable protection against undesirable collisions</li> </ul>





1

## STARTER SET SK 40 / DIN 69871

- Milling head holder
- Chuck 1 - 13 mm
- Pull stud
- Weldon
- Adapter SK 40 to MT 3
- Spring collet holder
- Spring collet key
- Collet chuck set
- Assembly and tool adjustment gauge
- Height-adjuster
- Taper squeegee



2

## STARTER SET HSK A-63

- Milling head holder with 27 mm collet
- Chuck 1 - 13 mm
- Weldon
- Adapter HSK63 to MT 3
- Spring collet holder
- Spring collet key
- Collet chuck set
- Swivelling mounting block
- Taper squeegee



3

## COOLANT THROUGH SPINDLE

- Guarantees optimal service life
- Optionally with internal or external unit



4

## AIR CONDITIONER

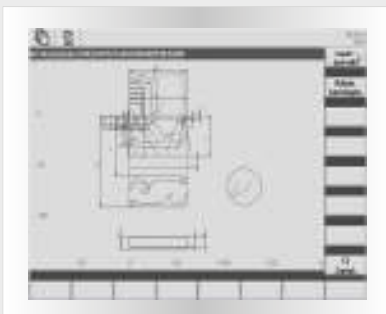
- Instead of heat exchanger



5

## HOUSING COVER

- Top machine cover
- Pneumatic opening/closing
- For oil mist extraction



6

## DXF READER

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



7

## TOP SURFACE

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



8

## COLLISION AVOIDANCE

- Complex machining of components with both static and moving parts without risk of collision

# FU 3

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## 3 + 2 axes machining centre for high-performance complete machining

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### SIEMENS CONTROL 828D

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- Siemens Sinumerik control 828D with 15.6 inch touch display
- Heavy duty version
- High productivity
- Tool changer, double arm grab with 24 tool slots
- Direct spindles (inline spindles)
- Also available with KESSLER built-in high-frequency spindles (MADE IN GERMANY) at 24 000 rpm
- Closed switch cabinet with integrated heat exchanger; ensures optimal temperature even in case of high ambient temperatures; prevents dirt particle penetration
- Automatic centralised lubrication
- Machine lamp in the workspace
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- High-performance oil cooler for spindle cooling and ball screw spindle
- CTS 20 bar internal (we recommend an extractor)
- Coolant gun
- Portable, electronic handwheel
- Ethernet
- EMC Electromagnetic compatibility and safety module by Siemens
- RJ45 plug-in connection, USB connection and power connection 230 V
- Including two years SIEMENS warranty
- Information on „Warranty extension“ on page 29
- Information on „Maintenance contracts“ from page 175



Fig. FU 3 with optional accessories

# TECHNICAL DATA



Model	FU 3	
Article no.	3511370	Kessler built-in spindle 351137006**
<b>Machine data</b>		
Electrical connection	400 V / 3 Ph ~ 50 Hz	
Total connected load	31 kVA	47 kVA
<b>Milling spindle</b>		
Drive motor S1 operation	15 kW	25 kW
Torque drive motor S1 operation	20 Nm	32 Nm
Drive motor S6 30% operation	22.5 kW	35 kW
Torque drive motor S6 30% operation	62 Nm	39 Nm
Spindle seat	SK 40 DIN 69871	HSK A-63 DIN 69893
Spindle centre to Z axis cover	595 mm	
Clearance spindle to table	100 - 500 mm	
<b>Cooling lubricant system</b>		
Tank capacity cooling lubricant tank	250 litres	
<b>Milling precision</b>		
Repetition accuracy	± 0.005 mm / 300 mm	
Positioning accuracy	± 0.005 mm	
<b>Tool changer</b>		
Type	Double arm grab	
Number of tool slots	24 slots	
Max. tool diameter	80 mm	
Max. tool diameter (adjacent slots free)	130 mm	
Tool length	245 mm	
Max. tool weight	8 kg	
Tool change time tool to tool	2 seconds	
<b>Travel</b>		
X axis	400 mm	
Y axis	560 mm	
Z axis	400 mm	
<b>Axis feed drive</b>		
Speed swivel axis A	max. 25 rpm	
Speed rotation axis C	max. 25 rpm	
Acceleration X, Y, Z axis	6 m/s <sup>2</sup>	
Rapid motion X, Y, Z axis	48 000 mm/min.	
<b>Speed range</b>		
Speeds*	15 000 rpm	24 000 rpm
<b>Pneumatics</b>		
Compressed air	6 bar	
<b>Inclining and rotating table</b>		
Table diameter	320 mm	
Table height	1 160 mm	
Indexing A axis	60 seconds	
Indexing C axis	20 seconds	
Swivel range A axis	± 120° / -30°	
Rotation range C axis	360°	
T-Slot size/distance/no	12 mm	
Max. load bearing capacity	100 kg	
<b>Dimensions</b>		
Length x width x height	2 254 x 2 990 x 2 960 mm	
Length x width x height with chip conveyor	3 110 x 2 990 x 2 960 mm	
Overall weight	5 000 kg	

Sinumerik 828D system software	SW 28x
CNC memory	8 MB
Set change time	1 ms
Look Ahead	150
Number of tools	512

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

\*\* Must be ordered with the basic machine. Cannot be retrofitted

# SINUMERIK 828D

## The power house in the compact CNC control class

### The device of choice for any machining technology

- Even at the highest machining speeds, the smart Advanced Surface (Standard) motion guidance and Top Surface (optional article no. 3584012) ensure optimal workpiece surfaces.
- Transfer CAD data to programming with ease at the CNC thanks to DXF Reader (optional article no. 3584014)
- 3D simulation on the PC ensures better control over and optimisation of the production process

### INCLUDING

- Safety Integrated
- Residual material detection and machining
- ShopMill work step programming
- Managing network drives
- 3-D simulation
- Logging
- PPU 290 with SW 28x system software

### Control with control panel featuring PPU 290

- 15.6" colour display
- 16:9 format
- Capacitive display with Multi-Touch controller
- Intuitive Multi-Touch control
- Soft key selection via touch function
- Proximity sensor/clearance sensor for smart display control
- Front panel made of die-cast magnesium with scratchproof glass front
- No battery (permanent intermediate data storage thanks to NV-RAM technology)
- No fan
- No hard disk
- Can be operated while wearing gloves
- Front interfaces: USB 2.0, RJ45 Ethernet, IP65 also with protective flap open

### Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 12, 24 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)

12 months - Article no. 3589020

24 months - Article no. 3589021

36 months - Article no. 3589022



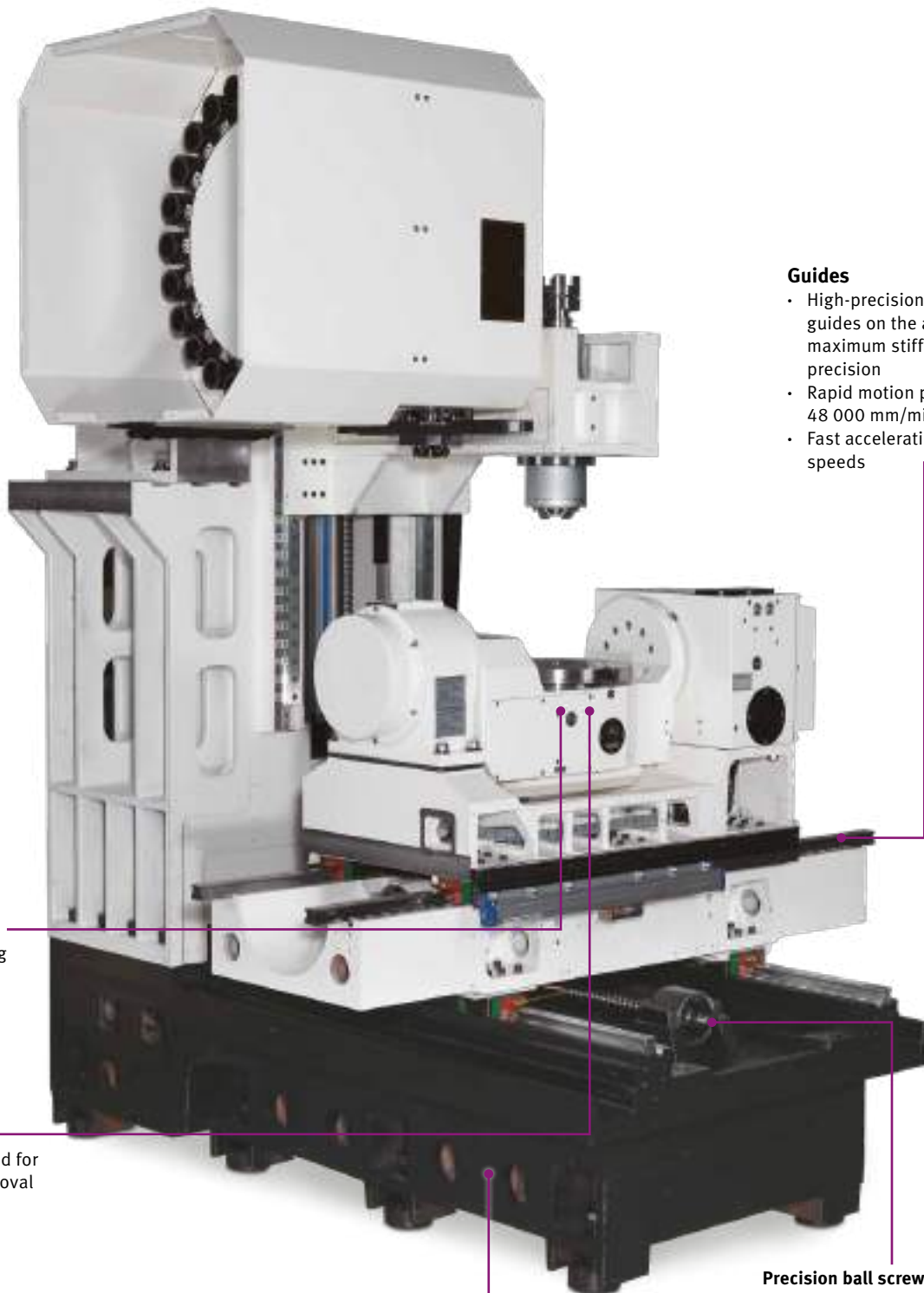
Siemens

**SAFETY INTEGRATED**

Set up work with open doors

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

- Avoiding the direct consequential cost of injury to persons
- Avoiding the indirect consequential cost of injuries
- Improved productivity thanks to increased machine availability: less unplanned downtime and more trouble-free production
- Longer period of use for system
- Improvement in global competitiveness thanks to boosting the export capability of machines



**Large work area**

- Facilitates loading and unloading of the machine

**Chip removal**

- Machine designed for optimal chip removal

**Base body**

- Torsion free premium cast machine base thanks to strong ribbing

**Guides**

- High-precision linear roller guides on the axes ensure maximum stiffness and precision
- Rapid motion possible up to 48 000 mm/min
- Fast acceleration/deceleration speeds

**Precision ball screw drive**

- With pre-stressed double nut that allows for high tolerance and low play
- Cooled recirculating spindle



### SPINDLE

Optionally

- Direct spindles (inline spindles) 15 000 rpm
- High-frequency spindles (built-in spindles) 24 000 rpm



### HANDWHEEL

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



### TOOL CHANGER

- Double arm grab
- Drum magazine
- 24 tool slots
- Tool exchange time tool to tool: 2 seconds



### LARGE WORK AREA

- For amazing versatility of machine applications
- Clearance spindle to table 100 - 500 mm



### OIL SEPARATOR / OIL SKIMMER

- Separation of non emulsified foreign oils by skimming
- Separation of solids by settling in the collection tank



### CLEANING GUN

- Easy cleaning of the workspace



### INCLINING AND ROTATING TABLE

- Load-bearing capacity of up to 100 kg
- Diameter 320 mm



### CHIP CONVEYOR

- Conveyor version
- For efficient chip discharge






### CENTRAL LUBRICATION

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

## OPTIMUM - OPTImill FU 3

### Special equipment

Tool measuring / workpiece measuring								
		<b>Renishaw Tool/workpiece measuring</b>	<ul style="list-style-type: none"> <li>Information on „Renishaw“ on page 162</li> </ul>					
		<b>Blum Tool/workpiece measuring</b>	<ul style="list-style-type: none"> <li>Information on „Blum“ on page 160</li> </ul>					
Miscellaneous								
3536109	1	<b>Starter set SK 40 / DIN 69871</b>	<ul style="list-style-type: none"> <li>Information on the starter set „SK 40 / DIN 69871“ on page 145</li> </ul>					
351137001*	2	<b>Coolant through spindle (CTS)</b>	Power unit	Tank capacity	Pressure	Outlet filter	Pre filter pump	We recommend an extraction unit
351137002*			extern	165 litres	20 bar	25 µm	40 µm	
351137012*	3	<b>Air conditioner</b>	<ul style="list-style-type: none"> <li>Instead of standard equipment &gt; heat exchanger</li> </ul>					
351137015	4	<b>Heidenhain glass scales on X/Y/Z axis</b>	<ul style="list-style-type: none"> <li>Greater precision</li> </ul>					
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> <li>Multiple contours/drilling points can be selected at the same time</li> <li>Generate and convert contours or drilling points for ShopMill</li> <li>Displays the created contours/drilling points in the geometry processor/ cycle support</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> <li>All new functions are system integrated and available with Sinumerik Operate</li> </ul>					
Hardware								
 351137016	8	<b>SINUMERIK 840D SL with OP 015</b>	<ul style="list-style-type: none"> <li>NCU720.3</li> <li>Collision avoidance</li> <li>Premium operating convenience: capacitive multitouch technology</li> <li>High resolution of 1366 x 768 pixels in wide-screen format for convenient operation and monitoring</li> <li>Rugged: No wear of mechanical components thanks to multitouch technology</li> <li>Scratch-proof glass front</li> <li>Modern, intelligent design</li> <li>Can be operated while wearing gloves</li> </ul>					





1

## STARTER SET SK 40 / DIN 69871

- Milling head holder with 27 mm collet
- Chuck 1 - 13 mm
- Pull stud
- 2 each Weldon 6 mm and 20 mm
- 2 each Weldon 8 mm, 10 mm, 12 mm and 16 mm
- Adapter SK 40 to MT 3
- Spring collet holder ER 32
- Spring collet key ER 32
- Spring collet set ER 32
- Assembly and tool adjustment gauge
- Height-adjuster
- Taper squeegee



2

## COOLANT THROUGH SPINDLE

- Guarantees optimal service life
- Optionally with internal or external unit



3

## AIR CONDITIONER

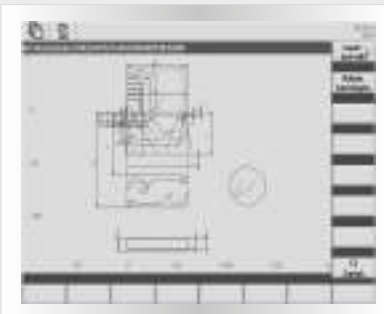
- Instead of heat exchanger



4

## GLASS SCALES

- X, Y and Z axis
- Greater precision



6

## DXF READER

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



7

## TOP SURFACE

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



8

## SINUMERIK 840D SL WITH OP 015

- New generation control panel with new machine control options.
- State-of-the-art multitouch interface for even more user-friendly operation, monitoring and programming

# F 410 HSC

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

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## SIEMENS CONTROL 828D

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- Siemens Sinumerik control 828D with 15.6 inch touch display
- Heavy duty version
- High productivity
- Profile rail with recirculating rollers on all axes for high load bearing capacity
- Tool changer, double arm grab with 30 tool slots
- Precision ground, pre-stressed, high-performance ball screws (Ø 40 mm x P16 x C3) on all axes
- Also available with KESSLER built-in high-frequency spindles (MADE IN GERMANY) at 24 000 rpm
- Torsion free machine base thanks to strong ribbing
- High-torque servo drives on all three axes, mounted directly on the ball screws
- Machine lamp in the workspace
- Precision ground router table with seven T-slots
- Chip conveyor, belt type ensures efficient chip discharge
- Coolant unit with 860 litre coolant tank and chip flushing system
- Cleaning gun
- Portable, electronic handwheel
- RJ45 plug-in connection, USB connection and power connection 230 V
- Telescopic guide rail covers on all three axes
- Closed switch cabinet with integrated heat exchanger; ensures optimal temperature even in case of high ambient temperatures; prevents dirt particle penetration
- Oil separator
- Including two years SIEMENS warranty
- Information on „Warranty extension“ on page 37
- Information on „Maintenance contracts“ from page 175



# TECHNICAL DATA

F 410HSC 			
<b>Article no.</b>	3511242		
	Belt drive	Inline spindle	Kessler built-in spindle
<b>Spindle option</b>	-	3511290005**	3511290014**
<b>Machine data</b>			
Electrical connection	400 V / 3 Ph ~ 50 Hz		
Total connected load	40 kVA	56 kVA	48 kVA
<b>Milling spindle</b>			
Drive motor S1 operation	11 kW	20 kW	25 kW
Drive motor torque S1	70 Nm	96 Nm	32 Nm
Drive motor S6 30% operation	31.4 kW	50.3 kW	35 kW
Torque drive motor S6 30% operation	200 Nm	240 Nm	39 Nm
Spindle seat	SK 40 DIN 69871		HSK A-63 DIN 69893
<b>Cooling lubricant system</b>			
Motor - coolant pumps, 3 pcs.	850 Watt each		
Tank capacity	860 litres		
<b>End mill size</b>			
Max. sensor head size	Ø 63 mm		
Max. shaft milling cutter size	Ø 32 mm		
<b>Milling precision</b>			
Repetition accuracy	± 0.005 mm		
Positioning accuracy	± 0.005 mm		
<b>Tool changer</b>			
Type	Double arm grab		
Number of tool slots	30 tools		
Max. tool diameter	Ø 80 mm		
Max. tool diameter (adjacent slots not occupied)	Ø 125 mm		
Tool length	300 mm		
Max. tool weight	8 kg		
Tool change time tool to tool	2 seconds		
<b>Travel</b>			
X axis	1 200 mm		
Y axis	730 mm		
Z axis	650 mm		
<b>Axis feed drive</b>			
Rapid motion X, Y, Z axis	30 000 mm/min.		
<b>Motor torque</b>			
X axis	18 Nm		
Y axis	27 Nm		
Z axis	36 Nm		
<b>Speed range</b>			
Speeds*	10 000 rpm	12 000 rpm	24 000 rpm
<b>Pneumatics</b>			
Compressed air	6 bar		
<b>Milling table</b>			
Clearance spindle to table	100 - 750 mm		
Table length x width	1 400 x 710 mm		
T-Slot size/distance/no	18 mm / 7 / 100 mm		
Max. load bearing capacity	1 000 kg		
<b>Dimensions</b>			
Length (with chip conveyor) x width x height	3 600 (4 731 mm) x 2 322 x 3 024 mm		
Overall weight	8 800 kg		

Sinumerik 828D system software	SW 28x
CNC memory	8 MB
Set change time	1 ms
Look Ahead	150
Number of tools	512

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

\*\* Must be ordered with the basic machine. Cannot be retrofitted

# SINUMERIK 828D

## The power house in the compact CNC control class

### The device of choice for any machining technology

- Even at the highest machining speeds, the smart Advanced Surface (Standard) motion guidance and Top Surface (optional article no. 3584012) ensure optimal workpiece surfaces.
- Transfer CAD data to programming with ease at the CNC thanks to DXF Reader (optional article no. 3584014)
- 3D simulation on the PC ensures better control over and optimisation of the production process

### INCLUDING

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

### Control with control panel featuring PPU 290

- 15.6" colour display
- 16:9 format
- Capacitive display with Multi-Touch controller
- Intuitive Multi-Touch control
- Soft key selection via touch function
- Proximity sensor/clearance sensor for smart display control
- Front panel made of die-cast magnesium with scratchproof glass front
- No battery (permanent intermediate data storage thanks to NV-RAM technology)
- No fan
- No hard disk
- Can be operated while wearing gloves
- Front interfaces: USB 2.0, RJ45 Ethernet, IP65 also with protective flap open

### Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 12, 24 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)

12 months - Article no. 3589020

24 months - Article no. 3589021

36 months - Article no. 3589022



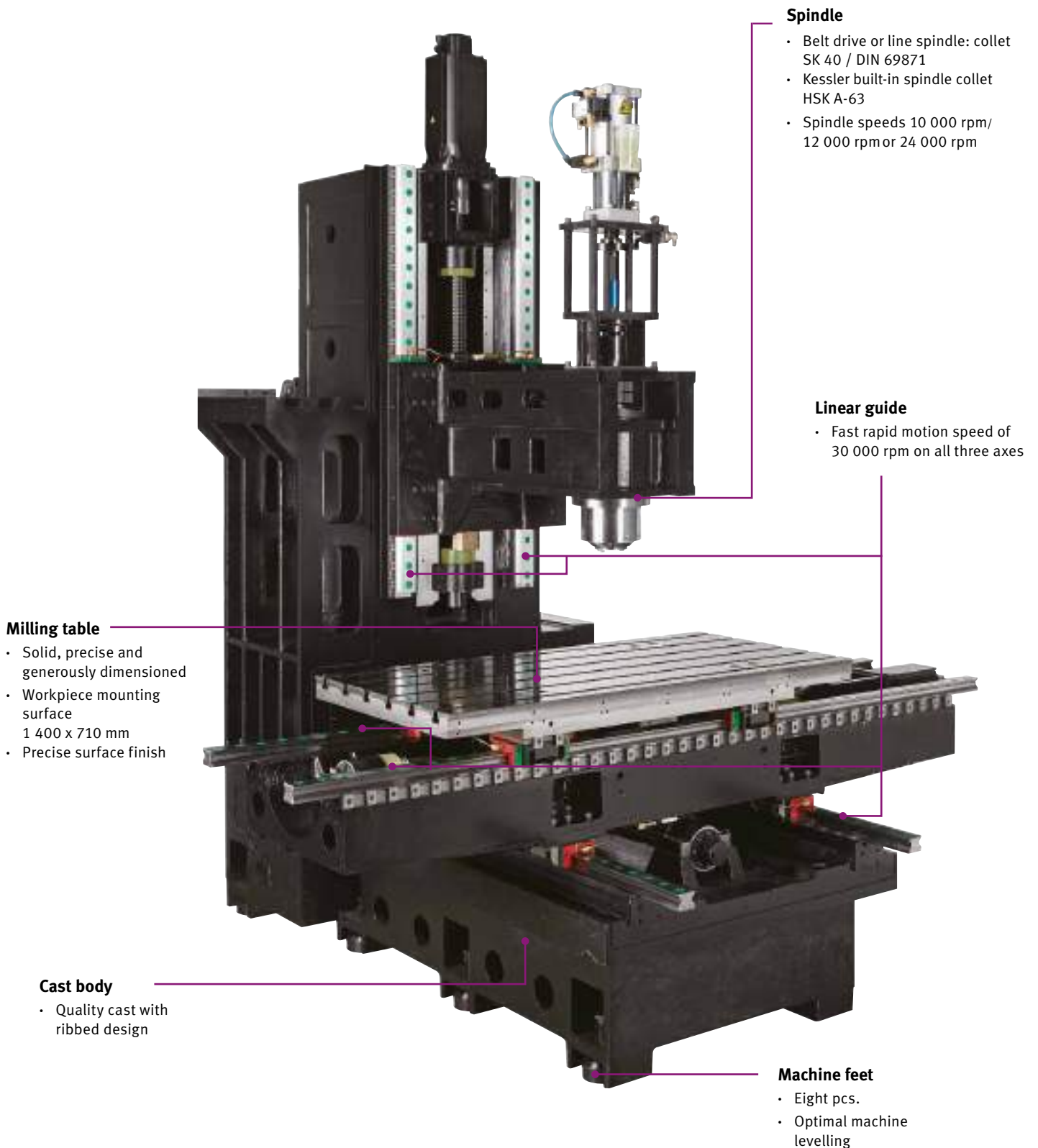
Siemens

**SAFETY INTEGRATED**

Set up work with open doors

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

- Avoiding the direct consequential cost of injury to persons
- Avoiding the indirect consequential cost of injuries
- Improved productivity thanks to increased machine availability: less unplanned downtime and more trouble-free production
- Longer period of use for system
- Improvement in global competitiveness thanks to boosting the export capability of machines



**Spindle**

- Belt drive or line spindle: collet SK 40 / DIN 69871
- Kessler built-in spindle collet HSK A-63
- Spindle speeds 10 000 rpm / 12 000 rpm or 24 000 rpm

**Linear guide**

- Fast rapid motion speed of 30 000 rpm on all three axes

**Milling table**

- Solid, precise and generously dimensioned
- Workpiece mounting surface 1 400 x 710 mm
- Precise surface finish

**Cast body**

- Quality cast with ribbed design

**Machine feet**

- Eight pcs.
- Optimal machine levelling



**HEAT EXCHANGER**

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



**BALL SCREWS**

- Accuracy class C3
- For high precision and repetition accuracy
- Directly coupled servo ball screw drive



**OIL SEPARATOR / OIL SKIMMER**

- Separation of non emulsified foreign oils by skimming
- Separation of solids by settling in the collection tank (Fig. without collection tank)



**TOOL CHANGER SYSTEM**

- Double arm grab with 30 tool slots
- Max. tool length 300 mm
- Tool-to-tool change in 2 seconds



**CHIP FLUSHING SYSTEM**

- Powerful chip flushing system for cleaning the workspace and workpiece



**LINEAR GUIDE**

- Profile rails with recirculating roller



**CHIP CONVEYOR**

- Conveyor version
- For efficient chip discharge



**COOLING LUBRICANT SYSTEM**

- Three coolant pumps with 850 Watt each
- Tank capacity 860 litres





**CENTRAL LUBRICATION SYSTEM**

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

## OPTIMUM - OPTimill F 410HSC

### Special equipment

Tool measuring / workpiece measuring			
		<b>Renishaw Tool/workpiece measuring</b>	<ul style="list-style-type: none"> <li>Information on „Renishaw“ on page 162</li> </ul>
		<b>Blum Tool/workpiece measuring</b>	<ul style="list-style-type: none"> <li>Information on „Blum“ on page 160</li> </ul>

Miscellaneous				
3536109		<b>Starter set SK 40 / DIN 69871</b>	<ul style="list-style-type: none"> <li>Information on the starter set „SK 40 / DIN 69871“ on page 145</li> </ul>	
3536110	1	<b>Starter set HSK A-63</b>	<ul style="list-style-type: none"> <li>Information on the starter set „HSK A-63“ on page 146</li> </ul>	
3511290502*	2	<b>Power transformer</b>	<ul style="list-style-type: none"> <li>For special clamping needs</li> </ul>	
3511290100*	3	<b>Coolant through spindle (CTS)</b>	<ul style="list-style-type: none"> <li>Integrated unit, 20 bar</li> </ul>	We recommend an extraction unit
3511290102*			<ul style="list-style-type: none"> <li>External unit; tank capacity 165 litres, 20 bar</li> </ul>	
3511290104*			<ul style="list-style-type: none"> <li>External unit; tank capacity 165 litres, 70 bar</li> </ul>	
3511290402*	4	<b>Air conditioner</b>	<ul style="list-style-type: none"> <li>Instead of standard equipment › heat exchanger</li> </ul>	
3511290110		<b>External CTS with paper filter</b>	<ul style="list-style-type: none"> <li>20 bar</li> <li>Recommended for aluminium or cast iron</li> </ul>	
3511290112			<ul style="list-style-type: none"> <li>70 bar</li> <li>Recommended for aluminium or cast iron</li> </ul>	

Fourth and fifth axis			
3511290201*	5	<b>Fourth axis</b>	<ul style="list-style-type: none"> <li>Preparation</li> </ul>
3511290210*		<b>Fourth axis complete kit</b>	<ul style="list-style-type: none"> <li>Three-jaw lathe chuck Ø 100 mm, tailstock, SIEMENS motor, assembly</li> <li>Table diameter 120 mm</li> </ul>
3511290211*			<ul style="list-style-type: none"> <li>Three-jaw lathe chuck Ø 250 mm, tailstock, SIEMENS motor, assembly</li> <li>Table diameter 250 mm</li> </ul>
3511290202*		<b>Fourth and fifth axis</b>	<ul style="list-style-type: none"> <li>Preparation</li> </ul>
3511290250*	6	<b>Fourth and fifth axis complete kit</b>	<ul style="list-style-type: none"> <li>Three-jaw lathe chuck Ø 100 mm, tailstock, SIEMENS motor, assembly</li> <li>Table diameter 120 mm</li> </ul>
3511290251*			<ul style="list-style-type: none"> <li>Three-jaw lathe chuck Ø 200 mm, tailstock, SIEMENS motor, assembly</li> <li>Table diameter 200 mm</li> </ul>

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> <li>Arbitrary workpiece zero point per contour/drilling point</li> </ul>
3584012		<b>Top surface for SIEMENS SINUMERIK control</b>	<ul style="list-style-type: none"> <li>from version 4.7</li> <li>optimal workpiece surfaces at highest machining speeds thanks to smart motion guidance</li> </ul>





1

## STARTER SET SK 40 / DIN 69871

- Milling head holder
- Chuck 1 - 13 mm
- Pull stud
- Weldon
- Adapter SK 40 to MT 3
- Spring collet holder
- Spring collet key
- Collet chuck set
- Assembly and tool adjustment gauge
- Height-adjuster
- Taper squeegee



## STARTER SET HSK A-63

- Milling head holder
- Chuck 1 - 13 mm
- Weldon
- Adapter HSK63 to MT 3
- Spring collet holder
- Spring collet key
- Collet chuck set
- Swivelling mounting block
- Taper squeegee



2

## POWER TRANSFORMER

- For custom voltage
- Weight 147 kg



3

## COOLANT THROUGH SPINDLE

- Guarantees optimal service life
- Optionally with internal or external unit



4

## AIR CONDITIONER

- Instead of heat exchanger



5

## EXTERNAL CTS

- Cartridge filter
- Paper filter 25µm
- Oil skimmer
- Coolant cooler
- Programmable pressure
- Tank capacity 320 litres



6

## FOURTH AXIS

- Servo motor by Siemens
- Table diameter 120 mm
- Peak height vertical 115 mm
- or
- Table diameter 250 mm
- Peak height vertical 185 mm



7

## FIFTH AXIS

- Optionally with
- Table diameter 120 mm
- Peak height vertical 115 mm
- or
- Table diameter 250 mm
- Peak height vertical 185 mm

# F 310 HSC

---

**Power, speed, precision and a long service life**

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## **SIEMENS CONTROL 828D**

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- Siemens Sinumerik control 828D with 15.6 inch touch display
- Profile rail with recirculating rollers on all axes for high load bearing capacity
- Tool changer, double arm grab with 30 tool slots
- Precision ground, pre-stressed, high-performance ball screws (Ø 40 mm x P16 x C3) on all axes
- Main spindle SK40 up to 10 000 rpm with belt drive
- Also available with KESSLER built-in high-frequency spindles (MADE IN GERMANY) at 24 000 rpm
- Torsion free machine base thanks to strong ribbing
- High-torque servo drives mounted directly on the ball screws on all three axes
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- Machine lamp in the workspace
- Coolant unit with 520 litre coolant tank and chip flushing system
- Cleaning gun
- Portable, electronic handwheel
- RJ45 plug-in connection, USB connection and 230 V power connection
- Telescopic guide rail covers on all three axes
- Closed switch cabinet with integrated heat exchanger; ensures optimal temperature even in case of high ambient temperatures; prevents dirt particle penetration
- Oil separator
- Including two years SIEMENS warranty
- Information on „Warranty extension“ on page 45
- Information on „Maintenance contracts“ from page 175



# TECHNICAL DATA

Model	F 310HSC 		
Article no.	3511232		
	Belt drive	Inline spindle	Kessler built-in spindle
Spindle option	-	3511290005**	3511290014**
<b>Machine data</b>			
Electrical connection	400 V / 3 Ph ~50 Hz		
Total connected load	40 kVA	56 kVA	48 kVA
<b>Milling spindle</b>			
Drive motor S1 operation	11 kW	20 kW	25 kW
Drive motor torque S1	70 Nm	96 Nm	32 Nm
Drive motor S6 30% operation	31.4 kW	50.3 kW	35 kW
Torque drive motor S6 30% operation	200 Nm	240 Nm	39 Nm
Spindle seat	SK 40 DIN 69871		HSK A-63 DIN 69893
<b>Cooling lubricant system</b>			
Motor - coolant pumps, 3 pcs.	2 pumps 930 W and 1 pump 850 W		
Tank capacity	520 litres		
<b>End mill size</b>			
Max. sensor head size	Ø 63 mm		
Max. shaft milling cutter size	Ø 32 mm		
<b>Milling precision</b>			
Repetition accuracy	± 0.005 mm		
Positioning accuracy	± 0.005 mm		
<b>Tool changer</b>			
Type	Double arm grab		
Number of tool slots	30 tools		
Max. tool diameter	Ø 80 mm		
Max. tool diameter (adjacent slots not occupied)	Ø 125 mm		
Tool length	300 mm		
Max. tool weight	8 kg		
Tool change time tool to tool	2 seconds		
<b>Travel</b>			
X axis	1 050 mm		
Y axis	600 mm		
Z axis	600 mm		
<b>Axis feed drive</b>			
Rapid motion X, Y, Z axis	30 000 mm/min.		
<b>Motor torque</b>			
X axis	18 Nm		
Y axis	18 Nm		
Z axis	27 Nm		
<b>Speed range</b>			
Speeds*	10 000 rpm	12 000 rpm	24 000 rpm
<b>Pneumatics</b>			
Compressed air	6 bar		
<b>Milling table</b>			
Clearance spindle to table	100 - 750 mm		
Table length x width	1 200 x 600 mm		
T-Slot size/distance/no	16 mm / 6 / 100 mm		
Max. load bearing capacity	800 kg		
<b>Dimensions</b>			
Length (with chip conveyor) x width x height	3 060 (4 319 mm) x 2 286 x 2 928 mm		
Overall weight	7 000 kg		

Sinumerik 828D system software	SW 28x
CNC memory	8 MB
Set change time	1 ms
Look Ahead	150
Number of tools	512

\* Please note that the maximum spindle speed must be reduced by approx. 20 % in continuous operation  
 \*\* Must be ordered with the basic machine. Cannot be retrofitted

# SINUMERIK 828D

## The power house in the compact CNC control class

### The device of choice for any machining technology

- Even at the highest machining speeds, the smart Advanced Surface (Standard) motion guidance and Top Surface (optional article no. 3584012) ensure optimal workpiece surfaces.
- Transfer CAD data to programming with ease at the CNC thanks to DXF Reader (optional article no. 3584014)
- 3D simulation on the PC ensures better control over and optimisation of the production process

### INCLUDING

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

### Control with control panel featuring PPU 290

- 15.6" colour display
- 16:9 format
- Capacitive display with Multi-Touch controller
- Intuitive Multi-Touch control
- Soft key selection via touch function
- Proximity sensor/clearance sensor for smart display control
- Front panel made of die-cast magnesium with scratchproof glass front
- No battery (permanent intermediate data storage thanks to NV-RAM technology)
- No fan
- No hard disk
- Can be operated while wearing gloves
- Front interfaces: USB 2.0, RJ45 Ethernet, IP65 also with protective flap open

### Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 12, 24 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)

12 months - Article no. 3589020

24 months - Article no. 3589021

36 months - Article no. 3589022



Siemens

**SAFETY INTEGRATED**

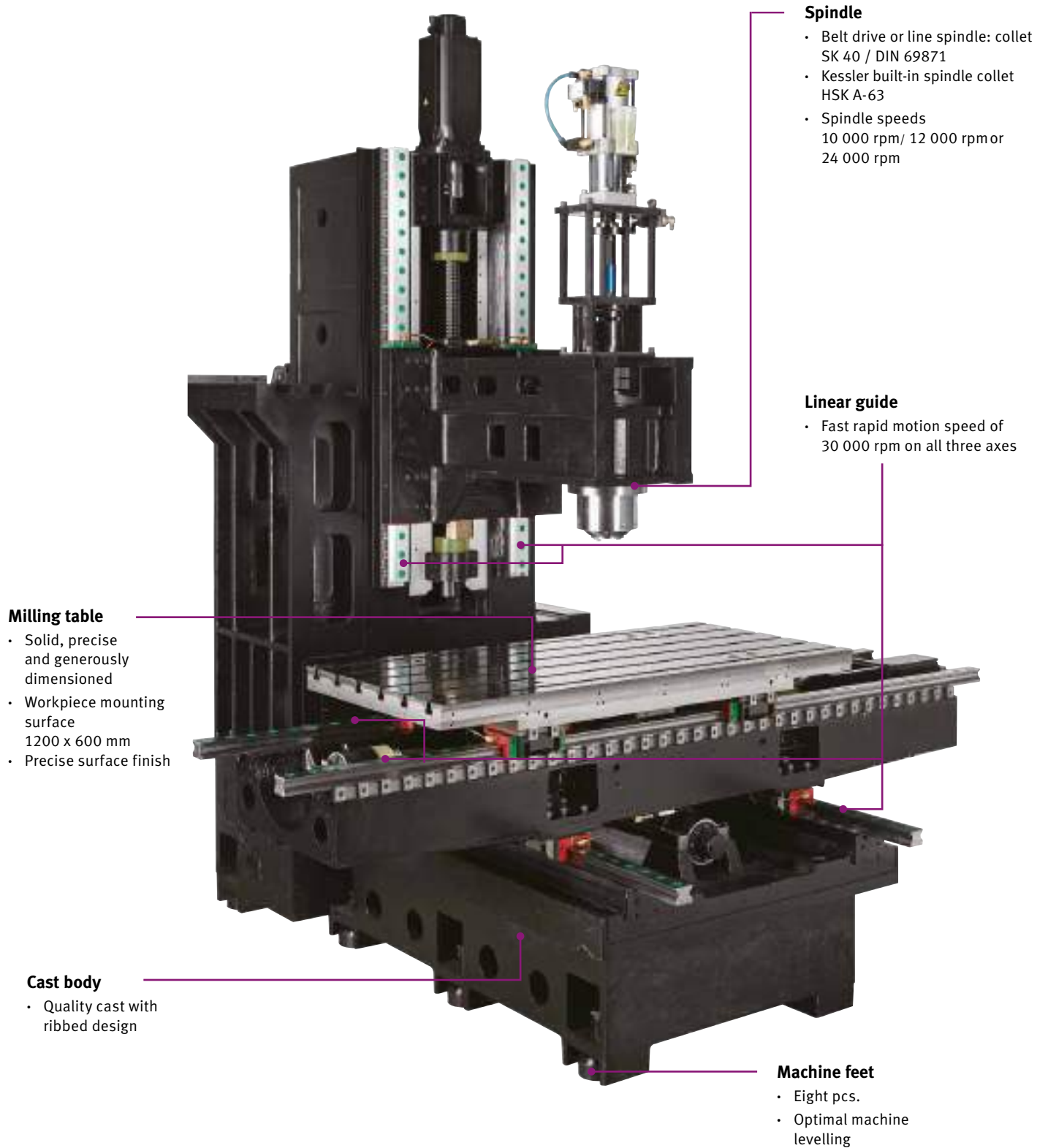
Set up work with open doors

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

- Avoiding the direct consequential cost of injury to persons
- Avoiding the indirect consequential cost of injuries
- Improved productivity thanks to increased machine availability: less unplanned downtime and more trouble-free production
- Longer period of use for system
- Improvement in global competitiveness thanks to boosting the export capability of machines

## OPTIMUM - OPTImill F 310HSC

Special equipment





**HEAT EXCHANGER**

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



**BALL SCREWS**

- Accuracy class C3
- For high precision and repetition accuracy
- Directly coupled servo ball screw drive



**OIL SEPARATOR / OIL SKIMMER**

- Separation of non emulsified foreign oils by skimming
- Separation of solids by settling in the collection tank  
(Fig. without collection tank)



**TOOL CHANGER SYSTEM**

- Double arm grab with 30 tool slots
- Max. tool length 300 mm
- Tool-to-tool change in 2 seconds



**CHIP FLUSHING SYSTEM**

- Powerful chip flushing system for cleaning the workspace and workpiece



**LINEAR GUIDE**

- Profile rails with recirculating roller



**CHIP CONVEYOR**

- Conveyor version
- For efficient chip discharge



**COOLING LUBRICANT SYSTEM**

- Three coolant pumps of 930 Watt each and one coolant pump of 850 Watt
- Tank capacity 520 litres





**CENTRAL LUBRICATION SYSTEM**

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

## OPTIMUM - OPTImill F 310HSC

### Special equipment

Tool measuring / workpiece measuring			
		<b>Renishaw Tool/workpiece measuring</b>	<ul style="list-style-type: none"> <li>Information on „Renishaw“ on page 162</li> </ul>
		<b>Blum Tool/workpiece measuring</b>	<ul style="list-style-type: none"> <li>Information on „Blum“ on page 160</li> </ul>

Miscellaneous				
3536109	1	<b>Starter set SK 40 / DIN 69871</b>	<ul style="list-style-type: none"> <li>Information on the starter set „SK 40 / DIN 69871“ on page 145</li> </ul>	
3536110	2	<b>Starter set HSK A-63</b>	<ul style="list-style-type: none"> <li>Information on the starter set „HSK A-63“ on page 146</li> </ul>	
3511290502*	3	<b>Power transformer</b>	<ul style="list-style-type: none"> <li>for special voltages</li> </ul>	
3511290100*	4	<b>Coolant through spindle (CTS)</b>	<ul style="list-style-type: none"> <li>Integrated unit, 20 bar</li> </ul>	We recommend an extraction unit
3511290102*			<ul style="list-style-type: none"> <li>External unit; tank capacity 165 litres, 20 bar</li> </ul>	
3511290104*			<ul style="list-style-type: none"> <li>External unit; tank capacity 165 litres, 70 bar</li> </ul>	
3511290402*	5	<b>Air conditioner</b>	<ul style="list-style-type: none"> <li>Instead of standard equipment › heat exchanger</li> </ul>	
3511290110		<b>External CTS with paper filter</b>	<ul style="list-style-type: none"> <li>20 bar</li> <li>Recommended for aluminium or cast iron</li> </ul>	
3511290112			<ul style="list-style-type: none"> <li>70 bar</li> <li>Recommended for aluminium or cast iron</li> </ul>	

Fourth and fifth axis			
3511290201*	6	<b>Fourth axis</b>	<ul style="list-style-type: none"> <li>Preparation</li> </ul>
3511290210*		<b>Fourth axis complete kit</b>	<ul style="list-style-type: none"> <li>Three-jaw lathe chuck Ø 100 mm,</li> <li>Tailstock, SIEMENS motor, assembly</li> </ul>
3511290202*	7	<b>Fourth and fifth axis</b>	<ul style="list-style-type: none"> <li>Preparation</li> </ul>
3511290250*		<b>Fourth and fifth axis complete kit</b>	<ul style="list-style-type: none"> <li>Three-jaw lathe chuck Ø 100 mm, tailstock, SIEMENS motor, assembly</li> <li>Table diameter 120 mm</li> </ul>
3511290251*			<ul style="list-style-type: none"> <li>Three-jaw lathe chuck Ø 200 mm, tailstock, SIEMENS motor, assembly</li> <li>Table diameter 200 mm</li> </ul>

Software			
3584014		<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> <li>Multiple contours/drilling points can be selected at the same time</li> <li>Generate and convert contours or drilling points for ShopMill</li> <li>Displays the created contours/drilling points in the geometry processor/ cycle support</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 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> <li>All new functions are system integrated and available with Sinumerik Operate</li> </ul>

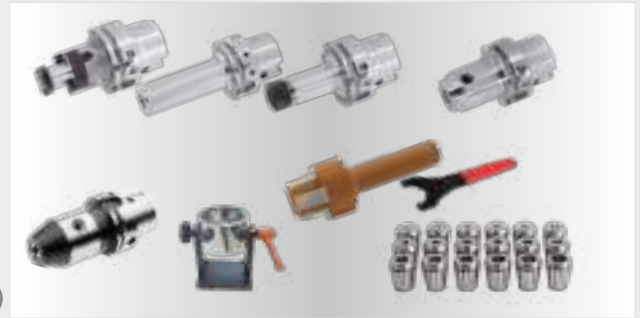




1

## STARTER SET SK 40 / DIN 69871

- Milling head holder
- Chuck 1 - 13 mm
- Pull stud
- Weldon
- Adapter SK 40 to MT 3
- Spring collet holder
- Spring collet key
- Collet chuck set
- Assembly and tool adjustment gauge
- Height-adjuster
- Taper squeegee



2

## STARTER SET HSK A-63

- Milling head holder with 27 mm collet
- Chuck 1 - 13 mm
- Weldon
- Adapter HSK63 to MT 3
- Spring collet holder
- Spring collet key
- Collet chuck set
- Swivelling mounting block
- Taper squeegee



3

## POWER TRANSFORMER

- For custom voltage
- Weight 147 kg



4

## COOLANT THROUGH SPINDLE

- Guarantees optimal service life
- Optionally with internal or external unit



5

## AIR CONDITIONER

- Instead of heat exchanger



6

## FOURTH AXIS

- Servo motor by Siemens
- Table diameter 120 mm
- Peak height vertical 115 mm
- Table height horizontal 170 mm
- Vertical overall height 193 mm



7

## FIFTH AXIS

- Optionally with
- Table diameter 120 mm
- Peak height vertical 150 mm
- or
- Table diameter 200 mm
- Peak height vertical 195 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 210 HSC

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

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## **SIEMENS CONTROL 828D**


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- Siemens Sinumerik control 828D with 15.6 inch touch display
- Heavy duty version
- High productivity
- High reliability
- Profile rail with recirculating rollers for fast rapid motion speeds and high load bearing capacity
- Machine lamp in the workspace
- Automatic lubrication
- High-torque servo drives on all three axes
- Torsion free machine base thanks to strong ribbing
- Solid, precision milling table with four T-grooves, generously dimensioned with precision surface finish
- Portable, electronic handwheel
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- RJ45 plug-in connection, USB connection and power connection 230 V
- Coolant unit with 370 litre coolant tank and chip flushing system
- Closed switch cabinet with integrated heat exchanger; ensures optimal temperature even in case of high ambient temperatures; prevents dirt particle penetration
- Also available with KESSLER built-in high-frequency spindles (MADE IN GERMANY) at 24 000 rpm
- Telescopic guide rail covers on all three axes
- Including two years SIEMENS warranty
- Information on „Warranty extension“ on page 53
- Information on „Maintenance contracts“ from page 175



Fig. with optional accessories

# TECHNICAL DATA

Model	F 210 HSC		
Article no.	3511222 		
	Belt drive	Inline spindle	Kessler built-in spindle
Spindle option	-	3511290002**	3511290014**
<b>Machine data</b>			
Electrical connection	400 V / 3 Ph ~ 50 Hz		
Total connected load	31 kVA		48 kVA
<b>Milling spindle</b>			
Drive motor S1 operation	9 kW		25 kW
Drive motor torque S1	57 Nm		32 Nm
Drive motor S6 30% operation	21.2 kW		35 kW
Torque drive motor S6 30% operation	135 Nm		39 Nm
Spindle seat	SK 40 / DIN 69871		HSK A-63 DIN 69893
<b>Cooling lubricant system</b>			
Motor - coolant pumps, 3 pcs.	0.56 kW		
Flow rate	155 l/min		
Tank capacity	370 litres		
<b>End mill size</b>			
Max. sensor head size	Ø 63 mm		
Max. shaft milling cutter size	Ø 32 mm		
<b>Milling precision</b>			
Repetition accuracy	± 0.005 mm		
Positioning accuracy	± 0.005 mm		
<b>Tool changer</b>			
Type	Double arm grab		
Number of tool slots	30 tools		
Max. tool diameter	Ø 75 mm		
Max. tool diameter (adjacent slots not occupied)	Ø 125 mm		
Tool length	300 mm		
Max. tool weight	8 kg		
Tool change time tool to tool	2 seconds		
<b>Travel</b>			
X axis	800 mm		
Y axis	500 mm		
Z axis	500 mm		
<b>Axis feed drive</b>			
Rapid motion X, Y, Z axis	30 000 mm/min.		
<b>Motor torque</b>			
X axis	11 Nm		
Y axis	11 Nm		
Z axis	16 Nm		
<b>Speed range</b>			
Speeds*	10 000 rpm	12 000 rpm	24 000 rpm
<b>Pneumatics</b>			
Compressed air	5 - 7 bar		
<b>Milling table</b>			
Clearance spindle to table	100 - 600 mm		
Table length x width	900 x 520 mm		
T-Slot size/distance/no	16 mm / 80 mm / 5		
Max. load bearing capacity	450 kg		
<b>Dimensions</b>			
Length x width x height	3 838 x 2 280 x 2 260 mm		
Overall weight	6 250 kg		

Sinumerik 828D system software	SW 28x
CNC memory	8 MB
Set change time	1 ms
Look Ahead	150
Number of tools	512

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

\*\* Must be ordered with the basic machine. Cannot be retrofitted

# SINUMERIK 828D

## The power house in the compact CNC control class

### The device of choice for any processing technology.

- Even at the highest machining speeds, the smart Advanced Surface (Standard) motion guidance and Top Surface (optional article no. 3584012) ensure optimal workpiece surfaces.
- Transfer CAD data to programming with ease at the CNC thanks to DXF Reader (optional article no. 3584014)
- 3D simulation on the PC ensures better control over and optimisation of the production process

### INCLUDING

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

### Control with control panel featuring PPU 290

- 15.6" colour display
- 16:9 format
- Capacitive display with Multi-Touch controller
- Intuitive Multi-Touch control
- Soft key selection via touch function
- Proximity sensor/clearance sensor for smart display control
- Front panel made of die-cast magnesium with scratchproof glass front
- No battery (permanent intermediate data storage thanks to NV-RAM technology)
- No fan
- No hard disk
- Can be operated while wearing gloves
- Front interfaces: USB 2.0, RJ45 Ethernet, IP65 also with protective flap open

### Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 12, 24 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)

12 months - Article no. 3589020

24 months - Article no. 3589021

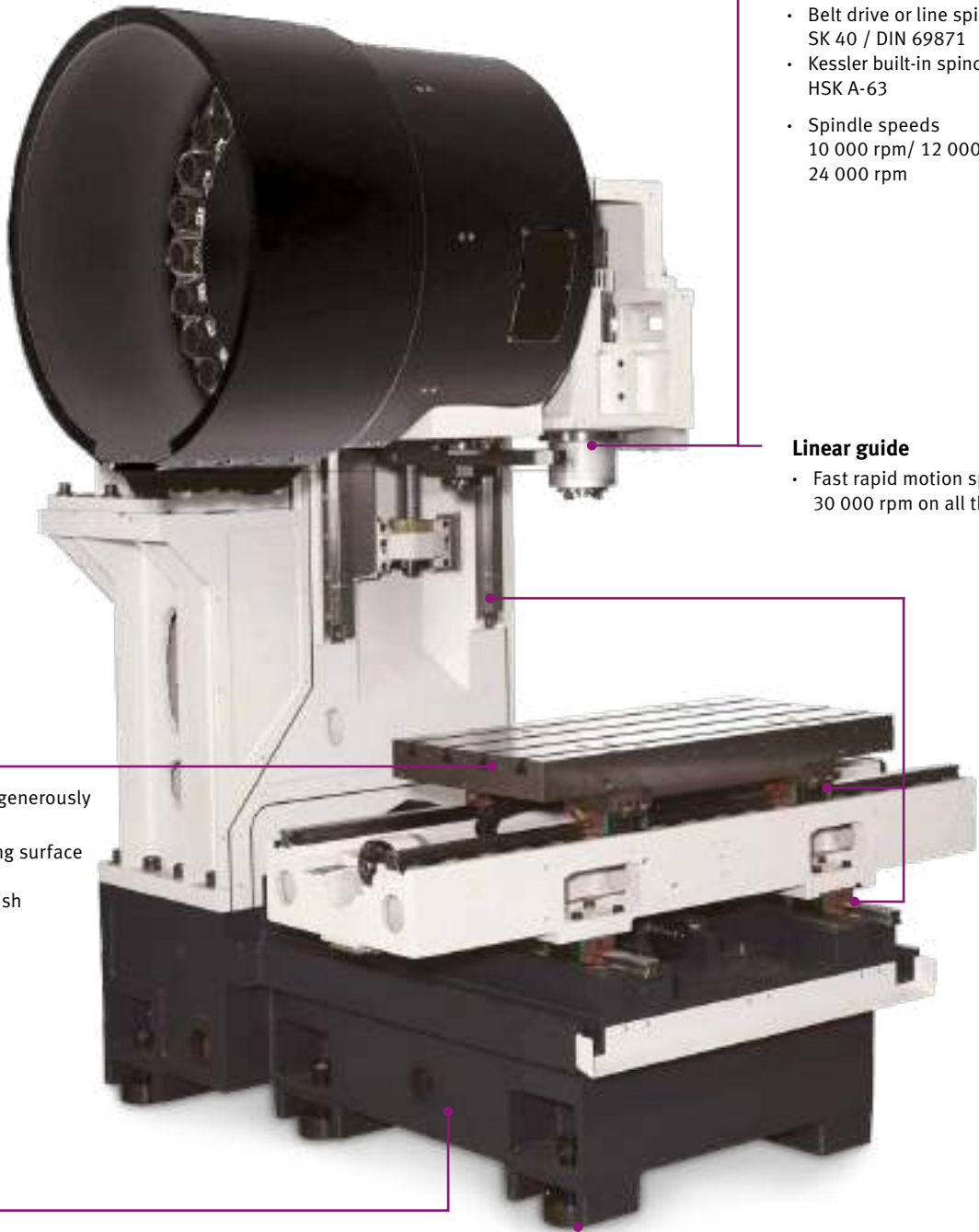
36 months - Article no. 3589022



Siemens  
**SAFETY INTEGRATED**  
Set up work with open doors

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

- Avoiding the direct consequential cost of injury to persons
- Avoiding the indirect consequential cost of injuries
- Improved productivity thanks to increased machine availability: less unplanned downtime and more trouble-free production
- Longer period of use for system
- Improvement in global competitiveness thanks to boosting the export capability of machines



**Spindle**

- Belt drive or line spindle: collet SK 40 / DIN 69871
- Kessler built-in spindle collet HSK A-63
- Spindle speeds 10 000 rpm/ 12 000 rpm or 24 000 rpm

**Linear guide**

- Fast rapid motion speed of 30 000 rpm on all three axes

**Milling table**

- Solid, precise and generously dimensioned
- Workpiece mounting surface 900 x 520 mm
- Precise surface finish

**Cast body**

- Quality cast with ribbed design

**Machine feet**

- Six pcs.
- Optimal machine levelling



**CLEANING GUN**

- Easy cleaning of the workspace



**BALL SCREWS**

- Accuracy class C3
- For high precision and repetition accuracy
- Directly coupled servo ball screw drive



**OIL SEPARATOR / OIL SKIMMER**

- Separation of non emulsified foreign oils by skimming
- Separation of solids by settling in the collection tank



**TOOL CHANGER SYSTEM**

- Double arm grab with 30 tool slots
- Max. tool length 300 mm



**CHIP FLUSHING SYSTEM**

- Powerful chip flushing system for cleaning the workspace and workpiece



**LINEAR GUIDE**

- Profile rails with recirculating roller guide



**CHIP CONVEYOR**

- Conveyor version
- For efficient chip discharge



**COOLING LUBRICANT SYSTEM**



- Three coolant pumps with 560 Watt each
- Tank capacity 370 litres
- Delivery rate 155 l/min



**CENTRAL LUBRICATION SYSTEM**

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

## OPTIMUM - OPTImill F 210HSC

Tool measuring / workpiece measuring			
		<b>Renishaw Tool/workpiece measuring</b>	<ul style="list-style-type: none"> <li>Information on „Renishaw“ on page 162</li> </ul>
		<b>Blum Tool/workpiece measuring</b>	<ul style="list-style-type: none"> <li>Information on „Blum“ on page 160</li> </ul>

Miscellaneous				
3536109	1	<b>Starter set SK 40 / DIN 69871</b>	<ul style="list-style-type: none"> <li>Information on the starter set „SK 40 / DIN 69871“ on page 145</li> </ul>	
3536110	2	<b>Starter set HSK A-63</b>	<ul style="list-style-type: none"> <li>Information on the starter set „HSK A-63“ on page 146</li> </ul>	
3511290502*	3	<b>Power transformer</b>	<ul style="list-style-type: none"> <li>For special clamping needs</li> </ul>	
3511290100*	4	<b>Coolant through spindle (CTS)</b>	<ul style="list-style-type: none"> <li>Integrated unit, 20 bar</li> </ul>	We recommend an extraction unit
3511290102*			<ul style="list-style-type: none"> <li>External unit; tank capacity 165 litres, 20 bar</li> </ul>	
3511290104*			<ul style="list-style-type: none"> <li>External unit; tank capacity 165 litres, 70 bar</li> </ul>	
3511290402*	5	<b>Air conditioner</b>	<ul style="list-style-type: none"> <li>Instead of standard equipment &gt; heat exchanger</li> </ul>	

Fourth and fifth axis			
3511290201*	6	<b>Fourth axis</b>	<ul style="list-style-type: none"> <li>Preparation</li> </ul>
3511290210*		<b>Fourth axis complete kit</b>	<ul style="list-style-type: none"> <li>Three-jaw lathe chuck 100 mm</li> <li>Tailstock</li> <li>SIEMENS motor</li> <li>Installation</li> </ul>
3511290202*	7	<b>Fourth and fifth axis</b>	<ul style="list-style-type: none"> <li>Preparation</li> </ul>
3511290250*		<b>Fourth and fifth axis complete kit</b>	<ul style="list-style-type: none"> <li>Three-jaw lathe chuck 100 mm</li> <li>Tailstock</li> <li>SIEMENS motor</li> <li>Installation</li> </ul>

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> <li>Arbitrary workpiece zero point per contour/drilling point</li> <li>Multiple contours/drilling points can be selected at the same time</li> <li>Generate and convert contours or drilling points for ShopMill</li> <li>Displays the created contours/drilling points in the geometry processor/ cycle support</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 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> <li>All new functions are system integrated and available with Sinumerik Operate</li> </ul>

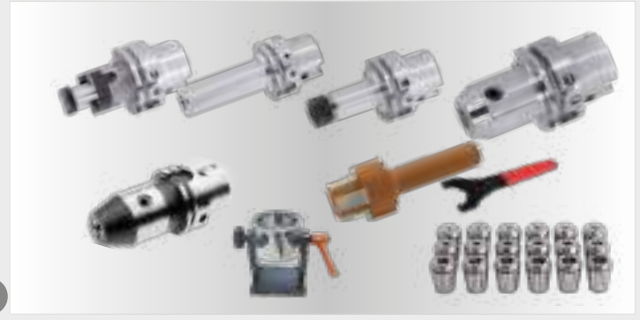




1

## STARTER SET SK 40 / DIN 69871

- Milling head holder
- Chuck 1 - 13 mm
- Pull stud
- Weldon
- Adapter SK 40 to MT 3
- Spring collet holder
- Spring collet key
- Collet chuck set
- Assembly adjustment aid
- Height-adjuster
- Taper squeegee



2

## STARTER SET HSK A-63

- Milling head holder with 27 mm collet
- Chuck 1 - 13 mm
- Weldon
- Adapter HSK63 to MT 3
- Spring collet holder
- Spring collet key
- Collet chuck set
- Swivelling mounting block
- Taper squeegee



3

## POWER TRANSFORMER

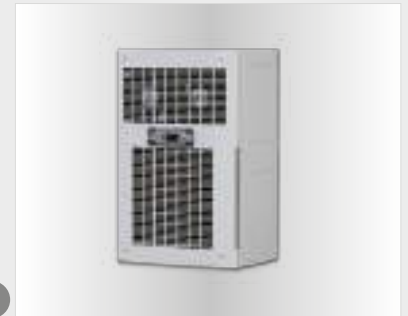
- For custom voltage
- Weight 147 kg



4

## COOLANT THROUGH SPINDLE

- Guarantees optimal service life
- Optionally with internal or external unit



5

## AIR CONDITIONER

- Instead of heat exchanger



6

## FOURTH AXIS

- Servo motor by Siemens
- Table diameter 120 mm
- Peak height vertical 115 mm
- Table height horizontal 170 mm
- Vertical overall height 193 mm



7

## FIFTH AXIS

- Servo motor by Siemens
- Table diameter 120 mm
- Peak height vertical 150 mm
- Vertical overall height 235 mm
- Tilt angle -20° ~ 120°



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 150/F 150HSC

---

Excellent precision, solid design, effectiveness and efficiency

---

## SIEMENS CONTROL 828D

---

- Heavy duty version
  - High productivity
  - High reliability
  - Profile rail with ball screw for fast rapid motion speeds on all axes
  - High-torque servo drives on all three axes
  - Torsion free machine base thanks to strong ribbing
  - Solid, precision milling table with four T-grooves, generously dimensioned with precision surface finish
  - Chip conveyor, screw auger type
  - Machine lamp in the workspace
  - RJ45 plug-in connection, USB connection and 230 V power connection
  - Coolant unit with 210 litre coolant tank and chip flushing system
  - Closed switch cabinet with integrated heat exchanger; ensures optimal temperature even in case of high ambient temperatures; prevents dirt particle penetration
  - Portable, electronic handwheel
  - Telescopic guide rail covers on all three axes
  - Including two years SIEMENS warranty
  - Information on „Warranty extension“ on page 61
  - Information on „Maintenance contracts“ from page 175
- 

## 2 variants available:

---

### F150

- Carousel tool changer with 16 tool slots
- Siemens control Sinumerik 828D with 10.4 inch colour display

### F150 HSC

- Double arm grab with 24 tool slots
- Siemens control Sinumerik 828D with 15.6 inch touch display
- Also available with KESSLER built-in high-frequency spindles (MADE IN GERMANY) at 24 000 rpm



Follow this for the video presentation of our Optimum milling machine F 150

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[www.youtube.com/user/OptimumMaschinen](http://www.youtube.com/user/OptimumMaschinen)



Fig. F150HSC with optional accessories

# TECHNICAL DATA



Models	F150	F150 HSC	
	Belt drive	Inline spindle	Kessler built-in
<b>Article no.</b>	3511210	3511212	3511290013**
<b>Speed range</b>			
Speeds*	10 000 rpm		24 000 rpm
<b>Machine data</b>			
Electrical connection	400 V / 3 Ph ~ 50 Hz		
Total connected load	31 kVA	48 kVA	
<b>Milling spindle</b>			
Drive motor S1 operation	9 kW	25 kW	
Torque drive motor S1 operation	57 Nm	32 Nm	
Drive motor S6 30% operation	21.2 kW	35 kW	
Torque drive motor S6 30% operation	135 Nm	39 Nm	
Spindle seat	SK 40 DIN 69871	HSK A-63 DIN 69893	
<b>Cooling lubricant system</b>			
Motor - coolant pumps, 3 pcs.	1.27 kW each		
Flow rate	66 - 100 l/min		
Tank capacity	210 litres		
<b>End mill size</b>			
Max. sensor head size	Ø 63 mm		
Max. shaft milling cutter size	Ø 32 mm		
<b>Milling precision</b>			
Repetition accuracy	± 0.005 mm		
Positioning accuracy	± 0.005 mm		
<b>Tool changer</b>			
Type	Carousel	Double arm grab	
Number of tool slots	16 slots	24 slots	
Max. tool diameter	89 mm	80 mm	
Max. tool weight	8 kg	8 kg	
Tool change time tool to tool	9 seconds	2 seconds	
<b>Travel</b>			
X axis	760 mm		
Y axis	440 mm		
Z axis	460 mm		
<b>Axis feed drive</b>			
Rapid motion X, Y, Z axis	30 000 mm/min.		
<b>Motor torque</b>			
X axis	6 Nm		
Y axis	6 Nm		
Z axis	11 Nm		
<b>Pneumatics</b>			
Compressed air	5 - 7 bar		
<b>Milling table</b>			
Clearance spindle to table	102 - 562 mm		
Throat	480 mm		
Table length x width	900 x 410 mm		
T-Slot size/distance/no	16 mm / 102 mm / 4		
Max. load bearing capacity	350 kg		
<b>Dimensions</b>			
Length x width x height	3 000 x 1 950 x 2 310 mm		
Overall weight	4 350 kg		
Transport surcharge	TPZ 3000		

Sinumerik 828D system software	F 150 / SW 26x	F 150HSC / SW 28x
CNC memory	5 MB	8 MB
Set change time	2 ms	1 ms
Look Ahead	100	150
Number of tools	256	512

\* Please note that the maximum spindle speed must be reduced by approx. 20 % in continuous operation without an optional oil cooler

\*\* Must be ordered with the basic machine. Cannot be retrofitted

# SINUMERIK 828D

## The power house in the compact CNC control class

### 2 variants available:

#### F 150

- 10.4" TFT colour display
- 4:3 format
- Front interfaces: RJ45 Ethernet, USB 2.0, Compact Flash (CF) Card
- 16 soft keys The 8 horizontal and 8 vertical soft keys take the user to all control windows with just a few key presses

#### F 150HSC: Control panel with PPU 290

- System software SW 28x
- 15.6" colour display
- 16:9 format
- Capacitive display with Multi-Touch controller
- Intuitive single-touch gesture control
- Soft key selection via touch function
- Integrated full "QWERTY" keyboard
- Proximity sensor/clearance sensor for smart display control
- Front panel made of die-cast magnesium with scratchproof glass front
- No battery (permanent intermediate data storage thanks to NV-RAM technology)
- No fan
- No hard disk
- Can be operated while wearing gloves
- Front interfaces: USB 2.0, RJ45 Ethernet, IP65 also with protective flap open



### The device of choice for any processing technology.

- Even at the highest machining speeds, the smart Advanced Surface (Standard) motion guidance and Top Surface (optional 3584012) ensure optimal workpiece surfaces.
- Transfer CAD data to programming with ease at the CNC thanks to DXF Reader (optional 3584014)
- 3D simulation on the PC ensures better control over and optimisation of the production process

### INCLUDING

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



Siemens

**SAFETY INTEGRATED**

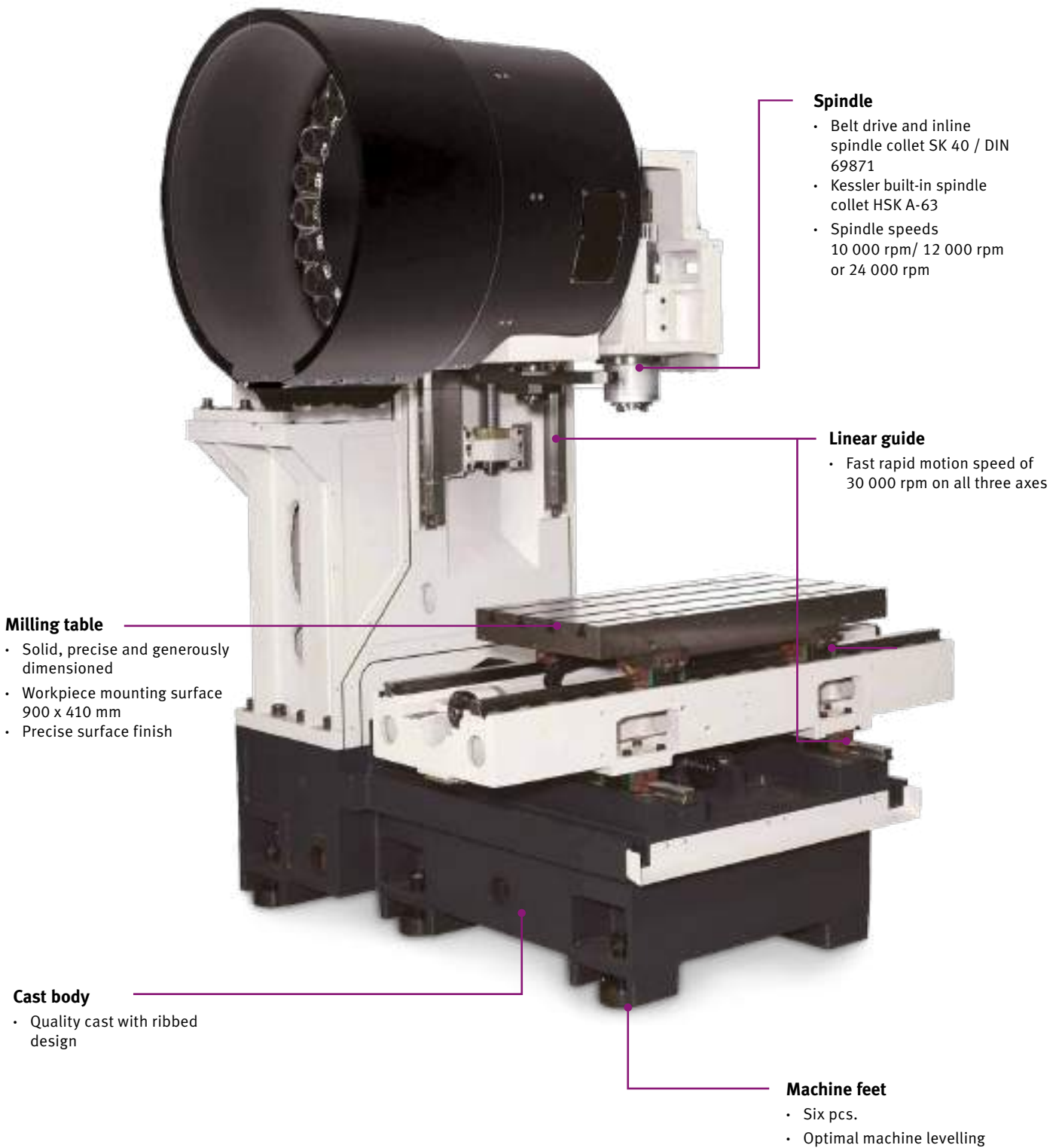
Set up work with open doors

### Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 12, 24 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)

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

## OPTIMUM - OPTImill F 150 / F 150 HSC





### CLEANING GUN

- Easy cleaning of the workspace



### HANDWHEEL

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



### HEAT EXCHANGER

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



### TOOL CHANGER SYSTEM

- F 150: Carousel type with 16 tool slots
- F 150HSC: Double arm grab with 24 tool slots
- Max. tool length 300 mm



### CHIP FLUSHING SYSTEM

- Powerful chip flushing system for cleaning the workspace and workpiece



### LINEAR GUIDE

- Profile rails with ball screw guides



### CHIP CONVEYOR

- Chip conveyor



### COOLING LUBRICANT SYSTEM

- Three powerful coolant pumps with 1.27 kW each
- Tank capacity 210 litres
- Delivery rate 66 - 100 l/min.





### CENTRAL LUBRICATION SYSTEM

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

# OPTIMUM - OPTImill F 150 / F 150 HSC

## Special equipment

Tool measuring / workpiece measuring		
	<b>Renishaw Tool/workpiece measuring</b>	<ul style="list-style-type: none"> <li>Information on „Renishaw“ on page 162</li> </ul>
	<b>Blum Tool/workpiece measuring</b>	<ul style="list-style-type: none"> <li>Information on „Blum“ on page 160</li> </ul>

F 150	F 150 HSC		
<b>Miscellaneous</b>			
3536109		<b>1 Starter set SK 40 / DIN 69871</b>	<ul style="list-style-type: none"> <li>Information on the starter set „SK 40 / DIN 69871“ on page 145</li> </ul>
3511290501*		<b>2 Power transformer</b>	<ul style="list-style-type: none"> <li>for special voltages</li> </ul>
-	3511290100*	<b>3 Coolant through spindle (CTS)</b>	<ul style="list-style-type: none"> <li>Integrated unit, 20 bar</li> </ul>
-	3511290102*		<ul style="list-style-type: none"> <li>External unit; tank capacity 165 litres, 20 bar</li> </ul>
-	3511290104*		<ul style="list-style-type: none"> <li>External unit; tank capacity 165 litres, 70 bar</li> </ul>
-	3511290002*	<b>Inline spindle 12 000 rpm</b>	<ul style="list-style-type: none"> <li>Instead of standard equipment &gt; 10 000 rpm</li> <li>Including spindle oil cooler (oil supply must be provided by customer)</li> </ul>
-	3511290401*	<b>Air conditioner</b>	<ul style="list-style-type: none"> <li>Instead of standard equipment &gt; heat exchanger</li> </ul>
-	3511290303*	<b>4 Chip conveyor, belt-type</b>	<ul style="list-style-type: none"> <li>Instead of standard equipment &gt; chip conveyor, screw auger type</li> </ul>
-	3511290301*	<b>5 Chip carriage</b>	<ul style="list-style-type: none"> <li>L x W x H: 994 x 510 x 838 mm, capacity: 65 litres</li> <li>For chip conveyors</li> </ul>

F 150	F 150HSC		
<b>Fourth and fifth axis</b>			
-	3511290201*	<b>Fourth axis</b>	<ul style="list-style-type: none"> <li>Preparation</li> </ul>
-	3511290210*	<b>6 Fourth axis complete kit</b>	<ul style="list-style-type: none"> <li>Three-jaw lathe chuck 100 mm</li> <li>Tailstock</li> <li>SIEMENS motor</li> <li>Installation</li> </ul>
-	3511290202*	<b>Fourth and fifth axis</b>	<ul style="list-style-type: none"> <li>Preparation</li> </ul>
-	3511290250*	<b>7 Fourth and fifth axis complete kit</b>	<ul style="list-style-type: none"> <li>Three-jaw lathe chuck 100 mm</li> <li>Tailstock</li> <li>SIEMENS motor</li> <li>Mounting</li> </ul>

F 150	F 150 HSC		
<b>Software</b>			
-	3584014	<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	<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 SK 40 / DIN 69871

- Milling head holder with 27 mm collet
- Chuck 1 - 13 mm
- Pull stud
- 2 each Weldon 6 mm and 20 mm
- 2 each Weldon 8 mm, 10 mm, 12 mm and 16 mm
- Adapter SK 40 to MT 3
- Spring collet holder ER 32
- Spring collet key ER 32
- Spring collet set ER 32
- Assembly and tool adjustment gauge
- Height-adjuster
- Taper squeegee



2

## POWER TRANSFORMER

- For custom voltage
- Weight 147 kg



3

## COOLANT THROUGH SPINDLE

- Guarantees optimal service life
- Optionally with internal or external unit



4

## AIR CONDITIONER

- Instead of heat exchanger



5

## CHIP TROLLEY/CONVEYOR

- Conveyor version
- For efficient chip discharge



6

## FOURTH AXIS

- Servo motor by Siemens
- Table diameter 120 mm
- Peak height vertical 115 mm
- Table height horizontal 170 mm
- Vertical overall height 193 mm



7

## FIFTH AXIS

- Servo motor by Siemens
- Table diameter 120 mm
- Peak height vertical 150 mm
- Vertical overall height 235 mm
- Tilt angle -20° ~ 120°



# F 120X

---

**Drilling and thread tapping machine with full milling capability**

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**SIEMENS SINUMERIK 828D**

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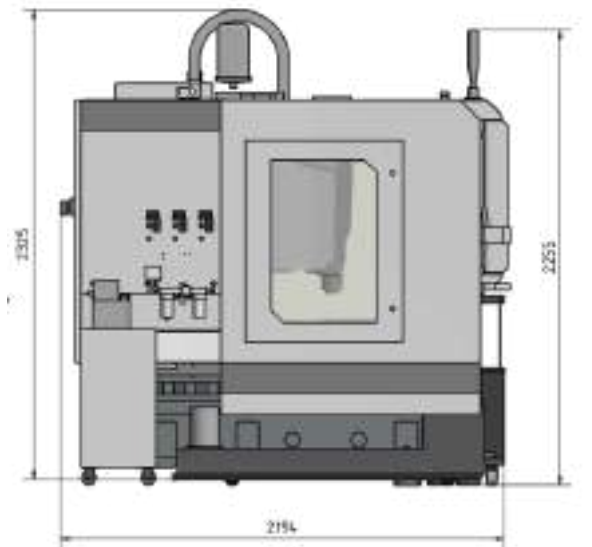
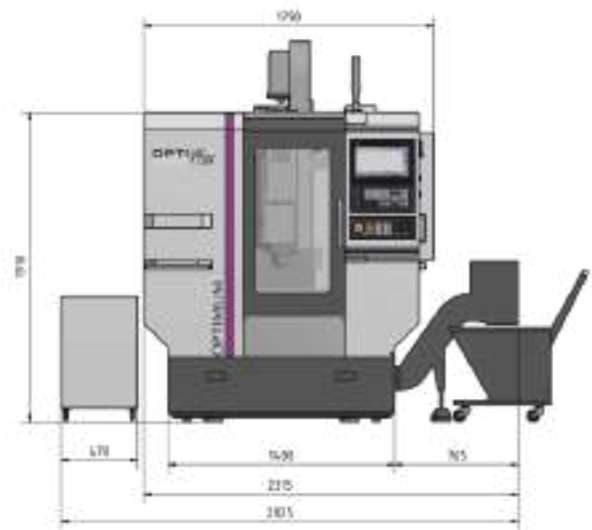
- Rugged design
- Servo tool changer with 16 tool slots
- All linear guides with stainless steel covers
- Automatic centralised lubrication
- Machine lamp in the workspace
- Portable, electronic handwheel with confirm button and emergency stop mushroom button.  
Substantially facilitates running in of programs
- Coolant system
- Fully automatic tool change
- Solid, precision milling table with precision surface finish
- Access doors very generously designed to reduce cleaning and maintenance times to a minimum
- SIEMENS servo drives on all axes
- Chip conveyor, belt-type
- Chip carriage
- Inline spindle 16 000 rpm
- Ball screws on all axes
- Oil cooler, compensates for temperature fluctuations at the main spindle
- Including two years SIEMENS warranty
- Information „Warranty extension“ on page 69
- Information on „Maintenance contracts“ from page 175



Fig. F 120X with optional accessories

# TECHNICAL DATA

Model	F 120X
Article no.	3515120
<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
Drive motor torque S1	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 motor	370 W
Tank capacity	120 litres
<b>End mill size</b>	
Max. sensor head size	Ø 63 mm
Max. shaft milling cutter size	Ø 25 mm
<b>Milling precision</b>	
Repetition accuracy	± 0.006 mm
Positioning accuracy	± 0.005 mm
<b>Tool changer</b>	
Type	Servo
Number of tool slots	16
Max. tool diameter	Ø 80 mm
Max. tool length	80 mm
Max. tool weight	3 kg
Tool change time tool to tool	0.5 seconds
<b>Travel</b>	
X axis	500 mm
Y axis	400 mm
Z axis	300 mm
<b>Feed drive axes (X, Y, Z axis)</b>	
Rapid traverse	40 000 mm/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
Drive motor torque S1	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/distance/no	14 mm / 125 mm / 3
Max. load bearing capacity	250 kg
<b>Dimensions</b>	
Length x width x height (with chip conveyor)	2 315 x 2 194 x 2 325 mm
Overall weight	3 800 kg



## F 120X - Punch Tap READY

Punch Tap Cycle installed

Punch Tap revolutionizes thread production  
see page 71



Sinumerik 828D system software	SW 28x
CNC memory	8 MB
Set change time	1 ms
Look Ahead	150
Number of tools	512

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

# SINUMERIK 828D with OP 019 black Multitouch control panel

## The device of choice for any machining technology

- Even at the highest machining speeds, the smart Advanced Surface (Standard) motion guidance and Top Surface (optional article no. 3584012) ensure optimal workpiece surfaces.
- Transfer CAD data to programming with ease at the CNC thanks to DXF Reader (optional article no. 3584014)
- 3D simulation on the PC ensures better control over and optimisation of the production process

## INCLUDING

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

## Control with control panel featuring PPU 290

- 15.6" colour display
- 16:9 format
- Capacitive display with Multi-Touch controller
- Intuitive single-touch gesture control
- Soft key selection via touch function
- Integrated full "QWERTY" keyboard
- Proximity sensor/clearance sensor for smart display control
- Front panel made of die-cast magnesium with scratchproof glass front
- No battery (permanent intermediate data storage thanks to NV-RAM technology)
- No fan
- No hard disk
- Can be operated while wearing gloves
- Front interfaces: USB 2.0, RJ45 Ethernet, IP65 also with protective flap open

### Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 12, 24 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)

12 months - Article no. 3589020

24 months - Article no. 3589021

36 months - Article no. 3589022



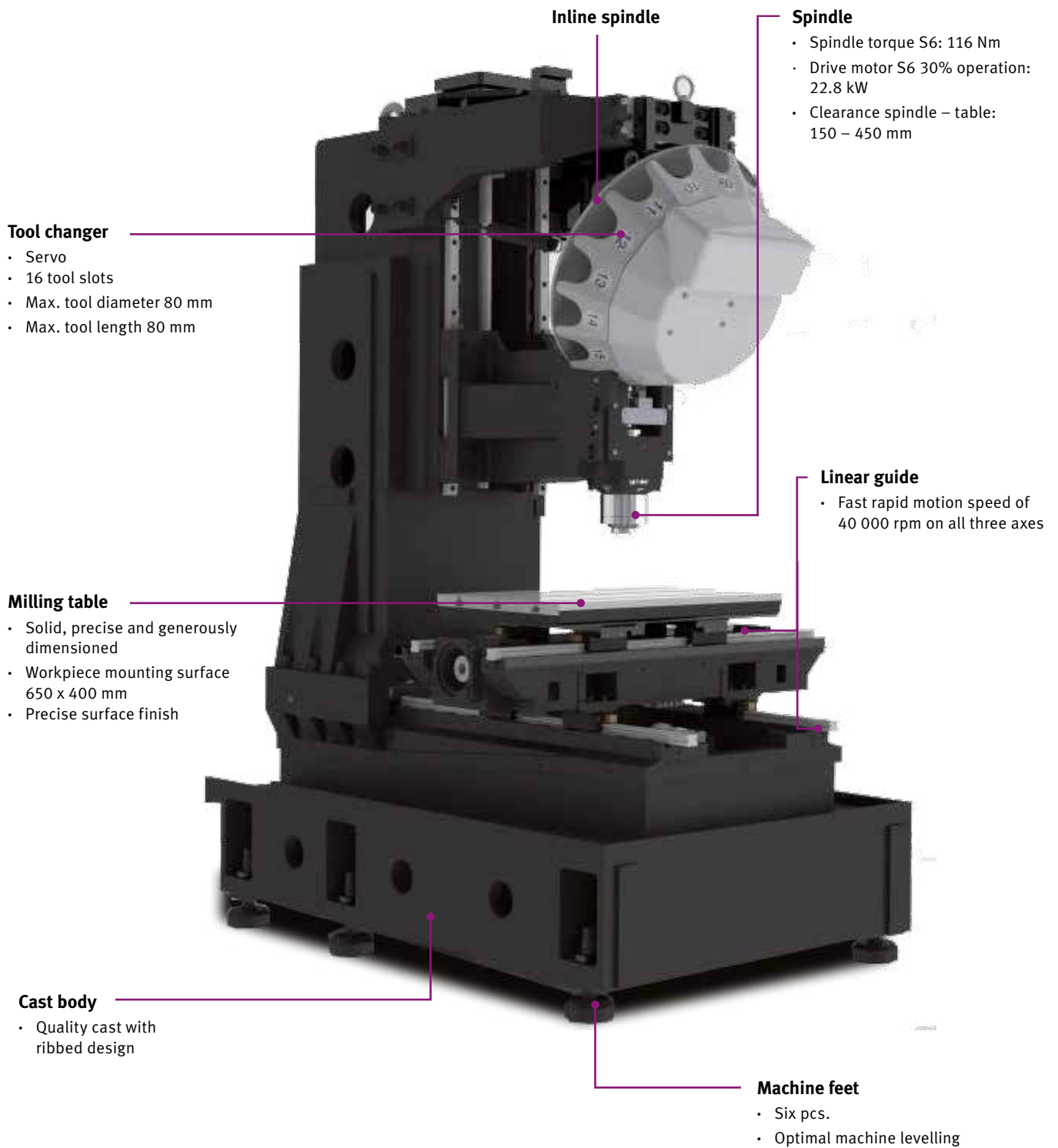
Siemens  
**SAFETY INTEGRATED**  
Set up work with open doors

## Functional safety also provides protection against high costs!

- Avoiding the direct consequential cost of injury to persons
- Avoiding the indirect consequential cost of injuries
- Improved productivity thanks to increased machine availability: less unplanned downtime and more trouble-free production
- Longer period of use for system
- Improvement in global competitiveness thanks to boosting the export capability of machines

# RUGGED DESIGN

Dynamics, precision and ergonomics



### Tool changer

- Servo
- 16 tool slots
- Max. tool diameter 80 mm
- Max. tool length 80 mm

### Inline spindle

### Spindle

- Spindle torque S6: 116 Nm
- Drive motor S6 30% operation: 22.8 kW
- Clearance spindle – table: 150 – 450 mm

### Milling table

- Solid, precise and generously dimensioned
- Workpiece mounting surface 650 x 400 mm
- Precise surface finish

### Linear guide

- Fast rapid motion speed of 40 000 rpm on all three axes

### Cast body

- Quality cast with ribbed design

### Machine feet

- Six pcs.
- Optimal machine levelling



### HANDWHEEL

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



### SPINDLE OIL COOLER

- Compensates for temperature fluctuations at the main spindle



### TOOL CHANGER

- Servo
- 16 tool slots
- Tool exchange time tool to tool: 0.5 seconds



### CONTROL CABINET

- Clear-cut
- With Siemens servo drive
- Standards-compliant setup



### LINEAR GUIDE

- High permissible load and high stiffness
- Low coefficient of friction



### STORAGE COMPARTMENTS

- Keep tools within reach on the machine

## Punch Tap revolutionizes thread production

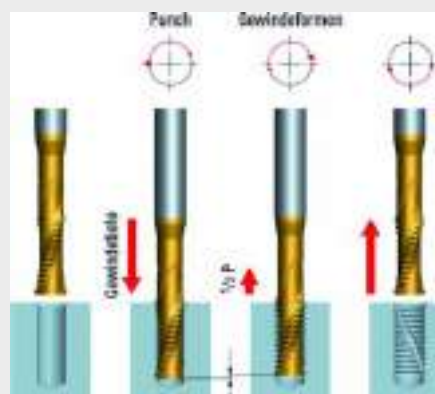
Audi and Emuge-Franken have jointly developed a new technology for threading.

The aim was to save time and energy during threading. This has been achieved with impressive results.

A comparison between the tool path of the EMUGE Punch Tap with the tool path of conventional taps or cold-forming taps shows that the path of the Punch Tap is approximately 15 times shorter for a thread M6 with thread depth of 15 mm.

The result is a significant time savings of up to 75% in a threading cycle.

<https://punchtap.com>



# F 105

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The compact solution for small batch production in SMEs

---

## SIEMENS SINUMERIK 808D ADVANCED

---

- Rugged design
- Carousel tool changer with 12 tool slots
- All linear guides with stainless steel covers
- Automatic centralised lubrication
- Siemens main spindle motor
- Servo drive by SIEMENS on all axes (closed control circuit)
- Max. spindle speed up to 10 000 rpm
- Machine lamp in the workspace
- Portable, electronic handwheel with confirm button and emergency stop mushroom button. Substantially facilitates running in of programs
- Integrated 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
- Software package "SINUMERIK 808D on PC" included. (Practical training software allowing workpieces to be programmed and simulated on a PC offline. Software can be downloaded free of charge from [www.cnc4you.com](http://www.cnc4you.com).)
- Including two years SIEMENS warranty
- Information on „Warranty extension“ on page 74
- Information on „Maintenance contracts“ from page 175



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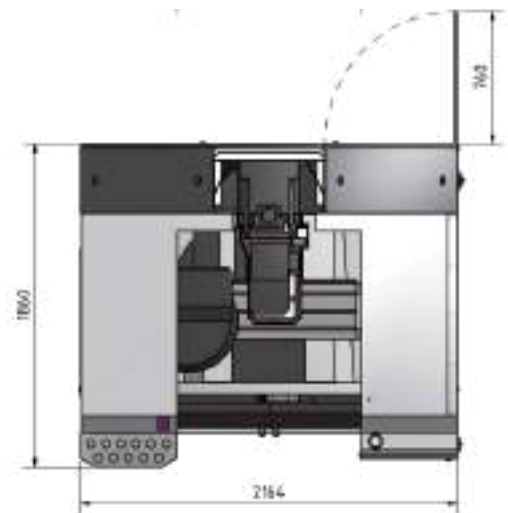




Fig. with optional accessories

# 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 motor	650 W
Tank capacity	120 litres
<b>End mill size</b>	
Max. sensor head size	Ø 63 mm
Max. shaft milling cutter size	Ø 35 mm
<b>Milling precision</b>	
Repetition accuracy	± 0.008 mm
Positioning accuracy	± 0.01 mm
<b>Tool changer</b>	
Type	Carousel
Number of tool slots	12 tools
Max. tool diameter	Ø 63 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>Axis feed drive</b>	
Rapid motion X, Y, Z axis	10 000 mm/min
<b>Motor torque</b>	
X axis	8 Nm
Y axis	8 Nm
Z axis	11 Nm
<b>Speed range</b>	
Speeds*	10 - 10 000 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/distance/no	• 14 mm / 100 mm / 3
Max. load bearing capacity	300 kg
<b>Dimensions</b>	
Length x width x height	2 164 x 1 860 x 2 200 mm
Overall weight	2 800 kg
Transport surcharge	TPZ 3000



## SIEMENS CONTROLS:

### SINUMERIK 808D ADVANCED

- RJ45 Ethernet port
- 8.4" LCD colour display with a resolution of 800x600
- 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

#### Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 12 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)

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

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

## OPTIMUM - OPTImill F 105

Standard equipment



### STORAGE COMPARTMENT

- Keep tools within reach on the machine



### HANDWHEEL

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



### MAIN SPINDLE

- Spindle speed from 10 to 10 000 rpm



### TOOL CHANGER

- Carousel
- 12 tool slots
- Tool exchange time: 7 seconds



### CONTROL CABINET

- Clear-cut
- With Siemens servo drive
- Standards-compliant setup



### LINEAR GUIDE

- High permissible load and high stiffness
- Low coefficient of friction

## RENISHAW PRIMO SET

Article No.: 3582031

Comprises:

- Tool measuring probe Radio Part Setter
- Tool measuring probe Radio 3D Tool
- Primo Interface
- GoProbe Software
- Collet BT 40
- License for six months



More information on „Renishaw Primo“ on page 163

## FOURTH AXIS COMPLETE KIT

Article No.: 3501120\*

**ONLY WITH SINUMERIK 808D ADVANCED**

Comprises:

- Three-jaw lathe chuck 125 mm
- Tailstock
- Installation



## STARTER SET BT 40

- Starter kit BT 40 - Article no.: 3536108
- Information on this „BT 40“ on page 144

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

# F 80

---

**Ideal for part production, prototype and jig building**

---

## **SIEMENS SINUMERIK 808D ADVANCED**

---

- Machine with cast stand design for good stiffness values
- Carousel tool changer with ten tool slots
- All linear guides with stainless steel covers
- Automatic centralised lubrication
- Machine lamp in the workspace
- Siemens main spindle motor
- SIEMENS servo drives on all axes (closed control circuit)
- Max. spindle speed up to 10 000 rpm
- Portable, electronic handwheel with confirm button and emergency stop mushroom button. Substantially facilitates running in of programs
- Integrated coolant unit with 70 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
- Software package "SINUMERIK 808D on PC" included. (Practical training software allowing workpieces to be programmed and simulated on a PC offline. Download for free on [www.cnc4you.com](http://www.cnc4you.com))
- Including two years SIEMENS warranty
- Information on „Warranty extension“ on page 78
- Information on „Maintenance contracts“ from page 175



Follow this for the video presentation of our Optimum milling machine F 80

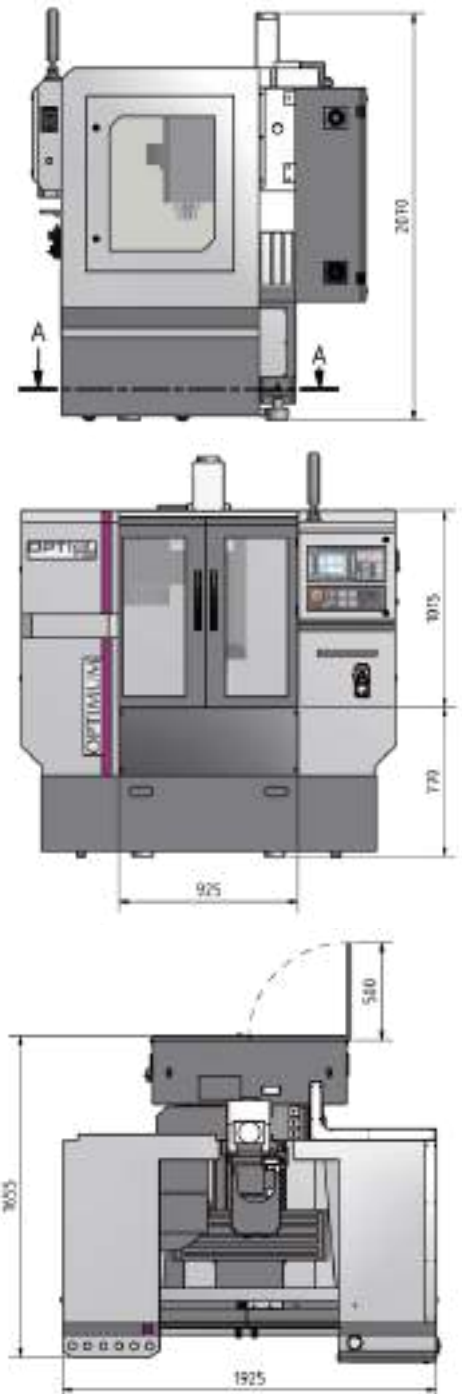
**Subscribe** to our YouTube channel, to avoid missing any of the new videos: [www.youtube.com/user/OptimumMaschinen](http://www.youtube.com/user/OptimumMaschinen)



Fig. with optional accessories

# TECHNICAL DATA

Model	F 80
Article no.	3501085
<b>Machine data</b>	
Electrical connection	400 V / 3 Ph ~ 50 Hz
Total connected load	14 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	35 Nm
Spindle seat	BT 30
<b>Cooling lubricant system</b>	
Coolant pump motor	650 W
Tank capacity	70 litres
<b>End mill size</b>	
Max. sensor head size	Ø 52 mm
Max. shaft milling cutter size	Ø 25 mm
<b>Milling precision</b>	
Repetition accuracy	±0.008 mm
Positioning accuracy	± 0.01 mm
<b>Tool changer</b>	
Type	Carousel
Number of tool slots	10 tools
Max. tool diameter	Ø 52 mm
Tool length	200 mm
Max. tool weight	6 kg
Tool change time	7 seconds
<b>Travel</b>	
X axis	400 mm
Y axis	225 mm
Z axis	375 mm
<b>Axis feed drive</b>	
Rapid motion X, Y, Z axis	10 000 mm/min.
<b>Motor torque</b>	
X axis	3.5 Nm
Y axis	6 Nm
Z axis	6 Nm
<b>Speed range</b>	
Speeds*	50 - 10 000 rpm
<b>Pneumatics</b>	
Compressed air	7 bar
<b>Milling table</b>	
Clearance spindle to table	75 - 475 mm
Table length x width	800 x 260 mm
T-Slot size/distance/no	16 mm / 50 mm / 5
Max. load bearing capacity	150 kg
<b>Dimensions</b>	
Length x width x height	1 925 x 1 655 x 2 070 mm
Overall weight	1 900 kg
Transport surcharge	TPZ 2000



## SIEMENS CONTROL:

### SINUMERIK 808D ADVANCED

adds verve to the milling machine. CNC technology from the technology leader, combined with a revolutionary operating strategy, makes the SINUMERIK 808D ADVANCED perfect for the world of CNC.

- RJ45 Ethernet port
- 8.4" LCD colour display with a resolution of 800x600
- 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



### Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 12 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)

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



**STORAGE COMPARTMENT**

- Keep tools within reach on the machine



**HANDWHEEL**

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



**SIGNAL LAMP**

- Visually displays the machine status



**TOOL CHANGER**

- Carousel
- 10 tool slots
- Tool exchange time: 7 seconds



**CONTROL CABINET**

- Clear-cut
- Standards-compliant setup
- Drives by Siemens



**ENERGY CHAIN**

- Routing conserves cable and hose material

**RENISHAW PRIMO SET**

Article No.: 3582030

Comprises:

- Tool measuring probe Radio Part Setter
- Tool measuring probe Radio 3D Tool
- Primo Interface
- GoProbe Software
- Collet BT 30
- License for six months



More information on „Renishaw Primo“ on page 163

**STARTER SET BT 30**

Article No.: 3536107

Comprises:

- 1 pc. milling head holder
- 1 pc. chuck
- 2 pcs. Weldon 6 mm
- 1 pc. Weldon 8 mm
- 1 pc. Weldon 10 mm
- 1 pc. Weldon 12 mm
- 1 pc. Weldon 16 mm
- 2 pcs. Weldon 20 mm
- 1 pc. adapter BT 30
- 3 pcs. spring collet holder ER 32
- 1 pc. spring collet spanner ER 32
- 18-part spring collet set ER 32
- 1 pc. height adjuster
- 1 pc. assembly and tool adjustment gauge
- 14 pcs. pull studs
- 1 pc. taper squeegee

More information on the starter set „BT 30“ on page 143

# F 3Pro

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**Universal milling machines with servo drives**

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**SIEMENS SINUMERIK 808D ADVANCED**

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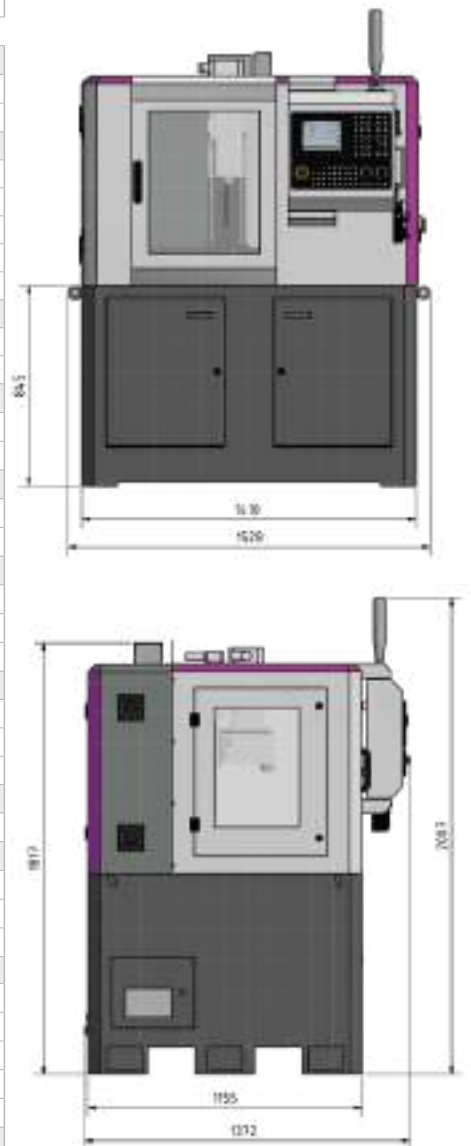
- Linear guides on all axes
- All axes with ball screws
- Servo drive on all axes (X, Y and Z axis)
- Tool change at the push of a button (electropneumatic tool clamping device)
- Coolant equipment
- Central lubrication
- Swivelling control panel
- Software package "SINUMERIK 808D on PC" included. (Practical training software allowing workpieces to be programmed and simulated on a PC offline. Download for free on [www.cnc4you.com](http://www.cnc4you.com))
- Including two years SIEMENS warranty
- Information on „Warranty extension“ on page 82
- Information on „Maintenance contracts“ from page 175





# 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
Drive motor S6 30% operation	2.2 kW
Torque drive motor S6 30% operation	14 Nm
Spindle seat	BT 30
<b>Cooling lubricant system</b>	
Coolant pump motor	95 W
Tank capacity	30 litres
<b>End mill size</b>	
Max. sensor head size	Ø 50 mm
Max. shaft milling cutter size	Ø 25 mm
<b>Milling precision</b>	
Repetition accuracy	± 0.02 mm
Positioning accuracy	± 0.01 mm
<b>Travel</b>	
X axis	355 mm
Y axis	190 mm
Z axis	245 mm
<b>Feed speed</b>	
X axis	10 000 mm/min.
Y axis	10 000 mm/min.
Z axis	10 000 mm/min.
<b>Speed range</b>	
Speeds*	4 000 rpm
<b>Motor torque</b>	
X axis	1.9 Nm
Y axis	3.5 Nm
Z axis	3.5 Nm
<b>Milling table</b>	
Throat	220 mm
Clearance spindle to table	50 - 295 mm
Table length x width	620 x 180 mm
T-Slot size/distance/no	12 mm / 50 mm / 3
Max. load bearing capacity	30 kg
<b>Dimensions</b>	
Length x width x height	1 410 x 1 372 x 2 007 mm
Overall weight	1 000 kg
Transport surcharge	TPZ 2000



## SIEMENS CONTROL:

### SINUMERIK 808D ADVANCED

adds verve to the milling machine. CNC technology from the technology leader, combined with a revolutionary operating strategy, makes the SINUMERIK 808D ADVANCED PPU 15X perfect for the world of CNC.

- 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 extension

The warranty extension lets you protect your new machine against warranty damage for a further 12 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)  
**12 months - Article no. 3589010; 36 months - Article no. 3589012**





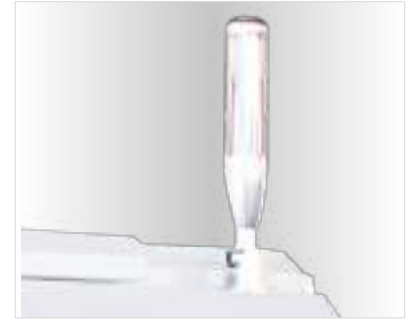
### WORK AREA

- Clearly visible from three sides
- Clear, resilient Makrolon panes



### HANDWHEEL

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



### SIGNAL LAMP

- Visually displays the machine status



### CONNECTIONS

- For easy access
- Easy to connect to the machine
- Socket
- RJ45



### LINEAR GUIDE

- High permissible load and high stiffness
- Low coefficient of friction
- Excellent error compensation due to X layout



### TOOL CHANGE

- Pneumatic at the push of a button
- BT 30 collet

## RENISHAW PRIMO SET

Article No.: 3582030

### Comprises:

- Tool measuring probe Radio Part Setter
- Tool measuring probe Radio 3D Tool
- Primo Interface
- GoProbe Software
- Collet BT 30
- License for six months



More information on „Renishaw Primo“ on page 163

## STARTER SET BT 30

Article No.: 3536107

### Comprises:

- 1 pc. milling head holder
- 1 pc. chuck
- 2 pcs. Weldon 6 mm
- 1 pc. Weldon 8 mm
- 1 pc. Weldon 10 mm
- 1 pc. Weldon 12 mm
- 1 pc. Weldon 16 mm
- 2 pcs. Weldon 20 mm
- 1 pc. adapter BT 30
- 3 pcs. spring collet holder ER 32
- 1 pc. spring collet spanner ER 32

More information on the starter set „BT 30“ on page 143

## CNC lathes

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Page 86	S 500 / S 500L / S 750K / S 750
Page 94	S 620 / S 620L
Page 102	S 600
Page 110	L 440 / L 460
Page 118	L 44
Page 126	S 400E
Page 130	L 34HS
Page 134	L 28HS



# OPTIMUM<sup>®</sup>

MASCHINEN - GERMANY



## LATHES

# S 500 / S 500L S 750K / S 750

---

**OPTIMUM PREMIUM CNC lathes impress with high speeds, precision and efficiency and with additional equipment such as chip conveyors and a C axis**

---

## **SIEMENS SINUMERIK 828D**

---

- Rugged and heavy "Cartridge" spindle system with one two-row cylinder roller bearing each at the front and back, and a double-side taper bearing in the centre
- Long service life of all bearings thanks to permanent lubrication
- All axes with SIEMENS servomotors
- All axes directly driven to eliminate torsion backlash or for greater precision in thread tapping and contour machining
- Doubly pre-stressed ball screw spindles with low helix slope to increase feed force
- Fast turret head switching - releasing and rotation occur practically at the same time
- Turret head switching occurs non-stop bi-directionally
- Programmable tailstock where the spindle sleeve is activated with the pedal or in the program
- Tailstock body can be positioned with a drive rod
- Portable electronic handwheel
- Hydraulic tool turret by Sauter with driven tools
- Automatic door opening with monitoring
- Coolant system
- Heat exchanger
- Bar feeder interface
- Chip conveyor and chip trolley
- Automatic Renishaw tool measuring arm for tool measuring
- Programmable part catcher
- Including two years of SIEMENS warranty
- Information on „Warranty extension“ on page 89
- Information on „Maintenance contracts“ on page 175



# TECHNICAL DATA

Model	S 500	S 500L	S 750K	S 750
Article no.	3515150	3515152	3515172	3515170
<b>Machine data</b>				
Electrical connection	400 V / 3 Ph ~ 50 Hz			
Total connected load	50 kVA		62.5 kVA	
<b>Spindle</b>				
Drive motor S1 operation	17 kW		30 kW	
Torque drive motor S1 operation	162 Nm		186 Nm	
Drive motor S6 30% operation	25.5 kW		45 kW	
Torque drive motor S6 30% operation	463 Nm		1 064 Nm	
Spindle seat	DIN ISO 702-1 No. 6		DIN ISO 702-1 No. 8	
Spindle bore	Ø 66 mm*		Ø 88 mm*	
Chuck passage	Ø 52 mm		Ø 77 mm	
Hydraulic lathe chuck	Ø 200 mm		Ø 250 mm	
<b>Cooling lubricant system</b>				
Coolant pump output	750 W			
Tank capacity	185 litres			
<b>Hydraulic system</b>				
Output of hydraulic pump	1.5 kW			
Tank capacity	70 litres			
<b>Machine data</b>				
Centre height	600 mm			
Max. turning diameter	Ø 485 mm			
Max. turning length* with tool turret	750 mm	1 250 mm	750 mm	1 250 mm
Swing over cross slide	Ø 450 mm			
Swing diameter over machine bed	Ø 600 mm			
Angled bed	45°			
<b>Speed range</b>				
Spindle speeds	10 - 4 500 rpm		10 - 3 000 rpm	
<b>Tool turret</b>				
Hydraulic type	Sauter VDI40 with tool drive			
Number of tool slots	12 tools			
Max. permissible speed at tool coupling	max. 4 500 rpm			
Tool output	4.82 kW			
Max. tool torque	20 Nm			
Max. chuck height, width square	25 x 25 mm			
Max. chuck diameter drilling rod	Ø 32 mm			
<b>Precision</b>				
Repetition accuracy	± 0.005 mm			
Positioning accuracy	± 0.005 mm			
<b>Travel</b>				
X axis	305 mm			
Z axis	750 mm	1 250 mm	750 mm	1 250 mm
Y axis (optional)	+/- 50 mm			
<b>Feed speed</b>				
X axis/Y axis	24 000 mm/min			
<b>Motor torque</b>				
X axis	11 Nm			
Z axis	27 Nm			
<b>Tailstock</b>				
Tailstock chuck	MT 5			
Travel	650 mm	1 150 mm	650 mm	1 150 mm
Tailstock quill diameter	90 mm			
Tailstock - quill stroke hydraulic	120 mm			
<b>Dimensions</b>				
Length with/without chip conveyor	3 015 mm	4 114 mm	3 515 mm	4 614 mm
width x height	1 856 x 2 016 mm		1 856 x 2 016 mm	
Overall weight	5 600 kg	6 400 kg	5 700 kg	6 500 kg

Sinumerik 828D system software	SW 26x
CNC memory	5 MB
Set change time	2 ms
Look Ahead	100
Number of tools	256

\* depending on installed lathe chuck



# SINUMERIK 828D

## High-tech for the compact class

### The device of choice for any machining technology

- State-of-the-art processor technology and software architecture form the basis for 80-bit NANOFP precision (80-bit floating point precision)
- Premium, robust operator manels made of die-cast magnesium with IP65 degree of protection
- Maintenance-free front control panel (no fan, battery, hard disk or similar)
- ShopTurn: shortest programming time for creating one-off parts and small batches

### Control system

- 10.4" colour display
- 4:3 format
- User-friendly SINUMERIK Operate software
- Front interfaces: USB 2.0, RJ45 Ethernet, Compact Flash (CF) Card
- The 8 horizontal and 8 vertical soft keys take the user to all control windows with just a few key presses
- Rugged and robust

### INCLUDING

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

### Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 12, 24 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)

12 months - Article no. 3589020

24 months - Article no. 3589021

36 months - Article no. 3589022



Siemens

**SAFETY INTEGRATED**

Set up work with open doors

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

- Avoiding the direct consequential cost of injury to persons
- Avoiding the indirect consequential cost of injuries
- Improved productivity thanks to increased machine availability: less unplanned downtime and more trouble-free production
- Longer period of use for system
- Improvement in global competitiveness thanks to boosting the export capability of machines

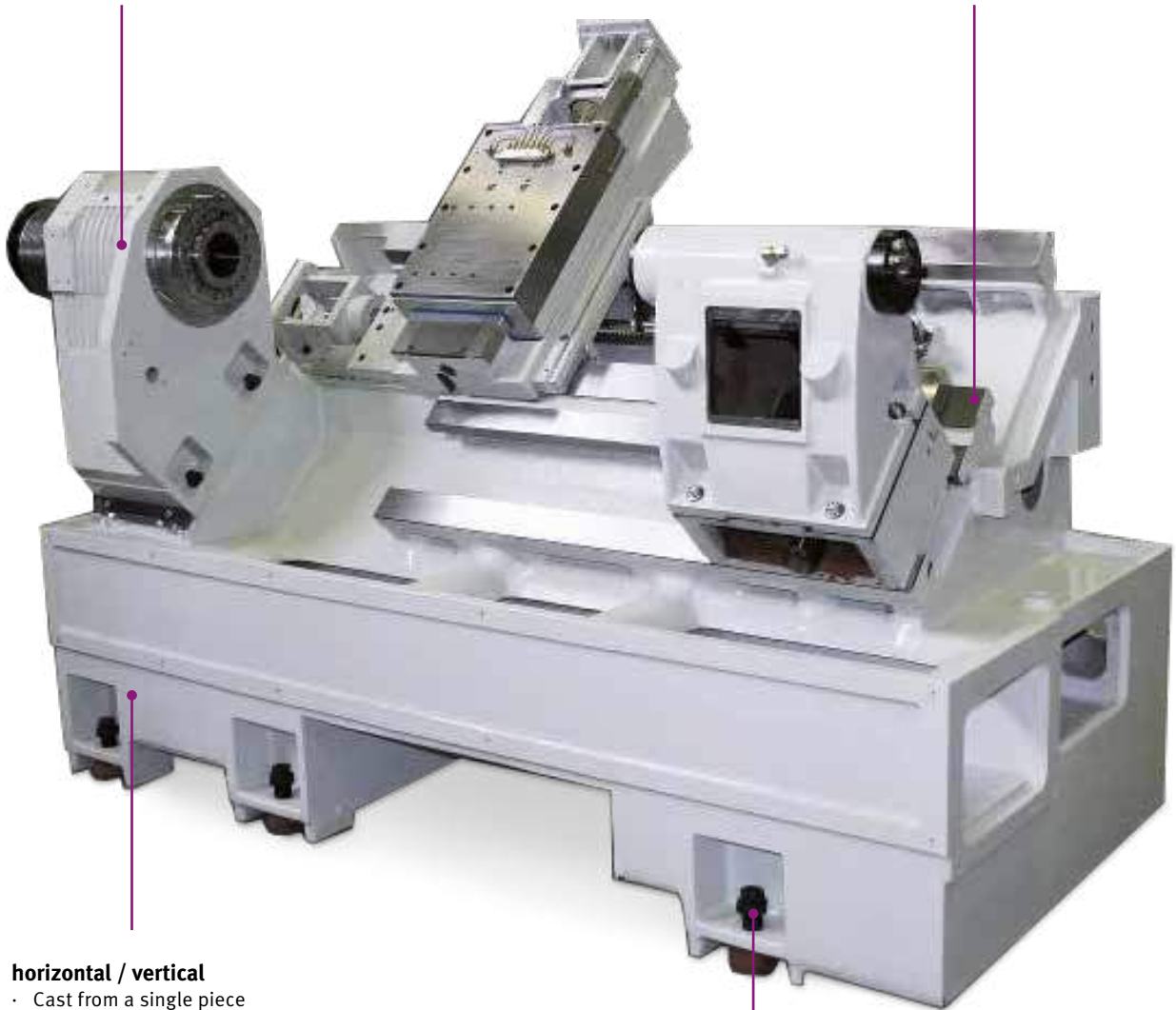
## OPTIMUM - OPTturn S 500 / S 500L / S 750 / S 750K

### Spindle stock

- Cast meehanite
- Cooling ribs on outside dissipate heat more effectively

### Guide

- Excellent stiffness and stability



### horizontal / vertical

- Cast from a single piece
- Pronounced ribbing
- 45-degree slope
- Excellent stiffness and durability
- Cast meehanite with hardness HB 170 ~ 180

### Machine feet

- Six pcs.
- Optimal machine levelling



### LASER MEASURING

- Guaranteed repetition and positioning accuracy



### C AXIS

- Excellent part precision and fast tool changes
- Swivel range, high torque and maximum stability



### TAILSTOCK

- Programmable
- Heavy duty version
- Excellent stiffness
- Can be optionally operated via a program or the foot pedal



### TOOL WITH INTERNAL COOLING

- Pressure: 20 bar
- Filter precision 25µm



### PART GRIPPER DEVICE

- Automatic



### BAR FEEDER

- Preparation
- Connection for bar feeder



### AUTOMATIC RENISHAW MEASURING ARM

- Far less time spent on setting up tools and workpieces
- Less scrap due to setup errors
- Break detection



### CHIP CONVEYOR - TROLLEY

- Conveyor version



### FOOT PEDAL

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

## OPTIMUM - OPTiturn S 500 / S 500L / S 750 / S 750K

### Special equipment

S 500 S 500L	S 750 S 750K			
<b>Tool turret and Y axis</b> (Please note: travel can change)				
351515018	351517018	1	<b>Y axis including Sauter tool turret With drive</b>	<ul style="list-style-type: none"> <li>Stroke +/- 50 mm</li> <li>instead of standard equipment &gt; hydraulic tool turret</li> </ul>
<b>Bar feeder</b>				
351515003	351517003	2	<b>Bar feeder Pro V 65E</b>	1.5 metres More information: „Short bar loader“ on page 158
351515012	351517012		<b>Bar feeder Pro Conqueror</b>	3 metres More information: „Short bar loader“ on page 158
<b>Tool holder</b>				
351515006	351517006	3	<b>Axially driven tool holder</b>	<ul style="list-style-type: none"> <li>Spring collet ER 32</li> </ul>
351515007	351517007	4	<b>Radially driven tool holder</b>	<ul style="list-style-type: none"> <li>Spring collet ER 32</li> </ul>
351515008	351517008	5	<b>Radially driven tool holder on rear side</b>	<ul style="list-style-type: none"> <li>Spring collet ER 32</li> </ul>
<b>Steady rests</b>				
351515010	351517010	6	<b>Fixed steady</b>	<ul style="list-style-type: none"> <li>Passageway Ø 20 - Ø 200 mm</li> </ul>
<b>Miscellaneous</b>				
351515009	351517009	7	<b>Air conditioner</b>	<ul style="list-style-type: none"> <li>Instead of standard equipment &gt; heat exchanger</li> </ul>
351515001	351517001		<b>Oil separator</b>	<ul style="list-style-type: none"> <li>With rotary disc, removes oil from the coolant</li> <li>Capacity: 1 litre per hour</li> </ul>
<b>Software</b>				
3584014		9	<b>Software DXF Viewer/Reader</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>
<b>Hardware</b>				
351515030		8	<b>Siemens control PPU 290</b>	<ul style="list-style-type: none"> <li>15.6" colour display- 16:9 format, Software SW 26</li> </ul>
<b>Lathe chuck</b>				
-	351517013		<b>Four-jaw lathe chuck hydraulic Ø 200 mm</b>	<ul style="list-style-type: none"> <li>instead of standard equipment- three-jaw lathe chuck hydraulic Ø 250 mm</li> </ul>
-	351517015		<b>Four-jaw lathe chuck hydraulic Ø 300 mm</b>	<ul style="list-style-type: none"> <li>instead of standard equipment &gt; three-jaw lathe chuck hydraulic Ø 250 mm</li> </ul>
351515013	-		<b>Four-jaw lathe chuck hydraulic Ø 200 mm</b>	<ul style="list-style-type: none"> <li>instead of standard equipment &gt; three-jaw lathe chuck hydraulic Ø 200 mm</li> </ul>
351515016	-		<b>Three-jaw lathe chuck hydraulic Ø 250 mm</b>	<ul style="list-style-type: none"> <li>instead of standard equipment &gt; three-jaw lathe chuck hydraulic Ø 200 mm</li> </ul>
351515017	-		<b>Four-jaw lathe chuck hydraulic Ø 250 mm</b>	<ul style="list-style-type: none"> <li>instead of standard equipment &gt; three-jaw lathe chuck hydraulic Ø 200 mm</li> </ul>
3519707			<b>Soft top jaw</b>	<ul style="list-style-type: none"> <li>for the four-jaw lathe chuck hydraulic Ø 200 mm (351517013)</li> </ul>
3519727			<b>Hard insert jaws</b>	<ul style="list-style-type: none"> <li>for the four-jaw lathe chuck hydraulic Ø 200 mm (351517013)</li> </ul>
3519708			<b>Soft top jaw</b>	<ul style="list-style-type: none"> <li>for the factory standard &gt; three-jaw lathe chuck hydraulic Ø 250 mm</li> <li>for the four-jaw lathe chuck hydraulic Ø 250 mm (351517015)</li> </ul>
3519728			<b>Hard insert jaws</b>	<ul style="list-style-type: none"> <li>for the factory standard &gt; three-jaw lathe chuck hydraulic Ø 250 mm</li> <li>for the four-jaw lathe chuck hydraulic Ø 250 mm (351517015)</li> </ul>



1

## Y AXIS

- Including Sauter tool turret
- With drive



2

## BAR FEEDER

- Pro V 65E: Bar length 1200 mm, spindle height 920 - 1300 mm, loading weight 250 kg
- Conqueror: Bar length 3 020 mm, spindle height 850 - 1 300 mm, loading weight 400 kg



3

## AXIALLY DRIVEN TOOL HOLDER

- High-precision bevel gears with excellent running characteristics
- Precision anti-friction bearings
- Excellent basic precision



4

## RADIALLY DRIVEN TOOL HOLDER

- Radially offset drilling and milling head
- External coolant supply
- Excellent basic precision



5

## RADIALLY DRIVEN TOOL HOLDER ON REAR SIDE

- Rear side radially offset drilling and milling head
- External coolant supply
- Excellent basic precision



6

## Steady

- Fixed steady with a passageway of 20 - 200 mm



7

## AIR CONDITIONER

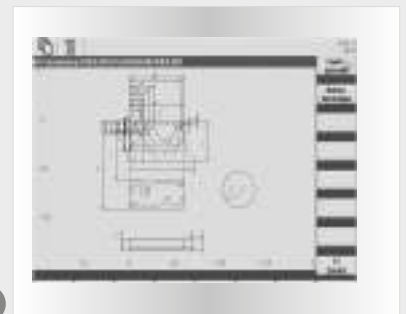
- Instead of heat exchanger



8

## CONTROL PPU 290

- Capacitive display with Multi-Touch controller
- Intuitive Multi-Touch control
- Soft key selection via touch function
- Software SW 26



9

## DXF READER

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

# S 620 / S 620L

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**OPTIMUM PREMIUM CNC sloping bed lathe with counter spindle and turning of both sides in a single step**

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**SIEMENS SINUMERIK 828D**

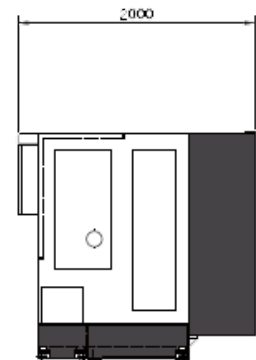
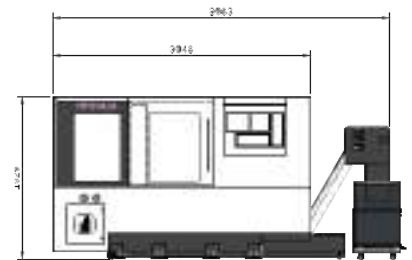
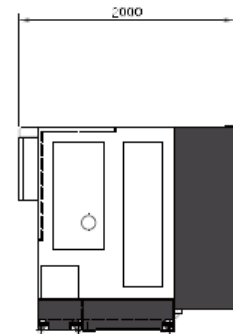
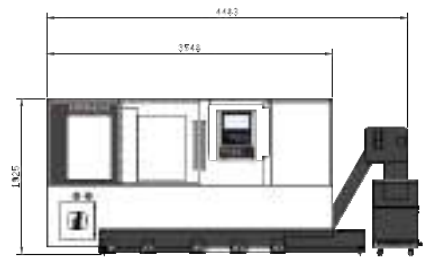
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- Heavy duty version
- Compact design
- Sloping bed design 30° for particularly large machining diameter
- Easy chip removal into the chip tray
- Dimensionally stable linear guides ensure a long service thanks to maximum static and dynamic stiffness
- Hardened and polished ball screw spindles
- All axes with SIEMENS servo motors
- All servomotors with integrated encoder for maximum precision
- Portable electronic hand wheel substantially facilitates running in of programs
- Chip conveyor
- Halogen work lamp
- C axis with brake system APEX PT16-16-RB-330 and 12 tools VDI 30
- Hydraulic three-jaw lathe chuck Ø 200 mm and 150 mm for the counter spindle
- Coolant system
- Foot switch
- Automatic lubrication system
- Hydraulic unit
- Instructions for use
- Heat exchanger for switch cabinet
- Bar feeder interface
- EMC Electromagnetic compatibility
- Including two years of SIEMENS warranty
- Information on „Warranty extension“ on page 97
- Information on „Maintenance contracts“ on page 175



# TECHNICAL DATA

Model	S 620	S 620L
Article no.	3515065	3515070
<b>Machine data</b>		
Electrical connection	400 V / 3 Ph ~ 50 Hz	
Total connected load	20 kVA	
<b>Main spindle Z spindle</b>		
Drive motor S1 operation	11 kW	
Torque drive motor S1 operation	15 kW	
Drive motor S6 30% operation	98.7 Nm	
Torque drive motor S6 30% operation	199.2 Nm	
Spindle seat	DIN ISO 702-1 No. 6	
Spindle bore	Ø 75 mm*	
Chuck passage	Ø 65 mm	
Hydraulic lathe chuck	Ø 200 mm	
<b>Counter spindle Z2 spindle</b>		
Drive motor S1 operation	7.5 kW	
Torque drive motor S1 operation	50 Nm	
Drive motor S6 30% operation	11 kW	
Torque drive motor S6 30% operation	112 Nm	
Spindle seat	DIN ISO 702-1 No. 5	
Spindle bore	Ø 52 mm*	
Chuck passage	Ø 45 mm	
Hydraulic lathe chuck	Ø 150 mm	
<b>Pumps</b>		
Coolant pump output	530 W	
Output of hydraulic pump	2.2 kW	
Central lubrication system output	30 W	
<b>Machine data</b>		
Max. turning diameter	Ø 380 mm	
Swing diameter over machine bed	Ø 650 mm	
Turning length	520 mm	1 020 mm
Swing over cross slide	Ø 380 mm	
Angled bed	30°	
<b>Speed range</b>		
Speeds main spindle Z spindle	4 000 rpm**	
Speeds counter spindle Z2 spindle	5 000 rpm**	
<b>Tool turret</b>		
Hydraulic type	VDI30 DIN 5480	
Engine output, driven tools	3.75 kW	
Speed, driven tools	6 000 rpm	
Number of tool slots	12 tools	
Max. chuck height, width square	25 x 25 mm	
Max. chuck diameter drilling rod	Ø 40 mm	
<b>Precision</b>		
Repetition accuracy	± 0.005 mm	
Positioning accuracy	± 0.005 mm	
<b>Travel</b>		
X axis	215 mm	
Y axis (option)	100 mm (± 50 mm)	
Z axis	520 mm	1 020 mm
Z2 axis	520 mm	1 020 mm
<b>Feed speed/rapid motion</b>		
X axis	24 000 mm/min	
Y axis (option)	6 000 mm/min.	
Z axis/Z2 axis	24 000 mm/min	
<b>Dimensions</b>		
Length without chip conveyor	3 500 mm	4 020 mm
Length with chip conveyor	3 985 mm	4 485 mm
width x height	3 135 x 1 950 mm	
Overall weight	5 000 kg	6 000 kg
<b>Sinumerik 828D system software</b>		
<b>SW 28</b>		
CNC memory	8 MB	
Set change time	1 ms	
Look Ahead	150	
Number of tools	512	





# SINUMERIK 828D

## The power house in the compact CNC control class

### The device of choice for any machining technology

- 15.6" colour display
- 16:9 format
- Capacitive display with Multi-Touch controller
- Intuitive Multi-Touch control
- Soft key selection via touch function
- Proximity sensor/clearance sensor for smart display control
- Front panel made of die-cast magnesium with scratchproof glass front
- No battery (permanent intermediate data storage thanks to NV-RAM technology)
- No fan
- No hard disk
- Can be operated while wearing gloves
- Front interfaces: USB 2.0, RJ45 Ethernet, IP65 also with protective flap open

### INCLUDING

- Safety Integrated
- Residual material detection and machining
- Shopturn work step programming
- Managing network drives
- 3-D simulation
- Logging
- PPU 290 - Software 28

### Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 12, 24 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)

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



Siemens  
**SAFETY INTEGRATED**  
 Set up work with open doors

### FUNCTIONAL SAFETY ALSO PROVIDES PROTECTION AGAINST HIGH COSTS!

- Avoiding the direct consequential cost of injury to persons
- Avoiding the indirect consequential cost of injuries
- Improved productivity thanks to increased machine availability: less unplanned downtime and more trouble-free production
- Longer period of use for system
- Improvement in global competitiveness thanks to boosting the export capability of machines

**Guides**

- High-performance linear guides contribute towards machine stability and ensure high precision and low vibrations during machining

**Angled bed**

- 30° single-piece sloping bed
- For excellent stability

**C axis**

- Precision 44/1000°

**C2 axis**

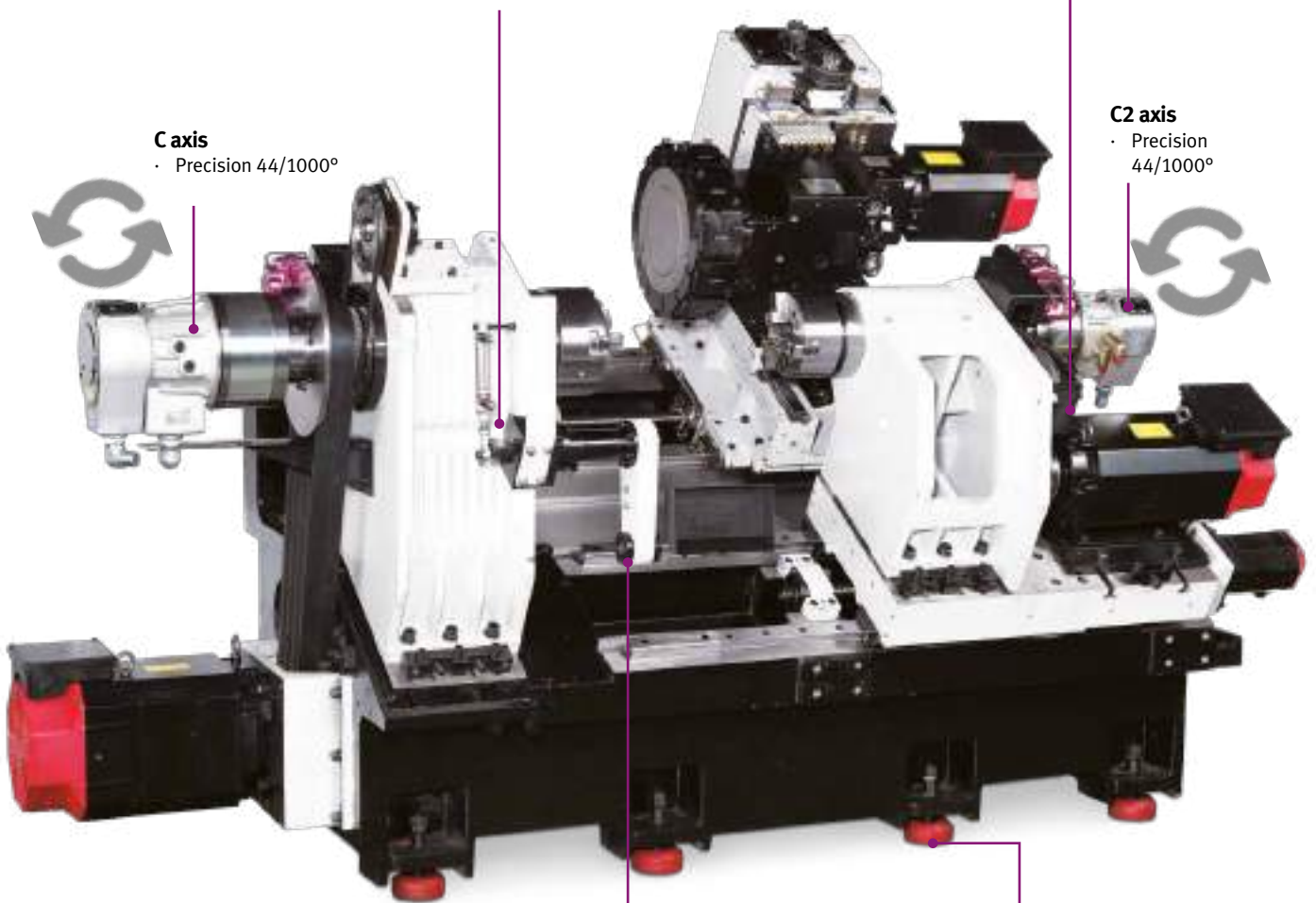
- Precision 44/1000°

**Cast body**

- Tempered HRC48-52 and heat-treated

**Machine feet**

- Eight pcs.
- Optimal machine levelling





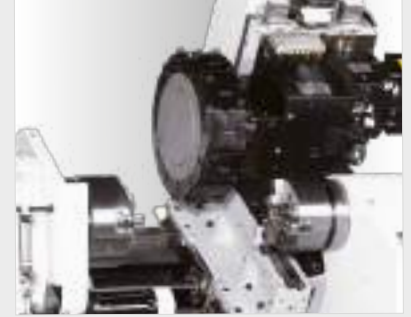
### HEAT EXCHANGER

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



### TOOL TURRET

- Reliable and fast changer
- Driven tools with servo motor, 12 tool slots



### COUNTER SPINDLE

- Both spindles with C axis control
- Hydraulic
- Braking system with spindle angle indexing



### TOOL PROBE

- By Renishaw
- Allows tools to be measured inside the machine



### LATHE CHUCK

- Hydraulic  $\varnothing$  200 mm



### AUTOM. LUBRICATION SYSTEM

- Folds out
- With float switch. If the oil level is too low, an audible signal is output



### X AXIS

- Servo motor and high precision ball screw spindle are directly coupled
- Reduces vibrations



### Z AND Z2 AXIS

Linear guides with ball screws



### LINEAR GUIDE

- Faster motion - rapid motion 24 m / min.

## OPTIMUM - OPTiturn S 620 / S 620L

### Special equipment

Lathe chuck			
351506501	1	Hydraulic <b>three-jaw lathe chuck Ø 250 mm</b>	· Instead of standard equipment › Hydraulic three-jaw lathe chuck Ø 200 mm
351506502		Hydraulic <b>four-jaw chuck Ø 200 mm</b>	· Instead of standard equipment › Hydraulic three-jaw lathe chuck Ø 200 mm
351506503		Hydraulic <b>four-jaw chuck Ø 250 mm</b>	· Instead of standard equipment › Hydraulic three-jaw lathe chuck Ø 200 mm
351506510		Hydraulic <b>four-jaw chuck Ø 150 mm</b>	· Instead of standard equipment › Hydraulic three-jaw lathe chuck Ø 150 mm · for counter spindle / B spindle
Bar feeder			
351506535	2	<b>Bar feeder Pro V 65E</b>	· 1.2 metres · More information: „Short bar loader“ on page 158
351506536		<b>Bar feeder Pro V 65LE</b>	· 1.5 metres · More information: „Short bar loader“ on page 158
351506538		<b>Bar feeder Pro Conqueror</b>	· 3 metres · More information: „Short bar loader“ on page 158
Collet chuck			
351506504	3	<b>Collet chuck</b>	· for the main spindle - instead of the standard equipment › Hydraulic three-jaw lathe chuck Ø 200 mm
351506511		<b>Collet chuck</b>	· for the B spindle - Instead of standard equipment › Hydraulic three-jaw lathe chuck Ø 150 mm
Miscellaneous			
351506515	4	<b>Y axis</b>	· for more flexible milling applications
351506520	5	<b>Internal tool cooling</b>	· 20 bar
351506527	6	<b>Air conditioner</b>	· Instead of standard equipment › heat exchanger
351506528	7	Automatic <b>door opener</b>	
351506525	8	Automatic <b>tool equipment</b>	
351506526	9	Automatic <b>part gripper</b>	



1

## LATHE CHUCK

- Hydraulic three- and four-jaw lathe chucks available in the sizes 200 mm and 250 mm



2

## BAR FEEDER

- Pro V 65E: Bar length 1 200 mm, loading weight 250 kg
- Pro V 65LE: Bar length 1 500 mm, loading weight 280 kg
- Pro Conqueror: Bar length 3 020 mm, loading weight 400 kg



3

## COLLET CHUCK

- For the main spindle and counter spindle



4

## Y axis

- More flexible machining



5

## AIR CONDITIONER

- Instead of heat exchanger



6

## DOOR OPENERS

- Particularly user-friendly
- High level of automation



8

## TOOL SETUP

- Automatic
- High level of automation



9

## PART GRIPPERS

- Automatically computes the correct position

# S 600

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**PREMIUM CNC sloping bed lathe characterised by high speed,  
performance, precision and a long service life**

---

## **SIEMENS SINUMERIK 828D BASIC**

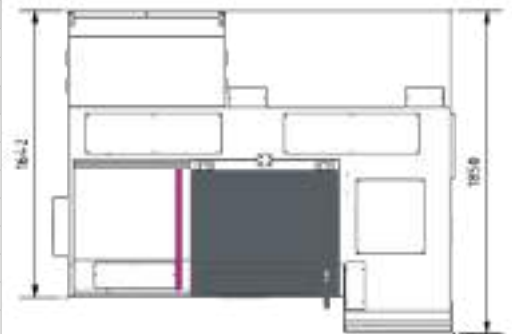
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- Heavy duty version
- Compact design
- Sloping bed design 30° for particularly large machining diameter
- Easy chip removal into the chip tray
- Dimensionally stable linear guides ensure a long service thanks to maximum static and dynamic stiffness
- Hardened and polished ball screw spindles
- All axes with SIEMENS servo motors
- All servomotors with integrated encoder for maximum precision
- Device for manual tool measuring
- Tailstock with hydraulic quill
- Portable electronic hand wheel substantially facilitates running in of programs
- Chip conveyor
- Chip carriage
- Halogen work lamp
- EMC Electromagnetic compatibility
- Hydraulic three-jaw lathe chuck Ø 200 mm
- Hard and soft block jaws
- Coolant system
- Standard changer with tool holder for MK3
- Heat exchanger
- Standard changer with tool holder set including three holders for reduction sleeves, one holder for reduction sleeves, one holder for an outside lathe tool and five reduction sleeves Ø 12 mm, Ø 16 mm, Ø 20 mm, Ø 25 mm, MT 3
- Operating tool
- Including two years of SIEMENS warranty
- Information on „Warranty extension“ on page 105
- Information on „Maintenance contracts“ on page 175



# TECHNICAL DATA

Model	S 600
Article no.	3515060
<b>Machine data</b>	
Electrical connection	400 V / 3 Ph ~ 50 Hz
Total connected load	31 kVA
<b>Spindle</b>	
Drive motor S1 operation	12 kW
Torque drive motor S1 operation	115 Nm
Drive motor S6 30% operation	30 kW
Torque drive motor S6 30% operation	250 Nm
Spindle seat	DIN ISO 702-1 No. 6
Spindle bore	Ø 75 mm*
Chuck passage	Ø 65 mm
Hydraulic lathe chuck	Ø 215 mm
<b>Cooling lubricant system</b>	
Coolant pump output	750 W
Cleaning pump output	750 W
Tank capacity	140 litres
<b>Hydraulic system</b>	
Motor - hydraulic pump	1.5 kW
Tank capacity	60 litres
<b>Machine data</b>	
Max. turning diameter	Ø 280 mm
Turning length (max.)	460 mm
Swing over cross slide	Ø 220 mm
Swing diameter over machine bed	Ø 500 mm
Angled bed	30°
<b>Speed range</b>	
Spindle speeds*	40 - 4 000 rpm
<b>Tool turret</b>	
Type	LS 200
Number of tool slots	12 tools
Max. chuck height, width square	25 x 25 mm
Max. chuck diameter drilling rod	Ø 32 mm
<b>Option: Sauter tool turret with power tools (Article no.: 351506001)</b>	
Type	VDI 30
Max. permissible speed at tool coupling	max. 4 500 rpm
Tool output	4.82 KW
Max. tool torque	20 Nm
<b>Precision</b>	
Repetition accuracy	± 0.005 mm
Positioning accuracy	± 0.005 mm
<b>Travel</b>	
X axis	215 mm
Z axis	520 mm
<b>Feed speed</b>	
X axis/Y axis	30 000 mm/min.
<b>Motor torque</b>	
X axis/Y axis	11 Nm
<b>Tailstock</b>	
Tailstock chuck	MT 4
Travel	425 mm
Tailstock quill diameter	Ø 72 mm
Tailstock - quill stroke hydraulic	110 mm
<b>Dimensions</b>	
Length x width x height	2 322 x 1 948 x 1 930 mm
Overall weight	3 070 kg



Sinumerik 828D system software	PPU 240 SW 24	PPU 290 SW 26
CNC memory	3 MB	5 MB
Set change time	3 ms	2 ms
Look Ahead	50	100
Number of tools	128	256

\*\* other spindle bores and spindle speeds on request

\*\* depending on installed lathe chuck



# SINUMERIK 828D Basic

## High-tech for the compact class

### The device of choice for any machining technology

- State-of-the-art processor technology and software architecture form the basis for 80-bit NANOFP precision (80-bit floating point precision)
- Premium, robust operator manels made of die-cast magnesium with IP65 degree of protection
- Maintenance-free front control panel (no fan, battery, hard disk or similar)
- ShopTurn: shortest programming time for creating one-off parts and small batches

### Control system

- 10.4" colour display
- 4:3 format
- User-friendly SINUMERIK Operate software
- Front interfaces: USB 2.0, RJ45 Ethernet, Compact Flash (CF) Card
- The 8 horizontal and 8 vertical soft keys take the user to all control windows with just a few key presses
- Rugged and robust

### INCLUDING

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

### Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 12, 24 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)

12 months - Article no. 3589020

24 months - Article no. 3589021

36 months - Article no. 3589022



Siemens

**SAFETY INTEGRATED**

Set up work with open doors

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

- Avoiding the direct consequential cost of injury to persons
- Avoiding the indirect consequential cost of injuries
- Improved productivity thanks to increased machine availability: less unplanned downtime and more trouble-free production
- Longer period of use for system
- Improvement in global competitiveness thanks to boosting the export capability of machines

## OPTIMUM - OPTiturn S 600

### Components and cast parts

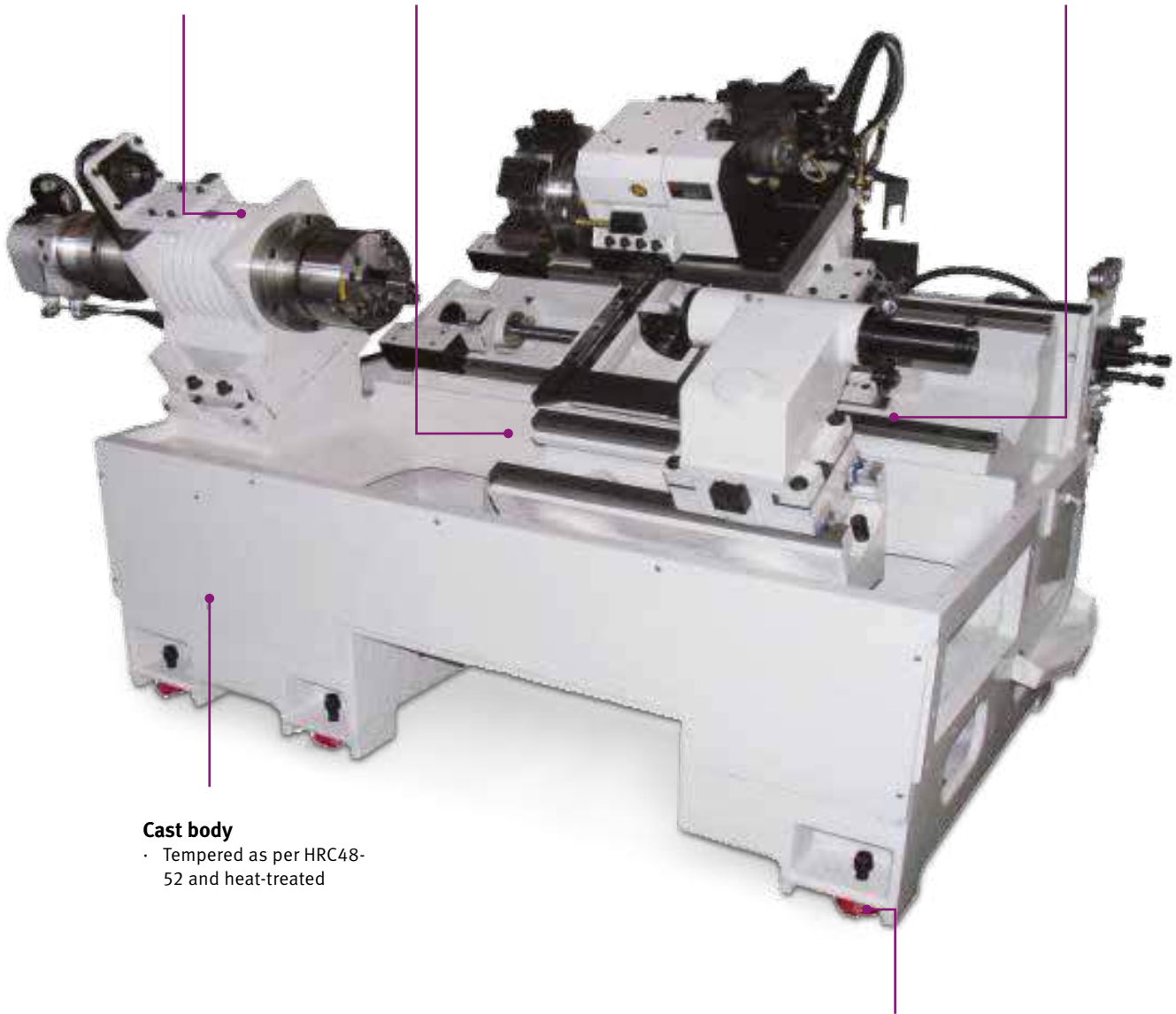
- Guarantee stiffness

### horizontal / vertical

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

### Linear guide

- Maximum feed speeds



### Cast body

- Tempered as per HRC48-52 and heat-treated

### Machine feet

- Six pcs.
- Optimal machine levelling



**SEPARATOR**

- Separates lubricant from coolant



**TOOL TURRET**

- Twelve tool slots
- Hydraulic (LS 200)
- Max. chuck height 25 mm
- Max. chuck diameter 32 mm



**TAILSTOCK QUILL**

- Hydraulic quill stroke 50 mm
- Faster machining



**HYDRAULIC POWER UNIT**

- Safety non-return valve
- Motor output 1.5 kW
- Tank capacity 60 litres



**TOOL PROBE**

- By Renishaw
- Allows tools to be measured inside the machine



**AUTOM. LUBRICATION SYSTEM**

- Folds out
- With float switch. If the oil level is too low, an audible signal is output



**THREE-JAW CHUCK**

- Hydraulic three-jaw lathe chuck  
 Ø 200 mm
- Passageway Ø 52 mm
- Easy workpiece clamping



**COOLANT TANK**

- Pull-out chip tray
- Pull-out cooling lubricant tank
- Level indicator
- Tank capacity 99 litres



**FOOT PEDAL**

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

Tool turret (Please note: travel can change)				
351506003	1	<b>Tool turret VDI 30 Without driven tools</b>	<ul style="list-style-type: none"> <li>Eight tools</li> <li>Instead of standard equipment › tool turret LS-200</li> </ul>	
351506029		<b>Tool turret VDI 40 Without driven tools</b>	<ul style="list-style-type: none"> <li>Eight tools</li> <li>Instead of standard equipment › tool turret LS-200</li> </ul>	
351506001		<b>Sauter tool turret VDI 30 Driven tools</b>	<ul style="list-style-type: none"> <li>Twelve driven tools, C-axis brake system</li> <li>Instead of standard equipment › tool turret LS-200</li> </ul>	
Tailstock				
351506004	2	<b>Automatic tailstock motion</b>	<ul style="list-style-type: none"> <li>via M Code</li> </ul>	
351506005		<b>Machine preparation for automatic tailstock motion</b>	<ul style="list-style-type: none"> <li>Only in combination with automatic tailstock motion (351506004)</li> </ul>	
Bar feeder				
351506011	3	<b>Bar feeder interface</b>		
351506012		<b>Bar feeder Pro V 65E 1.2 metres</b>	<ul style="list-style-type: none"> <li>Including bar feeder interface (351506011)</li> </ul>	
351506013		<b>Bar feeder Pro V 65LE 1.5 metres</b>	<ul style="list-style-type: none"> <li>Including bar feeder interface (351506011)</li> </ul>	
351506023		<b>Bar feeder Pro Conqueror 3 metres</b>	<ul style="list-style-type: none"> <li>Including bar feeder interface (351506011)</li> </ul>	
Spring collets				
351506017	4	<b>Spring collet individual</b>	<ul style="list-style-type: none"> <li>from Ø 10 mm to Ø 14.9 mm</li> </ul>	
351506018		<b>Spring collet individual</b>	<ul style="list-style-type: none"> <li>from Ø 15 mm to Ø 60 mm</li> </ul>	
351506002		<b>Collet chuck</b>	<ul style="list-style-type: none"> <li>for spring collets from Ø 15 mm to Ø 60 mm</li> </ul>	
Miscellaneous				
351506019	5	<b>Internal tool cooling</b>	<ul style="list-style-type: none"> <li>External unit, 20 bar</li> </ul>	
351506020		<b>Oil separator</b>	<ul style="list-style-type: none"> <li>With rotary disc, removes oil from the coolant</li> <li>Capacity: 1 litre per hour</li> </ul>	
351506022		7	<b>High performance coolant pump</b>	<ul style="list-style-type: none"> <li>5 bar</li> </ul>
351506021			<b>Air conditioner</b>	<ul style="list-style-type: none"> <li>Instead of standard equipment › heat exchanger</li> </ul>
351506006		6	<b>Automatic tool measuring</b>	<ul style="list-style-type: none"> <li>Instead of standard equipment › Manual tool measuring</li> </ul>
351506007			<b>Automatic part gripper</b>	
351506016			<b>Automatic door opening</b>	
Lathe chuck				
351506024		<b>Four-jaw lathe chuck hydraulic Ø 200 mm</b>	<ul style="list-style-type: none"> <li>instead of standard equipment › three-jaw lathe chuck hydraulic Ø 200 mm</li> </ul>	
351506008		<b>Three-jaw lathe chuck hydraulic Ø 250 mm</b>	<ul style="list-style-type: none"> <li>instead of standard equipment › three-jaw lathe chuck hydraulic Ø 200 mm</li> </ul>	
351506025		<b>Four-jaw lathe chuck hydraulic Ø 250 mm</b>	<ul style="list-style-type: none"> <li>instead of standard equipment › three-jaw lathe chuck hydraulic Ø 200 mm</li> </ul>	
3519707		<b>Soft top jaw</b>	<ul style="list-style-type: none"> <li>for the factory standard › three-jaw lathe chuck hydraulic Ø 200 mm</li> <li>for the four-jaw lathe chuck hydraulic Ø 200 mm (351506024)</li> </ul>	
3519727		<b>Hard insert jaws</b>	<ul style="list-style-type: none"> <li>for the factory standard › three-jaw lathe chuck hydraulic Ø 200 mm</li> <li>for the four-jaw lathe chuck hydraulic Ø 200 mm (351506024)</li> </ul>	
3519708		<b>Soft top jaw</b>	<ul style="list-style-type: none"> <li>for the three-jaw lathe chuck hydraulic Ø 250 mm (351506008)</li> <li>for the four-jaw lathe chuck hydraulic Ø 250 mm (351506025)</li> </ul>	
3519728		<b>Hard insert jaws</b>	<ul style="list-style-type: none"> <li>for the three-jaw lathe chuck hydraulic Ø 250 mm (351506008)</li> <li>for the four-jaw lathe chuck hydraulic Ø 250 mm (351506025)</li> </ul>	
Software				
3584014		<b>Software DXF Viewer/Reader</b>	<ul style="list-style-type: none"> <li>from version 4.7</li> </ul>	
Hardware				
351506030	8	<b>Siemens control PPU 290</b>	<ul style="list-style-type: none"> <li>15.6" colour display- 16:9 format, Software SW 26</li> </ul>	



1

## TOOL TURRET

Optionally

- VDI 30 or VDI 40
- With or without driven tools



2

## TAILSTOCK

- Fully automatic tailstock, for faster configuration
- Faster, more easily repeatable and more precise tailstock motion



3

## BAR FEEDER

- Pro V 65E: Bar length 1 200 mm, loading weight 250 kg
- Pro V 65LE: Bar length 1 500 mm, loading weight 280 kg
- Conqueror: Bar length 3 020 mm, loading weight 400 kg



4

## SPRING COLLETS AND CHUCKS

- Available from 10 mm to 60 mm



5

## Internal tool cooling

- Guarantees optimal service life
- External power unit



6

## AIR CONDITIONER

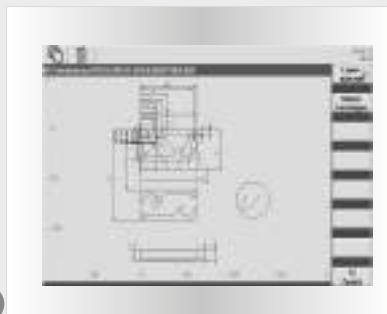
- Instead of heat exchanger



7

## OIL SEPARATOR

- Separates third party oil from coolant emulsion
- The third-party oil in the coolant shortens the tool service life



8

## DXF READER

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



9

## CONTROL PPU 290

- Capacitive display with Multi-Touch controller
- Intuitive Multi-Touch control
- Soft key selection via touch function
- Software SW 26

# L 440 / L 460

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The OPTIMUM PREMIUM high performance CNC cycle lathes.

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## SIEMENS SINUMERIK 828D BASIC

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- High-precision machine with the latest SIEMENS control and SIEMENS servo drives
- Compact spindle stock design
- High-speed spindle 4 500 rpm with high-precision and generously dimensioned taper roller bearings
- Shifting between the two gears occurs pneumatically via a compressed air cylinder
- Spindle stock design guarantees minimal noise development
- Wide machine bed with double-square guide rails, also for roughing work
- Bed rails tempered and polished
- Generously dimensioned tailstock and easily positionable with quick clamping mechanism
- Two separately movable sliding doors with integrated view windows at front
- Microswitch prevents starting the machine if the door is not fully closed
- RJ45 plug-in connection, USB connection and 230 V power connection
- Mobile control panel
- Two electronic hand wheels for manual control of the X and Z axis
- Automatic spindle stock lubrication
- Automatic lubrication of longitudinal and transverse slides
- Halogen work lamp
- Closed switch cabinet with integrated heat exchanger ensures an optimal temperature even in case of high ambient temperatures, and prevents dirt particle penetration
- Hard and soft block jaws
- Tailstock end cover
- Six machine feet
- Heat exchanger
- EMC Electromagnetic compatibility
- Including two years of SIEMENS warranty
- Information on „Warranty extension“ on page 113
- Information on „Maintenance contracts“ on page 175



# TECHNICAL DATA

Model	L 440	L 460
Article no.	3514410	3514420
<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 kW	
Torque drive motor S1 operation	70 Nm	
Drive motor S6 30% operation	23 kW	
Torque drive motor S6 30% operation	148 Nm	
Spindle seat	DIN ISO 702-1 No. 6	
Spindle bore	Ø 65 mm*	
Chuck passage	Ø 52 mm	
Hydraulic lathe chuck	Ø 200 mm	
<b>Cooling lubricant system</b>		
Coolant pump motor	375 W	
Tank capacity	170 litres	
<b>Hydraulic system</b>		
Motor - hydraulic pump	750 W	
Tank capacity	50 litres	
<b>Machine data</b>		
Centre height	235 mm	
Centre width	1 000 mm	1 500 mm
Swing over cross slide	Ø 240 mm	
Swing diameter over machine bed	Ø 475 mm	
Swing in the bed bridge	Ø 710 mm	
<b>Speed range</b>		
Speeds 1st gear / 2nd gear	100 - 950 rpm / 900 - 4 500 rpm	
Torque stage 1/stage 2	525 Nm / 382 Nm	
<b>Tool turret</b>		
Hydraulic type	LS 160 VDI 40	
Number of tool slots	8 tools	
Max. chuck height, width square	25 x 25 mm	
Max. chuck diameter drilling rod	Ø 32 mm	
<b>Option: Baruffaldi tool turret</b>	(Article no.: 351441012)	(Article no.: 351442012)
Number of tool slots	8 tools	
Type (hydraulic)	Baruffaldi VDI40 - TBMA- 160 with tool drive	
Max. permissible speed at tool coupling	max. 4 500 rpm	
Tool output	5 kW (S3 - 40% duty cycle 10 min.)	
Max. tool torque	20 Nm	
<b>Precision</b>		
Repetition accuracy	± 0.005 mm	
Positioning accuracy	± 0.005 mm	
<b>Travel</b>		
X axis	260 mm	
Z axis	1 150 mm	1 680 mm
<b>Feed speed</b>		
X axis/Y axis	15 000 mm/min	
<b>Motor torque</b>		
X axis	6 Nm	
Z axis	16 Nm	
<b>Tailstock</b>		
Tailstock chuck	MT 4	
Tailstock quill diameter	Ø 65 mm	
Tailstock - quill stroke	150 mm	
<b>Dimensions</b>		
Length x width x height	3 030 x 1 952 x 2 025 mm	3 530 x 1 952 x 2 025 mm
Overall weight	3 000 kg	3 450 kg

\* depending on installed lathe chuck

Sinumerik 828D system software	PPU 240 SW 24	PPU 290 SW 26
CNC memory	3 MB	5 MB
Set change time	3 ms	2 ms
Look Ahead	50	100
Number of tools	128	256



# SINUMERIK 828D Basic

## High-tech for the compact class

### The device of choice for any machining technology

- State-of-the-art processor technology and software architecture form the basis for 80-bit NANOFFP precision (80-bit floating point precision)
- Premium, robust operator manels made of die-cast magnesium with IP65 degree of protection
- Maintenance-free front control panel (no fan, battery, hard disk or similar)
- ShopTurn: shortest programming time for creating one-off parts and small batches

### Control system

- 10.4" colour display
- 4:3 format
- User-friendly SINUMERIK Operate software
- Front interfaces: USB 2.0, RJ45 Ethernet, Compact Flash (CF) Card
- The 8 horizontal and 8 vertical soft keys take the user to all control windows with just a few key presses
- Rugged and robust

### INCLUDING

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

### Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 12, 24 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)

12 months - Article no. 3589020

24 months - Article no. 3589021

36 months - Article no. 3589022



Siemens

**SAFETY INTEGRATED**

Set up work with open doors

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

- Avoiding the direct consequential cost of injury to persons
- Avoiding the indirect consequential cost of injuries
- Improved productivity thanks to increased machine availability: less unplanned downtime and more trouble-free production
- Longer period of use for system
- Improvement in global competitiveness thanks to boosting the export capability of machines





## HORIZONTAL / VERTICAL

- Particularly wide design
- Ball screw drive for excellent repetition accuracy



## SPINDLE STOCK

- Precision borne
- Rugged design
- Smooth action even at high spindle speeds



## HEAT EXCHANGER

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



## SPEED CHANGER

- Pneumatic
- Automatic
- The shaft runs in sintered bronze thus guaranteeing excellent precision



## AUTOM. LUBRICATION SYSTEM

- Automatic spindle stock lubrication
- Automatic lubrication of longitudinal and transverse slides



## TOOL TURRET

- Eight tool slots
- Hydraulic VDI40 tool turret
- Max. chuck height 25 mm
- Max. chuck diameter 32 mm



## TAILSTOCK

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



## HYDRAULIC POWER UNIT

- For clamping jaws, lathe chuck and tool turret
- Motor output 750 W
- Tank capacity 50 litres
- Clamping pressure/operating pressure 2 500 - 2 942 kPa



## THREE-JAW CHUCK

- Hydraulic three-jaw lathe chuck Ø 200 mm
- Passageway Ø 52 mm
- Easy workpiece clamping

L440	L460		
<b>Tool turret and C axis</b> (Please note: travel can change)			
351441012	351442012		<b>Tool turret Baruffaldi TBMA160 VDI40</b> · 8 tool slots, hydraulic · Instead of standard equipment › tool turret LS160
351441017	351442017	1	<b>C axis brake system</b> · only with tool turret Baruffaldi TBMA 160 VDI40 (3514410 12/351442012)

<b>Tailstock</b>			
351441019	351442019		<b>Machine preparation</b> · Hydraulic tailstock spindle
351441021	351442021		<b>Hydraulic tailstock spindle</b>
351441023	351442023	2	<b>Pneumatic lifting device for the tailstock</b> · Pneumatic air cushion, reduces friction thus facilitating tailstock movement
351441022	351442022		<b>Device for travelling tailstock</b> · Tailstock and support are linked for motion

<b>Bar feeder</b>			
351441037	351442037		<b>Bar feeder interface</b> · Preparation
351441033	351442033		<b>Bar feeder Pro V 65E 1.2 metres</b> · Including bar feeder interface (351441037/351442037)
351441034	351442034	3	<b>Bar feeder Pro V 65LE 1.5 metres</b> · Including bar feeder interface (351441037/351442037)
351441038	351442038		<b>Bar feeder Pro Conqueror 3 metres</b> · Including bar feeder interface (351441037/351442037)

<b>Miscellaneous</b>			
351441001	351442001	4	<b>Internal tool cooling</b> · External unit (we recommend an extraction unit)
351441007	351442007	5	<b>Oil separator</b> · With rotary disc, removes oil from the coolant
351441013	351442013		<b>High performance coolant pump</b> · 5 bar
351441014	351442014	6	<b>Air conditioner</b> · Instead of standard equipment › heat exchanger
351441016	351442016		<b>Tool holder set</b> · for the LS160 tool turret included in standard equipment - Only for standard changer, not VDI
351441020	351442020		<b>Portable electronic handwheel</b> · Instead of standard equipment › electronic handwheel (cannot be combined with joystick 351441002 / 351442002)
351441002	351442002		<b>Joystick</b> · cannot be combined with electronic handwheel 351441(2)0 20
351441003	351442003		<b>Fixed steady</b> · Passageway Ø 20 - Ø 200 mm
351441004	351442004	7	<b>Travelling steady</b> · Passageway Ø 20 - Ø 100 mm
351441005	351442005		<b>Chip conveyor</b> · L 440: 1.0 metre - L 460: 1.5 metres
351441006			<b>Chip carriage</b> · Rollable, folding, L x W x H: 994 x 510 x 838 mm
3582081			<b>Renishaw measuring arm HPPA</b> · More information on „Renishaw“ from page 164

<b>Software</b>			
3584014		9	<b>Software DXF Viewer/Reader</b> · from version 4.7

<b>Hardware</b>			
351442080		8	<b>Siemens control PPU 290</b> · 15.6" colour display- 16:9 format, Software SW 26

<b>Lathe chuck</b>			
351441008	351442008		<b>Three-jaw lathe chuck</b> · manual Ø 200 mm
351441011	351442011		<b>Four-jaw lathe chuck</b> · manual Ø 250 mm
351441028	351442028		<b>Three-jaw lathe chuck hydraulic Ø 250 mm</b> · instead of standard equipment › three-jaw lathe chuck hydraulic Ø 200 mm
351441031	351442031		<b>Four-jaw lathe chuck hydraulic Ø 250 mm</b> · instead of standard equipment › three-jaw lathe chuck hydraulic Ø 200 mm
3519707			<b>Soft top jaw</b> · for the factory standard › three-jaw lathe chuck hydraulic Ø 200 mm
3519727			<b>Hard insert jaws</b> · for the factory standard › three-jaw lathe chuck hydraulic Ø 200 mm
3519708			<b>Soft top jaw</b> · for the three-jaw lathe chuck hydraulic Ø 250 mm (351441028) · for the four-jaw lathe chuck hydraulic Ø 250 mm (351441031)
3519728			<b>Hard insert jaws</b> · for the three-jaw lathe chuck hydraulic Ø 250 mm (351441028) · for the four-jaw lathe chuck hydraulic Ø 250 mm (351441031)



1

## TOOL TURRET

Optionally

- VDI 30 or VDI 40
- With or without driven tools
- Driven speed Tools 6 000 rpm
- 12 tools
- Collet h x w square max. 25 x 25 mm



2

## TAILSTOCK

- Fully automatic, easily configurable tailstock ensures tailstock motion with improved repetition accuracy and precision



3

## BAR FEEDER

- Pro V 65E: Bar length 1 200 mm, loading weight 250 kg
- Pro V 65LE: Bar length 1 500 mm, loading weight 280 kg
- Conqueror: Bar length 3 020 mm, loading weight 400 kg



4

## INTERNAL TOOL COOLING

- External power unit
- Tank capacity 165 litres
- Pressure 20 bar



5

## OIL SEPARATOR

- Separates third party oil from coolant emulsion
- The third-party oil in the coolant shortens the tool service life



6

## AIR CONDITIONER

- Instead of heat exchanger



7

## Steady rests

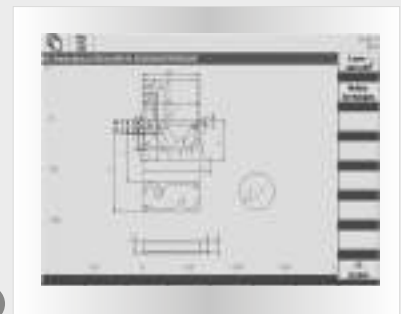
- Fixed and travelling steadies available



8

## CONTROL PPU 290

- Capacitive display with Multi-Touch controller
- Intuitive Multi-Touch control
- Soft key selection via touch function
- Software SW 26



9

## DXF READER

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

# L 44

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**OPTIMUM PREMIUM CNC lathe that sets standards in terms of: speed, power, precision and service life**

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## **SIEMENS SINUMERIK 828D BASIC**

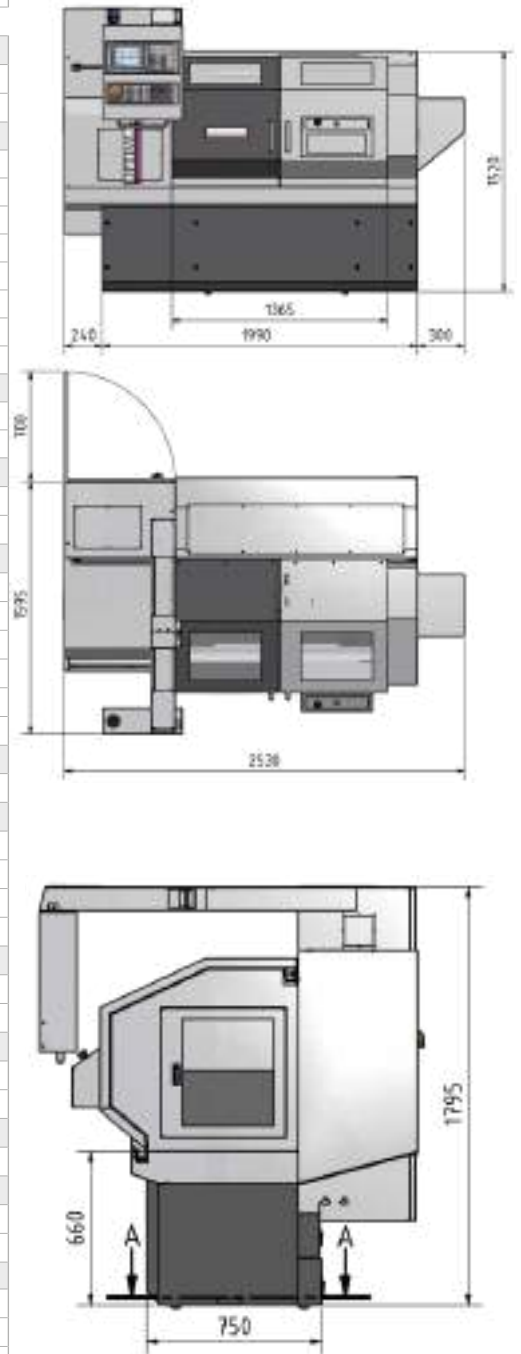
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- Spindle and servo motors by SIEMENS
- Fully cladded with safety device
- Coolant unit with 90 litre coolant tank
- Automatic centralised lubrication
- With max. spindle speed up to 3 000 rpm as standard
- Swivelling operating unit
- Electronic handwheels for the X and Z axis
- RJ45 plug-in connection, USB connection and power connection 230 V
- Tailstock cover
- 6 machine feet
- EMC Electromagnetic compatibility
- Operating tool
- Including two years of SIEMENS warranty
- Information on „Warranty extension“ on page 121
- Information on „Maintenance contracts“ on page 175



# 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 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>	
Output of hydraulic pump	750 W
Tank capacity	50 litres
<b>Machine data</b>	
Centre height	223 mm
Centre width	850 mm
Swing over cross slide	Ø 240 mm
Swing diameter over machine bed	Ø 446 mm
Swing in the bed bridge	Ø 520 mm
Bed width	300 mm
<b>Speed range</b>	
Speeds	10 - 3 000 rpm
<b>Tool turret</b>	
Hydraulic type	VDI 30
Number of tool slots	8 tools
Max. chuck height, width square	20 x 20 mm
Max. chuck diameter drilling rod	Ø 25 mm
<b>Precision</b>	
Repetition 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	15 000 mm/min.
<b>Motor torque</b>	
X axis	6 Nm
Z axis	8.5 Nm
<b>Tailstock</b>	
Tailstock chuck	MT 4
Tailstock quill diameter	Ø 52 mm
Tailstock - quill stroke hydraulic	165 mm
<b>Dimensions</b>	
Length x width x height	2 530 x 1 595 x 1 795 mm
Overall weight	3 070 kg



Sinumerik 828D system software	PPU 240 SW 24	PPU 290 SW 26
CNC memory	3 MB	5 MB
Set change time	3 ms	2 ms
Look Ahead	50	100
Number of tools	128	256



# SINUMERIK 828D Basic

## High-tech for the compact class

### The device of choice for any machining technology

- State-of-the-art processor technology and software architecture form the basis for 80-bit NANOPF precision (80-bit floating point precision)
- Premium, robust operator manels made of die-cast magnesium with IP65 degree of protection
- Maintenance-free front control panel (no fan, battery, hard disk or similar)
- ShopTurn: shortest programming time for creating one-off parts and small batches

### Control system

- 10.4" colour display
- 4:3 format
- User-friendly SINUMERIK Operate software
- Front interfaces: USB 2.0, RJ45 Ethernet, Compact Flash (CF) Card
- The 8 horizontal and 8 vertical soft keys take the user to all control windows with just a few key presses
- Rugged and robust

### INCLUDING

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

### Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 12, 24 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)

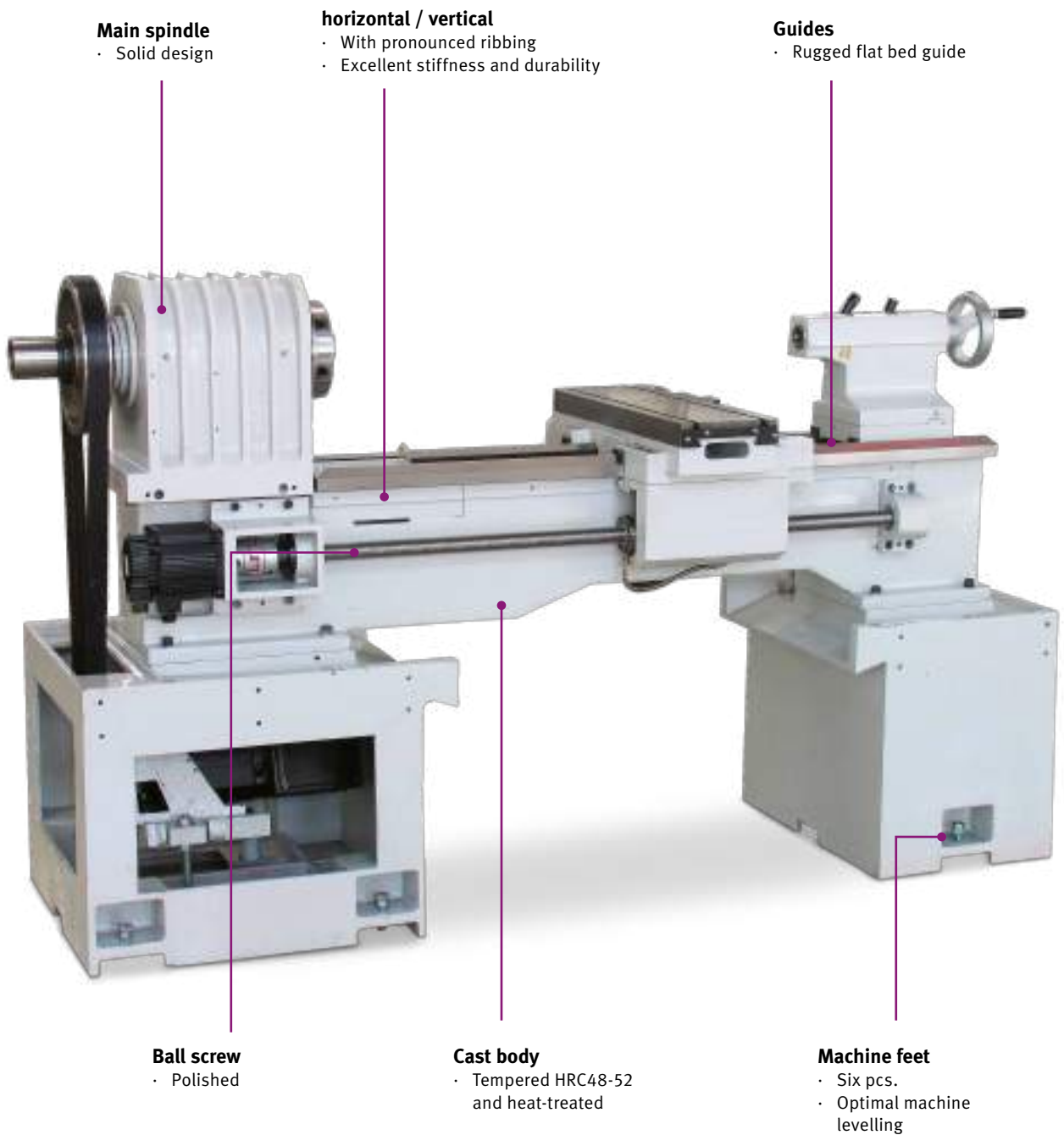
12 months - Article no. 3589020  
24 months - Article no. 3589021  
36 months - Article no. 3589022



Siemens  
**SAFETY INTEGRATED**  
Set up work with open doors

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

- Avoiding the direct consequential cost of injury to persons
- Avoiding the indirect consequential cost of injuries
- Improved productivity thanks to increased machine availability: less unplanned downtime and more trouble-free production
- Longer period of use for system
- Improvement in global competitiveness thanks to boosting the export capability of machines





### HEAT EXCHANGER

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



### TOOL CHANGER SYSTEM

- Eight tool slots
- Hydraulic VDI30 tool turret
- Max. chuck height 20 mm



### TAILSTOCK

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



### HYDRAULIC POWER UNIT

- Motor output 750 W
- Tank capacity 50 litres



### THREE-JAW CHUCK

- Hydraulic three-jaw lathe chuck  
 $\varnothing$  150 mm
- Easy workpiece clamping
- Hard and soft block jaws



### CENTRAL LUBRICATION SYSTEM

- Folds out
- With float switch. If the oil level is too low, an audible signal is output



### JOYSTICK

- Hand wheels for manual movement
- Emergency stop
- Confirm button



### COOLANT TANK

- Pull-out chip tray
- Pull-out cooling lubricant tank
- Level indicator
- Tank capacity 50 litres



### FOOT PEDAL

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

## OPTIMUM - OPTiturn L 44

### Special equipment

Starter set			
3536115	1	<b>Starter set VDI 30</b>	· Information on the starter set „VDI 30“ from page 155
Steady rests			
351433002		<b>Fixed steady</b>	· Passage Ø 10 mm to Ø 130 mm
351433003		<b>Travelling steady</b>	· Passage Ø 10 mm to Ø 100 mm
Bar feeder			
351433026		<b>Bar feeder interface</b>	
351433012	2	<b>Bar feeder Pro V 65E 1.2 metres</b>	· Includes bar feeder interface (351433026) · More information „Short bar loader“ from page 158
351433019		<b>Bar feeder Pro Conqueror 3 metres</b>	· Includes bar feeder interface (351433026) · More information „Short bar loader“ from page 158
Miscellaneous			
351433001*	3	<b>Hydraulic tailstock quill</b>	· for fast machining · Quill can be extended and retracted hydraulically
351433011*		<b>Fast change tool holder Multifix 4</b>	· Instead of standard equipment › hydraulic tool turret VDI30
351433009*	4	<b>Portable electronic handwheel</b>	· Instead of standard equipment › joystick
351433013		<b>Power transformer</b>	· for custom voltage · Weight 147 kg
Measuring arm			
3582080	5	<b>Renishaw measuring arm HPPA</b>	· Information on Renishaw „Renishaw“ on page 164
Lathe chuck			
351433015		<b>Three-jaw lathe chuck manual Ø 200 mm</b>	· instead of standard equipment › three-jaw lathe chuck hydraulic Ø 150 mm
351433016		<b>Four-jaw lathe chuck manual Ø 250 mm</b>	· instead of standard equipment › three-jaw lathe chuck hydraulic Ø 150 mm
351433018		<b>Three-jaw lathe chuck hydraulic Ø 200 mm</b>	· instead of standard equipment › three-jaw lathe chuck hydraulic Ø 150 mm
351433020		<b>Four-jaw lathe chuck hydraulic Ø 200 mm</b>	· instead of standard equipment › three-jaw lathe chuck hydraulic Ø 150 mm
3519706		<b>Soft top jaw</b>	· for the factory standard › three-jaw lathe chuck hydraulic Ø 150 mm
3519726		<b>Hard insert jaws</b>	· for the factory standard › three-jaw lathe chuck hydraulic Ø 150 mm
3519707		<b>Soft top jaw</b>	· for the three-jaw lathe chuck hydraulic Ø 200 mm (351433018) · for the four-jaw lathe chuck hydraulic Ø 200 mm (351433020)
3519727		<b>Hard insert jaws</b>	· for the three-jaw lathe chuck hydraulic Ø 200 mm (351433018) · for the four-jaw lathe chuck hydraulic Ø 200 mm (351433020)
Software			
3584014	6	<b>Software DXF Viewer/Reader</b>	· from version 4.7 · For importing DXF files · Hiding graphics layers · Automatic contour tracking · Arbitrary workpiece zero point per contour/drilling point
Hardware			
351433030	7	<b>Siemens control PPU 290</b>	· 15.6" colour display- 16:9 format, Software SW 26



1

## STARTER SET VDI 30

- Square transverse mount
- Square longitudinal mount
- Spring collet holder
- Chuck
- Square transverse mount for overhead work
- Sealing cover
- Spring collet key
- Drill rod holder
- Collet chuck set
- Tool holder



2

## BAR FEEDER

- Pro V 65E: Bar length 1 200 mm, spindle height 920 - 1 300 mm, loading weight 250 kg
- Pro Conqueror: Bar length 3 020 mm, spindle height 850 - 1 300 mm, loading weight 400 kg



3

## TAILSTOCK SPINDLE SLEEVE

- Retracts and extends hydraulically via foot pedal



4

## HANDWHEEL

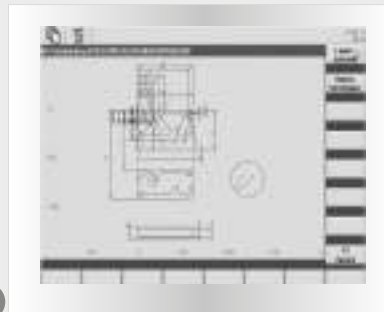
- Portable, electronic
- Substantially facilitates running in of programs
- Emergency stop button
- Confirm button



5

## MANUAL RENISHAW MEASURING ARM

- Far less time spent on setting up tools and workpieces
- Less scrap due to setup errors
- Break detection



6

## DXF READER

- DXF data can be converted to NC programs.



7

## CONTROL PPU 290

- Capacitive display with Multi-Touch controller
- Intuitive Multi-Touch control
- Soft key selection via touch function
- Software SW 26

# S 400E

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**CNC sloping bed lathe by OPTIMUM**

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**SIEMENS SINUMERIK 808D ADVANCED**

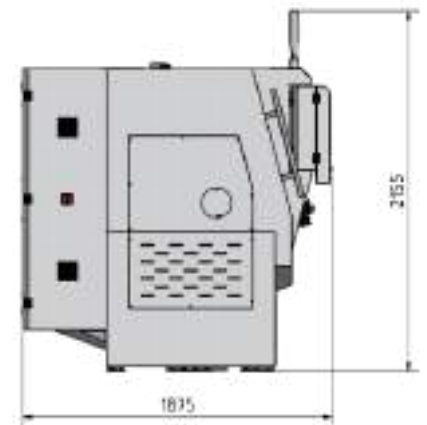
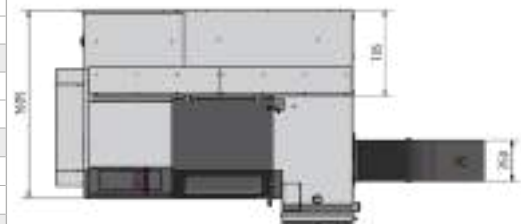
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- Compact design
- Sloping bed design 45° for particularly large machining diameter
- Easy chip removal into the chip tray
- Dimensionally stable linear guides ensure a long service thanks to maximum static and dynamic stiffness
- Hardened and polished ball screw spindles
- All servomotors with integrated encoder for maximum precision
- Tailstock with hydraulic quill
- Portable electronic hand wheel substantially facilitates running in of programs
- Chip conveyor
- Chip carriage
- Work lamp
- Software package "SINUMERIK 808D on PC" included. (Practical training software allowing workpieces to be programmed and simulated on a PC offline. Download for free on [www.cnc4you.com](http://www.cnc4you.com))
- Including two years of SIEMENS warranty
- Information on „Warranty extension“ on page 128
- Information on „Maintenance contracts“ on page 175



# TECHNICAL DATA

Model	S 400E
Article no.	3504325
<b>Machine data</b>	
Electrical connection	400 V / 3 Ph ~ 50 Hz
Total connected load	19 kVA
<b>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	ISO 702-1 No. 6 Sheet A2
Spindle bore	Ø 61 mm*
Chuck passage	Ø 52 mm
Hydraulic lathe chuck	Ø 200 mm
<b>Cooling lubricant system</b>	
Coolant pump output	580 W
Tank capacity	75 litres
<b>Hydraulic system</b>	
Output of hydraulic pump	1.5 kW
Tank capacity	60 litres
<b>Machine data</b>	
Turning length (max.)	430 mm
Max. turning diameter	Ø 224 mm
Swing over cross slide	Ø 200 mm
Swing diameter over machine bed	Ø 450 mm
Angled bed	45°
<b>Speed range</b>	
Spindle speeds*	40 - 4 500 rpm
<b>Tool turret</b>	
Type	hydraulic
Number of tool slots	8 tools
Max. chuck height, width square	25 mm
Max. chuck diameter drilling rod	Ø 16 mm
<b>Precision</b>	
Repetition accuracy	± 0.006 mm / 300 mm
Positioning accuracy	± 0.01 mm
<b>Travel</b>	
X axis	200 mm
Z axis	430 mm
<b>Feed speed</b>	
X axis	10 000 mm/min.
Z axis	10 000 mm/min.
<b>Motor torque</b>	
X axis	10 Nm
Z axis	10 Nm
<b>Tailstock</b>	
Tailstock chuck	MT 4
Tailstock quill diameter	Ø 72 mm
Tailstock - quill stroke	110 mm
<b>Dimensions</b>	
L with/without chip conveyor x W x H	3 670 (2 535) x 1 875 x 2 155 mm
Overall weight	3 500 kg



## SIEMENS CONTROLS:

### SINUMERIK 808D ADVANCED

- RJ45 Ethernet port
- 8.4" LCD colour display with a resolution of 800x600
- 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

#### Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 12 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)

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







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### CHIP CARRIAGE

- Static welded steel design with rugged, tilting steel sheet compartment
- Sliding handle made of steel tube



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### HANDWHEEL

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



---

### CENTRAL LUBRICATION SYSTEM

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



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### TOOL CHANGER

- 8 tool slots
- hydraulic
- Only requires 0.25 seconds for a 45° swivel



---

### TAILSTOCK

- With hydraulic spindle sleeve

---

## STANDARD EQUIPMENT

- Chip conveyor
- Electronic hand wheel
- Chip carriage
- Bracket for tool changer
- Hydraulic 3-jaw lathe chuck Ø 200 mm
- Machine feet
- Operating tool

# L 34HS

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**CNC-controlled flat bed lathe**

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**SIEMENS SINUMERIK 808D ADVANCED**

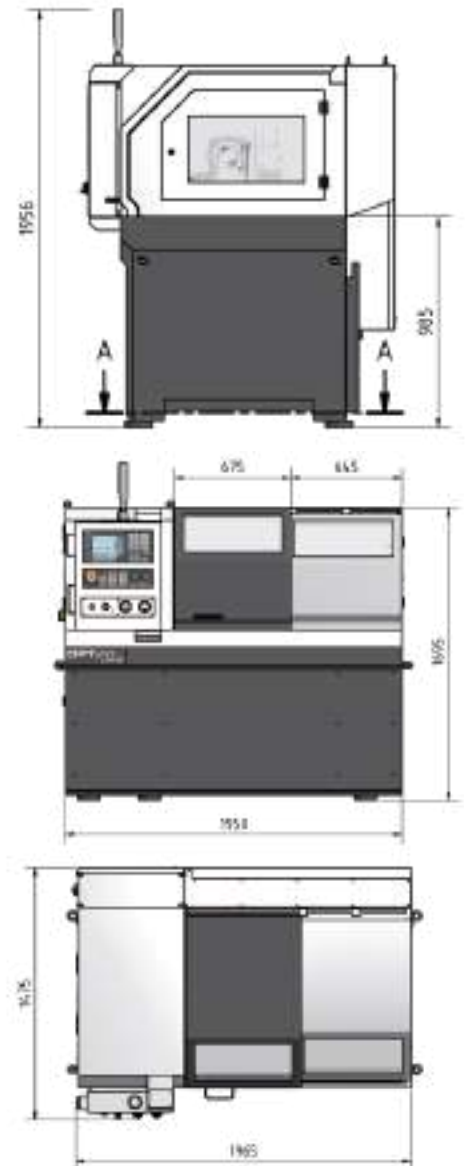
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- Precision workmanship
- Braced machine bed made from grey cast-iron
- Bed guide rails induction hardened (HRC 42-52) and precision ground
- Complex spindle bearing
- Emergency stop button
- Central lubrication
- Polished ball screw spindles
- Maintenance-friendly protective housing
- Access flap on rear for maintenance
- Safety switch on front sliding door
- Turret located behind the lathe centre (left turning tool)
- SIEMENS feed motors
- Software package "SINUMERIK 808D on PC" included. (Practical training software allowing workpieces to be programmed and simulated on a PC offline. Download for free on [www.cnc4you.de](http://www.cnc4you.de))
- Including two years of SIEMENS warranty
- Information on „Warranty extension“ on page 132
- Information on „Maintenance contracts“ on page 175



# TECHNICAL DATA

Model	L 34HS
Article no.	3504232
<b>Machine data</b>	
Electrical connection	400 V / 3 Ph ~ 50 Hz
Total connected load	8 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	DIN 6350 A2-4
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
<b>Machine data</b>	
Centre height	170 mm
Centre width	800 mm
Swing over cross slide	Ø 152 mm
Swing diameter over machine bed	Ø 340 mm
Bed width	208 mm
<b>Speed range</b>	
Speeds*	30 - 3 500 rpm
<b>Tool turret</b>	
Type	electrical
Number of tool slots	6 tools
Max. chuck height, width square	16 x 16 mm
Max. chuck diameter drilling rod	Ø 16 mm
<b>Precision</b>	
Repetition accuracy	± 0.015 mm
Positioning accuracy	± 0.03 mm
<b>Travel</b>	
X axis	185 mm
Z axis	540 mm
<b>Feed speed</b>	
X axis	6 000 mm/min.
Z axis	8 000 mm/min.
<b>Motor torque</b>	
X axis	4 Nm
Z axis	6 Nm
<b>Tailstock</b>	
Tailstock chuck	MT 3
Tailstock quill diameter	Ø 45 mm
Tailstock - quill stroke	120 mm
<b>Dimensions</b>	
Length x width x height	1 950 x 1 475 x 1 956 mm
Overall weight	1 200 kg



## Equipment level

- Holder for tool turret
- Coolant system
- Machine lamp
- Operating tool

## SIEMENS CONTROL:



### Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 12 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)  
 12 months - Article no. 3589010  
 36 months - Article no. 3589012

## SINUMERIK 808D ADVANCED

- RJ45 Ethernet port
- 8.4" LCD colour display with a resolution of 800x600
- 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



**TOOL TURRET**

- For 6 tool slots



**SPINDLE**

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



**SIGNAL LAMP**

- Visually displays the machine status



**COOLANT SYSTEM**

- Pulls out
- Easy chip disposal



**MACHINE LAMP**

- Full illumination of the workspace



**CENTRAL LUBRICATION SYSTEM**

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

**ACCESSORIES**

Remember to order a lathe chuck and chuck flange

• <b>BISON</b> Three-jaw lathe chuck cast, Ø 160 mm DIN 6350	3450232
• <b>BISON</b> Monoblock jaw set, soft for three-jaw lathe chuck Ø 160 mm	3450412
• <b>BISON</b> Four-jaw lathe chuck cast, Ø 160 mm DIN 6350	3450236
• <b>BISON</b> Monoblock jaw set, soft for four-jaw lathe chuck Ø 160 mm	3450422
• <b>BISON</b> Chuck flange for lathe chuck Ø 160 mm	3450241

Made in EU

• Lathe tool set HM 16 mm, 5-part Information on page 154	3441216
• Cylindrical collet Ø16 mm for B16 chuck	3535170



**ACCESSORIES**

<b>Siemens Manual Machine Plus (MM+)</b>	3584150
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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:

- Axis parallel motion
- Turning tapers
- Turning radii
- Centre drilling
- Thread tapping
- Slotting cycle
- Thread tapping
- Preliminary contour turning



# L 28HS

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**CNC-controlled flat bed lathe with linear guide**

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**SIEMENS CONTROL 808D ADVANCED**

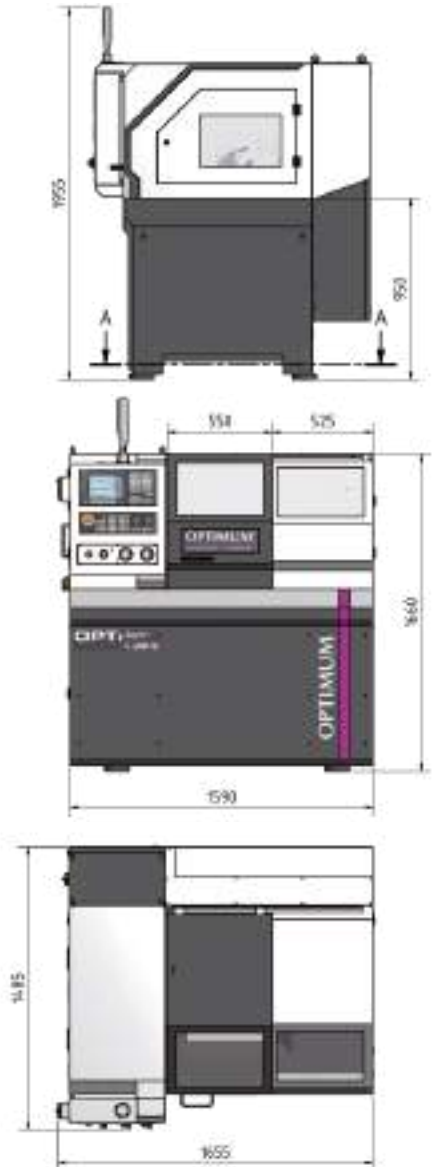
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- Braced machine bed made from grey cast-iron
- Complex spindle bearing
- Emergency stop button
- Central lubrication
- Reference switch
- Maintenance-friendly protective housing
- Access flap on rear for maintenance
- Safety switch on front sliding door
- Turret located behind the lathe centre (left turning tool)
- Linear guide
- Software package "SINUMERIK 808D on PC" included. (Practical training software allowing workpieces to be programmed and simulated on a PC offline. Download for free on [www.cnc4you.com](http://www.cnc4you.com))
- Including two years of SIEMENS warranty
- Information on „Warranty extension“ on page 136
- Information on „Maintenance contracts“ on page 175



# 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
<b>Machine data</b>	
Centre height	169 mm
Centre width	430 mm
Swing over cross slide	Ø 200 mm
Swing diameter over machine bed	Ø 300 mm
<b>Speed range</b>	
Spindle speeds*	40 - 4 000 rpm
<b>Tool turret</b>	
Type	electrical
Number of tool slots	6 tools
Max. chuck height, width square	16 mm
Max. chuck diameter drilling rod	16 mm
<b>Precision</b>	
Repetition 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	10 000 mm/min.
Z axis	12 000 mm/min.
<b>Motor torque</b>	
X axis	1.3 Nm
Z axis	2.4 Nm
<b>Tailstock</b>	
Tailstock chuck	MT 2
Tailstock quill diameter	30 mm
Tailstock - quill stroke	120 mm
<b>Dimensions</b>	
Length x width x height	1 655 x 1 590 x 1 955 mm
Overall weight	900 kg



## Equipment level

- Coolant system
- Machine lamp
- Operating tool

## SIEMENS CONTROL:



### Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 12 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)  
 12 months - Article no. 3589010  
 36 months - Article no. 3589012

## SINUMERIK 808D ADVANCED PPU 150

- Siemens servo drives and motors on all axes
- Closed-loop control circuit
- Network function
- RJ45 Ethernet port
- 8.4" LCD colour display with a resolution of 800x600
- 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





**TOOL TURRET**

- For 6 tool slots
- 1.5 seconds (60°)
- 60 Watt



**SPINDLE**

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



**SIGNAL LAMP**

- Visually displays the machine status



**COOLANT SYSTEM**

- Pulls out
- Easy chip disposal



**LINEAR GUIDE**

- High permissible load and high stiffness
- Low coefficient of friction



**CENTRAL LUBRICATION SYSTEM**

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

**ACCESSORIES**

Remember to order a lathe chuck and chuck flange

• <b>BISON</b> Three-jaw lathe chuck cast, Ø 125 mm DIN 6350	3450230
• <b>BISON</b> Monoblock jaw set, soft for three-jaw lathe chuck Ø 125 mm	3450410
• <b>BISON</b> Four-jaw lathe chuck cast, Ø 125 mm DIN 6350	3450234
• <b>BISON</b> Monoblock jaw set, soft for four-jaw lathe chuck Ø 125 mm	3450420
• <b>BISON</b> Chuck flange for lathe chuck Ø 125 mm	3450240
• <b>BISON</b> Collet chuck 5C	3450238

Made in EU

• Lathe tool set HM 16 mm, 5-part Information on page 154	3441216
• Cylindrical collet Ø16 mm for B16 chuck	3535170



**ACCESSORIES**

<b>Siemens Manual Machine Plus (MM+)</b>	3584150
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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.

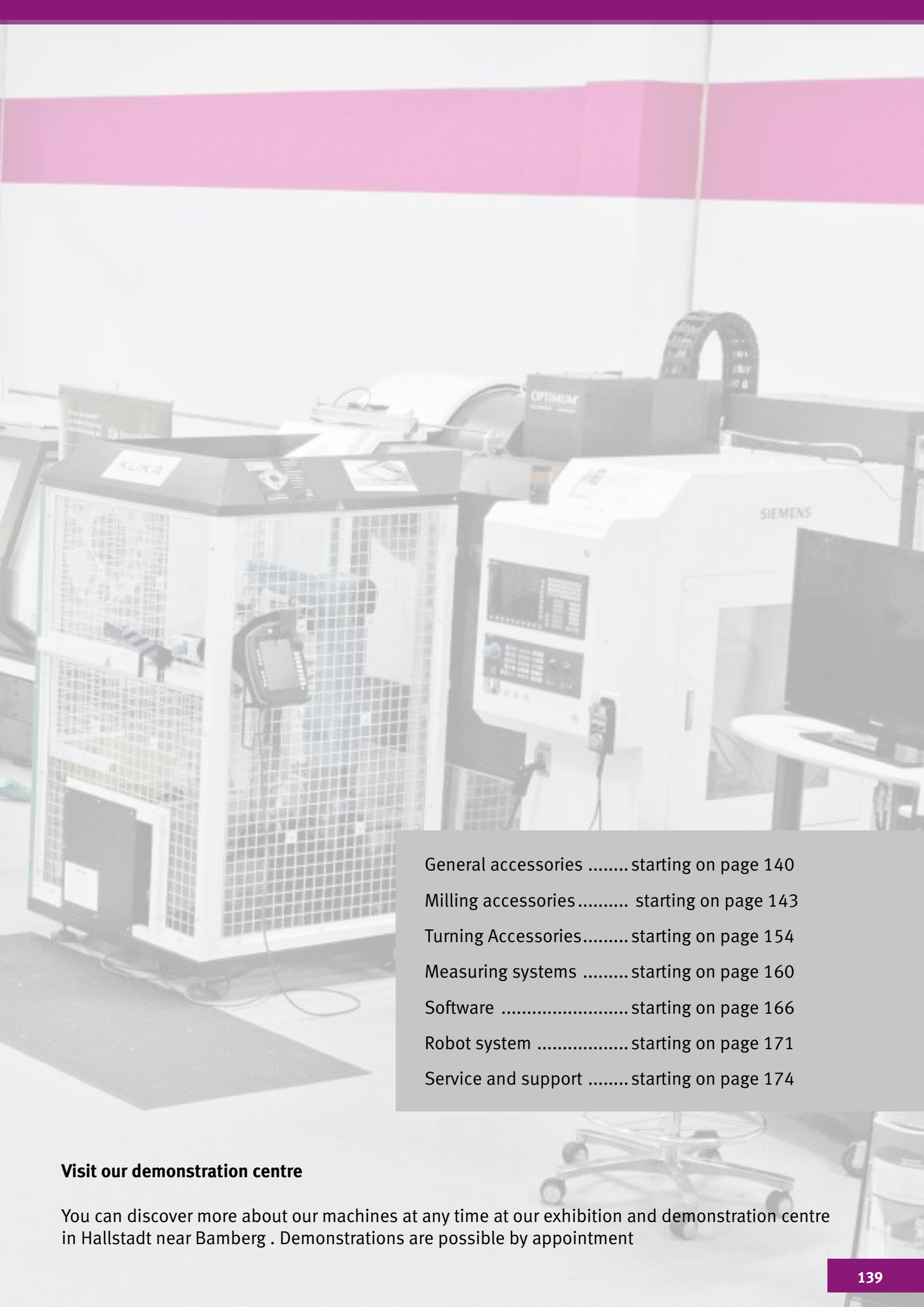
Functions:

- Axis parallel motion
- Turning tapers
- Turning radii
- Centre drilling
- Thread tapping
- Slotting cycle
- Thread tapping
- Preliminary contour turning



A grayscale photograph of a modern industrial manufacturing environment. In the foreground, a large, white, boxy machine sits on a metal pallet. To its right, another piece of machinery is visible, featuring a prominent circular component. The background shows a clean, well-lit factory floor with various pipes and equipment. A horizontal pink bar is visible at the top of the image, partially overlapping the machinery.

# ACCESSORIES TURNING AND MILLING



General accessories .....	starting on page 140
Milling accessories .....	starting on page 143
Turning Accessories.....	starting on page 154
Measuring systems .....	starting on page 160
Software .....	starting on page 166
Robot system .....	starting on page 171
Service and support .....	starting on page 174

### **Visit our demonstration centre**

You can discover more about our machines at any time at our exhibition and demonstration centre in Hallstadt near Bamberg . Demonstrations are possible by appointment

## Rotoclear® S3 - for CNC lathes and CN milling machines

### Viewing panels

Rotoclear S3	354700101
<ul style="list-style-type: none"> <li>• Screw-type version</li> </ul>	
<ul style="list-style-type: none"> <li>• 1 x Rotoclear® S3 - Basic 460</li> <li>• Screw-type flange (6 - 17 mm pane)</li> <li>• Perforated positioning template</li> <li>• Hose 1.6 m</li> <li>• Compressed air hose 8.5 m</li> <li>• Cable 2 x 0.75 mm<sup>2</sup> shielded 10 m</li> <li>• Adapter electro-pneumatic for hose</li> <li>• Threaded fitting for hose</li> <li>• 2 x Threaded fitting for protective tube</li> <li>• Screw-in bracket 90°</li> <li>• Without installation</li> </ul>	

### Rotoclear® 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 work-space – operator safety is thus always ensured in line with currently applicable safety regulations.

Rotoclear S3	354700121
<ul style="list-style-type: none"> <li>• Adhesion bonded version</li> </ul>	
<ul style="list-style-type: none"> <li>• 1 x Rotoclear® S3 - Basic 460</li> <li>• Adhesive flange with cover plate</li> <li>• 2-component adhesive for adhesive flange 50 ml</li> <li>• Dosing gun for 2-component adhesive</li> <li>• Perforated positioning template</li> <li>• Hose 1.6 m</li> <li>• Compressed air hose 8.5 m</li> <li>• Cable 2 x 0.75 mm<sup>2</sup> shielded 10 m</li> <li>• Adapter electro-pneumatic for hose</li> <li>• Threaded fitting for hose</li> <li>• 2 x Threaded fitting for protective tube</li> <li>• Screw-in bracket 90°</li> <li>• Primer for PC pane 25 ml</li> <li>• Swab for primer</li> <li>• Adhesion bonding guide</li> <li>• Without installation</li> </ul>	

#### 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





**Spot facer 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



**Twist drill set**

- › As per DIN 338 HSS-CO 5%
- › Tetrahedral 135° split point allows for excellent self-centring
- › Improved tool service life thanks to alloyed components
- › 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

**25-part** 3201010

- › 1- 13 mm

**51-part** 3201020

- › 1 - 6 mm (in 0.1 mm increments)

**41-part** 3201021

- › 6 - 10 mm (in 0.1 mm increments)



**Carbide end mill 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
- › Rake angle 35°



**Conical counterbore 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



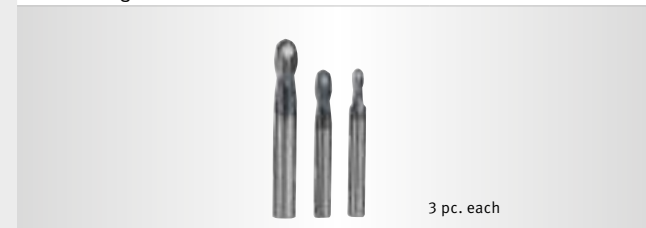
**Drilling and thread tapping set** 3202015

- › Through bore
- › 15-part
- › 7 pcs. thread tap: M3 / M4 / M5 / M6 / M8 / M10 / M12
- › 7 pcs. spiral bit DIN 338; Ø2.5 mm / Ø3.3 mm / Ø4.2 mm / Ø5.0 mm / Ø6.8 mm / Ø8.5 mm / Ø10.2 mm
- › Tap wrench DIN 1814 size 1½
- › Practical OPTIMUM plastic case



**Radius end mill 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
- › Rake angle 30°





# ACCESSORIES

# **MILLING**

**BT 30**  
Starter set

<b>Starter set</b>	<b>BT 30</b>
Article no.	3536107

<b>Comprises:</b>	
1 pc. milling head holder	
1 pc. chuck 1 - 13 mm	
2 pcs. Weldon 6 mm	
1 pc. Weldon 8 mm	
1 pc. Weldon 10 mm	
1 pc. Weldon 12 mm	
1 pc. Weldon 16 mm	
2 pcs. Weldon 20 mm	
1 pc. adapter BT 30 to MT 2	
3 pcs. spring collet holder ER 32	
1 pc. spring collet spanner ER 32	
18-part spring collet set ER 32	
1 pc. height adjuster	
1 pc. assembly and tool adjustment gauge	
14 pcs. pull studs	
1 pc. taper squeegee	

<b>Milling head holder</b>	<b>3536306</b>
· Collet 22 mm	



<b>Chuck</b>	<b>3536303</b>
· Clamping range 1 - 13 mm	
· Concentricity 0.03 mm	
· Max. speed 12 000 rpm	



<b>Weldon holder</b>	
Ø 6 mm	3536310
Ø 8 mm	3536311
Ø 10 mm	3536312
Ø 12 mm	3536313
Ø 16 mm	3536314
Ø 20 mm	3536315



<b>Adapter</b>	
BT 30 to MT 2	3536305
BT 30 to MT 3	3536316



<b>Spring collet holder ER 32</b>	<b>3536304</b>
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<b>Spring collet holder spanner ER 32</b>	<b>3536307</b>
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<b>Spring collet set ER 32</b>	<b>3441122</b>
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- 18-part spring collet set size Ø 1 - 16 mm



<b>Height-adjuster</b>	<b>3536290</b>
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- 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



<b>Assembly and tool adjustment gauge</b>	<b>3536193</b>
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- For easy and precise adjustment of tools
- Vertical and horizontal collet for tools with a steep-angle taper



<b>Taper squeegee</b>	<b>3536301</b>
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<b>Pull stud JIS B 6339</b>	<b>3536302</b>
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## BT 40

### Starter set

<b>Starter set</b>	<b>BT40</b>
Article no.	3536108

#### Comprises:

- 1 pc. milling head holder with 27 mm collet
- 1 pc. quick-release drill chuck 1 - 13 mm
- 2 pcs. Weldon 6 mm
- 1 pc. Weldon 8 mm
- 1 pc. Weldon 10 mm
- 1 pc. Weldon 12 mm
- 1 pc. Weldon 16 mm
- 2 pcs. Weldon 20 mm
- 1 pc. adapter BT 40 to MT 3
- 3 pcs. spring collet holder ER 32
- 1 pc. spring collet spanner ER 32
- 18-part spring collet set ER 32
- 1 pc. height adjuster
- 1 pc. assembly and tool adjustment gauge
- 1 pc. taper squeegee
- 15 pcs. pull studs

<b>Milling head holder</b>	<b>3536336</b>
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- Collet 27 mm



<b>Chuck</b>	<b>3536333</b>
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- Clamping range 1 - 13 mm



<b>Weldon holder</b>	
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Ø 6 mm	3536340
Ø 8 mm	3536341
Ø 10 mm	3536342
Ø 12 mm	3536343
Ø 16 mm	3536344
Ø 20 mm	3536345



<b>Adapter</b>	<b>3536335</b>
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- BT 40 to MT 3



<b>Spring collet holder ER 32</b>	<b>3536334</b>
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<b>Spring collet holder spanner ER 32</b>	<b>3536307</b>
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<b>Spring collet set ER 32</b>	<b>3441122</b>
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- 18 spring collets; sizes Ø 1 - 16 mm



<b>Height-adjuster</b>	<b>3536290</b>
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- 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



<b>Assembly and tool adjustment gauge</b>	<b>3536194</b>
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- For easy and precise adjustment of tools
- Vertical and horizontal collet for tools with a steep-angle taper



<b>Taper squeegee</b>	<b>3536331</b>
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<b>Pull stud JIS B 6339</b>	<b>3536332</b>
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## SK 40 / DIN 69871

### Starter set

<b>Starter set</b>	<b>SK 40 / DIN 69871</b>
Article no.	3536109

#### Comprises:

1 pc. milling head holder with 27 mm collet
1 pc. quick-release drill chuck 1 - 13 mm
2 pcs. Weldon 6 mm
1 pc. Weldon 8 mm
1 pc. Weldon 10 mm
1 pc. Weldon 12 mm
1 pc. Weldon 16 mm
2 pcs. Weldon 20 mm
1 pc. adapter SK 40 to MT 3
3 pcs. spring collet holder ER 32
1 pc. spring collet spanner ER 32
18-part spring collet set ER 32
1 pc. height adjuster
1 pc. assembly and tool adjustment gauge
1 pc. taper squeegee
15 pcs. pull studs

<b>Milling head holder</b>	<b>3536366</b>
· Collet 27 mm	



<b>Chuck</b>	<b>3536363</b>
· Clamping range 1 - 13 mm	



<b>Weldon holder</b>	
Ø 6 mm	3536370
Ø 8 mm	3536371
Ø 10 mm	3536372
Ø 12 mm	3536373
Ø 16 mm	3536374
Ø 20 mm	3536375



<b>Adapter</b>	<b>3536365</b>
· SK 40 to MT 3	



<b>Spring collet holder ER 32</b>	<b>3536364</b>
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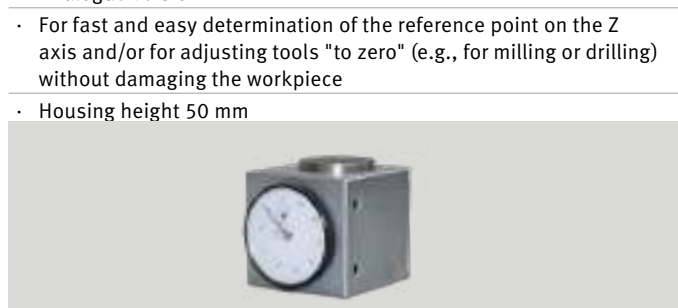
<b>Spring collet holder spanner ER 32</b>	<b>3536307</b>
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<b>Spring collet set ER 32</b>	<b>3441122</b>
· 18 spring collets; sizes Ø 1 - 16 mm	



<b>Height-adjuster</b>	<b>3536290</b>
· 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	



<b>Assembly and tool adjustment gauge</b>	<b>3536195</b>
· For easy and precise adjustment of tools	
· Vertical and horizontal collet for tools with a steep-angle taper	



<b>Taper squeegee</b>	<b>3536331</b>
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<b>Pull stud DIN 69872</b>	<b>3536362</b>
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## HSK A-63

### Starter set

<b>Starter set</b>	<b>HSK A-63</b>
Article no.	3536110

#### Comprises:

- 1 pc. milling head holder with 27 mm collet
- 1 pc. chuck 1 - 13 mm
- 1 pc. Weldon 6 mm
- 1 pc. Weldon 8 mm
- 1 pc. Weldon 10 mm
- 1 pc. Weldon 12 mm
- 1 pc. Weldon 16 mm
- 1 pc. Weldon 20 mm
- 1 pc. adapter HSK63 to MT 3
- 1 pc. spring collet holder ER 32
- 18-part spring collet set ER 32
- 1 pc. spring collet spanner ER 32
- 1 pc. assembly block swivelling
- 1 pc. taper squeegee

<b>Milling head holder</b>	<b>3536414</b>
· Collet 27 mm	



<b>Chuck</b>	<b>3536411</b>
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- Clamping range 1 - 13 mm
- Excellent precision and concentricity
- Secure clamping of the workpiece thanks to mechanical clamping force booster
- Avoids autonomous release of clamp while machining right-handed/left-handed rotation and in case of spindle stop



<b>Weldon holder</b>	
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- For clamping tools with a lateral carrier
- Extremely smooth action

Ø 6 mm	3536450
Ø 8 mm	3536451
Ø 10 mm	3536452
Ø 12 mm	3536453
Ø 16 mm	3536454
Ø 20 mm	3536455



<b>Spring collet holder ER 32</b>	<b>3536412</b>
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- For clamping tools with a cylindrical shank in ER spring collets
- Clamping range 0.5 - 10 mm



<b>Spring collet holder spanner ER 32</b>	<b>3536307</b>
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<b>Adapter</b>	<b>3536413</b>
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- HSK63 to MT 3
- Ground to precisely match helix gradient on inside and outside



<b>Spring collet set ER 32</b>	<b>3441122</b>
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- 18 spring collets; sizes Ø 1 - 16 mm



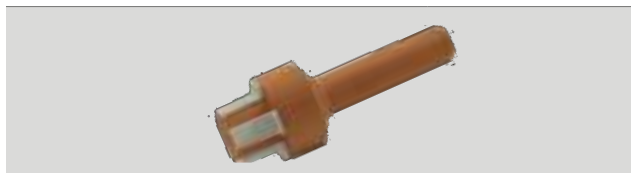
<b>Assembly block</b>	<b>3536415</b>
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- For easy and precise adjustment of tools
- Swivelling

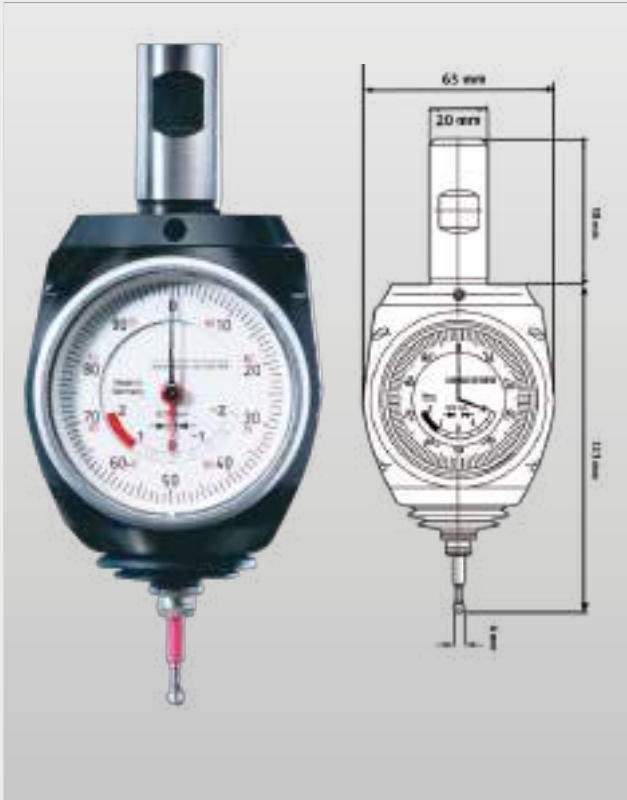


<b>Taper squeegee</b>	<b>3536410</b>
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- For cleaning the machine taper to remove dust, chips and soiling
- Non-woven border



Universal 3D probe	354700201
<ul style="list-style-type: none"> <li>• Including short probe insert Ø 4 mm</li> <li>• High-precision, versatile measuring device for milling and erosion machines</li> <li>• 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</li> <li>• For fast and easy setting of workpiece zero points and for length measurement</li> <li>• Arbitrary touch direction (X, Y, Z axis)</li> <li>• Dial gauge shows the clearance between the spindle axis and the workpiece</li> <li>• Reduces overheads, improves productivity and reduces staff workload</li> <li>• Probe inserts of different lengths available, interchangeable without tools</li> <li>• To maximise measuring accuracy and precision, all Universal 3D probes are individually measured and calibrated in installation</li> <li>• Meets all currently applicable safety regulations</li> <li>• Splash proof as per IP 67</li> </ul>	



<b>NEW</b> AQUACUT C1	3530030
<ul style="list-style-type: none"> <li>• 10 litre cannister</li> <li>• Cooling emulsion</li> <li>• High-pressure resistant and containing mineral oil, for long tool life and clean surfaces</li> <li>• Emulsifiable with water, microbe-resistant and kind to the skin</li> </ul>	



Twist drill HSS with morse taper	
<ul style="list-style-type: none"> <li>• 9-part; sizes 14.5/16/18/20/22/24/26/28/30 mm</li> <li>• Long service life.</li> <li>• Good chip removal</li> <li>• Right handed</li> </ul>	
<b>MT 2</b>	3051002
<b>MT 3</b>	3051003



Parallel shim set	3536191
<ul style="list-style-type: none"> <li>• Finely polished to 0.01 mm precision</li> <li>• Length 150 mm x width 8.5 mm</li> <li>• 18 pcs. sizes 2 x 14 mm/2 x 16 mm/2 x 20 mm/2 x 24 mm/2 x 30 mm/2 x 32 mm/2 x 36 mm/2 x 40 mm/2 x 44 mm</li> <li>• Right handed</li> </ul>	



Face-milling cutter without indexable inserts	
Ø 63 mm bore, 27 mm	3536390
Ø 50 mm bore, 22 mm	3536391



Indexable inserts	3536392
<ul style="list-style-type: none"> <li>• For face-milling cutter 3536390/3536391</li> <li>• Ten pcs.</li> </ul>	

Workpiece support	Article no.
Material S 45C	
<b>WPS-1</b> height 40 mm	3354261
<b>WPS-2</b> height 70 mm	3354262
<b>WPS-3</b> height 150 mm	3354263
<b>WPS-4</b> height 250 mm	3354264



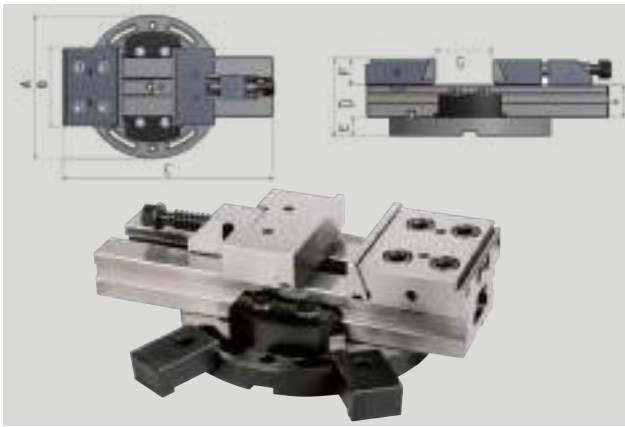
## Machine vices

### Precision modular vices PNM

- Modular vice for series production 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

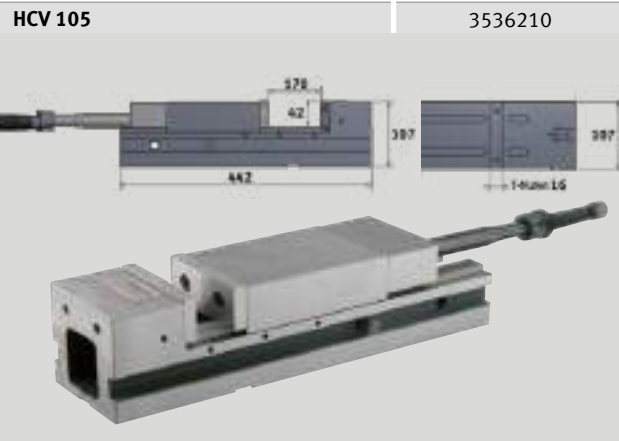
<b>PNM 100</b>	3355551
<b>PNM 125</b>	3355553

Tech. specifications	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

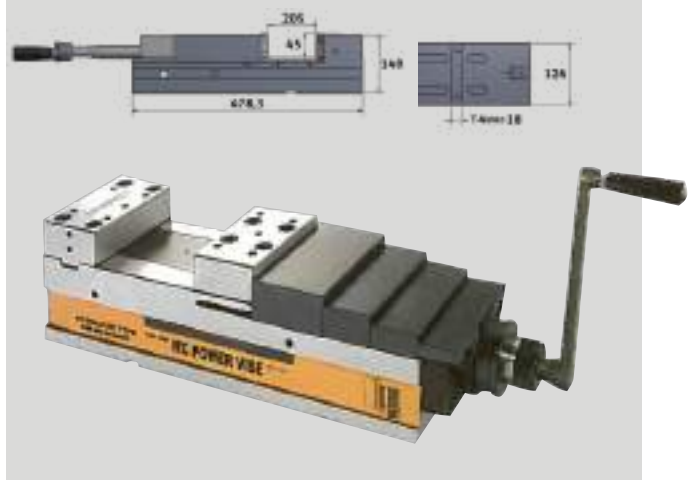
- Modular machine vice with high precision and repetition accuracy for series production and single-part machining on CNC milling machines and machining centres
- Robust design for milling
- Guide surfaces tempered and polished
- Booster system, requires little force, high pressure build-up during clamping
- 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

- Modular machine vice with high precision and repetition accuracy for series production 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

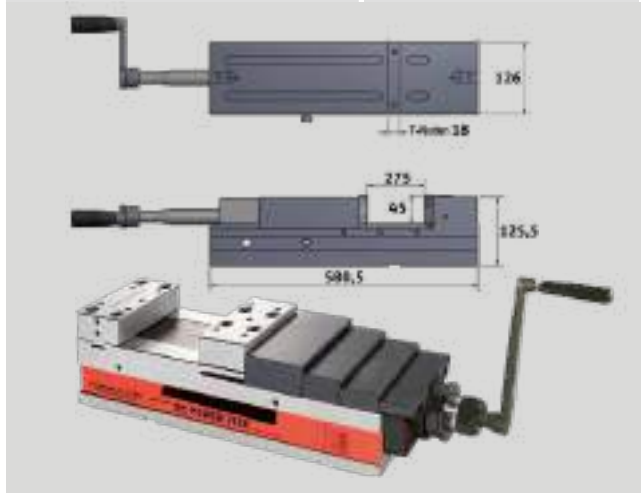
<b>HCV 125</b>	3536214
<b>Soft jaws 2 pcs.</b>	3536221
<b>L jaws 2 pcs.</b>	3536222

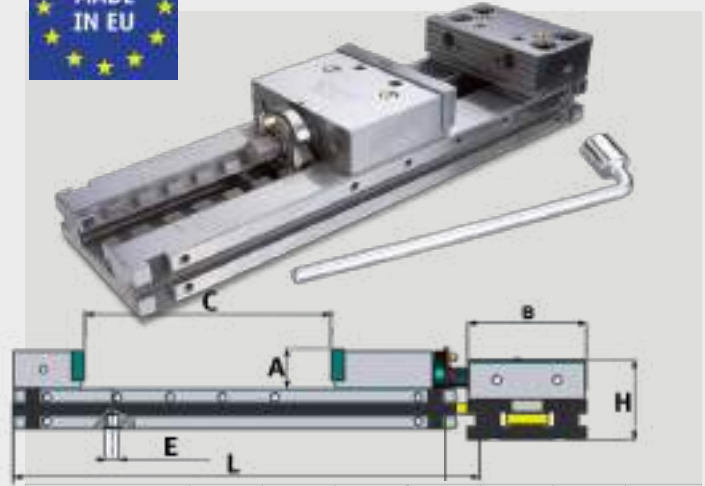


### Hydraulic machine vice HCV 160

- Hydraulic CNC precision machine vice for series and one-off 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

<b>HCV 160</b>	3536215
<b>Soft jaws 2 pcs.</b>	3536225
<b>L jaws 2 pcs.</b>	3536226





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	305	16	635	174	100	58.8
MVMP 150x200	mm	60	205	16	410	150	118	34

### Modular machine vice

- Modular machine vice with high precision and repetition accuracy for series production and single-part machining on CNC milling machines and machining centres
- Robust design for milling
- 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

<b>MVSP 150 x 200</b>	3530104
<b>MVSP 150 x 300</b>	3530108
<b>MVSP 150 x 400</b>	3530110
<b>MVSP 175 x 300</b>	3530114
<b>MVMP 150 x 300</b>	3530138

### Accessories for MVSP / MVMP

Clamping jaw set	Article no.
<b>150 mm</b> - smooth for MVSP	3530216
<b>175 mm</b> - smooth for MVSP	3530217
<b>150 mm</b> - smooth for MVMP	3530256



Clamping jaw set	Article no.
<b>150 mm</b> - knurled for MVSP	3530231
<b>175 mm</b> - knurled for MVSP	3530232
<b>150 mm</b> - knurled for MVMP	3530271



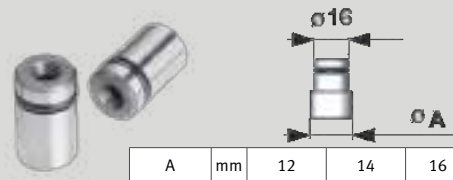
Side clamping blocks	Article no.
<b>150 mm</b> - soft (2 pcs.)	3530406
<b>175 mm</b> - soft (2 pcs.)	3530407



T-slot nuts	Article no.
<b>Ø 12 mm</b> (2 pcs.)	3530390
<b>Ø 14 mm</b> (2 pcs.)	3530391
<b>Ø 16 mm</b> (2 pcs.)	3530392
<b>Ø 18 mm</b> (2 pcs.)	3530393

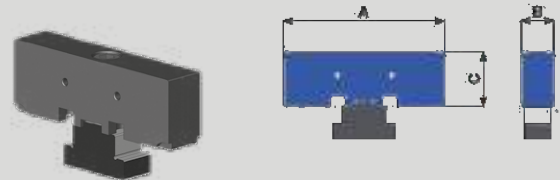


T-slot nuts	Article no.
<b>Ø 12 mm</b> (2 pcs.) cylindrical	3530380
<b>Ø 14 mm</b> (2 pcs.) cylindrical	3530381
<b>Ø 16 mm</b> (2 pcs.) cylindrical	3530382
<b>Ø 18 mm</b> (2 pcs.) cylindrical	3530383



Intermediate jaw	Article no.
<b>150 mm</b> - mobile	3530351
<b>175 mm</b> - mobile	3530352

- For parallel workpieces



Jaw		A	B	C
150	mm	149	30	50
175	mm	174	30	60

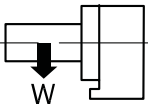
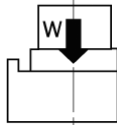
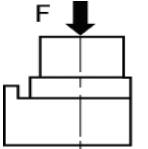
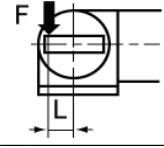
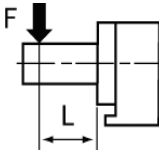
Clamping jaw set	Article no.
<b>150 mm</b> for extending the clamping area	3530361
<b>175 mm</b> for extending the clamping area	3530362



## Fourth axis

### Technical specifications



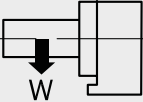
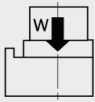
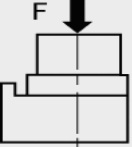
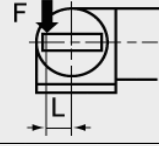
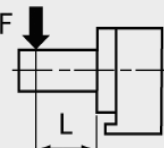
Model	F 150 / F 150HSC / F 210HSC / F 310HSC / F 410HSC	F 410 HSC
Article no.	3511290210*	3511290211*
<b>Technical specifications</b>		
Table diameter	120 mm	250 mm
Vertical table peak height	115 mm	185 mm
Table height horizontal	170 mm	200 mm
Vertical overall height	193 mm	315 mm
Passageway	30 mm	70 mm
T-slot size	10 mm	12 mm
Width of guide block	14 mm	18 mm
Servo motor	Siemens 1FK7042	Siemens 1FK7060
Transmission ratio	1:60	1:180
Minimum step width	0.001°	0.001°
Max. speed (Motor : 2 000 rpm)	33.3 rpm	11.1 rpm
Pneumatic clamping force (5 bar)	120 Nm	250 Nm
Hydraulic clamping force (20 bar)	240 Nm	500 Nm
Subsystem precision	30"	15"
Repetition accuracy	4"	4"
Max. machining force	12"	50"
Net weight	28 kg	124 kg
Vertical 	W = 35 kg	W = 150 kg
Horizontal 	W = 75 kg	W = 300 kg
	F = 800 kg	F = 1 450 kg
	F x L = 8 kg x m	F x L = 94 kg x m
	F x L = 18 kg x m	F x L = 180 kg x m

## Fifth axis

### Technical specifications



Information „Fifth axis“ on page 152

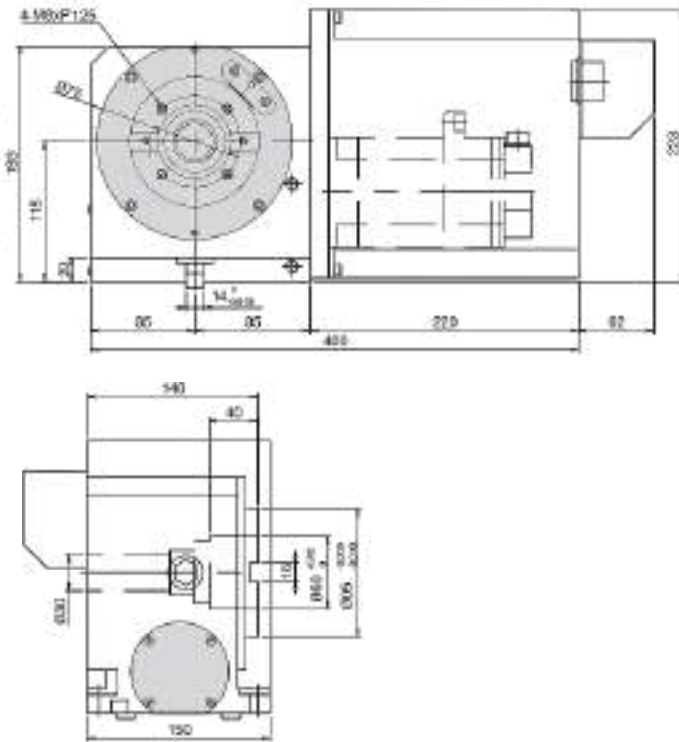
Model	F 150HSC / F 210HSC F 310HSC / F 410HSC	F 310HSC / F 410 HSC
Article no.	3511290250*	3511290251*
<b>Technical specifications</b>		
Table diameter	120 mm	200 mm
Vertical table peak height	150 mm	195 mm
Vertical overall height	235 mm	360 mm
Passageway	30 mm	35 mm
T-slot size	10 mm	12 mm
Width of guide block	14 mm	18 mm
Servomotor rotating	Siemens 1FK7042	Siemens 1FK7060
Servomotor tilting	Siemens 1FK7042	Siemens 1FK7063
Gearbox rotating	1:72	1:90
Gearbox tilting	1:120	1:180
Minimum step width	0.001°	0.001°
Max. speed rotating/tilting	27.8 rpm / 16.7 rpm	22.2 rpm / 11.1 rpm
Tilt angle	-20°~120°	-110°~110°
<b>Rotation axis</b>		
Pneumatic clamping force (5 bar)	120 Nm	250 Nm
Hydraulic clamping force (20 bar)	240 Nm	500 Nm
Subsystem precision	30"	20"
Repetition accuracy	4"	4"
Pneumatic resistance	120 Nm	250 Nm
Hydraulic resistance	240 Nm	500 Nm
Subsystem precision	60"	50"
Net weight	105 kg	240 kg
Vertical 	W = 20 kg	W = 50 kg
Horizontal 	W = 35 kg	W = 100 kg
	F = 400 kg	F = 500 kg
	F x L = 12 kg x m	F x L = 16.5 kg x m
	F x L = 10 kg x m	F x L = 15 kg x m

## Fourth axis

Dimensions

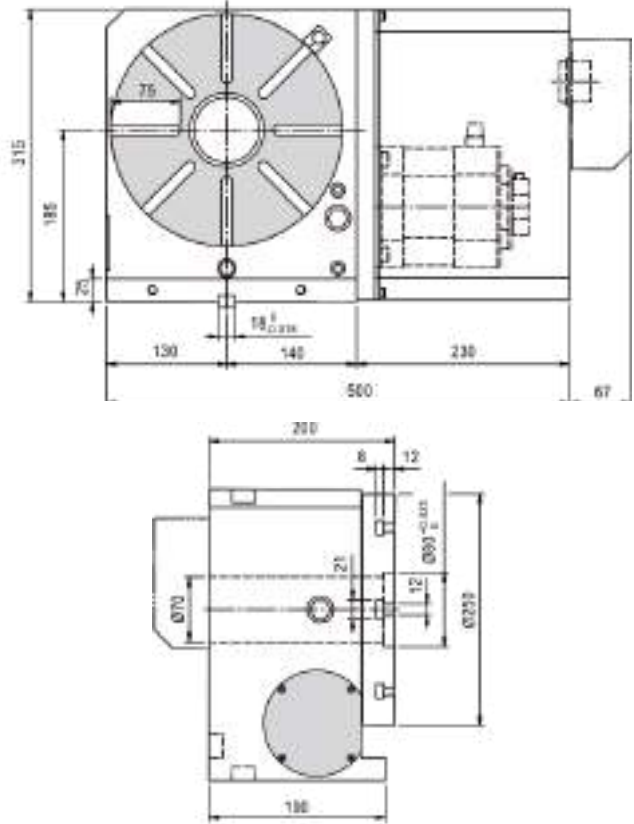
### F 150HSC / F 210HSC / F 310HSC / F 410HSC

Article no. 3511290210



### F 410 HSC

Article no. 3511290211

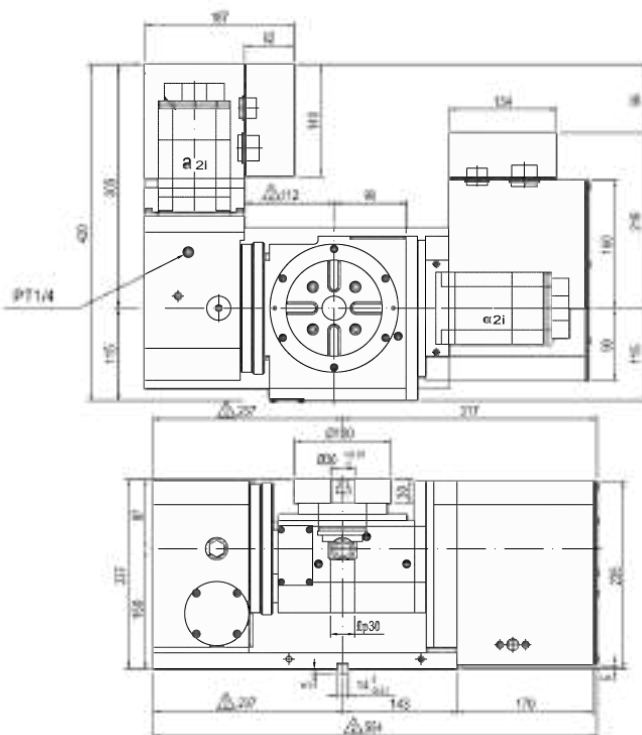


## Fifth axis

Dimensions

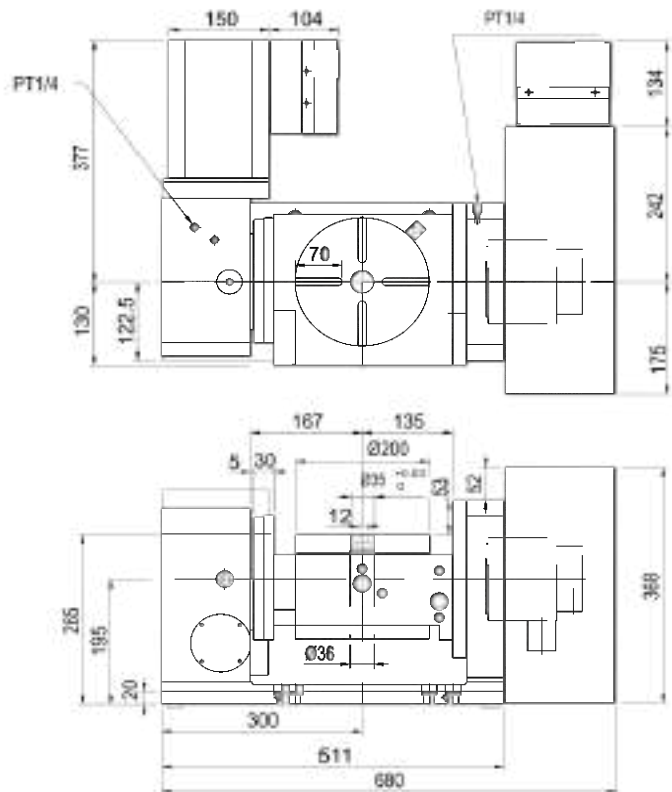
### F 150HSC / F 210HSC / F 310HSC / F 410HSC

Article no. 3511290250



### F 310HSC / F 410HSC

Article no. 3511290251





# ACCESSORIES TURNING

**Clamping block set 16-05** 3440653

> 1 pc. clamping block SLTBN 16-05, 1 pc. parting off tool SLIH 26-2, 1 pc. parting off tool SLIH 26-3, 5 pcs. cutting plates GTN2 (cutting width 2.2 mm), 5 pcs. cutting plates GTN3 (cutting width 3.1 mm) aluminium box

**Clamping block set 20-05** 3440654

> 1 pc. clamping block SLTBN 20-05, 1 pc. parting off tool SLIH 26-3, 1 pc. parting off tool SLIH 26-4, 5 pcs. cutting plates GTN3 (cutting width 3.1 mm), 5 pcs. cutting plates GTN4 (cutting width 4.1 mm) aluminium box

**Clamping block set 25-05** 3440655

> 1 pc. clamping block SLTBN 25-05, 1 pc. parting off tool SLIH 26-3, 1 pc. parting off tool SLIH 26-4, 5 pcs. cutting plates GTN3 (cutting width 3.1 mm), 5 pcs. cutting plates GTN4 (cutting width 4.1 mm) aluminium box

**Replacement cutting insert set (10 pcs.)** Article no.

for cutting inserts <b>GTN 2</b>	3440663
for cutting inserts <b>GTN 3</b>	3440664
for cutting inserts <b>GTN 4</b>	3440665



Block	16-05	20-05	25-05
L x W x H	88 x 38 x 42 mm	88 x 38 x 43 mm	100 x 42 x 43.5 mm
C	16 mm	20 mm	25 mm
D	4 mm	5 mm	5 mm

**Shank** 3535170

• cylindrical collet Ø16 mm for B16 chuck



**AQUACUT C1** 3530030

- 10 litre cannister
- For mixing emulsions
- Drilling and cooling emulsion
- High-pressure resistant and containing mineral oil, for long tool life and clean surfaces
- Emulsifiable with water, microbe-resistant and kind to the skin



**OPTIMUM Precision quick release chuck** Article no.

Concentricity better than 0.06 mm

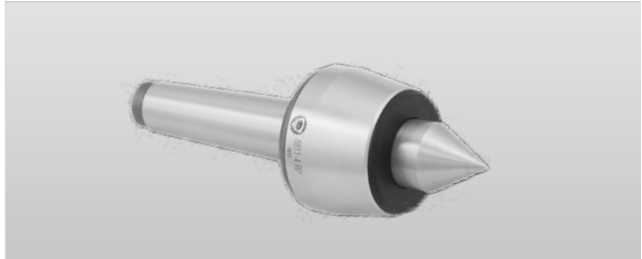
<b>1 - 8 mm; B16</b>	3050608
<b>1 - 10 mm; B16</b>	3050610
<b>1 - 13 mm; B16</b>	3050623
<b>1 - 16 mm; B16</b>	3050626



**BISON Travelling centre** Article no.

max. radial run-out 0.005 mm

<b>MT 2</b> (NSK ball roller bearings INA needle bearings)	3451002
• Max. speed 7 000 rpm; radial load max. 2 000 N	
<b>MT 3</b> (NSK ball roller bearings INA needle bearings)	3451003
• Max. speed 5 000 rpm; radial load max. 4 000 N	
<b>MT 4</b> (NSK ball roller bearings INA needle bearings)	3451004
• Max. speed 3 800 rpm; radial load max. 8 000 N	
<b>MT 5</b> (2-row SKF angular contact bearings)	3451005
• Max. speed 3 000 rpm; radial load max. 20 000 N	



**Lathe tool set HM 16 mm** 3441216

- > 5-part
- > With HM turning plates
- > TiN coated



**HM replacement turning plates (5 pcs. each)**

No.	Art. no.	ISO	D1	D2	B1	S1	right
<b>1</b>	3441280	SCMT09T304	9.525	4.4	90°	3.97	0.4
<b>2</b>	3441282	CCMT09T304	9.525	4.4	80°	3.97	0.4
<b>3-5</b>	3441281	DCMT11T304	9.525	4.4	55°	3.97	0.4

## VDI 30

### Starter set

<b>Starter set</b>	<b>VDI 30</b>
Article no.	3536115
<b>Comprises:</b>	
3 pcs. square transverse mount	
1 pc. square transverse overhead mount	
1 pc. square longitudinal mount	
5 pcs. drill rod holder Ø 10 / 12 / 16 / 20 / 25 mm	
3 pcs. cap	
1 pc. spring collet holder ER 25	
1 pc. spring collet spanner ER 25	
15-part spring collet set ER 25	
1 pc. tool holder	
1 pc. chuck	

<b>Square transverse mount</b>	<b>3536231</b>
<ul style="list-style-type: none"> <li>Right-hand type, short</li> <li>DIN 69880</li> <li>Large adjustable conical tipped nozzle</li> </ul>	



<b>Square transverse mount</b>	<b>3536232</b>
<ul style="list-style-type: none"> <li>For overhead work</li> <li>Right-hand type, short</li> <li>DIN 69880</li> <li>Large adjustable conical tipped nozzle</li> </ul>	



<b>Square longitudinal mount</b>	<b>3536233</b>
<ul style="list-style-type: none"> <li>Right-hand type</li> <li>Large adjustable conical tipped nozzle</li> </ul>	



<b>Sealing cover</b>	<b>3536236</b>
<ul style="list-style-type: none"> <li>Protects the tool changer against soiling</li> </ul>	



<b>Spring collet holder ER 25</b>	<b>3536237</b>

<b>Spring collet key ER 25</b>	<b>3536240</b>

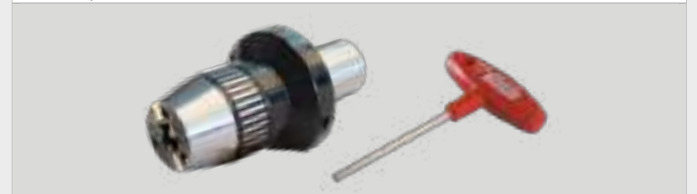
<b>Spring collet set ER 25</b>	<b>3441109</b>
<ul style="list-style-type: none"> <li>15 pcs.; sizes Ø 1 - 16 mm</li> </ul>	



<b>Tool holder</b>	<b>3536238</b>
<ul style="list-style-type: none"> <li>Pre-worked</li> <li>Round blank</li> </ul>	



<b>Chuck</b>	<b>3536239</b>
<ul style="list-style-type: none"> <li>Clamping range 1 - 13 mm</li> </ul>	



<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



## VDI 40

### Starter set

<b>Starter set</b>	<b>VDI 40</b>
Article no.	3536116

#### Comprises:

3 pcs. square transverse mount
1 pc. square transverse overhead mount
1 pc. square longitudinal mount
5 pcs. drill rod holder Ø 10 / 12 / 16 / 20 / 25 mm
3 pcs. cap
1 pc. spring collet holder ER 25
1 pc. spring collet spanner ER 25
15-part spring collet set ER 25
1 pc. tool holder
1 pc. chuck

<b>Square transverse mount</b>	<b>3536251</b>
--------------------------------	----------------

- Right-hand type, short
- DIN 69880
- Large adjustable conical tipped nozzle



<b>Square transverse mount</b>	<b>3536252</b>
--------------------------------	----------------

- For overhead work
- Right-hand type, short
- DIN 69880
- Large adjustable conical tipped nozzle



<b>Square longitudinal mount</b>	<b>3536253</b>
----------------------------------	----------------

- Right-hand type
- Large adjustable conical tipped nozzle



<b>Sealing cover</b>	<b>3536256</b>
----------------------	----------------

- Protects the tool changer against soiling



<b>Spring collet holder ER 25</b>	<b>3536257</b>
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<b>Spring collet key ER 25</b>	<b>3536260</b>
--------------------------------	----------------



<b>Spring collet set ER 25</b>	<b>3441109</b>
--------------------------------	----------------

- 15 pcs.; sizes Ø 1 - 16 mm



<b>Tool holder</b>	<b>3536258</b>
--------------------	----------------

- Pre-worked
- Round blank



<b>Chuck</b>	<b>3536259</b>
--------------	----------------

- 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 |



## Grippex II

Automatic bar grab



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

## GRIPPEX bar grab

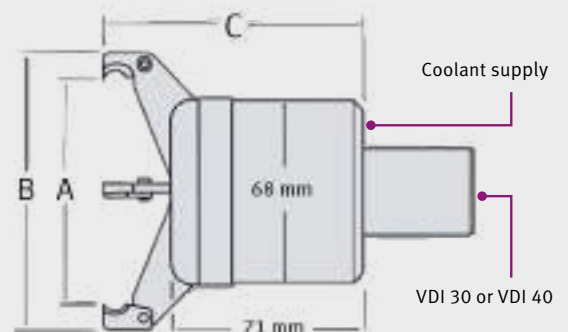
Lightweight and compact

### Benefits and main features of the GRIPPEX bar grab

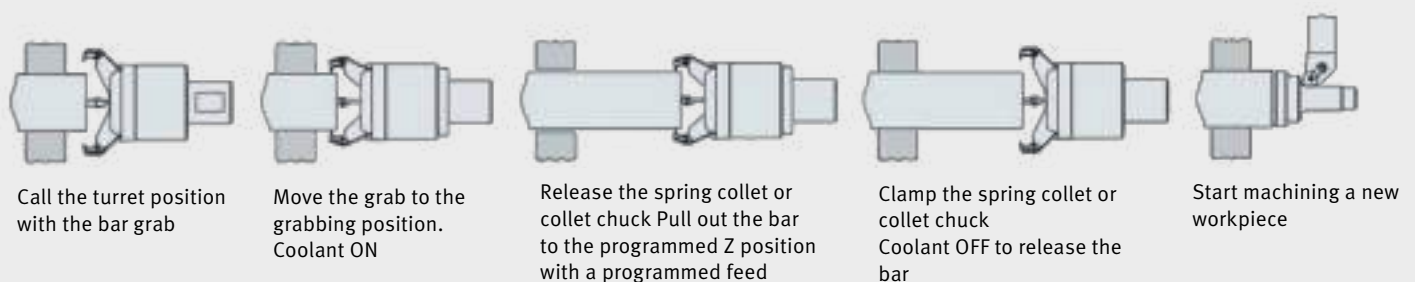
- Fast and easy installation - the grab's work range can be fully utilised without conversion
- Lightweight and compact - thus allowing the turret to be fully occupied
- Resists high coolant pressure (20 bar). No need for a pressure reduction valve
- Works reliably as of 0.5 bar coolant pressure
- Clamps 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
Grab range 2-60 mm	Article no.	354500100	354500103
Grab range 3-80 mm	Article no.	354500101	354500104
Grab range 7-105 mm	Article no.	354500102	354500105



Grab range		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



## Short bar loader the ideal solution for automatic loading

The Pro V 65E / Pro V 65LE / Pro Conqueror bar loaders are the ideal solution for automatically loading CNC lathes with short bars. It combines maximum productivity with a small footprint, and is equipped with one magazine for up to 1 200 mm bar length with the in the E version, up to 1 500 mm with the LE version, and up to 3 200 mm with the Conqueror version.

### Intuitive control unit and remote control

A user-friendly control unit and remote control ensure the interplay between the loading magazine and the lathe.

This allows the owner to run the production process safely and efficiently.

### Mitsubishi PLC controller

- Touchscreen digital interface with LCD display
- Various function and parameter settings are clearly visible on the display; they ensure easy and clear-cut control.
- Alarm display for troubleshooting
- Basic functions can be accessed via the remote control



Remote control for checks and adjustments



Quick and accurate adjustment of the height by means of an adjustment lever with scale








	Bar feeder interface Article no.	Pro V 65 E Article no.	Pro V 65 LE Article no.	Pro Conqueror Article no.
<b>L 44</b>	351433026	351433012	-	351433019
<b>L 440</b>	351441037	351441033	351441034	351441038
<b>L 460</b>	351442037	351442033	351442034	351442038
<b>S 600</b>	351506011	351506012	351506013	351506023
<b>S 620 / S 620L</b>	-	351506535	351506536	351506538
<b>S 500 / S 500L</b>	-	351515003	-	351515012
<b>S 750 / S 750k</b>	-	351517003	-	351517012
		Pro V 65 E	Pro V 65 LE	Pro Conqueror
diameter		Ø 5 mm - Ø 65 mm		Ø 5 mm - Ø 51mm
Bar length		1 200 mm	1 500 mm	3 020 mm
Spindle height		920 mm / 1 300 mm		850 mm / 1 300 mm
Loading weight		250 kg	280 kg	400 kg



**MEASURING  
SYSTEM  
ACCESSORIES**

## Blum

### Tool to workpiece measuring

 <b>TC52IR measuring system</b> infrared transmission	3582102
 <b>TC62RC measuring system</b> BRC wireless technology (without tool fitting)	3582103
<ul style="list-style-type: none"> <li>• Siemens licence</li> <li>• Including installation</li> </ul>	
 <b>ZX-Speed measuring system</b> infrared transmission	3582104
 <b>ZX-Speed measuring system</b> BRC wireless technology	3582105
<ul style="list-style-type: none"> <li>• Siemens licence</li> <li>• Including installation</li> </ul>	
 <b>Rubin measuring insert</b>	
Length 30 mm, Ø 3 mm carbide	3582140
Length 30 mm, Ø 5 mm carbide	3582141
Length 50 mm, Ø 3 mm carbide	3582142
Length 50 mm, Ø 5 mm carbide	3582143

### TC52/TC 62 measuring system

#### Universal measuring probe for shortest measuring times

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 is generated by interrupting a miniature light barrier
- Switching point repetition accuracy from 0.3 µm 2σ at 2000 mm/min measuring speed
- Wear-free and durably stable
- Very compact probe with Ø 40 mm
- Precise measuring possible even with coolant running



##### High-precision, rotationally symmetrical measuring system

- Precise, directionally independent approach behaviour
- Constant deflection forces
- Spindle orientation not required
- Not a sustainable 3-leg principle with lobbing effect

##### Reliable and proven transmission technology

- TC52: Infrared transmission
- TC62: BRC wireless technology
- Sequential actuation of up to 2 measuring systems with one infrared receiver
- Switching on and off with M command
- IP protection class IP68
- Very long battery service life



 <b>TC52IR and ZX-Speed measuring systems</b> infrared transmission	3582108
 <b>TC62RC and ZX-Speed IR measuring systems</b> BRC wireless technology (without tool fitting)	3582109
<ul style="list-style-type: none"> <li>• Siemens licence</li> <li>• Including installation</li> </ul>	
<b>SK 40 seat*</b> for TC 52 / TC 62	3582125
<b>HSK-A63 seat*</b> for TC 52 / TC 62	3582126

\*Order to match Spindle seat

### ZX-Speed

#### Touch tool measuring system optionally with infrared transmission or BRC wireless transmission

Wireless 3D probe head for precise tool measuring and tool break monitoring

##### Wear-free, optical/electronic signal generation

- Reliable measurement of various tool types and sizes
- Unrivalled precision thanks to state-of-the-art measuring system technology
- Avoid consequential damage in cases where tool breakage goes undetected
- Short amortisation time
- 2 measuring systems selectable via IR signal
- Long battery service life
- Compact and robust

##### Optical/electronic measuring system

- Switching signal is generated by interrupting a miniature light barrier
- Wear-free signal generation
- Allows for faster measuring speeds and measuring precision than comparable probes

IP protection class of device	IP68
Touch direction	±X, ±Y, -Z
Measuring force in X / Y / Z	3.0 N   5.2 N
Max. deflection in X / Y / Z	±11°   6 mm
Switching point repetition accuracy	0.4 µm 2σ
Max. touch speed	2 m/min



ex warehouse Germany  
Only for machines with an 828D control





<b>Laser Control Micro Compact NT</b>	3582112
<ul style="list-style-type: none"> <li>• Blum measuring cycles</li> <li>• Max. tool diameter max. 80 mm</li> <li>• Including installation</li> </ul>	

<b>TC 52IR laser control and measuring system</b> infrared transmission	3582113
<b>TC 62RC laser control and measuring system</b> BRC wireless technology	3582114
<ul style="list-style-type: none"> <li>• without tool fitting</li> <li>• Siemens licence</li> <li>• Including installation</li> </ul>	

<b>SK 40 seat*</b> for TC 52 / TC 62	3582125
<b>HSK-A63 seat*</b> for TC 52 / TC 62	3582126

\*Order to match Spindle seat

## Laser measuring systems

are the leading solution for zero contact tool adjustment and tool monitoring

### Proven, high-precision laser measuring system

- Carrier systems offer best possible precision
- Laser diodes and lenses of the highest quality
- Intelligent NT technology
- Maximum absolute precision thanks to focused laser beam
- Programmable via integrated microprocessor
- Easy assembly thanks to factory-tuned laser beam
- Compact and robust

### Zero contact, optical tool measurement

- Fast, precise and automatic measuring of all tool types, shapes and cutting materials (PKD, CBN...)
- Tool measurement in the actual clamping situation and at nominal speed
- Compensation for spindle growth and orbital errors of the tool blades
- Reliable measurement of highly sensitive and very small tools
- Measuring of stepped and custom tools

### 100% reliability thanks to BLUM protection system

- Process-assured tool measurement thanks to patented NT electronics and sealing air flow
- Perfect protection of the optics against soiling thanks to proven mechanical closure
- BLUM Pneumatic unit for maximum availability and low-maintenance operation
- Reliable tool cleaning through high-end blowing nozzles
- Very low air consumption
- IP protection class IP68



## Renishaw

### Tool to workpiece measuring

Renishaw OTS probe and Renishaw OMP40-2 probe	3582012
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- Including installation

Touch probe Renishaw OTS	3582011
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- For tool measurement
- Including installation
- For wireless use with twin pallets and machines with rotary tables.
- The OTS is available in two variants, either with ½ AA batteries or with AA batteries. This means that you can use the same battery type in the OTS as in your spindle probe.
- The OTS uses OSI with OMM-2 optical interface for use with multiple probes; the OMI-2T optical interface for use with two probes, and the OMI-2 for use with just one probe.
- Precision tool length and diameter measurement.
- Automatic updating of tool corrections.

Touch probe with optical signal transmission, Renishaw OMP40-2	3582010
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- For workpiece measurement
- Including installation
- Ultra-compact – just Ø 40 mm and 50 mm length
- Miniaturisation of the electronic components without impairing performance
- Easy installation – ideal for retrofitting
- Long battery service life, minimal downtime, economical
- Resilient to shock and vibrations
- **Signal transmission**  
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 signal transmission**  
Modulated optical signal transmission is also resilient to malfunctions caused by light interference.
- **Repetition accuracy of the probe**  
The repetition accuracy in one direction is 1.0 µm (determined with an approach speed of 480 mm/min and 50 mm probe insert).
- **Switch-on methods**  
The probe can be switched on by an M command or autostart.
- **Switch-off methods**  
The probe can be switched off by an M command or via a configurable switch-off time.
- **Probe sealing**  
Protection class IPX8, developed for tough deployment in machining centres.
- Visible LED display diagnostics



High-precision measuring probes for machine tools Renishaw OMP 400	3582020
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- For checking and setting up workpieces
- Including installation
- 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
- Repetition accuracy of 0.25 µm (2)
- 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 longer probe inserts can be used
- Up to 10 times longer service life than with conventional switching probes
- Elimination of reset errors
- Excellent protection against shock and machine vibrations
- Switching on and off is possible in any spindle position
- The use of a digital signal filter safeguards the measuring probe against shocks and thus potentially false signals
- Compatible with all Renishaw optical receivers



ex warehouse Germany  
Only for machines with an 828D control

## Renishaw Primo

Workpiece and tool probe

<b>Renishaw Primo Set</b>	3582030
· with collet BT 30	
<b>Renishaw Primo Set</b>	3582031
· with collet BT 40	
<b>PRIMO CREDIT TOKEN</b>	3582040
· 6 months	
· System protection	
<b>PRIMO CREDIT TOKEN</b>	3582041
· temporally unrestricted use	

<b>Scope of delivery: Renishaw Primo Set</b>
· Tool measuring probe Radio Part Setter
· Tool measuring probe Radio 3D Tool Setter
· Primo Interface
· GoProbe Software
· License for six months

### Primo™ Radio Part Setter

The Primo Radio Part Setter (tool measuring probe) is a measuring probe that switches on touching for automatic tool measurement. It determines the exact position of a workpiece so that the machining program can be adapted accordingly.



### Primo™ Interface

The interface is used for communication between the Primo System and the tool machine controller. It saves the Primo System's credit information. A display on the front panel shows the residual credit as a number of days as well as system status information.



### Primo™ Radio 3D Tool Setter

The Primo Radio 3D Tool Setter (tool measuring probe) is fastened on the tool machine table and used for precise longitudinal and diameter measurement of cutting tools to improve production precision.



### GoProbe Software

A simple and complete measuring solution for workpiece and tool measurement based on single-line commands. The GoProbe training kit is a comprehensive self-study package which helps you program a variety of program sequences with the GoProbe software.



## Renishaw

### HPPA measuring arm

Renishaw measuring arm HPPA with measuring probe	L 44	L 440 / L 460
	3582080	3582081
<ul style="list-style-type: none"> <li>• Including installation</li> <li>• Measuring arm for tool adjustment</li> <li>• RP3 probe</li> <li>• Basis with outlet and holder on rear</li> <li>• TSI2 Interface</li> <li>• User Manual</li> </ul>		

- Measure tools in just a few seconds
- Fast tool break control enhances safety
- Save time and reduce work overhead thanks to high precision measurements on the machine

## High-precision manual swivel arm for tool measurement, featuring a 3-axis RP3 probe.

Insert the measuring probe. . .  
More machining and cost savings

#### • 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 are some machines down for hours? It's simple: tools are often adjusted 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 workplaces 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.



#### 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 positioning accuracy (measuring speed 36 mm/min)	5 μm 2 X/Z	
Protection against environmental influences	IPX8 (static)	
Temperature range for operation	5 °C to 60 °C	
Temperature range for storage	-10 °C to 70 °C	
Arm pivoting angle	91°/90° (if the probe protection housing by Renishaw is not use, the max. arm pivoting angle is 91°)	



# ACCESSORIES

# **SOFTWARE**

## ncTOUCH

Software

## ncTOUCH

Application for the stand-alone machine through to the networked solution.  
touch my nc

Are you ready for a piece of Industry 4.0!

Easy-to-use, integrated middleware for connecting any smart device to the SINUMERIK 828 and SINUMERIK 840D sl CNC controls.

### Benefits

- Runs on any smart device
- Simple scripting language for rapid development
- Customer-specific adaptation of screens
- Integrated solution for the SINUMERIK CNC controls; no additional hardware required
- Allows access to information on the SINUMERIK 840D sl / 828D
- Important information, such as the operating state, pending alarms, load, tool information and much more is displayed at a glance, allowing for rapid intervention in case of interference in production.



- For more details, go to [www.Mill-IT.de](http://www.Mill-IT.de)

### Function

- Visualisation and interaction with the SINUMERIK CNC controls on your smart device
- Design your own screens in your corporate design
- Create apps with individual content, e.g., monitoring, alert processing or custom views
- Only scripting skills are needed for programming
- Flexible design functions for maximum portability to any smart device



## 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

- NC programming language feature set identical to 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*	Article no.
<b>Siemens SinuTrain Operate V4.7</b> single user commercial use	3584106
<b>Siemens SinuTrain Operate V4.7</b> Trainer package XL	3584112
<b>Siemens SinuTrain Operate V4.7</b> not for commercial use SINUMERIK 808D on PC free download	3584130

\*Please quote the control software version with your order

# SYMplus plusCARE™

Software

## Turning

**Workshop capable CAD/CAM system with 802S training.**

**SYMplus plusCARE™ turning is the ideal software supplement to your OPTIMUM CNC lathe.**

### CNC software SYMplus plusCARE™

#### Turning

3581012

Selection of licencing models:

- CodeMeter (licence is stored on USB dongle)
- CodeMeterWAN (licencing via internet connection, login with ID and password)
- Also available as a package for 2, 5, 10 or 20 users
- Incl. post-processors for SINUMERIK 802C, 802D, 808D, 810D/840D, 840D sl/828D, and others
- plusCARE™ includes regular updates, telephone and email support, and remote maintenance by the manufacturer

#### USB adapter

3571968

- RS 232

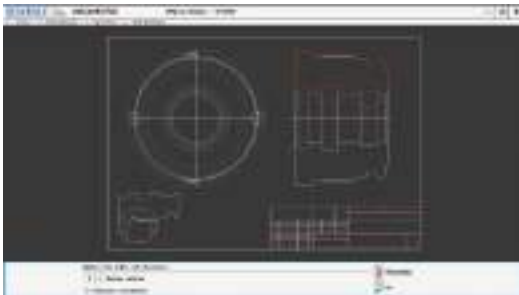
We also offer SYMplus plusCARE™ with an identical interface for turning technology (cf. left side).

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



### ■ 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.



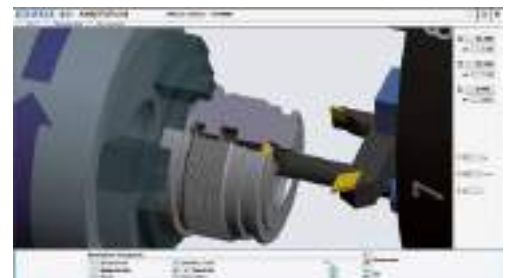
Of course, there is also a dialogue-based contour computer for transferring hard copy drawings.

### ■ 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).



You can precisely monitor the dimensional accuracy of the programming with the measuring function from within the 2D simulation (not shown). Collision monitoring of the cutting edge and holders is performed. In the 3D simulation you can also monitor adjacent tools.



Finally, you select the post-processor for the machine on which you will be producing, and transfer the program.

SYMplus plusCARE™ turning runs on Windows 7, 8 and 10. More details and additional modules available on request.



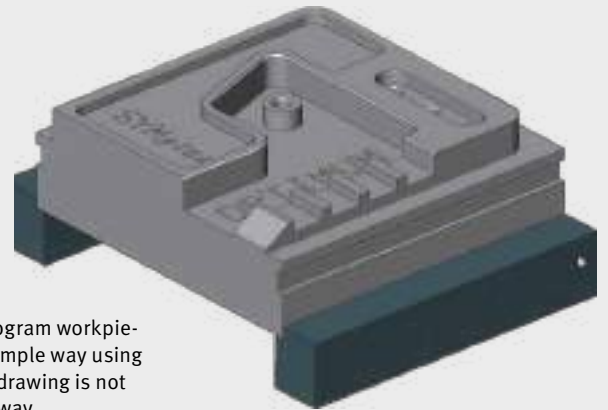
**Milling** for low-cost, fast and economic work.

**SYMplus plusCARE™** milling is the ideal software add-in for all **SIEMENS** controlled **OPTIMUM** milling machines.

CNC software SYMplus plusCARE™	
<b>Milling</b>	3581010
Selection of licencing models:	
<ul style="list-style-type: none"> <li>CodeMeter (licence is stored on USB dongle)</li> <li>CodeMeterWAN (licencing via internet connection, login with ID and password)</li> </ul>	
<ul style="list-style-type: none"> <li>Also available as a package for 2, 5, 10, 20 or 50 users</li> </ul>	
<ul style="list-style-type: none"> <li>Incl. post-processors for SINUMERIK 802C, 802D, 808D, 810D/840D, 840D sl/828D, and others</li> </ul>	
<ul style="list-style-type: none"> <li>plusCARE™ includes regular updates, telephone and email support, and remote maintenance by the manufacturer</li> </ul>	
<b>USB adapter</b>	3571968
<ul style="list-style-type: none"> <li>RS 232</li> </ul>	

As a training software package, SYMplus plusCARE™ supports a rapid introduction to DIN programming as per PAL and SIEMENS.

But above all, plusCARE™ is a genuinely easy to learn CAD/CAM system that helps you save programming time, avoid crashes, reduce production time and create NC programs for various OPTIMUM machines or SIEMENS controls (802S,808D, 828D, 840D, ...) in a uniform interface.



### ■ CAD - Geometry Creation

SYMplus plusCARE™ lets you program workpieces in an unbeatably quick and simple way using a graphical interface, even if the drawing is not dimensioned in an NC compliant way.

Alternatively, you can use CAD contours from DXF.



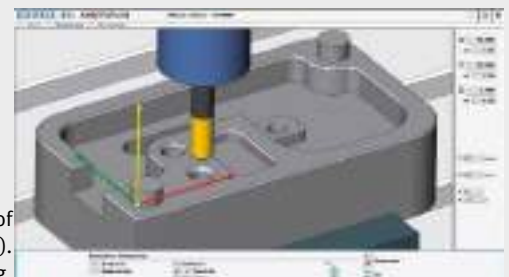
### ■ CAM - work schedule generation

Machining is also defined graphically using pictograms. You can conveniently compare production strategies and thus optimise machining. Timing computation helps you with costing.

Residual material detection relates to the entire process; the blank is continually tracked.



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.



You create the NC program itself with just a few clicks and transfer it to the control, for example using a USB stick.

# ACCESSORIES

# ROBOTS

## KUKA

As a pioneer of robotics, KUKA has developed automation solutions for many years and is the global innovation leader today. Robots are regarded as a key to competitiveness in industry. With the KUKA training package, your training institute can teach contemporary robotics skills to students.

[www.KUKA-robotics.com](http://www.KUKA-robotics.com)



Christiani is evolving nationally and internationally into the leading institute and media house in vocational training. The focus of our activities is on innovative teaching media development and in their implementation in teaching.

[www.christiani.de](http://www.christiani.de)

## SIEMENS

Siemens offers the SINUMERIK CNC, a highly productive automation solution for workshops, contract manufacturing and high-volume industrial production.

Whether individual parts or mass production, simple or complex workpieces – SINUMERIK always offers a matching solution.

[www.siemens.de](http://www.siemens.de)



EMUGE Franken has offered premium machining technology for more than 90 years. State-of-the-art production facilities and quality assurance are the basis for consistently high quality.

[www.emuge.de](http://www.emuge.de)



Renishaw is the market leader in industrial measuring technology and offers powerful solutions in this field. Global locations offer customers fast and expert service on site.

[www.renishaw.de](http://www.renishaw.de)



AURON GmbH, a specialist in CAD/CAM solutions, has specialised for many years on CAD solutions by the global market leader AUTODESK® and since 2010 also on the integrated CAM solution InventorCAM®.

[www.auroncad.de](http://www.auroncad.de)



Schunk stands for best-in-class consulting, precise know-how transfer, fast service and absolute delivery assurance. This is guaranteed by a closely meshed network of sales partners, customer-orientated branches and our own professional consultants on site.

[www.schunk.de](http://www.schunk.de)



Piston and screw-type compressors, compressed air treatment, distribution and tools for industry and trades. Our own final assembly in Austria allows ready-for-shipment preparation within just a few workdays. This ensures a high level of flexibility and fast delivery ability for the requirements of the German market.

[www.aircraft-kompressoren.de](http://www.aircraft-kompressoren.de)



State-of-the-art measuring and analysis technology that serves to optimise your machines in terms of vibration and thus improve its vibration behaviour. The result is measurable quality improvements for products while at the same time reducing the noise level in production shops.

[www.isoloc.de](http://www.isoloc.de)

## CNC milling machine OPTImill F 150

The complete package centred on the Premium CNC milling machine OPTImill F 150 with Siemens Sinumerik 828D control system including Schunk clamping technology, Mediabloc CFC and the robust KCR safety cage.



More packages on request!



### PACKAGE COMPONENTS

- Premium CNC milling machine OPTImill F 150 with the Siemens Sinumerik 828D control and one tool changer for 24 tools
- Schunk clamping technology
- 4 pcs. ISOLOC NTS levelling platen
- KCR safety cage
- Training package

Training	Trades/Industry
3519010	3519011



e-Mail  
[education@optimum-maschinen.de](mailto:education@optimum-maschinen.de)

At our headquarters in Hallstadt near Bamberg, trainers have the option of using a free training day to gain a comprehensive overview of all aspects of the OPTIMUM Siemens training drive.

## Industrial robot KR 6 R900 sixx AGILUS

The extremely compact and robust KUKA KR 6 R900 sixx is one of the newest, fastest and most reliable robots in its class.

With six axes, a maximum load-bearing capacity of 6 kg and a reach of approx. 900 mm, it is perfectly suited for getting started with state-of-the-art robotics.

On request, the KUKA Education Bundle can also be offered with other KUKA robots.



### PACKAGE COMPONENTS

- Industrial robot
- KUKA KR 6 R900
- sixx AGILUS
- KUKA adjustment set

Training	Trades/Industry
35111010	35111011

## HARDWARE PACKAGE

To facilitate your entry into machining, we offer a hardware package that lets you implement the Sinutrain practice piece in reality. You receive everything you need to hold a finished component in your hands at the end of the training with the help of the Siemens training video and OPTIMUM guide.

### PACKAGE COMPONENTS

- Chuck
- Milling head holder
- Weldon holder
- Adapter, pull stud
- Collet chuck holder, base rails
- 4 aluminium blanks

#### EMUGE end mill set

HM deburrer, end mill, various HM end milling cutters, spherical cutter, HM toroidal cutter, Micro HM end mill, end mill holders)

Hardware package

3519012



## MEDIA PACKAGE

The media package is perfectly suited to visualising the events in the workspace, also for external viewers, whether for groups of students or employees themselves. A splash-water protected camera captures the activity and transfers it (via WiFi or HDMI) to the TV set. Using the matching computer, you can establish a connection to the machine via RJ45 and visualise the control unit in real time on the monitor.

### PACKAGE COMPONENTS

- Multimedia table
- LCD TV 127 cm (50 inch) with HDMI connection
- Splash water-protected camera
- Housing including holder
- Desktop computer
- Installed Siemens Toolbox CD
- Keyboard and mouse

Media package

3519013



Similar to fig.

A photograph of two men in a factory or workshop. The man on the left is older, with grey hair and glasses, wearing a dark blue polo shirt. He is pointing towards a machine. The man on the right is younger, with dark hair, wearing a dark blue polo shirt. He is looking at the machine. The background is a bright, industrial setting with white walls and a purple accent wall. The text 'SERVICE AND SUPPORT' is overlaid on the image in large, bold, black letters.

**SERVICE**  
**AND SUP-**  
**PORT**

## Service and support

### Service

## FAST & RELIABLE with decades of experience

Whether planned service or fast help after a sudden machine failure, our intensively trained OPTIMUM service engineers are ready to help you with their 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 for maintenance, repairs and interruptions

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. Major benefits: regular servicing and maintenance by our Service Team improves the functional capability of your machines, thus extending their uptime.



## MAINTENANCE CONTRACTS

### Comfort, Medium or Basic

The objective of our service is to make maintaining and repairing your OPTIMUM CNC machine as 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. One thing you can rest assured of: our engineers are always there to help you in case of problems, whether on the phone, by remote maintenance using Teamviewer, or on-site. The following options are available:

Options *	Comfort:	Medium	basic
Article no.	3589101	3589102	3589103
Response to a problem	Within 1 working day	Within max. 2 working days	Within max. 3 working days
Technical troubleshooting by phone	✓	✓	✓
Preventive maintenance options	Every six months	Annually	Annually
Remote maintenance using Teamviewer**	✓	✓	
Non-wear part supply parts supplied by express delivery	✓		

- Incl. 400 km total (200 km one way)
- Each additional kilometre is invoiced at EUR 0.59
- Plus travel expenses at EUR 60.00 per hour or part thereof
- Accommodation costs and expenses at cost



\*\* the prerequisites must be in place customer-side

## 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:

#### Coolant system:

- Remove/check coolant pump and motor
- Clean coolant pump filter
- Check lines and screw connections for leak tightness

#### Lubrication system:

- Check and/or replace filter units
- Check lines and screw connections for leak tightness
- Perform centralised lubrication system function test

#### Compressed air system:

- Perform pressure test
- Check maintenance unit
- 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 0.59
- plus travel expenses at EUR 60.00 per hour or part thereof
- Accommodation costs and expenses at cost

#### 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 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



### SERVICE PACKAGES

#### for prevention & an assured supply of spare parts

Capable CNC machines with a comprehensive feature set and OPTIMUM price and performance – this is 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.



## Service and support

Service packages

### 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

#### 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 0.59
- plus travel expenses at EUR 60.00 per hour or part thereof
- Accommodation costs and expenses at cost

#### SERVICE DATA BACKUP

Lathes/Milling machines

Article No.: 3589110



\* if installed

## 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

#### 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 0.59
- plus travel expenses at EUR 60.00 per hour or part thereof
- Accommodation costs and expenses at cost



GEOMETRY CHECK

Lathes/Milling machines

Article No.: 3589111

#### Please note

- The publication of this catalogue renders all previous price lists invalid.
- Prices are recommended retail prices, subject to change, in €, plus statutory VAT, plus packaging, shipping, transportation, unloading, installation and training costs as applicable.
- We accept no liability for printing errors, mistakes or incorrect representation.
- Subject to technical modifications and visual changes.
- Illustrations show optimal accessories in some cases
- Delivery is effected solely on the basis of our terms of delivery and payment.
- The machines are delivered partly knocked down for transportation reasons.
- All items are sold through specialist retailers.
- The goods shall remain our property until payment has been received in full.
- Our retention of title shall remain valid in case of sale to a third-party.
- Legal warranty conditions apply for businesses.
- Copying and reproduction in full or in part is subject to written approval by us.
- Please note that transport packaging surcharges apply for some machines in this catalogue to cover transport units, packaging and packaging overheads. These machines are appropriately marked in the catalogue.

#### Warranty conditions

- Independently of your legal warranty entitlement, OPTIMUM provides a guarantee on the basis of the following provisions for the period as stated in the catalogue for the respective machine; the guarantee period starts on the date of sale of the machine to the end customer. OPTIMUM offers a guarantee on catalogue products where a guarantee is specifically indicated. The guarantee exclusively covers defects resulting from material or manufacturing errors. The warranty exclusively covers spare parts but not the transport and installation costs or labour and ancillary services necessary for eliminating defects. The guarantee excludes unintended use or improper application such as overloading of the machine or the use of non-approved and unsuitable tools, use of force, damage caused by external influences or by foreign bodies, e.g., dust, chips or stones, damage caused by failure to observe the Operating Instructions, e.g., connection to the wrong mains voltage or current, failure to observe assembly instructions, conversions and extensions carried out by the customer, as well as normal wear. The guarantee also excludes partially or fully disassembled machines and machine tools. When claiming against guarantee/warranty, you must submit the original sales receipt showing the date of purchase. Repairs under guarantee/warranty may be performed by authorised partners only who will be named by the guarantee/warranty provider. The guarantee/warranty is restricted to the end customer of the new machine and is not transferrable.

#### 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.
- <sup>(1)</sup> 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.

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