

Computer Numerical Control

OPTIMUM[®]

MASCHINEN - GERMANY

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



MAIN CATALOGUE 2021/22

OFFER FOR OUR CUSTOMERS, WHO ARE ENTREPRENEURS AND NOT CONSUMERS



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

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

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



Kilian Stürmer
Managing Director



DISCOVER OUR PRODUCT VIDEOS NOW!

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





On-site for you: in Europe and worldwide

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

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



WE ARE ON-SITE FOR YOU



CUSTOMER ADVISORY SERVICE

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

INSTALLATION, COMMISSIONING AND INSTRUCTION

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

MAINTENANCE AND REPAIRS

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

SERVICE

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

COST TRANSPARENCY

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

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



EVERY MACHINE NEEDS SERVICE ONCE - WE OFFER IT!

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



SERVICE HOTLINE (REPAIRS, WARRANTY CLAIMS)

Phone: +49 (0) 951 96 555 - 128
e-mail: CNC_service@stuermer-maschinen.de

You can contact us as follows:
Monday to Thursday: 7.00 am – 4.30 pm
Friday: 7.00 am – 1.30 pm



APPOINTMENTS DEMO CENTRE

For faster and easier registration, please send us an **e-mail** with your full data (retailer/customer name, reason for visit: demonstration, operational instruction, application instruction, product interest) at:

cnc@optimum-maschinen.de
Phone: +49 (0) 951 96555 - 129
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SPARE PARTS

First-class spare parts guarantee high quality, reliability and a long life/production cycle of your machine tool. Fast delivery of spare parts

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You can contact us as follows:
Monday to Thursday: 7.00 am – 4.30 pm
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SERVICE HOTLINE (REPAIRS, WARRANTY CLAIMS)

Quick acceptance & status enquiry: write us an e-mail

CNC simulation with the DIGITAL TWIN in training and production, protects your machine from expensive damage

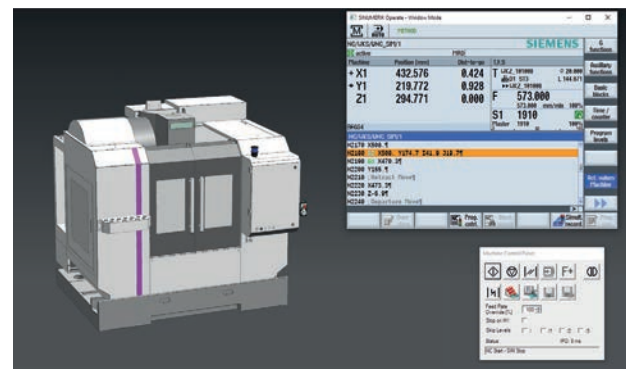
Cost-effective and low-risk work preparation and qualification on the virtual machine.

Realistic digital image of the real machine tool

The digital twin is the realistic digital image of the real machine tool used in the workshop. Including all geometries of the machine, fixtures and tools, as well as the control system used in the real machine, including version and all parameter settings.

For this purpose, all machine data and parameters of a SIEMENS 828D / 840Dsl control can be extracted from the Optimum CNC machine and transferred to the PC version of the control.

This option is only available for Sinumerik controllers. The VNCK (Virtual NC Core) is then coupled with the outputs of the CAD-CAM software and thus all movements of the machine with tools, clamping devices and components can be represented kinematically using the virtual machine.



Digital twin for training on CNC machines

With its product Run MyVirtual Machine, Siemens AG has developed an ideal platform for creating and operating a digital twin. Especially for the area of vocational training, training on virtual machines has proven to be advantageous.

The student can safely test and optimise his NC programs without causing damage to a real machine. In traditional training, it is almost impossible for the teacher to have every one of his students programming on the machine. Most educational institutions do not have the resources to run more than one CNC machine. Often you still have to choose between turning and milling.

Almost any type of machine and any kinematics can be simulated with the digital twin.

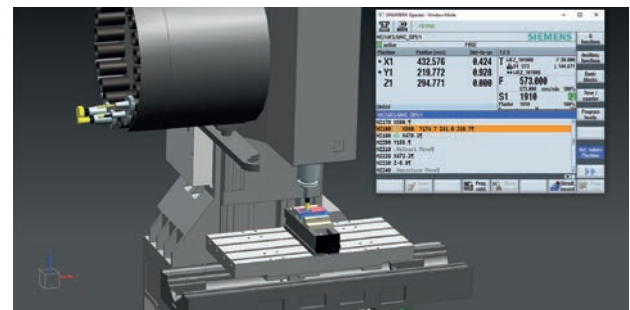
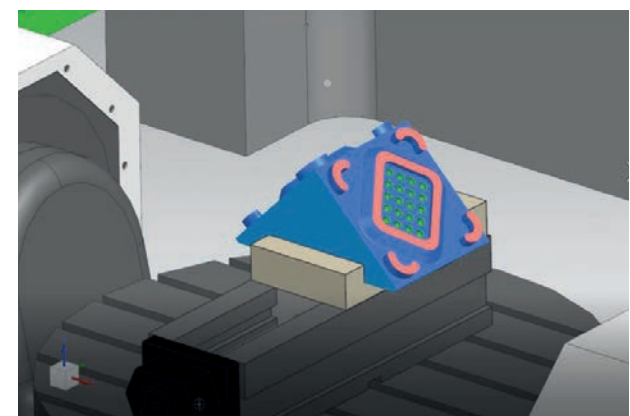


Fig.: OPTImill F150 HSC without protective housing

Use the digital twin of our CNC machines

The digital twin is already available for the OPTIMUM CNC milling machines OPTImill F150 HSC and OPTImill FU5 as well as the CNC lathe OPTItur L44. Other Optimum machines can be created and adapted to customer requirements.

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





EQUIPMENT FOR SPECIAL-PURPOSE FACILITIES

We know what is important

In collaboration with 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 90 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:

- Advice and needs analysis
- Planning and conception
- Completion and commissioning
- Train-the-trainer training and support



www.christiani.de/fachraumkonzepte

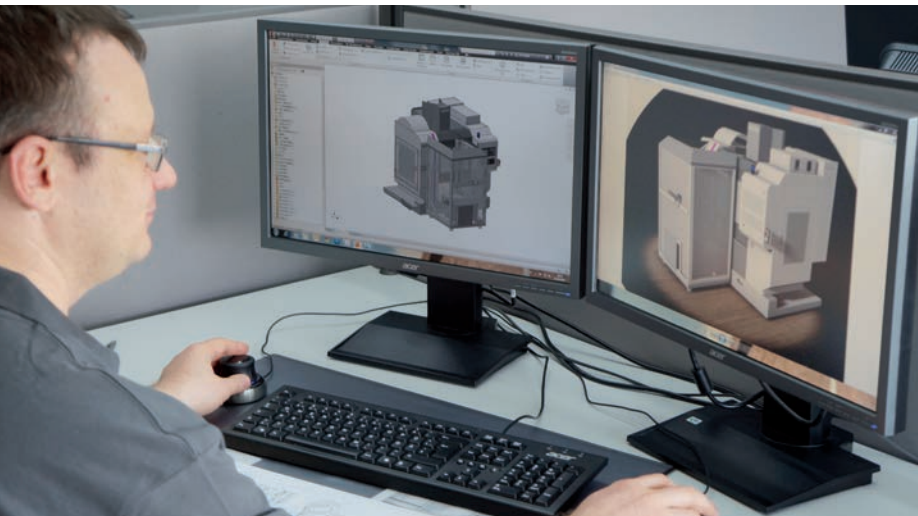
A STRONG TEAM



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 advantage: This means that all market influences and customer requirements are immediately incorporated where the course is set for successful product design.

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.



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.

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!



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.



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, after implementing the measures, the residual risk is evaluated.



A STRONG TEAM



QUALITY MANAGEMENT GOODS ISSUE 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, with which they form an optimal symbiosis.

QUALITY MANAGEMENT, PRODUCTION AND GOODS ISSUE INSPECTION

Besides adhering 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 and a German mechanical engineer directly influence the production process on site through regular training and checks. It is only through this intensive support and training 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 achieving this demanding certification is ultimately driven by this approach. 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.



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 controls 808 D Advanced, 828 D Basic, 828 D or 840 D sl 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.



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



DEMONSTRATION CENTRE

You can experience many of our highlights live on a floor space of some 2 000 m² in our demonstration centre at our main facility in Hallstadt, near Bamberg, Germany. Four customer advisors are available to help you with their expert knowledge.

What you can look forward to:

- approx. 2 000 m² 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.



Aircraft compressors and accessories

MAKE AN APPOINTMENT DEMONSTRATION CENTRE

For faster and less complicated registration
Send us an e-mail with complete data
to: cnc@optimum-maschinen.de



Cleancraft cleaning technology and accessories



DISCOVER THE VIDEO ABOUT OUR
DEMONSTRATION CENTRE
On our YouTube channel



TRAINING

OPTIMUM offers **dealer training and product training such as Sinumerik Operate training, 3-D printing basic training, 3-D printing advanced seminar** at the company location in Hallstadt and Pettstadt for its trade partners. Please note the training courses offered from page 327

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

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

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



Practice-oriented training



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

DISTRIBUTION SYSTEM



Two-stage distribution system

PRODUCTION OF CNC MACHINES FOR CRAFTSMAN

Our customers are our focus

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

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

We also manufacture on our own CNC machines

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

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



Only original with the pink stripe



Two-stage distribution system

PREMIUM

PRODUCTION OF CNC INDUSTRIAL MACHINES

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.

Only original with the blue Premium stripe



Civil/military occupational training centre in Tunisia

Germany's Federal government deploys OPTIMUM CNC machines in development project in Tunisia

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

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

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



OPTIMUM PREMIUM CNC-Slant bed lathe S 620 with counter spindle



5 axis simultaneous processing centre OPTIMUM PREMIUM FU 5



OPTIMUM CNC technician



Three-axis OPTIMUM PREMIUM F150 HSC milling machine

Training workshop at the tyre manufacturer Michelin

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.



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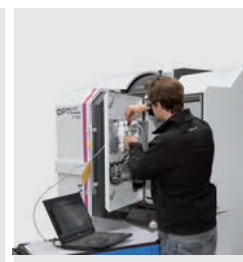
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CNC milling machine F 80
CNC milling machine F 105
CNC milling machine F 150E

01 MILLING

STANDARD MACHINES

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
- .SIEMENS main spindle motor
- .SIEMENS servo drives on all axes (closed loop)
- Max. spindle speed up to 10 000 rpm
- Portable, electronic handwheel with confirm button and emergency stop button. Substantially facilitates running in of programs
- 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 so that workpieces can be programmed and simulated offline on the PC . Free to download at www.cnc4you.com)
- Including two years SIEMENS warranty
- SIEMENS warranty extension on page 25
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



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

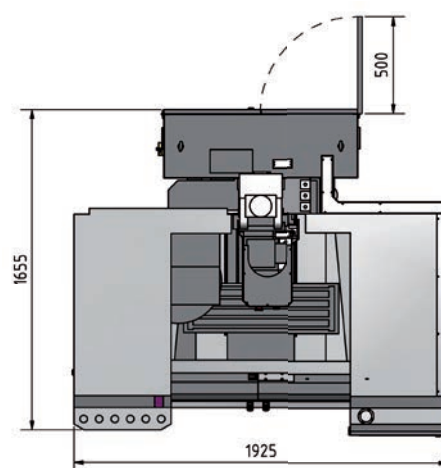
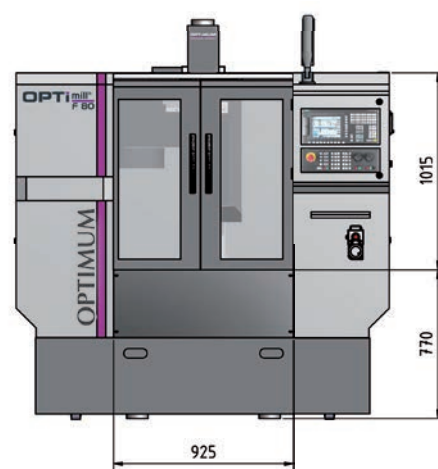
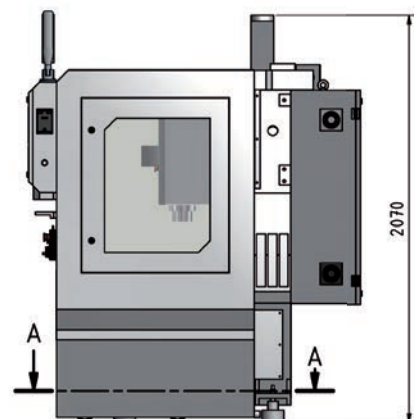
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Fig.: with optional accessories

TECHNICAL DATA

| Model | F 80 |
|--------------------------------------|--------------------------|
| Article no. | 3501085 |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 14 kVA |
| Milling spindle | |
| 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 |
| Cooling lubricant system | |
| Coolant pump motor | 650 W |
| Tank capacity | 70 litres |
| Milling cutter size | |
| Cutter head size max. | Ø 70 mm |
| End mill size max. | Ø 25 mm |
| Milling precision | |
| Repeat accuracy | ± 0.008 mm |
| Positioning accuracy | ± 0.008 mm |
| Tool changer | |
| Type | Carousel |
| Number of tool slots | 10 tools |
| Max. tool diameter | Ø 60 mm |
| Tool length | 200 mm |
| Max. tool weight | 6 kg |
| Tool change time | 7 seconds |
| Traverse paths | |
| X axis | 400 mm |
| Y axis | 225 mm |
| Z axis | 375 mm |
| Axis feed drive | |
| Rapid traverse X/Y/Z axis | 10 m/min. |
| Motor torque | |
| X axis | 3.5 Nm |
| Y axis | 6 Nm |
| Z axis | 6 Nm |
| Speed range | |
| Speeds* | 50 - 10 000 rpm |
| Pneumatics | |
| Compressed air | 7 bar |
| Milling table | |
| Clearance spindle to table | 75 - 475 mm |
| Table length x width | 800 x 260 mm |
| T-slot size / amount / distance | 16 mm / 5 / 50 mm |
| Max. load of working table | 150 kg |
| Dimensions | |
| Length x width x height | 1 925 x 1 655 x 2 070 mm |
| Overall weight | 1 900 kg |



SINUMERIK 808 ADVANCED

CNC technology from the technology leader, paired with a revolutionary operating concept

Boost productivity in production

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

COMPACT AND ROBUST

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

SINUMERIK 808D ON PC

- Control-identical software package that further simplifies handling of the machine tool (see page 24)



Control

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

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

OVERALL PACKAGE



STORAGE COMPARTMENT



- Keep tools within reach on the machine

HANDWHEEL



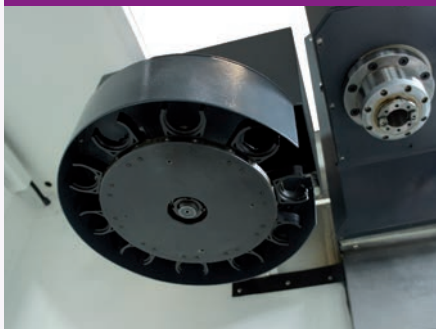
- Portable
- Electronic
- Substantially facilitates running in of programs
- Emergency stop button
- Confirm button

SIGNAL LIGHT



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

TOOL CHANGER



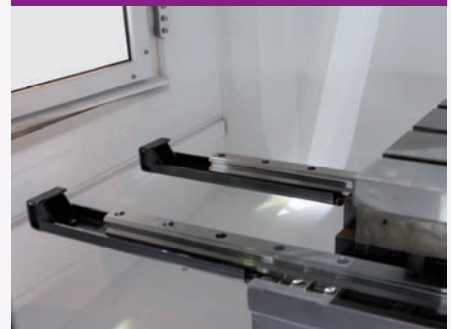
- Carousel tool changer
- 10 tool slots
- Tool change time: 7 seconds

CONTROL CABINET



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

LINEAR GUIDE



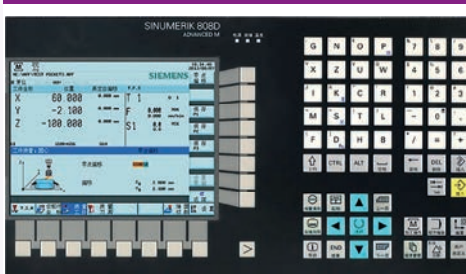
- High permissible load and high stiffness
- Low coefficient of friction

CENTRAL LUBRICATION SYSTEM



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

SINUMERIK 808D ON PC



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

Training and learning

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

Offline CNC programming:

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

Professional CNC presentations:

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

TOOL MEASURING SYSTEM

| Article no. | | | |
|---|---------------------------|---|--|
| 350108580* | RENISHAW Primo set |  | <ul style="list-style-type: none"> • Tool measuring probe Radio Part Setter • Tool probe • Radio 3D Tool • Primo Interface • GoProbe Software • Collet BT 30 • License for six months |
| ➡ Information on the Primo set also available ex warehouse Germany see page 289 | | | |

NEW

3-D PRINTING PREPARATION


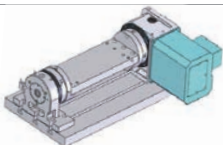
| Article no. | | | |
|---|-----------------------------------|---|--|
| 350108590* | Motor upgrade 3-D PRINTING |  | <ul style="list-style-type: none"> • Main spindle motor with high-resolution encoder • 20 bit absolute value encoder instead of incremental encoder |
| 350108591* | 3-D printing interface |  | <ul style="list-style-type: none"> • Plug connector on milling head for OPTImill 3X printing head • Power supply is installed in control cabinet • Prepared for connecting open circuit monitoring • Filament holder |
| ➡ Information on 3-D printing from page 266 | | | |

STARTER SET

| Article no. | | | |
|--|--------------------------|---|--|
| 3536107 | Starter set BT 30 |  | <ul style="list-style-type: none"> • 1 pc. milling head holder • 1 pc. chuck • 2 each Weldon 6 mm and 20 mm • 1 each Weldon 8 / 10 / 12 / 16 mm • 1 pc. Adapter BT 30 • 4 pcs. Collet chuck holder ER 32 • 1 pc. Collet spanner ER 32 • 18-part collet chuck set ER 32 • 1 pc. Height-adjuster • 1 pc. Assembly and tool adjustment gauge • 14 pcs. pull stud • 1 pc. taper squeegee |
| ➡ Information on the starter set „BT 30“ on page 282 | | | |

NEW

FOURTH AXIS

| Article no. | | | |
|---|------------------------------------|---|---|
| 350108502* | Preparation for fourth axis |  | |
| 350108503* | Fourth axis Complete set |  | <ul style="list-style-type: none"> • Rotary indexing table Ø 80 mm • Three-jaw lathe chuck Ø 75 mm • Mounting included |
| 350108504* | Swivel bridge |  | <ul style="list-style-type: none"> • Size 160 x 85 mm • With counterholder |
| ➡ For details on the fourth axis for the rotary indexing table see page 276 | | | |

F 105

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

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
- SIEMENS servo drives on all axes (closed loop)
- Max. spindle speed 10 000 rpm
- Portable, electronic handwheel with confirm button and emergency stop button. Substantially facilitates running in of programs
- Coolant unit with 120 litre coolant tank
- Tool change occurs automatically or at the push of a button (electropneumatic tool clamping device)
- Solid, precision milling table, generously dimensioned with precision surface finish
- Access doors very generously designed to reduce cleaning and maintenance times to a minimum
- LED machine lamp for complete illumination of the workspace
- 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.)
- Including two years SIEMENS warranty
- SIEMENS warranty extension on page 31
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



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

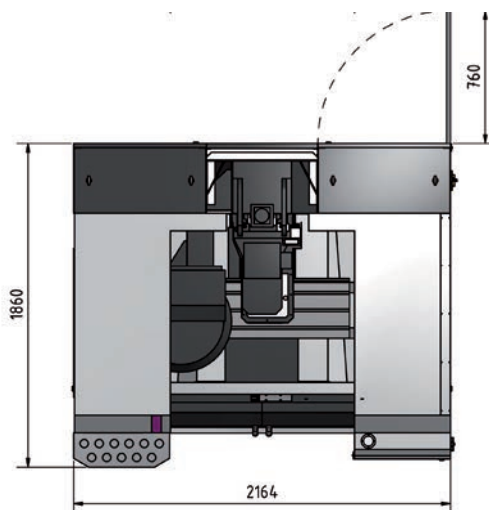
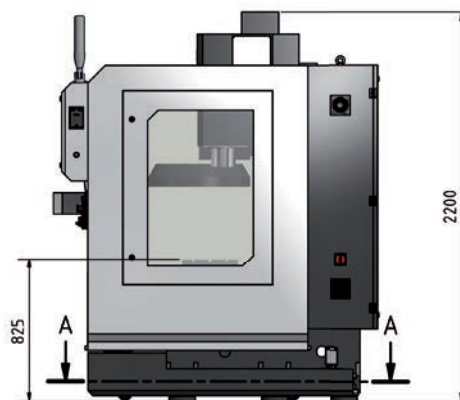
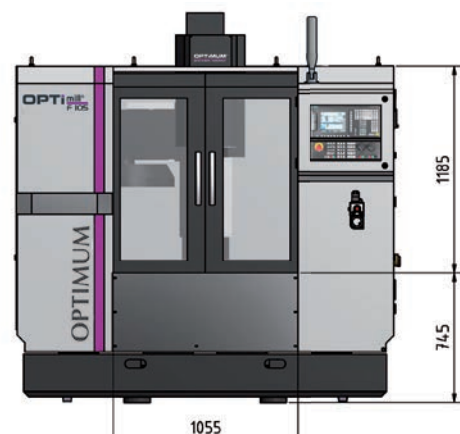
Subscribe to our YouTube channel, to avoid missing any of the new videos:
www.youtube.com/user/OptimumMaschinen



Fig. with optional accessories

TECHNICAL DATA

| Model | F 105 |
|--------------------------------------|--------------------------|
| Article no. | 3501100 |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 15 kVA |
| Milling spindle | |
| 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 |
| Cooling lubricant system | |
| Coolant pump motor | 650 W |
| Tank capacity | 120 litres |
| End mill size | |
| Cutter head size max. | Ø 63 mm |
| End mill size max. | Ø 35 mm |
| Milling precision | |
| Repeat accuracy | ± 0.008 mm |
| Positioning accuracy | ± 0.008 mm |
| Tool changer | |
| 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 |
| Traverse paths | |
| X axis | 550 mm |
| Y axis | 305 mm |
| Z axis | 460 mm |
| Axis feed drive | |
| Rapid traverse X/Y/Z axis | 15 m/min. |
| Motor torque | |
| X axis | 8 Nm |
| Y axis | 8 Nm |
| Z axis | 11 Nm |
| Speed range | |
| Speeds* | 10 - 10 000 rpm |
| Pneumatics | |
| Compressed air | 7 bar |
| Milling table | |
| Clearance spindle to table | 100 - 600 mm |
| Table length x width | 800 x 320 mm |
| T-slot size / amount / distance | 14 mm / 3 / 100 mm |
| Max. load of working table | 300 kg |
| Dimensions | |
| Length x width x height | 2 164 x 1 860 x 2 200 mm |
| Overall weight | 2 800 kg |



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Boost productivity in production

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- With its technology-specific variants, the SINUMERIK 808D ADVANCED control is perfectly preconfigured for milling. And with its hardware and software enhancements, the SINUMERIK 808D ADVANCED also offers sufficient performance for simple milling functionalities in mould and tool making.

COMPACT AND ROBUST

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

SINUMERIK 808D ON PC

- Control-identical software package that further simplifies handling of the machine tool (see page 30)



Control

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

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

OVERALL PACKAGE

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



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



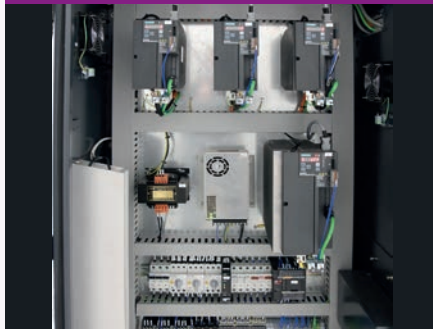
- Spindle speed from 10 to 10 000 rpm

TOOL CHANGER



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

CONTROL CABINET



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

LINEAR GUIDE



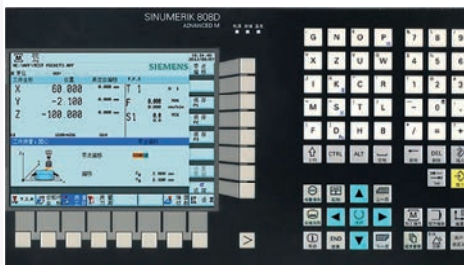
- High permissible load and high stiffness
- Low coefficient of friction

CENTRAL LUBRICATION SYSTEM



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

SINUMERIK 808D ON PC



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

Training and learning

- SINUMERIK Operate BASIC operations can be explored on a PC without additional hardware
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Offline CNC programming:

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

Professional CNC presentations:

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

TOOL MEASURING SYSTEM

Article no.

350110080*

RENISHAW
Primo set



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

➞ Information on the Primo set also available ex warehouse Germany see page 289

NEW

3-D PRINTING PREPARATION

Article no.

350110090*

Motor upgrade
3-D PRINTING



- Main spindle motor with high-resolution encoder
- 20 bit absolute value encoder instead of incremental encoder

350110091*

3-D printing interface



- Plug connector on milling head for OPTImill 3X printing head
- Power supply is installed in control cabinet
- Prepared for connecting open circuit monitoring
- Filament holder

➞ Information on 3-D printing from page 266

STARTER SET

Article no.

3536108

Starter set
BT 40



- 1 pc. milling head holder
- 1 pc. quick clamping drill chuck 1 - 13 mm
- 2 each Weldon 6 mm and 20 mm
- 1 each Weldon 8 / 10 / 12 / 16 mm
- 1 pc. Adapter BT 40 to MT 3
- 4 pcs. Collet chuck holder ER 32
- 1 pc. Collet chuck spanner ER 32
- 18-part collet chuck set ER 32
- 1 pc. Height-adjuster
- 1 pc. Assembly and tool adjustment gauge
- 15 pcs. Pull stud
- 1pc. Taper squeegee

➞ For Information on the starter set see „BT 40“ on page 283

NEW

FOURTH AXIS

Article no.

350110002*

Preparation for
fourth axis



350110003*

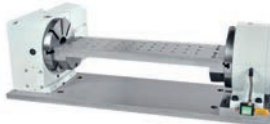
Fourth axis
Complete set



- Rotary indexing table Ø 125 mm
- Three-jaw lathe chuck 100 mm
- Tailstock with MT 2 quill
- Mounting included

350110004*

Swivel bridge



Similar to fig. and with optional fourth axis

- Size 260 x 130 mm
- with counterholder

➞ For details on the fourth axis for the rotary indexing table see page 276

A white circular badge with a purple shadow, containing the word "NEW" in purple capital letters.

F 150E

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

SIEMENS SINUMERIK 808D ADVANCED

- Carousel tool changer with 16 tool slots
- All linear guides with stainless steel covers
- Automatic centralised lubrication
- SIEMENS main spindle motor
- SIEMENS servo drives on all axes (closed loop)
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- Max. spindle speed 10 000 rpm
- Portable, electronic handwheel with confirm button and emergency stop button Substantially facilitates running in of programs
- Coolant unit with 190 litre coolant tank
- Tool change occurs automatically or at the push of a button (electropneumatic tool clamping device)
- Solid, precision milling table, generously dimensioned with precision surface finish
- Access doors very generously designed to reduce cleaning and maintenance times to a minimum
- Six levelling feet
- LED machine lamp for complete illumination of the workspace
- 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.)
- Including two years SIEMENS warranty
- SIEMENS warranty extension on page 37
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



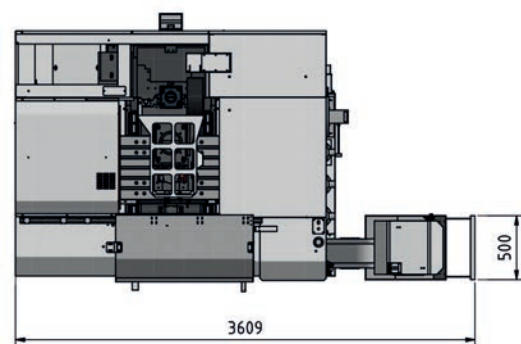
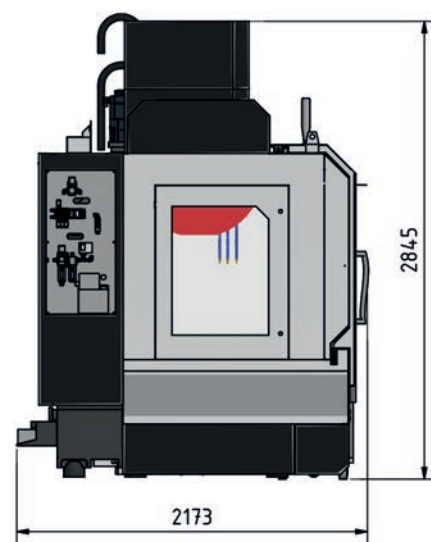
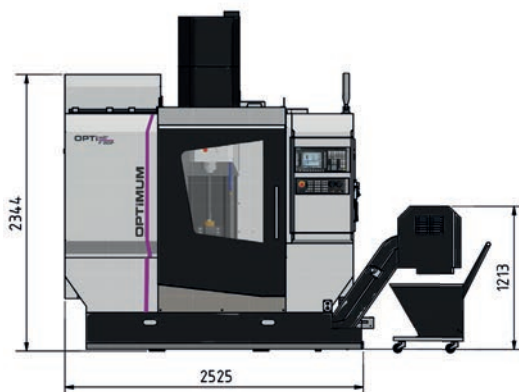
Fig.: with optional accessories



Fig.: with optional accessories

TECHNICAL DATA

| Model | F 150E |
|--|-----------------------------|
| Article no. | 3501150 |
| Spindle | Belt drive |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 15 kW |
| Milling spindle | |
| Drive motor S1 operation | 7.5 kW |
| Drive motor torque S1 | 48 Nm |
| Drive motor S6 30 % operation | 11.25 kW |
| Torque drive motor S6 30 % operation | 72 Nm |
| Spindle seat | BT 40 |
| Cooling lubricant system | |
| Coolant pump motor | 370 W |
| Tank capacity | 190 litres |
| End mill size | |
| Cutter head size max. | Ø 80 mm |
| Max. shaft milling cutter size | Ø 38 mm |
| Milling precision | |
| Repeat accuracy | ± 0.008 mm |
| Positioning accuracy | ± 0.008 mm |
| Tool changer | |
| Type | Carousel |
| Number of tool slots | 16 tools |
| Max. tool diameter | 90 mm |
| Max. tool diameter (tools slots beside not occupied) | 180 mm |
| Max. tool length | 250 mm |
| Max. tool weight | 8 kg |
| Tool change time T-T | 6 seconds |
| Traverse paths | |
| X axis | 750 mm |
| Y axis | 500 mm |
| Z axis | 500 mm |
| Axis feed drive | |
| Rapid traverse X/Y/Z axis | 20 m/min. |
| Motor torque | |
| X/Y/Z axis | 9.55 Nm / 9.55 Nm / 16.7 Nm |
| Speed range | |
| Speeds* | 10 - 10 000 rpm |
| Pneumatics | |
| Compressed air | 0.6 mpa |
| Milling table | |
| Clearance spindle to table | 100 - 600 mm |
| Table length x width | 900 x 500 mm |
| T-slot size / amount / distance | 5 / 18 / 80 mm |
| Max. load of working table | 350 kg |
| Dimensions | |
| Length x width x height | 3 420 x 2 050 x 2 400 mm |
| Overall weight | 4 500 kg |



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COMPACT AND ROBUST

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

SINUMERIK 808D ON PC

- Control-identical software package that further simplifies handling of the machine tool



Control

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

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

OVERALL PACKAGE

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



CONTROL CABINET



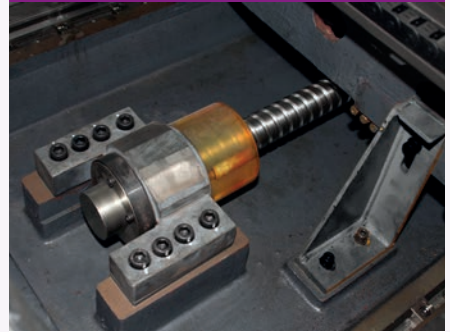
- Closed, uncluttered switch cabinet with integrated heat exchanger; ensures optimal temperature
- With **SIEMENS** servo drive
- Standards-compliant setup

HANDWHEEL



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

BALL SCREW



- Ball screw for fast rapid motion speeds on all axes

TOOL CHANGER



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

CENTRAL LUBRICATION



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

LINEAR GUIDE



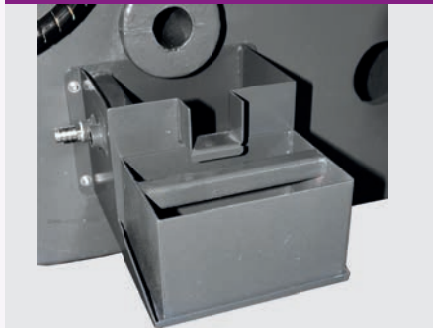
- High permissible load and high stiffness
- Low coefficient of friction

CHIP CONVEYOR



- Conveyor version
- For efficient chip discharge

OIL SEPARATOR / OIL SKIMMER



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

MILLING TABLE



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

TOOL MEASURING SYSTEM

| Article no. | | | |
|---|---------------------------|---|--|
| 350110080* | RENISHAW Primo set |  | <ul style="list-style-type: none"> • Tool measuring probe Radio Part Setter • Tool probe • Radio 3D Tool • Primo Interface • GoProbe Software • Collet BT 30 • License for six months |
| ➡ Information on the Primo set also available ex warehouse Germany see page 289 | | | |

3-D PRINTING PREPARATION

| Article no. | | | |
|---|-----------------------------------|---|--|
| 350115090* | Motor upgrade 3-D PRINTING |  | <ul style="list-style-type: none"> • Main spindle motor with high-resolution encoder • 20 bit absolute value encoder instead of incremental encoder |
| 350115091* | 3-D printing interface |  | <ul style="list-style-type: none"> • Plug connector on milling head for OPTImill 3X printing head • Power supply is installed in control cabinet • Prepared for connecting open circuit monitoring • Filament holder |
| ➡ Information on 3-D printing from page 266 | | | |




MISCELLANEOUS

| Article no. | | | |
|-------------|---------------------------|--|--|
| 350115010* | Spindle oil cooler | | <ul style="list-style-type: none"> • Continuous precision • Optimum heat transfer and dimensional stability • Higher productivity |

STARTER SET

| Article no. | | | |
|--|--------------------------|---|---|
| 3536108 | Starter set BT 40 |  | <ul style="list-style-type: none"> • 1 pc. milling head holder • 1 pc. quick clamping drill chuck 1 - 13 mm • 2 each Weldon 6 mm and 20 mm • 1 each Weldon 8 / 10 / 12 / 16 mm • 1 pc. Adapter BT 40 to MT 3 • 4 pcs. Collet chuck holder ER 32 • 1 pc. Collet chuck spanner ER 32 • 18-part collet chuck set ER 32 • 1 pc. Height-adjuster • 1 pc. Assembly and tool adjustment gauge • 15 pcs. Pull stud • 1 pc. Taper squeegee |
| ➡ For Information on the starter set see „BT 40“ on page 283 | | | |

FOURTH AXIS

| Article no. | | | |
|---|------------------------------------|--|--|
| 350115001* | Preparation for fourth axis |  | |
| 350110003* | Fourth axis Complete set |  | <ul style="list-style-type: none"> • Rotary indexing table Ø 125 mm • Three-jaw lathe chuck 100 mm • Tailstock with MT 2 quill <p>mounting included</p> |
| 350110004* | Swivel bridge |  Similar to fig. and with optional fourth axis | <ul style="list-style-type: none"> • Size 260 x 130 mm • with counterholder |
| ➡ For details on the fourth axis for the rotary indexing table see page 276 | | | |





CNC lathe L 34HS
CNC lathe L 50E
CNC lathe S 400E

01 TURNING STANDARD MACHINES

L 34HS

CNC-controlled lathe with linear guide

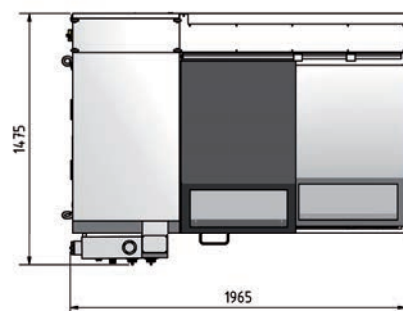
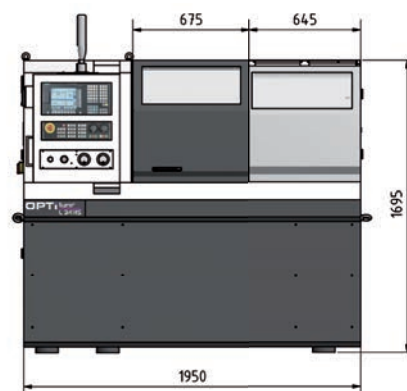
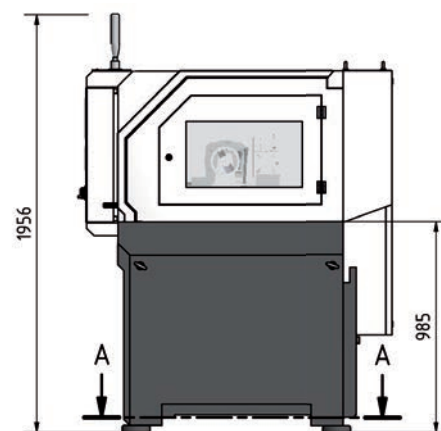
SIEMENS SINUMERIK 808D ADVANCED

- Precise workmanship
- Spindle and servo motors by [Siemens](#)
- Braced machine bed made from grey cast-iron
- Maintenance-friendly protective housing
- Grinded ball screw spindles
- Complex spindle bearing
- Linear guides on both axes
- Emergency stop button
- Central lubrication
- Access flap on rear for maintenance
- Safety switch on front sliding door
- Turret located behind the lathe centre (left turning tool)
- 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)
- Including two-year [SIEMENS](#) Gwarranty
- [SIEMENS](#) warranty extension on page 45
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



TECHNICAL DATA

| Model | L 34HS |
|---------------------------------|---------------------------|
| Article no. | 3504232 |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 6.5 kVA |
| Spindle | |
| Drive motor S1 operation | 3.7 kW |
| Torque drive motor S1 operation | 23.6 Nm |
| Torque at the spindle | 40 Nm |
| Spindle seat | ISO 702-1 No. 4 - Form A2 |
| Spindle bore | Ø 46 mm |
| Chuck passage | Ø 42 mm |
| Lathe chuck | Ø 160 mm |
| Cooling lubricant system | |
| Coolant pump output | 95 W |
| Tank capacity | 75 litres |
| Machine data | |
| Centre height | 265 mm |
| Centre width | 600 mm |
| Swing Ø above cross slide | Ø 146 mm |
| Swing Ø above machine bed | Ø 350 mm |
| Bed width | 208 mm |
| Speed range | |
| Speeds* | 30 - 3 500 rpm |
| Tool turret | |
| Type | electrical |
| Number of tool slots | 6 tools |
| Max. height, width square | 16 x 16 mm |
| Max. diameter drilling rod | Ø 16 mm |
| Tool change time T-T | 1.5 seconds |
| Precision | |
| Repeat accuracy | ± 0.01 mm |
| Positioning accuracy | ± 0.01 mm |
| Travel | |
| X axis | 185 mm |
| Z axis | 600 mm |
| Feed speed | |
| X axis | 6 m/min. |
| Z axis | 8 m/min. |
| Motor torque | |
| X axis | 4 Nm |
| Z axis | 6 Nm |
| Tailstock | |
| Tailstock seat | MT 3 |
| Tailstock quill diameter | Ø 45 mm |
| Tailstock - quill stroke | 120 mm |
| Dimensions | |
| Length x width x height | 1 950 x 1 475 x 1 956 mm |
| Overall weight | 1 200 kg |



SINUMERIK 808 ADVANCED

CNC technology from the technology leader, paired with a revolutionary operating concept

Boost productivity in production

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

COMPACT AND ROBUST

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

SINUMERIK 808D ON PC

- Control-identical software package that further simplifies handling of the machine tool (see page 47)



Control

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

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)

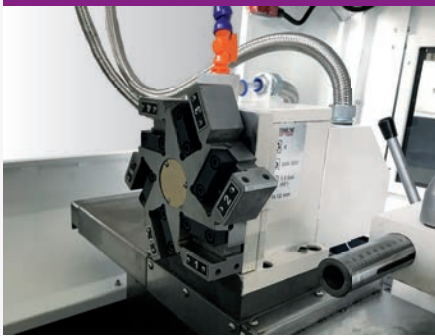
12 months; Article no. 3589010
36 months; Article no. 3589012

OVERALL PACKAGE

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

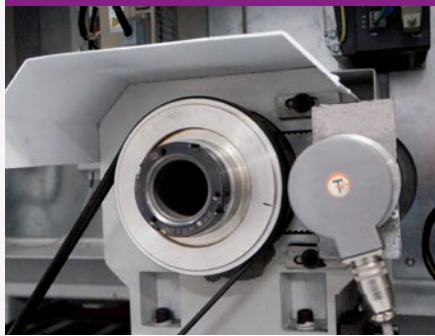


TOOL TURRET



- For 6 tool slots

SPINDLE



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

LINEAR GUIDE



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

COOLANT SYSTEM



- Pulls out
- Easy chip disposal

MACHINE LAMP



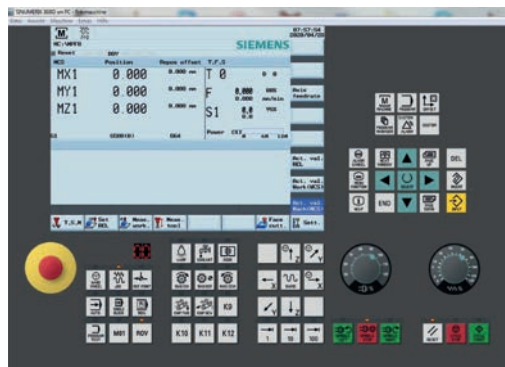
- Full illumination of the workspace

CENTRAL LUBRICATION SYSTEM



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

SINUMERIK 808D ON PC



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

Training and learning

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

Offline CNC programming:

- Boosts productivity by programming directly on a PC
- Testing of part programmes on the PC with the integrated simulation

Professional CNC presentations:

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

LATHE CHUCK

Article no.







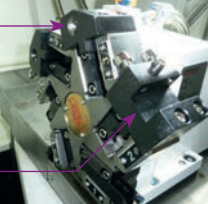
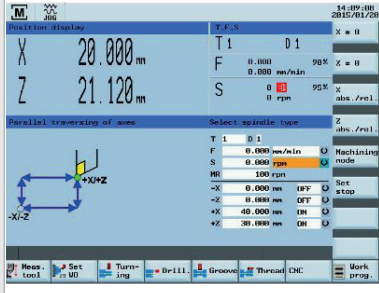
| | | | |
|---------|--------------------------------------|--|---|
| 3450232 | Bison three-jaw lathe chuck |  | <ul style="list-style-type: none"> • Cast, Ø 160 mm DIN 6350 • Hard jaws, single-part, with outside-inside clamping • Chuck key • Runout accuracy: 0.03 mm |
| 3450412 | Bison monoblock jaw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

Fig. with collet - not included in the scope of delivery

MISCELLANEOUS

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

SOFTWARE

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

➡ For more information see on page 318

A white circular badge with a purple shadow, containing the word "NEW" in purple capital letters.

L 50E

OPTIMUM PREMIUM Universal CNC Lathe

Complete solution - Diverse possibilities

SIEMENS SINUMERIK 808D ADVANCED

- Precision workmanship
- Spindle and servo motors by **SIEMENS**
- Machine housing with safety switches
- With max. spindle speed up to 3 000 rpm as standard
- Hydraulic lathe chuck
- Ball screws
- Linear guides on all axes
- Automatic centralised lubrication
- Servo hydraulic VDI 30 tool changer with 8 tools
- Swivelling operating unit
- Electronic handwheels for the X and Z axis
- Coolant unit with 110 litre coolant tank
- RJ45 plug-in connection, USB connection and power connection 230 V
- EMC Electromagnetic compatibility
- Six levelling feet
- Operating tool
- Including two-year **SIEMENS** warranty
- **SIEMENS** warranty extension on page 51
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322

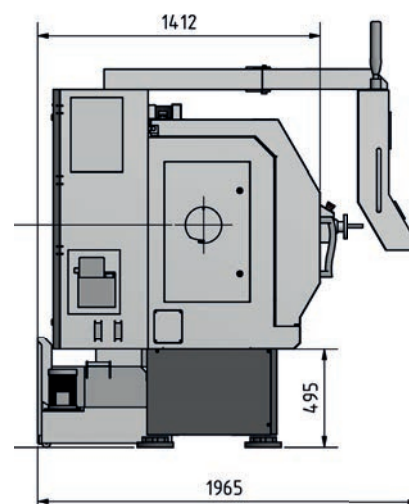
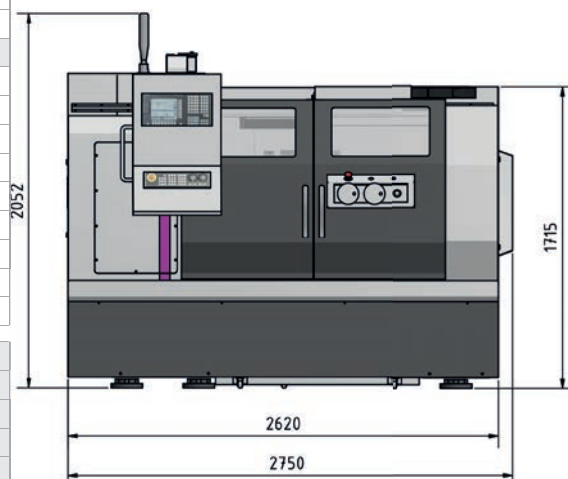


TECHNICAL DATA

| Model | L 50E |
|--------------------------------------|-------------------------|
| Article no. | 3504240 |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 11 kW |
| Spindle | |
| Drive motor S1 operation | 7.5 kW |
| Torque drive motor S1 operation | 48 Nm |
| Drive motor S6 30 % operation | 11.25 kW |
| Torque drive motor S6 30 % operation | 72 Nm |
| Spindle seat | ISO 702-1 No. 6 form A2 |
| Hydraulic lathe chuck | Ø 210 mm |
| Chuck passage | Ø 52 mm |
| Spindle bore* | Ø 66 mm |
| Torque at the spindle | 86 Nm |

| | |
|---|-------------------------|
| Option (Article No. 350424011)** | |
| Spindle seat | ISO 702-1 No. 8 form A2 |
| Hydraulic lathe chuck | Ø 260 mm |
| Chuck passage | Ø 75 mm |
| Spindle bore* | Ø 85 mm |

| | |
|---------------------------------|--------------------------|
| Cooling lubricant system | |
| Cleaning pump output | 1 kW |
| Coolant pump output | 450 W |
| Tank capacity | 110 litres |
| Hydraulic system | |
| Hydraulic pump power | 2.2 kW |
| Tank capacity | 50 litres |
| Machine data | |
| Max. turning length | 618 mm |
| Max. turning diameter | 245 mm |
| Swing Ø above cross slide | 280 mm |
| Swing Ø above machine bed | 490 mm |
| Bed width | 400 mm |
| Speed range | |
| Spindle speeds | 3 000 rpm |
| Tool turret | |
| Tool changer seat | VDI 30 |
| Type | Servo hydraulic |
| Number of tool slots | 8 tools |
| Max. height, width square | 20 mm |
| Max. diameter drilling rod | 32 mm |
| Precision | |
| Repeat accuracy | ± 0.005 mm |
| Positioning accuracy | ± 0.008 mm |
| Traverse paths | |
| X axis | 300 mm |
| Z axis | 800 mm |
| Feed speed | |
| X axis fast motion | 12 m/min. |
| Z axis fast motion | 15 m/min. |
| Motor torque | |
| X axis | 6 Nm |
| Z axis | 11 Nm |
| Tailstock | |
| Tailstock seat | MT 5 |
| Tailstock quill diameter | 75 mm |
| Tailstock - quill stroke | 150 mm |
| Dimensions | |
| Length x width x height | 2 750 x 1 965 x 2 052 mm |
| Overall weight | 4 200 kg |



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Boost productivity in production

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- With its technology-specific variants, the SINUMERIK 808D ADVANCED control is perfectly preconfigured for turning. And with its hardware and software enhancements, the SINUMERIK 808D ADVANCED also offers sufficient performance for simple turning functionalities in mould and tool making.

COMPACT AND ROBUST

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

SINUMERIK 808D ON PC

Control-identical software package that further simplifies handling of the machine tool (see page 53)



Control

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

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

OVERALL PACKAGE

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

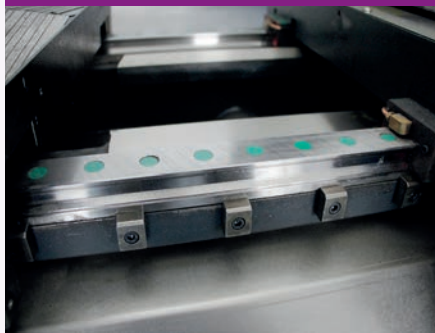


TOOL TURRET



- For eight tool stations
- Servo Hydraulic VDI30 tool turret
- Max. height 20 mm
- Max. diameter 32 mm

LINEAR GUIDE



- Maximum feed speed
- Durable
- Stainless steel cover

SIGNAL LIGHT



- Visually displays the machine status

HANDWHEELS



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

CONTROL CABINET



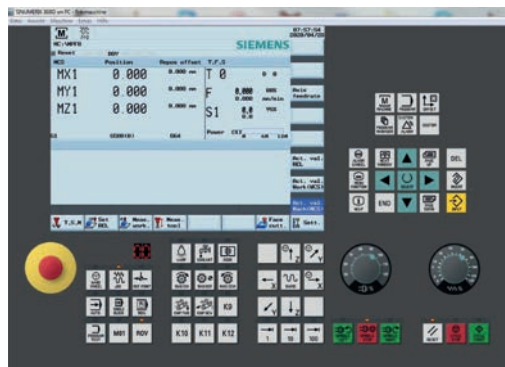
- Clear-cut layout of the control cabinet
- Standard-compliant
- Drives by **SIEMENS**

CENTRAL LUBRICATION SYSTEM



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

SINUMERIK 808D ON PC



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

Training and learning

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

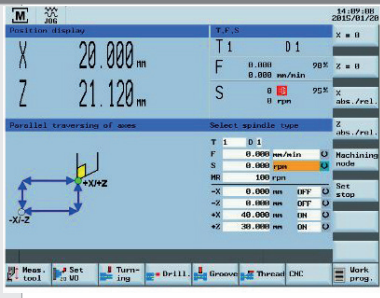
Offline CNC programming:

- Boosts productivity by programming directly on a PC
- Testing of part programmes on the PC with the integrated simulation

Professional CNC presentations:

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

| ACCESSORIES | | | |
|-------------|---|---|---|
| Article no. | | | |
| 350424011 | Spindle upgrade to Ø 75 mm Spindle seat ISO 702-1 no. 8 form A2 Three-jaw lathe chuck Ø 260 mm Chuck passage Ø 65 mm | | <ul style="list-style-type: none"> instead of the standard equipment > Spindle seat ISO 702-1 no. 6 form A2 Three-jaw lathe chuck Ø 210 mm Chuck passage Ø 52 mm |
| 350434012* | Four-jaw lathe chuck Ø 260 mm |  | <ul style="list-style-type: none"> instead of the one in the spindle upgrade > three-jaw lathe chuck Ø 260 mm |
| 350434014* | Four-jaw lathe chuck Ø 210 mm | | <ul style="list-style-type: none"> instead of standard equipment > three-jaw lathe chuck Ø 210 mm |
| 3519712 | Soft top jaw (1 pc.) | | <ul style="list-style-type: none"> for lathe chuck Ø 210 mm |
| 3519713 | Soft top jaw (1 pc.) | | <ul style="list-style-type: none"> for the optional lathe chuck Ø 260 mm |
| 3519732 | Hard top jaw set (3 pcs.) | | <ul style="list-style-type: none"> for three-jaw chuck Ø 210 mm - included in the standard equipment |
| 3519733 | Hard top jaw set (4 pcs.) | | <ul style="list-style-type: none"> for the optional four-jaw lathe chuck Ø 210 mm |
| 3519734 | Hard top jaw set (3 pcs.) | | <ul style="list-style-type: none"> for the optional three-jaw lathe chuck Ø 260 mm |
| 3519735 | Hard top jaw set (4 pcs.) | | <ul style="list-style-type: none"> for the optional four-jaw lathe chuck Ø 260 mm |
| 3536115 | Starter set VDI 30 |  | <ul style="list-style-type: none"> 3 pcs. square transverse holder 1 pc. square transverse overhead holder 1 pc. square longitudinal holder 5 pieces boring bar holder Ø 10 / 12 / 16 / 20 / 25 mm 3 pcs. cap 1 pc. collet chuck holder ER 25 1 pc. collet spanner ER 25 15-part collet set ER 25 1 pc. tool holder 1 pc. chuck |
| 350424004 | Chip conveyor with chip trolley | | <ul style="list-style-type: none"> Conveyor version |
| 350424003 | Oil separator / oil skimmer |  | <ul style="list-style-type: none"> Separation of non emulsified foreign oils by skimming Separation of solids by settling in the collection tank |
| 350424002 | High performance coolant pump 1 kW |  | <ul style="list-style-type: none"> instead of the - in the standard equipment > coolant pump 450 W |
| 350424001 | Lifting device |  | <ul style="list-style-type: none"> a lifting device is required to unload the machine. |

| SOFTWARE | | | |
|---|--|---|---|
| 3584150* | SIEMENS Manual Machine Plus (MM+) Simple cycle control |  | <p>The software enables the transition from conventional machines to CNC programming.</p> <p>Functions:</p> <ul style="list-style-type: none"> Axis parallel motion Turning tapers Turning radii Centre drilling Thread tapping Slotting cycle Thread tapping Preliminary contour turning |
| <p>➔ For more information see on page 318</p> | | | |

S 400E

CNC-Slant bed lathe by OPTIMUM

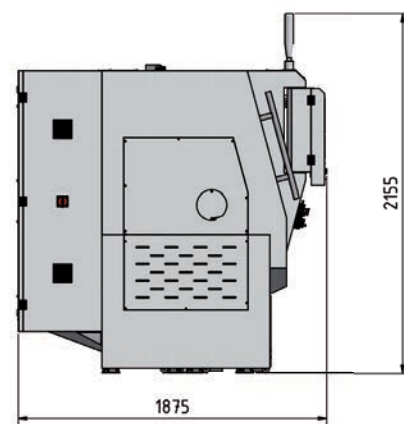
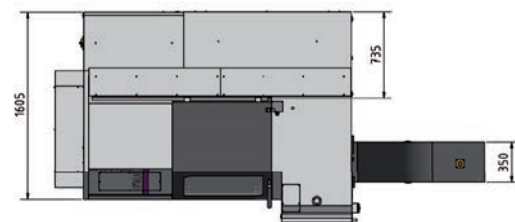
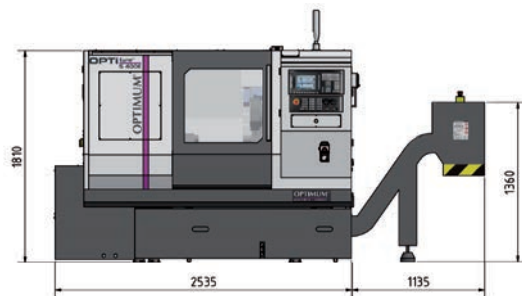
SIEMENS SINUMERIK 808D ADVANCED

- Compact design
- Spindle and servo motors by SIEMENS
- Slant bed design 45° for particularly large machining diameter
- Easy chip removal into the chip tray
- Hydraulic 3-jaw lathe chuck Ø 200 mm
- Hardened and grinded ball screw spindles
- Dimensionally stable linear guides ensure a long service thanks to maximum static and dynamic stiffness
- 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)
- Including two-year SIEMENS warranty
- Warranty extension see page 57
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



TECHNICAL DATA

| Model | S 400E |
|--------------------------------------|----------------------------------|
| Article no. | 3504325 |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 15 kVA |
| Spindle | |
| 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 form A2 |
| Spindle bore* | Ø 61 mm* |
| Chuck passage | Ø 52 mm |
| Hydraulic lathe chuck | Ø 200 mm |
| Cooling lubricant system | |
| Coolant pump output | 650 W |
| Tank capacity | 140 litres |
| Hydraulic system | |
| Hydraulic pump power | 1.5 kW |
| Tank capacity | 60 litres |
| Machine data | |
| Max. turning length | 450 mm |
| Max. turning diameter | Ø 220 mm |
| Swing Ø above cross slide | Ø 220 mm |
| Swing Ø above machine bed | Ø 450 mm |
| Slant bed | 45° |
| Speed range | |
| Spindle speeds | 40 - 4 500 rpm |
| Tool turret | |
| Type | hydraulic |
| Number of tool slots | 8 tools |
| Max. height, width square | 25 mm |
| Max. diameter drilling rod | Ø 16 mm |
| Precision | |
| Repeat accuracy | ± 0.01 mm |
| Positioning accuracy | ± 0.008 mm |
| Traverse paths | |
| X axis | 230 mm |
| Z axis | 450 mm |
| Feed speed | |
| X axis fast motion | 6 m/min. |
| Z axis fast motion | 8 m/min. |
| Motor torque | |
| X axis | 10 Nm |
| Z axis | 10 Nm |
| Tailstock | |
| Tailstock seat | MT 4 |
| Tailstock quill diameter | Ø 72 mm |
| Tailstock - quill stroke | 100 mm |
| Dimensions | |
| L with/without chip conveyor x W x H | 3 650 (1 410) x 1 900 x 1 800 mm |
| Overall weight | 3 500 kg |



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COMPACT AND ROBUST

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SINUMERIK 808D ON PC

- Control-identical software package that further simplifies handling of the machine tool



Control

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

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

OVERALL PACKAGE

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

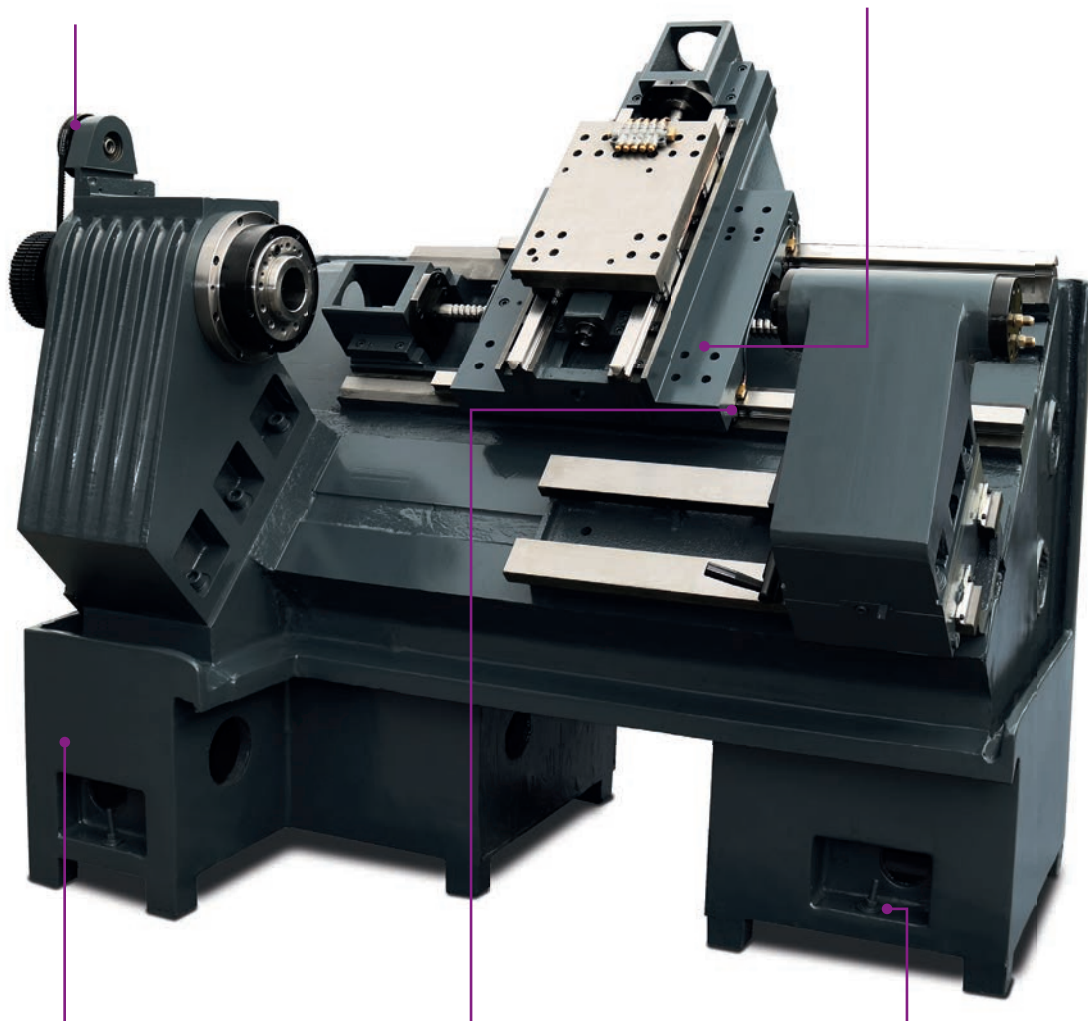


Main spindle

- 7.5 kW main spindle motor has high torque over the entire speed range
- Speed range 40 - 4 500 rpm
- High dynamics
- Ø 61 mm spindle bore

Machine bed

- Pronounced ribbing
- Stable 45° slant bed construction
- Excellent stiffness and durability
- Good chip removal



Machine stand

- Components and castings ensure stiffness
- Compact design

Linear guide

- Maximum feed rate

Machine feet

- Optimal machine levelling

CHIP CONVEYOR - TROLLEY



- Automates chip removal and increases machining productivity by safely removing waste from processes.

HANDWHEEL



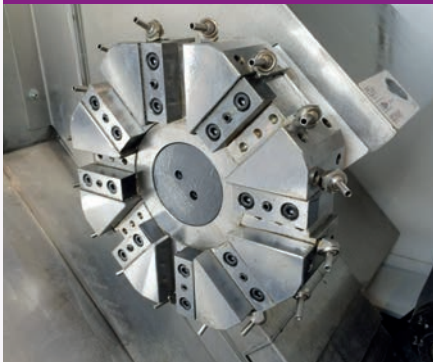
- Portable
- Electronic
- Substantially facilitates running in of programs
- Emergency stop button
- Confirm button

CENTRAL OIL LUBRICATION SYSTEM



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

TOOL CHANGER



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

TAILSTOCK



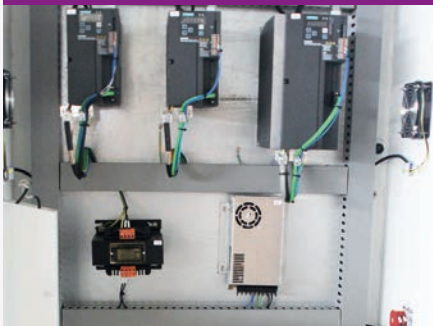
- The tailstock quill is moved hydraulically with the foot switch.

SLANT BED



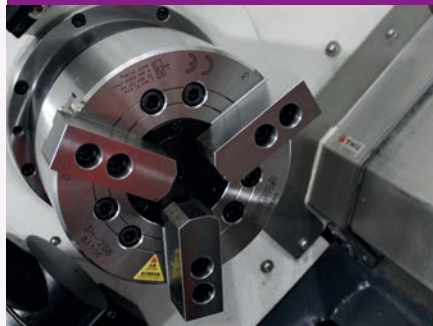
- 45° slant bed for best accessibility and operation of the machine.

CONTROL CABINET



- Clear-cut layout of the control cabinet

HYDRAULIC LATHE CHUCK



- Hydraulically operated three-jaw chuck Ø 200 mm

SINUMERIK 808D ON PC



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





CNC milling machine F 120X
CNC milling machine F 150HSC
CNC milling machine F 210P
CNC milling machine F 210HSC
CNC milling machine F 310HSC
CNC milling machine F 410HSC
CNC milling machine F 610HSC
Production machines user report on page 168

MILLING

PRODUCTION MACHINES

F 120X

Drilling and thread tapping machine with full milling capability

SIEMENS SINUMERIK 828D with PPU 290

- Rugged design
- Servo tool changer with 21 tool slots
- All linear guides with stainless steel covers
- Automatic centralised lubrication
- **SIEMENS** main spindle motor
- **SIEMENS** servo drives on all axes (closed loop)
- Max. spindle speed - inline spindle 16 000 rpm
- Ball screws on all axes
- Portable, electronic handwheel
- Coolant unit with 120 litre coolant tank
- Central lubrication
- 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
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- Oil cooler, compensates for temperature fluctuations at the main spindle
- LED machine lamp for complete illumination of the workspace
- Including two years **SIEMENS** warranty
- **SIEMENS** warranty extension on page 65
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322

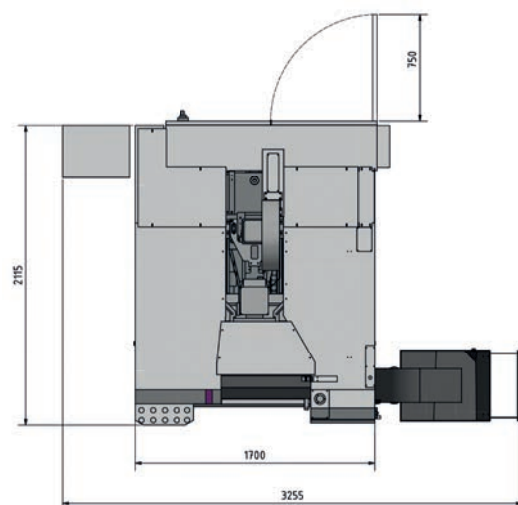
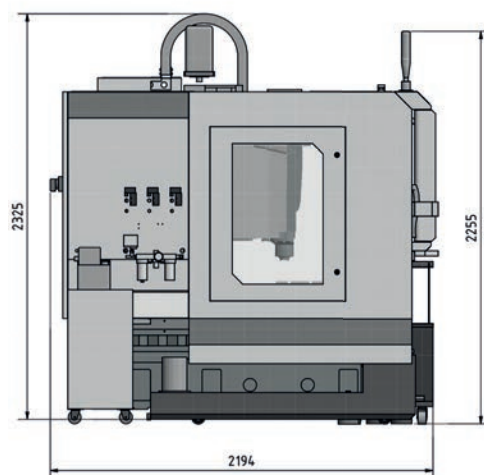
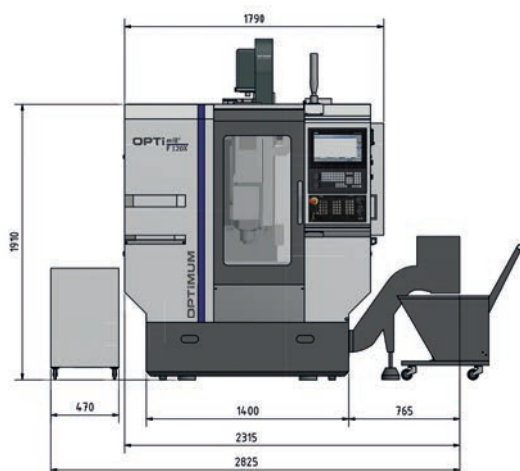


Fig. F 120X with optional accessories

TECHNICAL DATA

| Model | F 120X |
|--|--------------------------|
| Article no. | 3515120 |
| Spindle | Inline spindle |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 45 kVA |
| Milling spindle | |
| 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 |
| Cooling lubricant system | |
| Coolant pump motor | 370 W |
| Tank capacity | 120 litres |
| End mill size | |
| Cutter head size max. | Ø 63 mm |
| Max. shaft milling cutter size | Ø 25 mm |
| Milling precision | |
| Repeat accuracy | ± 0.006 mm |
| Positioning accuracy | ± 0.005 mm |
| Tool changer | |
| Type | Servo |
| Number of tool slots | 21 |
| Max. tool diameter | Ø 80 mm |
| Max. tool length | 80 mm |
| Max. tool weight | 3 kg |
| Tool change time T-T | 0.5 seconds |
| Traverse paths | |
| X axis | 500 mm |
| Y axis | 400 mm |
| Z axis | 300 mm |
| Feed drive axes (X/Y/Z axis) | |
| Rapid traverse | 40 m/min. |
| Acceleration | 2 m/s² |
| Motor torque (X/Y/Z axis) | |
| 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 |
| Speed range | |
| Speeds* | 16 000 rpm |
| Pneumatics | |
| Compressed air | 6 bar |
| Milling table | |
| Spindle centre to Z axis cover | 400 mm |
| Clearance spindle to table | 150 - 450 mm |
| Table length x width | 650 x 400 mm |
| T-slot size / amount / distance | 14 mm / 3 / 125 mm |
| Max. load of working table | 250 kg |
| Dimensions | |
| Length x width x height (with chip conveyor) | 2 315 x 2 194 x 2 325 mm |
| Overall weight | 3 800 kg |

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



SINUMERIK 828D

The power package in the compact class of CNC controls

Boosting productivity and precision in manufacturing

Robust hardware architecture and intelligent control algorithms as well as top-class drive and motor technology ensure the highest dynamics and precision during machining.

Advanced software-controlled compensation functions ensure additional quality in surface machining and high availability of the machine tool.

With SINUMERIK Operate, all machining technologies, from standard to complex, can be operated intuitively and with a uniform "look & feel".

ADVANCED SURFACE

- Thanks to the new Advanced Surface movement guide, it can also be used for tool and mould making.



Perfect surface quality through reproducible results in adjacent milling paths (right picture)

Multitouch operation with PPU 290

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

User-friendly

- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function
- Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)
- Proximity/distance sensor for smart display control

Rugged and maintenance-free

- Front panel made of die-cast magnesium with scratchproof glass front
- Can be operated while wearing gloves
- NV RAM memory technology without buffer battery
- Fanless and hard diskless design

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

TOP SURFACE

- Siemens shows a further development in terms of surface quality in mould making with Top Surface (optional article no. 3584012).
- The function optimises the CAD/CAM-CNC data, which reduces the dependence of the manufacturing quality on the CAD/CAM calculation tolerance and improves the surface quality and shape accuracy.

DXF READER

- Faster from the drawing to the workpiece. Easy transfer of CAD data into programming by DXF reader (optional article no. 3584014).



**SIEMENS
SAFETY**

INTEGRATED

SET UP WORK WITH OPEN DOORS

Functional safety also provides protection against high costs!

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

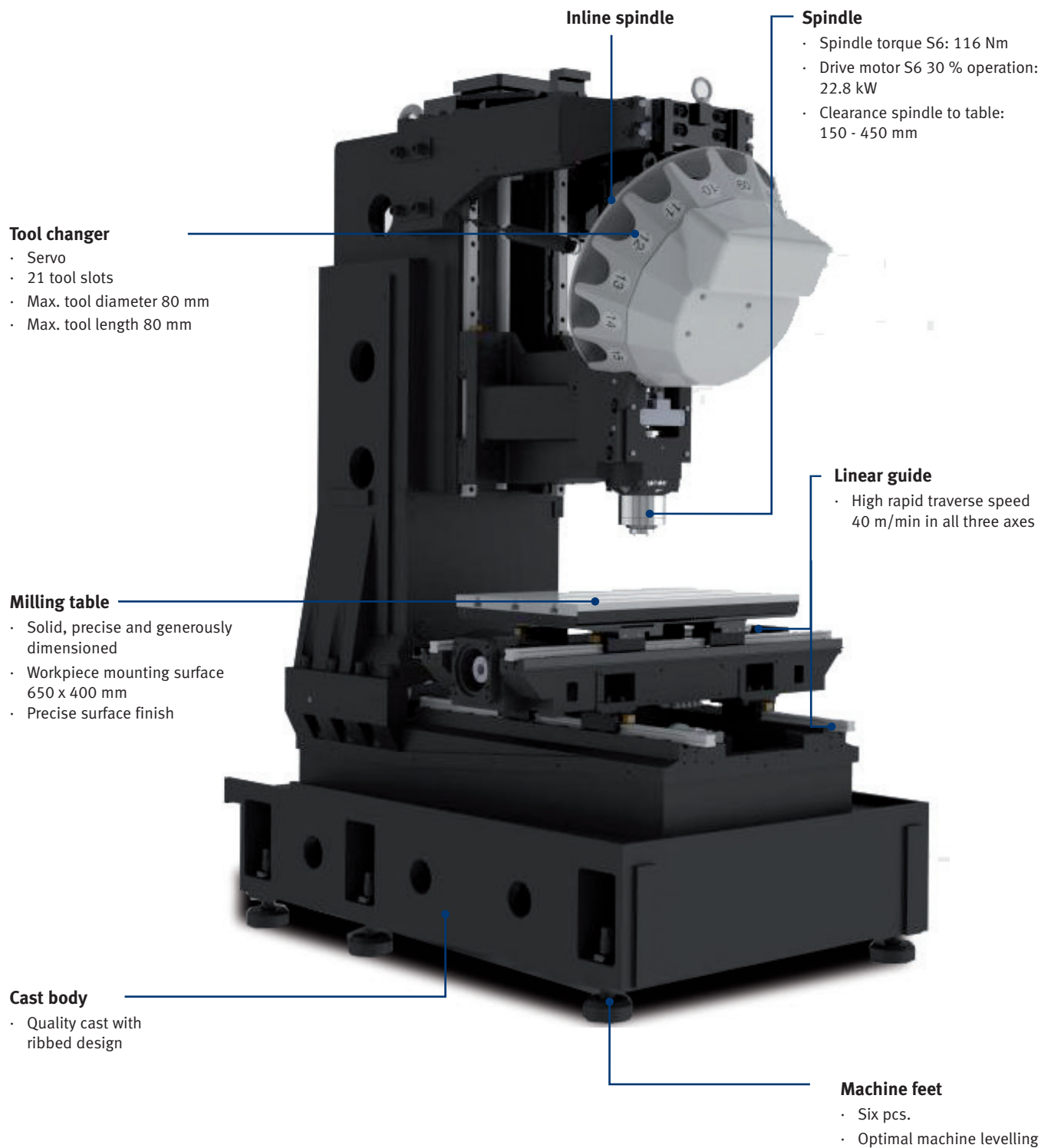
OVERALL PACKAGE

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



RUGGED DESIGN

Dynamics, precision and ergonomics



COOLANT PUMP



- Powerful 370 W coolant pump
- Tank capacity 120 litres
- max. delivery volume 4 m³/h (66 litres per minute)

HANDWHEEL



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

SPINDLE OIL COOLER



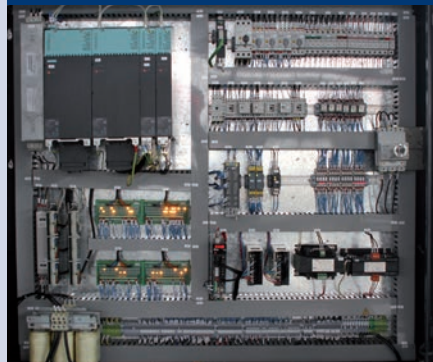
- Prevents deviation of the spindle centre line or thermal deformation of the machine
- Prevents oil vibration
- Extends the machine's service life

TOOL CHANGER SYSTEM



- Servo
- 21 tool slots
- Tool change time T-T: 0.5 seconds

CONTROL CABINET



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

LINEAR GUIDE



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

COMPARTMENTS



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

INLINE SPINDLE



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

CENTRAL LUBRICATION SYSTEM




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

TOOL MEASURING / WORKPIECE MEASURING

➔ For information on tool/workpiece measurement ex warehouse Germany see page 290.

MISCELLANEOUS

| | | | | |
|------------|---|---|--|------------------------|
| 3536107 | 1 | Starter set BT 30 |  Information on page 282 | |
| 351512010* | 3 | Coolant through spindle (CTS) | <ul style="list-style-type: none">• Pump pressure 30 bars• Integrated unit | we recommend a suction |
| 351512011* | | | <ul style="list-style-type: none">• Pump pressure 70 bars• External power unit• Tank capacity 168 l | |
| 351512016* | 2 | Double contact spindle system BIG-PLUS® BT 30 | <ul style="list-style-type: none">• BIG-PLUS® is an extremely stable connection between the machine spindle and the tool holder, which is achieved by simultaneous taper and face contact of the tool holder in the machine spindle. | |

NEW

NEW

FOURTH AXIS

| | | | |
|------------|---|--|---|
| 351512002* | 4 | Fourth axis rotary indexing table | <ul style="list-style-type: none"> Preparation |
| 351512003* | | | <ul style="list-style-type: none"> Rotary indexing table Ø 120 mm Three-jaw lathe chuck 100 mm Tailstock Installation |
| 350110004* | 5 | Swivel bridge | <ul style="list-style-type: none"> 260 x 130 mm with counterholder |

➔ For details on the fourth axis for the rotary indexing table see page 276

SOFTWARE

| | | | |
|---------|---|--|--|
| 3584014 | 6 | DXF Reader for SIEMENS SINUMERIK controls | <ul style="list-style-type: none"> from version 4.7 For importing DXF files Hiding graphics layers Automatic contour tracking Arbitrary workpiece zero point per contour/drilling point |
| 3584012 | 7 | Top surface for SIEMENS SINUMERIK control | <ul style="list-style-type: none"> The NC data from the CAM system are optimised online during processing 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 |

MISCELLANEOUS

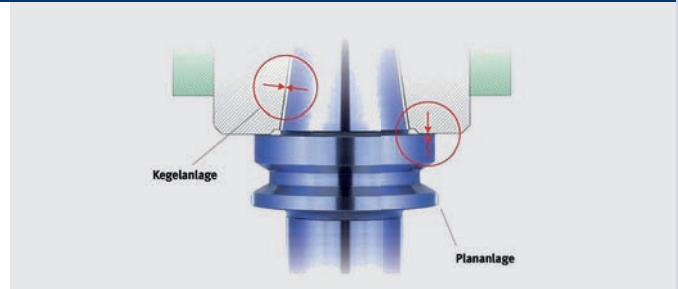
| | | | |
|------------|---|------------------------|---|
| on request | 8 | Punch Tap READY | Punch Tap cycle installed Punch Tap revolutionises thread tapping. For more information see: https://punchtap.com |
|------------|---|------------------------|---|

1 STARTER SET BT 30



- 1 pc. milling head holder 1
- 1 pc. drill chuck 2
- 2 each Weldon 6 mm and 20 mm
- 1 each Weldon 8/10/12/16 mm 3
- 1 pc. adapter BT 30 4
- 4 pcs. collet chuck holder ER 32 5
- 1 pc. Collet spanner ER 32 6
- 18-part collet set ER 32 7
- 1 pc. Height adjuster 8
- 1pc. Assembly and tool adjustment gauge 9
- 14 pcs. Pull stud 10
- 1pc. Taper squeegee 11

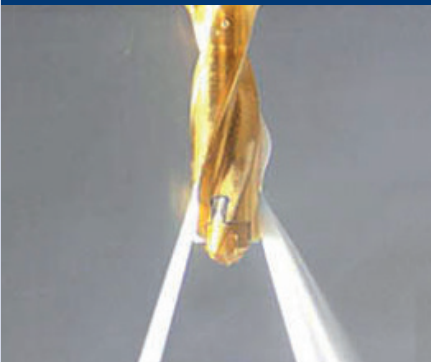
2 DOUBLE CONTACT SPINDLE SYSTEM BIG-PLUS®



The advantages

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

3 COOLANT THROUGH SPINDLE



- Guarantees optimal service life
- Optionally with internal or external unit
- Pump pressure 30 bars or 70 bars

4 PREPARATION



- Preparation for fourth axis

5 FOURTH AXIS/SWIVEL BRIDGE

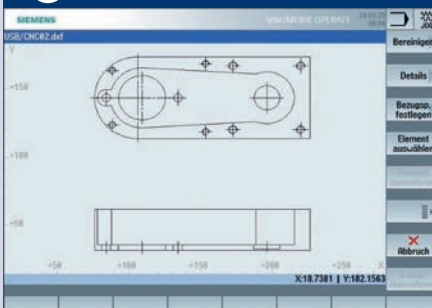


Swivel bridge similar to fig. and with optional fourth axis

Fourth axis

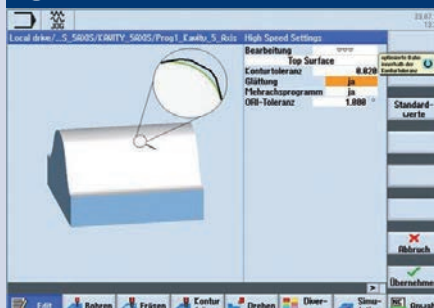
- Rigid design thanks to single-part front plate and spindle design
- A combination of high-precision worm wheel and bronze/nickel housing. The screw made of hardened steel

6 DXF READER



- DXF data can be converted 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 PUNCH TAP READY



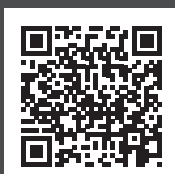
- EMUGE Punch Tap technology, also known as helical thread forming, is a fourth manufacturing technology for the production of internal threads in addition to thread forming, thread cutting and thread milling

F 150HSC

Excellent precision, solid design, effectiveness and efficiency

SIEMENS SINUMERIK 828D mit PPU 290 with 15.6 inch touchscreen

- Heavy duty version
- High productivity
- High reliability
- Torsion free machine base thanks to strong ribbing
- Profile rail with ball screw for fast rapid motion speeds on all axes
- High-torque servo drives on all three axes
- Telescopic guide rail covers on all three axes
- Solid, precision milling table with four T-grooves, generously dimensioned with precision surface finish
- Portable, electronic handwheel with confirm button and emergency stop button.
Substantially facilitates running in of programs
- Coolant unit with 210 litre coolant tank, including chip flushing system and cleaning gun
- Chip conveyor, screw auger type
- RJ45 plug-in connection, USB connection and 230 V power connection
- Spindle oil cooler
- Closed switch cabinet with integrated heat exchanger; ensures optimal temperature even in case of high ambient temperatures; prevents dirt particle penetration
- Machine lamp in the workspace
- Including two years **SIEMENS** warranty
- **SIEMENS** warranty extension on page 73
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



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

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



Fig. F 150HSC with optional accessories

TECHNICAL DATA

| Model | F 150HSC |
|--|--------------------------|
| Article no. | 3511213 |
| Spindle | Inline spindle |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 31 kVA |
| Milling spindle | |
| Drive motor S1 operation | 9 kW |
| Drive motor torque S1 | 57 Nm |
| Drive motor S6 30 % operation | 21.2 kW |
| Torque drive motor S6 30 % operation | 135 Nm |
| Spindle seat | SK 40 / DIN 69871 |
| Cooling lubricant system | |
| Motor - coolant pumps, 3 pcs. | 1.27 kW each |
| Pump capacity | 66 - 100 l/min |
| Tank capacity | 210 litres |
| End mill size | |
| Cutter head size max. | Ø 63 mm |
| Max. shaft milling cutter size | Ø 32 mm |
| Milling precision | |
| Repeat accuracy | ± 0.005 mm |
| Positioning accuracy | ± 0.005 mm |
| Tool changer | |
| Type | Double arm grab |
| Number of tool slots | 24 tools |
| Max. tool diameter | Ø 80 mm |
| Max. tool diameter (tools slots beside not occupied) | Ø 125 mm |
| Tool length | 200 mm |
| Max. tool weight | 8 kg |
| Tool change time T-T | 2 seconds |
| Traverse paths | |
| X axis | 760 mm |
| Y axis | 440 mm |
| Z axis | 460 mm |
| Axis feed drive | |
| Rapid traverse X/Y/Z axis | 36 m/min. |
| Motor torque | |
| X/Y/Z axis | 7.3 Nm / 10.5 Nm / 15 Nm |
| Feed forces | |
| X/Y/Z axis | 3 kN / 5.5 kN / 5.5 kN |
| Speed range | |
| Speeds* | 12 000 rpm |
| Pneumatics | |
| Compressed air | 5 - 7 bar |
| Milling table | |
| Clearance spindle to table | 102 - 562 mm |
| Throat | 480 mm |
| Table length x width | 900 x 410 mm |
| T-slot size / amount / distance | 16 mm / 4 / 102 mm |
| Max. load of working table | 350 kg |
| Dimensions | |
| Length x width x height | 3 000 x 1 950 x 2 531 mm |
| Overall weight | 4 350 kg |

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

SINUMERIK 828D

The power package in the compact class of CNC controls

Boosting productivity and precision in manufacturing

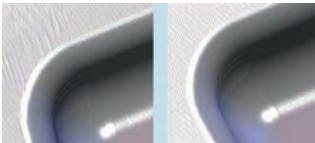
Robust hardware architecture and intelligent control algorithms as well as top-class drive and motor technology ensure the highest dynamics and precision during machining.

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With SINUMERIK Operate, all machining technologies, from standard to complex, can be operated intuitively and with a uniform "look & feel".

ADVANCED SURFACE

- Thanks to the new Advanced Surface movement guide, it can also be used for tool and mould making.



Perfect surface quality through reproducible results in adjacent milling paths (right picture)

Multitouch operation with PPU 290

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

User-friendly

- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function
- Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)
- Proximity/distance sensor for smart display control

Rugged and maintenance-free

- Front panel made of die-cast magnesium with scratchproof glass front
- Can be operated while wearing gloves
- NV RAM memory technology without buffer battery
- Fanless and hard diskless design

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

TOP SURFACE

- Siemens shows a further development in terms of surface quality in mould making with Top Surface (optional article no. 3584012).
- The function optimises the CAD/CAM-CNC data, which reduces the dependence of the manufacturing quality on the CAD/CAM calculation tolerance and improves the surface quality and shape accuracy.

DXF READER

- Faster from the drawing to the workpiece. Easy transfer of CAD data into programming by DXF reader (optional article no. 3584014).



**SIEMENS
SAFETY**

INTEGRATED

SET UP WORK WITH OPEN DOORS

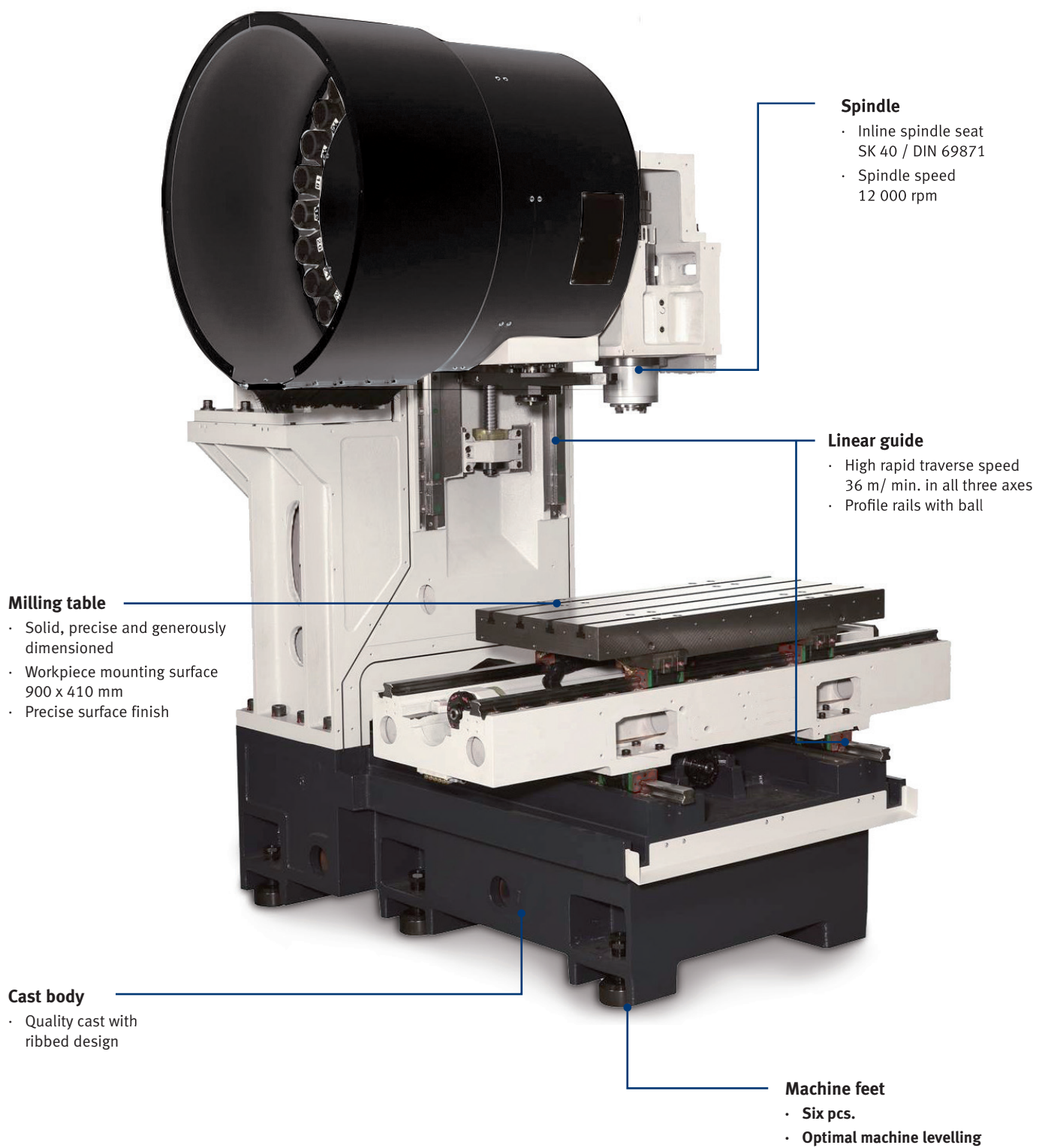
Functional safety also provides protection against high costs!

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

OVERALL PACKAGE

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





CLEANING GUN



- Easy cleaning of the workspace

HANDWHEEL



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

HEAT EXCHANGER



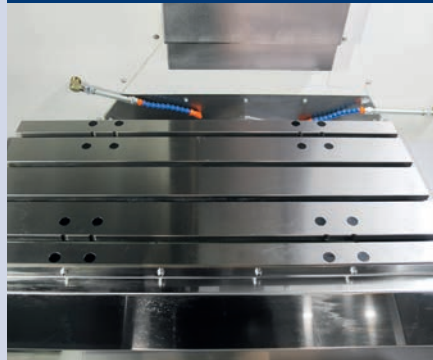
- Closed switch cabinet with smart cooling management
- Optimal temperature even in case of high ambient temperatures
- Prevents particulate soiling

TOOL CHANGER SYSTEM



- Double arm grab with 24 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
- Solid, precision milling table with five T-grooves, generously dimensioned with precision surface finish

CONTROL CABINET



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

CHIP CONVEYOR



- Screw auger design
- For efficient chip discharge

COOLING LUBRICANT SYSTEM



- Three coolant pumps with 1.27 Watt each
- Tank capacity 210 litres

CENTRAL LUBRICATION SYSTEM



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

TOOL MEASURING / WORKPIECE MEASURING

| | | | |
|--|--|--|--|
| 3511290604* | | BLUM TC52IR Universal measuring probe | <ul style="list-style-type: none"> Switching point repetition accuracy from 0, 3µm 2 at 2 m/ min. measuring speed Wear-free and durably stable Very compact probe with 40 mm diameter |
| 3511290605* | | BLUM ZX-Speed 3-D probe | <ul style="list-style-type: none"> Universal 3-D probe for toolmaking and tool break monitoring |
| ➔ For information on Blum workpiece/tool measuring, also ex warehouse Germany see page 275 | | | |
| 3511290620* | | Renishaw NC 4 Laser system for tool measurement | <ul style="list-style-type: none"> NC4 zero-contact tool control system is a high-precision, extremely fast solution for tool measurement and breakage checking |
| 3511290621* | | Renishaw OMP 60 Probe with optical signal transmission | <ul style="list-style-type: none"> For checking and setting up workpieces on processing centres Compact, touch-actuated 3D probe. Reliably modulated, optical signal transmission. |
| 3511290622* | | Renishaw TS 27R Probe for tactile tool measurement | <ul style="list-style-type: none"> Tool breakage check Compact, tactile 3-D tool probe with wired signal transmission |
| ➔ For information on the Renishaw laser system and probe, also ex warehouse Germany see page 288 | | | |

NEW

3-D PRINTING

| | | | |
|---|--|-------------------------------|--|
| 3562411 | | 3-D printing interface | <ul style="list-style-type: none"> Plug connector on milling head for OPTImill 3X printing head Power supply is installed in control cabinet Prepared for open circuit monitoring and filament holder |
| ➔ For information on 3-D printing and accessories see 266 | | | |

MISCELLANEOUS

| | | | | |
|-------------|---|-------------------------------|--|------------------------|
| 3536109 | 1 | Starter set SK 40 / DIN 69871 | ➔ For Information on the starter set see on page 284 | |
| 3511290100* | 2 | Coolant through spindle (CTS) | • Integrated unit, 20 bar pump pressure | we recommend a suction |
| 3511290102* | | | • External unit, pump pressure 20 bars, tank capacity 165 litres, delivery rate 30 l/min | |
| 3511290104* | | | • External unit, pump pressure 70 bars, tank capacity 165 litres, delivery rate 29 l/min | |
| 3511290401* | 3 | Air conditioner | • Instead of the standard heat exchanger | |
| 3511290299 | | Automatic side door | • for robot loading, including assembly | |
| 3511290501* | 4 | Power transformer | • for special voltages | |
| 3511290303* | | Chip conveyor, belt-type | • Instead of standard equipment › chip conveyor, screw auger type | |
| 3511290301* | 5 | Chip trolley | • L x W x H: 994 x 510 x 838 mm, Capacity: 65 litres | |

NEW

FOURTH AND FIFTH AXIS

| | | | |
|--|---|--|--|
| 3511290201* | 6 | Fourth axis rotary indexing table | <ul style="list-style-type: none"> Preparation |
| 3511290210* | | | <ul style="list-style-type: none"> Table diameter 120 mm, three-jaw lathe chuck Ø 100 mm Tailstock, Siemens Motor, assembly |
| 3511290202* | | | <ul style="list-style-type: none"> Preparation |
| 3511290250* | 7 | 5-axis rotary/swivelling table | <ul style="list-style-type: none"> Possible machining diameter 120 mm, Three-jaw lathe chuck Ø 100 mm Tailstock, Siemens Motor, assembly |
| ➔ For details on the fourth axis for the rotary indexing table and 5-axis rotary/swivelling table see page 276 | | | |

SOFTWARE

| | | | |
|---------|---|--|---|
| 3584014 | | DXF Reader for SIEMENS SINUMERIK controls | <ul style="list-style-type: none"> from version 4.7 For importing DXF files Hiding graphics layers |
| 3584012 | 8 | Top surface for SIEMENS SINUMERIK control | <ul style="list-style-type: none"> The NC data from the CAM system are optimised online during processing The result is excellent surface quality while milling complex free-form surfaces. This is particularly beneficial for geometrically complex mould parts |

1 STARTER SET SK 40 / DIN 69871



- Milling head holder with 27 mm seat **1**
- Quick-action drill chuck 1- 13 mm **2**
- 2 each Weldon 6 mm and 20 mm **3**
- 1 each Weldon 8/10/12/16 mm **3**
- Adapter SK 40 to MT 3 **4**
- 4 pcs. Collet chuck holder ER 32 **5**
- Collet spanner ER 32 **6**
- 18-part collet set ER 32 **7**
- Assembly and tool adjustment gauge **8**
- Height-adjuster **9**
- Taper squeegee **10**
- Pull stud **11**

2 COOLANT THROUGH SPINDLE



- Guarantees optimal service life
- Optionally with internal or external unit
- Pump pressure 20 bars or 70 bars

Fig. Filter unit internal 20 bar

3 AIR CONDITIONER



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

4 POWER TRANSFORMER



- For custom voltage
- Weight 147 kg

5 CHIP TROLLEY CONVEYOR



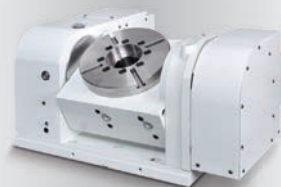
- Conveyor version
- For efficient chip discharge

6 FOURTH AXIS



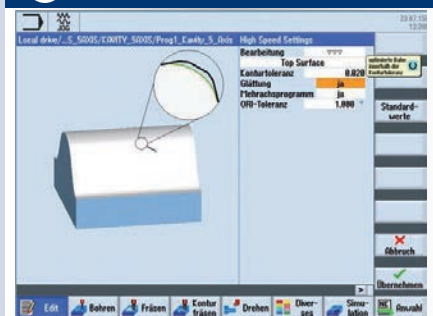
- Table diameter 120 mm
- Vertical table centre height 115 mm
- Total vertical height without motor cover 193 mm
- Horizontal table height 170 mm
- Workpiece weight horizontal / vertical max. 75 / 35 kg

7 FIFTH AXIS



- Compact design
- Possible machining \varnothing 120 mm
- Vertical table centre height 150 mm
- Vertical table overall height 235 mm
- Through hole diameter 30^{H7}mm
- Slot nut width 14^{H7}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

A white circular badge with a blue border and the word "NEW" in blue capital letters.

F 210P

Excellent precision, solid design, effectiveness and efficiency

SIEMENS SINUMERIK 828D mit PPU 290 with 15.6 inch touchscreen

- Heavy duty version
- High productivity
- High reliability
- Torsion free machine base thanks to strong ribbing
- Profile rail with ball screw for fast rapid motion speeds on all axes
- High-torque servo drives on all three axes
- Telescopic guide rail covers on all three axes
- Solid, precision milling table with five T-grooves, generously dimensioned with precision surface finish
- Portable, electronic handwheel with confirm button and emergency stop button.
Substantially facilitates running in of programs
- Coolant unit with 210 litre coolant tank, including chip flushing system and cleaning gun
- Chip conveyor, belt-type
- Chip carriage
- RJ45 plug-in connection, USB connection and 230 V power connection
- Closed switch cabinet with integrated heat exchanger; ensures optimal temperature even in case of high ambient temperatures; prevents dirt particle penetration
- Machine lamp in the workspace
- Including two years **SIEMENS** warranty
- **SIEMENS** warranty extension on page 81
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322

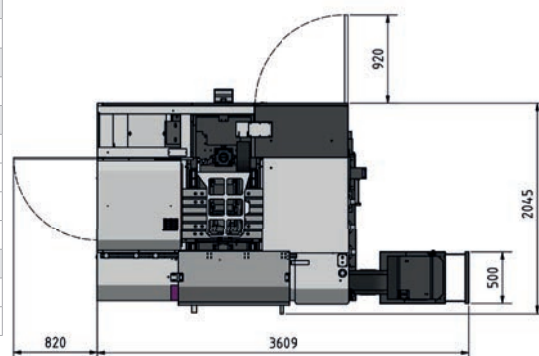
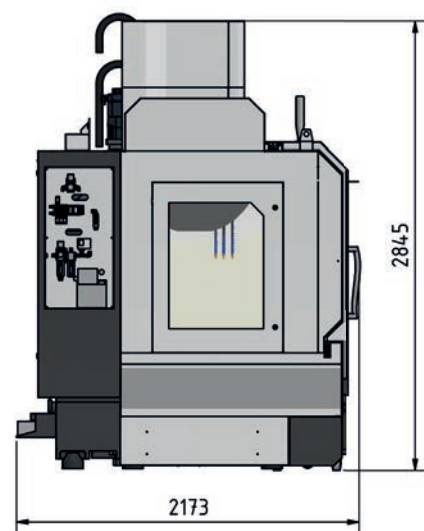
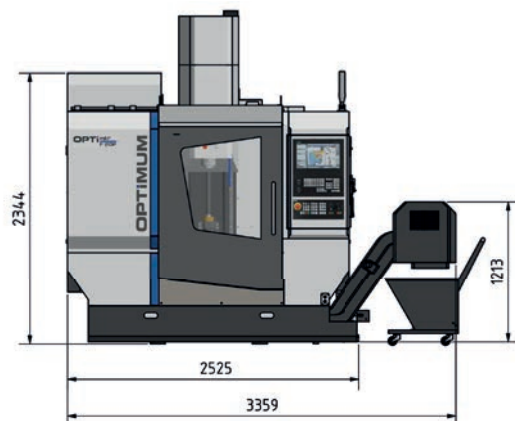


Fig. with optional accessories



TECHNICAL DATA

| Model | F 210P |
|--|--------------------------|
| Article no. | 3511215 |
| Spindle | Inline spindle |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 20 KVA |
| Milling spindle | |
| Drive motor S1 operation | 9 kW |
| Drive motor torque S1 | 57 Nm |
| Drive motor S6 30 % operation | 15.8 kW |
| Torque drive motor S6 30 % operation | 95 Nm |
| Spindle seat | BT 40 |
| Cooling lubricant system | |
| Coolant pump motor | 370 W |
| Tank capacity | 200 litres |
| End mill size | |
| Cutter head size max. | Ø 80 mm |
| Max. shaft milling cutter size | Ø 38 mm |
| Milling precision | |
| Repeat accuracy | ± 0,005 mm |
| Positioning accuracy | ± 0,005 mm |
| Tool changer | |
| Type | Double arm grab |
| Number of tool slots | 30 tools |
| Max. tool diameter | Ø 75 mm |
| Max. tool diameter (tools slots beside not occupied) | 150 mm |
| Max. tool length | 300 mm |
| Max. tool weight | 8 kg |
| Tool change time T-T | 2.5 seconds |
| Traverse paths | |
| X axis | 800 mm |
| Y axis | 500 mm |
| Z axis | 500 mm |
| Axis feed drive | |
| Rapid traverse X/Y/Z axis | 30 m/min. |
| Motor torque | |
| X/Y/Z axis | 7.3 Nm / 10.5 Nm / 15 Nm |
| Speed range | |
| Speeds* | 10 - 12 000 rpm |
| Pneumatics | |
| Compressed air | 0.6 Mpa |
| Milling table | |
| Clearance spindle to table | 100 - 600 mm |
| Table length x width | 1 000 x 500 mm |
| T-slot size / amount / distance | 5 / 18 / 80 mm |
| Max. load of working table | 350 kg |
| Dimensions | |
| Length x width x height | 3 609 x 2 173 x 2 845 mm |
| Overall weight | 4 800 kg |



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

SINUMERIK 828D

The power package in the compact class of CNC controls

Boosting productivity and precision in manufacturing

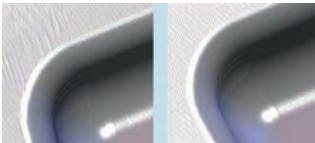
Robust hardware architecture and intelligent control algorithms as well as top-class drive and motor technology ensure the highest dynamics and precision during machining.

Advanced software-controlled compensation functions ensure additional quality in surface machining and high availability of the machine tool.

With SINUMERIK Operate, all machining technologies, from standard to complex, can be operated intuitively and with a uniform "look & feel".

ADVANCED SURFACE

- Thanks to the new Advanced Surface movement guide, it can also be used for tool and mould making.



Perfect surface quality through reproducible results in adjacent milling paths (right picture)

Multitouch operation with PPU 290

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

User-friendly

- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function
- Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)
- Proximity/distance sensor for smart display control

Rugged and maintenance-free

- Front panel made of die-cast magnesium with scratchproof glass front
- Can be operated while wearing gloves
- NV RAM memory technology without buffer battery
- Fanless and hard diskless design

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

TOP SURFACE

- Siemens shows a further development in terms of surface quality in mould making with Top Surface (optional article no. 3584012).
- The function optimises the CAD/CAM-CNC data, which reduces the dependence of the manufacturing quality on the CAD/CAM calculation tolerance and improves the surface quality and shape accuracy.

DXF READER

- Faster from the drawing to the workpiece. Easy transfer of CAD data into programming by DXF reader (optional article no. 3584014).



SIEMENS SAFETY INTEGRATED

SET UP WORK WITH OPEN DOORS

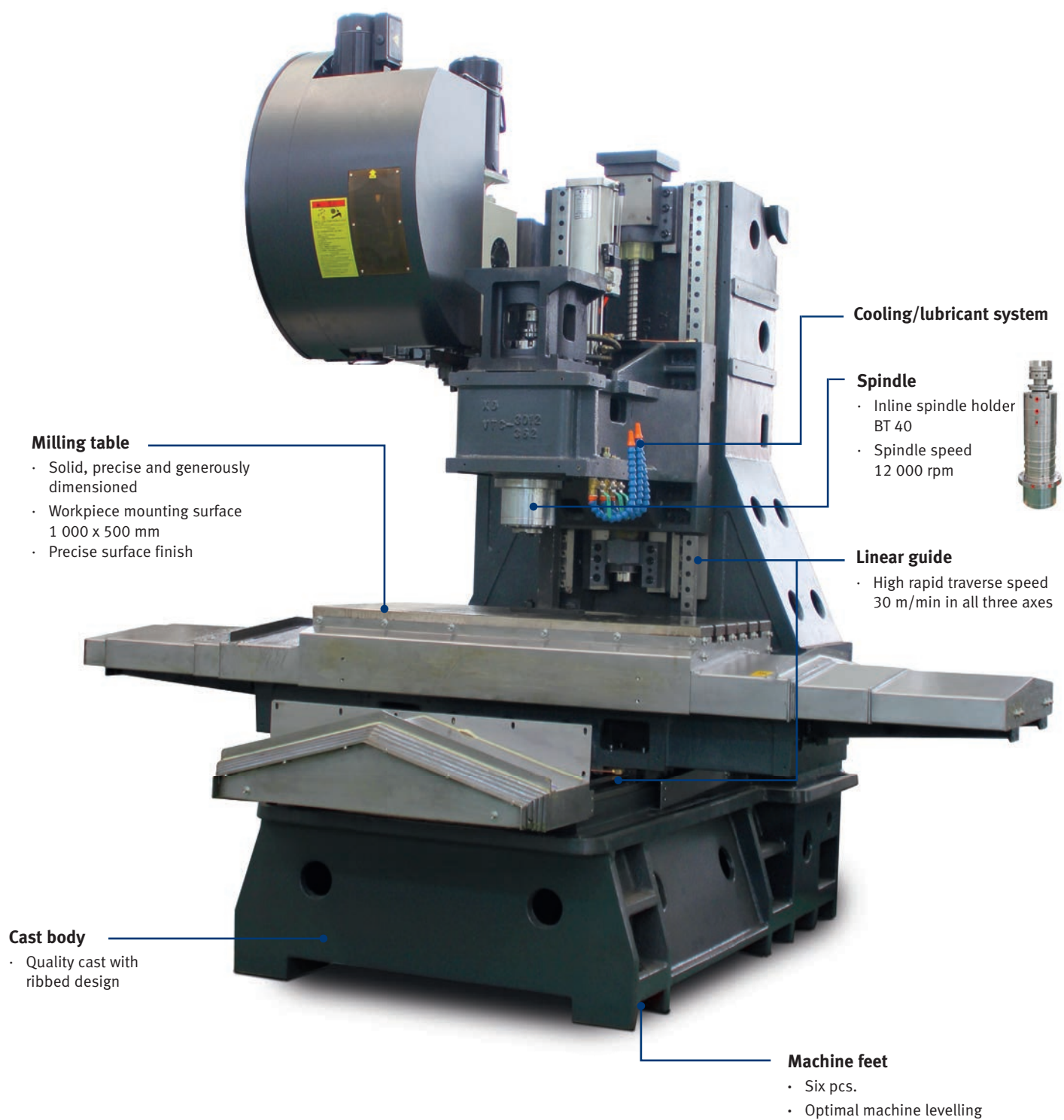
Functional safety also provides protection against high costs!

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

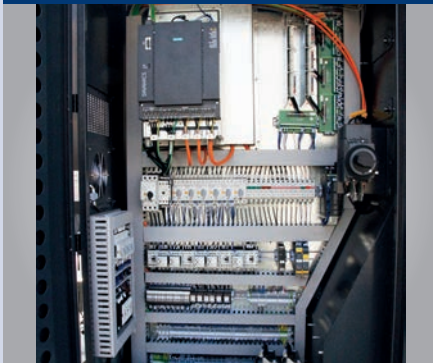
OVERALL PACKAGE

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





CONTROL CABINET



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

HANDWHEEL



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

BALL SCREW



- Ball screw for fast rapid motion speeds on all axes

TOOL CHANGER



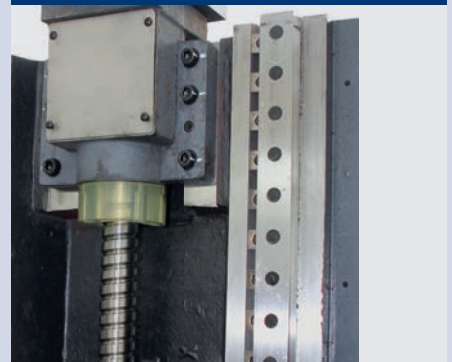
- Double arm grab
- 30 tool slots
- Tool change time: 2.5 seconds

GREASE LUBRICATION



- Reduces wear
- High load-bearing capacity
- Excellent lubricant film
- Low maintenance
- Good adhesion properties

LINEAR GUIDE



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

CHIP CONVEYOR



- Conveyor version
- For efficient chip discharge

OIL SEPARATOR / OIL SKIMMER



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

MILLING TABLE



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

TOOL MEASURING / WORKPIECE MEASURING

➔ For information on tool/workpiece measurement ex warehouse Germany see page 290


MISCELLANEOUS

| | | | |
|------------|---|--------------------------------------|--|
| 3536108 | 1 | Starter set BT 40 | ➔ Information on the starter set on page 283 |
| 351121520* | 2 | Coolant through spindle (CTS) | • Integrated unit, 30 bar pump pressure |
| 351121521* | | | • External unit, pump pressure 70 bars, tank capacity 165 litres, delivery rate 29 l/ min. We recommend an extraction unit |

3-D PRINTING

| | | | |
|---|---|-------------------------------|---|
| 351121591* | 3 | 3-D printing interface | • Interface, power supply, preparation for open circuit monitoring, filament holder |
| ➔ For information on 3-D printing and accessories see 266 | | | |

FOURTH AND FIFTH AXIS

| | | | |
|--|---|--|--|
| 351121501* | 4 | Fourth axis rotary indexing table complete set | <ul style="list-style-type: none">• Preparation |
| 351121509* | | | <ul style="list-style-type: none">• Rotary indexing table Ø 120 mm• Three-jaw lathe chuck 100 mm• Tailstock• Installation |
| 350110004* | | | <ul style="list-style-type: none">• 260 x 130 mm• with counterholder for fourth axis |
| 351121502* | 5 | 5-axis rotary/swivelling table | <ul style="list-style-type: none">• Preparation |
| 351121510* | | | <ul style="list-style-type: none">• Possible machining diameter 120 mm• Three-jaw lathe chuck 100 mm• Tailstock• Siemens motor• Installation |
|  For details on the fourth axis for the rotary indexing table and 5-axis rotary/swivelling table see page 276 | | | |

SOFTWARE

| | | | |
|---------|--|--|--|
| 3584014 | | DXF Reader for SIEMENS SINUMERIK controls | • from version 4.7 • For importing DXF files • Hiding graphics layers • Automatic contour tracking • Arbitrary workpiece zero point per contour/drilling point |
| 3584012 | | Top surface for SIEMENS SINUMERIK control | • The NC data from the CAM system are optimised online during processing • 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 |

1 STARTER SET BT 40



- Milling head holder with 27 mm collet **1**
- Chuck 1 - 13 mm **2**
- Pull stud **3**
- 2 each Weldon 6 mm and 20 mm **4**
- 2 each Weldon 8 mm, 10 mm, 12 mm and 16 mm **4**
- Adapter BT 40 to MT 3 **5**
- Collet holder ER 32 **6**
- Collet spanner ER 32 **7**
- Collet set ER 32 **8**
- Assembly and tool adjustment gauge **9**
- Height-adjuster **10**
- Taper squeegee **11**

2 COOLANT THROUGH SPINDLE



- Guarantees optimal service life
- Optionally with internal or external unit
- Pump pressure 30 bars or 70 bars



Fig.: CTS extern 70 bar

3 3-D PRINTING INTERFACE



- Plug connector on milling head for OPTImill 3X and 5X printing heads
- Power supply is installed in control cabinet
- Prepared for connecting open circuit monitoring
- Filament holder

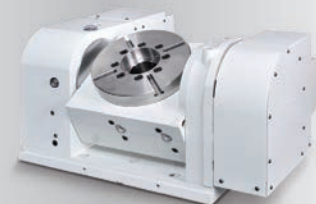
4 FOURTH AXIS



Swivel bridge similar to fig. and with optional fourth axis

- Rigid design thanks to single-part front plate and spindle design
- A combination of high-precision worm wheel and bronze/nickel housing. Worm screw made of hardened steel
- Design with low transmission ratio (90:1), for a fast feed speed.

5 FIFTH AXIS



- Compact design
- 120mm possible machining diameter
- Three-jaw lathe chuck 100 mm
- Tailstock
- Vertical centre height 150 mm
- Vertical overall height 235 mm
- Slot nut width 14^{H7}
- Servo motor **SIEMENS** 1FK7042

F 210HSC

Excellent precision, solid design, effectiveness and efficiency

SIEMENS SINUMERIK 828D mit PPU 290 and 15.6 inch touchscreen

- Heavy duty version
- High productivity
- High reliability
- Torsion free machine base thanks to strong ribbing
- Profile rail with roller recirculation for high rapid traverse speeds in all axes
- High-torque servo drives on all three axes
- Telescopic guide rail covers on all three axes
- Automatic lubrication
- Solid, precision milling table with four T-grooves, generously dimensioned with precision surface finish
- Portable, electronic handwheel with confirm button and emergency stop button .
Substantially facilitates running in of programs
- Coolant unit with 370 litre coolant tank and chip flushing system
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- RJ45 plug-in connection, USB connection and power connection 230 V
- Closed switch cabinet with integrated heat exchanger; ensures optimal temperature even in case of high ambient temperatures; prevents dirt particle penetration
- Machine lamp in the workspace
- Including two years **SIEMENS** warranty
- **SIEMENS** warranty extension on page 89
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



TECHNICAL DATA

| Model | F 210HSC | |
|--|--------------------------|----------------|
| Article no. | 3511222 | |
| Milling spindle | Belt drive | Inline spindle |
| | Standard | 3511290002** |
| | | |
| Machine data | | |
| Electrical connection | 400 V / 3 Ph ~50 Hz | |
| Total connected load | 31 kVA | |
| Milling spindle | | |
| Drive motor S1 operation | 9 kW | |
| Drive motor torque S1 | 57 Nm | |
| Drive motor S6 30 % operation | 21.2 kW | |
| Torque drive motor S6 30 % operation | 135 Nm | |
| Spindle seat | SK 40 / DIN 69871 | |
| Cooling lubricant system | | |
| Motor - coolant pumps, 3 pcs. | 1.27 kW | |
| Pump capacity | 155 l/min | |
| Tank capacity | 370 litres | |
| End mill size | | |
| Cutter head size max. | Ø 63 mm | |
| Max. shaft milling cutter size | Ø 32 mm | |
| Milling precision | | |
| Repeat accuracy | ± 0.005 mm | |
| Positioning accuracy | ± 0.005 mm | |
| Tool changer | | |
| Type | Double arm grab | |
| Number of tool slots | 30 tools | |
| Max. tool diameter | Ø 75 mm | |
| Max. tool diameter (tools slots beside not occupied) | Ø 125 mm | |
| Tool length | 300 mm | |
| Max. tool weight | 8 kg | |
| Tool change time T-T | 2 seconds | |
| Traverse paths | | |
| X axis | 800 mm | |
| Y axis | 500 mm | |
| Z axis | 500 mm | |
| Axis feed drive | | |
| Rapid traverse X/Y/Z axis | 30 m/min. | |
| Motor torque | | |
| X/Y/Z axis | 11 Nm / 11 Nm / 16 Nm | |
| Feed forces | | |
| X/Y/Z axis | 4,1 kN / 4,1 kN / 5,9 kN | |
| Speed range | | |
| Speeds* | 10 000 rpm | 12 000 rpm |
| Pneumatics | | |
| Compressed air | 5 - 7 bar | |
| Milling table | | |
| Clearance spindle to table | 100 - 600 mm | |
| Table length x width | 900 x 520 mm | |
| T-slot size / amount / distance | 16 mm / 5 / 80 mm | |
| Max. load of working table | 450 kg | |
| Dimensions | | |
| Length x width x height | 3 838 x 2 280 x 2260 mm | |
| Overall weight | 6 250 kg | |

| Sinumerik 828D system software | SW 28x |
|--------------------------------|--------|
| CNC memory | 8 MB |
| Cycle 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

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

SINUMERIK 828D

The power package in the compact class of CNC controls

Boosting productivity and precision in manufacturing

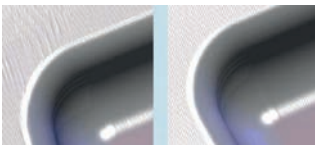
Robust hardware architecture and intelligent control algorithms as well as top-class drive and motor technology ensure the highest dynamics and precision during machining.

Advanced software-controlled compensation functions ensure additional quality in surface machining and high availability of the machine tool.

With SINUMERIK Operate, all machining technologies, from standard to complex, can be operated intuitively and with a uniform "look & feel".

ADVANCED SURFACE

- Thanks to the new Advanced Surface movement guide, it can also be used for tool and mould making.



Perfect surface quality through reproducible results in adjacent milling paths (right picture)

Multitouch operation with PPU 290

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

User-friendly

- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function
- Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)
- Proximity/distance sensor for smart display control

Rugged and maintenance-free

- Front panel made of die-cast magnesium with scratchproof glass front
- Can be operated while wearing gloves
- NV RAM memory technology without buffer battery
- Fanless and hard diskless design

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

TOP SURFACE

- Siemens shows a further development in terms of surface quality in mould making with Top Surface (optional article no. 3584012).
- The function optimises the CAD/CAM-CNC data, which reduces the dependence of the manufacturing quality on the CAD/CAM calculation tolerance and improves the surface quality and shape accuracy.

DXF READER

- Faster from the drawing to the workpiece. Easy transfer of CAD data into programming by DXF reader (optional article no. 3584014).



**SIEMENS
SAFETY**

INTEGRATED

SET UP WORK WITH OPEN DOORS

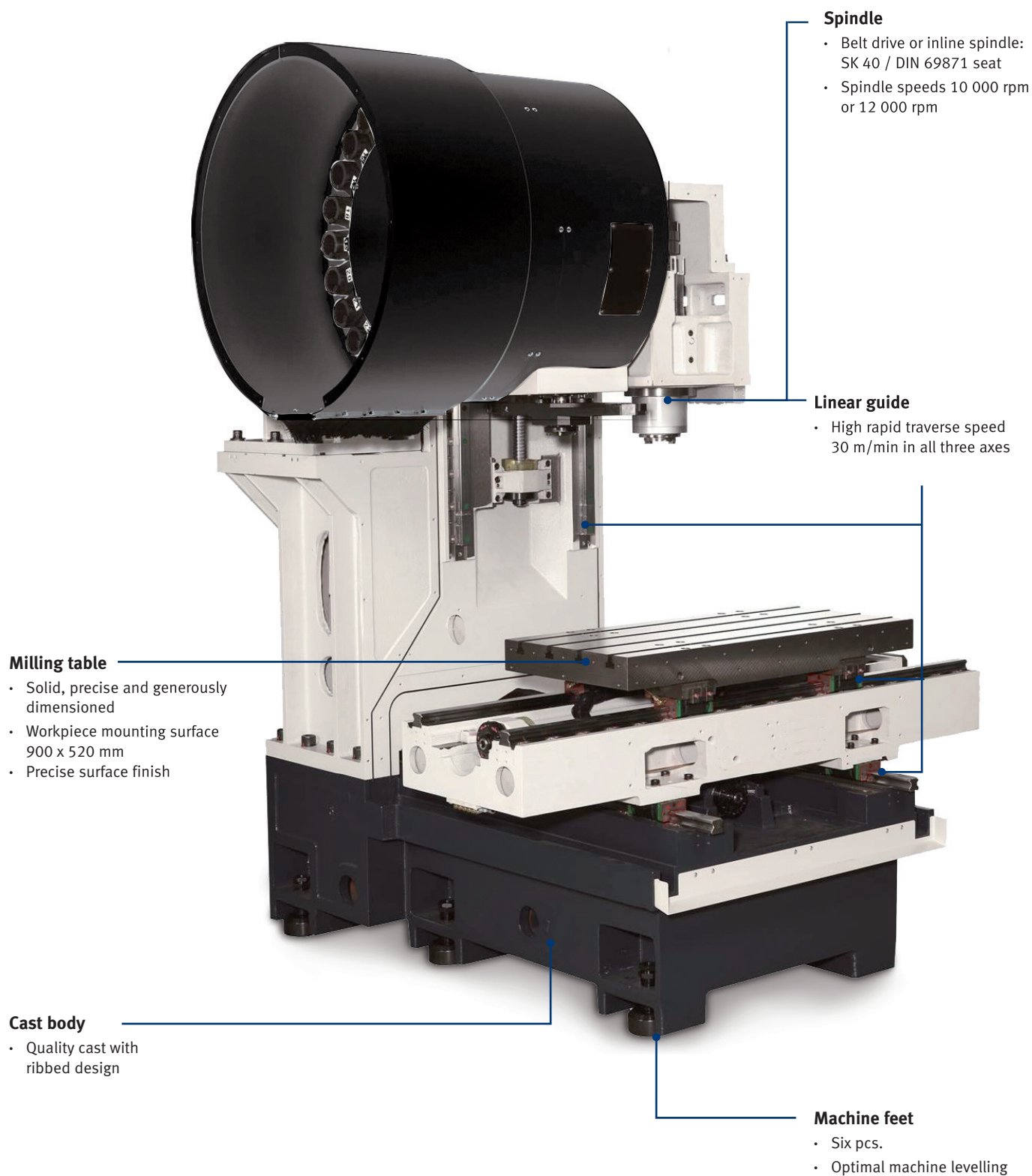
Functional safety also provides protection against high costs!

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

OVERALL PACKAGE

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



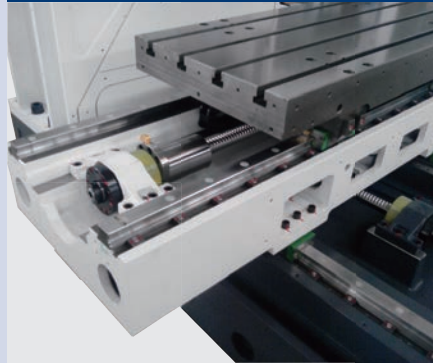


CLEANING GUN



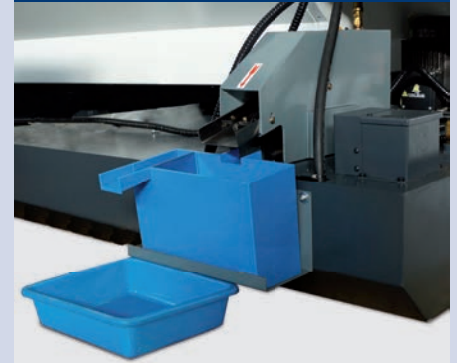
- Easy cleaning of the workspace

BALL SCREWS



- Accuracy class C3
- For high precision and repetition accuracy
- Coupled servo drive on the ballscrew

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 1.27 Watt each
- Tank capacity 370 litres

CENTRAL LUBRICATION SYSTEM



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

TOOL MEASURING / WORKPIECE MEASURING

| | | | |
|--|--|--|--|
| 3511290604* | | BLUM TC52IR Universal measuring probe | <ul style="list-style-type: none"> Switching point repetition accuracy from 0, 3µm 2 at 2 m/ min. measuring speed Wear-free and durably stable Very compact probe with 40 mm diameter |
| 3511290605* | | BLUM ZX-Speed 3-D probe | <ul style="list-style-type: none"> Universal 3-D probe for toolmaking and tool break monitoring |
| ➔ For information on Blum workpiece/tool measuring, also ex warehouse Germany see page 275 | | | |
| 3511290620* | | Renishaw NC 4 Laser system for tool measurement | <ul style="list-style-type: none"> NC4 zero-contact tool control system is a high-precision, extremely fast solution for tool measurement and breakage checking |
| 3511290621* | | Renishaw OMP 60 Probe with optical signal transmission | <ul style="list-style-type: none"> For checking and setting up workpieces on processing centres Compact, touch-actuated 3D probe. Reliably modulated, optical signal transmission. Excellent measuring performance for less scrap and more profit. |
| 3511290622* | | Renishaw TS 27R Probe for tactile tool measurement | <ul style="list-style-type: none"> Tool breakage check Compact, tactile 3-D tool probe with wired signal transmission |
| ➔ For information on Renishaw tool measuring, also ex warehouse Germany see page 288 | | | |

NEW

3-D PRINTING

| | | | |
|---|--|-------------------------------|---|
| 3562411 | | 3-D printing interface | <ul style="list-style-type: none"> Plug connector on milling head for OPTImill 3X/5X printing head Power supply is installed in control cabinet Prepared for open circuit monitoring and filament holder |
| ➔ For information on 3-D printing and accessories see 266 | | | |

MISCELLANEOUS

| | | | | |
|-------------|--|-------------------------------|--|--------------------------------|
| 3536109 | 1 | Starter set SK 40 / DIN 69871 | ➡ For Information on the starter set see on page 284 | |
| 3511290100* | | Coolant through spindle (CTS) | • Integrated unit, 20 bar pump pressure | An extraction unit is required |
| 3511290102* | • External unit, pump pressure 20 bars, tank capacity 165 litres, delivery rate 30 l/min | | | |
| 3511290104* | • External unit, pump pressure 70 bars, tank capacity 165 litres, delivery rate 29 l/min | | | |
| 3511290402* | 3 | Air conditioner | • Instead of the standard equipment › heat exchanger | |
| 3511290502* | 4 | Power transformer | • for custom voltage | |

FOURTH AXIS AND 5-AXIS ROTARY/SWIVEL TABLE

| | | | |
|--|---|---|---|
| 3511290201* | 5 | Fourth axis rotary indexing table complete set | <ul style="list-style-type: none"> Preparation |
| 3511290210* | | | <ul style="list-style-type: none"> Three-jaw lathe chuck Ø 100 mm, Table diameter 120 mm Tailstock Motor from SIEMENS, assembly |
| 3511290202* | | | <ul style="list-style-type: none"> Preparation |
| 3511290250* | 6 | 5-axis rotary/swivelling table | <ul style="list-style-type: none"> Three-jaw lathe chuck Ø 100 mm, Possible machining Ø 120 mm Tailstock Motor from SIEMENS, assembly |
| ➔ For details on the fourth axis for the rotary indexing table and 5-axis rotary/swivelling table see page 276 | | | |

SOFTWARE

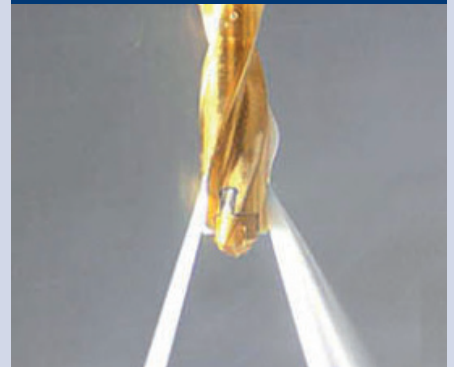
| | | | |
|---------|---|---|--|
| 3584014 | 7 | DXF Reader for SIEMENS SINUMERIK controls | <ul style="list-style-type: none"> From version 4.7 For importing DXF files Hiding graphics layers Automatic contour tracking |
| 3584012 | 8 | Top surface for SIEMENS SINUMERIK control | <ul style="list-style-type: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

1 STARTER SET SK 40 / DIN 69871



- Milling head holder with 27 mm collet 1
- Quick-action drill chuck 1- 13 mm 2
- 2 each Weldon 6 mm and 20 mm 3
- 1 each Weldon 8/10/12/16 mm 4
- Adapter SK 40 to MT 3 5
- 4 pcs. Collet chuck holder ER 32 6
- Collet spanner ER 32 7
- 18-part collet set ER 32 8
- Assembly and tool adjustment gauge 9
- Height-adjuster 10
- Taper squeegee 11
- Pull stud 12

2 COOLANT THROUGH SPINDLE



- Guarantees optimal service life
- Optionally with internal or external unit
- Pump pressure 20 bars or 70 bars

3 AIR CONDITIONER



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

4 POWER TRANSFORMER



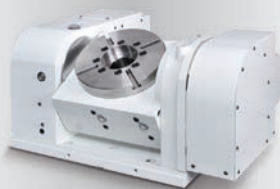
- For custom voltage
- Weight 147 kg

5 FOURTH AXIS



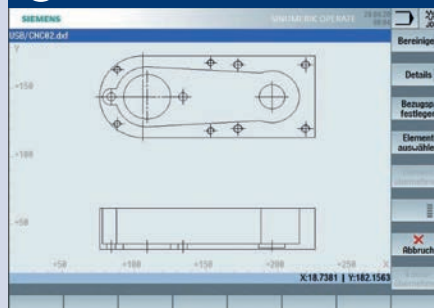
- Table diameter 120 mm
- Vertical table centre height 115 mm
- Total vertical height without motor cover 193 mm
- Horizontal table height 170 mm

6 FIFTH AXIS



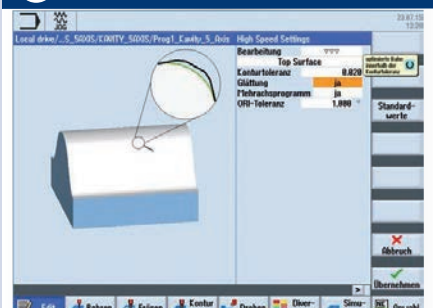
- Compact design
- Possible machining Ø 120 mm
- Vertical table centre height 150 mm
- Vertical table overall height 235 mm
- Through hole diameter 30^{H7}mm
- Slot nut width 14^{H7}mm

7 DXF READER



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

8 TOP SURFACE



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

F 310HSC

Power, speed, precision and a long service life

SIEMENS SINUMERIK 828D mit **PPU 290** and 15.6 inch touchscreen

- Heavy duty version
- High productivity
- High reliability
- Torsion free machine base thanks to strong ribbing
- Profile rail with recirculating rollers on all axes for high load bearing capacity
- High-torque servo drives mounted directly on the ball screws on all three axes
- Telescopic guide rail covers on all three axes
- Main spindle SK40 up to 10 000 rpm with belt drive and up to 12 000 rpm with inline spindle
- Solid, precision milling table with four T-grooves, generously dimensioned with precision surface finish
- Portable, electronic handwheel with confirm button and emergency stop button. Substantially facilitates running in of programs
- Tool changer, double arm grab with 30 tool slots
- Precision ground, prestressed, high-performance ball screws (Ø 40 mm x P16 x C3) on all axes
- Coolant unit with 520 litre coolant tank, including chip flushing system and cleaning gun
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- RJ45 plug-in connection, USB connection and 230 V power connection
- Closed switch cabinet with integrated heat exchanger; ensures optimal temperature even in case of high ambient temperatures; prevents dirt particle penetration
- Oil Separator
- Machine lamp in the workspace
- Including two years **SIEMENS** warranty
- **SIEMENS** warranty extension on page 97
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



TECHNICAL DATA

| Model | F 310HSC | |
|--|----------------------------------|----------------|
| Article no. | 3511232 | |
| Optional spindle | Belt drive | Inline spindle |
| | - | 3511290005** |
| | | |
| Machine data | | |
| Electrical connection | 400 V / 3 Ph ~50 Hz | |
| Total connected load | 40 kVA | 56 kVA |
| Milling spindle | | |
| Drive motor S1 operation | 11 kW | 20 kW |
| Drive motor torque S1 | 70 Nm | 96 Nm |
| Drive motor S6 30 % operation | 31.4 kW | 50.3 kW |
| Torque drive motor S6 30 % operation | 200 Nm | 240 Nm |
| Spindle seat | SK 40 DIN 69871 | |
| Cooling lubricant system | | |
| Motor - coolant pumps, 3 pcs. | 2 pumps 930 W and 1 pump 850 W | |
| Delivery rate max. | 155 l/min. | |
| Tank capacity | 520 litres | |
| End mill size | | |
| Cutter head size max. | Ø 63 mm | |
| Max. shaft milling cutter size | Ø 32 mm | |
| Milling precision | | |
| Repeat accuracy | ± 0.005 mm | |
| Positioning accuracy | ± 0.005 mm | |
| Tool changer | | |
| Type | Double arm grab | |
| Number of tool slots | 30 tools | |
| Max. tool diameter | Ø 80 mm | |
| Max. tool diameter (tools slots beside not occupied) | Ø 125 mm | |
| Tool length | 300 mm | |
| Max. tool weight | 8 kg | |
| Tool change time T-T | 2 seconds | |
| Traverse paths | | |
| X axis | 1 050 mm | |
| Y axis | 600 mm | |
| Z axis | 600 mm | |
| Axis feed drive | | |
| Rapid traverse X/Y/Z axis | 30 m/min. | |
| Motor torque | | |
| X/Y/Z axis | 18 Nm / 18 Nm / 27 Nm | |
| Feed forces | | |
| X/Y/Z axis | 6.7 kN / 6.7 kN / 10 kN | |
| Speed range | | |
| Speeds* | 10 000 rpm | 12 000 rpm |
| Pneumatics | | |
| Compressed air | 6 bar | |
| Milling table | | |
| Clearance spindle to table | 100 - 750 mm | |
| Table length x width | 1 200 x 600 mm | |
| T-slot size / amount / distance | 16 mm / 6 / 100 mm | |
| Max. load of working table | 800 kg | |
| Dimensions | | |
| Length (with chip conveyor) x width x height | 3 060 (4 319) x 2 286 x 2 928 mm | |
| Overall weight | 7 000 kg | |

| Sinumerik 828D system software | SW 28x |
|--------------------------------|--------|
| CNC memory | 8 MB |
| Cycle 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

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

SINUMERIK 828D

The power package in the compact class of CNC controls

Boosting productivity and precision in manufacturing

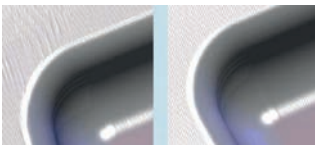
Robust hardware architecture and intelligent control algorithms as well as top-class drive and motor technology ensure the highest dynamics and precision during machining.

Advanced software-controlled compensation functions ensure additional quality in surface machining and high availability of the machine tool.

With SINUMERIK Operate, all machining technologies, from standard to complex, can be operated intuitively and with a uniform "look & feel".

ADVANCED SURFACE

- Thanks to the new Advanced Surface movement guide, it can also be used for tool and mould making.



Perfect surface quality through reproducible results in adjacent milling paths (right picture)

Multitouch operation with PPU 290

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

User-friendly

- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function
- Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)
- Proximity/distance sensor for smart display control

Rugged and maintenance-free

- Front panel made of die-cast magnesium with scratchproof glass front
- Can be operated while wearing gloves
- NV RAM memory technology without buffer battery
- Fanless and hard diskless design

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

TOP SURFACE

- Siemens shows a further development in terms of surface quality in mould making with Top Surface (optional article no. 3584012).
- The function optimises the CAD/CAM-CNC data, which reduces the dependence of the manufacturing quality on the CAD/CAM calculation tolerance and improves the surface quality and shape accuracy.

DXF READER

- Faster from the drawing to the workpiece. Easy transfer of CAD data into programming by DXF reader (optional article no. 3584014).



SIEMENS SAFETY INTEGRATED

SET UP WORK WITH OPEN DOORS

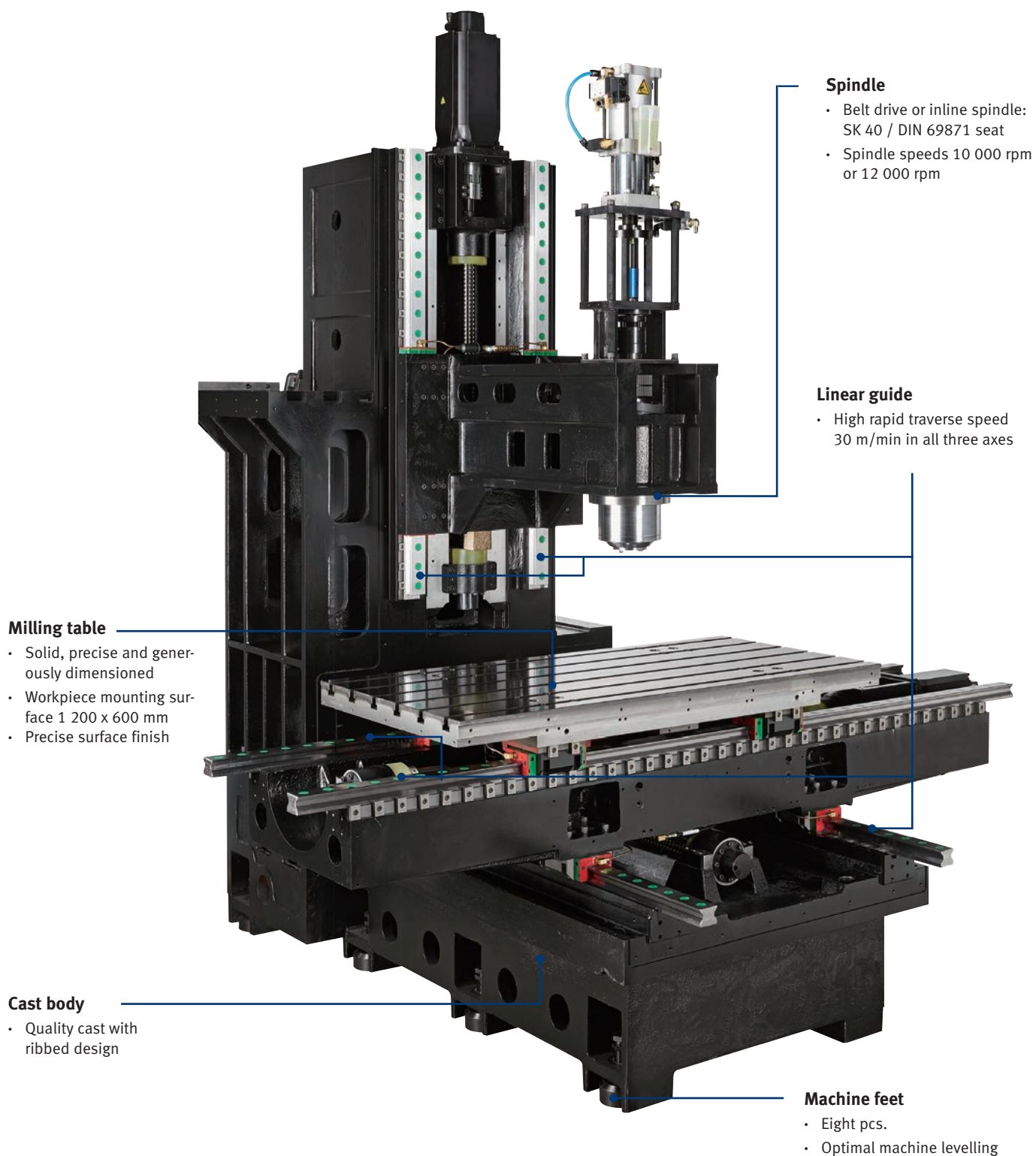
Functional safety also provides protection against high costs!

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

OVERALL PACKAGE

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





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
- Coupled servo drive on the ballscrew

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



- Two coolant pumps with 930 watts and one coolant pump with 850 watts
- Tank capacity 860 litres

CENTRAL LUBRICATION SYSTEM



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

TOOL MEASURING / WORKPIECE MEASURING

| | | | |
|--|--|--|--|
| 3511290604* | | BLUM TC52IR Universal measuring probe | <ul style="list-style-type: none"> Switching point repetition accuracy from 0, 3µm 2 at 2 m/ min. measuring speed Wear-free and durably stable Very compact probe with 40 mm diameter |
| 3511290605* | | BLUM ZX-Speed 3-D probe | <ul style="list-style-type: none"> Universal 3-D probe for toolmaking and tool break monitoring |
| ➔ For information on Blum workpiece/tool measuring, also ex warehouse Germany see page 275 | | | |
| 3511290620* | | Renishaw NC 4 Laser system for tool measurement | <ul style="list-style-type: none"> NC4 zero-contact tool control system is a high-precision, extremely fast solution for tool measurement and breakage checking |
| 3511290621* | | Renishaw OMP 60 Probe with optical signal transmission | <ul style="list-style-type: none"> For checking and setting up workpieces on processing centres Compact, touch-actuated 3D probe. Reliably modulated, optical signal transmission. Excellent measuring performance for less scrap and more profit. |
| 3511290622* | | Renishaw TS 27R Probe for tactile tool measurement | <ul style="list-style-type: none"> Tool breakage check Compact, tactile 3-D tool probe with wired signal transmission |
| ➔ For information on the Renishaw laser system and probe, also ex warehouse Germany see page 288 | | | |

NEW

3-D PRINTING

| | | | |
|---|---|-------------------------------|---|
| 3562411 | 1 | 3-D printing interface | <ul style="list-style-type: none"> Preparation |
| ➔ For information on 3-D printing and accessories see 266 | | | |

MISCELLANEOUS

| | | | | |
|-------------|---|-------------------------------|---|--------------------------------|
| 3536109 | 2 | Starter set SK 40 / DIN 69871 | ➡ For Information on the starter set see on page 284 | |
| 3511290100* | | | <div>• Integrated unit, 20 bar pump pressure</div> | An extraction unit is required |
| 3511290102* | <div>• External unit, pump pressure 20 bars, tank capacity 165 litres, delivery rate 30 l/min</div> | | | |
| 3511290104* | <div>• External unit, pump pressure 70 bars, tank capacity 165 litres, delivery rate 29 l/min</div> | | | |
| 3511290110 | 3 | Coolant through spindle (CTS) | <div>• External unit with paper filter, Pump pressure 20 bars, tank capacity 320 litres, recommended for aluminium or cast iron</div> | |
| 3511290112 | | | <div>• External unit with paper filter, programmable, pump pressure 70 bars, tank capacity 320 litres, recommended for aluminium or cast iron</div> | |
| 3512904101 | | Automatic side door | <div>• for robot loading, including assembly</div> | |
| 3511290402* | 4 | Air conditioner | <div>• Instead of the standard equipment › heat exchanger</div> | |
| 3511290502* | 5 | Power transformer | <div>• for special voltages</div> | |

NEW

FOURTH AXIS AND 5-AXIS ROTARY/SWIVEL TABLE

| | | | |
|--|---|-----------------------------------|--|
| 3511290201* | 6 | Fourth axis rotary indexing table | <ul style="list-style-type: none">• Preparation |
| 3511290210* | | | <ul style="list-style-type: none">• Three-jaw lathe chuck Ø 100 mm, Table diameter 120 mm• Tailstock, SIEMENS Motor, assembly |
| 3511290202* | | | <ul style="list-style-type: none">• Preparation |
| 3511290250* | 7 | 5-axis rotary/swivelling table | <ul style="list-style-type: none">• Three-jaw lathe chuck Ø 100 mm, Tailstock, SIEMENS motor, assembly• Possible machining diameter 120 mm |
| 3511290251* | | | <ul style="list-style-type: none">• Three-jaw lathe chuck Ø 200 mm, Tailstock, SIEMENS motor, assembly• Possible machining diameter 200 mm |
| <div>➔ For details on the fourth axis for the rotary indexing table and 5-axis rotary/swivelling table see from page 278</div> | | | |

SOFTWARE

| | | | |
|---------|---|--|---|
| 3584014 | | DXF Reader for SIEMENS SINUMERIK controls | <ul style="list-style-type: none"> From version 4.7 Import of DXF files, hiding of graphic layers |
| 3584012 | 8 | Top surface for SIEMENS SINUMERIK control | <ul style="list-style-type: none"> The NC data from the CAM system are optimised online during processing |

1 3-D PRINTING INTERFACE



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

2 STARTER SET SK 40 / DIN 69871



- Milling head holder with 27 mm seat 1
- Quick-action drill chuck 1- 13 mm 2
- 2 each Weldon 6 mm and 20 mm 3
- 1 each Weldon 8/10/12/16 mm 4
- Adapter SK 40 to MT 3 4
- 4 pcs. Collet chuck holder ER 32 5
- Collet spanner ER 32 6
- 18-part collet set ER 32 7
- Assembly and tool adjustment gauge 8
- Height-adjuster 9
- Taper squeegee 10
- Pull stud 11

3 EXTERNAL CTS



Fig. External unit with paper filter

- Optionally with 20 bar or 70 bar pressure
- Also with paper filter, oil skimmer
- 25µm paper filter
- Coolant cooler
- Tank capacity 165 litres or 320 litres

4 AIR CONDITIONER



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

5 POWER TRANSFORMER



- For custom voltage
- Weight 147 kg

6 FOURTH AXIS



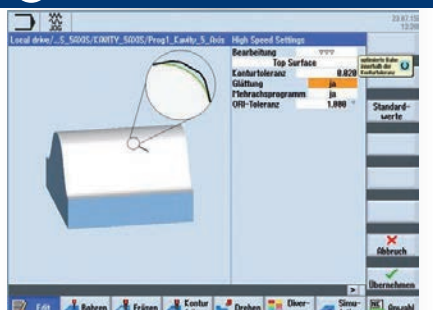
- Table diameter 120 mm
- Vertical table centre height 115 mm
- Total vertical height without motor cover 193 mm
- Horizontal table height 170 mm
- Workpiece weight horizontal / vertical max. 75 / 35 kg

7 FIFTH AXIS



- Possible machining-Ø optionally 120 mm or 200 mm
- Vertical table centre height 150 resp. 355 mm
- Vertical overall height 235 resp. 360 mm
- Through hole diameter 30^{H7}mm resp. 35^{H7}mm
- Slot nut width 14^{H7}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 410HSC

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

SIEMENS SINUMERIK 828D mit **PPU 290** and 15.6 inch touchscreen

- Heavy duty version
- High productivity
- High reliability
- Torsion free machine base thanks to strong ribbing
- Profile rail with recirculating rollers on all axes for high load bearing capacity
- High-torque servo drives mounted directly on the ball screws on all three axes
- Telescopic guide rail covers on all three axes
- Main spindle SK40 up to 10 000 rpm with belt drive and up to 12 000 rpm with inline spindle
- Solid, precision milling table with four T-grooves, generously dimensioned with precision surface finish
- Portable, electronic handwheel with confirm button and emergency stop button. Substantially facilitates running in of programs
- Tool changer, double arm grab with 30 tool slots
- Precision ground, prestressed, high-performance ball screws (Ø 40 mm x P16 x C3) on all axes
- Coolant unit with 80 litre coolant tank, including chip flushing system and cleaning gun
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- RJ45 plug-in connection, USB connection and 230 V power connection
- Closed switch cabinet with integrated heat exchanger; ensures optimal temperature even in case of high ambient temperatures; prevents dirt particle penetration
- Oil Separator
- Machine lamp in the workspace
- Including two years **SIEMENS** warranty
- **SIEMENS** warranty extension on page 97
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



TECHNICAL DATA

| Model | F 410HSC | |
|--|-------------------------------------|----------------|
| Article no. | 3511242 | |
| Optional spindles | Belt drive | Inline spindle |
| | - | 3511290005** |
| | | |
| Machine data | | |
| Electrical connection | 400 V / 3 Ph ~50 Hz | |
| Total connected load | 40 kVA | 56 kVA |
| Milling spindle | | |
| Drive motor S1 operation | 11 kW | 20 kW |
| Drive motor torque S1 | 70 Nm | 96 Nm |
| Drive motor S6 30 % operation | 31.4 kW | 50.3 kW |
| Torque drive motor S6 30 % operation | 200 Nm | 240 Nm |
| Spindle seat | SK 40 DIN 69871 | |
| Cooling lubricant system | | |
| Motor - coolant pumps, 3 pcs. | each 850 Watts | |
| Tank capacity | 860 litres | |
| End mill size | | |
| Cutter head size max. | Ø 63 mm | |
| Max. shaft milling cutter size | Ø 32 mm | |
| Milling precision | | |
| Repeat accuracy | ± 0.005 mm | |
| Positioning accuracy | ± 0.005 mm | |
| Tool changer | | |
| Type | Double arm grab | |
| Number of tool slots | 30 tools | |
| Max. tool diameter | Ø 80 mm | |
| Max. tool diameter (tools slots beside not occupied) | Ø 125 mm | |
| Tool length | 300 mm | |
| Max. tool weight | 8 kg | |
| Tool change time T-T | 2 seconds | |
| Traverse paths | | |
| X axis | 1 200 mm | |
| Y axis | 730 mm | |
| Z axis | 650 mm | |
| Axis feed drive | | |
| Rapid traverse X/Y/Z axis | 30 m/min. | |
| Motor torque | | |
| X/Y/Z axis | 18 Nm / 27 Nm / 36 Nm | |
| Feed forces | | |
| X/Y/Z axis | 6.7 kN / 10.1 kN / 13.5 kN | |
| Speed range | | |
| Speeds* | 10 000 rpm | 12 000 rpm |
| Pneumatics | | |
| Compressed air | 6 bar | |
| Milling table | | |
| Clearance spindle to table | 100 - 750 mm | |
| Table length x width | 1 400 x 710 mm | |
| T-slot size / amount / distance | 18 mm / 7 / 100 mm | |
| Max. load of working table | 1 000 kg | |
| Dimensions | | |
| 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 |
| Cycle change time | 1 ms |
| Look Ahead | 150 |
| Number of tools | 512 |

SINUMERIK 828D

The power package in the compact class of CNC controls

Boosting productivity and precision in manufacturing

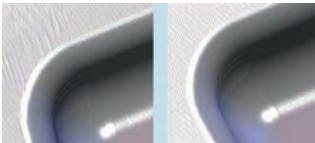
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- Thanks to the new Advanced Surface movement guide, it can also be used for tool and mould making.



Perfect surface quality through reproducible results in adjacent milling paths (right picture)

Multitouch operation with PPU 290

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

User-friendly

- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function
- Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)
- Proximity/distance sensor for smart display control

Rugged and maintenance-free

- Front panel made of die-cast magnesium with scratchproof glass front
- Can be operated while wearing gloves
- NV RAM memory technology without buffer battery
- Fanless and hard diskless design

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

TOP SURFACE

- Siemens shows a further development in terms of surface quality in mould making with Top Surface (optional article no. 3584012).
- The function optimises the CAD/CAM-CNC data, which reduces the dependence of the manufacturing quality on the CAD/CAM calculation tolerance and improves the surface quality and shape accuracy.

DXF READER

- Faster from the drawing to the workpiece. Easy transfer of CAD data into programming by DXF reader (optional article no. 3584014).



**SIEMENS
SAFETY**

INTEGRATED

SET UP WORK WITH OPEN DOORS

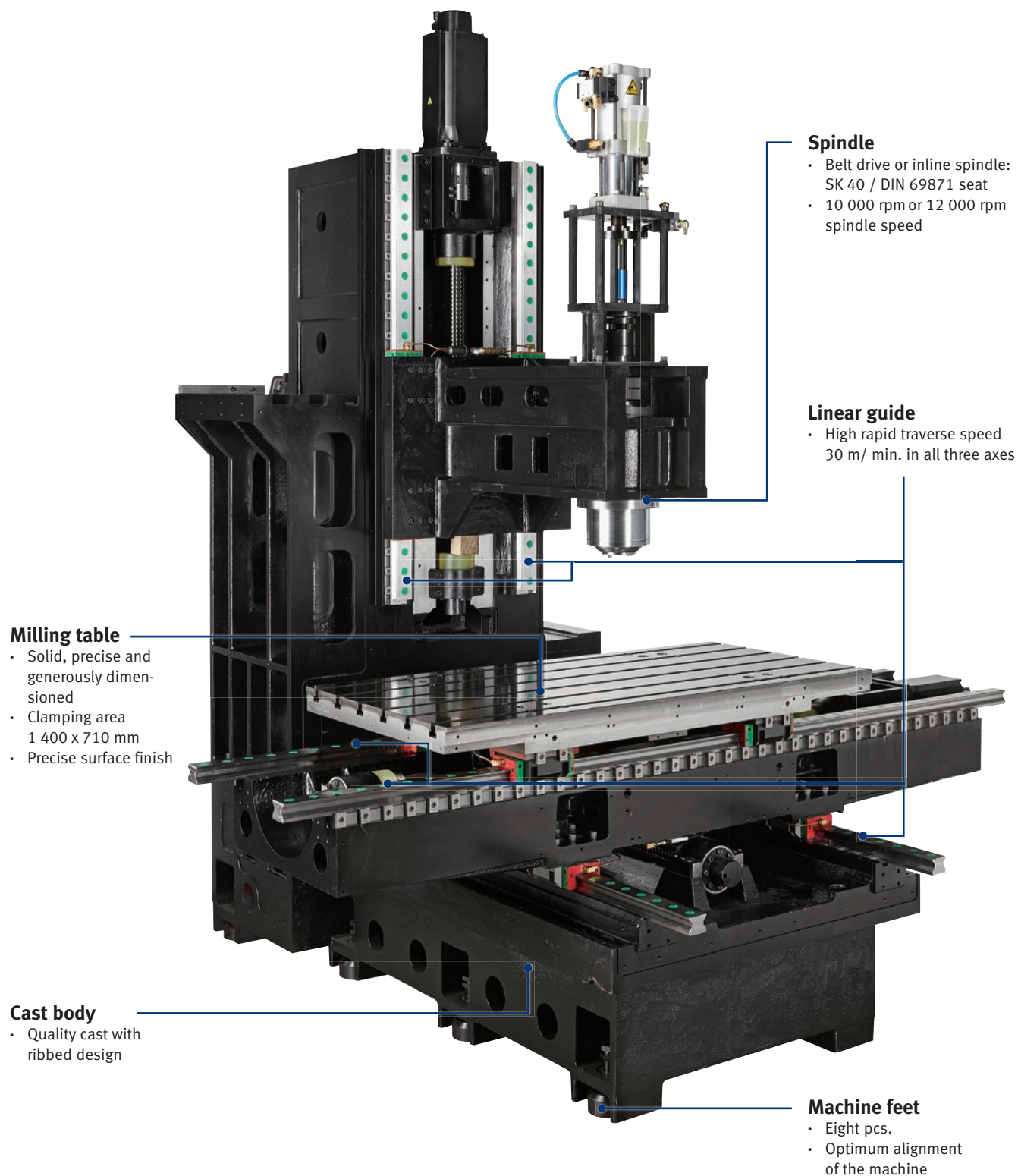
Functional safety also provides protection against high costs!

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

OVERALL PACKAGE

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





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
- Coupled servo drive on the ballscrew

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

TOOL MEASURING / WORKPIECE MEASURING

| | | | |
|--|--|--|--|
| 3511290604* | | BLUM TC52IR Universal measuring probe | <ul style="list-style-type: none"> Switching point repetition accuracy from 0, 3µm 2 at 2 m/ min. measuring speed Wear-free and durably stable Very compact probe with 40 mm diameter |
| 3511290605* | | BLUM ZX-Speed 3-D probe | <ul style="list-style-type: none"> Universal 3-D probe for toolmaking and tool break monitoring |
| ➡ For information on Blum workpiece/tool measuring, also ex warehouse Germany see page 275 | | | |
| 3511290620* | | Renishaw NC 4 Laser system for tool measurement | <ul style="list-style-type: none"> NC4 zero-contact tool control system is a high-precision, extremely fast solution for tool measurement and breakage checking |
| 3511290621* | | Renishaw OMP 60 Probe with optical signal transmission | <ul style="list-style-type: none"> For checking and setting up workpieces on processing centres Compact, touch-actuated 3D probe. Reliably modulated, optical signal transmission. |
| 3511290622* | | Renishaw TS 27R Probe for tactile tool measurement | <ul style="list-style-type: none"> Tool breakage check Compact, tactile 3-D tool probe with wired signal transmission |
| ➡ For information on the Renishaw laser system and probe, also ex warehouse Germany see page 288 | | | |

NEW


3-D PRINTING

| | | | |
|---|---|-------------------------------|---|
| 3562411 | 1 | 3-D printing interface | <ul style="list-style-type: none"> Plug connector on milling head for OPTImill 3X/5X printing head Power supply is installed in control cabinet Prepared for open circuit monitoring and filament holder |
| ➡ For information on 3-D printing and accessories see 266 | | | |

MISCELLANEOUS

| | | | | |
|-------------|--|-------------------------------|--|---|
| 3536109 | 2 | Starter set SK 40 / DIN 69871 | ➡ For Information on the starter set see on page 284 | |
| 3511290100* | | 3 | Coolant through spindle (CTS) | • Integrated unit, 20 bar pump pressure |
| 3511290102* | • External unit, pump pressure 20 bars, delivery rate 30 l/min | | | |
| 3511290104* | • External unit, pump pressure 70 bars, tank capacity 165 litres, delivery rate 29 l/min | | | |
| 3511290110 | • External unit with paper filter, Pump pressure 20 bars, tank capacity 320 litres, recommended for aluminium or cast iron | | | |
| 3511290112 | • External unit with paper filter, programmable, pump pressure 70 bars, tank capacity 320 litres, recommended for aluminium or cast iron | | | |
| 3511290402* | 4 | Air conditioner | • Instead of the standard equipment › heat exchanger | |
| 3511290502* | 5 | Power transformer | • for custom voltage | |

FOURTH AXIS AND 5-AXIS ROTARY/SWIVEL TABLE

| | | | |
|---|---|--|--|
| 3511290201* | 6 | Fourth axis rotary indexing table complete set | <ul style="list-style-type: none">• Preparation |
| 3511290210* | | | <ul style="list-style-type: none">• Three-jaw lathe chuck Ø 100 mm, Tailstock, SIEMENS motor, assembly• Table diameter 120 mm |
| 3511290211* | | | <ul style="list-style-type: none">• Three-jaw lathe chuck Ø 250 mm, Tailstock, SIEMENS motor, assembly• Table diameter 250 mm |
| 3511290202* | | | <ul style="list-style-type: none">• Preparation |
| 3511290250* | 7 | 5-axis rotary/swivelling table | <ul style="list-style-type: none">• Three-jaw lathe chuck Ø 100 mm, Tailstock, SIEMENS motor, assembly• Possible machining diameter 120 mm |
| 3511290251* | | | <ul style="list-style-type: none">• Three-jaw lathe chuck Ø 200 mm, Tailstock, SIEMENS motor, assembly• Possible machining diameter 200 mm |
|  For details on the fourth axis for the rotary indexing table and 5-axis rotary/swivelling table see from page 278 | | | |

SOFTWARE

| | | | |
|---------|---|---|---|
| 3584014 | | DXF Reader for SIEMENS SINUMERIK controls | <ul style="list-style-type: none"> From version 4.7 For importing DXF files Hiding of graphic layers, automatic contour tracing, arbitrary workpiece zero point per contour/drilling point |
| 3584012 | 8 | Top surface for SIEMENS SINUMERIK control | <ul style="list-style-type: none"> From version 4.7 Optimal workpiece surfaces at highest machining speeds thanks to smart motion guidance |

1 3-D PRINTING INTERFACE



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

2 STARTER SET SK 40 / DIN 69871



- Milling head holder with 27 mm collet (1)
- Quick-action drill chuck 1- 13 mm (2)
- 2 each Weldon 6 mm and 20 mm (3)
- 1 each Weldon 8/10/12/16 mm (4)
- Adapter SK 40 to MT 3 (5)
- Collet spanner ER 32 (6)
- 18-part collet set ER 32 (7)
- Assembly and tool adjustment gauge (8)
- Height-adjuster (9)
- Taper squeegee (10)
- Pull stud (11)

3 EXTERNAL CTS



Fig. External unit with paper filter

- Optionally with 20 bars or 70 bars pump pressure
- Cartridge filter, oil skimmer
- 25µm paper filter
- Coolant cooler
- Tank capacity 320 litres

4 AIR CONDITIONER



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

5 POWER TRANSFORMER



- For custom voltage
- Weight 147 kg

6 FOURTH AXIS



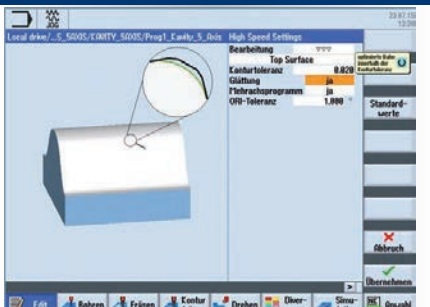
- Table diameter 120 mm
- Vertical table centre height 115 mm
- Total vertical height without motor cover 193 mm
- Horizontal table height 170 mm
- Workpiece weight horizontal / vertical max. 75 / 35 kg

7 FIFTH AXIS



- Possible machining-Ø optionally 120 mm or 200 mm
- Vertical table centre height 150 resp. 355 mm
- Vertical overall height 235 resp. 360 mm
- Through hole diameter 30^{H7}mm resp. 35^{H7}mm
- Slot nut width 14^{H7}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 610HSC

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

SIEMENS SINUMERIK 828D mit **PPU 290** and 15.6 inch touchscreen

- Heavy duty version
- High productivity
- High reliability
- All components and the entire machine frame were analysed with ANSYS Mechanical (= Finite Element Analysis (FEA) tool) to solve difficult mechanical problems in the complex product architecture
- Profile rail with recirculating rollers on all axes for high load bearing capacity
- High-torque servo drives mounted directly on the ball screws on all three axes
- Telescopic guide rail covers on all three axes
- Solid, precision milling table with five T-grooves, generously dimensioned with precision surface finish
- Portable, electronic handwheel with confirm button and emergency stop button. Substantially facilitates running in of programs
- Tool changer, double arm grab with 30 tool slots
- Precision ground, pre-stressed, high-performance ball screws on all axes
- The machine hood is opened to load the machine with a crane
- Chip conveyor, belt type ensures efficient chip discharge
- RJ45 plug-in connection, USB connection and power connection 230 V
- Coolant unit with 980 litre coolant tank, including chip flushing system and 4 bars cleaning gun
- Closed switch cabinet with integrated heat exchanger; ensures optimal temperature even in case of high ambient temperatures; prevents dirt particle penetration
- Oil Separator
- Machine lamp in the workspace
- Including two years **SIEMENS** warranty
- **SIEMENS** warranty extension on page 113
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



TECHNICAL DATA

| Model | F 610HSC |
|--|----------------------------------|
| Article no. | 3511260 |
| Spindle | Inline spindle |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 50 kVA |
| Milling spindle | |
| Drive motor S1 operation | 20 kW |
| Drive motor torque S1 | 133.7 Nm |
| Drive motor S6 30 % operation | 30 kW |
| Torque drive motor S6 30 % operation | 200.6 Nm |
| Spindle seat | ISO 40/DIN 69871 |
| Distance spindle to Z axis | 825 mm |
| Cooling lubricant system | |
| Coolant pump motor | 1.5 kW |
| Tank capacity | 980 litres |
| End mill size | |
| Cutter head size max. | Ø 63 mm |
| Max. shaft milling cutter size | Ø 32 mm |
| Milling precision | |
| Repeat accuracy | ± 0.005 mm |
| Positioning accuracy | ± 0.005 mm |
| Tool changer | |
| Type | Double arm grab |
| Number of tool slots | 30 tools |
| Max. tool diameter | Ø 75 mm |
| Max. tool diameter (tools slots beside not occupied) | Ø 125 mm |
| Tool length | 300 mm |
| Max. tool weight | 8 kg |
| Tool change time T-T | 1.94 seconds |
| Traverse paths | |
| X axis | 1,700 mm |
| Y axis | 800 mm |
| Z axis | 800 mm |
| Axis feed drive | |
| Rapid traverse X/Y/Z axis | 30 m/min. |
| Motor torque | |
| X/Y/Z axis | 18 Nm / 27 Nm / 36 Nm |
| Feed forces | |
| X/Y/Z axis | 6,7 kN / 10 kN / 13,4 kN |
| Speed range | |
| Speeds* | 12 000 rpm |
| Pneumatics | |
| Compressed air | 6 bar |
| Milling table | |
| Clearance spindle to table | 100 - 900 mm |
| Table length x width | 1 700 x 700 mm |
| T-slot size / amount / distance | 18 mm / 5 / 125 mm |
| Max. load of working table | 1 500 kg |
| Dimensions | |
| Length (with chip conveyor) x width x height | 4 400 (5 735) x 4 400 x 3 248 mm |
| Overall weight | 10 500 kg |

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

SINUMERIK 828D

The power package in the compact class of CNC controls

Boosting productivity and precision in manufacturing

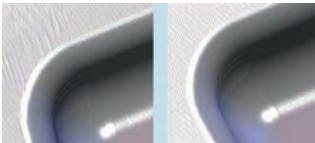
Robust hardware architecture and intelligent control algorithms as well as top-class drive and motor technology ensure the highest dynamics and precision during machining.

Advanced software-controlled compensation functions ensure additional quality in surface machining and high availability of the machine tool.

With SINUMERIK Operate, all machining technologies, from standard to complex, can be operated intuitively and with a uniform "look & feel".

ADVANCED SURFACE

- Thanks to the new Advanced Surface movement guide, it can also be used for tool and mould making.



Perfect surface quality through reproducible results in adjacent milling paths (right picture)

Multitouch operation with PPU 290

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

User-friendly

- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function
- Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)
- Proximity/distance sensor for smart display control

Rugged and maintenance-free

- Front panel made of die-cast magnesium with scratchproof glass front
- Can be operated while wearing gloves
- NV RAM memory technology without buffer battery
- Fanless and hard diskless design

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

TOP SURFACE

- Siemens shows a further development in terms of surface quality in mould making with Top Surface (optional article no. 3584012).
- The function optimises the CAD/CAM-CNC data, which reduces the dependence of the manufacturing quality on the CAD/CAM calculation tolerance and improves the surface quality and shape accuracy.

DXF READER

- Faster from the drawing to the workpiece. Easy transfer of CAD data into programming by DXF reader (optional article no. 3584014).



**SIEMENS
SAFETY**

INTEGRATED

SET UP WORK WITH OPEN DOORS

Functional safety also provides protection against high costs!

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

OVERALL PACKAGE

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



Spindle

- Directly coupled
- High positioning accuracy

Spindle

- Single-piece spindle stock for high stability
- Belt drive:
- Spindle speed 12 000 rpm

Linear guide

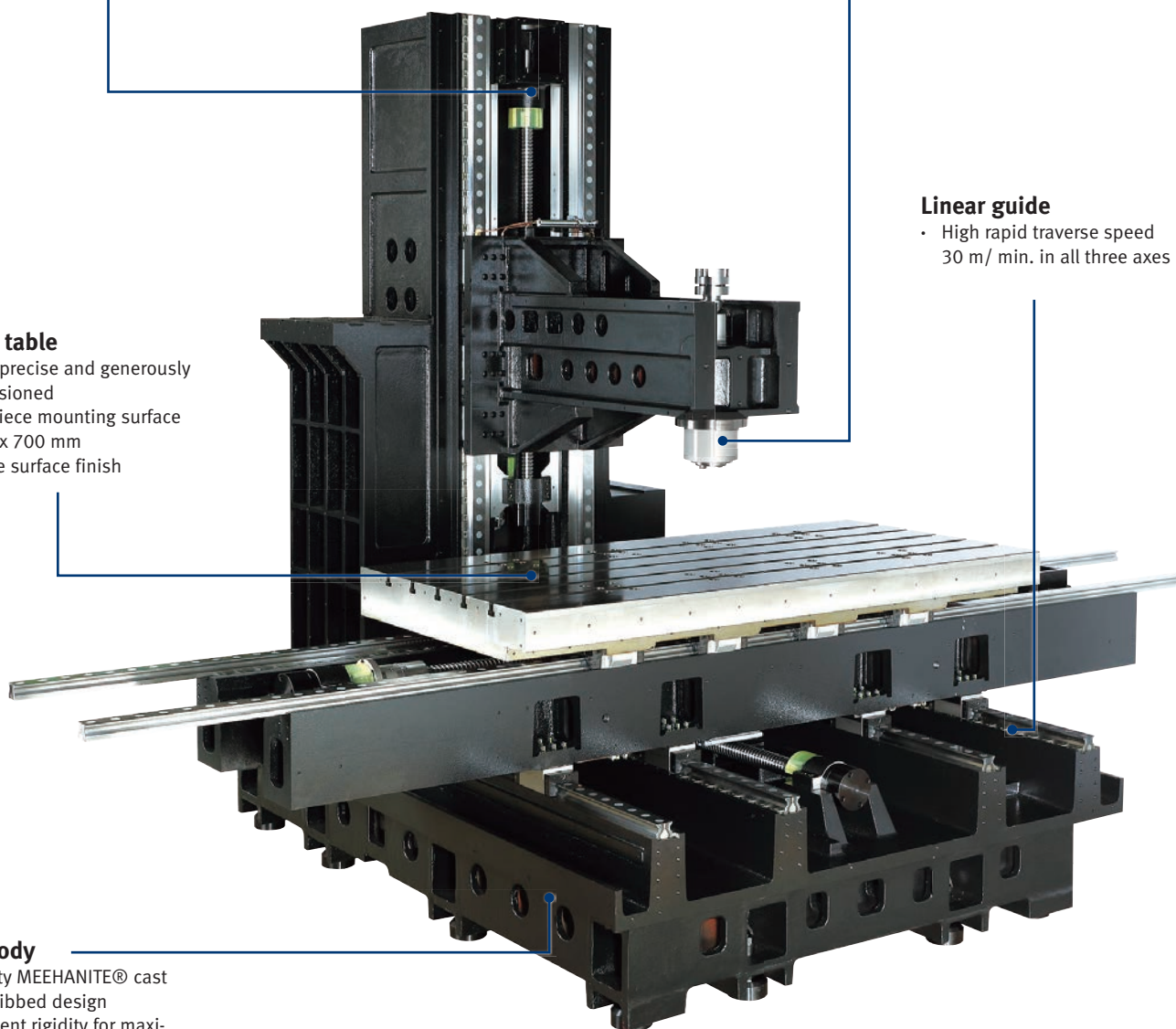
- High rapid traverse speed
30 m/ min. in all three axes

Milling table

- Solid, precise and generously dimensioned
- Workpiece mounting surface
1 700 x 700 mm
- Precise surface finish

Cast body

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



HEAT EXCHANGER



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

BALL SCREWS



- Accuracy class C3
- For high precision and repetition accuracy
- Coupled servo drive on the ballscrew

CHIP FLUSHING SYSTEM



- Powerful chip flushing system for cleaning the workspace and workpiece

TOOL CHANGER SYSTEM



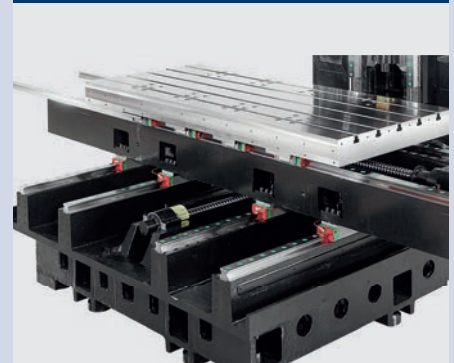
- Double arm grab with 30 tool slots
- Max. tool length 300 mm
- Tool-to-tool change in 1.94 seconds

SPINDLE



- Belt drive
- Spindle seat MT 40
- Spindle speed 12 000 rpm

LINEAR GUIDE



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

CHIP CONVEYOR



- Conveyor version
- For efficient chip discharge

COOLING LUBRICANT SYSTEM




- Powerful coolant pumps with 1.5 kW


CENTRAL LUBRICATION SYSTEM




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

| TOOL MEASURING / WORKPIECE MEASURING | | | |
|--|--|--|--|
| 3511290604* | | BLUM TC52IR Universal measuring probe | <ul style="list-style-type: none"> Switching point repetition accuracy from 0, 3µm 2 at 2 m/ min. measuring speed Wear-free and durably stable Very compact probe with 40 mm diameter |
| 3511290605* | | BLUM ZX-Speed 3-D probe | <ul style="list-style-type: none"> Universal 3-D probe for toolmaking and tool break monitoring |
|  For information on Blum workpiece/tool measuring, also ex warehouse Germany see page 275 | | | |
| 3511290620* | | Renishaw NC 4 Laser system for tool measurement | <ul style="list-style-type: none"> NC4 non-contact tool inspection system is a high-precision, extremely fast solution for tool measurement and breakage control |
| 3511290621* | | Renishaw OMP 60 Probe with optical signal transmission | <ul style="list-style-type: none"> For checking and setting up workpieces on processing centres Compact, touch-actuated 3D probe. Reliably modulated, optical signal transmission. |
| 3511290622* | | Renishaw TS 27R Probe for tactile tool measurement | <ul style="list-style-type: none"> Tool breakage check Compact, tactile 3-D tool probe with wired signal transmission for tool breakage checking |

NEW

| 3-D PRINTING | | | |
|---|---|-------------------------------|---|
| 3562411 | 1 | 3-D printing interface | <ul style="list-style-type: none"> Preparation |
|  For information on 3-D printing and accessories see 266 | | | |

| MISCELLANEOUS | | | | |
|---------------|--|------------------------------------|--|--------------------------------|
| 3536109 | 2 | Starter set SK 40 / DIN 69871 | ➡ For Information on the starter set see on page 284 | |
| 3511290120* | | Coolant through spindle (CTS) | • Integrated unit, 20 bar pump pressure | an extraction unit is required |
| 3511290122 | • External unit, pump pressure 20 bars, tank capacity 165 litres, delivery rate 30 l/min | | | |
| 3511290124 | • External unit, pump pressure 70 bars, tank capacity 165 litres, delivery rate 29 l/min | | | |
| 3511290126 | • External unit with paper filter, Pump pressure 20 bars, tank capacity 320 litres, recommended for aluminium or cast iron | | | |
| 3511290113 | • External unit with paper filter, programmable, pump pressure 70 bars, tank capacity 320 litres, recommended for aluminium or cast iron | | | |
| 3511290655* | 4 | Heidenhain Linear Measuring scales | • on the X/Y/Z axis | |
| 3511290403* | 5 | Air conditioner | • Instead of the standard equipment › heat exchanger | |
| 3511290502* | | Power transformer | • for custom voltage | |

| FOURTH AXIS AND 5-AXIS ROTARY/SWIVEL TABLE | | | |
|--|---|-----------------------------------|---|
| 3511290203* | 6 | Fourth axis rotary indexing table | <ul style="list-style-type: none">• Preparation |
| 3511290212* | | | <ul style="list-style-type: none">• Three-jaw lathe chuck Ø 320 mm, Tailstock, SIEMENS motor, assembly• Table diameter 320 mm |
| 3511290202* | 7 | 5-axis rotary/swivelling table | <ul style="list-style-type: none">• Preparation |
| 3511290213* | | | <ul style="list-style-type: none">• Possible machining diameter Ø 250 mm, Tailstock, SIEMENS motor, assembly |
|  For details on the fourth axis for the rotary indexing table and 5-axis rotary/swivelling table see page 278 | | | |

| SOFTWARE | | | |
|----------|---|---|---|
| 3584014 | | DXF Reader for SIEMENS SINUMERIK controls | <ul style="list-style-type: none"> from version 4.7 For importing DXF files Hiding of graphic layers, automatic contour tracing, arbitrary workpiece zero point per contour/drilling point |
| 3584012 | 8 | Top surface for SIEMENS SINUMERIK control | <ul style="list-style-type: none"> from version 4.7 optimal workpiece surfaces at highest machining speeds thanks to smart motion guidance |

1 3-D PRINTING INTERFACE



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

2 STARTER SET SK 40 / DIN 69871



- Milling head holder with 27 mm collet **1**
- Quick-action drill chuck 1- 13 mm **2**
- 2 each Weldon 6 mm and 20 mm **3**
- 1 each Weldon 8/10/12/16 mm **4**
- Adapter SK 40 to MT 3 **5**
- Collet spanner ER 32 **6**
- 18-part collet set ER 32 **7**
- Assembly and tool adjustment gauge **8**
- Height-adjuster **9**
- Taper squeegee **10**
- Pull stud **11**

3 EXTERNAL CTS



Fig. External unit with paper filter

- Optionally with 20 bar or 70 bar pressure
- Cartridge filter, oil skimmer
- 25µm paper filter
- Coolant cooler
- Tank capacity 320 litres

4 LINEAR MEASURING SCALES



- Encapsulated length measuring device
- Aluminium housing protects the scale, scanning carriage and its guide from chips, dust and splash water
- Elastic sealing lips close the housing at the bottom.
- The scanning carriage is guided on the scale with low friction

5 AIR CONDITIONER



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

6 FOURTH AXIS



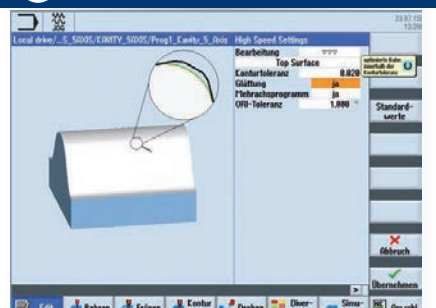
- Table diameter 320 mm
- Vertical table centre height 210 mm
- Total vertical height without motor cover 315 mm
- Horizontal table height 200 mm
- Workpiece weight horizontal / vertical max. 300 / 150 kg

7 FIFTH AXIS



- Possible machining Ø 250 mm
- Vertical table centre height 255 mm
- Vertical table overall height 355 mm
- Through hole diameter 70^{H7} mm
- Slot nut width 18^{H7} 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





CNC lathe L 44
CNC lathe L 50P
CNC lathe S 600
CNC lathe L 440 / L 460
CNC lathe S 620 / S 620L
CNC lathe S 500 / S 500L
CNC lathe S 750K / S 750
Production machines user report on page 168

02

TURNING

PRODUCTION MACHINES

L 44

OPTIMUM PREMiUM CNC lathe with cycle control that sets standards in terms of speed, performance, precision and service life

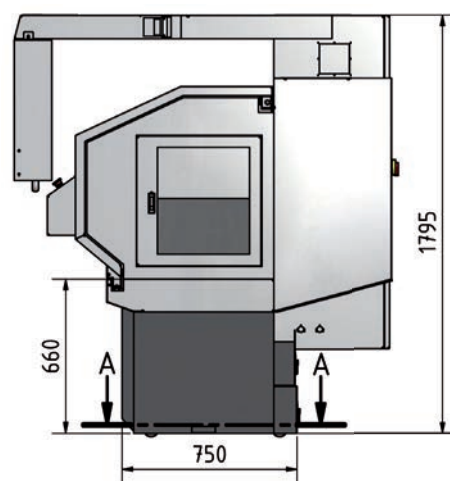
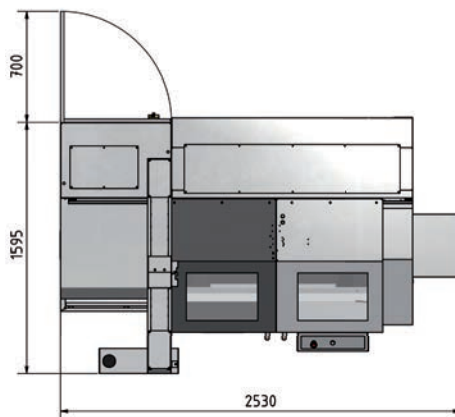
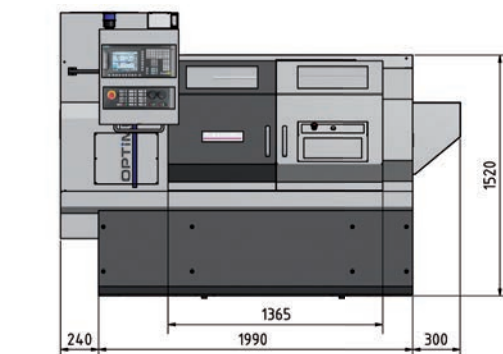
SIEMENS SINUMERIK 828D BASIC

- Spindle and servo motors by **SIEMENS**
- Machine housing with safety switches
- With max. spindle speed up to 3 000 rpm as standard
- Automatic centralised lubrication
- Swivelling operating unit
- Tailstock cover
- Electronic handwheels for the X and Z axis
- Coolant unit with 90 litre coolant tank
- RJ45 plug-in connection, USB connection and power connection 230 V
- EMC Electromagnetic compatibility
- Six levelling feet
- Operating tool
- Including two-year **SIEMENS** warranty
- **SIEMENS** warranty extension on page 123
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



TECHNICAL DATA

| Model | L 44 |
|--------------------------------------|--------------------------|
| Article no. | 3514330 |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 23 kVA |
| Spindle | |
| 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 |
| Torque at spindle | 87 Nm |
| Spindle bore * | Ø 52 mm |
| Chuck passage | Ø 40 mm |
| Hydraulic lathe chuck | Ø 150 mm |
| Cooling lubricant system | |
| Coolant pump output | 270 W |
| Tank capacity | 90 litres |
| Hydraulic system | |
| Hydraulic pump power | 750 W |
| Tank capacity | 50 litres |
| Machine data | |
| Centre height | 223 mm |
| Centre width | 850 mm |
| Swing Ø above cross slide | Ø 240 mm |
| Swing Ø above machine bed | Ø 446 mm |
| Swing Ø in the bed bridge | Ø 520 mm |
| Bed width | 300 mm |
| Speed range | |
| Rotational speeds | 10 - 3 000 rpm |
| Tool turret | |
| Tool changer seat | VDI 30 |
| Type | Hydraulic |
| Number of tool slots | 8 tools |
| Max. height, width square | 20 x 20 mm |
| Max. diameter drilling rod | Ø 25 mm |
| Precision | |
| Repeat accuracy | ± 0.005 mm |
| Positioning accuracy | ± 0.005 mm |
| Travel | |
| X axis | 250 mm |
| Z axis | 760 mm |
| Feed speed | |
| X axis/Y axis | 15 m/min. |
| Motor torque | |
| X/Z axis | 6 Nm / 8.5 Nm |
| Feed forces | |
| X/Z axis | 7.5 kN / 5.3 kN |
| Tailstock | |
| Tailstock seat | MT 4 |
| Tailstock quill diameter | Ø 52 mm |
| Tailstock - quill stroke hydraulic | 165 mm |
| Dimensions | |
| Length x width x height | 2 530 x 1 595 x 1 795 mm |
| Overall weight | 2 600 kg |



| Sinumerik 828D system software | PPU 271 SW 24 | PPU 290/SW 26x (optional article no. 351433030) |
|--------------------------------|---------------|---|
| CNC memory | 3 MB | 5 MB |
| Cycle change time | 3 ms | 2 ms |
| Look Ahead | 50 | 100 |
| Number of tools | 128 | 256 |

SINUMERIK 828D Basic

High-tech for the compact class

Boosting productivity and precision in manufacturing

The use of two autonomously operating tools makes 4-axis turning - balance cutting - possible. The new functions include multi-channel capability with ShopTurn, which, among other things, allows programmes to be synchronised with programSYNC. The new Software offers the possibility to run two channels simultaneously in turning and grinding machines. SINUMERIK CNC control Sinumerik 828D Basic sets standards in all aspects of machining performance. Whether accuracy and speed, whether reduction of cycle times or energy efficiency and safety - the SINUMERIK sets the pace.

SHOPTURN

- shortest programming time for creating one-off parts and small batches

DXF READER

- Faster from the drawing to the workpiece. Easy transfer of CAD data into programming by DXF reader (optional article no. 3584014).



Control

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

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

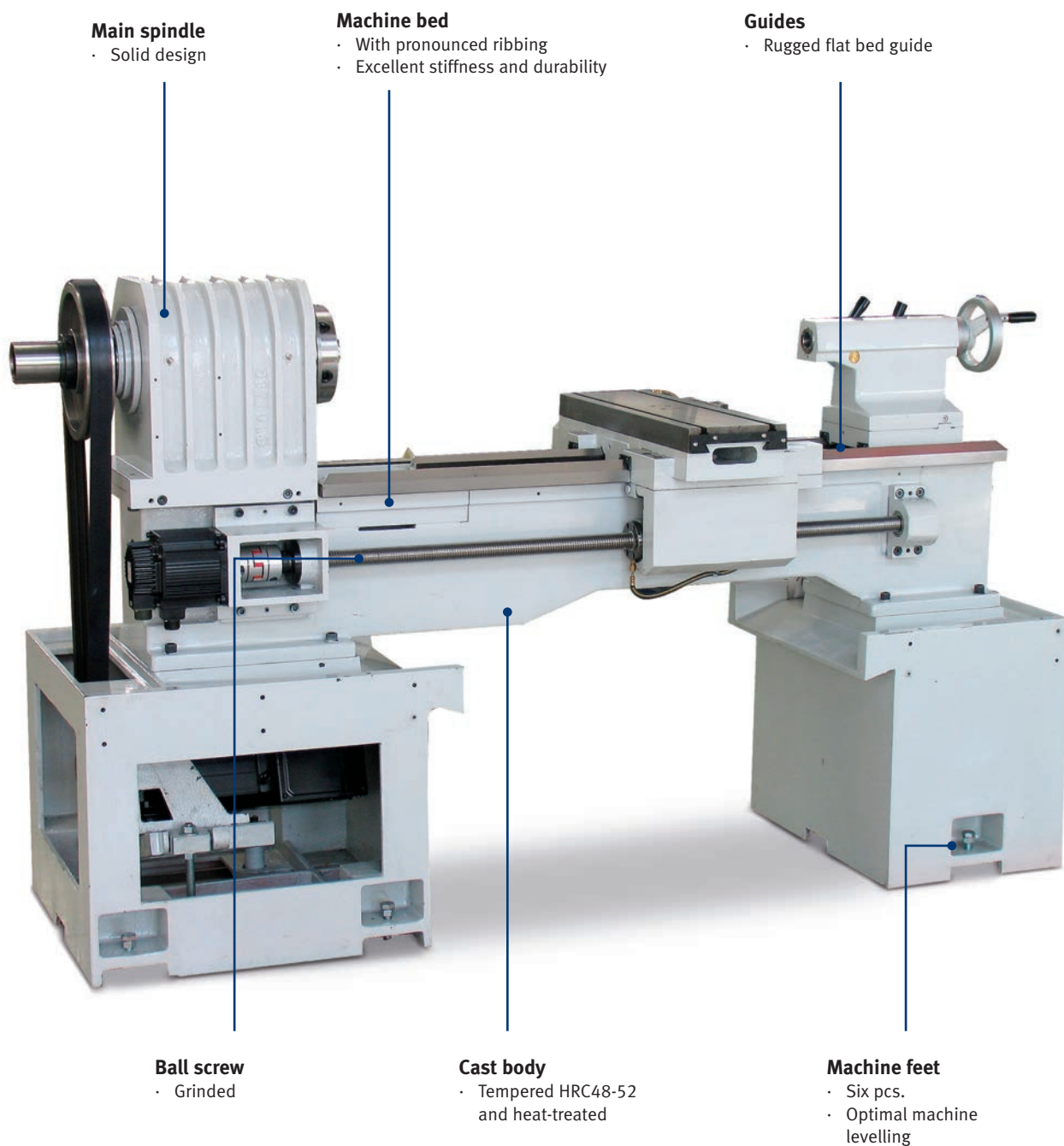
Functional safety also provides protection against high costs!

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

OVERALL PACKAGE

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





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. 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
- Clamping pressure/operating pressure 2 500 - 2 942 kPa

THREE-JAW CHUCK



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

CENTRAL LUBRICATION SYSTEM



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

HAND WHEELS



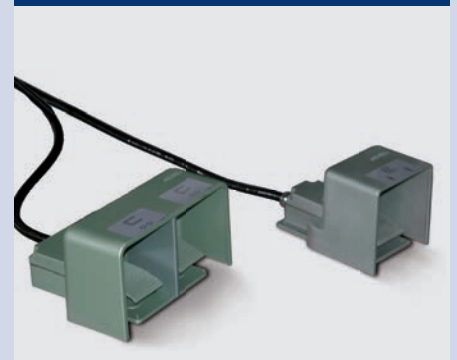
- Joystick for moving the X, Z axis
- Handwheel for moving the X axis and Z axis manually
- Emergency stop button
- Confirm button

COOLANT TANK



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

FOOT PEDAL



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

| STEADY RESTS | | | |
|--|---|--|---|
| 351433002* | 1 | Fixed steady rest | • Passage Ø 10 mm to Ø 130 mm |
| 351433003* | | Follow steady rest | • Passage Ø 10 mm to Ø 100 mm |
| | | | |
| BAR FEEDER | | | |
| 351433026* | 2 | Bar feeder interface | |
| 351433012* | | Bar feeder Pro V 65E 1.2 metres | • Includes bar feeder interface (Item No.: 351433026) |
| 351433019* | | Bar feeder Pro Conqueror 3 metres | • Includes bar feeder interface (Item No.: 351433026) |
| ➡ For information on bar feeders, and more bar feeders ex warehouse Germany see page 296 | | | |
| MISCELLANEOUS | | | |
| 3536115 | 3 | Starter set VDI 30 | |
| 351433001* | | Hydraulic tailstock quill | • For fast machining • Quill can be extended and retracted hydraulically |
| 351433011* | | Fast change tool holder Multifix 4 | • Instead of standard equipment › hydraulic tool turret VDI30 |
| 351433009* | 4 | Portable electronic handwheel | • Instead of the standard equipment › Joystick |
| 351433013* | 5 | Power transformer | • For custom voltage • Weight 147 kg |
| W 3511294601* | 6 | HPRA Renishaw High Precision Measuring Arm | • For Ø 150 mm lathe chuck • For tool measuring and tool break monitoring |
| ➡ Information on the measuring arm ex warehouse Germany can be found at page 300 | | | |
| | | | |
| LATHE CHUCK | | | |
| 351433015* | | Three-jaw lathe chuck manual Ø 200 mm | • Instead of standard equipment › three-jaw lathe chuck hydraulic Ø 150 mm |
| 351433016* | | Four-jaw lathe chuck manual Ø 250 mm | • Instead of standard equipment › three-jaw lathe chuck hydraulic Ø 150 mm |
| 351433018* | | Three-jaw lathe chuck hydraulic Ø 200 mm | • Instead of standard equipment › three-jaw lathe chuck hydraulic Ø 150 mm |
| 351433020* | | Hydraulic four-jaw lathe chuck Ø 200 mm | • Instead of standard equipment › hydraulic three-jaw lathe chuck Ø 150 mm |
| 3519706 | | soft top jaw | • for the › hydraulic three-jaw lathe chuck Ø 150 mm - included in the standard equipment |
| 3519726 | | Hard insert jaws | • for the › hydraulic three-jaw lathe chuck Ø 150 mm - included in the standard equipment |
| 3519707 | | soft top jaw | • for the three-jaw lathe chuck hydraulic Ø 200 mm (Item No. 351433018) • for the four-jaw lathe chuck hydraulic Ø 200 mm (Item No. 351433020) |
| 3519727 | | Hard insert jaws | • for the three-jaw lathe chuck hydraulic Ø 200 mm (Item No. 351433018) • for the four-jaw lathe chuck hydraulic Ø 200 mm (Item No. 351433020) |
| 351433024* | | Collet chuck | • for the › hydraulic three-jaw lathe chuck Ø 150 mm - included in the standard equipment |
| | | | |
| SOFTWARE | | | |
| 3584014 | 7 | Software DXF Viewer/Reader | • from version 4.7 • For importing DXF files • Hiding of graphic layers, automatic contour tracking |
| | | | |
| HARDWARE | | | |
| 351433030* | 8 | SIEMENS control PPU 290 | • 15.6" colour display- 16:9 format, System software SW 26x |

1 STEADY RESTS



Fixed steady rest

- Passage Ø 10 mm to Ø 130 mm

Follow steady rest

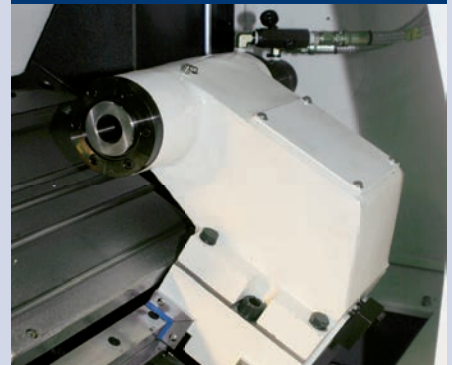
- Passage Ø 10 mm to Ø 100 mm

2 BAR FEEDER



- The bar feeders are the ideal solutions for automatic loading of CNC lathes with short bars. They combine maximum productivity with a small footprint

3 TAILSTOCK SPINDLE SLEEVE



- Retract and extend hydraulically via foot pedal

4 HANDWHEEL



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

5 POWER TRANSFORMER



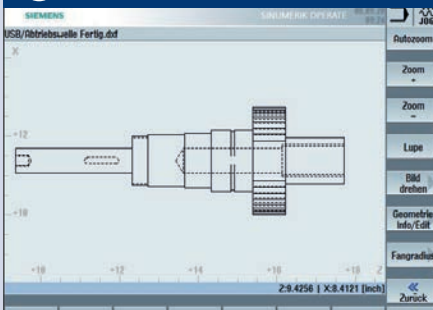
- For custom voltage
- Weight 147 kg

6 MEASURING ARM



- Up to 90 % faster tool measuring
- Typical position accuracy of 5 µm 2
- LED displays the probe status and the operational readiness of the arm
- IPX8 protected (static)
- TS12 Interface

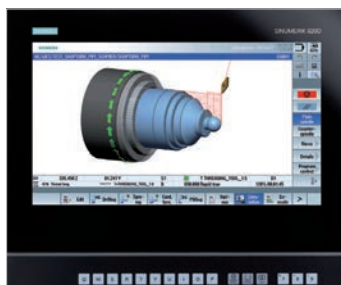
7 SOFTWARE DXF VIEWER/READER



■ from version 4.7

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

8 CONTROL PPU 290



The PPU 290 enables Multitouch operation. The 15.6" panel is robust even in harsh environments. The SINUMERIK Operate user interface is optimised for touch-sensitive operation.

User-friendly

- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function
- Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)
- Proximity/distance sensor for smart display control

Robust and maintenance-free

- Front panel made of die-cast magnesium with scratchproof glass front
- Can be operated while wearing gloves
- NV RAM memory technology without buffer battery

A white circular badge with a blue border and the word "NEW" in blue capital letters.

L 50P

OPTIMUM PREMIUM Universal CNC lathe with cycle control.

Complete solution - Diverse possibilities

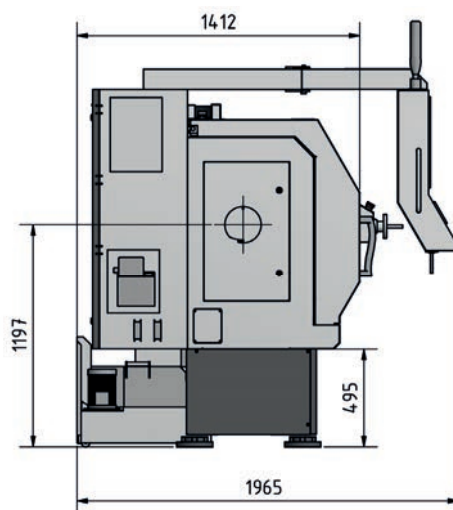
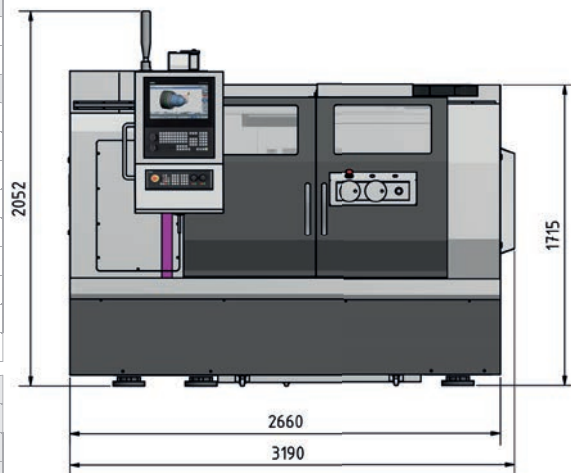
SIEMENS SINUMERIK 828D with PPU 290

- Precision workmanship
- Spindle and servo motors by **SIEMENS**
- Machine housing with safety switches
- With max. spindle speed up to 3 500 rpm as standard
- Hydraulic lathe chuck
- Ball screws
- Linear guides on all axes
- Automatic centralised lubrication
- Servo hydraulic VDI 30 tool changer with 8 tools
- Swivelling operating unit
- Electronic handwheels for the X and Z axis
- Coolant unit with 110 litre coolant tank
- RJ45 plug-in connection, USB connection and power connection 230 V
- EMC Electromagnetic compatibility
- Six levelling feet
- Operating tool
- Including two-year **SIEMENS** warranty
- **SIEMENS** warranty extension on page 51
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



TECHNICAL DATA

| Model | L 50P |
|---|--------------------------|
| Article no. | 3514340 |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 18 kVA |
| Spindle | |
| Drive motor S1 operation | 9 kW |
| Torque drive motor S1 operation | 57 Nm |
| Drive motor S6 30 % operation | 15.8 kW |
| Torque drive motor S6 30 % operation | 95 Nm |
| Spindle seat | ISO 702-1 No. 6 form A2 |
| Hydraulic lathe chuck | Ø 210 mm |
| Chuck passage | Ø 52 mm |
| Spindle bore* | Ø 66 mm |
| Torque at the spindle | 95 Nm |
| Option (Article No. 351434011)** | |
| Spindle seat | ISO 702-1 No. 8 form A2 |
| Hydraulic lathe chuck | Ø 260 mm |
| Chuck passage | Ø 75 mm |
| Spindle bore* | Ø 85 mm |
| Spindle speeds | 3 000 rpm |
| Cooling lubricant system | |
| Cleaning pump output | 1 kW |
| Coolant pump output | 450 W |
| Tank capacity | 110 litres |
| Hydraulic system | |
| Hydraulic pump power | 2.2 kW |
| Tank capacity | 50 litres |
| Machine data | |
| Max. turning length | 618 mm |
| Max. turning diameter | 245 mm |
| Swing Ø above cross slide | 280 mm |
| Swing Ø above machine bed | 490 mm |
| Bed width | 400 mm |
| Speed range | |
| Spindle speeds | 3 500 rpm |
| Tool turret | |
| Tool changer seat | VDI 30 |
| Type | Servo hydraulic |
| Number of tool slots | 8 |
| Max. height, width square | 20 mm |
| Max. diameter drilling rod | Ø 32 mm |
| Precision | |
| Repeat accuracy | ± 0.005 mm |
| Positioning accuracy | ± 0.005 mm |
| Traverse paths | |
| X axis | 300 mm |
| Z axis | 800 mm |
| Feed speed | |
| X axis fast motion | 15 m/min. |
| Z axis fast motion | 20 m/min. |
| Motor torque | |
| X axis | 6 Nm |
| Z axis | 11 Nm |
| Tailstock | |
| Tailstock seat | MT 5 |
| Tailstock quill diameter | Ø 75 mm |
| Tailstock - quill stroke | 150 mm |
| Dimensions | |
| Length x width x height | 3 190 x 1 965 x 2 052 mm |
| Overall weight | 4 500 kg |



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

SINUMERIK 828D

The power package in the compact class of CNC controls

Boosting productivity and precision in manufacturing

Robust hardware architecture and intelligent control algorithms as well as top-class drive and motor technology ensure the highest dynamics and precision during machining.

Advanced software-controlled compensation functions ensure additional quality in surface machining and high availability of the machine tool.

With SINUMERIK Operate, all machining technologies, from standard to complex, can be operated intuitively and with a uniform "look & feel".

SINUTRAIN

- NC programming on the PC as on the CNC - same operation and programming
- Work preparation already while the machine is still cutting: Test, run-in and simulate NC programs on the PC - less time stress at the machine

- CNC education and training with exactly the same programming and operating interface as in the workshop - without waiting for it to "finally get to it", without the risk of breaking something - and with the possibility of doing preparatory and follow-up work at home or on the road.

DXF READER

- Faster from the drawing to the workpiece. Easy transfer of CAD data into programming by DXF reader (optional article no. 3584014).

Multitouch operation with PPU 290

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

User-friendly

- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function
- Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)
- Proximity/distance sensor for smart display control

Rugged and maintenance-free

- Front panel made of die-cast magnesium with scratchproof glass front
- Can be operated while wearing gloves
- NV RAM memory technology without buffer battery
- Fanless and hard diskless design



**SIEMENS
SAFETY**

INTEGRATED

SET UP WORK WITH OPEN DOORS

Functional safety also provides protection against high costs!

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

Warranty extension

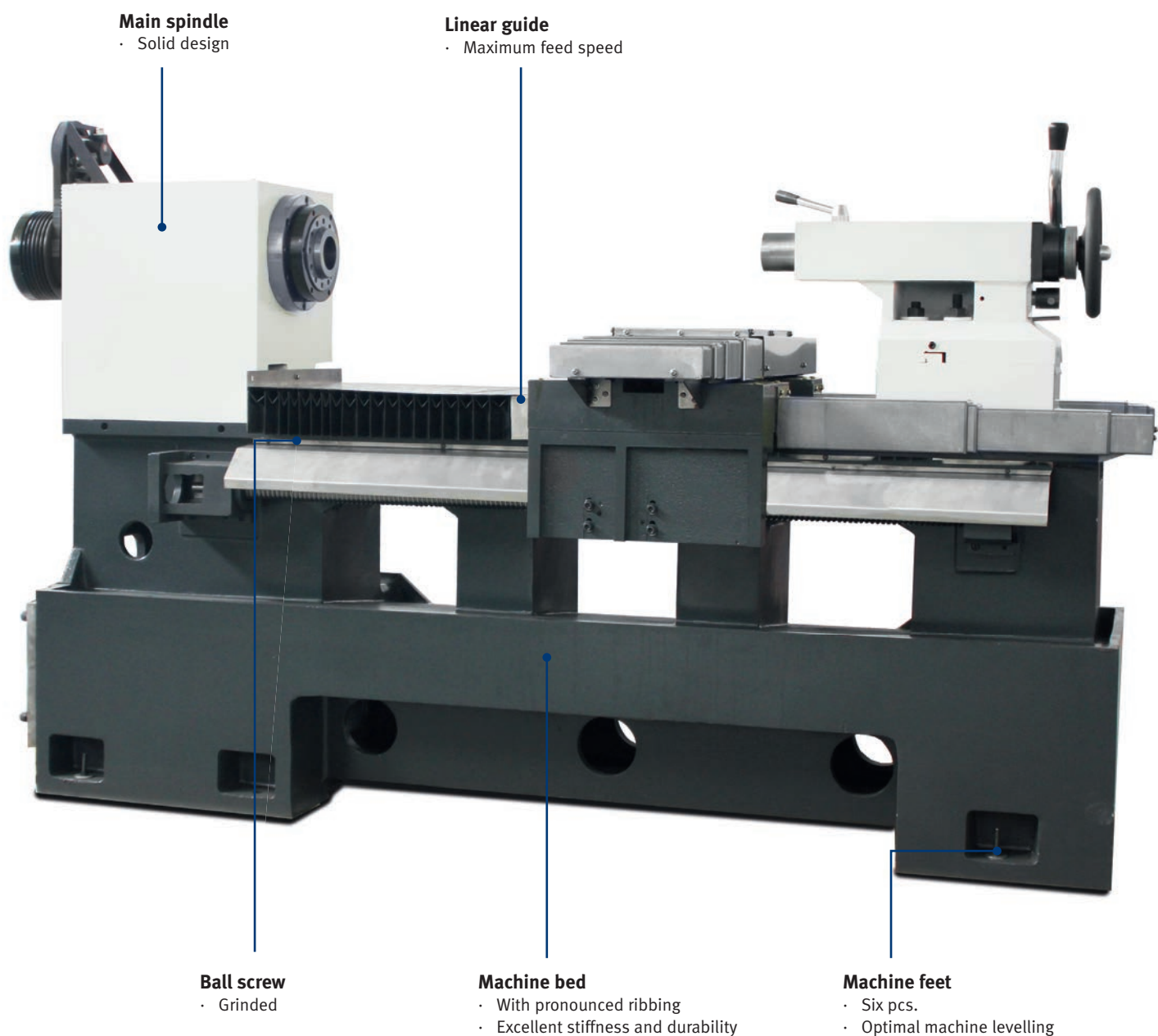
The warranty extension lets you protect your new machine against warranty damage for a further 12, 24 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)

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

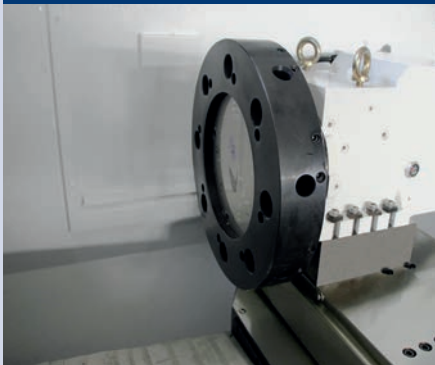
OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- Shopturn work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording
- System software SW 26x



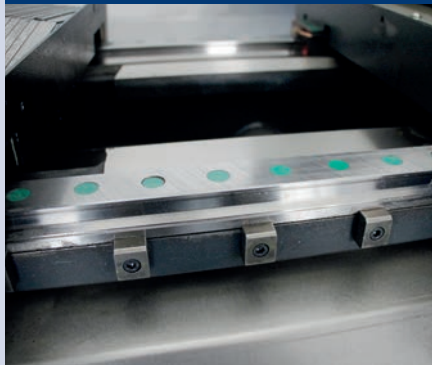


TOOL TURRET



- For eight tool stations
- Servo hydraulic VDI 30 tool changer
- Mounting height square max. 20 mm
- Reception Ø boring bar 32 mm

LINEAR GUIDE



- Max. feed speed
- Consistent precision with long service life
- High positioning accuracy
- Stainless steel cover

SIGNAL LIGHT



- Visually displays the machine status
- Long service life

HANDWHEELS



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

HEAT EXCHANGER



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

CENTRAL LUBRICATION SYSTEM



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

TAILSTOCK



- Fast, easy adjustment without tools thanks to clamping lever

THREE-JAW CHUCK



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

FOOT PEDAL



- Enables easy and quick opening and closing of the lathe chuck

BAR FEEDER

➡ For information on bar feeders see from page 296

RENISHAW MEASURING ARM

| | | | |
|------------|---|--|--|
| 351434020* | 1 | Renishaw measuring arm with probe for Ø 200 mm lathe chuck | <ul style="list-style-type: none"> • Including assembly • TSI2 Interface |
| 351434021* | | Renishaw measuring arm with probe for Ø 250 mm lathe chuck | |

➡ Information on the measuring arm ex warehouse Germany can be found at page 300

MISCELLANEOUS

| | | | |
|------------|------------------|--|--|
| 351434011* | 2 3 4 5 | Spindle upgrade to Ø 86 mm Spindle seat ISO 702-1 no. 8 form A2 Three-jaw lathe chuck Ø 260 mm Chuck passage Ø 75 mm Spindle speed 3 000 rpm | <ul style="list-style-type: none"> • instead of the standard equipment › Spindle seat ISO 702-1 no. 6 form A2 Three-jaw lathe chuck Ø 210 mm Chuck passage Ø 52 mm Spindle speed 3 500 rpm |
| 351434001* | | Lifting device | |
| 3536115 | | Starter set VDI 30 | ➡ For Information on the starter set see page 294 |
| 351434004* | | Chip conveyor with chip trolley | |
| 351434003* | | Oil separator / oil skimmer | |
| 351434002* | | High performance coolant pump 1 kW | <ul style="list-style-type: none"> • instead of standard equipment › coolant pump 450 W |
| 351434010* | | Hydraulic tailstock quill | <ul style="list-style-type: none"> • For fast machining • Quill can be extended and retracted hydraulically |

LATHE CHUCK

| | | | |
|------------|--|--------------------------------------|--|
| 351434012* | | Four-jaw lathe chuck Ø 260 mm | <ul style="list-style-type: none"> • instead of the one in the spindle upgrade › three-jaw lathe chuck Ø 260 mm |
| 351434014* | | Four-jaw lathe chuck Ø 210 mm | <ul style="list-style-type: none"> • instead of standard equipment › three-jaw lathe chuck Ø 210 mm |
| 3519712 | | Soft top jaw (1 pc.) | <ul style="list-style-type: none"> • for lathe chuck Ø 210 mm |
| 3519713 | | Soft top jaw (1 pc.) | <ul style="list-style-type: none"> • for the optional lathe chuck Ø 260 mm |
| 3519732 | | Hard top jaw set (3 pcs.) | <ul style="list-style-type: none"> • for three-jaw chuck Ø 210 mm - included in the standard equipment |
| 3519733 | | Hard top jaw set (4 pcs.) | <ul style="list-style-type: none"> • for the optional four-jaw lathe chuck Ø 210 mm |
| 3519734 | | Hard top jaw set (3 pcs.) | <ul style="list-style-type: none"> • for the optional three-jaw lathe chuck Ø 260 mm |
| 3519735 | | Hard top jaw set (4 pcs.) | <ul style="list-style-type: none"> • for the optional four-jaw lathe chuck Ø 260 mm |

SOFTWARE

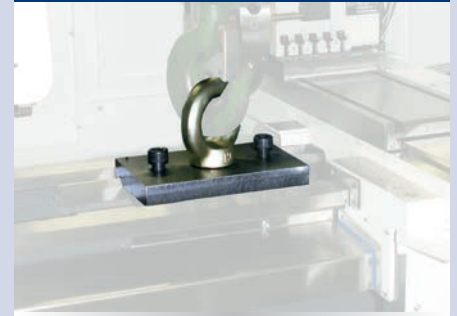
| | | | |
|---------|---|-----------------------------------|--|
| 3584014 | 6 | Software DXF Viewer/Reader | <ul style="list-style-type: none"> • from version 4.7 • For importing DXF files • Hiding graphics layers • Automatic contour tracking |
|---------|---|-----------------------------------|--|

1 HPPA RENISHAW MEASURING ARM



- High-precision, manually swivelling arm HPPA with probe for tool measurement, which has a 3-axis RP3 probe.
- TSI2 interface included
- ➡ Information on the measuring arm see page 300

2 LIFTING DEVICE



- A lifting device is required to unload the machine

3 STARTER SET VDI 30



- | | |
|---|-------------------------------------|
| ■ 3 pcs. square transverse holder 1 | ■ 1 pc. collet chuck holder ER 25 6 |
| ■ 1 pc. square transverse overhead holder 2 | ■ 1 pc. collet spanner ER 25 7 |
| ■ 1 pc. square longitudinal holder 3 | ■ 15-part collet set ER 25 8 |
| ■ 5 pcs. drill rod holder Ø 10 / 12 / 16 / 20 / 25 mm 4 | ■ 1 pc. tool holder 9 |
| ■ 3 pcs. cap 5 | ■ 1 pc. chuck 10 |

4 CHIP TROLLEY CONVEYOR



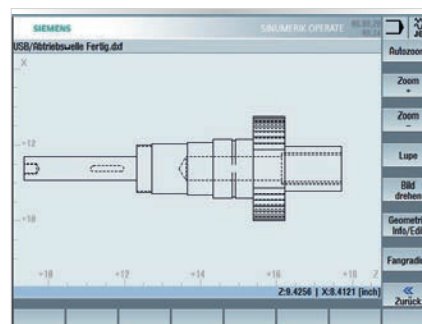
- Conveyor version
- For efficient chip discharge

5 OIL SEPARATOR / OIL SKIMMER



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

6 SOFTWARE DXF VIEWER/READER



■ from version 4.7

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

S 600

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

SIEMENS SINUMERIK 828D BASIC

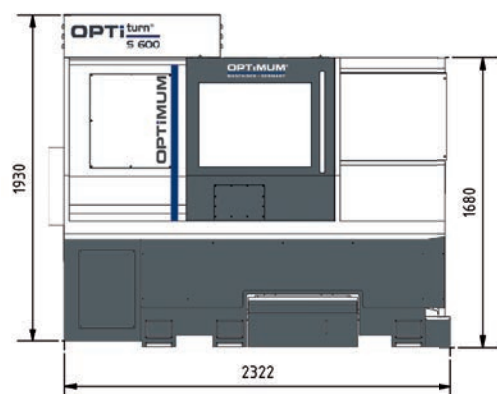
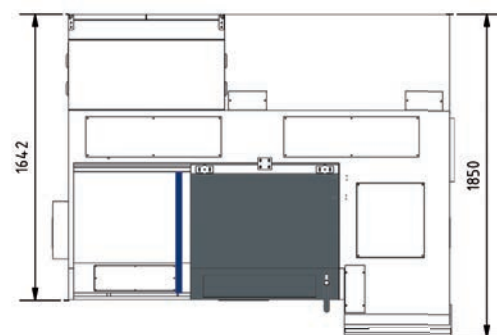
- Heavy duty version
- Compact design
- **SIEMENS** servo motors on all axes
- All servomotors with integrated encoder for maximum precision
- Slant bed design 30° for particularly large machining diameter
- Easy chip removal into the chip tray
- Hydraulic three-jaw lathe chuck Ø 200 mm
- Hard and soft block jaws
- VDI30 tool changer with 8 tools as standard
- Hardened and grinded ball screw spindles
- Dimensionally stable linear guides ensure a long service thanks to maximum static and dynamic stiffness
- Device for manual tool measuring
- Tailstock with hydraulic quill
- Heat exchanger
- Portable electronic hand wheel substantially facilitates running in of programs
- Chip conveyor
- Chip carriage
- Halogen work lamp
- Coolant system
- EMC Electromagnetic compatibility
- Including two-year **SIEMENS** warranty
- **SIEMENS** warranty extension on page 139
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



Fig. with optional SIEMENS PPU 290
control and parts catcher

TECHNICAL DATA

| Model | S 600 |
|---|--------------------------|
| Article no. | 3515060 |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 31 kVA |
| Spindle | |
| 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 200 mm |
| Cooling lubricant system | |
| Coolant pump output | 750 W |
| Cleaning pump output | 750 W |
| Tank capacity | 140 litres |
| Hydraulic system | |
| Motor - hydraulic pump | 1.5 kW |
| Tank capacity | 60 litres |
| Machine data | |
| Max. turning diameter | Ø 280 mm |
| Max. turning length | 460 mm |
| Swing Ø above cross slide | Ø 220 mm |
| Swing Ø above machine bed | Ø 500 mm |
| Slant bed | 30° |
| Speed range | |
| Spindle speeds** | 40 - 4 500 rpm |
| Tool turret | |
| Type | VDI 30 |
| Number of tool slots | 8 tools |
| Option: Sauter tool turret with driven tools DIN5480 (article no. 351506001) | |
| Type | VDI 30 |
| 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 |
| Precision | |
| Repeat accuracy | ± 0.005 mm |
| Positioning accuracy | ± 0.005 mm |
| Traverse paths | |
| X axis | 215 mm |
| Z axis | 520 mm |
| Feed speed | |
| X axis/Y axis | 30 m/min. |
| Motor torque | |
| X axis/Y axis | 11 Nm |
| Feed forces | |
| X axis/Y axis | 6.9 kN |
| Tailstock | |
| Tailstock seat | MT 4 |
| Travel | 425 mm |
| Tailstock quill diameter | Ø 65 mm |
| Tailstock - quill stroke hydraulic | 60 mm |
| Dimensions | |
| Length x width x height | 2 322 x 1 948 x 1 930 mm |
| Overall weight | 3 200 kg |



| Sinumerik 828D system software | PPU 271 SW 24 | PPU 290/SW 26x (optional 351506030) |
|--------------------------------|---------------|-------------------------------------|
| CNC memory | 3 MB | 5 MB |
| Cycle change time | 3 ms | 2 ms |
| Look Ahead | 50 | 100 |
| Number of tools | 128 | 256 |

SINUMERIK 828D Basic

High-tech for the compact class

Boosting productivity and precision in manufacturing

The use of two autonomously operating tools makes 4-axis turning - balance cutting - possible. The new functions include multi-channel capability with ShopTurn, which, among other things, allows programmes to be synchronised with programSYNC. The new Software offers the possibility to run two channels simultaneously in turning and grinding machines. SINUMERIK CNC control Sinumerik 828D Basic sets standards in all aspects of machining performance. Whether accuracy and speed, whether reduction of cycle times or energy efficiency and safety - the SINUMERIK sets the pace.

SHOPTURN

- shortest programming time for creating one-off parts and small batches

DXF READER

- Faster from the drawing to the workpiece. Easy transfer of CAD data into programming by DXF reader (optional article no. 3584014).



Control

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

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!

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

OVERALL PACKAGE

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



Components and cast parts

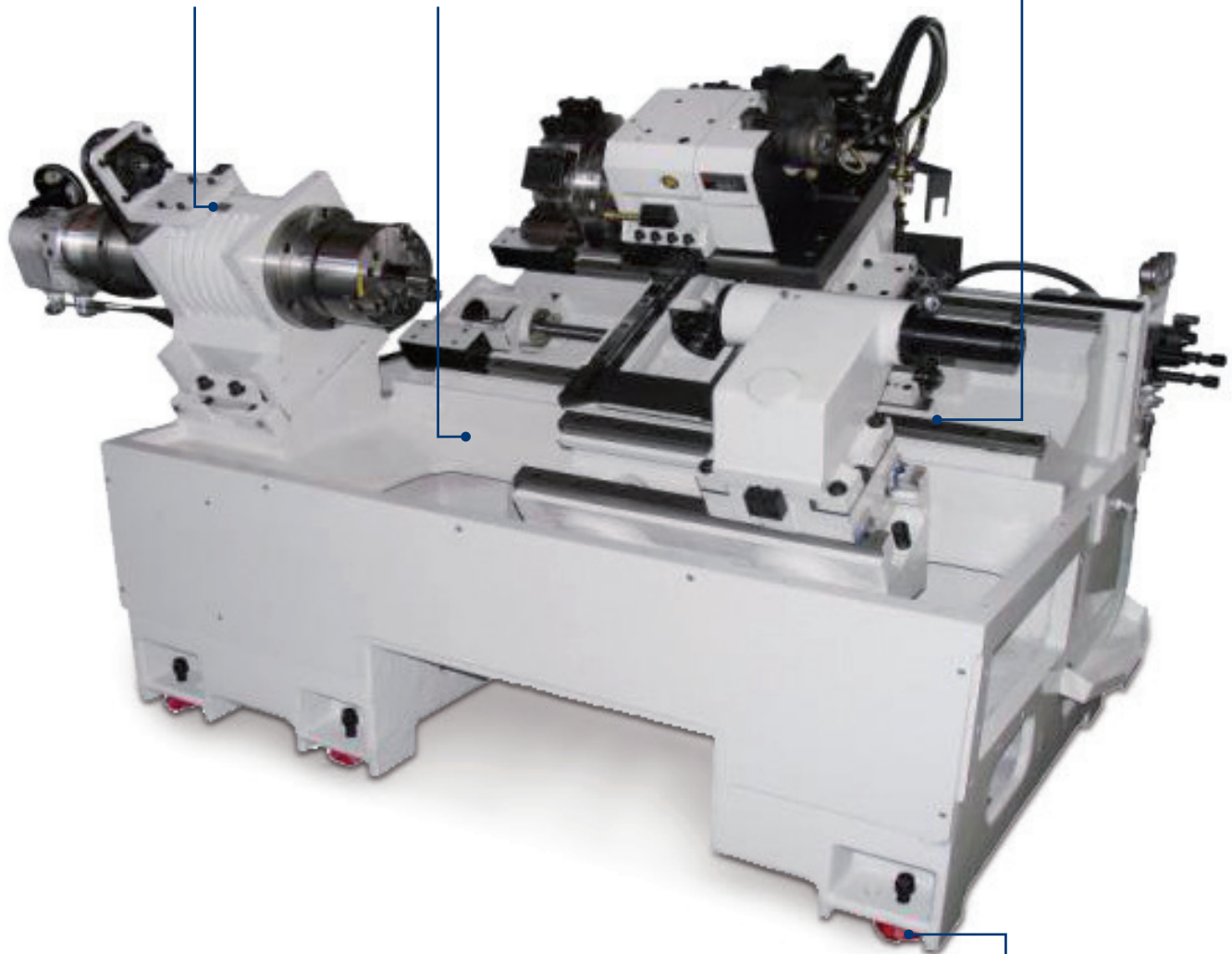
- Guarantee stiffness

Machine bed

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

Linear guide

- Maximum feed rate



Machine feet

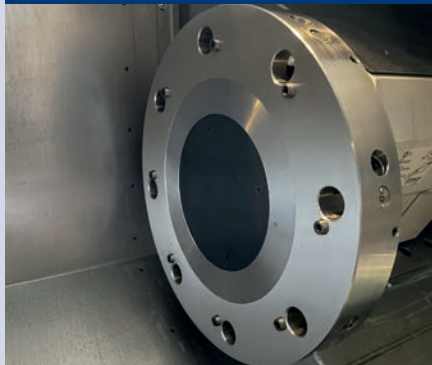
- Six pcs.
- Optimal machine levelling

SEPARATOR



- Separates lubricant from coolant

TOOL TURRET



- 8 tool slots
- VDI 30

TAILSTOCK QUILL



- The tailstock quill is moved hydraulically with the foot switches.
- Hydraulic quill stroke 60 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



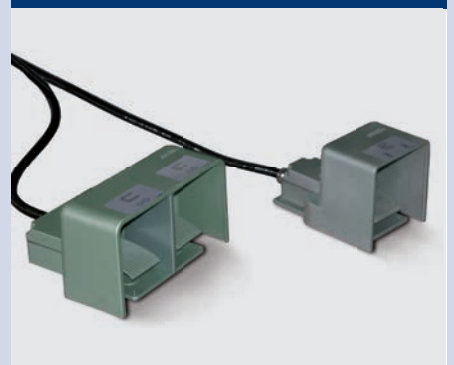
- Hydraulic three-jaw lathe chuck Ø 200 mm
- Passageway Ø 65 mm
- Easy workpiece clamping

COOLANT TANK



- Pull-out chip tray
- Pull-out cooling lubricant tank
- Level indicator
- Tank capacity 140 litres

FOOT PEDAL



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

| TOOL TURRET (Please note: traverse paths can change) | | | |
|--|---|---|---|
| 351506001* | 1 | Sauter tool turret VDI 30 driven tools DIN 5480 | <ul style="list-style-type: none"> Twelve driven tools DIN 5480, C-axis brake system Instead of Standard equipment > VDI 30 tool turret without power tools |
| TOOL HOLDER | | | |
| 351506034 | | Axially driven tool holder | • VDI30 DIN 5480 |
| 351506035 | | Radially driven tool holder | • VDI30 DIN 5480 |
| 351506036 | | Radially driven tool holder on rear side | • VDI30 DIN 5480 |
| STARTER SET | | | |
| 3536115 | | Starter set VDI 30 | • Information VDI 30 on page 294 |
| TAILSTOCK | | | |
| 351506004* | | Automatic tailstock motion | • via M Code |
| 351506005* | 2 | Machine preparation | • Only for automatic tailstock motion (351506004) |
| BAR FEEDER | | | |
| 351506011* | | Bar feeder interface | |
| 351506012* | | Bar feeder Pro V 65E 1.2 metres | • Including bar feeder interface (351506011) |
| 351506013* | 3 | Bar feeder Pro V 65LE 1.5 metres | • Including bar feeder interface (351506011) |
| 351506023* | | Bar feeder Pro Conqueror 3 metres | • Including bar feeder interface (351506011) |
| ➔ For information on bar feeders, and more bar feeders ex warehouse Germany see page 296 | | | |
| COLLETS FOR COLLET CHUCKS | | | |
| 351506017* | | Individual collets for collet chucks | • from Ø 10 mm to Ø 14.9 mm |
| 351506018* | | Individual collets for collet chucks | • from Ø 15 mm to Ø 60 mm |
| 351506002* | 4 | Collet chuck | • for collets from Ø 15 mm to Ø 60 mm |
| LATHE CHUCK | | | |
| 351506024 | | Hydraulic four-jaw lathe chuck Ø 200 mm | • Instead of standard equipment > hydraulic three-jaw lathe chuck Ø 200 mm |
| 351506008 | | Hydraulic three-jaw lathe chuck Ø 250 mm | • Instead of standard equipment > hydraulic three-jaw lathe chuck Ø 200 mm |
| 351506025 | | Hydraulic four-jaw lathe chuck Ø 250 mm | • Instead of standard equipment > hydraulic three-jaw lathe chuck Ø 200 mm |
| 3519707 | | soft top jaw | <ul style="list-style-type: none"> for the > hydraulic three-jaw lathe chuck Ø 200 mm - included in the standard equipment for the hydraulic four-jaw lathe chuck Ø 200 mm (351506024) |
| 3519727 | | Hard insert jaws | <ul style="list-style-type: none"> for the > hydraulic three-jaw lathe chuck Ø 200 mm - included in the standard equipment for the hydraulic four-jaw lathe chuck Ø 200 mm (351506024) |
| 3519708 | | soft top jaw | <ul style="list-style-type: none"> for the hydraulic three-jaw lathe chuck Ø 250 mm (351506008) for the hydraulic four-jaw lathe chuck Ø 250 mm (351506025) |
| 3519728 | | Hard insert jaws | <ul style="list-style-type: none"> for the hydraulic three-jaw lathe chuck Ø 250 mm (351506008) for the hydraulic four-jaw lathe chuck Ø 250 mm (351506025) |
| MISCELLANEOUS | | | |
| 351506019* | | Internal tool cooling | • External unit, 20 bar |
| 351506020* | 5 | Oil separator | <ul style="list-style-type: none"> with rotary disc, removes oil from the coolant Capacity: 1 litre per hour |
| 351506022* | | High performance coolant pump | • 5 bar |
| 351506021* | 6 | Air conditioner | • Instead of the standard equipment > heat exchanger |
| 351506006* | | Automatic tool measuring | • Instead of standard equipment > Manual tool measuring |
| 351506007* | | Automatic part gripper | |
| 351506016* | | Automatic door opening | |
| SOFTWARE | | | |
| 3584014 | 7 | Software DXF Viewer/Reader | • from version 4.7 |
| HARDWARE | | | |
| 351506030* | 8 | SIEMENS control PPU 290 | • 15.6" colour display- 16:9 format, System software SW 26x |

1 TOOL TURRET



- VDI 30 with driven tools by Sauter incl. C axis brake system

2 TAILSTOCK



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

3 BAR FEEDER



- The bar feeders are the ideal solutions for automatic loading of CNC lathes with short bars. They combine maximum productivity with a small footprint

4 COLLETS AND COLLET CHUCKS



- Available from 10 mm to 60 mm

5 OIL SEPARATOR



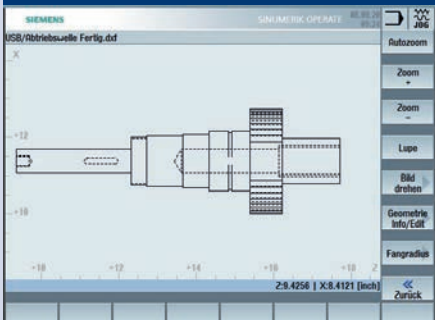
- Separates third party oil from coolant emulsion
- The third-party oil in the coolant shortens the tool service life

6 AIR CONDITIONER



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

7 DXF READER



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

8 CONTROL PPU 290



- The PPU 290 enables Multitouch operation of the SINUMERIK 828. The 15.6" panel is robust even in harsh environments. The SINUMERIK Operate user interface is optimised for touch-sensitive operation.
- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function
- Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)
- Proximity/distance sensor for smart display control
- Rugged and maintenance-free
- Can be operated while wearing gloves
- System software SW 26x

L 440 / L 460

The OPTIMUM PREMiUM high-performance CNC lathe with cycle control

SIEMENS SINUMERIK 828D BASIC

- High-precision machine with the latest **SIEMENS** control and **SIEMENS** servo drives
- Compact spindle stock design
- Spindle stock design guarantees minimal noise development
- 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
- Wide machine bed with double rectangular guideways
- Bed rails tempered and grinded
- 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
- 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
- Tailstock end cover
- 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 in standard scope of delivery
- RJ45 plug-in connection, USB connection and 230 V power connection
- Six machine feet in the standard scope of delivery
- EMC Electromagnetic compatibility
- Including two-year **SIEMENS** warranty
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



OPTITURN L 440 / L 460

TECHNICAL DATA

| Model | L 440 | | L 460 | |
|---|--|--|-------------------------------------|--|
| Article no. | 3514410 | | 3514420 | |
| | | | | |
| Machine data | | | | |
| Electrical connection | 400 V / 3 Ph ~50 Hz | | | |
| Total connected load | 25 kVA | | | |
| Spindle | | | | |
| 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 | | | |
| Cooling lubricant system | | | | |
| Coolant pump motor | 375 W | | | |
| Tank capacity | 170 litres | | | |
| Hydraulic system | | | | |
| Motor - hydraulic pump | 750 W | | | |
| Tank capacity | 50 litres | | | |
| Machine data | | | | |
| Centre height | 235 mm | | | |
| Centre width | 1 000 mm | | 1 500 mm | |
| Swing Ø above cross slide | Ø 240 mm | | | |
| Swing Ø above machine bed | Ø 475 mm | | | |
| Swing Ø in the bed bridge | Ø 710 mm | | | |
| Bed width | 355 mm | | | |
| Speed range | | | | |
| Speeds stage 1 / stage 2 | 100 - 950 rpm / 900 - 4 500 rpm | | | |
| Torque at stage 1/stage 2 | 525 Nm / 382 Nm | | | |
| Tool turret | | | | |
| Hydraulic type | LS 160 VDI 40 | | | |
| Number of tool slots | 8 tools | | | |
| Max. height, width square | 25 x 25 mm | | | |
| Max. diameter drilling rod | Ø 32 mm | | | |
| Option: Baruffaldi tool turret | (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 | | | |
| Precision | | | | |
| Repeat accuracy | ± 0.005 mm | | | |
| Positioning accuracy | ± 0.005 mm | | | |
| Travel | | | | |
| X axis | 260 mm | | | |
| Z axis | 1 150 mm | | 1 680 mm | |
| Feed speed | | | | |
| X axis/Y axis | 15 m/min. | | | |
| Motor torque | | | | |
| X axis/Y axis | 6 Nm / 16 Nm | | | |
| Feed forces | | | | |
| X axis/Y axis | 7.5 kN / 10 kN | | | |
| Tailstock | | | | |
| Tailstock seat | MT 4 | | | |
| Tailstock quill diameter | Ø 65 mm | | | |
| Tailstock - quill stroke | 150 mm | | | |
| Dimensions | | | | |
| 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 | |
| Sinumerik 828D system software | | | | |
| | PPU 271/SW 24x | | PPU 290/SW 26x (optional 351442080) | |
| CNC memory | 3 MB | | 5 MB | |
| Cycle change time | 3 ms | | 2 ms | |
| Look Ahead | 50 | | 100 | |
| Number of tools | 128 | | 256 | |

SINUMERIK 828D Basic

High-tech for the compact class

Boosting productivity and precision in manufacturing

The use of two autonomously operating tools makes 4-axis turning - balance cutting - possible. The new functions include multi-channel capability with ShopTurn, which, among other things, allows programmes to be synchronised with programSYNC. The new Software offers the possibility to run two channels simultaneously in turning and grinding machines. SINUMERIK CNC control Sinumerik 828D Basic sets standards in all aspects of machining performance. Whether accuracy and speed, whether reduction of cycle times or energy efficiency and safety - the SINUMERIK sets the pace.

SHOPTURN

- shortest programming time for creating one-off parts and small batches

DXF READER

- Faster from the drawing to the workpiece. Easy transfer of CAD data into programming by DXF reader (optional article no. 3584014).



Control

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

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

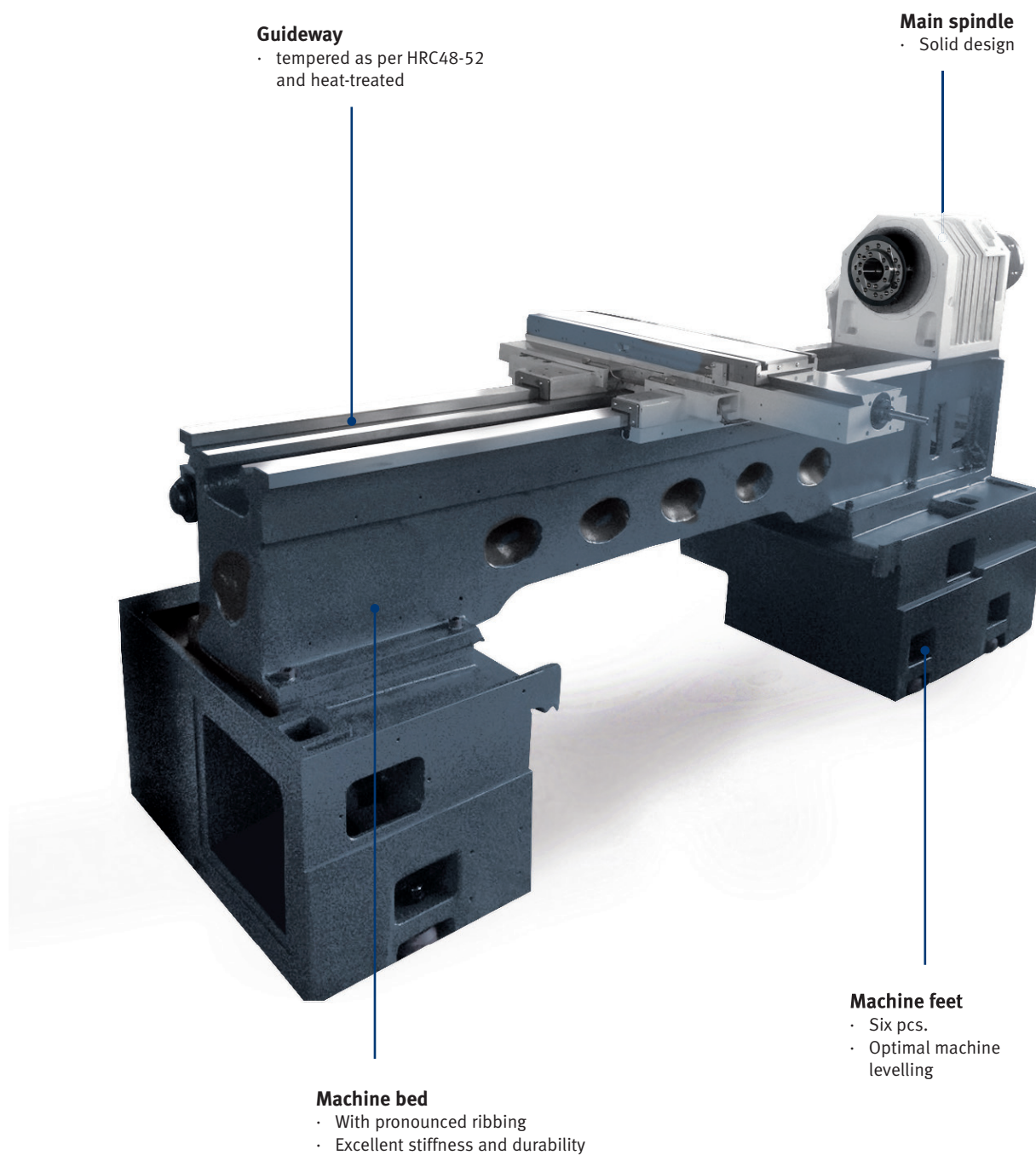
Functional safety also provides protection against high costs!

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

OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- Shopturn work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording
- System software SW 24x



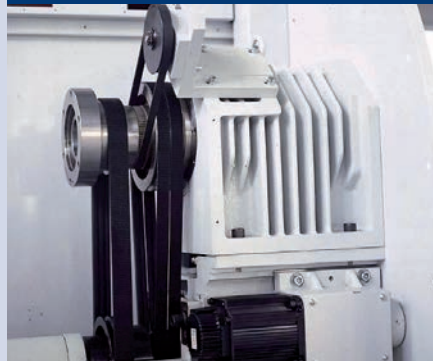


HORIZONTAL / VERTICAL



- 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

SWITCH GEARBOX



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

AUTOM. LUBRICATION SYSTEM



- Automatic lubrication of the headstock and the longitudinal and cross slide

TOOL TURRET



- Eight tool slots
- Hydraulic VDI40 tool turret
- Mounting height square max. 25 mm
- Boring bar 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/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 | | |
|--|------------|----------------|--|
| TOOL TURRET AND C-AXIS (Please note: traverse paths can change) | | | |
| 351441042 * | 351442042* | 1 | Baruffaldi tool turret TBMA160 VDI40 with tool drive <ul style="list-style-type: none">Instead of standard equipment › tool turret LS160 |
| | | | |
| TAILSTOCK | | | |
| 351441019* | 351442019* | 2 | Tailstock spindle <ul style="list-style-type: none">Machine preparation for the hydraulic tailstock spindleHydraulic tailstock spindle |
| 351441021* | 351442021* | | |
| 351441023* | 351442023* | | Pneumatic lifting device for the tailstock <ul style="list-style-type: none">Pneumatic air cushion, reduces friction thus facilitating tailstock movement |
| 351441022* | 351442022* | | Device for travelling tailstock <ul style="list-style-type: none">Tailstock and support are linked for motion |
| BAR FEEDER | | | |
| 351441037* | 351442037* | 3 | Bar feeder interface <ul style="list-style-type: none">Preparation |
| 351441033* | 351442033* | | Bar feeder Pro V 65E 1.2 metres <ul style="list-style-type: none">Including bar feeder interface (351441037/351442037) |
| 351441034* | 351442034* | | Bar feeder Pro V 65LE 1.5 metres <ul style="list-style-type: none">Including bar feeder interface (351441037/351442037) |
| 351441038* | 351442038* | | Bar feeder Pro Conqueror 3 metres <ul style="list-style-type: none">Including bar feeder interface (351441037/351442037) |
| ➡ For information on bar feeders, and more bar feeders ex warehouse Germany see page 296 | | | |
| LIFTING DEVICE | | | |
| 3514301 | | Lifting device | <ul style="list-style-type: none">a lifting device is required to unload the machine. |
| LATHE CHUCK | | | |
| 351441008* | 351442008* | | Three-jaw lathe chuck <ul style="list-style-type: none">manual Ø 200 mm |
| 351441011* | 351442011* | | Four-jaw lathe chuck <ul style="list-style-type: none">manual Ø 250 mm |
| 351441028* | 351442028* | | Hydraulic three-jaw lathe chuck Ø 250 mm <ul style="list-style-type: none">Instead of standard equipment › hydraulic three-jaw lathe chuck Ø 200 mm |
| 351441031* | 351442031* | | Hydraulic four-jaw lathe chuck Ø 250 mm <ul style="list-style-type: none">Instead of standard equipment › hydraulic three-jaw lathe chuck Ø 200 mm |
| 3519707 | | | soft top jaw <ul style="list-style-type: none">for the hydraulic three-jaw lathe chuck Ø 200 mm included in the standard equipment |
| 3519727 | | | Hard insert jaws <ul style="list-style-type: none">for the hydraulic three-jaw lathe chuck Ø 200 mm included in the standard equipment |
| 3519708 | | | soft top jaw <ul style="list-style-type: none">for the hydraulic three-jaw lathe chuck Ø 250 mm (351441028)for the hydraulic four-jaw lathe chuck Ø 250 mm (351441031) |
| 3519728 | | | Hard insert jaws <ul style="list-style-type: none">for the hydraulic three-jaw lathe chuck Ø 250 mm (351441028)for the hydraulic four-jaw lathe chuck Ø 250 mm (351441031) |
| | | | |
| MISCELLANEOUS | | | |
| 351441001* | 351442001* | 4 | Internal tool cooling <ul style="list-style-type: none">External unit (an extraction unit is required) |
| 351441007* | 351442007* | | Oil separator <ul style="list-style-type: none">with rotary disc, removes oil from the coolant |
| 351441013* | 351442013* | | High performance coolant pump <ul style="list-style-type: none">5 bar |
| 351441014* | 351442014* | 5 | Air conditioner <ul style="list-style-type: none">Instead of the standard equipment › heat exchanger |
| 351441016* | 351442016* | 6 | Tool holder set <ul style="list-style-type: none">For the › tool turret LS160 - included in the standard equipment |
| 351441020* | 351442020* | | Portable electronic handwheel <ul style="list-style-type: none">Instead of standard equipment › electronic handwheel (cannot be combined with joystick 351441002 / 351442002) |
| 351441002* | 351442002* | | Joystick <ul style="list-style-type: none">Cannot be combined with electronic handwheel 351441(2)0 20 |
| 351441003* | 351442003* | | Fixed steady rest |
| 351441004* | 351442004* | | Follow steady rest |
| 351441043 | | 7 | HPRA Renishaw High Precision Measuring Arm <ul style="list-style-type: none">for Ø 200 mm lathe chuckfor Ø 250 mm lathe chuck <ul style="list-style-type: none">Information ex warehouse Germany can be found at page 300 |
| 351441044 | | | |
| 351441005* | 351442005* | 9 | Chip conveyor <ul style="list-style-type: none">L 440: 1.0 metre - L 460: 1.5 metres |
| 351441006* | | | Chip carriage <ul style="list-style-type: none">Rollable, folding, L x W x H: 994 x 510 x 838 mm |
| SOFTWARE | | | |
| 3584014 | | 8 | Software DXF Viewer/Reader <ul style="list-style-type: none">From version 4.7 |
| HARDWARE | | | |
| 351442080* | | 9 | SIEMENS control PPU 290 <ul style="list-style-type: none">15.6" colour display- 16:9 format, Software SW 26x |

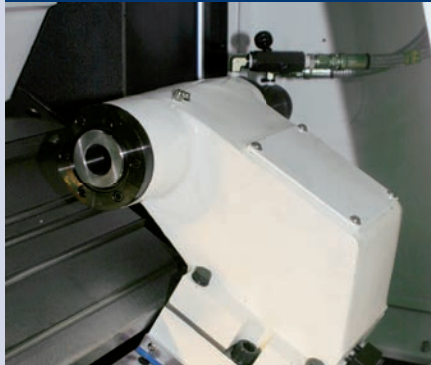
NEW

1 TOOL TURRET



- Max. permissible speed 6 000 rpm at tool coupling
- Max. 5 kW tool output (S3 40 % duty cycle 10 min.)
- Max. 20 Nm tool torque
- Hydraulic drive

2 TAILSTOCK



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

3 BAR FEEDER



- The bar feeders are the ideal solutions for automatic loading of CNC lathes with short bars
- They combine maximum productivity with a small footprint

4 OIL SEPARATOR



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

5 AIR CONDITIONER



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

6 STEADY RESTS



Fixed steady rest

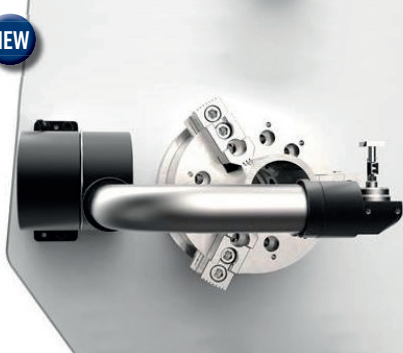
- Passage from Ø 20 mm to Ø 200 mm

Follow steady rest

- Passage from Ø 20 mm to Ø 100 mm

7 MEASURING ARM

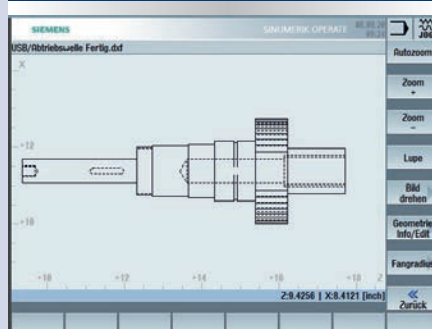
NEW



- Up to 90 % faster tool measuring
- Typical position accuracy of 5 µm 2
- TS12 Interface

Information on the measuring arm see page 300

8 DXF READER



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

9 CONTROL PPU 290



- Capacitive display with Multitouch controller
- Intuitive Multitouch operation
- Soft key selection via touch function
- Software SW 26

S 620 / S 620L

OPTIMUM PREMIUM CNC-Slant bed lathes with counter spindle

SIEMENS SINUMERIK 828D with PPU 290

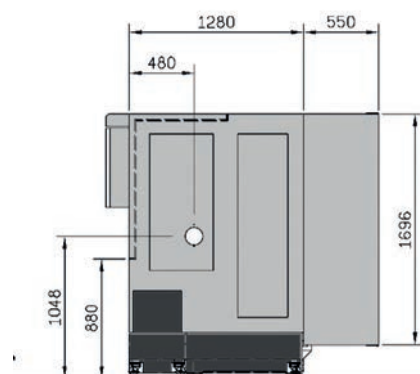
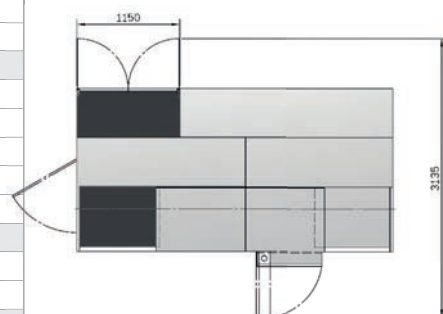
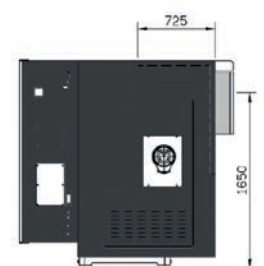
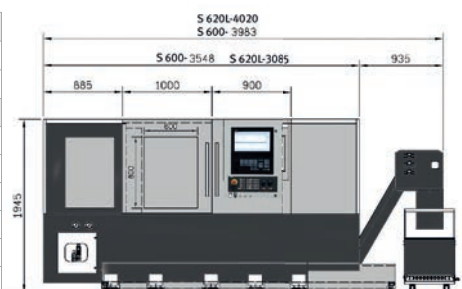
- Heavy duty version
- Compact design
- **SIEMENS** servo motors on all axes
- Slant bed design 30° for particularly large machining diameter
- Easy chip removal into the chip tray
- Dimensionally stable linear guides ensure a long service thanks to maximum static and dynamic stiffness
- Hardened and grinded ball screw spindles
- 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 Ø 150 mm for the counter spindle
- Coolant system
- Foot switch
- Automatic lubrication system
- Hydraulic unit
- Heat exchanger for switch cabinet
- Bar feeder interface
- EMC Electromagnetic compatibility
- Including two-year **SIEMENS** warranty
- **SIEMENS** warranty extension on page 155
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



OPTITURN S 620 / S 620L

TECHNICAL DATA

| Model | S 620 | S 620L |
|--------------------------------------|---------------------|-------------------|
| Article no. | 3515065 | 3515070 |
| | | |
| Machine data | | |
| Electrical connection | 400 V / 3 Ph ~50 Hz | |
| Total connected load | 20 kVA | |
| Main spindle Z spindle | | |
| Drive motor S1 operation | 11 kW | |
| Torque drive motor S1 operation | 98.7 Nm | |
| Drive motor S6 30 % operation | 15 kW | |
| 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 | |
| Counter spindle Z2 spindle | | |
| 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 | |
| Pumps | | |
| Coolant pump output | 530 W | |
| Output of hydraulic pump | 2.2 kW | |
| Central lubrication system output | 30 W | |
| Machine data | | |
| Max. turning diameter | Ø 380 mm | |
| Swing Ø above machine bed | Ø 650 mm | |
| Turning length | 520 mm | 1 020 mm |
| Swing Ø above cross slide | Ø 380 mm | |
| Slant bed | 30° | |
| Speed range | | |
| Speeds main spindle Z spindle | 4 000 rpm | |
| Speeds counter spindle Z2 spindle | 5 000 rpm | |
| Tool turret | | |
| Hydraulic type | VDI 30 DIN 5480 | |
| Motor output, power tools DIN 5480 | 3.75 kW | |
| Speed, power tools DIN 5480 | 6 000 rpm | |
| Number of tool slots | 12 tools | |
| Max. height, width square | 25 x 25 mm | |
| Max. diameter drilling rod | Ø 40 mm | |
| Precision | | |
| Repeat accuracy | ± 0.005 mm | |
| Positioning accuracy | ± 0.005 mm | |
| Travel | | |
| X axis | 215 mm | |
| Y axis (option) | 100 mm (± 50 mm) | |
| Z axis/Z2 axis | 520 mm | 1 020 mm |
| Feed speed/rapid motion | | |
| X axis | 24 m/min | |
| Y axis (option) | 6 m/min. | |
| Z axis/Z2 axis | 24 m/min | |
| Motor torque | | |
| X axis/Y axis | 11 Nm / 16 Nm | |
| Y axis (option) | 6 Nm | |
| Feed forces | | |
| X axis/Y axis | 6.9 kN / 10 kN | |
| Y axis (option) | 6.2 kN | |
| Dimensions | | |
| Length without / with chip conveyor | 3 500 mm/3 985 mm | 4 020 mm/4 485 mm |
| Width x height | 3 135 x 1 950 mm | |
| Overall weight | 5 000 kg | 6 000 kg |



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

SINUMERIK 828D

The power package in the compact class of CNC controls

Boosting productivity and precision in manufacturing

Robust hardware architecture and intelligent control algorithms as well as top-class drive and motor technology ensure the highest dynamics and precision during machining.

Advanced software-controlled compensation functions ensure additional quality in surface machining and high availability of the machine tool.

With SINUMERIK Operate, all machining technologies, from standard to complex, can be operated intuitively and with a uniform "look & feel".

SINUTRAIN

- NC programming on the PC as on the CNC - same operation and programming
- Work preparation already while the machine is still cutting: Test, run-in and simulate NC programs on the PC - less time stress at the machine
- CNC education and training with exactly the same programming and operating interface as in the workshop - without waiting for it to "finally get to it", without the risk of breaking something - and with the possibility of doing preparatory and follow-up work at home or on the road.

Multitouch operation with PPU 290

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

User-friendly

- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function
- Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)
- Proximity/distance sensor for smart display control

Rugged and maintenance-free

- Front panel made of die-cast magnesium with scratchproof glass front
- Can be operated while wearing gloves
- NV RAM memory technology without buffer battery
- Fanless and hard diskless design



**SIEMENS
SAFETY**

INTEGRATED

SET UP WORK WITH OPEN DOORS

Functional safety also provides protection against high costs!

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

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

OVERALL PACKAGE

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



Guides

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

Slant bed

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

C axis

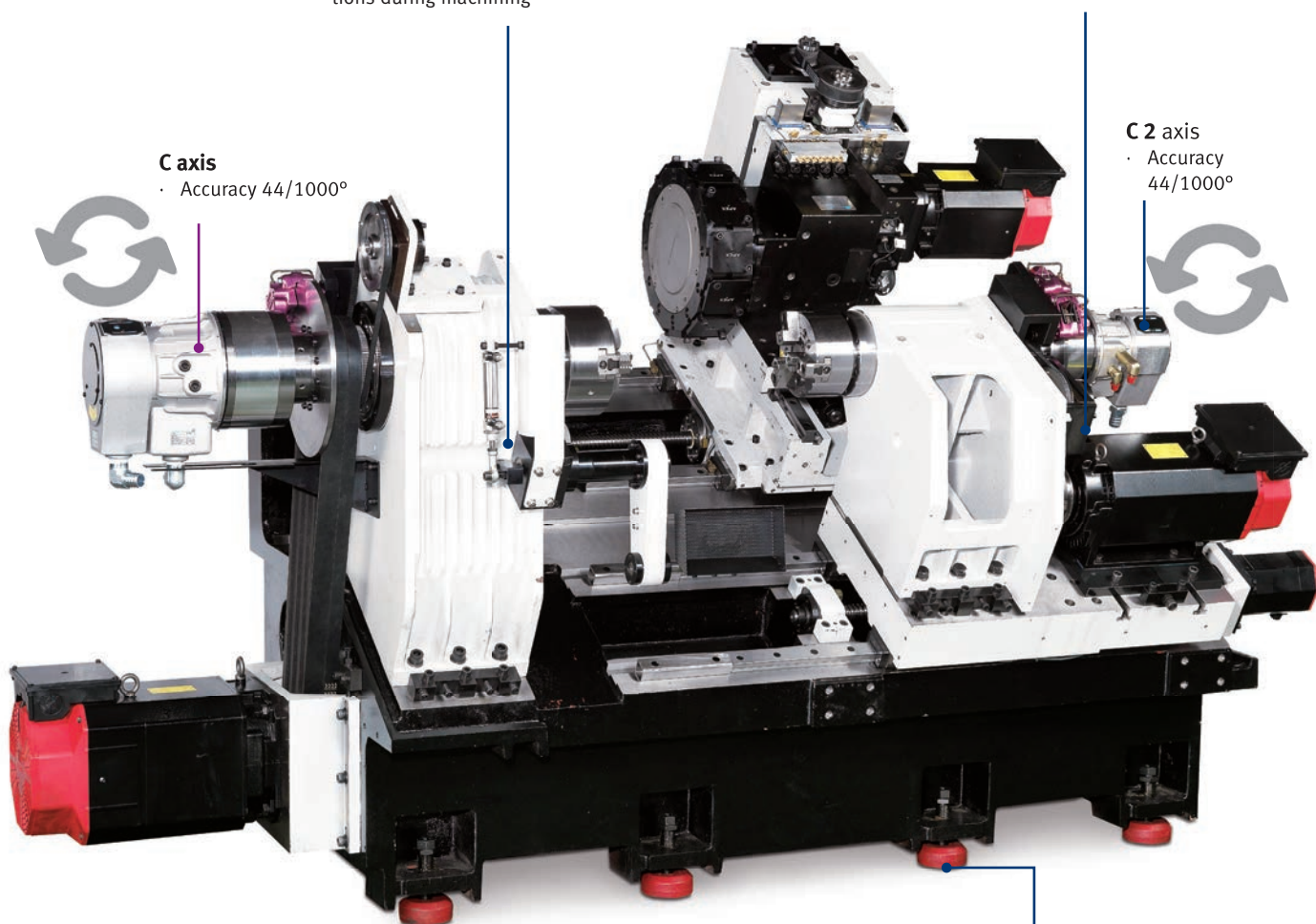
- Accuracy 44/1000°

C 2 axis

- Accuracy 44/1000°

Machine feet

- Eight pcs.
- Optimised alignment of the machine

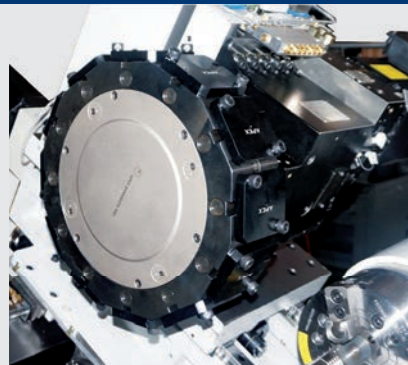


HEAT EXCHANGER



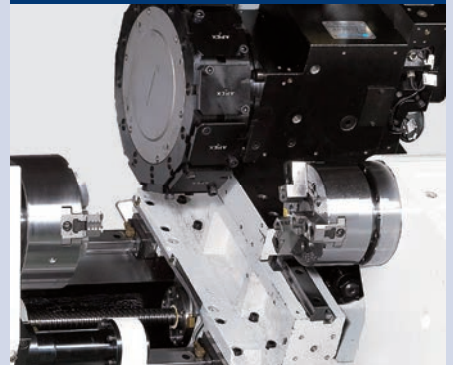
- Closed switch cabinet with smart cooling management
- Optimal temperature even in case of high ambient temperatures

TOOL TURRET



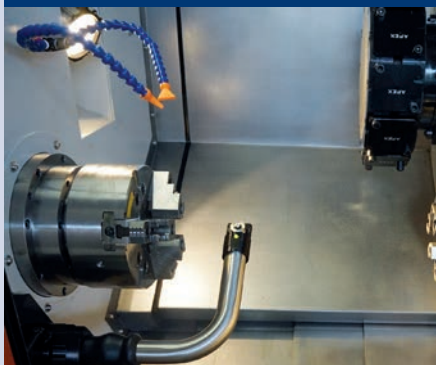
- Reliable and fast changer
- Driven tools DIN 5480 with servo motor, 12 tool slots

COUNTER SPINDLE



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

TOOL PROBE



- By Renishaw
- Enables measuring of the tools within the machine at the main spindle

LATHE CHUCK



- Hydraulic Ø 200 mm

AUTOM. LUBRICATION SYSTEM



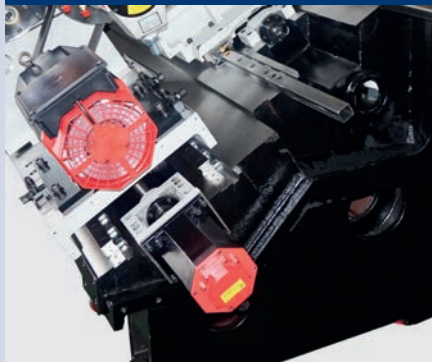
- Folds out
- With float switch. If the oil level is too low, an audible signal is output

LINEAR GUIDE



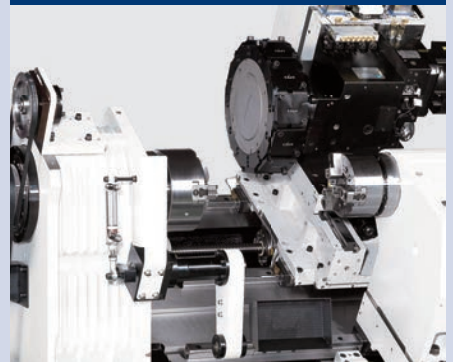
- Faster motion - rapid traverse 24 m / min.
- Z/Z2 axis

SLANT BED




- 30° one-piece slant bed
- Ribbed
- Maximum stiffness

MAINSPINDLE Z-SPINDLE



- Main spindle 4 000 rpm
- Counter spindle 5 000 rpm

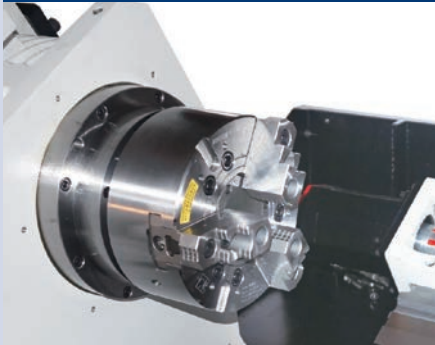
| LATHE CHUCK | | | |
|-------------|---|---|---|
| 351506501 | 1 | Hydraulic three-jaw lathe chuck Ø 250 mm | · Instead of standard equipment › hydraulic three-jaw lathe chuck Ø 200 mm |
| 351506502 | | Hydraulic four-jaw chuck Ø 200 mm | · Instead of standard equipment › hydraulic three-jaw lathe chuck Ø 200 mm |
| 351506503 | | Hydraulic four-jaw chuck Ø 250 mm | · Instead of standard equipment › hydraulic three-jaw lathe chuck Ø 200 mm |
| 351506510 | | Hydraulic four-jaw chuck Ø 150 mm | · Instead of standard equipment › hydraulic three-jaw lathe chuck Ø 150 mm · for counter spindle / B spindle |

| BAR FEEDER | | | |
|--|---|--------------------------|---|
| 351506535* | 2 | Bar feeder Pro V 65E | · Rod length 1 200 mm; material rods Ø 5 mm - Ø 65 mm |
| 351506536* | | Bar feeder Pro V 65LE | · Rod length 1 500 mm; material rods Ø 5 mm - Ø 65 mm |
| 351506538* | | Bar feeder Pro Conqueror | · Rod length 3 000 mm; material rods Ø 5 - 51 mm |
|  For information on bar feeders, and more bar feeders ex warehouse Germany see page 296 | | | |

| COLLET CHUCK | | | |
|--------------|---|--------------|---|
| 351506504* | 3 | Collet chuck | · for the main spindle - instead of standard equipment › hydraulic three-jaw lathe chuck Ø 200 mm |
| 351506511* | | Collet chuck | · for the B spindle - instead of standard equipment › hydraulic three-jaw lathe chuck Ø 150 mm |

| MISCELLANEOUS | | | |
|---------------|---|-------------------------|--|
| 351506515* | 4 | Y axis | · for more flexible milling applications |
| 351506520* | 5 | Internal tool cooling | · 20 bar |
| 351506527* | | Air conditioner | · Instead of the standard equipment › heat exchanger |
| 351506528* | 6 | Automatic door opener | |
| 351506525* | 7 | Automatic tool set-up | |
| 351506526* | 8 | Automatic parts catcher | |

1 LATHE CHUCK



- Hydraulic three-jaw lathe chuck available in size Ø 250 mm
- Hydraulic four-jaw lathe chuck in sizes Ø 200 mm and Ø 250 mm
- For the counter spindle, hydraulic four-jaw lathe chuck Ø 150 mm

2 BAR FEEDER



- The bar feeders are the ideal solutions for automatic loading of CNC lathes with short bars
- They combine maximum productivity with a small footprint

3 COLLET CHUCK



- For the main spindle and counter spindle

4 Y AXIS



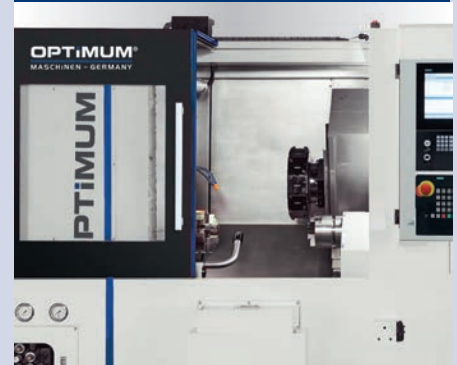
- More flexible machining

5 AIR CONDITIONER



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

6 DOOR OPENERS



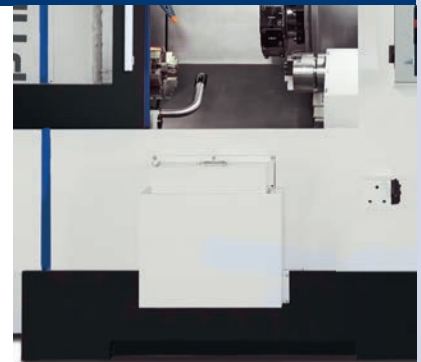
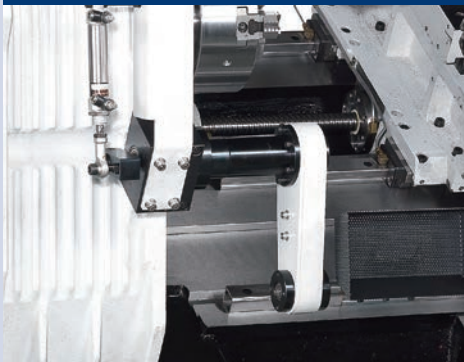
- Particularly user-friendly
- High level of automation

7 TOOL SETUP



- Automatic
- High level of automation

8 PART GRIPPERS



- An automatic part catcher reduces non-productive times, as the finished workpieces can be removed outside the machine
- Automatically computes the correct position

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

- All axes with **SIEMENS** servo motors
- 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 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
- 20 bars Coolant Through Spindle
- 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-year **SIEMENS** warranty
- **SIEMENS** warranty extension on page 163
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



OPTITURN S 500 / S 750

TECHNICAL DATA

| Model | S 500 | | S 500L | | S 750K | | S 750 | |
|---------------------------------------|----------|--|------------------------------|--|---------------------|--|----------|--|
| Article no. | 3515150 | | 3515152 | | 3515172 | | 3515170 | |
| | | | | | | | | |
| Machine data | | | | | | | | |
| Electrical connection | | | 400 V / 3 Ph ~50 Hz | | | | | |
| Total connected load | | | 50 kVA | | 62.5 kVA | | | |
| Spindle | | | | | | | | |
| 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 | | | |
| Cooling lubricant system | | | | | | | | |
| Coolant pump output | | | 750 W | | | | | |
| Tank capacity | | | 185 litres | | | | | |
| Hydraulic system | | | | | | | | |
| Hydraulic pump power | | | 1.5 kW | | | | | |
| Tank capacity | | | 70 litres | | | | | |
| Machine data | | | | | | | | |
| 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 Ø above cross slide | | | Ø 450 mm | | | | | |
| Swing Ø above machine bed | | | Ø 600 mm | | | | | |
| Slant bed | | | 45° | | | | | |
| Speed range | | | | | | | | |
| Spindle speeds | | | 10 - 4 500 rpm | | 10 - 3 000 rpm | | | |
| Tool turret | | | | | | | | |
| Hydraulic type | | | Sauter VDI40 with tool drive | | | | | |
| Number of tool slots | | | 12 tools | | | | | |
| Permissible speed at tool coupling | | | max. 4 500 rpm | | | | | |
| Power of the tools | | | 4.82 KW | | | | | |
| Max. tool torque | | | 20 Nm | | | | | |
| Max. height, width square | | | 25 x 25 mm | | | | | |
| Max. diameter drilling rod | | | Ø 32 mm | | | | | |
| Precision | | | | | | | | |
| Repeat accuracy | | | ± 0.005 mm | | | | | |
| Positioning accuracy | | | ± 0.005 mm | | | | | |
| Travel | | | | | | | | |
| X axis | | | 305 mm | | | | | |
| Z axis | 750 mm | | 1 250 mm | | 750 mm | | 1 250 mm | |
| Y axis (optional) | | | +/- 50 mm | | | | | |
| Feed speed | | | | | | | | |
| X axis/Y axis | | | 24 m/min. | | | | | |
| Motor torque | | | | | | | | |
| X axis/Y axis | | | 11 Nm / 27 Nm | | | | | |
| Feed forces | | | | | | | | |
| X axis/Y axis | | | 6.9 kN / 16.9 kN | | | | | |
| Tailstock | | | | | | | | |
| Tailstock seat | | | MT 5 | | | | | |
| Travel | 650 mm | | 1 150 mm | | 650 mm | | 1 150 mm | |
| Tailstock quill diameter | | | 90 mm | | | | | |
| Tailstock - quill stroke hydraulic | | | 120 mm | | | | | |
| Dimensions | | | | | | | | |
| Length | 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 | PPU 271/SW 26x | | |
| CNC memory | 5 MB | Look Ahead | 100 |
| Cycle change time | 2 ms | Number of tools | 256 |

SINUMERIK 828D

The power package in the compact class of CNC controls

Boosting productivity and precision in manufacturing

Robust hardware architecture and intelligent control algorithms as well as top-class drive and motor technology ensure the highest dynamics and precision during machining.

Advanced software-controlled compensation functions ensure additional quality in surface machining and high availability of the machine tool.

With SINUMERIK Operate, all machining technologies, from standard to complex, can be operated intuitively and with a uniform "look & feel".

SINUTRAIN

- NC programming on the PC as on the CNC - same operation and programming
- Work preparation already while the machine is still cutting: Test, run-in and simulate NC programs on the PC - less time stress at the machine
- CNC education and training with exactly the same programming and operating interface as in the workshop - without waiting for it to "finally get to it", without the risk of breaking something - and with the possibility of doing preparatory and follow-up work at home or on the road.



Control

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

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!

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

OVERALL PACKAGE

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

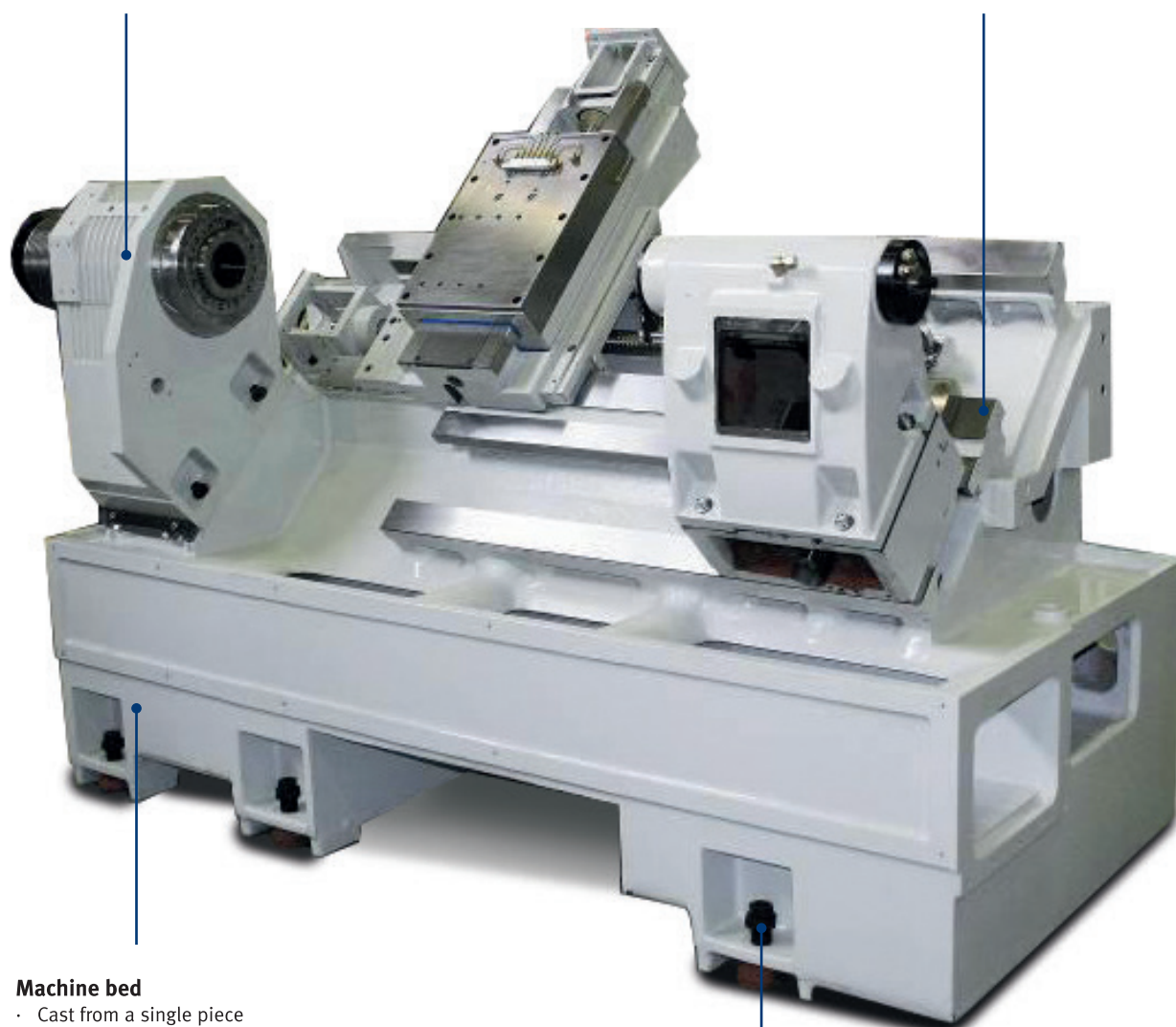


Headstock

- MEEHANITE® cast iron
- Cooling ribs on outside dissipate heat more effectively

Guide

- Excellent stiffness and stability



Machine bed

- Cast from a single piece
- Pronounced ribbing
- 45-degree slant
- Excellent stiffness and durability
- MEEHANITE® cast iron with a hardness of HB 170 ~ 180

Machine feet

- Six pcs.
- Optimal machine levelling

LASER MEASURING



- Guaranteed repetition and positioning accuracy

C AXIS



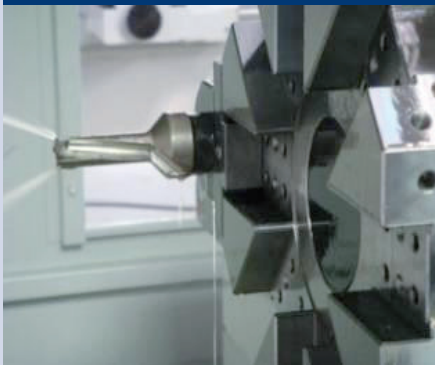
- Excellent part precision and fast tool changes
- Swivel range, high torque and maximum stability

TAILSTOCK



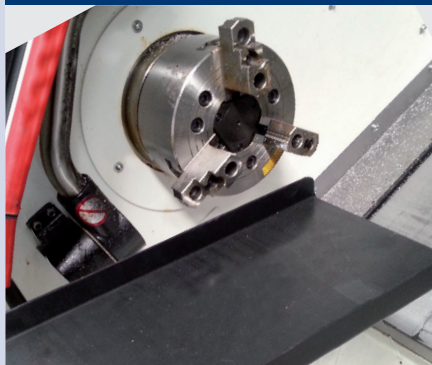
- Programmable
- Heavy duty version
- Excellent stiffness
- Can be optionally operated via a program or the foot pedal

TOOL WITH INTERNAL COOLING



- Pressure: 20 bars
- 25µm filter accuracy

PART GRIPPER DEVICE



- Automatic
- Finished parts are transported from the main spindle to the finished parts container with the aid of the parts catcher.
- This enables the gentle removal of the finished parts

INTERFACE



- Preparation
 - Connection for bar feeder
- ➔ For information on bar feeders see page 296

AUTOM. 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

| S 500 | S 750 | | |
|--|------------|---|--|
| TOOL TURRET AND Y-AXIS (Please note: traverse paths can change) | | | |
| 351515018* | 351517018* | 1 | Y axis Including Sauter tool turret with drive <ul style="list-style-type: none"> Travel path +/- 50 mm Instead of standard equipment › hydraulic tool turret |

| BAR FEEDER | | | | |
|---|------------|---|--------------------------|---|
| 351515003* | 351517003* | 2 | Bar feeder Pro V 65E | • Rod length 1 500 mm; material rods Ø 5 mm - Ø 65 mm |
| 351515012* | 351517012* | | Bar feeder Pro Conqueror | • Rod length 3 000 mm; material rods Ø 5 - 51 mm |
|  For information on bar feeders, and more bar feeders ex warehouse Germany see from page 296 | | | | |

| TOOL HOLDER | | | |
|--------------------|------------|---|--|
| 351515006* | 351517006* | 3 | Axially driven tool holder <ul style="list-style-type: none"> Collet chuck ER 32 |
| 351515007* | 351517007* | 4 | Radially driven tool holder <ul style="list-style-type: none"> Collet chuck ER 32 |
| 351515008* | 351517008* | 5 | Radially driven tool holder on rear side <ul style="list-style-type: none"> Collet chuck ER 32 |

| STEADY RESTS | | | |
|---------------------|-----------|---|--------------------------|
| 351515010 | 351517010 | 6 | Fixed steady rest |

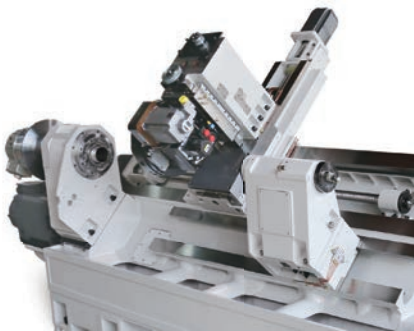
| MISCELLANEOUS | | | |
|----------------------|------------|---|---|
| 351515009* | 351517009* | 7 | Air conditioner <ul style="list-style-type: none"> Instead of the standard equipment › heat exchanger |
| 351515001* | 351517001* | | Oil separator <ul style="list-style-type: none"> with rotary disc, removes oil from the coolant Capacity: 1 litre per hour |

| SOFTWARE | | | |
|-----------------|--|---|--|
| 3584014 | | 8 | Software DXF Viewer/Reader <ul style="list-style-type: none"> from version 4.7 For importing DXF files Hiding graphics layers Automatic contour tracking Arbitrary workpiece zero point per contour/drilling point |

| HARDWARE | | | |
|-----------------|--|---|--|
| 351515030* | | 9 | SIEMENS control PPU 290 <ul style="list-style-type: none"> 15.6" colour display- 16:9 format, Software SW 26 |

| LATHE CHUCK | | | |
|--------------------|-----------|--|--|
| - | 351517013 | | Hydraulic four-jaw lathe chuck Ø 200 mm <ul style="list-style-type: none"> Instead of standard equipment - hydraulic three-jaw lathe chuck Ø 250 mm |
| - | 351517015 | | Four-jaw lathe chuck hydraulic Ø 300 mm <ul style="list-style-type: none"> Instead of standard equipment › three-jaw lathe chuck hydraulic Ø 250 mm |
| 351515013 | - | | Hydraulic four-jaw lathe chuck Ø 200 mm <ul style="list-style-type: none"> Instead of standard equipment › hydraulic three-jaw lathe chuck Ø 200 mm |
| 351515016 | - | | Hydraulic three-jaw lathe chuck Ø 250 mm <ul style="list-style-type: none"> Instead of standard equipment › hydraulic three-jaw lathe chuck Ø 200 mm |
| 351515017 | - | | Four-jaw lathe chuck hydraulic Ø 250 mm <ul style="list-style-type: none"> Instead of standard equipment › hydraulic three-jaw lathe chuck Ø 200 mm |
| 3519707 | | | soft top jaw <ul style="list-style-type: none"> for the hydraulic four-jaw lathe chuck Ø 200 mm (351517013) |
| 3519727 | | | Hard insert jaws <ul style="list-style-type: none"> for the hydraulic four-jaw lathe chuck Ø 200 mm (351517013) |
| 3519708 | | | soft top jaw <ul style="list-style-type: none"> for the hydraulic three-jaw lathe chuck Ø 250 mm included in the standard equipment for the hydraulic four-jaw lathe chuck Ø 250 mm (351517015) |
| 3519728 | | | Hard insert jaws <ul style="list-style-type: none"> for the hydraulic three-jaw lathe chuck Ø 250 mm included in the standard equipment for the hydraulic four-jaw lathe chuck Ø 250 mm (351517015) |

1 Y AXIS



- Including Sauter tool turret
- With drive

2 BAR FEEDER



- The bar feeders are the ideal solutions for automatic loading of CNC lathes with short bars.
- They combine maximum productivity with a small footprint

3 TOOL HOLDER



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

4 TOOL HOLDER



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

5 TOOL HOLDER



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

6 STEADY



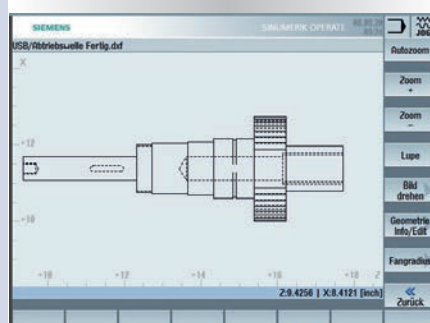
- Fixed steady with a passageway of 20 - 200 mm

7 AIR CONDITIONER



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

8 DXF READER



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

9 CONTROL PPU 290



- Capacitive display with Multitouch controller
- Intuitive Multitouch operation
- Soft key selection via touch function
- Software SW 26

BALTEC IN KAUNAS



Baltec CNC Technologies company headquarters in Kaunas

Training centre in Lithuania uses OPTIMUM CNC machines

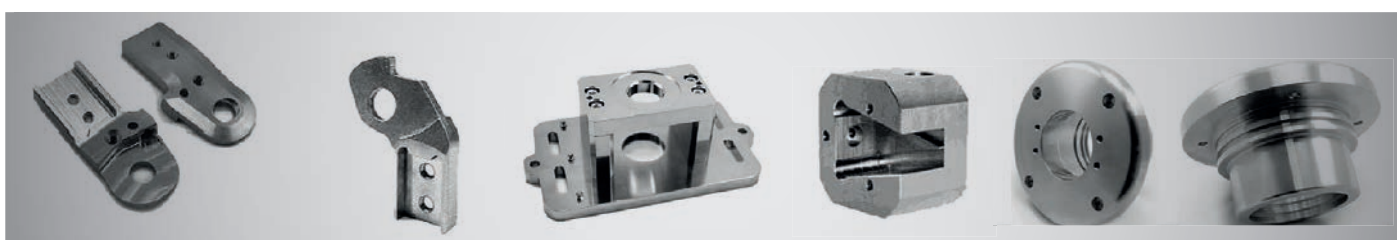
For six years now, Baltec CNC Technologies, a manufacturer of mechanical precision components in Lithuania, has been relying on OPTIMUM lathes and milling machines. Now the cooperation is being taken to a new level: Since March 2020, the company's own training centre has also been equipped with OPTIMUM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

The milled parts specialist, which was founded in 1995 in central Lithuania, currently has around 45 CNC machines in operation, all of which run in 2-shift and, if required, 3-shift operation. Half of them are OPTIMUM brand machines. Under the meticulous eye of highly qualified specialists, these machines produce around 36 000 milled parts a year, the majority of which are exported to Western and Northern Europe, e.g. to Germany, Sweden, Norway and Switzerland. The company also specialises in welding, CNC bending, flame cutting, powder coating and the assembly of subassemblies. Production is optimised for machining individual workpieces made of steel, aluminium, titanium and plastic.

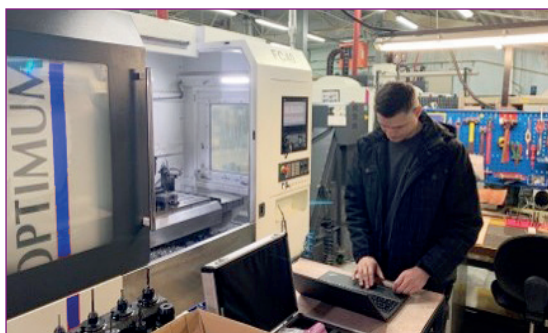
Thus far, Baltec CNC Technologies has used OPTIMUM machines



OPTIMUM machinery at the Baltec CNC Technologies production facility



Turned and milled parts manufactured on OPTIMUM machines



OPTIMUM service technicians on site performing maintenance in Production

exclusively for the production processes. A total of **30 CNC-controlled OPTIMUM machines** are used to manufacture components for the automotive industry, universal mechanical engineering, printing machine technology and the energy sector. To achieve the best possible results, Baltec CNC Technologies is already working with the new 3D printing head 3X technology, which supports the production of medical components by means of 3D printing processes. Since March 2020, the company has not only been using OPTIMUM machines in its production facilities, but has also equipped its in-house training centre with OPTIMUM machines. The company uses this facility, which has an accredited training program, to serve professional development needs of its employees, who can take courses in CNC production techniques there.



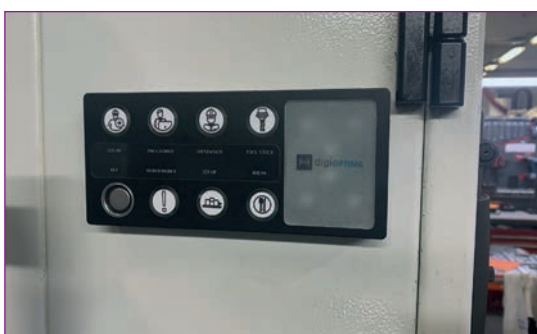
Seven F 150 CNC milling machines and two F310 HSC CNC milling machines in one of Baltec's production shops



Automatic production with robots

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

OPTIMUM lathes and milling machines at Baltec CNC Technologies in Lithuania



Maintenance system for monitoring machine utilisation



OPTIMUM CNC machines coupled to robots





CNC milling machine FU 3 -3+2
CNC milling machine FU 5 -3+2
CNC milling machine FU 5
5-axis milling machines user report see page 196

03

5-AXIS MACHINES

A white circular badge with a blue border and a subtle drop shadow, containing the word "NEW" in blue capital letters.

FU 3 / 3+2

5-axis milling machine with 3+2 machining for powerful complete processing

SIEMENS CONTROL 828D mit PPU 290 and 15.6 inch touchscreen

- Heavy duty version
- High productivity
- The CAM software and milling strategies are equivalent to normal 3-axis programming
- Laterally mounted tool changer, double arm grab with 24 tool slots
- Direct spindles (inline spindles)
- Portable, electronic handwheel with confirm button and emergency stop button. Substantially facilitates running in of programs
- Coolant unit with 250 litre coolant tank, including chip flushing system and cleaning gun
- Automatic centralised lubrication
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- High-performance oil cooler for spindle cooling and ball screw spindle
- 20 bar internal spindle cooling (an extraction unit is required)
- Ethernet
- EMC Electromagnetic compatibility and safety module by **SIEMENS**
- Closed switch cabinet with integrated heat exchanger; ensures optimal temperature even in case of high ambient temperatures; prevents dirt particle penetration
- Machine lamp in the workspace
- RJ45 plug-in connection, USB connection and power connection 230 V
- Including two years **SIEMENS** warranty
- **SIEMENS** warranty extension on page 175
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



Fig. FU 3 with optional accessories

TECHNICAL DATA

| Model | FU 3/3+2 |
|--|--------------------------|
| Article no. | 3511370 |
| Spindle | Inline spindle |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 31 kVA |
| Milling spindle | |
| Drive motor S1 operation | 15 kW |
| Torque drive motor S1 operation | 20 Nm |
| Drive motor S6 30 % operation | 22.5 kW |
| Torque drive motor S6 30 % operation | 62 Nm |
| Spindle seat | SK 40 DIN 69871 |
| Spindle centre to Z axis cover | 595 mm |
| Clearance spindle to table | 100 - 500 mm |
| Cooling lubricant system | |
| Tank capacity cooling lubricant tank | 250 litres |
| Milling precision | |
| Repeat accuracy | ± 0.005 mm / 300 mm |
| Positioning accuracy | ± 0.005 mm |
| Tool changer | |
| Type | Double arm grab |
| Number of tool slots | 24 slots |
| Max. tool diameter | 80 mm |
| Max. tool diameter (tools slots beside not occupied) | 130 mm |
| Tool length | 245 mm |
| Max. tool weight | 8 kg |
| Tool change time T-T | 2 seconds |
| Traverse paths | |
| X axis | 400 mm |
| Y axis | 560 mm |
| Z axis | 400 mm |
| Axis feed drive | |
| Speed swivel axis A | max. 25 rpm |
| Speed rotation axis C | max. 25 rpm |
| Acceleration X/Y/Z axis | 6 m/s ² |
| Rapid traverse X/Y/Z axis | 48 m/min. |
| Speed range | |
| Speeds* | 15 000 rpm |
| Pneumatics | |
| Compressed air | 6 bar |
| Inclining and rotating table | |
| Table diameter | Ø 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 | 12 mm |
| Max. load of working table | 100 kg |
| Dimensions | |
| 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 |
| Cycle change time | 1 ms |
| Look Ahead | 150 |
| Number of tools | 512 |

SINUMERIK 828D

The power package in the compact class of CNC controls

Boosting productivity and precision in manufacturing

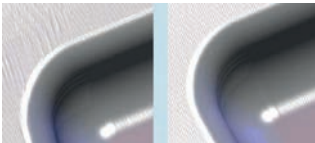
Robust hardware architecture and intelligent control algorithms as well as top-class drive and motor technology ensure the highest dynamics and precision during machining.

Advanced software-controlled compensation functions ensure additional quality in surface machining and high availability of the machine tool.

With SINUMERIK Operate, all machining technologies, from standard to complex, can be operated intuitively and with a uniform "look & feel".

ADVANCED SURFACE

- Thanks to the new Advanced Surface movement guide, it can also be used for tool and mould making.



Perfect surface quality through reproducible results in adjacent milling paths (right picture)

Multitouch operation with PPU 290

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

User-friendly

- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function
- Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)
- Proximity/distance sensor for smart display control

Rugged and maintenance-free

- Front panel made of die-cast magnesium with scratchproof glass front
- Can be operated while wearing gloves
- NV RAM memory technology without buffer battery
- Fanless and hard diskless design

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

TOP SURFACE

- Siemens shows a further development in terms of surface quality in mould making with Top Surface (optional article no. 3584012).
- The function optimises the CAD/CAM-CNC data, which reduces the dependence of the manufacturing quality on the CAD/CAM calculation tolerance and improves the surface quality and shape accuracy.

DXF READER

- Faster from the drawing to the workpiece. Easy transfer of CAD data into programming by DXF reader (optional article no. 3584014).



**SIEMENS
SAFETY**

INTEGRATED

SET UP WORK WITH OPEN DOORS

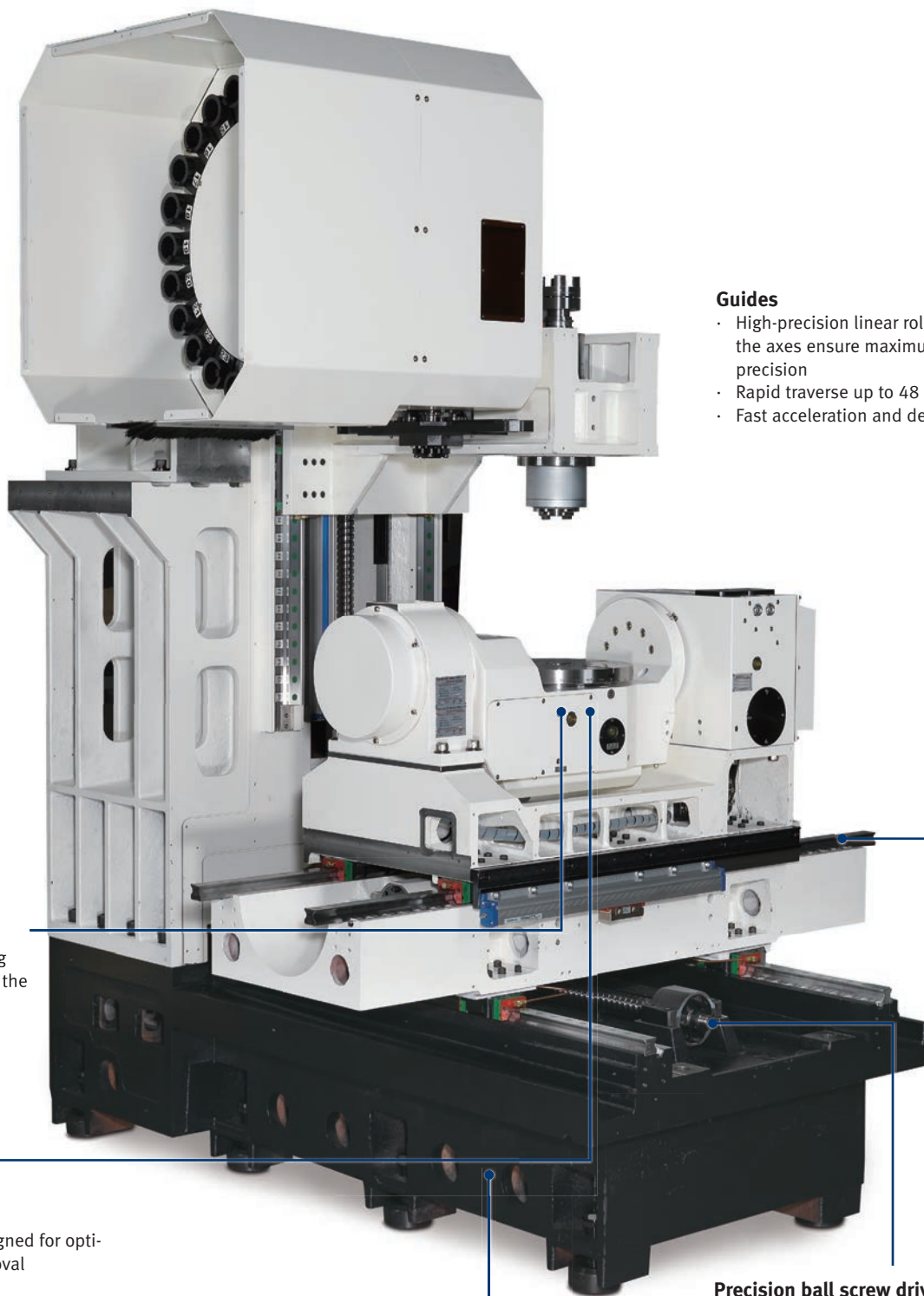
Functional safety also provides protection against high costs!

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

OVERALL PACKAGE

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





Guides

- High-precision linear roller guides on the axes ensure maximum stiffness and precision
- Rapid traverse up to 48 m/min. possible
- Fast acceleration and deceleration speed

Large work area

- Facilitates loading and unloading of the machine

Chip removal

- Machine designed for optimal chip removal

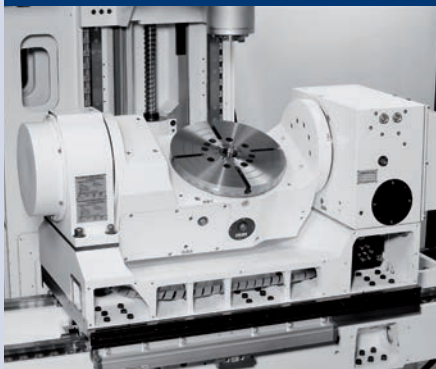
Base body

- Torsion free machine base thanks to strong ribbing, made of quality cast iron

Precision ball screw drives

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

LARGE WORK AREA



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

CONTROL



- Swivel and rotatable
- with signal lamp

TOOL CHANGER



- Double arm grab
- Drum magazine
- 24 tool slots
- Tool change time T-T: 2 seconds

HANDWHEEL



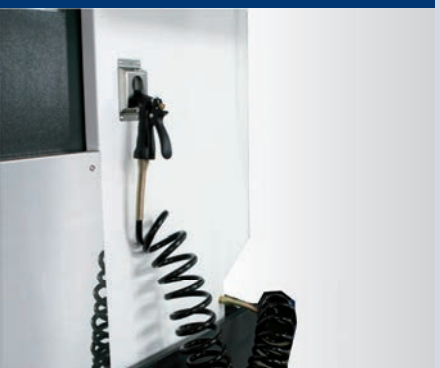
- Portable; electronic
- Substantially facilitates running in of programs
- Emergency stop button
- Confirm button

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

| TOOL MEASURING / WORKPIECE MEASURING | | | |
|--|--|---|---|
| 3511290604* | | BLUM TC52IR Universal measuring probe | <ul style="list-style-type: none"> Switching point repetition accuracy from 0.3µm 2 at 2 m/ min. measuring speed Wear-free and durably stable Very compact probe with 40 mm diameter |
| 3511290605* | | BLUM ZX-Speed 3-D probe | <ul style="list-style-type: none"> Universal 3-D probe for toolmaking and tool break monitoring |
|  For information on Blum workpiece/tool measuring, also ex warehouse Germany see page 275 | | | |

| MISCELLANEOUS | | | |
|---------------|---|--|--|
| 3536109 | 1 | Starter set SK 40 / DIN 69871 |  For Information on the starter set see on page 284 |
| 351137001* | 2 | Coolant through spindle (CTS) | <ul style="list-style-type: none"> External power unit Pump pressure 20 bars Tank capacity 165 litres Pump capacity 30 l/min |
| 351137002* | | | <ul style="list-style-type: none"> External power unit Pump pressure 70 bars Tank capacity 165 litres Pump capacity 29 l/min |
| 351137012* | 3 | Air conditioner | <ul style="list-style-type: none"> Instead of the standard equipment › heat exchanger |
| 351137015* | 4 | Heidenhain glass scales on X/Y/Z axis | <ul style="list-style-type: none"> Greater precision |

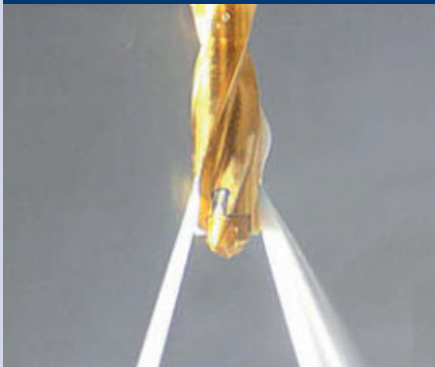
| SOFTWARE | | | |
|----------|---|--|--|
| 3584014 | 5 | DXF Reader for SIEMENS SINUMERIK controls | <ul style="list-style-type: none"> from version 4.7 For importing DXF files Hiding graphics layers Automatic contour tracking Arbitrary workpiece zero point per contour/drilling point Multiple contours/drilling points can be selected at the same time Generate and convert contours or drilling points for ShopMill Displays the created contours/drilling points in the geometry processor/cycle support |
| 3584012 | 6 | Top surface for SIEMENS SINUMERIK control | <ul style="list-style-type: none"> The NC data from the CAM system are optimised online during processing 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 |

1 STARTER SET SK 40 / DIN 69871



- Milling head holder with 27 mm collet 1
- Chuck 1 - 13 mm 2
- Pull stud 3
- 2 each Weldon 6 mm and 20 mm 4
- 2 each Weldon 8 mm, 10 mm, 12 mm and 16 mm
- Reduction sleeve SK 40 to MT 3 5
- Collet chuck ER 32 6
- Collet spanner ER 32 7
- Collet set ER 32 8
- Assembly and tool adjustment gauge 9
- Height-adjuster 10
- Taper squeegee 11

2 COOLANT THROUGH SPINDLE



- Guarantees optimal service life
- External unit
- Pump pressure 20 bars or 70 bars

3 AIR CONDITIONER



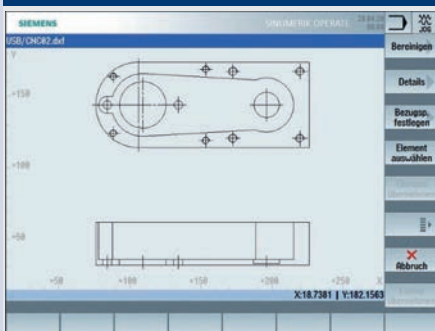
- Instead of heat exchanger
- The air conditioner permanently and constantly cools the control cabinet to the set temperature.

4 GLASS SCALES



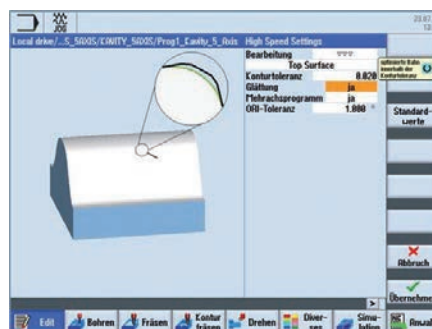
- X, Y and Z axis
- Greater precision

5 DXF READER



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

6 TOP SURFACE



- Top Surface gets the most out of your machine
- Top Surface is synonymous with milling at the physical limits of the machine – at the highest speeds, with utmost accuracy and the best surface quality – not only in mould making
- Excellent surface quality and form precision
- Fast and precise machining thanks to new technology
- Complete machining fully integrated with Sinumerik Operate

FU 5/3+2

A circular badge with a white background and a blue border, containing the word "NEW" in blue capital letters.

5-axis milling machine for 3+2 machining

SIEMENS CONTROL 828D with PPU 290

- Heavy duty version
- High productivity
- Telescopic guideway cover
- Precision ground, pre-stressed, high-performance ball screws
- Spindle borne on P5 precision bearings and permanently lubricated
- High-torque servo drives on all five axes
- Precision linear guides
- Glass scales
- Fast rapid motion speed of up to 36 m/min.
- C-axis with torque motor. For maximum rotational speed and precision over service life
- A axis with screw drive for high torque during tilting actions
- Portable, electronic handwheel with enabling switch and emergency stop button that significantly facilitates the running-in of programmes
- Double arm grab tool changer with 32 tool slots included in standard scope of delivery (optionally available with 48 or 60 tool slots)
- Coolant unit with 380 litre coolant tank, including chip flushing system and cleaning gun
- Automatic centralised lubrication
- RJ45 plug-in connection, USB connection and 230 V power connection
- Additional USB interface on control panel
- Water circuit cooling unit for the main spindle and main spindle motor
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- Heat exchanger
- EMC Electromagnetic compatibility
- Including two years **SIEMENS** warranty
- **SIEMENS** warranty extension on page 183
- Information on „Maintenance contracts“ on page 322



Fig. FU 5 with optional
SCHUNK vice

TECHNICAL DATA

| Model | FU 5/3+2 |
|--|---|
| Article no. | 3511375 |
| Spindle | Direct spindles (In-Line Spindle) |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 70 kVA |
| Milling spindle | |
| Drive motor S1 operation | 25 kW |
| Drive motor torque S1 | 105 Nm |
| Drive motor S6 30 % operation | 40 kW |
| Torque drive motor S6 30 % operation | 261 Nm |
| Spindle seat | SK 40 DIN 69871 |
| Milling precision | |
| Repeat accuracy | ± 0.004 mm |
| Positioning accuracy | ± 0.008 mm |
| Tool changer | |
| Type | Double arm grab |
| Number of tool slots | 32 slots |
| Max. tool diameter | 78 mm |
| Max. tool diameter (tools slots beside not occupied) | 120 mm |
| Tool length | 300 mm |
| Max. tool weight | 7 kg |
| Tool change time T-T | 1.51 seconds |
| Traverse paths | |
| X axis | 600 mm |
| Y axis | 600 mm (+400 mm and -200 mm) |
| Z axis | 500 mm |
| Axis feed drive | |
| Acceleration X/Y/Z axis | 7 m/s ² |
| Rapid traverse X/Y/Z axis | 36 m/min. |
| Motor torque | |
| X/Y/Z axis | 20 Nm |
| Feed forces | |
| X/Y/Z axis | 10 kN |
| Speed range | |
| Speeds* | 15 000 rpm |
| Pneumatics | |
| Compressed air | 6 bar |
| Cooling lubricant system | |
| 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 |
| Inclining and rotating table | |
| Table length x width | 500 x 420 mm |
| T-slot size / amount / distance | 14 mm / 7 / 75 mm |
| Max. load of working table | 600 kg |
| Axis C | |
| Rotating axis | 360° |
| Hydraulic clamping torque | 1 200 Nm (at 50 bar hydraulic operating pressure) |
| Maximum rotational speed (worm gear) | max. 90 rpm |
| A axis | |
| 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 |
| Dimensions | |
| Length x width x height | 3 015 x 4 440 x 3 000 mm |
| Overall weight | 9 150 kg |

| Sinumerik 828D system software | SW 28x |
|--------------------------------|--------|
| CNC memory | 8 MB |
| Cycle 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

The power package in the compact class of CNC controls

Boosting productivity and precision in manufacturing

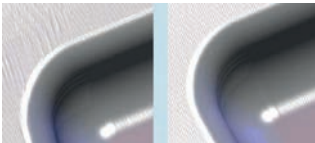
Robust hardware architecture and intelligent control algorithms as well as top-class drive and motor technology ensure the highest dynamics and precision during machining.

Advanced software-controlled compensation functions ensure additional quality in surface machining and high availability of the machine tool.

With SINUMERIK Operate, all machining technologies, from standard to complex, can be operated intuitively and with a uniform "look & feel".

ADVANCED SURFACE

- Thanks to the new Advanced Surface movement guide, it can also be used for tool and mould making.



Perfect surface quality through reproducible results in adjacent milling paths (right picture)

Multitouch operation with PPU 290

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

User-friendly

- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function
- Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)
- Proximity/distance sensor for smart display control

Rugged and maintenance-free

- Front panel made of die-cast magnesium with scratchproof glass front
- Can be operated while wearing gloves
- NV RAM memory technology without buffer battery
- Fanless and hard diskless design

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

TOP SURFACE

- Siemens shows a further development in terms of surface quality in mould making with Top Surface (optional article no. 3584012).
- The function optimises the CAD/CAM-CNC data, which reduces the dependence of the manufacturing quality on the CAD/CAM calculation tolerance and improves the surface quality and shape accuracy.

DXF READER

- Faster from the drawing to the workpiece. Easy transfer of CAD data into programming by DXF reader (optional article no. 3584014).



**SIEMENS
SAFETY**

INTEGRATED

SET UP WORK WITH OPEN DOORS

Functional safety also provides protection against high costs!

OVERALL PACKAGE

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



Centre drive

- X axis

Guides

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

Inclining and rotating table

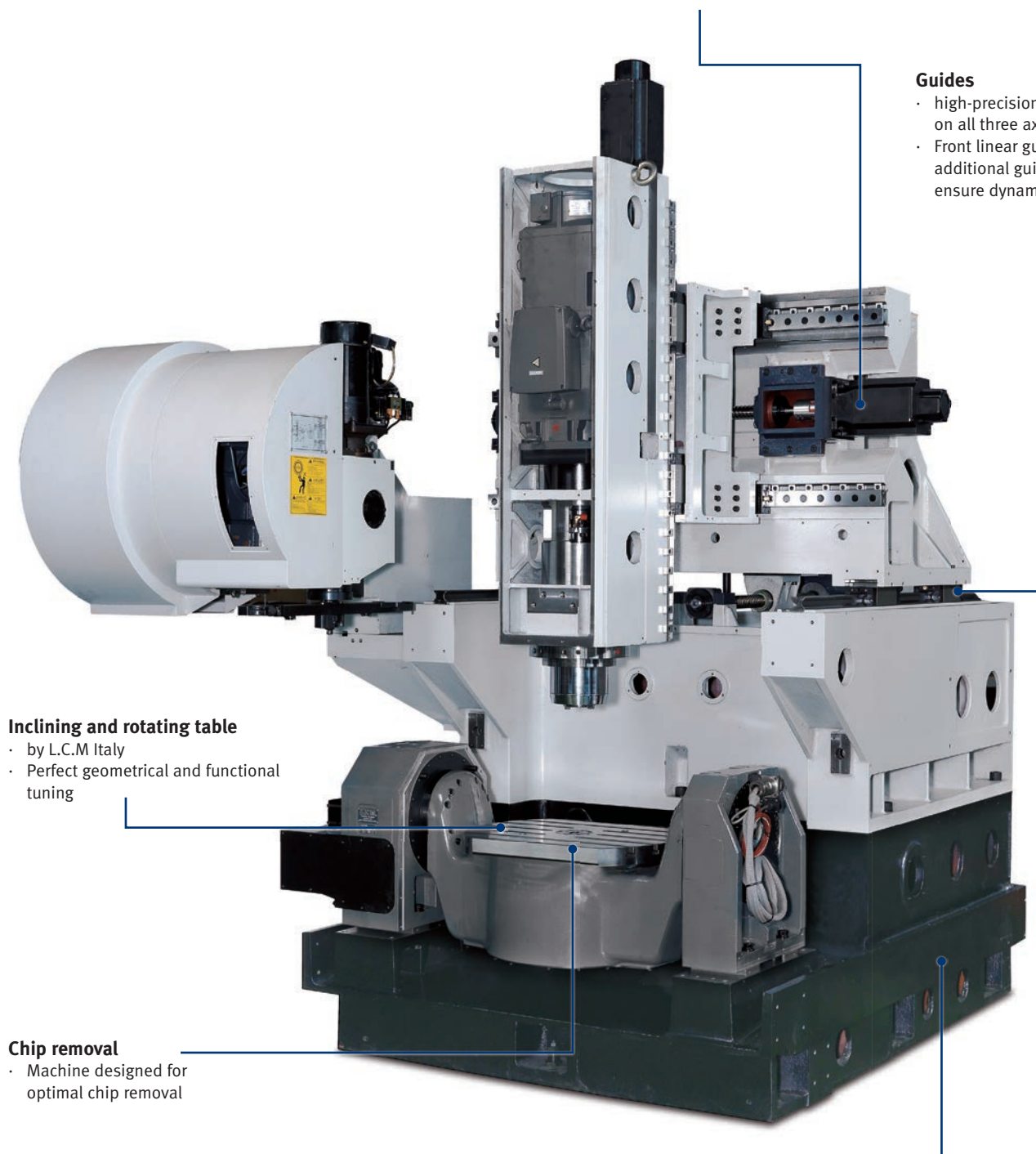
- by L.C.M Italy
- Perfect geometrical and functional tuning

Chip removal

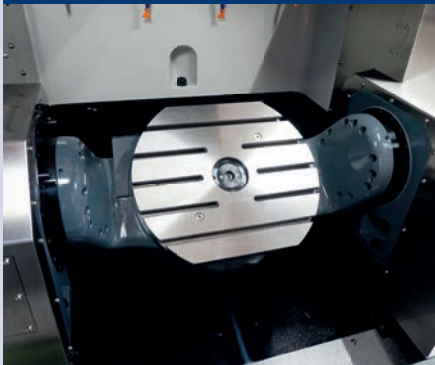
- Machine designed for optimal chip removal

Base body

- Torsion free premium cast machine base thanks to strong ribbing



INCLINING AND ROTATING TABLE



- Max. rotational speed 90 rpm
- Max. tilt speed 16.6 rpm
- 3x hydraulic and 1x pneumatic connections (without valves)
- High-precision A axis & C axis
- Maximum table load 600 kg

FEED AXES



- Direct driven
- Rapid traverse X/Y/Z axis 36 m/min.

TOOL CHANGER



- Double arm gripper
- Drum magazine
- 32 tool slots
- optionally with 48 or 60 tool slots

GREASE LUBRICATION



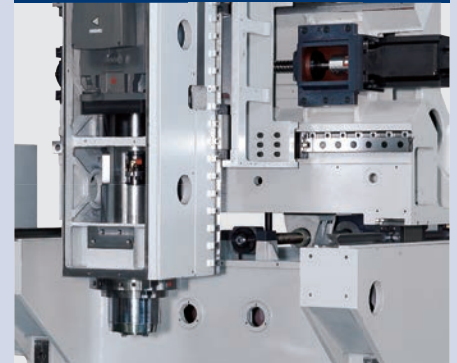
- Reduces wear
- High load-bearing capacity
- Excellent lubricant film
- Low maintenance
- Good adhesion properties

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



- Next generation control panel with new machine control options
- Modern Multitouch screen interface

CHIP CONVEYOR



- Conveyor version
- for efficient chip discharge

COOLING UNIT



- Main spindle and main spindle motor cooling

| TOOL MEASURING / WORKPIECE MEASURING | | | |
|--|--|--|---|
| 351138018* | | BLUM TC52IR Universal measuring probe | <ul style="list-style-type: none"> Switching point repetition accuracy from 0.3µm 2 at 2 m/ min. measuring speed Wear-free and durably stable Very compact probe with 40 mm diameter |
| 351137506* | | BLUM NT 2A Laser measuring system | <ul style="list-style-type: none"> Proven, high-precision laser measuring system Carrier systems offer best possible precision Laser diodes and lenses of the highest quality |
| ➡ For information on Blum workpiece/tool measuring, also ex warehouse Germany see page 275 | | | |
| 3511290620* | | Renishaw NC 4 Laser system for tool measurement | <ul style="list-style-type: none"> NC4 zero-contact tool control system is a high-precision, extremely fast solution for tool measurement and breakage checking |
| 351138019* | | Renishaw OMP 60 Probe with optical signal transmission | <ul style="list-style-type: none"> For checking and setting up workpieces on processing centres Compact, touch-actuated 3D probe. Reliably modulated, optical signal transmission. |
| 3511290622* | | Renishaw TS 27R Probe for tactile tool measurement | <ul style="list-style-type: none"> Tool breakage check Compact, tactile 3-D tool probe with wired signal transmission for tool breakage checking and fast measurement of the tool length and diameter |
| ➡ For information on the Renishaw laser system and probe, also ex warehouse Germany see page 288 | | | |

| MISCELLANEOUS | | | |
|---------------|---|--------------------------------------|--|
| 3536109 | 1 | Starter set SK 40 / DIN 69871 | ➡ For Information on the starter set see on page 284 |
| 351137503* | | | <ul style="list-style-type: none"> External unit, pump pressure 70 bars, tank capacity 165 litres, flow rate 29 l/min (a suction unit is required) |
| 351137504* | 2 | Coolant through spindle (CTS) | <ul style="list-style-type: none"> External unit, Grundfos high pressure 20 bars, with oil separator, paper filter and cooling unit |
| 351137505* | | | <ul style="list-style-type: none"> External unit, Grundfos high pressure 70 bars, with oil separator, paper filter and cooling unit |
| 351137516* | 3 | Hood for machine work space | |
| 354590050 | | Grease cartridge LHL - X100-7 | <ul style="list-style-type: none"> for grease lubrication - 700 ml / 680 g grease Greases create an ideal and constant lubricating film on the mechanical parts of the machine Significantly extends the machine's service life |

| TOOL CHANGER | | | |
|---|---|---|--|
| 351137509* | | Double arm grab tool changer 48 tool slots | <ul style="list-style-type: none"> Instead of standard equipment > double arm grab tool changer with 32 tool slots |
| 351137510* | 4 | Double arm grab tool changer 60 tool slots | <ul style="list-style-type: none"> Instead of standard equipment > double arm grab tool changer with 32 tool slots |
| <ul style="list-style-type: none"> If the tool changer option with 48 or 60 tool magazines is selected, the tools can be easily changed from the left-hand side during automatic operation to avoid idle time between power-up times | | | |

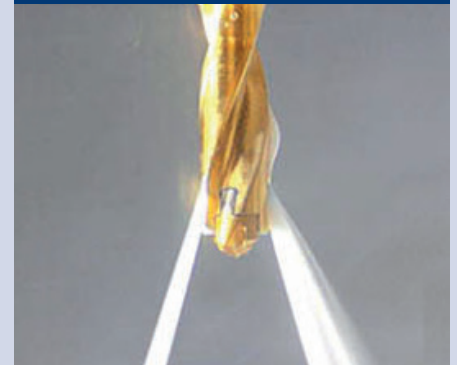
| SOFTWARE | | | |
|------------|---|--|---|
| 3584014 | 5 | DXF Reader for SIEMENS SINUMERIK controls | <ul style="list-style-type: none"> From version 4.7 For importing DXF files Hiding graphics layers |
| 3584012 | 6 | Top surface for SIEMENS SINUMERIK control | <ul style="list-style-type: none"> The NC data from the CAM system are optimised online during processing |
| 351137520* | 7 | Collision Avoidance ECO | <ul style="list-style-type: none"> Enables simple, reliable machine protection and prevents inherent collisions of the machine bodies in the work area |

1 STARTER SET SK 40 / DIN 69871



- Milling head holder with 27 mm collet [1]
- Chuck 1 - 13 mm [2]
- Pull stud [3]
- 2 each Weldon 6 mm and 20 mm [4]
- 2 each Weldon 8 mm, 10 mm, 12 mm and 16 mm
- Reduction sleeve SK 40 to MT 3 [5]
- Collet chuck ER 32 [6]
- Collet spanner ER 32 [7]
- Collet set ER 32 [8]
- Assembly and tool adjustment gauge [9]
- Height-adjuster [10]
- Taper squeegee [11]

2 COOLANT THROUGH SPINDLE



- Guarantees optimal service life
- Optionally with internal or external unit
- Also available with Grundfos high-performance pump
- Pump pressure 20 bars or 70 bars

3 TOOL CHANGER



- Double arm grab
- Drum magazine
- 48 or 60 tool slots

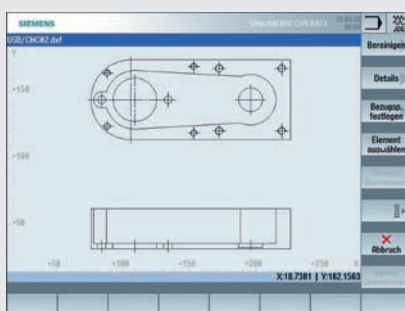
4 HOOD



- Easy loading and unloading of heavy and bulky workpieces with a crane
- Top machine space cover
- For oil mist extraction

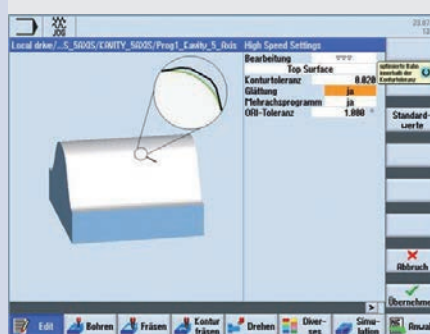


5 DXF READER



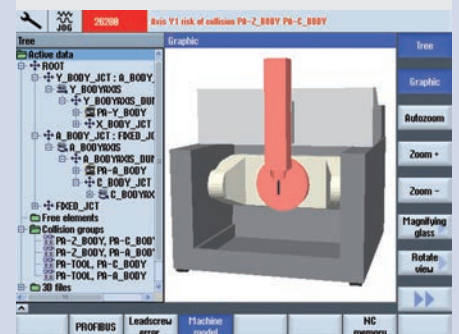
- DXF data can be converted to NC programs for drilling patterns and contours.

6 TOP SURFACE



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

7 COLLISION AVOIDANCE ECO



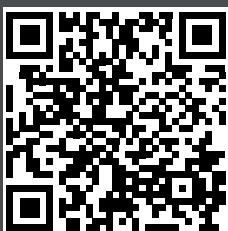
- The Collision Avoidance Eco collision avoidance system relies on user-configurable safety areas and clearances

FU 5

5-axis simultaneous machining centre

SIEMENS SINUMERIK 840D SL with OP 019 BLACK

- Heavy duty version
- High productivity
- Telescopic guideway cover
- Precision ground, pre-stressed, high-performance ball screws
- Spindle borne on P5 precision bearings and permanently lubricated
- High-torque servo drives on all five axes
- Precision linear guides
- Heidenhain glass scales – additional measuring system ensures greater precision
- Fast rapid motion speed of up to 36 m/min.
- C-axis with torque motor. For maximum rotational speed and precision over service life
- A axis with screw drive for high torque during tilting actions
- Portable, electronic handwheel with confirm button and emergency stop button. Substantially facilitates running in of programs
- Double arm grab tool changer with 32 tool slots included in standard scope of delivery (optionally available with 48 or 60 tool slots)
- Coolant unit with 380 litre coolant tank, including chip flushing system and cleaning gun
- Automatic centralised lubrication
- RJ45 plug-in connection, USB connection and 230 V power connection
- Additional USB interface on control panel
- Water circuit cooling unit for the main spindle and main spindle motor
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- 20-bar internal spindle cooling with internal tank(an extraction unit is required)
- Heat exchanger
- EMC Electromagnetic compatibility
- Two years' SIEMENS repair service contract included
- Extension of the SIEMENS repair service contracts (RSV) see page 191
- Information on „Maintenance contracts“ on page 322



Follow this for the video presentation of our Optimum FU 5 milling machine

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



Fig. FU 5 with optional
SCHUNK vice

TECHNICAL DATA

| Models | FU 5-600 HSC 15 | FU 5-600 HSC 24 |
|--|---|---|
| Article no. | 3511382 | 3511386 |
| Spindle | In-line spindle (In-line spindle) | High frequency spindle (Built-in spindle) from Kessler |
| | | |
| Machine data | | |
| Electrical connection | 400 V / 3 Ph ~50 Hz | |
| Total connected load | 70 kVA | 77 kVA |
| Milling spindle | | |
| Drive motor S1 operation | 25 kW | 25 kW |
| Drive motor torque S1 | 105 Nm | 32 Nm |
| Drive motor S6 30 % operation | 40 kW | 35 kW |
| Torque drive motor S6 30 % operation | 261 Nm | 39 Nm |
| Spindle seat | SK 40 DIN 69871 | HSK A-63 DIN 69893 |
| Milling precision | | |
| Repeat accuracy | ± 0.004 mm | |
| Positioning accuracy | ± 0.008 mm | |
| Tool changer | | |
| Type | Double arm grab | |
| Number of tool slots | 32 slots | |
| Max. tool diameter | 78 mm | |
| Max. tool diameter (tools slots beside not occupied) | 120 mm | |
| Tool length | 300 mm | |
| Max. tool weight | 7 kg | |
| Tool change time T-T | 1.51 seconds | |
| Traverse paths | | |
| X axis | 600 mm | |
| Y axis | 600 mm (+500 mm und -100 mm) | |
| Z axis | 500 mm | |
| Axis feed drive | | |
| Acceleration X/Y/Z axis | 7 m/s2 | |
| Rapid traverse X/Y/Z axis | 36 m/min. | |
| Motor torque | | |
| X/Y/Z axis | 20 Nm | |
| Feed forces | | |
| X/Y/Z axis | 10 kN | |
| Speed range | | |
| Speeds* | 15 000 rpm | 24 000 rpm |
| Pneumatics | | |
| Compressed air | 6 bar | |
| Cooling lubricant system | | |
| 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 | |
| Inclining and rotating table | | |
| Table diameter | 600 mm | |
| T-slot size / amount / distance | 14 mm / 7 / 75 mm | |
| Max. load of working table | 600 kg | |
| Axis C | | |
| Rotating axis | 360° | |
| Hydraulic clamping torque | 1 200 Nm (at 50 bar hydraulic operating pressure) | |
| Maximum rotational speed (worm gear) | max. 90 rpm | |
| Axis A | | |
| 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 | |
| Dimensions | | |
| Length x width x height | 3 015 x 4 440 x 3 000 mm | |
| Overall weight | 9 150 kg | |

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

SINUMERIK 840D sl with OP 019 black Multitouch operating panel

The right solution for any engineering challenge

- The SINUMERIK 840D sl is rightly considered the benchmark in the CNC premium class. Maximum CNC performance and unrivalled flexibility and openness are the basis for almost any machine concept.

Multitouch operation OP 019 black

- 18.5" diagonal industrial display
- Maximum operating comfort: Capacitive multi-touch technology (up to 5 contact points simultaneously)
- High resolution of 1 366 x 768 pixels in widescreen format
- 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

Functional safety also provides protection against high costs!

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

OVERALL PACKAGE

- Safety functions SINUMERIK Safety Integrated
- Residual material detection and machining
- ShopMill work step programming
- MDynamic 5-axis
- Managing network drives
- 3-D simulation
- Advanced surface
- Spline interpolation
- TRANSMIT/cylinder surface transformation
- Measuring cycles
- Simultaneous recording
- HMI user memory on CF card
- 3D tool radius correction
- Kinematics measuring cycle CYCLE996

Extension of the **SIEMENS** repair service contracts (RSV)

The **SIEMENS** Repair Service Contract (RSV) helps you to protect your machine for another 12, 24 or 36 months (can only be ordered within the two-year Siemens warranty period).

12 months; Article no. 3589035 / 24 months; Article no. 3589036
36 months; Article no. 3589037

MODULAR AND SCALABLE

- In addition to scalable NCU performance, the SINUMERIK 840D sl also offers a high degree of modularity of the operating components. With a flexible operating concept - e.g. the combination of any control panel with the NCU - the SINUMERIK 840D sl ideally adapts to the operating philosophy of modern premium machine concepts.

BENCHMARK IN OPEN ARCHITECTURE

- The system openness of the SINUMERIK 840D sl is unparalleled. In this way, the CNC can be optimally adapted to the technology of the machine and has a high degree of freedom in production automation.

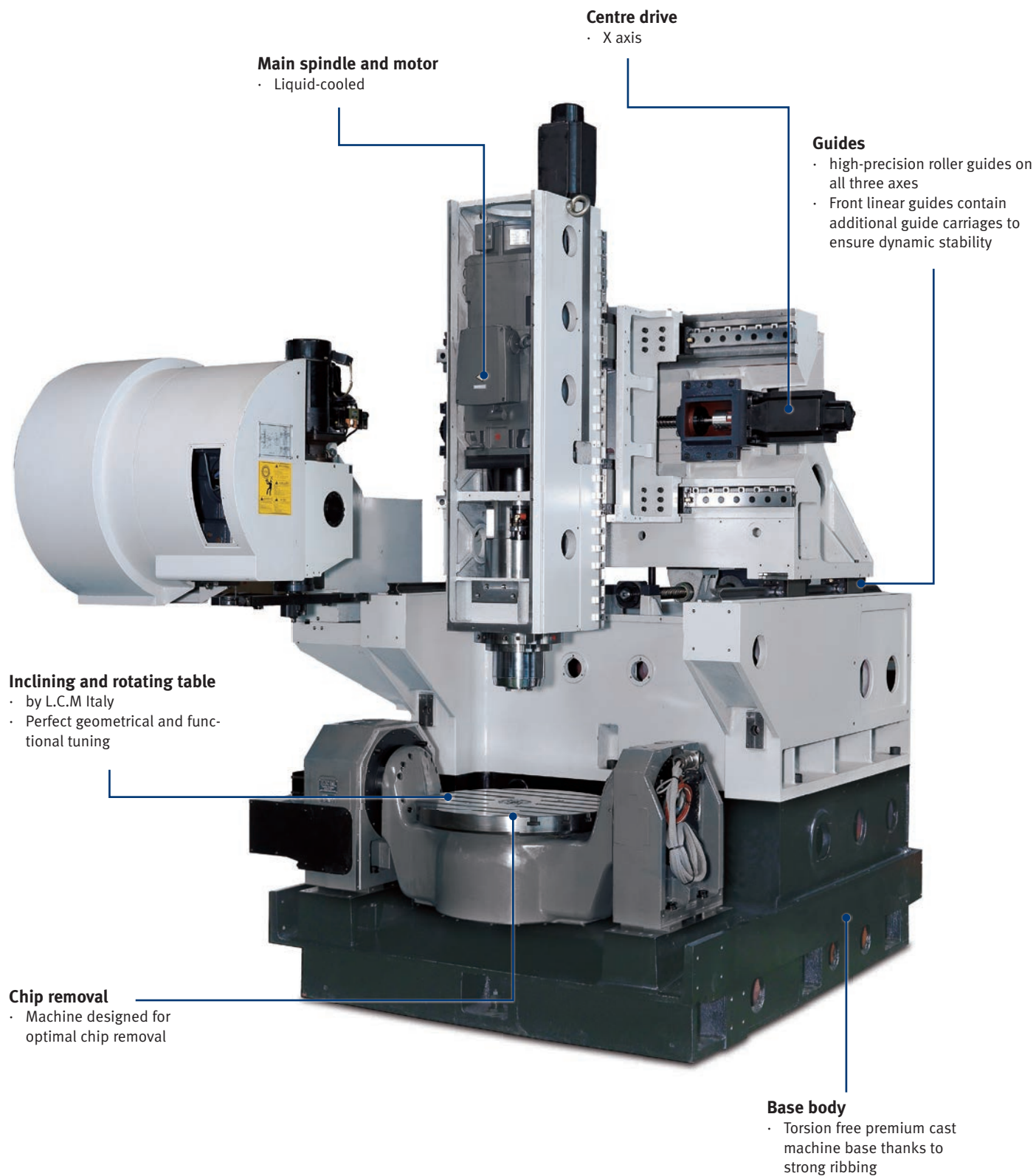


SIEMENS NCU 730.3

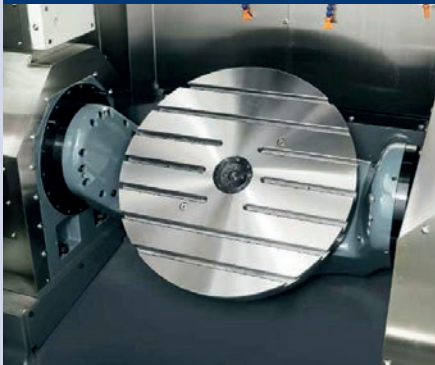
- up to 31 axes
- Cycle time 0.3 ms
- up to 1 500 tools
- Optional collision avoidance

NEW





INCLINING AND ROTATING TABLE



- Max. rotational speed 90 rpm
- Max. tilt speed 16.6 rpm
- 3x hydraulic and 1x pneumatic connections (without valves)
- High-precision A axis & C axis
- Maximum table load 600 kg

FEED AXES



- Direct driven
- Rapid traverse X/Y/Z axis 36 m/min.

TOOL CHANGER



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

GREASE LUBRICATION



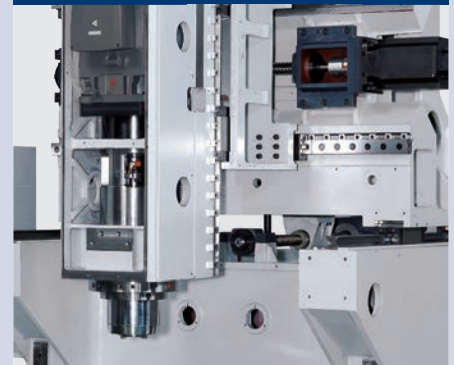
- Reduces wear
- High load-bearing capacity
- Excellent lubricant film
- Low maintenance
- Good adhesion properties

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



- Next generation control panel with new machine control options
- Modern Multitouch screen interface

CHIP CONVEYOR




- Conveyor version
- for efficient chip discharge

WATER CIRCULATION UNIT



- Main spindle and main spindle motor cooling

| TOOL MEASURING / WORKPIECE MEASURING | | | |
|---|--|---|---|
| 351138018* | | BLUM TC52IR Universal measuring probe | <ul style="list-style-type: none"> Switching point repetition accuracy from 0.3µm 2 at 2 m/ min. measuring speed Wear-free and durably stable Very compact probe with 40 mm diameter |
| 351138006* | | BLUM NT 2A Laser measuring system | <ul style="list-style-type: none"> Proven, high-precision laser measuring system Carrier systems offer best possible precision Laser diodes and lenses of the highest quality |
|  For information on Blum workpiece/tool measuring see page 275 | | | |

| MISCELLANEOUS | | | | |
|---------------|---|-------------------------------------|--|--------------------------------|
| 3536109 | 1 | Starter set SK 40 / DIN 69871 | ➡ For Information on the starter set see on page 284 | |
| 3536110 | 2 | Starter set HSK A-63 | ➡ For Information on the starter set see on page 285 | |
| 351138003* | 3 | Coolant through spindle (CTS) | • External unit, pump pressure 20 bars, tank capacity 165 litres, delivery rate 30 l/min | An extraction unit is required |
| 351138004* | | | • External unit, pump pressure 70 bars, tank capacity 165 litres, delivery rate 29 l/min | |
| 351138005* | | | • External unit, Grundfos high pressure 70 bars, with oil separator, paper filter and cooling unit | |
| 351138002* | | Air conditioner | • Instead of the standard equipment › heat exchanger | |
| 351138016* | 4 | Hood for machine work space | | |
| 351138017* | | Solenoid valve set for router table | • For controlling three hydraulic connections and one pneumatic connection for workpiece clamping | |
| 354590050 | | Grease cartridge LHL - X100-7 | • for grease lubrication - 700 ml / 680 g grease • Greases create an ideal and constant lubricating film on the mechanical parts of the machine • Significantly extends the machine's service life | |

| TOOL CHANGER | | | |
|---|--|---|---|
| <ul style="list-style-type: none"> If the tool changer option with 48 or 60 tool magazines is selected, the tools can be easily changed from the left-hand side during automatic operation to avoid idle time between power-up times | | | |
| 351138009* | | Double arm grab tool changer 48 tool slots | <ul style="list-style-type: none"> Instead of standard equipment › double arm grab tool changer with 32 tool slots |
| 351138010* | | Double arm grab tool changer 60 tool slots | <ul style="list-style-type: none"> Instead of standard equipment › double arm grab tool changer with 32 tool slots |

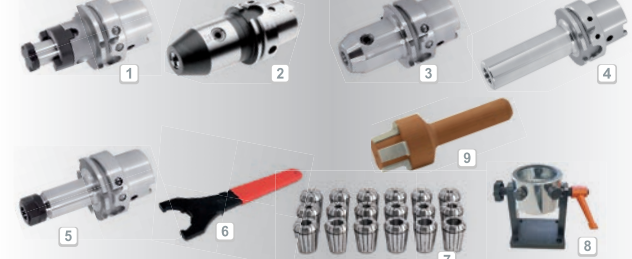
| SOFTWARE | | | |
|------------|---|--|---|
| 3584014 | | DXF Reader for SIEMENS SINUMERIK controls | <ul style="list-style-type: none"> From version 4.7 For importing DXF files Hiding graphics layers Automatic contour tracking |
| 3584012 | 5 | Top surface for SIEMENS SINUMERIK control | <ul style="list-style-type: none"> The NC data from the CAM system are optimised online during processing |
| 351138014* | 6 | Collision Avoidance, Collision avoidance software | <ul style="list-style-type: none"> Enables simple, reliable machine protection and prevents inherent collisions of the machine bodies in the work area |

1 STARTER SET SK 40 / DIN 69871



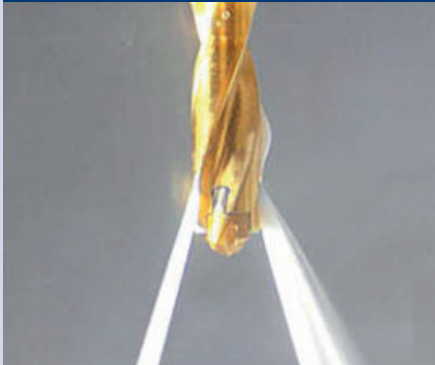
- Milling head holder 27 mm seat 1
- Chuck 1 - 13 mm 2
- Pull stud 3
- 2 each Weldon 6 mm and 20 mm 4
- 2 each Weldon 8 / 10 / 12 / 16 mm 5
- Reduction sleeve SK 40 to MT 3 5
- Collet chuck ER 32 6
- Collet spanner ER 32 7
- Collet set ER 32 8
- Assembly and tool adjustment gauge 9
- Height-adjuster 10
- Taper squeegee 11

2 STARTER SET HSK A-63



- Milling head holder with 27 mm collet 1
- Chuck 1 - 13 mm 2
- Weldon 6 / 8 / 10 / 12 / 16 / 20 mm 3
- Adapter HSK63 to MT 3 4
- Collet chuck holder 5
- Collet spanner 6
- Collet chuck set 7
- Swivelling mounting block 8
- Taper squeegee 9

3 COOLANT THROUGH SPINDLE



- Guarantees optimal service life
- External unit
- Also with Grundfos high pressure pump
- Pump pressure 20 bars or 70 bars

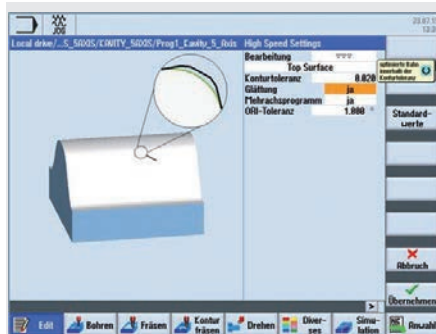
4 HOOD



- Easy loading and unloading of heavy and bulky workplaces with a crane
- Top machine space cover
- For oil mist extraction

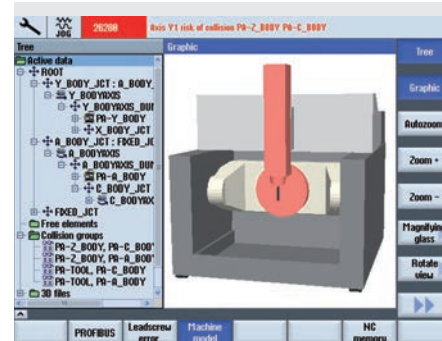


5 TOP SURFACE



- The NC data from the CAM system are optimised online during processing
- Excellent surface quality and form precision
- Fast and precise machining thanks to new technology
- Complete machining fully integrated with Sinumerik Operate

6 COLLISION AVOIDANCE



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

Environmental Campus Birkenfeld

Optimum provides new CNC machine for research and development



Just in time for the start of the winter semester 2019, the Hallstadt-based company Stürmer Maschinen GmbH provided the students at the Environmental Campus Birkenfeld with a new, state-of-the-art type OPTIMUM FU 5 CNC machine. The Environmental Campus specialises in environmental planning, technology and economics and is among the top ten in the world ranking list in the current GreenMetricRanking. The new OPTIMUM FU 5 milling machine is used for development work in the field of Industry 4.0 in order to achieve an optimised learning effect for the students, who can now demonstrate their developments with this machine.

The modern 5-axis machine with a weight of 10 tons and a value of approx. 240 000 euros was initially made available to the Environmental Campus free of charge for nine months. It will help employees and students at the Institute of Operations and Technology Management (ITB) to develop new methods of 3-D printing and thus provide new impetus in the fields of Industry 4.0 and the Digital Factory. The OPTIMUM FU5 milling machine is the ideal companion for this, as it enables filament printing on a 3-axis machine tool in combination with a modern software solution that can control the CNC machine via a Sinumerik control.

This project sees Stürmer continue its close cooperation with the Environmental Campus enabling employees and students to advance their research work in the field of 3-D printing with state-of-the-art technology. "Constant modernisation of the equipment in our laboratories in this area cannot be financed with internal resources. The loan shows that we have our finger on the pulse with our education and research programs, and we hope that we can expand this form of cooperation further," says Prof. Dr.-Ing. Peter Gutheil, Dean of the Department of Environmental Planning and Environmental Technology. Project manager Dipl.-Ing. (FH) Stefan Hirsch also sees the advantages: "The learning effect for the students involved is enormous and can have an extremely positive impact when starting a career."



OPTImill FU5 CNC milling machine impresses in test

A new milestone in progressive digitalisation of industrial production can be set thanks to support from Stürmer.

In January 2020, the Optimum FU 5 CNC milling machine, which had been made available to the Environmental Campus Birkenfeld a few months ago for 3-D printing trials, was tested in the scope of a workshop. The 5-axis machining centre impressed across the board. Even under the camera microscope used in the workshop, it was virtually impossible to detect defects on the test workpieces milled by the Optimum machine.

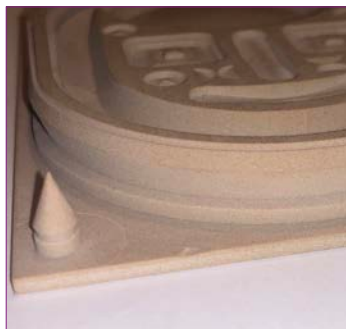
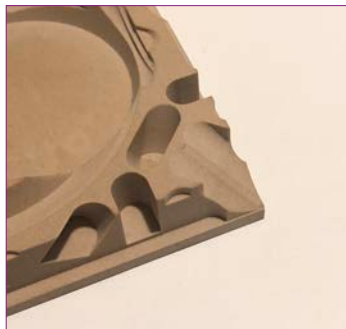
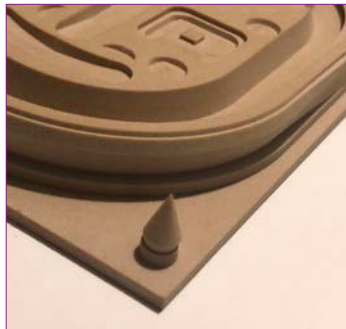
The CNC milling machine was tested using a test workpiece that the NC Gesellschaft e.V. had developed in 2005 to investigate the dynamic synchronisation of the machine axes and milling operations. The program data for this test part are now in the care of the Environmental Campus Birkenfeld, and were used to test the machine's machining precision. During a workshop with Hans Vogler, one of the developers of the test piece and an expert in the field of NC control, the OPTImill FU5 was put through its paces at the Environmental Campus Birkenfeld in the presence of representatives of Optimum and SIEMENS AG. The many years of experience that Mr. Vogler has built up from his development and consulting activities from the beginnings of NC control to the present day proved to be massively beneficial for the participants.

In a first step, SIEMENS application engineer Wolfgang Reichert explained the special cycles for 5-axis programming on the SIEMENS 840 D controller used here. Subsequently, various adaptations of machine data and control parameters were tested directly on the machine and optimised to tune the test workpiece. Using these adapted parameters, Hans Vogler's team produced several test parts on the milling machine in a second step; the parts were then examined with regard to running time and potential geometric deviations.

Defects of the test pieces produced by the OPTImill FU5 were virtually undetectable, even using a camera microscope. To underline the precise operation of the OPTIMUM CNC machine, archive pictures with negative examples were finally used; this once again illustrated the outstanding results achieved by the OPTIMUM 5-axis machining centre.

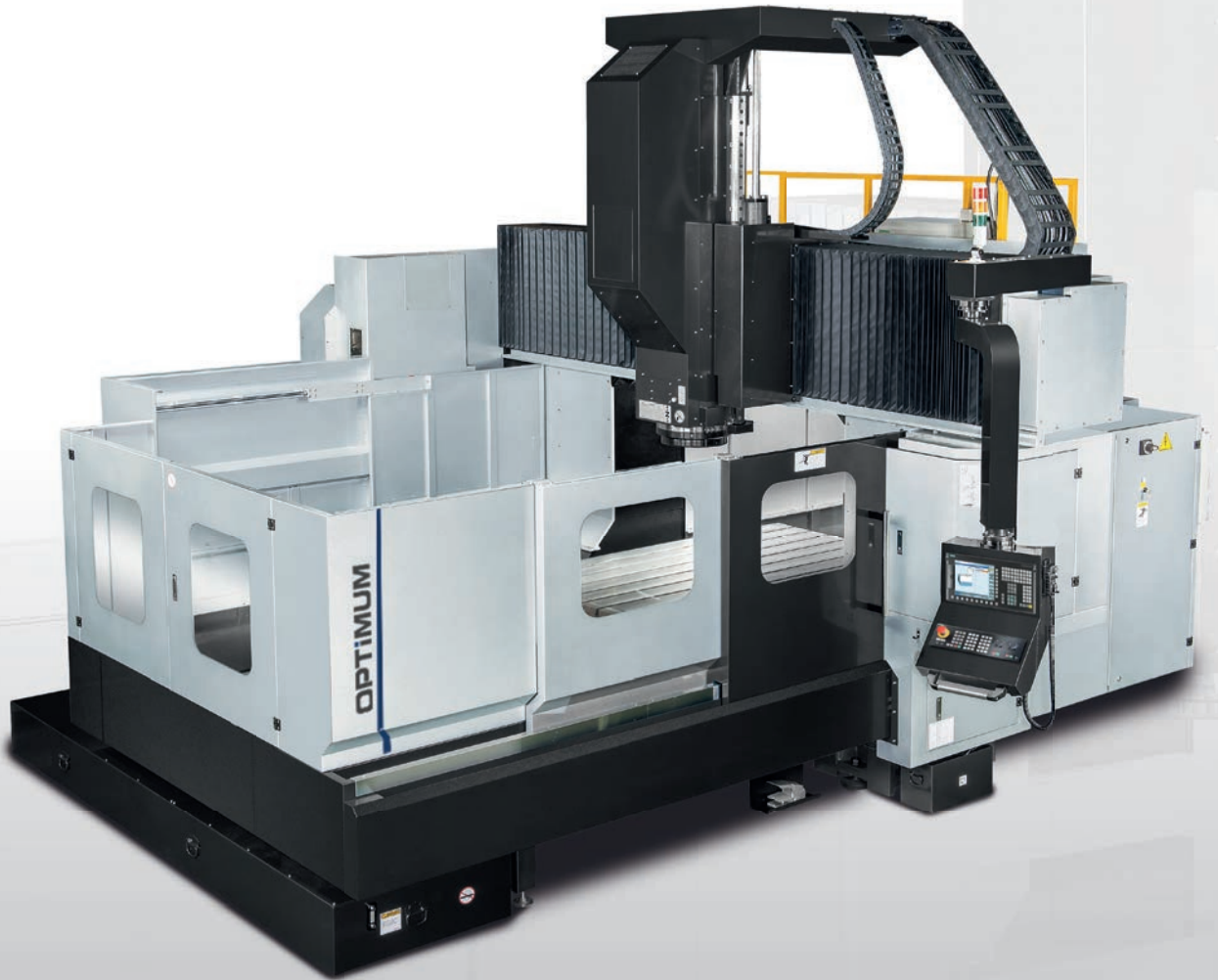
Conclusions:

With this perfectly manufactured test workpiece, the OPTImill FU5 stands up to any comparison with market competitors in terms of quality, precision and price-performance ratio.



Follow this for the video presentation

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





CNC Portal milling machine FP 1700
CNC Portal milling machine FP 2200
CNC Portal milling machine FP 3200
CNC Portal milling machine FP 4200
Portal milling machines user report see page 218

04

PORTAL MILLING MACHINES

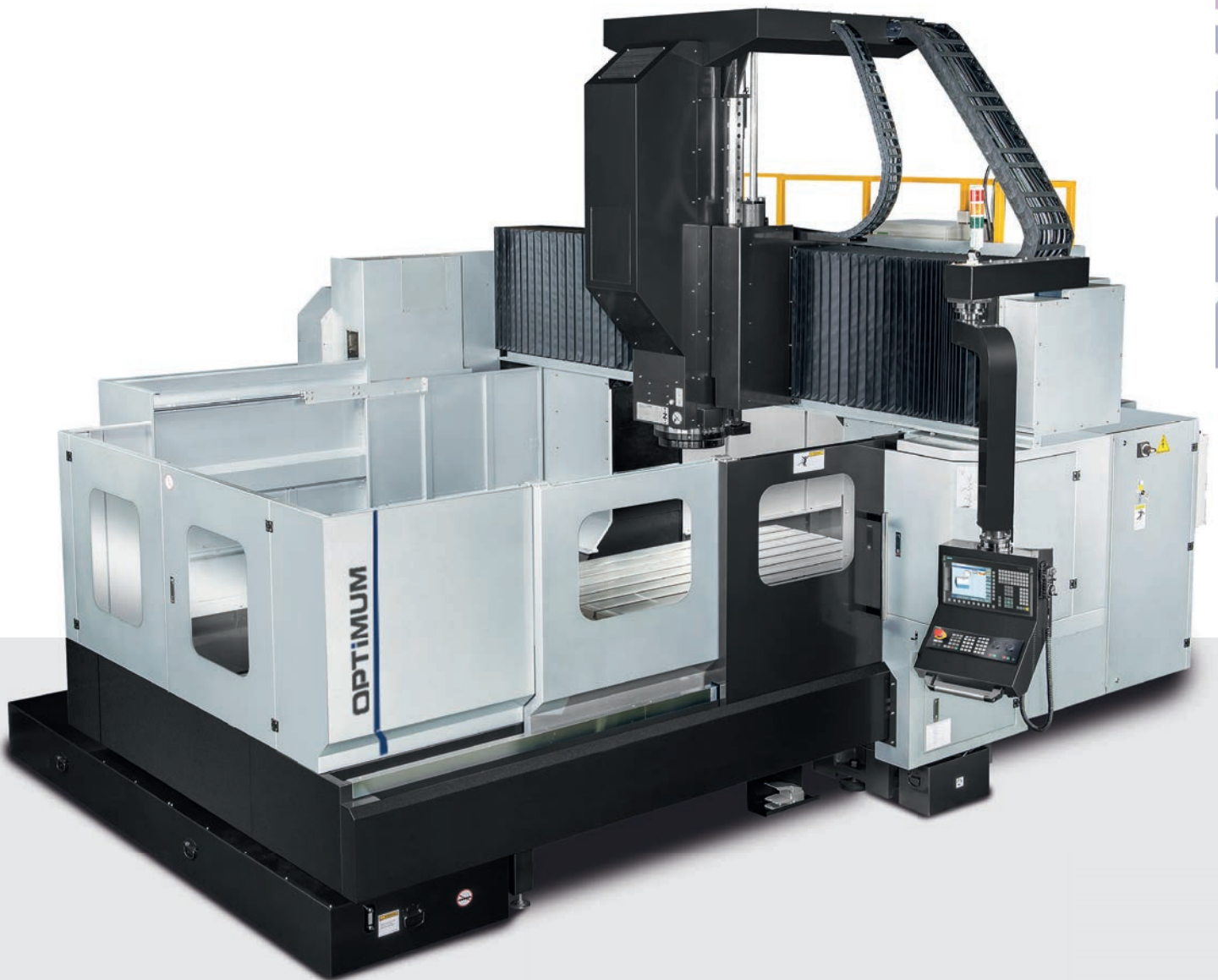
A white circular badge with a blue border and the word "NEW" in blue capital letters.

FP 1700 / FP 2200

OPTIMUM PREMIUM CNC Portal milling machines.

SIEMENS CONTROL 828D

- Perfect structures and a rugged design guarantee best possible rigidity and stability
- All main components - bed, worktable, column, crossbeam, saddle and headstock are made of high quality MEEHANITE® cast iron
- Generously dimensioned guides on the X, Y and Z axes
- All guide rails tempered and ground (HRC50 -HRC55)
- The X and Y axes are equipped with linear roller guides. This allows the axes to travel with maximum precision even at high speed
- Highest machining accuracy and high damping due to wide adjustable box ways of the Z-axis for high drilling and milling performance with high spindle output torque
- Hardened and precision-ground ball screws mounted in high-precision bearings in all three axes allow for absolutely unbalance-free rotation of the spindle
- Cooling of the main spindle gear (gear wheels, bearings, spindle), by oil circulation system to reduce thermal expansion
- Operating status display (work end lamp)
- Axis covers
- Working lamp
- Air gun/water gun
- Heat exchanger
- SK50 spindle seat with a maximum spindle speed of 8 000 rpm with 2-stage gear for high precision
- Pneumatic counterbalance of the Z-axis ensures very high reliability and stability while several axes are working simultaneously. The SCBS system does not need an additional power supply or drive. This balance system helps to achieve high speeds and excellent machining
- Complete machine enclosure with wide opening doors for ergonomic workpiece handling
- Automatic lubrication system with pressure control system
- Torsion free machine base thanks to strong ribbing
- Separating system for lubricating oil and coolant
- Set-up elements
- Including two years **SIEMENS** warranty
- **SIEMENS** warranty extension on page 203
- Information on „Maintenance contracts“ on page 322



OPTIMILL FP 1700/FP 2200

TECHNICAL DATA

| Model | FP 1700 | FP 2200 |
|--|-------------------------------------|------------------|
| Article no. | 3511610 | 3511620 |
| | | |
| Machine data | | |
| Electrical connection | 400 V / 3 Ph ~50 Hz | |
| Total connected load | 50 KVA | |
| Milling spindle | | |
| Drive motor S1 | 15 kW | |
| Drive motor torque S1 | 126 Nm | |
| Drive motor S6 30 % operation | 22.5 kW | |
| Torque drive motor S6 30 % operation | 380 Nm | |
| Spindle seat | SK 50 DIN 69871 | |
| Cooling lubricant system | | |
| Tank capacity | 900 litres | |
| Tool changer | | |
| Type | Double arm grab | |
| Number of tool slots | 32 tools | |
| Max. tool diameter | ø 160 mm | |
| Max. tool diameter (tools slots beside not occupied) | ø 250 mm | |
| Tool length | 350 mm | |
| Max. tool weight | 15 kg | |
| Milling precision | | |
| Repeat accuracy | ± 0.008 mm | |
| Positioning accuracy | ± 0.008 mm | |
| Traverse paths | | |
| X axis (linear guide) | 1 700 mm | 2 200 mm |
| Y axis (linear guide) | 1 400 mm | |
| Z axis (box way) | 850 mm (option 1050 mm) | |
| Axis feed drive | | |
| X axis fast motion | 20 m/min. | 16 m/min. |
| Y axis / Z axis rapid traverse | 20 m/min. | |
| Motor torque | | |
| X/Y/Z axis | 48 Nm | |
| Feed forces | | |
| X/Y/Z axis | 13 kN/ 15.6 kN / 15.6 kN | |
| Speed range | | |
| Speeds* | 8 000 rpm | |
| Pneumatics | | |
| Compressed air | 0.6 MPa (6 bar) | |
| Milling table | | |
| Table length x width | 1 700 x 1 200 mm | 2 200 x 1 200 mm |
| T-slot size / amount / distance | 22 / 7 / 150 mm | |
| Max. load of working table | 5 000 kg | 5 000 kg |
| Spindle to table distance | 50 - 900 mm | |
| Stand to spindle distance | 404 mm | |
| Distance between the stands | 1 400 mm | |
| | „Work area“ on page 212 | |
| Dimensions | | |
| Footprint | 6 000 x 4 500 mm | 8 130 x 4 150 mm |
| | „Machinery layout plan“ on page 212 | |
| Overall weight | 17 000 kg | 19 500 kg |

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

SINUMERIK 828D

The power package in the compact class of CNC controls

Boosting productivity and precision in manufacturing

- With the SINUMERIK 828D CNC control from SIEMENS, users benefit from the fast and well-engineered hardware. The control offers maximum ease of use and ensures good connections to a wide range of storage media and networks. In its basic structure, the CNC control corresponds to the standards of common NC technology.
- As a top specialist for sophisticated milling machines, the Siemens SINUMERIK 828D masters every conceivable drilling and milling operation. Of course, this also applies in any tilted workpiece plane and on cylindrical workpieces. Even for mould making applications you do not need a special CNC control. The unique performance of the SINUMERIK 828D guarantees mirror-smooth surfaces with a minimum of machining time.
- For ergonomic operation and programming, the SINUMERIK 828D is equipped with a large 10.4-inch graphic colour screen. Robust function keys and a full QWERTY keyboard on the terminal allow the user to program, set up and operate even in harsh workshop environments. The mechanical buttons are protected against dust and liquids according to IP 65 by a stable and durable foil.
- Since the SINUMERIK 828D operates without components that are subject to wear, such as the fan and hard disk, it is maintenance-free and reliable in the long term. Powerful computers and memory enable modern NC strategies to be processed quickly and extensive colour graphics to be displayed in real time, even in animated form. On the one hand, this increases machining accuracy, and on the other, it simplifies operation, programming and diagnostics. The computing and storage capacity is so generous that moving graphics can be generated and shown to help with all functions and detailed simulations can be generated and shown for programmed operations.

Control

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



**SIEMENS
SAFETY**

INTEGRATED

SET UP WORK WITH OPEN DOORS

Functional safety also provides protection against high costs!

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

OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- ShopMill work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording
- System software SW 26x



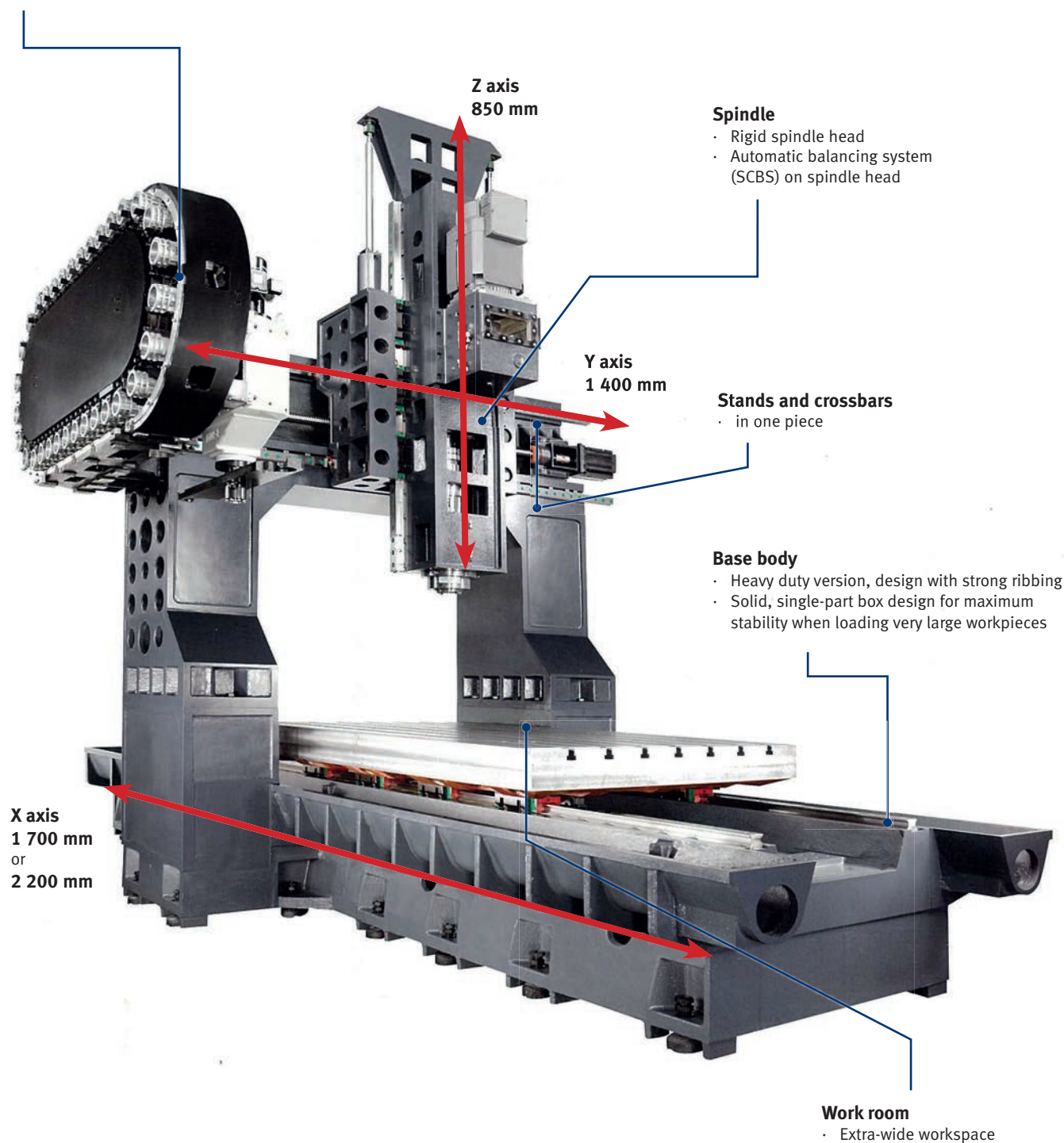
Warranty extension

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

Tool changer

- Driven by precision cam for fast and accurate tool positioning
- The tools are transferred directly from the tool magazine to the spindle during the tool change by means of a double gripper
- Tool selection occurs bidirectionally via the shortest route.
- The tool magazine is located outside of the work area
- The cover on the tool magazine protects the tools against chips or coolant



CHIP DISPOSAL



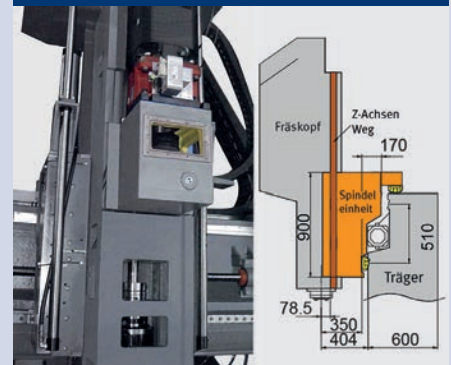
- Feeder spirals on both sides of the machine base transport high flow rates to the chip auger

SPINDLE HEAD



- ZF gearbox for high speeds
- oil bath lubricated
- Efficient cooling of the workpiece by internal spindle cooling
- Longer service life and high accuracy

Z AXIS



- Excellent stiffness and stability
- Box design
- Stability even with heavy machining

SPINDLE



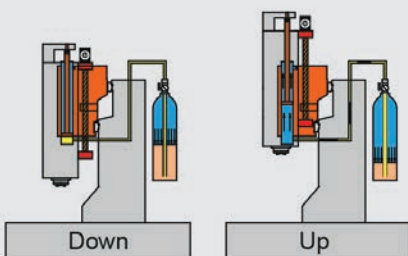
- High torque spindle ideal for high performance cutting applications
- Wide speed range up to 8 000 rpm for heavy machining and precision machining
- Automatic oil lubrication of spindles with cooling
- In-line spindle SK 50
- Cam gear

GEARBOX



- Gearbox with high transmission ratio

Z AXIS



- Pneumatic weight compensation in the Z-axis for high dynamics

PRECISION



- Each machine goes through dynamic and static precision tests. The machine precision complies with

- ISO 10791
- VDI 3441t
- ISO 230
- JIS B6388
- and ASME B5 standards.

| Standard Tolerance | | ISO 10791-4 | FP 1700/2200 |
|-------------------------------------|---|---------------------|--------------|
| | | Axes traverse path | |
| | | >1 250 mm >2 000 mm | |
| Bi-directional positioning accuracy | A | 0.042 mm | 0.008 mm |
| Bi-directional Repeat accuracy | R | 0.020 mm | 0.008 mm |

JIS B6336-4 shows the same value as the ISO standard:
The P value of VDI / DGQ3441 is equivalent to A in ISO10791-4 and PS is equivalent to R.
All values shown above were measured in environments with good air conditioning.

| TOOL MEASURING / WORKPIECE MEASURING | | | |
|--|---|--|---|
| 351161023* | 1 | BLUM TC62 Universal measuring probe | <ul style="list-style-type: none">• Switching point repetition accuracy from 0.3µm 2 at 2 m/ min. measuring speed• Wear-free and durably stable• Very compact probe with 40 mm diameter |
| 351161024* | | BLUM ZX-Speed 3-D probe | <ul style="list-style-type: none">• Universal 3-D probe for toolmaking and tool break monitoring |
| ➡ For information on Blum workpiece/tool measuring, also ex warehouse Germany see page 275 | | | |
| 351161021* | 2 | Renishaw OMP 60 Probe with optical signal transmission | <ul style="list-style-type: none">• For checking and setting up workpieces on processing centres• Compact, touch-actuated 3D probe.• Reliably modulated, optical signal transmission. |
| 351161020* | | Renishaw NC 4 Laser system for tool measurement | <ul style="list-style-type: none">• NC4 non-contact tool inspection system is a high-precision, extremely fast solution for tool measurement and breakage control |
| 351161022* | 3 | Renishaw TS 27R Probe for tactile tool measurement | <ul style="list-style-type: none">• Tool breakage check• Compact, tactile 3-D tool probe with wired signal transmission for tool breakage checking |
| ➡ For information on the Renishaw laser system and probe, also ex warehouse Germany see page 288 | | | |

| 3-D PRINTING | | | |
|---|--|-------------------------------|---|
| 3562411 | | 3-D printing interface | <ul style="list-style-type: none"> Plug connector on milling head for OPTImill 3X/5X printing head Power supply is installed in control cabinet Prepared for open circuit monitoring and filament holder |
| ➡ For information on 3-D printing and accessories see 266 | | | |

| MISCELLANEOUS | | | |
|---------------|---|---|---|
| 3536111 | 4 | Starter set SK 50 / DIN 69871 | <ul style="list-style-type: none"> Cutter head holder with 27 mm receptacle, 2 each Weldon 6 mm/20 mm, 1 each Weldon 8 mm / 10 mm / 12 mm / 16 mm, adapter SK 50 to MK 3, 4 collet holders ER 32, collet spanner ER 32, 18-piece collet set ER 32, height adjuster, cone squeegee, 15 tightening bolts |
| 351161001* | | Coolant through spindle (CTS) | <ul style="list-style-type: none"> Integrated unit, 20 bar |
| 351161002* | | | <ul style="list-style-type: none"> External unit; tank capacity 165 litres, 20 bars pump pressure |
| 351161003* | | | <ul style="list-style-type: none"> External unit; tank capacity 165 litres, 70 bars pump pressure |
| 351161014* | 6 | Air conditioner | <ul style="list-style-type: none"> Instead of the standard equipment › heat exchanger |
| 351161005* | 5 | Linear guide | <ul style="list-style-type: none"> for Z axis |
| 351161010* | | Tool changer with 40 tool slots | <ul style="list-style-type: none"> Instead of the standard equipment › Tool changer with 32 tool slots |
| 351161011* | | Tool changer with 60 tool slots | <ul style="list-style-type: none"> Instead of the standard equipment › Tool changer with 32 tool slots |
| 351161025* | | Hood for machine work space | |
| 351161030* | 7 | Z-axis extension | <ul style="list-style-type: none"> Z = 1 050 mm |
| 351161035* | | 90° angle milling head | <ul style="list-style-type: none"> Speed up to 2 500 rpm Gearbox transmission ratio 1:1 38 kW maximum power transfer of the spindle drive |
| 351161036* | | Automatically indexing milling head B and C axis | <ul style="list-style-type: none"> Speed up to 3 500 rpm 5° pitch |
| On request | | Fourth axis | <ul style="list-style-type: none"> 250 mm |
| On request | 8 | Fifth axis | |

1 BLUM TC62 / ZX-SPEED



- Precise, directionally independent approach behaviour
- Constant deflection forces
- Spindle orientation not required
- No detrimental 3-leg principle with lobing effect

2 RENISHAW OMP 60



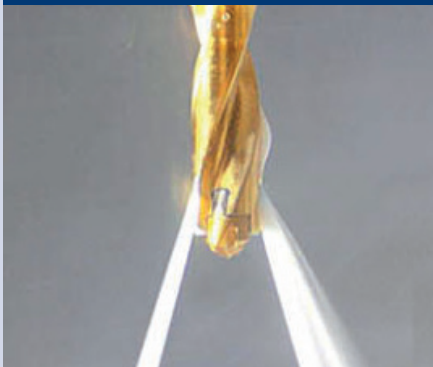
- Compact, high-accuracy probe that offers all the advantages of an automatic workpiece setup while enabling the measurement of complex 3D part geometries on CNC machining centres.

3 RENISHAW TS 27R



- Proven kinematic design.
- Interference-free, wired communication
- Least expensive tool measurement for all types of machining centres.
- Repetition accuracy of 1.00 µm (2)

4 COOLANT THROUGH SPINDLE



- Guarantees optimal service life
- Optionally with internal or external unit
- Pump pressure 20 bars or 70 bars

5 HOOD



- Easy loading and unloading of heavy and bulky workplaces with a crane
- Top machine space cover
- For oil mist extraction

6 AIR CONDITIONER



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

7 90° ANGLE MILLING HEAD



- Increases the technological nature of the machining equipment, work productivity and reduces set-up and auxiliary times and the need for special fixtures.

8 AUTOMATIC MILLING HEAD



- Increase in machining accuracy because it is not necessary to change the position of the clamped workpiece.
- Speed up to 3 500 rpm
- 5° pitch

A white circular badge with a blue border and the word "NEW" in blue capital letters.

FP 3200 / FP 4200

OPTIMUM PREMIUM CNC Portal milling machine

SIEMENS CONTROL 828D

- Perfect structures and a rugged design guarantee best possible rigidity and stability
- All main components - bed, worktable, column, crossbeam, saddle and headstock are made of high quality MEEHANITE® cast iron
- Generously dimensioned guides on the X, Y and Z axes
- All guide rails tempered and ground (HRC50 -HRC55)
- The X and Y axes are equipped with linear roller guides. This allows the axes to travel with maximum precision even at high speed
- Highest machining accuracy and high damping due to wide adjustable box way guides of the Z-axis for high drilling and milling performance with high spindle output torque.
- Hardened and precision-ground ball screws mounted in high-precision bearings in all three axes allow for absolutely unbalance-free rotation of the spindle
- Cooling of the main spindle gear (gear wheels, bearings, spindle), by oil circulation system to reduce thermal expansion
- Operating status display (work end lamp)
- Axis covers
- Working lamp
- Air gun/water gun
- Heat exchanger
- SK50 spindle seat with a maximum spindle speed of 8 000 rpm with 2-stage gear for high precision
- Pneumatic counterbalance of the Z-axis ensures very high reliability and stability while several axes are working simultaneously. The SCBS system does not need an additional power supply or drive. This balance system helps to achieve high speeds and excellent machining precision
- Complete machine enclosure with wide opening doors for ergonomic workpiece handling
- Automatic lubrication system with pressure control system
- Torsion free machine base thanks to strong ribbing
- Separating system for lubricating oil and coolant
- Including two years **SIEMENS** warranty
- **SIEMENS** warranty extension on page 203
- Information on „Maintenance contracts“ on page 322

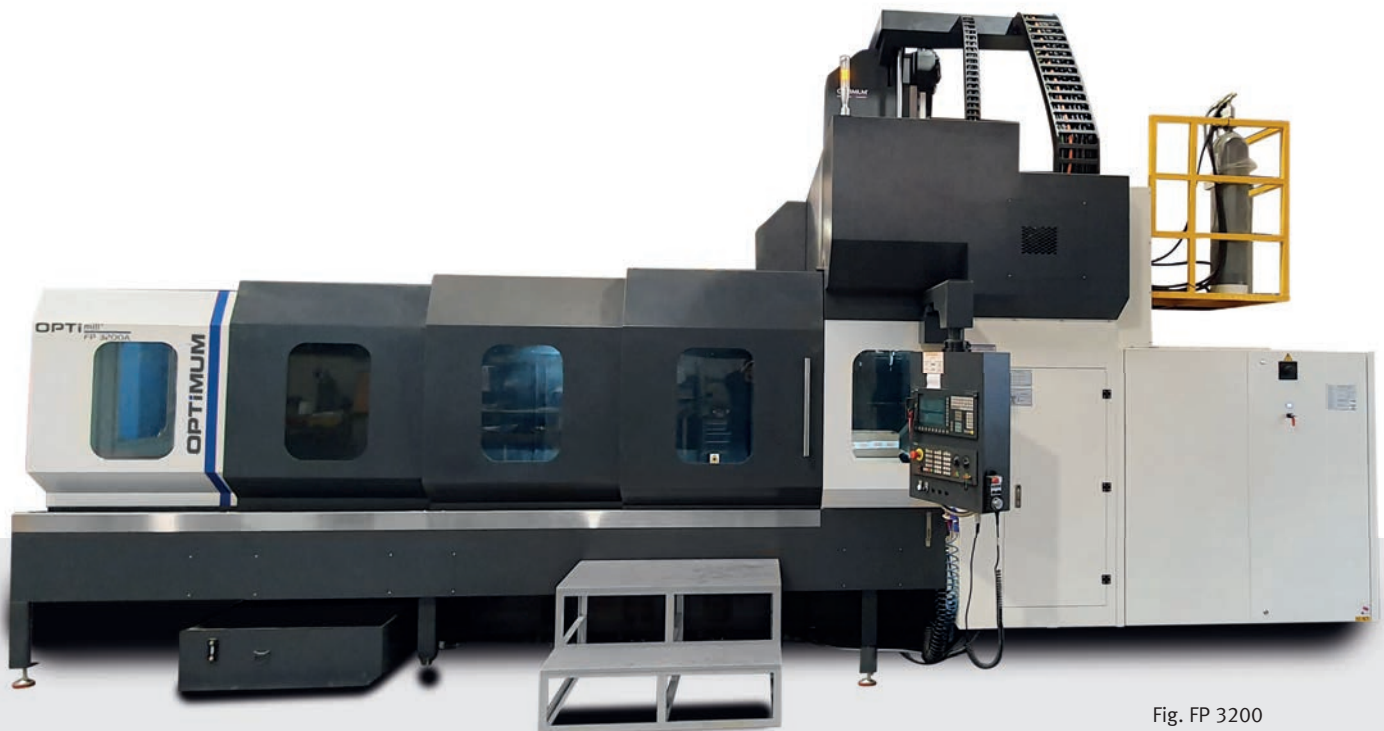


Fig. FP 3200

OPTIMILL FP 3200 / FP 4200

TECHNICAL DATA

| Model | FP 3200 | FP 4200 |
|--|--|-------------------|
| Article no. | 3511630 | 3511640 |
| Machine data | | |
| Electrical connection | 400 V / 3 Ph ~50 Hz | |
| Total connected load | 50 KVA | |
| Milling spindle | | |
| Drive motor S1 | 15 kW | |
| Drive motor torque S1 | 126 Nm | |
| Drive motor S6 30 % operation | 22.5 kW | |
| Torque drive motor S6 30 % operation | 380 Nm | |
| Spindle seat | SK 50 DIN 69871 | |
| | „Spindle power and torque diagram“ on page 213 | |
| Cooling lubricant system | | |
| Tank capacity | 900 litres | |
| Tool changer | | |
| Type | Double arm grab | |
| Number of tool slots | 32 tools | |
| Max. tool diameter | ø 160 mm | |
| Max. tool diameter (tools slots beside not occupied) | ø 250 mm | |
| Tool length | 350 mm | |
| Max. tool weight | 15 kg | |
| Milling precision | | |
| Repeat accuracy | ± 0.008 mm | |
| Positioning accuracy | ± 0.008 mm | |
| Traverse paths | | |
| X axis (linear guide) | 3 200 mm | 4 200 mm |
| Y axis (linear guide) | 1 400 mm | |
| Z axis (box way) | 850 mm (option 1050 mm) | |
| Axis feed drive | | |
| X axis fast motion | 16 m/min. | 12 m/min. |
| Y axis fast motion | 20 m/min. | |
| Z axis rapid traverse | 20 m/min. | |
| Motor torque | | |
| X/Y/Z axis | 48 Nm | |
| Feed forces | | |
| X/Y/Z axis | 14.4 kN / 28.9 kN / 28.9 kN | |
| Speed range | | |
| Speeds* | 8 000 rpm | |
| Pneumatics | | |
| Compressed air | 0.6 MPa (6 bar) | |
| Milling table | | |
| Table length x width | 3 200 x 1 200 mm | 4 200 x 1 200 mm |
| T-slot size / amount / distance | 22 / 7 / 150 mm | |
| Max. load of working table | 8 000 kg | |
| Clearance spindle to table | 50 - 900 mm | |
| Distance spindle to crossbar | 404 mm | |
| Distance between the stands | 1 400 mm | |
| | „Work area“ on page 212 | |
| Dimensions | | |
| Footprint | 8 130 x 4 500 mm | 10 000 x 4 500 mm |
| | „Machinery layout plan“ on page 212 | |
| Overall weight | 21 000 kg | 22 000 kg |

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

SINUMERIK 828D

The power package in the compact class of CNC controls

Boosting productivity and precision in manufacturing

- With the SINUMERIK 828D CNC control from SIEMENS, users benefit from the fast and well-engineered hardware. The control offers maximum ease of use and ensures good connections to a wide range of storage media and networks. In its basic structure, the CNC control corresponds to the standards of common NC technology.
- As a top specialist for sophisticated milling machines, the Siemens SINUMERIK 828D masters every conceivable drilling and milling operation. Of course, this also applies in any tilted workpiece plane and on cylindrical workpieces. Even for mould making applications you do not need a special CNC control. The unique performance of the SINUMERIK 828D guarantees mirror-smooth surfaces with a minimum of machining time.
- For ergonomic operation and programming, the SINUMERIK 828D is equipped with a large 10.4-inch graphic colour screen. Robust function keys and a full QWERTY keyboard on the terminal allow the user to program, set up and operate even in harsh workshop environments. The mechanical buttons are protected against dust and liquids according to IP 65 by a stable and durable foil.
- Since the SINUMERIK 828D operates without components that are subject to wear, such as the fan and hard disk, it is maintenance-free and reliable in the long term. Powerful computers and memory enable modern NC strategies to be processed quickly and extensive colour graphics to be displayed in real time, even in animated form. On the one hand, this increases machining accuracy, and on the other, it simplifies operation, programming and diagnostics. The computing and storage capacity is so generous that moving graphics can be generated and shown to help with all functions and detailed simulations can be generated and shown for programmed operations.

Control

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



**SIEMENS
SAFETY**

INTEGRATED

SET UP WORK WITH OPEN DOORS

Functional safety also provides protection against high costs!

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

OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- ShopMill work step programming
- Managing network drives
- 3-D simulation
- Simultaneous recording
- System software SW 26x

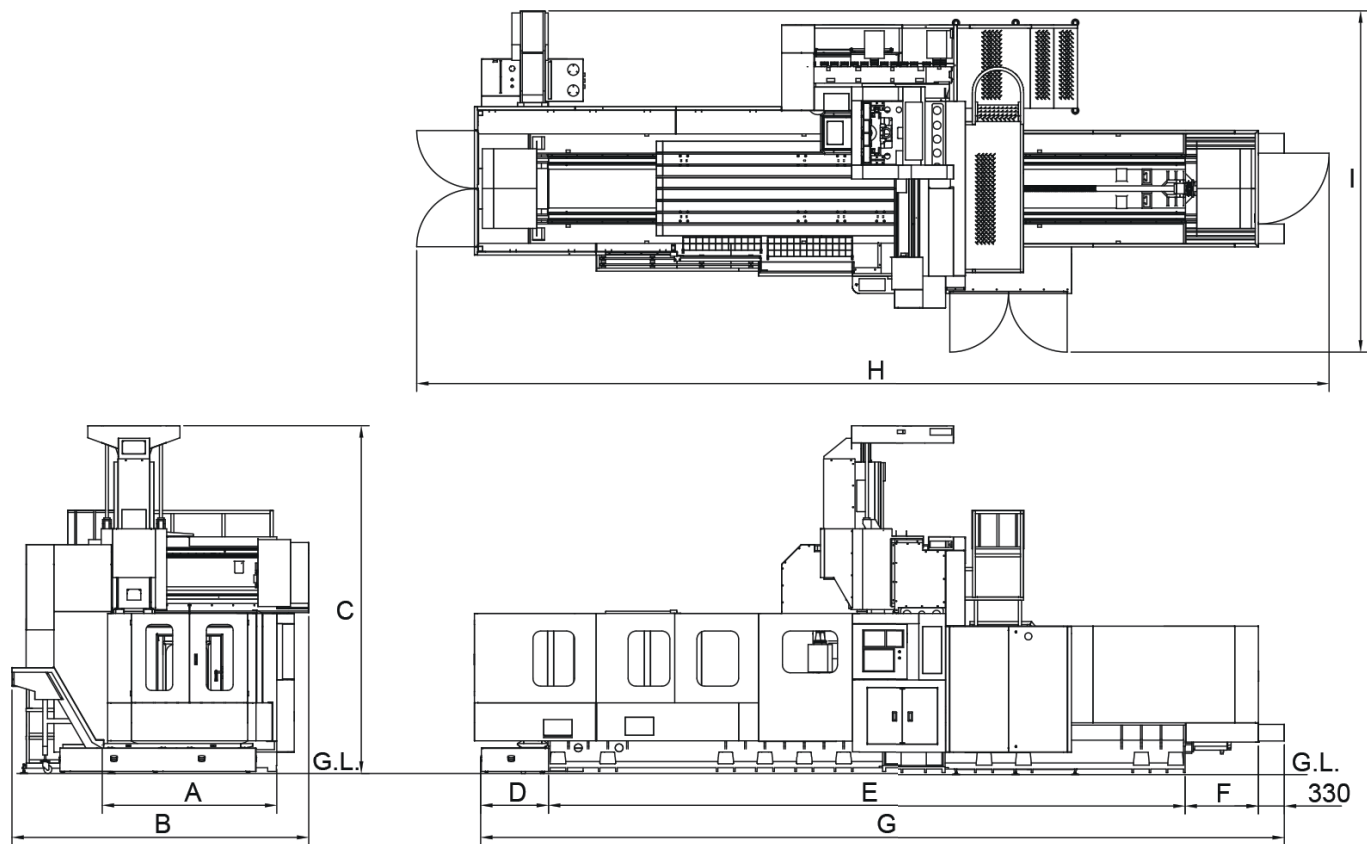


Warranty extension

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

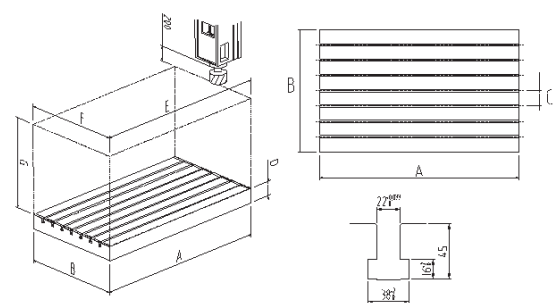
MACHINERY LAYOUT PLAN



mm

| | FP 1700 | FP 2200 | FP 3200 | FP 4200 |
|---|---------|---------|---------|---------|
| A | 2 200 | 2 200 | 2 200 | 2 200 |
| B | 3 850 | 3 850 | 3 850 | 3 850 |
| C | 4 420 | 4 420 | 4 420 | 4 420 |
| D | 860 | 860 | 860 | 860 |
| E | 4 100 | 4 100 | 6 100 | 8 100 |
| F | 735 | 735 | 840 | 932 |
| G | 6 025 | 6 025 | 8 130 | 10 312 |
| H | 8 600 | 8 600 | 10 600 | 13 300 |
| I | 4 335 | 4 335 | 4 335 | 4 335 |

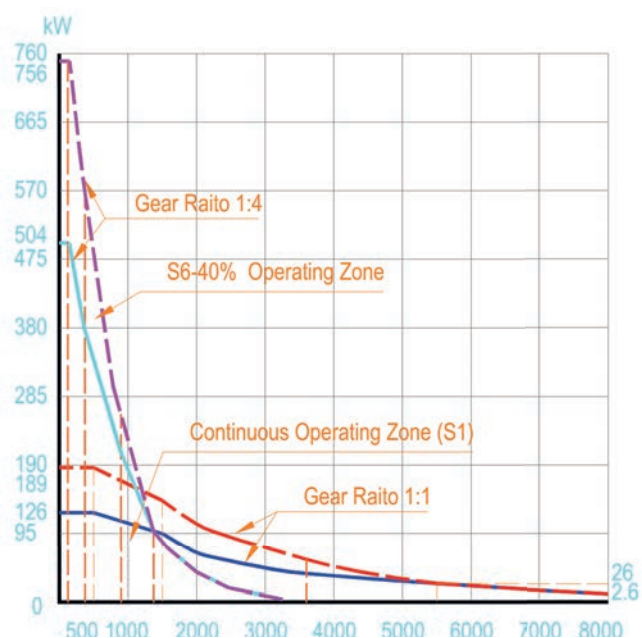
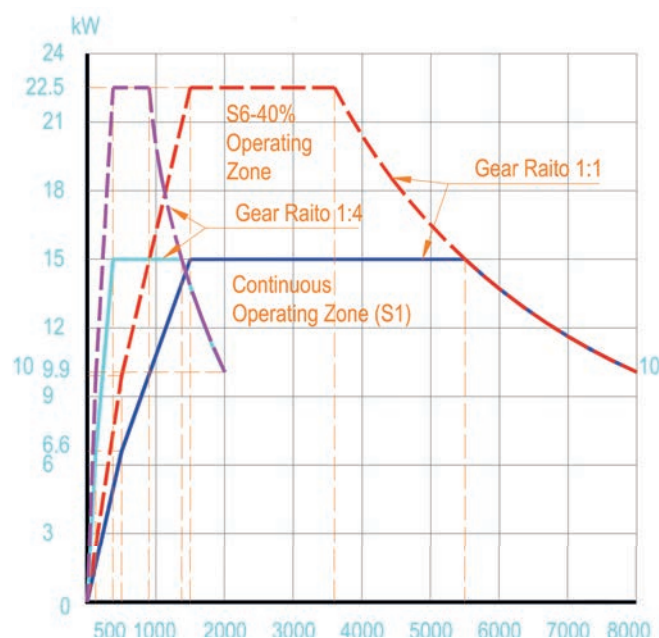
WORK AREA



mm

| | FP 1700 | FP 2200 | FP 3200 | FP 4200 |
|---|---------|---------|---------|---------|
| A | 1 700 | 2 200 | 3 200 | 4 200 |
| B | 1 200 | 1 200 | 1 200 | 1 200 |
| C | 150 | 150 | 150 | 150 |
| D | 150 | 150 | 150 | 150 |
| E | 1 700 | 2 200 | 3 200 | 4 200 |
| F | 1 200 | 1 200 | 1 200 | 1 200 |
| G | 725 | 725 | 725 | 725 |

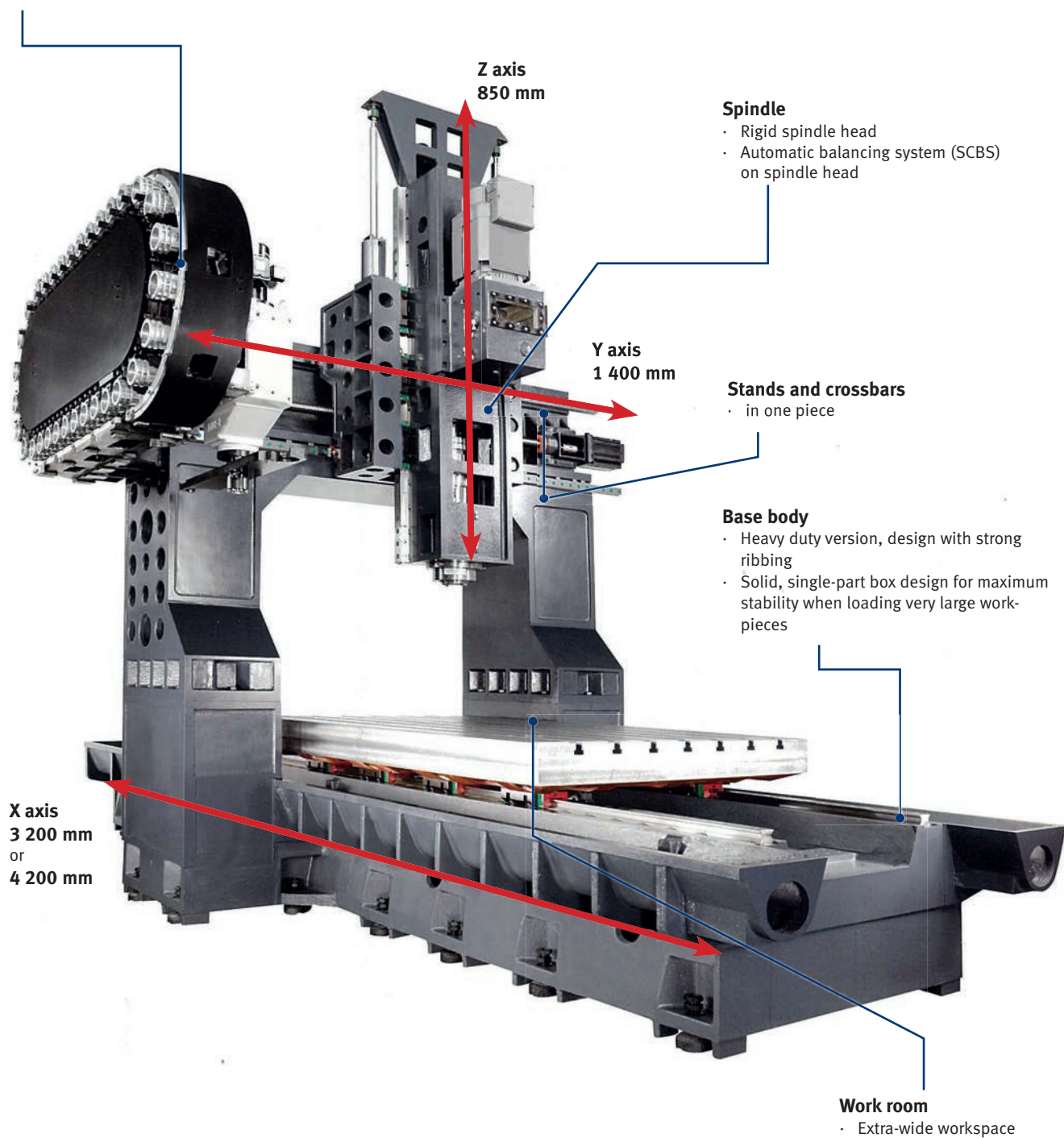
SPINDLE POWER AND TORQUE DIAGRAM



| Torque/KW diagram data | |
|------------------------|----------------------------|
| Spindle seat | SK 50 |
| | DIN 69871 |
| Rotational speeds | 8 000 rpm |
| Drive motor | Siemens 1PH8133-1DF02-1DA1 |
| | 15 / 22.5 kW |
| Pulley ratio | 1:1 1:4 |

Tool changer

- Driven by precision cam for fast and accurate tool positioning
- The tools are transferred directly from the tool magazine to the spindle during the tool change by means of a double gripper
- Tool selection occurs bidirectionally via the shortest route.
- The tool magazine is located outside of the work area
- The cover on the tool magazine protects the tools against chips or coolant



CHIP DISPOSAL



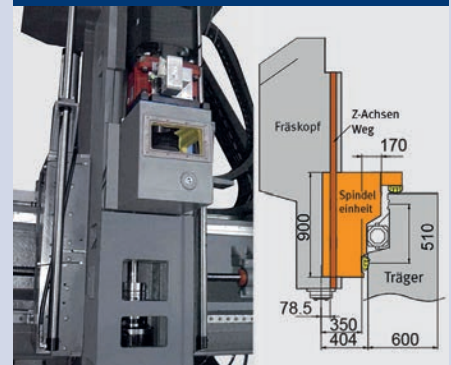
- Feeder spirals on both sides of the machine base transport high flow rates to the chip auger

SPINDLE HEAD



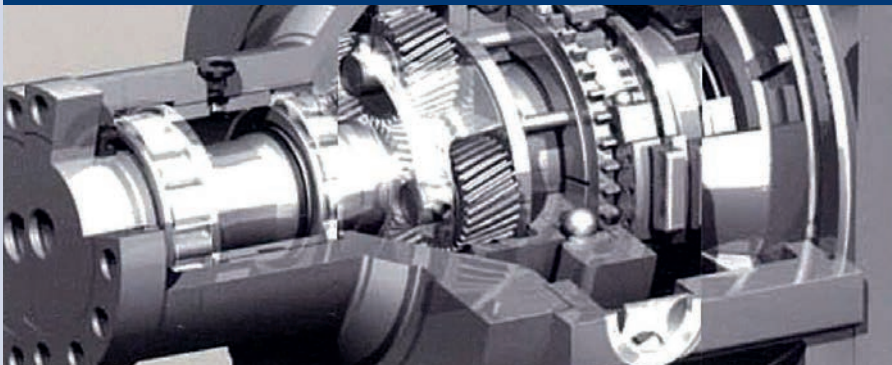
- All gear wheels and bearings in the gearbox are oil bath lubricated
- Efficient cooling of the workpiece by internal spindle cooling
- Longer service life and excellent part accuracy

Z AXIS



- Excellent stiffness and stability
- Box design
- Stability even with heavy machining

SPINDLE



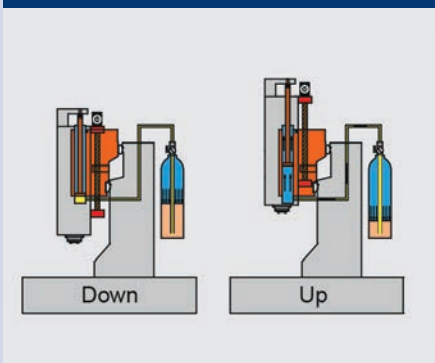
- High torque spindle ideal for high performance cutting applications
- Wide speed range up to 8 000 rpm for heavy machining and precision machining
- Automatic oil lubrication of spindles with cooling
- In-line spindle SK 50
- Cam gear

GEARBOX



- Gearbox with high transmission ratio

Z AXIS



- Pneumatic weight compensation in the Z-axis for high dynamics

PRECISION



Each machine goes through dynamic and static precision tests. The machine precision complies with:

- ISO 10791
- VDI 3441t
- ISO 230
- JIS B6388
- and ASME B5 standards.

| Standard | ISO 10791-4 | | FP 3200 FP 4200 |
|-------------------------------------|-------------|----------|--------------------|
| | Tolerance | | |
| Bi-directional positioning accuracy | A | 0.042 mm | 0.008 mm |
| | | 0.020 mm | 0.008 mm |
| Bi-directional Repeat accuracy | R | 0.042 mm | 0.008 mm |
| | | 0.020 mm | 0.008 mm |

JIS B6336-4 shows the same value as the ISO standard: The P value of VDI / DGQ3441 is equivalent to A in ISO10791-4 and PS is equivalent to R. All values shown above were measured in environments with good air conditioning.

| TOOL MEASURING / WORKPIECE MEASURING | | | |
|--|---|--|---|
| 351161023* | 1 | BLUM TC62 Universal measuring probe | <ul style="list-style-type: none">• Switching point repetition accuracy from 0.3µm 2 at 2 m/ min. measuring speed• Wear-free and durably stable• Very compact probe with 40 mm diameter |
| 351161024* | | BLUM ZX-Speed 3-D probe | <ul style="list-style-type: none">• Universal 3-D probe for toolmaking and tool break monitoring |
| ➡ For information on Blum workpiece/tool measuring, also ex warehouse Germany see page 275 | | | |
| 351161020* | 2 | Renishaw NC 4 Laser system for tool measurement | <ul style="list-style-type: none">• NC4 non-contact tool inspection system is a high-precision, extremely fast solution for tool measurement and breakage control |
| 351161021* | | Renishaw OMP 60 Probe with optical signal transmission | <ul style="list-style-type: none">• For checking and setting up workpieces on processing centres• Compact, touch-actuated 3D probe.• Reliably modulated, optical signal transmission. |
| 351161022* | | Renishaw TS 27R Probe for tactile tool measurement | <ul style="list-style-type: none">• Tool breakage check• Compact, tactile 3-D tool probe with wired signal transmission for tool breakage checking |
| ➡ For information on the Renishaw laser system and probe, also ex warehouse Germany see page 288 | | | |

| 3-D PRINTING | | | |
|---|--|-------------------------------|---|
| 3562411 | | 3-D printing interface | <ul style="list-style-type: none"> Plug connector on milling head for OPTImill 3X/5X printing head Power supply is installed in control cabinet Prepared for open circuit monitoring and filament holder |
| ➡ For information on 3-D printing and accessories see 266 | | | |

| MISCELLANEOUS | | | |
|---------------|---|---|---|
| 3536111 | 4 | Starter set SK 50 / DIN 69871 | <ul style="list-style-type: none"> Cutter head holder with 27 mm receptacle, 2 each Weldon 6 mm/20 mm, 1 each Weldon 8 mm / 10 mm / 12 mm / 16 mm, adapter SK 50 to MK 3, 4 collet holders ER 32, collet spanner ER 32, 18-piece collet set ER 32, height adjuster, cone squeegee, 15 tightening bolts |
| 351161001* | | Coolant through spindle (CTS) | <ul style="list-style-type: none"> Integrated unit, 20 bars pump pressure |
| 351161002* | | | <ul style="list-style-type: none"> External unit; tank capacity 165 litres, 20 bars pump pressure |
| 351161003* | | | <ul style="list-style-type: none"> External unit; tank capacity 165 litres, 70 bars pump pressure |
| 351161014* | 6 | Air conditioner | <ul style="list-style-type: none"> Instead of the standard equipment › heat exchanger |
| 351161005* | | Linear guide | <ul style="list-style-type: none"> for the Z axis |
| 351161010* | | Tool changer with 40 tool slots | <ul style="list-style-type: none"> Instead of the standard equipment › Tool changer with 32 tool slots |
| 351161011* | 5 | Tool changer with 60 tool slots | <ul style="list-style-type: none"> Instead of the standard equipment › Tool changer with 32 tool slots |
| 351163026* | | Hood for machine work space | <ul style="list-style-type: none"> FP 3200 |
| 351164027* | | | <ul style="list-style-type: none"> FP 4200 |
| 351161030* | 7 | Z axis extension | <ul style="list-style-type: none"> Z = 1 050 mm |
| 351161035* | | 90° angle milling head | <ul style="list-style-type: none"> Speed up to 2 500 rpm Gearbox transmission ratio 1:1 38 kW maximum power transfer of the spindle drive |
| 351161036* | | | <ul style="list-style-type: none"> Speed up to 3 500 rpm 5° pitch |
| On request | 8 | Automatically indexing milling head B and C axis | <ul style="list-style-type: none"> Speed up to 3 500 rpm 5° pitch |
| On request | | Fourth axis | <ul style="list-style-type: none"> 250 mm |
| On request | | Fifth axis | |

1 BLUM TC62 / ZX-SPEED



- Precise, directionally independent approach behaviour
- Constant deflection forces
- Spindle orientation not required
- No detrimental 3-leg principle with lobing effect
- BRC wireless technology

2 RENISHAW OMP 60



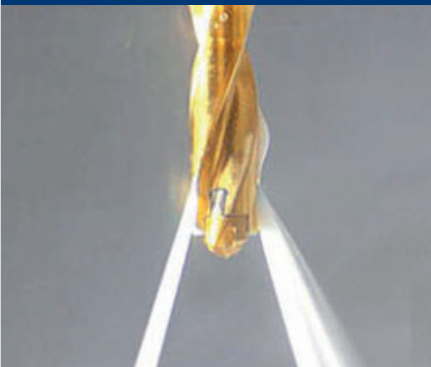
- Compact, high-accuracy probe that offers all the advantages of an automatic workpiece setup while enabling the measurement of complex 3D part geometries on CNC machining centres.

3 RENISHAW TS 27R



- Proven kinematic design
- Interference-free, wired communication
- Least expensive tool measurement for all types of machining centres
- Repetition accuracy of 1.00 µm (2)

4 COOLANT THROUGH SPINDLE



- Guarantees optimal service life
- Optionally with internal or external unit
- Pump pressure 20 bars or 70 bars

5 HOOD



- Easy loading and unloading of heavy and bulky workpieces with a crane
- Top machine space cover
- For oil mist extraction

6 AIR CONDITIONER



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

7 MANUAL MILLING HEAD



- Increases the technological nature of the machining equipment, work productivity and reduces set-up and auxiliary times and the need for special fixtures.

8 AUTOMATIC MILLING HEAD



- Increase in machining accuracy because it is not necessary to change the position of the clamped workpiece.
- Speed up to 3 500 rpm
- 5° pitch

Eyring Stahl- und Metallbau UG

Thuringian metalworking company extends machine line-up to include OPTIMUM CNC Portal milling machine

Eyring Stahl- und Metallbau, based in Römhild, Thuringia, has been a major player in the production of steel and metal structures made of aluminium, stainless steel and brass since 1981. Now the family-run company has expanded its machinery to include the OPTIMUM CNC Portal milling machine FP 3200A, thus raising its production process to a new technological level.

OPTimill FP 3200A Portal milling machine

On a production area of approx. 1.500 m² the company combines a wide variety of metalworking machines in order to be able to react quickly to individual needs and to offer tailor-made, innovative solutions at any time. They include bending machines, hydraulic presses, welding equipment, painting cabins, grinding machines, circular saws and gate shears. They are used to manufacture external and internal stairways, railings, canopies, fences and gates, balcony railings and special constructions. Now that the new OPTIMUM FP 3200A CNC Portal milling machine has been integrated

into its machine line-up, the company can rely on state-of-the-art technology to automate its manufacturing processes in a sustainable manner and meet the increased precision requirements in an even better way in the future.

SIEMENS Sinumerik 828D control

The OPTIMUM CNC portal milling machine, which was presented to the market only a few months ago, is equipped with a SIEMENS Sinumerik control 828D, which enables intelligent motion control. This makes the machine especially suitable for the production of workpieces with a high dimensional accuracy and surface quality. 3-D simulation allows the manufacturing processes to be optimally controlled and adjusted where neces-

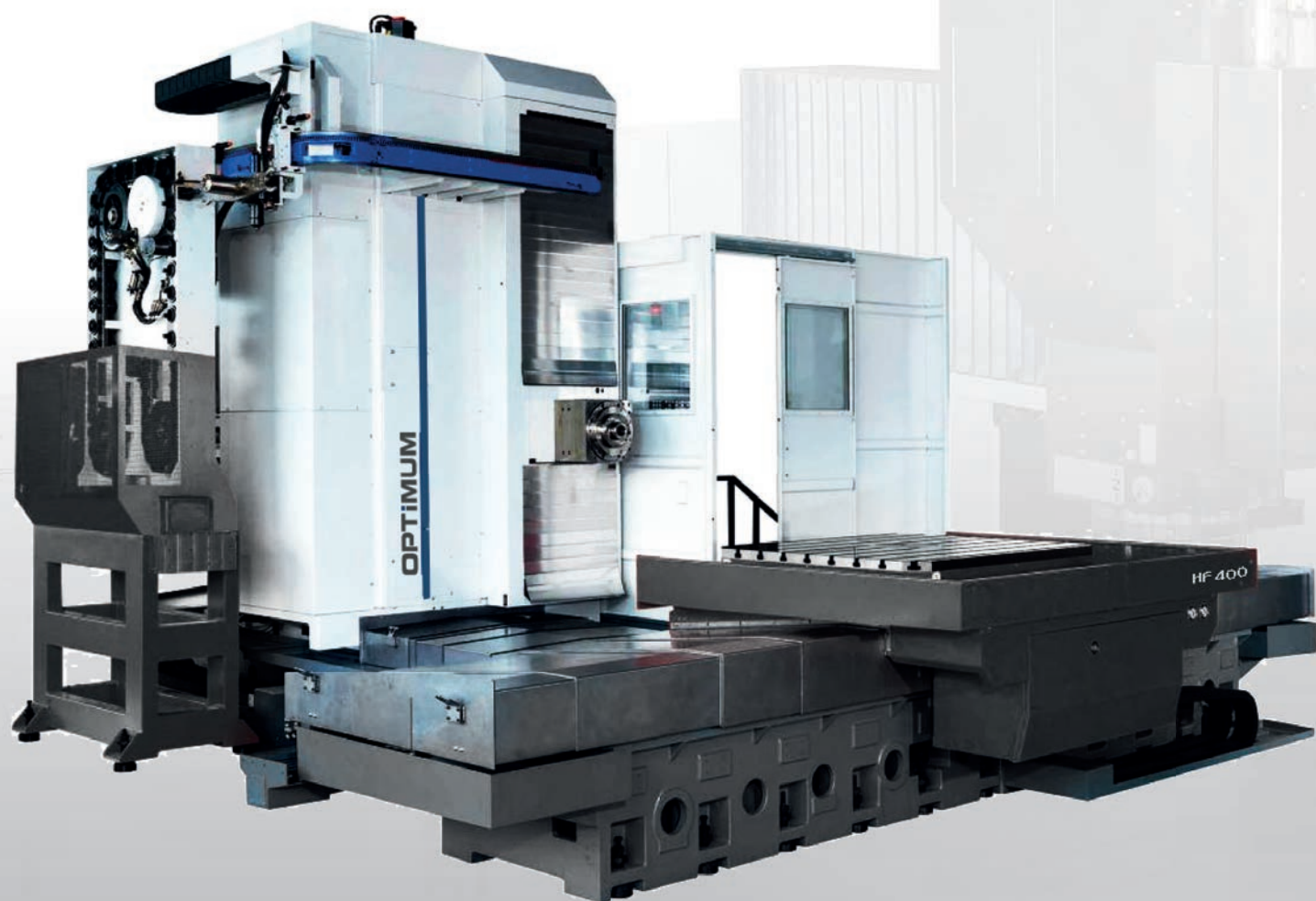


sary. Due to its rigid, rugged design, made of high-quality MEEHANITE[®] quality cast iron, and the milling head mounted on a cross beam, the Portal milling machine guarantees maximum stability and is ideally suited for machining large surfaces such as panels. Roller linear guides on the X and Y axis as well as a balance system in the Z axis ensure highest precision and reliability even at high speeds. The ball screws are mounted in high-precision bearings and allow for absolutely unbalance-free rotation of the spindle. In order to set the highest standards in safety, the portal milling machine is also equipped with the **SIEMENS** Safety Integrated function, which prevents injuries to persons, resulting in higher machine availability and thus increased productivity.

High quality and reliable service

In addition to high quality and reliable service, the large dimensioned clamping area was an important factor for the metal construction company Eyring when choosing the OPTIMUM CNC Portal milling machine. This is why the traditional Thuringian company will be using the machine especially for the production of large components such as welding frames in the future.







Horizontal drilling and milling centre HF 400
Horizontal drilling and milling centre HF 500
Horizontal drilling and milling centre HF 600

05

HORIZONTAL DRILLING AND MILLING CENTRE

HF 400

OPTIMUM PREMIUM CNC horizontal drilling and milling centre



SIEMENS CONTROL 840D SL with OP 019 BLACK

- Perfect structures and a rugged design guarantee best possible rigidity and stability
- Meehanite cast iron construction provides excellent mechanical stability
- Dimensionally stable extra-wide roller linear guides of the X and Z axes ensure high speed and a long service life through maximum static and dynamic stiffness.
- Y-axis with flat guide increases tool life and smoothness, resulting in better surface quality on the workpiece and higher cutting performance
- Turcite B headstock support surface
- Hardened spindle and quill (surface hardness HRC52-55) ensure high stiffness and accuracy
- The X / Y and Z axis is equipped with a 1 µm linear scale as standard, the B-axis with angular scale
- Large, fully ground work table with 11 T-slots
- High table loading with 8 tons or optionally with 10 tons
- Extremely large working capacity with fixed ram head
- Spindle Vibration Supervision (SVS) function - spindle vibration monitoring software and real-time control technology
- AC servo motor offers extremely high torque, as well as very high power and axis force
- High-quality precision ball screws
- Rotary table with 0.001° high pitch accuracy
- SK50 tool changer for 60 tools
- Headstock stability through hydraulic counterweight
- Precision ground, pre-stressed, high-performance ball screws
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- Spindle oil cooler
- Automatic central lubrication system
- Coolant gun
- Coolant system with check valve
- Control system for low voltage switching
- Lifting device for unloading the machine
- Levelling feet
- Including two years **SIEMENS** warranty
- Extension of the **SIEMENS** repair service contracts (RSV) see page 225
- Information on „Maintenance contracts“ on page 322



Fig. machines without standard protective housing

TECHNICAL DATA

| Model | HF 400 |
|---|--------------------------------|
| Article no. | 3512040 |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 47 KVA |
| Milling spindle | |
| Drive motor S1 | 37 kW |
| Drive motor torque S1 | 1 941 Nm |
| Drive motor S6 30 % operation | 56 kW |
| Torque drive motor S6 30 % operation | 2 912 Nm |
| Quill diameter (W-axis) | 130 mm |
| Spindle bearing inner diameter | Ø170 mm |
| Spindle seat | SK50 DIN 69871 |
| Tool changer | |
| Number of tool slots | 60 tools |
| Max. tool diameter | 125 mm |
| Max. tool diameter (tools slots beside not occupied) | 245 mm |
| Tool length | 500 mm |
| Max. tool weight | 25 kg |
| Tool change time T-T | 16 sec. |
| Max. total tool weight in magazine | 900 kg |
| Milling precision | |
| Repeat accuracy | ± 0.015 mm |
| Positioning accuracy | ± 0.004 mm |
| Traverse paths | |
| X axis (linear guide) | 2 000 mm |
| Y axis (box way) | 2 000 mm |
| Z axis (linear guide) | 1 400 mm |
| W1 axis | 700 mm |
| Axis feed drive | |
| X axis fast motion | 10 m/min. |
| Y axis fast motion | 10 m/min. |
| Z axis fast motion | 10 m/min. |
| W axis rapid traverse | 8 m/min. |
| Speed range | |
| Speeds* | 35 - 788 rpm / 789 - 3 000 rpm |
| stages | 2 stages |
| Work table | |
| Table length x width | 1 400 x 1 600 mm |
| Table height | 1 280 mm |
| T-slot size / amount / distance | 24 mm / 9 / 160 mm |
| Max. load of working table | 8 tons |
| Positioning accuracy of the rotary table | 15° |
| Rotary table repeatability | 4" |
| Spindle to table distance | 70 - 2 170 mm |
| Spindle to stand distance | 65 - 2 090 mm |
| Encoder accuracy | ± 0.005° |
|  More information on the „Swivel table working area“ on page 226 | |
| Dimensions | |
| Installation area | 7 853 x 7 050 x 3 706 mm |
| Overall weight | 40 000 kg |
|  More dimensions on page 227 | |

SINUMERIK 840D sl with OP 019 black Multitouch operating panel

The right solution for any engineering challenge

- The SINUMERIK 840D sl is rightly considered the benchmark in the CNC premium class. Maximum CNC performance and unrivalled flexibility and openness are the basis for almost any machine concept.

Multitouch operation OP 019 black

- 18.5" diagonal industrial display
- Maximum operating comfort: Capacitive multi-touch technology (up to 5 contact points simultaneously)
- High resolution of 1 366 x 768 pixels in widescreen format
- Rugged: No wear of mechanical components thanks to Multitouch technology
- Scratch-proof glass front
- Modern, intelligent design
- Can be operated while wearing gloves

MODULAR AND SCALABLE

- In addition to scalable NCU performance, the SINUMERIK 840D sl also offers a high degree of modularity of the operating components. With a flexible operating concept - e.g. the combination of any control panel with the NCU - the SINUMERIK 840D sl ideally adapts to the operating philosophy of modern premium machine concepts.

BENCHMARK IN OPEN ARCHITECTURE

- The system openness of the SINUMERIK 840D sl is unparalleled. In this way, the CNC can be optimally adapted to the technology of the machine and has a high degree of freedom in production automation.



Functional safety also provides protection against high costs!

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

OVERALL PACKAGE

- Safety functions SINUMERIK Safety Integrated
- Residual material detection
- Shopmill
- Simultaneous recording
- 3D simulation



Extension of the SIEMENS repair service contracts (RSV)

The SIEMENS Repair Service Contract (RSV) helps you to protect your machine for another 12, 24 or 36 months (can only be ordered within the two-year Siemens warranty period).

12 months; Article no. 3589035
24 months; Article no. 3589036
36 months; Article no. 3589037

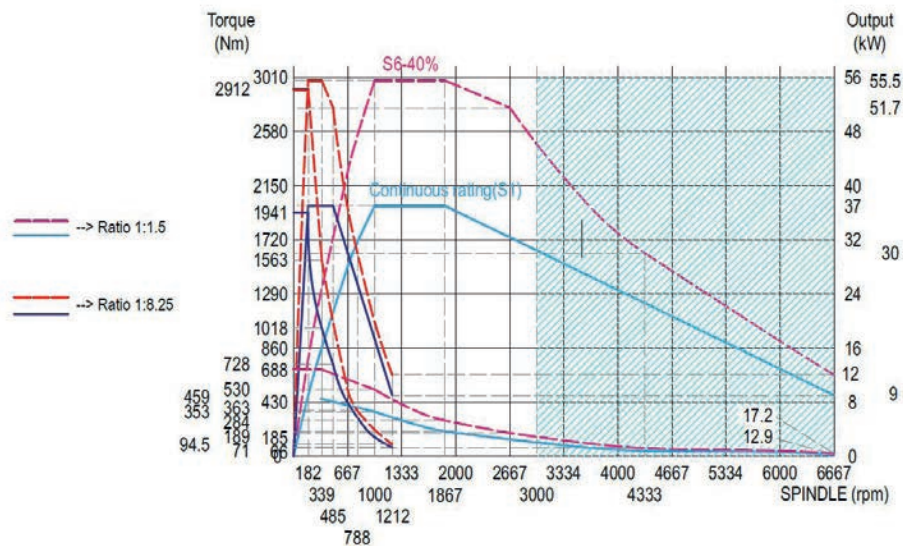


SIEMENS NCU 710.3B

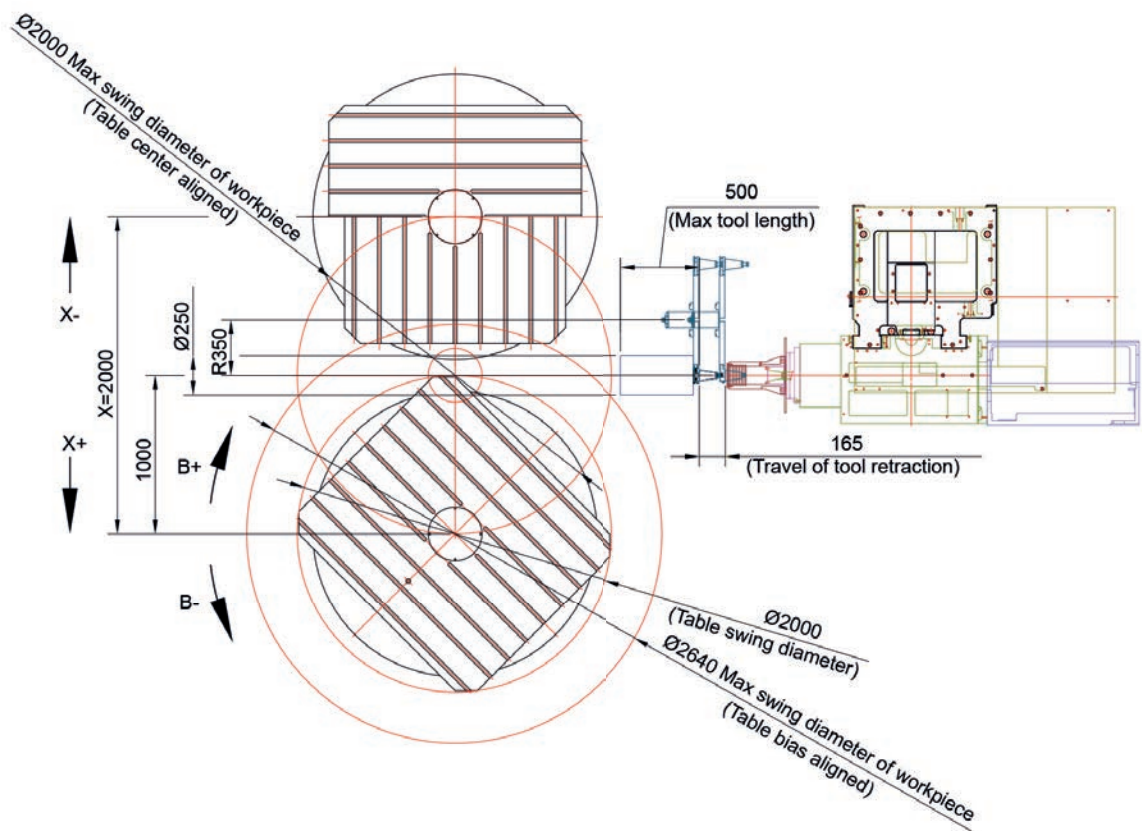
- up to 8 axes
- Cycle time 1.2 ms
- up to 600 tools



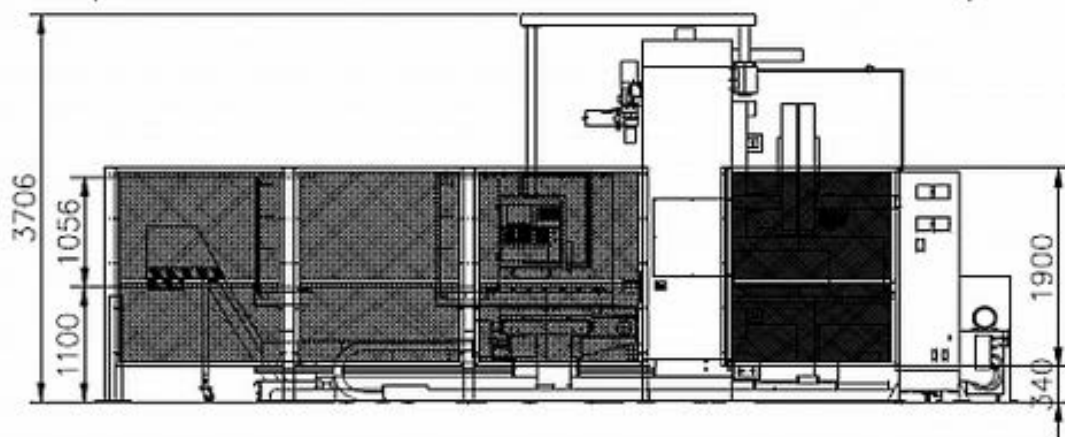
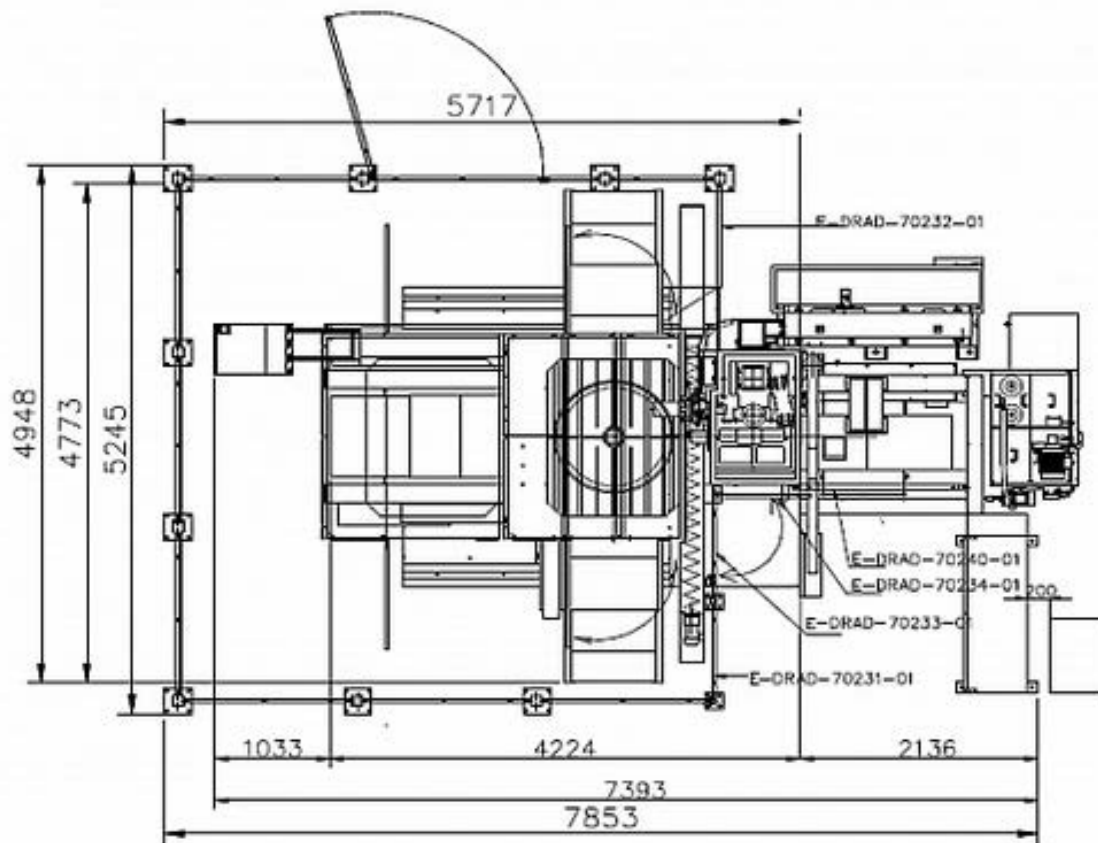
POWER AND TORQUE DIAGRAM



SWIVEL TABLE WORKING AREA



DIMENSIONS



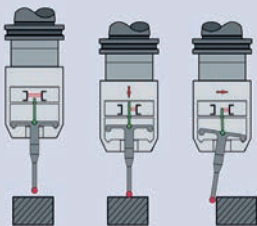
TC 62RC - Workpiece touch probe

Compact high speed measuring probe for workpiece measurement

Unrivalled precision and fast workpiece measuring thanks to modern, multidirectional measuring system with optical/electronic switching signal generation.

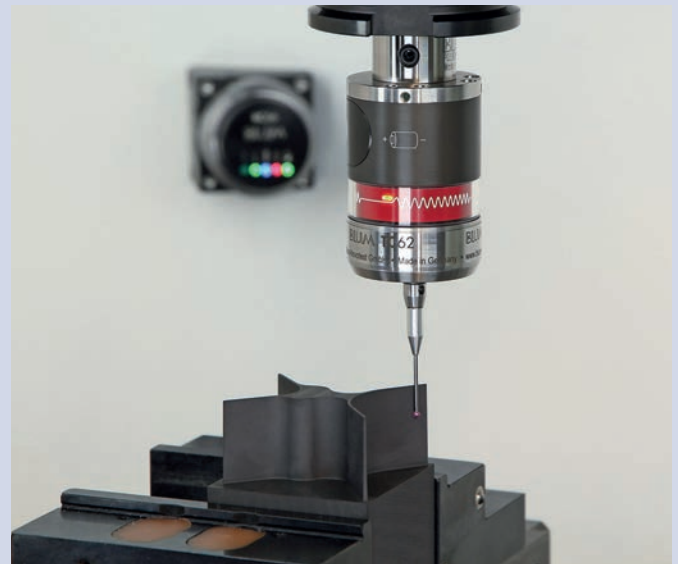
Wear-free, optical-electronic signal generation:

- Switching signal generated by interrupting a miniature light barrier
- Switching point repeatability of $0.3\mu\text{m}$ at 2 m/min. Measuring speed
- Wear-free and durably stable
- Very compact probe with $\varnothing 40\text{ mm}$



High-precision, rotationally symmetrical measuring system

- Precise, directionally independent approach behaviour
- Constant deflection forces
- Spindle orientation not required
- No detrimental 3-leg principle with lobing effect



ZX speed

Tool measuring probe

Universal 3-D probe heads for tool adjustment and tool break monitoring

Economical solutions for tool length and radius adjustment and tool break monitoring. Precise and process-assured measurements due to state-of-the-art metrology equipment with optoelectronic switching signal generation.

Wear-free, optical/electronic signal generation

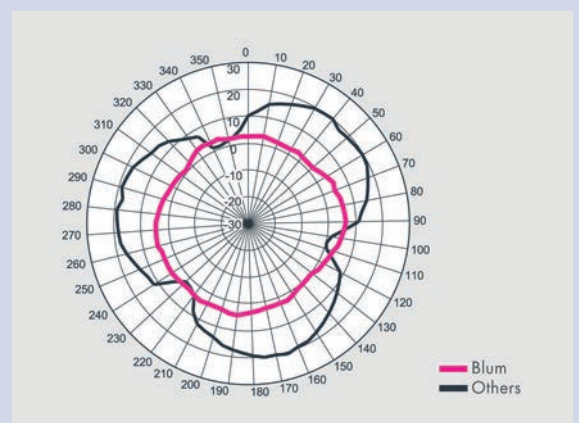
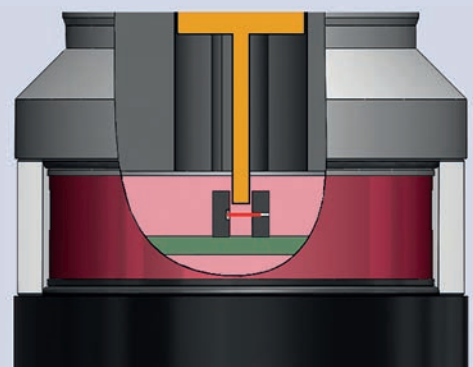
- Switching signal is generated by interrupting a miniature light barrier
- Allows for faster measuring speeds and measuring precision than comparable probes
- Reliable tool adjustment under the toughest conditions

High-precision state-of-the-art measuring equipment

- Precise, directionally independent switching behaviour
- Constant deflection forces
- Premium BLUM measuring equipment, latest generation
- No detrimental 3-leg principle
- No highly-sensitive switching elements

Latest transmission technologies

- ZX speed: Cable-connected
- ZX speed IR: Infrared transmission

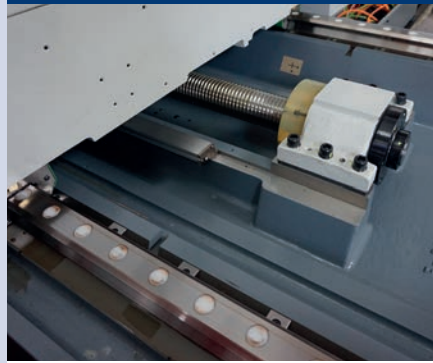


BALL SCREWS



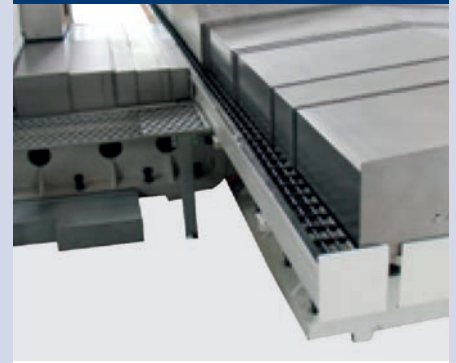
- Class C3 ball screws with double nuts for high rapid traverse speeds in all axes

LINEAR GUIDE



- X and Z axis
- Maximum feed speed
- Extremely high stiffness
- Very high load capacity
- Ensure precise positioning

CHIP DISPOSAL



- Conveyor belt transports high volumes to the chip conveyor

AUTOMATIC LUBRICATION SYSTEM



- Pressureless recirculating lubrication: the oil volume is controlled according to the measured distribution values; the oil is supplied according to the lubricating oil requirement of the sliding surface and the recirculating ball screw
- With oil level detector unit.
The alarm is displayed on the screen when there is a lack of oil
Sealed spindle bearings are lubricated with grease

MEASURING SYSTEM



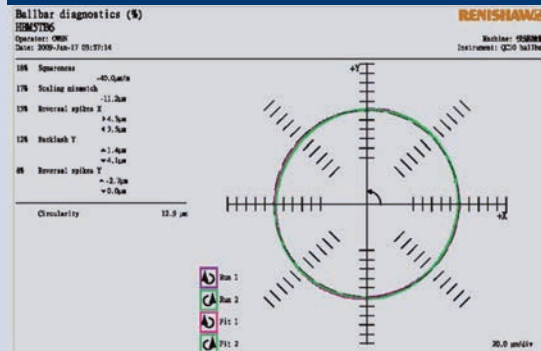
- All three axes are equipped with an absolute linear scale with an accuracy of $\pm 5 \mu\text{m}$
- Rotary table with rotary encoder with an accuracy of 0.001

HIGH-PERFORMANCE SPINDLE



- Developed for deep drilling
- The spindle with cylindrical roller bearing (double roller) is suitable for high-performance machining
- Ground spindle and sleeve for high accuracy

GEOMETRIC TEST FOR HIGH ACCURACY



- Geometric accuracy is tested according to the ISO 3070-2 standard and repeatability and positioning accuracy according to the ISO 230-1 standard. And it is approved by laser devices

- All geometric tests are completed after 24 hours of full function run, then a test is performed on the machine and the complete test programmes are stored.

| MISCELLANEOUS | | | | |
|---------------|---|---|---|---|
| 3512065010* | | Coolant Through Spindle External unit; tank capacity 165 litres, 70 bars pump pressure | <ul style="list-style-type: none"> Instead of the standard equipment › Internal spindle cooling 20 bar | <ul style="list-style-type: none"> We recommend an extraction unit |
| 3512065028* | 1 | Oil separator / oil skimmer | | |
| 3512065020* | | | <ul style="list-style-type: none"> L x W x H: 800 x 525 x 800 mm | |
| 3512065021* | 2 | Right-angled stop | <ul style="list-style-type: none"> L x W x H: 1 000 x 550 x 1 000 mm | |
| 3512065022* | | | <ul style="list-style-type: none"> L x W x H: 1 300 x 700 x 1300 mm | |
| 3512065047* | 3 | Tool changer with 120 tool slots | <ul style="list-style-type: none"> Instead of the standard equipment › Tool changer with 60 tool slots | |
| 3512065046* | 5 | Air conditioner | <ul style="list-style-type: none"> Instead of the standard equipment › heat exchanger | |
| 3536111 | | Starter set SK 50 / DIN 69871 | <ul style="list-style-type: none"> Cutter head holder with 27 mm receptacle, 2 each Weldon 6 mm/20 mm, 1 each Weldon 8 mm / 10 mm / 12 mm / 16 mm, adapter SK 50 to MK 3, 4 collet holders ER 32, collet spanner ER 32, 18-piece collet set ER 32, height adjuster, cone squeegee, 15 tightening bolts | |

| TRAVEL AND WORKING RANGE | | | | |
|--------------------------|---|---|--|--|
| 3512065047* | | X axis travel to 3 000 mm | <ul style="list-style-type: none"> Instead of standard equipment › X axis travel 2 000 mm | |
| 3512065030* | 4 | Work area Table size 1 600 x 1 800 mm Load capacity max. 10 tons | <ul style="list-style-type: none"> Instead of the standard equipment › Table size 1 400 x 1 600 mm Instead of the standard equipment › Load capacity max. 8 tons | |

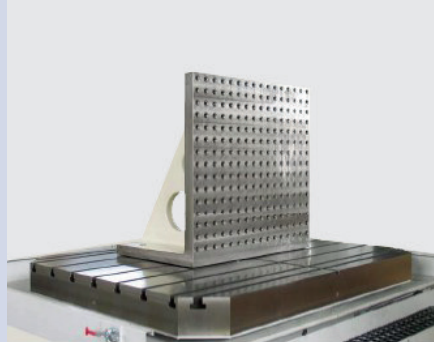
| MILLING HEADS AND ACCESSORIES | | | | |
|-------------------------------|---|---------------------------------|--|--|
| 3512065060* | 6 | Angle head 90° N75 | <ul style="list-style-type: none"> for extended machining options (milling, drilling, reaming, thread cutting) | |
| 3512065062* | 7 | Spindle extension sleeve | <ul style="list-style-type: none"> absolutely necessary for the universal milling head (Item no. 3512065061) | |
| 3512065061* | 8 | Universal milling head | <ul style="list-style-type: none"> Milling head with two axes of rotation, thus pivots and rotates to any spatial angle | |

1 OIL SEPARATOR / OIL SKIMMER



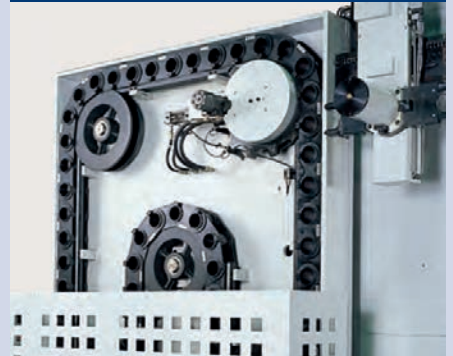
- Separation of non emulsified foreign oils by skimming
- Separation of solids by settling in the collection tank

2 RIGHT-ANGLED STOP



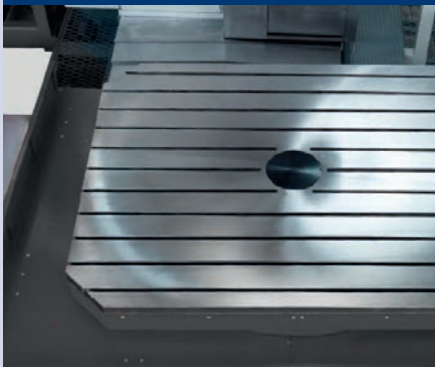
- Extra thick and heavy ribbed construction

3 TOOL CHANGER



- for up to 120 tools

4 TABLE WORKSPACE



- High table load with 10t
- Rotary table with 0.001° high pitch accuracy
- Large, fully ground work table with 11 T-slots

5 AIR CONDITIONER



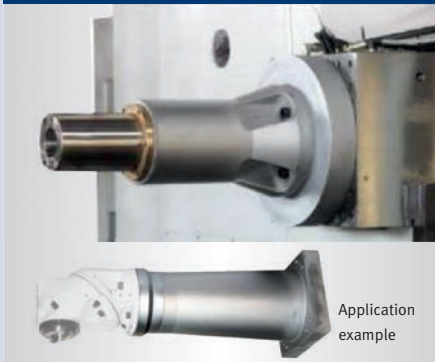
- Instead of heat exchanger
- The air conditioner permanently and constantly cools the control cabinet to the set temperature.

6 ANGLE HEAD N75 90°



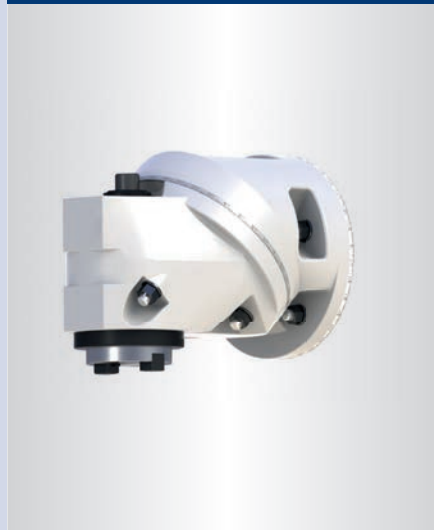
- Complete machining
- Reduction of machine downtimes
- Machining of otherwise inaccessible workpiece areas (internal machining)

7 SPINDLE EXTENSION SLEEVE



- for the universal milling head

8 UNIVERSAL MILLING HEAD



- Rotation axes arranged at an angle of 45° to each other.
- Maximum speed 1 800 rpm
- Spindles and gears made of hardened chrome-nickel steel.
- High precision angular contact ball bearings

A white circular badge with a blue border and the word "NEW" in blue capital letters.

HF 500 / HF 600

OPTIMUM PREMIUM CNC horizontal drilling and milling centre.

Convincing technology for dynamics and precision

SIEMENS CONTROL 840D SL with OP 019 BLACK

- Perfect structures and a rugged design guarantee best possible rigidity and stability
- Meehanite cast iron construction provides excellent mechanical stability
- Dimensionally stable extra-wide roller linear guides of the X and Z axes ensure high speed and a long service life through maximum static and dynamic stiffness
- Y-axis with box way increases tool life and smoothness, resulting in better surface quality on the workpiece and higher cutting performance
- Turcite B headstock support surface
- Hardened spindle and quill (surface hardness HRC52-55) ensure high stiffness and accuracy
- The X / Y and Z axis is equipped with a 1 µm linear scale as standard, the B-axis with angular scale
- Large, fully ground work table with 11 T-slots
- High table load with 15 tons
- Extremely large working capacity with fixed ram head
- Spindle Vibration Supervision (SVS) function - spindle vibration monitoring software and real-time control technology
- AC servo motor offers extremely high torque, as well as very high power and axis force
- High-quality precision ball screws
- Rotary table with 0.001° high pitch accuracy
- SK50 tool changer for 60 tools
- Headstock stability through hydraulic counterweight
- Precision ground, pre-stressed, high-performance ball screws
- Chip conveyor, belt type ensures efficient chip discharge
- Chip carriage
- Spindle oil cooler
- Automatic central lubrication system
- Coolant gun
- Coolant system with check valve
- Control system for low voltage switching
- Lifting device for unloading the machine
- Levelling feet
- Including two years **SIEMENS** warranty
- Extension of the **SIEMENS** repair service contracts (RSV) see page 235
- Information on „Maintenance contracts“ on page 322



Fig. machines HF 600 without
standard protective housing



OPTIMILL HF 500 / HF 600

TECHNICAL DATA

| Model | HF 500 | HF 600 |
|---|--------------------------------|--------------------------------|
| Article no. | 3512050 | 3512060 |
| Machine data | | |
| Electrical connection | 400 V / 3 Ph ~50 Hz | 400 V / 3 Ph ~50 Hz |
| Total connected load | 95 KVA | 95 KVA |
| Milling spindle | | |
| Drive motor S1 | 37 kW | 37 kW |
| Drive motor torque S1 | 1 941 Nm | 1 941 Nm |
| Drive motor S6 30 % operation | 56 kW | 56 kW |
| Torque drive motor S6 30 % operation | 2 912 Nm | 2 912 Nm |
| Quill diameter (W-axis) | Ø 130 mm | Ø 150 mm |
| Spindle bearing inner diameter | Ø 170 mm | Ø 190 mm |
| Spindle seat | SK50 DIN 69871 | SK50 DIN 69871 |
| Tool changer | | |
| Number of tool slots | 60 tools | 60 tools |
| Max. tool diameter | Ø 125 mm | Ø 125 mm |
| Max. tool diameter (tools slots beside not occupied) | Ø 245 mm | Ø 245 mm |
| Tool length | 500 mm | 500 mm |
| Max. tool weight | 25 kg | 25 kg |
| Max. total tool weight in magazine | 900 kg | 900 kg |
| Milling precision | | |
| Repeat accuracy | ± 0.015 mm | ± 0.015 mm |
| Positioning accuracy | ± 0.004 mm | ± 0.004 mm |
| Traverse paths | | |
| X axis (linear guide) | 4 500 mm | 5 500 mm |
| Y axis (box way) | 2 600 mm | 3 200 mm |
| Z axis (linear guide) | 2 000 mm | 2 000 mm |
| W1 axis | 700 mm | 900 mm |
| Axis feed drive | | |
| X axis fast motion | 10 m/min. | 10 m/min. |
| Y axis fast motion | 10 m/min. | 10 m/min. |
| Z axis fast motion | 10 m/min. | 10 m/min. |
| W axis rapid traverse | 8 m/min. | 8 m/min. |
| Speed range | | |
| Speeds* | 35 - 788 rpm / 789 - 3 000 rpm | 35 - 788 rpm / 789 - 2 000 rpm |
| stages | 2 stages | 2 stages |
| Work table | | |
| Table length x width | 1 800 x 2 200 mm | 1 800 x 2 200 mm |
| Table height | 1 390 mm | 1 390 mm |
| T-slot size / amount / distance | 24 mm / 11 / 160 mm | 24 mm / 11 / 160 mm |
| Max. load of working table | 15 tons | 15 tons |
| Positioning accuracy | 15" | 15" |
| Rotary table repeatability | 4" | 4" |
| Clearance spindle to table | 30 - 2 070 mm | 230 - 2 070 mm |
| Spindle to stand distance | 100 - 2 000 mm | 100 - 2 000 mm |
| Encoder accuracy | ± 0.005° | ± 0.005° |
| ➡ More information on „Swivel table working area“ on page 237 | | |
| Dimensions | | |
| Footprint | 8 450 x 8 500 x 5 400 mm | 10 100 x 5 580 x 9000 mm |
| Overall weight | 51 500 kg | 56 500 kg |
| ➡ More dimensions on page 236 | | |

SINUMERIK 840D sl with OP 019 black Multitouch operating panel

The right solution for any engineering challenge

- The SINUMERIK 840D sl is rightly considered the benchmark in the CNC premium class. Maximum CNC performance and unrivalled flexibility and openness are the basis for almost any machine concept.

Multitouch operation OP 019 black

- 18.5" diagonal industrial display
- Maximum operating comfort: Capacitive multi-touch technology (up to 5 contact points simultaneously)
- High resolution of 1 366 x 768 pixels in widescreen format
- Rugged: No wear of mechanical components thanks to Multitouch technology
- Scratch-proof glass front
- Modern, intelligent design
- Can be operated while wearing gloves

MODULAR AND SCALABLE

- In addition to scalable NCU performance, the SINUMERIK 840D sl also offers a high degree of modularity of the operating components. With a flexible operating concept - e.g. the combination of any control panel with the NCU - the SINUMERIK 840D sl ideally adapts to the operating philosophy of modern premium machine concepts.

BENCHMARK IN OPEN ARCHITECTURE

- The system openness of the SINUMERIK 840D sl is unparalleled. In this way, the CNC can be optimally adapted to the technology of the machine and has a high degree of freedom in production automation.



Functional safety also provides protection against high costs!

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

OVERALL PACKAGE

- Safety functions SINUMERIK Safety Integrated
- Residual material detection
- Shopmill
- Simultaneous recording
- 3D simulation



Extension of the SIEMENS repair service contracts (RSV)

The SIEMENS Repair Service Contract (RSV) helps you to protect your machine for another 12, 24 or 36 months (can only be ordered within the two-year Siemens warranty period).

12 months; Article no. 3589035
24 months; Article no. 3589036
36 months; Article no. 3589037



SIEMENS NCU 710.3B

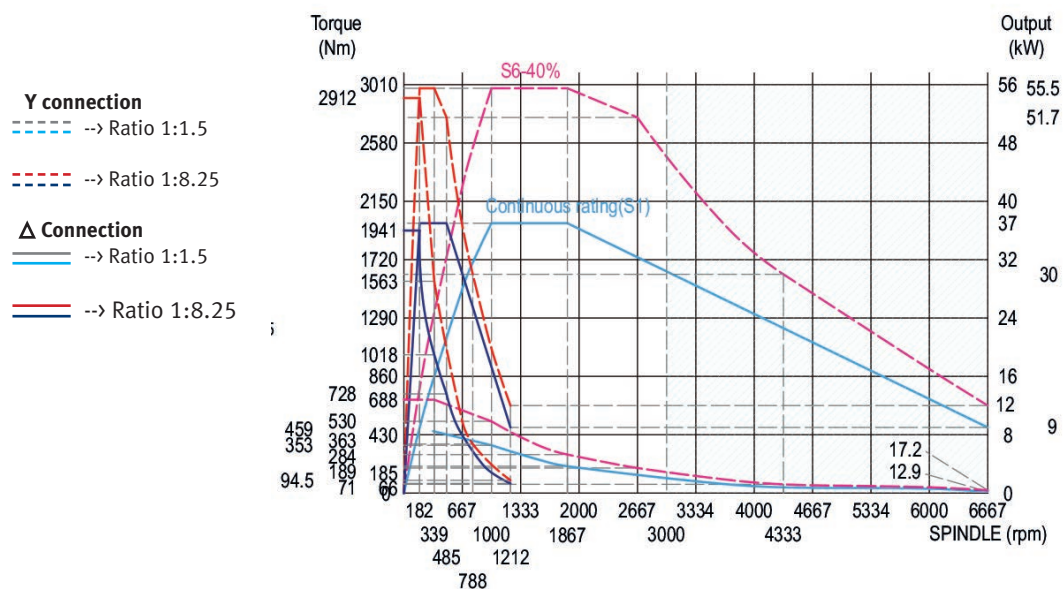
- up to 8 axes
- Cycle time 1.2 ms
- up to 600 tools



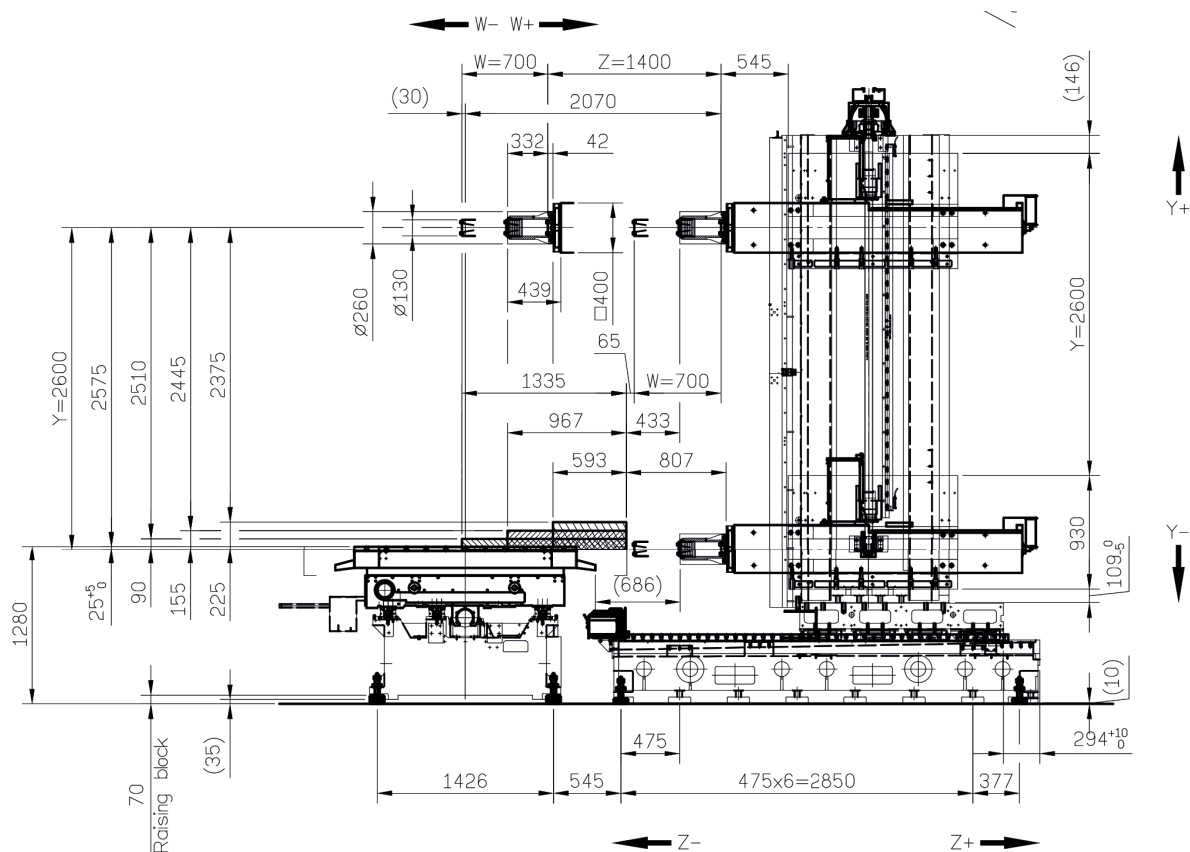
POWER AND TORQUE DIAGRAM

Diagram

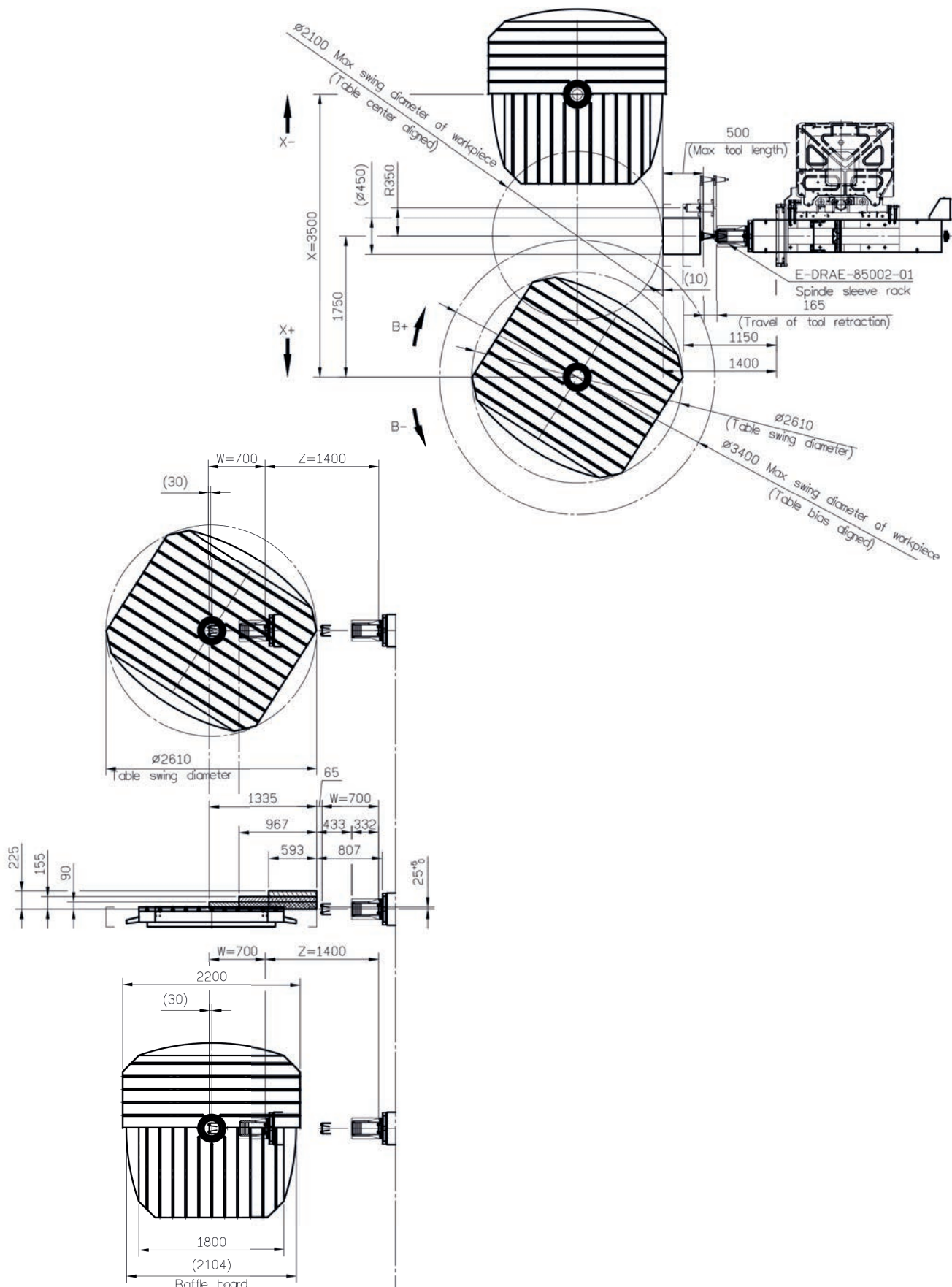
· Siemens 37/56 kW



DIMENSIONS



SWIVEL TABLE WORKING AREA



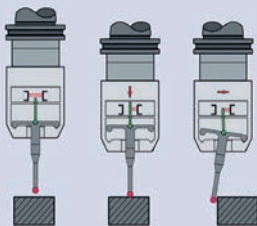
TC 62RC - Workpiece touch probe

Compact high speed measuring probe for workpiece measurement

Unrivalled precision and fast workpiece measuring thanks to modern, multidirectional measuring system with optical/electronic switching signal generation.

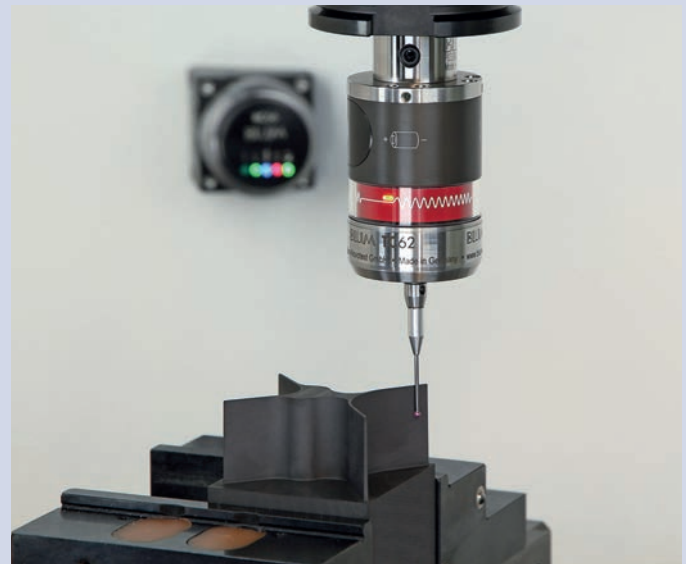
Wear-free, optical-electronic signal generation:

- Switching signal generated by interrupting a miniature light barrier
- Switching point repeatability of $0.3\mu\text{m}$ at 2 m/min. Measuring speed
- Wear-free and durably stable
- Very compact probe with $\varnothing 40\text{ mm}$



High-precision, rotationally symmetrical measuring system

- Precise, directionally independent approach behaviour
- Constant deflection forces
- Spindle orientation not required
- No detrimental 3-leg principle with lobing effect



ZX speed

Tool measuring probe

Universal 3-D probe heads for tool adjustment and tool break monitoring

Economical solutions for tool length and radius adjustment and tool break monitoring. Precise and process-assured measurements due to state-of-the-art metrology equipment with optoelectronic switching signal generation.

Wear-free, optical/electronic signal generation

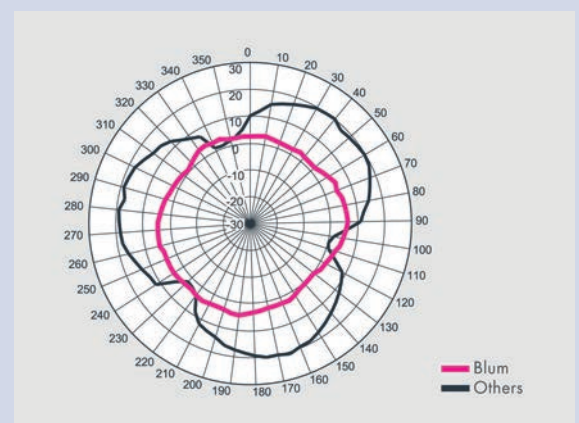
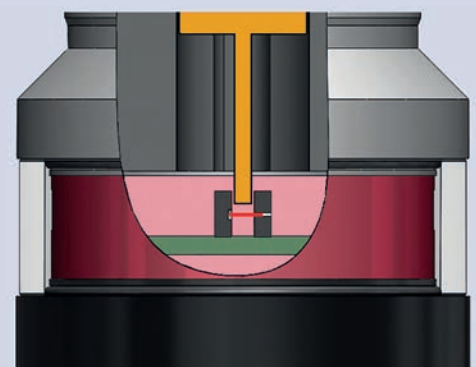
- Switching signal is generated by interrupting a miniature light barrier
- Allows for faster measuring speeds and measuring precision than comparable probes
- Reliable tool adjustment under the toughest conditions

High-precision state-of-the-art measuring equipment

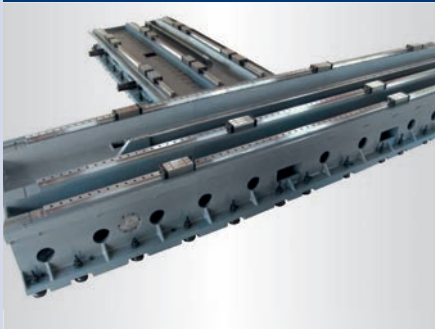
- Precise, directionally independent switching behaviour
- Constant deflection forces
- Premium BLUM measuring equipment, latest generation
- No detrimental 3-leg principle
- No highly-sensitive switching elements

Latest transmission technologies

- ZX speed: Cable-connected
- ZX speed IR: Infrared transmission

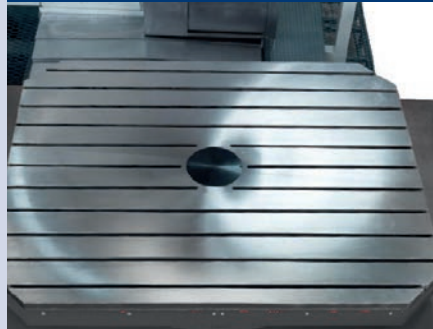


LINEAR GUIDES



- Ball screws for high rapid traverse speeds in all axes
- X axis: 2 roller linear guide with 6 sliding shoes
- Z axis: 2 roller linear guide with 8 sliding shoes

DRILLING AND MILLING TABLE



- Rotary table with high indexing accuracy of 0.001 degrees

HIGH-PERFORMANCE SPINDLE



- Developed for deep drilling
- The spindle with cylindrical roller bearing (double roller) is suitable for high-performance machining.
- Ground spindle and sleeve for high accuracy.

AUTOMATIC LUBRICATION SYSTEM



- Pressureless recirculating lubrication: the oil volume is controlled according to the measured distribution values; the oil is supplied according to the lubricating oil requirement of the sliding surface and the recirculating ball screw
- With oil level detector unit.
The alarm is displayed on the screen when there is a lack of oil.
Sealed spindle bearings are lubricated with grease.

BALL SCREW



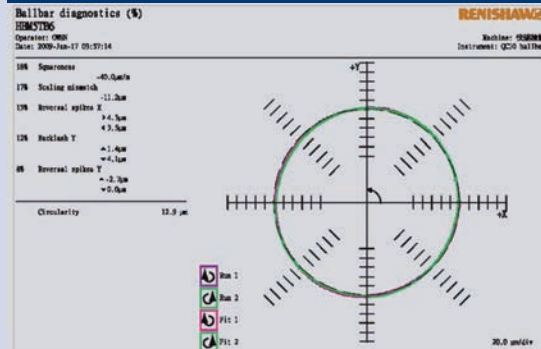
- Class C3 ball screw with double nuts for high axis accuracy and low deformation under high axial force

CHIP CONVEYOR



- Belt design ensures efficient chip removal

GEOMETRIC TEST FOR HIGH ACCURACY



- Geometric accuracy is tested according to the ISO 3070-2 standard and repeatability and positioning accuracy according to the ISO 230-1 standard. And it is approved by laser devices

- All geometric tests are completed after 24 hours of full function run, then a test is performed on the machine and the complete test programmes are stored.

| MISCELLANEOUS | | | | |
|---------------|---|--|---|---|
| 3512065012* | | Coolant Through Spindle External unit; tank capacity 165 litres, 70 bars pump pressure | <ul style="list-style-type: none"> Instead of the standard equipment › Internal spindle cooling 20 bar | <ul style="list-style-type: none"> We recommend an extraction unit |
| 3512065028* | 1 | Oil separator / oil skimmer | | |
| 3512065020* | | | <ul style="list-style-type: none"> L x W x H: 800 x 525 x 800 mm | |
| 3512065021* | 2 | Right-angled stop | <ul style="list-style-type: none"> L x W x H: 1 000 x 550 x 1 000 mm | |
| 3512065022* | | | <ul style="list-style-type: none"> L x W x H: 1 300 x 700 x 1300 mm | |
| 3512065047* | 3 | Tool changer with 120 tool slots | <ul style="list-style-type: none"> Instead of the standard equipment › Tool changer with 60 tool slots | |
| 3512065046* | 4 | Air conditioner | <ul style="list-style-type: none"> Instead of the standard equipment › heat exchanger | |
| 3536111 | | Starter set SK 50 / DIN 69871 | <ul style="list-style-type: none"> Cutter head holder with 27 mm receptacle, 2 each Weldon 6 mm/20 mm, 1 each Weldon 8 mm / 10 mm / 12 mm / 16 mm, adapter SK 50 to MK 3, 4 collet holders ER 32, collet spanner ER 32, 18-piece collet set ER 32, height adjuster, cone squeegee, 15 tightening bolts | |

| TRAVEL AND WORKING RANGE | | | | |
|--------------------------|---|---|---|--|
| HF 500: 3512065041* | 5 | X axis travel path to 5 500 mm | <ul style="list-style-type: none"> Instead of standard equipment › X axis travel path 4 500 mm | |
| HF 500: 3512065043* | | Y axis travel path to 3 200 mm | <ul style="list-style-type: none"> Instead of standard equipment › Y axis travel path 4 500 mm | |
| 3512065031* | | Load capacity max. 20 tons | <ul style="list-style-type: none"> Instead of the standard equipment › Table size 1 800 x 2 200 mm | |
| HF 500: 3512065032* | | Table size 2 500 x 2 500 mm Load capacity max. 20 tons | <ul style="list-style-type: none"> Instead of the standard equipment › Load capacity max. 15 tons | |

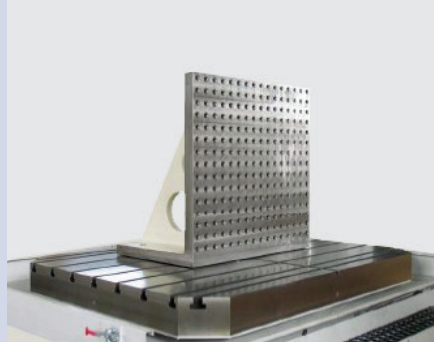
| MILLING HEADS AND ACCESSORIES | | | | |
|-------------------------------|---|---|--|--|
| 3512065060* | 6 | Angle head 90° N75 | <ul style="list-style-type: none"> for extended machining options (milling, drilling, reaming, thread cutting) | |
| 3512065062* | 7 | Spindle extension sleeve | <ul style="list-style-type: none"> absolutely necessary for the 3512065061 Universal milling head | |
| 3512065061* | 8 | Universal milling head | <ul style="list-style-type: none"> Milling head with two axes of rotation, thus pivots and rotates to any spatial angle | |
| 3512065064* | 9 | Angle milling head ALBERTI T90-8 | <ul style="list-style-type: none"> with 675 mm extension sleeve | |
| 3512065063* | | Driven face milling head | <ul style="list-style-type: none"> Driven by the W-axis | |

1 OIL SEPARATOR / OIL SKIMMER



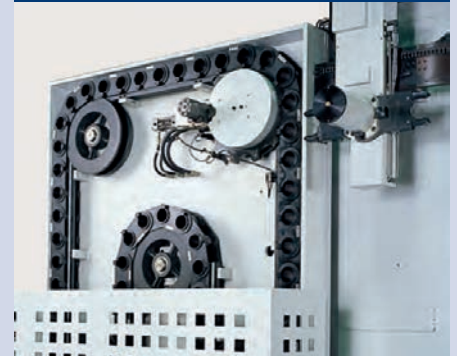
- Separation of non emulsified foreign oils by skimming
- Separation of solids by settling in the collection tank

2 RIGHT-ANGLED STOP



- Extra thick and heavy ribbed construction

3 TOOL CHANGER



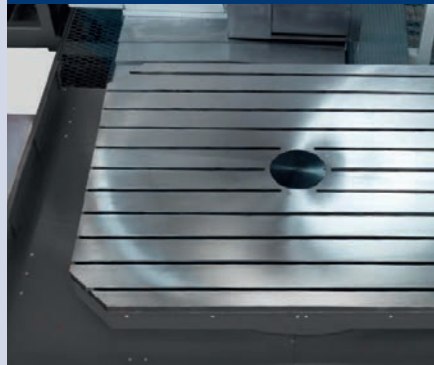
- for up to 120 tools

4 AIR CONDITIONER



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

5 TABLE WORKSPACE



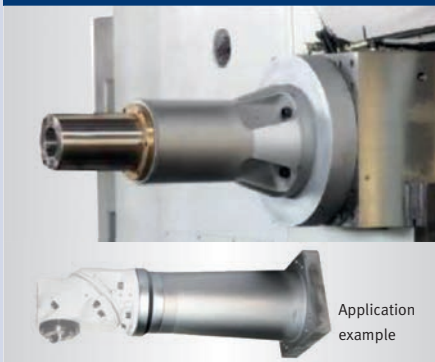
- High table load with up to 20 tons
- Rotary table with 0.001° high pitch accuracy
- Large, fully ground work table with 11 T-slots

6 ANGLE HEAD N75 90°



- Complete machining
- Reduction of machine downtimes
- Machining of otherwise inaccessible workpiece areas (internal machining)

7 SPINDLE EXTENSION SLEEVE



- for the universal milling head

8 UNIVERSAL MILLING HEAD



- Rotation axes arranged at an angle of 45 ° to each other.
- Maximum speed 1 800 rpm
- Spindles and gears made of hardened chrome-nickel steel.
- High precision angular contact ball bearings

9 ALBERTI ANGLE MILLING HEAD



- The orientation ring and the locking arm, which carries the locking pin, can be rotated 360°





CNC milling machine F 3Pro
CNC milling machine MZ 4CNC
Media package see page 263

06 MILLING TRAINING MACHINES

F 3Pro

Universal milling machines with servo drives

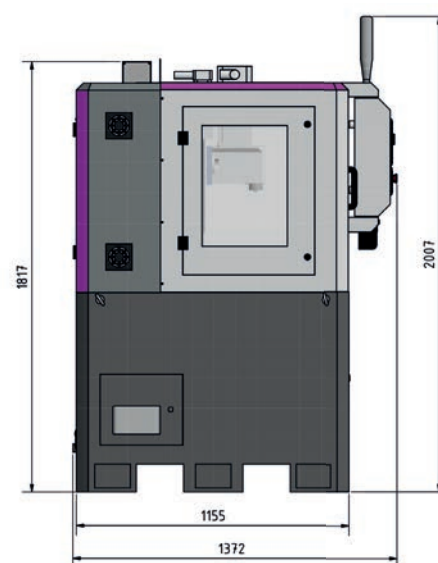
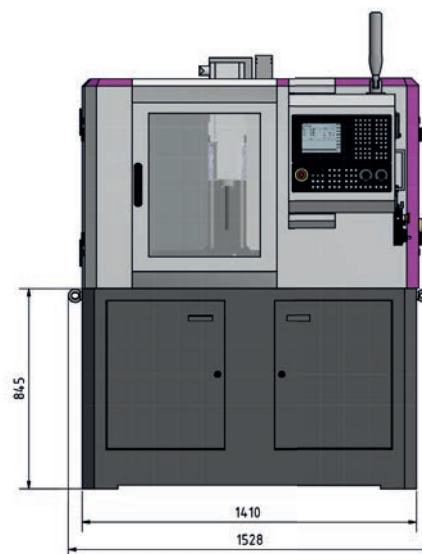
SIEMENS SINUMERIK 808D ADVANCED

- Linear guides on all axes
- All axes with ball screws
- Servo drive on all axes (X, Y and Z axis)
- Tool change at the push of a button (electropneumatic tool clamping device)
- Coolant system
- Central lubrication
- Signal light
- Solid, precision milling table, generously dimensioned with precision surface finish
- Swivelling control panel
- Portable, electronic handwheel with confirm button and emergency stop button. Substantially facilitates running in of programs
- 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)
- Including two years **SIEMENS** warranty
- **SIEMENS** warranty extension on page 246
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



TECHNICAL DATA

| Model | F 3Pro |
|--------------------------------------|--------------------------|
| Article no. | 3500415 |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 5 kVA |
| Milling spindle | |
| 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 |
| Cooling lubricant system | |
| Coolant pump motor | 95 W |
| Tank capacity | 30 litres |
| End mill size | |
| Cutter head size max. | Ø 50 mm |
| Max. shaft milling cutter size | Ø 25 mm |
| Milling precision | |
| Repeat accuracy | ± 0.02 mm |
| Positioning accuracy | ± 0.01 mm |
| Travel | |
| X axis | 355 mm |
| Y axis | 190 mm |
| Z axis | 245 mm |
| Feed speed | |
| X axis | 10 m/min. |
| Y axis | 10 m/min. |
| Z axis | 10 m/min. |
| Speed range | |
| Speeds* | max. 4 000 rpm |
| Motor torque | |
| X axis | 1.9 Nm |
| Y axis | 3.5 Nm |
| Z axis | 3.5 Nm |
| Milling table | |
| Throat | 220 mm |
| Clearance spindle to table | 50 - 295 mm |
| Table length x width | 620 x 180 mm |
| T-slot size / amount / distance | 12 mm / 3 / 50 mm |
| Max. load of working table | 30 kg |
| Dimensions | |
| Length x width x height | 1 410 x 1 372 x 2 007 mm |
| Overall weight | 1 000 kg |



SINUMERIK 808D ADVANCED

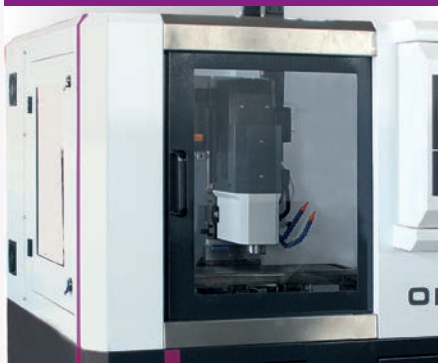
- RJ45 Ethernet port
- 8.4" LCD colour display with a resolution of 800x600
- Network function
- Ready for remote maintenance
- AST function gives users an easy optimisation option in case of stricter dynamic and precision requirements
- Closed-loop control circuit
- Greater precision
- Incremental encoder/referencing move required

Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 24 or 36 months after the two-year SIEMENS warranty expires. (can only be ordered within the two-year SIEMENS warranty)
12 months; Art. no. 3589010; 36 months; Art. no. 3589012



WORK AREA



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

HANDWHEEL



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

SIGNAL LIGHT



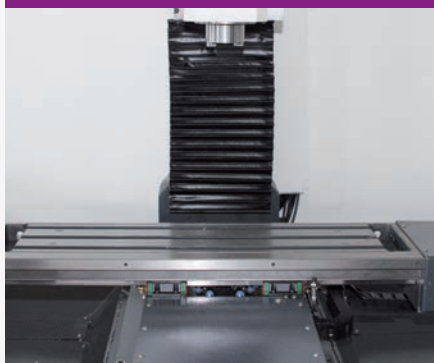
- Visually displays the machine status
- Very bright and with a long service life

CONNECTIONS



- For easy access
- Easy to connect to the machine
- Data interfaces:
 - › Power connection
 - › RJ45 plug-in connection
 - › Ethernet connection
 - › USB connection

LINEAR GUIDE



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

TOOL CHANGE



- Pneumatic with pushbutton (electropneumatic tool clamping device)
- BT 30 Spindle holder

OPTIONS

STARTER SET BT 30

Article no. 3536107

Comprises:

- 1 pc. milling head holder 1
- 1 pc. drill chuck 2
- 2 pcs. each Weldon 6 mm / 20 mm 3
- 1 pc. each Weldon 8 mm / 10 mm / 12 mm / 16 mm 3
- 1 pc. adapter BT 30 to MT 2 4
- 4 units collet chuck ER 32 5
- 1 pc. collet spanner ER 32 6
- 18-part collet set ER 32 7
- 1 pc. height adjuster 8
- 1 pc. assembly and tool adjustment gauge 9
- 14 pcs. pull studs 10
- 1 pc. taper squeegee 11



➤ For more information see page 282

A white circular badge with a purple shadow, containing the word "NEW" in purple capital letters.

MZ 4CNC

Rugged universal tool milling machine with maximum operator convenience.

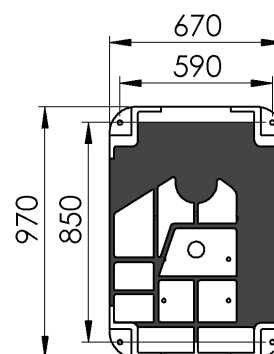
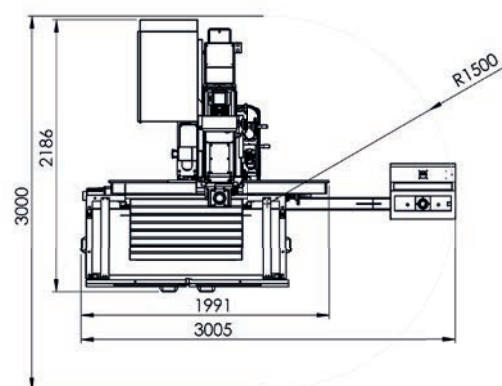
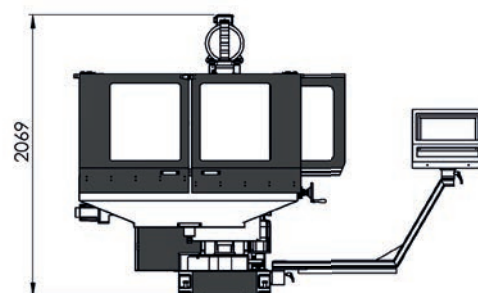
SIEMENS SINUMERIK with PPU 290

- Versatile range of applications
- All important components such as machine structure, column, slide, angle table, cross table and milling head body are made of stress-free MEEHANITE[®] quality cast iron (FC30), some of them with multiple ribbing
- Excellent damping characteristics and stability of machine mobile chassis
- Servo drive on X/Y/Z axis
- X and Y axis with rugged dovetail guide
- Portable, electronic handwheel with confirm button and emergency stop button. Substantially facilitates running in of programs
- All guides are hardened, ground and additionally coated with Turcite[®]-B to ensure optimum and constant movement
- All guides adjustable using wedge bars
- All axes with ball screws
- Central and clearly arranged control panel with control
- Solid XY table, generously dimensioned with precision surface finish, hardened and precision ground
- Milling head pivots through $\pm 45^\circ$
- Coolant system
- Machine lamp
- Smooth action
- Foldable table protection with lockable safety switch
- Heat exchanger for switchbox
- Telescopic covers on all 3 axes
- Automatic centralised lubrication with lubricating oil and oil volume control
- Hydraulic tool clamping
- Including two years **SIEMENS** warranty
- **SIEMENS** warranty extension on page 251
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



TECHNICAL DATA

| Model | MZ 4CNC |
|--|--------------------------|
| Article no. | 3511050 |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Milling spindle | |
| Drive motor S1 operation | 5.5 kW |
| Torque drive motor S1 operation | 94 Nm |
| Drive motor S6 30 % operation | 9.5 kW |
| Torque drive motor S6 30 % operation | 120 Nm |
| Coolant pump motor | 90 W |
| Spindle | |
| Vertical | |
| Spindle seat | SK 40 DIN 69871 |
| Spindle sleeve diameter | Ø 100 mm |
| Spindle sleeve stroke | 120 mm |
| Throat | 110 - 560 mm |
| Clearance spindle to table | 58 - 460 mm |
| Horizontal | |
| Spindle seat | SK 40 DIN 2080 |
| Clearance spindle to table | 152 - 580 mm |
| End mill size | |
| Cutter head size max. | Ø 85 mm |
| Max. shaft milling cutter size | Ø 20 mm |
| Milling precision | |
| Repeat accuracy | ± 0.02 mm |
| Positioning accuracy | ± 0.02 mm |
| Travel | |
| X axis | 600 mm |
| Y axis | 460 mm |
| Z axis | 395 mm |
| Feed speed | |
| Feed | 10 - 2 m/min. |
| Rapid traverse | 5 m/min. |
| Speed range | |
| Speeds* | 48 - 3 800 rpm |
| Speeds | 6 |
| Milling table | |
| Table length x width horizontal | 500 x 900 mm |
| T-slot size / spacing / count horizontal | 14 / 7 / 63 mm |
| Table length x width vertical | 300 x 960 mm |
| T-slot size / spacing / count vertical | 14 / 4 / 63 mm |
| Max. load of working table | 320 kg |
| Dimensions | |
| Length x width x height | 2 186 x 3 005 x 2 069 mm |
| Overall weight | 1 950 kg |



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

SINUMERIK 828D

The power package in the compact class of CNC controls

Boosting productivity and precision in manufacturing

Robust hardware architecture and intelligent control algorithms as well as top-class drive and motor technology ensure the highest dynamics and precision during machining.

Advanced software-controlled compensation functions ensure additional quality in surface machining and high availability of the machine tool. With SINUMERIK Operate, all machining technologies, from standard to complex, can be operated intuitively and with a uniform "look & feel".

Multitouch operation with PPU 290

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

User-friendly

- Capacitive 15.6" color display, 16:9 format
- Configurable side screen
- Intuitive Multitouch operation
- Full QWERTY keyboard
- Soft key selection via touch function
- Easy data transfer thanks to IP65 protected front interfaces (USB 2.0, RJ45 Ethernet)
- Proximity/distance sensor for smart display control

Rugged and maintenance-free

- Front panel made of die-cast magnesium with scratchproof glass front
- Can be operated while wearing gloves
- NV RAM memory technology without buffer battery
- Fanless and hard diskless design



**SIEMENS
SAFETY**

INTEGRATED

SET UP WORK WITH OPEN DOORS

Functional safety also provides protection against high costs!

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

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

OVERALL PACKAGE

- Safety Integrated
- Residual material detection and machining
- Simultaneous recording
- System software SW 26X



WORK AREA



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

HANDWHEEL



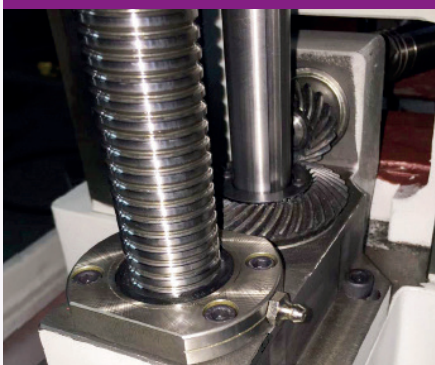
- Electronic
- Substantially facilitates running in of programs
- Emergency stop button
- Confirm button

SIGNAL LIGHT



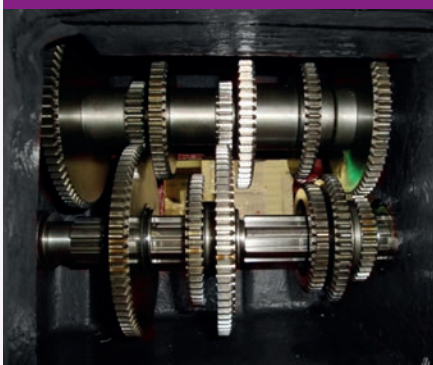
- Visually displays the machine status
- Very bright and with a long service life

BALL SCREW



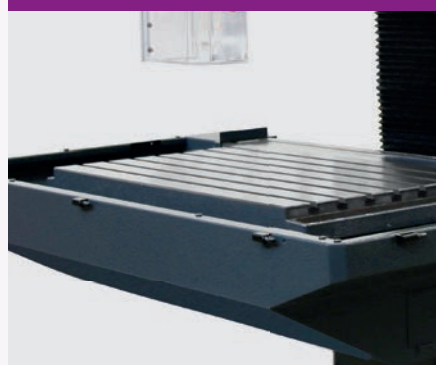
- On all axes
- Higher precision
- Lower reversing play

GEARBOX



- High quality

MILLING TABLE



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

OPERATING PANEL



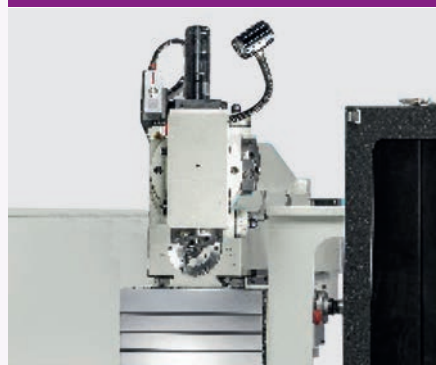
- Pivotal, central and clear

CENTRAL LUBRICATION



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

MILLING HEAD



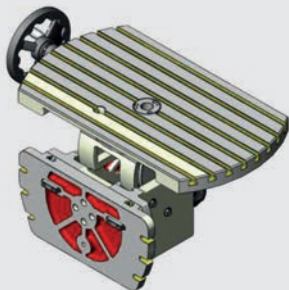
- $\pm 45^\circ$ pivotable

CONTENTS OF PACKAGE

| |
|---|
| Counter-bearing for horizontal spindle |
| Hydraulic clamping set (DIN 40-DIN 69871) 95 mm for vertical spindle |
| 3 reduction sleeves (MT 1, MT 2, MT 3) |
| 3x pull studs |
| Collet chuck with 7 collets (Ø 6, 8, 10, 12, 16, 20, 25 mm) |
| External arbour and long cutter arbour (27 mm) for horizontal spindle |
| LED work lamp |
| Operating tool |

OPTIONS

ANGLED TABLE



Angled table
 Article no. 3346221

- Table length x width 375 x 660 mm
- Max. load of working table 150 kg
- T-slot size / amount / distance: 12 mm / 8 / 45 mm
- Dimensions 895 x 433 x 354 mm
- Weight 140 kg

SPINDLE WITH SERVO DRIVE

Upgrade spindle with servo drive (instead of inverter)
 Article no. 351105001*

VIBRATION DAMPER, FOOT



SE 55
 (4 items required)
 Article no. 3352981

- Excellent vibration and structure-borne noise insulation
- Noise reduction
- Eliminates floor unevenness up to 5°
- Precision levelling by means of a regular threaded screw





Media package
CNC Lathe L 28HS see page 263

06 TURNING TRAINING MACHINES

L 28HS

CNC-controlled flat bed lathe with linear guide

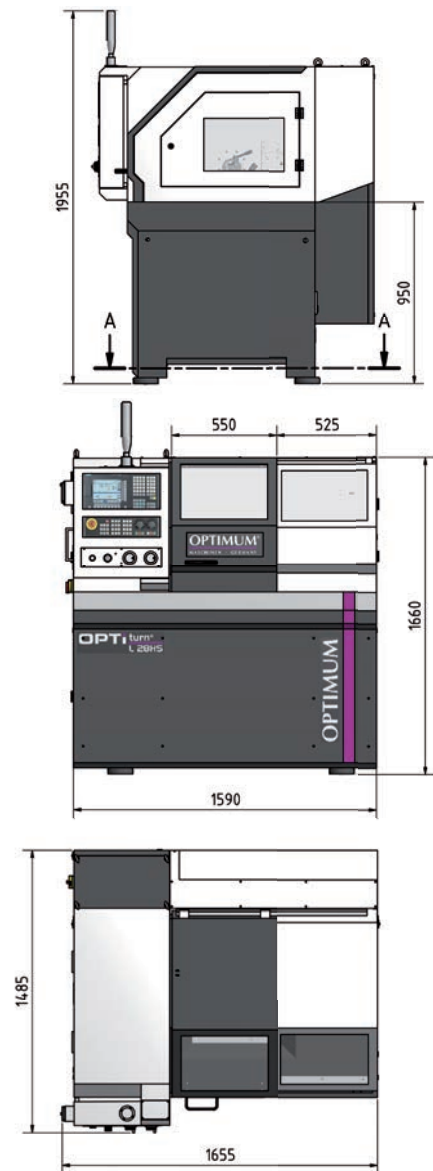
SIEMENS SINUMERIK 808D ADVANCED

- 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)
- Including two-year **SIEMENS** warranty
- **SIEMENS** warranty extension on page 259
- Information on the warranty at www.optimum-machines.com
- Information on „Maintenance contracts“ on page 322



TECHNICAL DATA

| Model | L 28HS |
|---------------------------------|--------------------------|
| Article no. | 3504220 |
| Machine data | |
| Electrical connection | 400 V / 3 Ph ~50 Hz |
| Total connected load | 3.75 kVA |
| Spindle | |
| 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 |
| Cooling lubricant system | |
| Coolant pump output | 95 W |
| Tank capacity | 25 litres |
| Machine data | |
| Centre height | 169 mm |
| Centre width | 430 mm |
| Swing Ø above cross slide | Ø 200 mm |
| Swing Ø above machine bed | Ø 300 mm |
| Speed range | |
| Spindle speeds | 40 - 4 000 rpm |
| Tool turret | |
| Type | electrical |
| Number of tool slots | 6 tools |
| Max. height, width square | 16 mm |
| Max. diameter drilling rod | 16 mm |
| Precision | |
| Repeat accuracy | ± 0.01 mm |
| Positioning accuracy | ± 0.01 mm |
| Travel | |
| X axis | 145 mm |
| Z axis | 465 mm |
| Feed speed | |
| X axis | 10 m/min. |
| Z axis | 12 m/min. |
| Motor torque | |
| X axis | 1.3 Nm |
| Z axis | 2.4 Nm |
| Tailstock | |
| Tailstock seat | MT 2 |
| Tailstock quill diameter | Ø 30 mm |
| Tailstock - quill stroke | 120 mm |
| Dimensions | |
| Length x width x height | 1 655 x 1 590 x 1 955 mm |
| Overall weight | 832 kg |



SINUMERIK 808 ADVANCED

CNC technology from the technology leader, combined with a revolutionary operating strategy

Surprisingly much dynamics and precision

- The SINUMERIK 808D ADVANCED control is a panel-based CNC control. The compact and user-friendly entry-level solution is used for simple turning applications. Features such as simple operation, commissioning and maintenance, but also an optimal cost position are the perfect basis for equipping entry-level CNC machines. With its technology-specific variants, the SINUMERIK 808D ADVANCED control is perfectly preconfigured for turning.

Intelligent machine optimisation

- With the proven Auto Servo Tuning (AST) function, users can easily optimise the machine. By selecting the tuning strategy, the CNC and drive parameters are automatically optimised according to the machine condition. This allows the simple optimisation of standard machines for applications that require high dynamics.



Control

- 8.4" colour display with 800x600 resolution
- SIMATIC S7-200 PLC-based
- Front USB port (IP65)
- Rear RJ45 Ethernet port
- Technology-specific keyboard layout
- Mechanical keys with protective film
- No battery – permanent intermediate data storage thanks to NV-RAM technology
- Protection class IP65 at the front
- LED tool number display
- MCP with rotary switch for feed and spindle override

Warranty extension

The warranty extension lets you protect your new machine against warranty damage for a further 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. 3589010
36 months; Article no. 3589012

OVERALL PACKAGE

- RJ45 Ethernet port
- Ready for remote maintenance
- AST function gives users an easy optimisation option in case of stricter dynamic and precision requirements
- Greater precision
- Incremental encoder/referencing move required

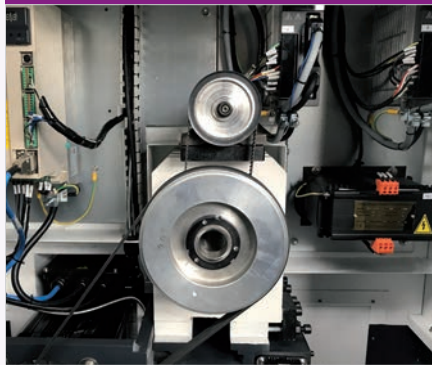


TOOL TURRET



- For 6 tool slots

SPINDLE



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

LINEAR GUIDE



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

COOLANT SYSTEM



- Pulls out
- Easy chip disposal

MACHINE LAMP



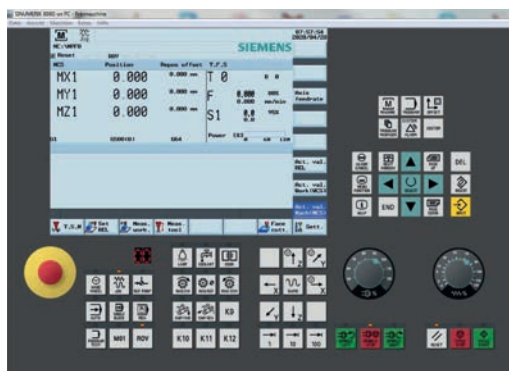
- Full illumination of the workspace

CENTRAL LUBRICATION SYSTEM



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

SINUMERIK 808D ON PC



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

Training and learning





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



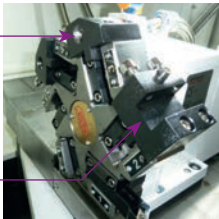
Offline CNC programming:

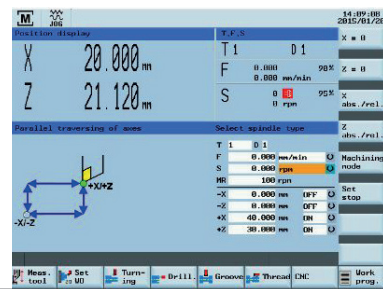
Boos productivity by programming directly on a PC
Test sub-routines on the PC with the integrated simulator

Professional CNC presentations:

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

| LATHE CHUCK | | | |
|-------------|--------------------------------------|--|--|
| Article no. | | | |
| 3450230 | Bison three-jaw lathe chuck |  | <ul style="list-style-type: none"> • Cast, Ø 125 mm DIN 6350 • Hard jaws, single-part, with outside-inside clamping • Chuck key • Runout accuracy: 0.03 mm |
| 3450410 | Bison monoblock jaw set, soft | | <ul style="list-style-type: none"> • for three-jaw lathe chuck Ø 125 mm |
| 3450234 | Bison four-jaw lathe chuck |  | <ul style="list-style-type: none"> • Cast, Ø 125 mm DIN 6350 • Hard jaws, single-part, with outside-inside clamping • Chuck key • Runout accuracy: 0.03 mm |
| 3450420 | Bison monoblock jaw set, soft | | <ul style="list-style-type: none"> • For four-jaw lathe chuck Ø 125 mm |
| 3450240 | Bison Chuck flange |  | <ul style="list-style-type: none"> • For lathe chuck Ø 125 mm • For collet chuck 5C (Article no. 3450238) |
| 3450238 | Collet chuck 5C |  | <ul style="list-style-type: none"> • Size Ø 25 mm • Chuck flange needed (Article no. 3450240) |

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

| SOFTWARE | | | |
|---|--|---|---|
| 3584150* | SIEMENS Manual Machine Plus (MM+) Simple cycle control |  | <p>Enables the transition from conventional machines to CNC programming. The machine can be operated by means of hand wheels like a conventional machine, but with the advantages of CNC-supported technology cycles.</p> <p>Functions:</p> <ul style="list-style-type: none"> • Axis-parallel traverse, taper turning, radius turning, centre drilling, tapping, groove cycle, tapping, pre-turning of contours |
| <p>➔ For more information see on page 318</p> | | | |



MEDIA PACKAGE
SIDE DOOR

07

ROBOTS

OPTImill F 150 CNC milling machine

07 ROBOTS

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.



Product video
OPTImill F 150 CNC milling
machine with robot



More packages on request!

Similar to fig.

Media package

3519013

- Monitor LCD TV 127 cm (50 inch) with HDMI connection
The monitor shows either the working area of the machine or the control system. Optionally also with split screen for displaying the working area and the control.
- Desktop computer
- Splash water-protected camera
- Multimedia table
- Housing including holder
- Installed SIEMENS Toolbox CD
- Keyboard and mouse



Automatic side door

Article no.

- for automatic tooling of the machine
- Door dimension – depending on the machine
- Net weight 46 kg

| | including installation |
|------------------|------------------------|
| F 150 HSC | 3511290299 |
| F 310 HSC | 3511290410 |

mko

Eco PID

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01.0
02.0

P ▼ ▲ ↵

OPTi mill 3X

OPTIMUM®

MASCHINEN - GERMANY





3-D printing head
Filaments
Accessories
3D Printing application report see page 274

The OPTImill 3X and OPTImill 5X print heads enable the production of tangible objects from digital 3-D files created by a CAD system

Printing instead of milling

Turn your CNC milling machine into a fully functional 3-D printer in just minutes.

The OPTIMUM OPTImill 3X and OPTImill 5X print heads turn your machine into a top class 3-D printer.

The supplied software can convert and load 3-D models and convert them into machine-compatible G-code. I.e. the components are programmed using the Cura Slice program and output to our machines using add-on software.

A very big advantage of our concept is that the wire feed is controlled by the spindle speed. So we can brake in corners and accelerate out, which leads to very good results. Thanks to the use of web preview and feed control, it is possible to print much faster than all other commercially available competitors while maintaining the same quality. More than three times the printing speed with the same or better print quality.

Setup times of maximum 20 minutes* - easy integration on the machine thanks to 3-D interface.

Think big – print big!

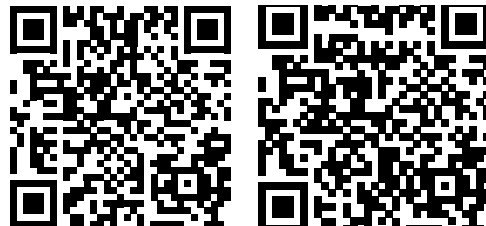
The installation space of your CNC machine allows you to print workpieces that commercial printers cannot produce. The advantage of our concept is that it is possible to machine on the CNC machine during the day, and convert your machine's normal downtime into cash by fully utilising the machine, for example, overnight.

Thanks to the two heating elements on the print head of the Optimill 3x and the ring heater of the Optimill 5X, we achieve temperatures of up to 300 °C, which means that a wide variety of filaments can be printed. Materials such as PA, PLA, ABS, nylon, and carbon are no problem for the printer.

The OPTIMUM print heads OPTImill 3X and OPTImill 5X offer unlimited possibilities

Whether you need large or small 3D prototypes or highly complex components, the flexibility and speed, together with the accuracy of your CNC machine, allows you to produce more cost-effectively and flexibly than ever before. We used the Cura 3-D software for our programming.

With the standard scope of supply filament with a thickness of 1.75 mm can be printed. A conversion kit for the print head is required for 2.85 mm filament. You will also benefit economically from our exchangeable printing nozzles. It is not necessary to replace the entire module, as is often the case with other manufacturers.



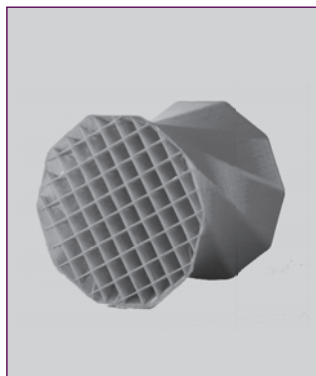
Product video showing the Optimum 3 X - 3-D Printer

Areas of application



Models

Models are particularly useful for making designs tangible.



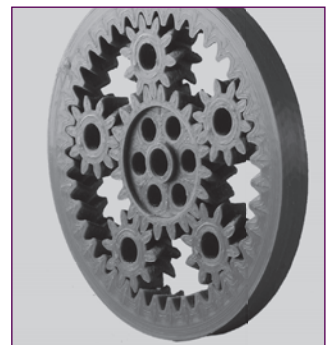
Prototypes

Prototyping gives companies the ability to decisively reduce the development time of new products. In this way, errors can be corrected and improvements introduced at an early stage.



Batch size one production

It is often only possible to produce components and models with complex geometries at very high cost or not at all using conventional, chip-removing manufacturing processes. Especially for small quantities, switching to additive production makes a lot of sense.



Spare parts

Printing spare parts is a popular and inexpensive solution with fast availability. Possible improvements can also be integrated to extend the durability or offer additional benefits.

OPTImill print head

As an add-on for any Optimum CNC milling machine with a **SIEMENS** Sinumerik 808D/828D/840D sl control



Fig. 3X print head



Fig. 5X print head

Technical specifications:

- 2 heating nozzles with a performance of 100 Watt at 24 V
- Temperature range: 150 °C–300 °C
- 2 heating cartridges for 3X
- Ring heater for 5X
- Printing speed (depending on machine design) ± 75 mm/s

Scope of delivery:

- 2 feed rollers for filament 1.75 mm
- Filament holder
- Printing nozzle size 0.4 mm
- Print head with PID temperature control
- Power supply unit 230 V/24 V DC 15A
- Instruction manual

OPTImill 3X print head

3560010

- For 3-axis printing

NEW

OPTImill 5X print head

3560012

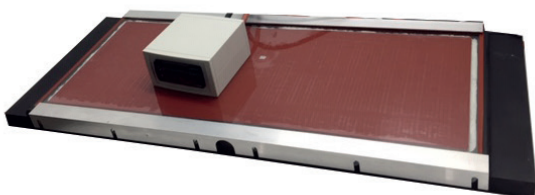
- Special 5-axis printing design

Heater plates

Prevent fast cooling of the objects, thus improving adhesion.
Improve adhesion, especially for large components.

Scope of delivery:

- Completely ready for operation
- Separate temperature control with magnetic holder
- Power supply 230 V
- Heating temperature controllable from 0 °C to 120 °C



Heater plate

Article no.

Size 1

3560050

- CNC milling machine F 80/F 105/F 150E/F 150HSC/F 210P/F 210HSC
- Work area 600 x 245 mm
- Power: 500 W / 230 V ~50 Hz

Size 2

3560051

- CNC milling machine F 310HSC/ F 410HSC
- Work area 980 x 500 mm
- Power: 2.2 kW / 230 V ~50 Hz

NEW

Size 3

3560052

- CNC milling machine FU 5
- Work area 370 x 410 mm
- Power: 500 W / 230 V ~50 Hz

Custom sizes on request

Feed roller transfer shaft

- 2 pcs.
- High-quality design
- Milled carrier grooves

| | |
|--|---------|
| Feed rollers for 1.75 mm filament | 3562202 |
|--|---------|

| | |
|--|---------|
| Feed rollers for 2.85 mm filament | 3562204 |
|--|---------|

- Without coating

| | |
|--|---------|
| Feed rollers for 1.75 mm filament | 3562212 |
|--|---------|

| | |
|--|---------|
| Feed rollers for 2.85 mm filament | 3562214 |
|--|---------|

- with diamond coating



Conversion kit for 2.85 mm filament

| | |
|------------------------|---------|
| for OPTImill 3X | 3562220 |
|------------------------|---------|

| | |
|------------------------|---------|
| for OPTImill 5X | 3562222 |
|------------------------|---------|

- Two feed rollers
- Teflon material feed, Ø 3 mm
- Cooler 3 mm
- Holder with press-on rollers
- Premium design
- Milled carrier grooves



Extruder nozzle sets, 3 pcs.

- Rugged and durable

| | |
|--|---------|
| Stainless steel nozzle set for 1.75 mm filament | 3562302 |
|--|---------|

- For nozzle size 0.4 mm / 0.6 mm / 0.8 mm

- Suitable for PLA plastics or similar

| | |
|--|---------|
| Stainless steel nozzle set for 2.85 mm filament | 3562308 |
|--|---------|

- For nozzle size 0.8 mm / 1.0 mm / 1.2 mm

- Suitable for PLA plastics or similar

| | |
|---|---------|
| Titanium nozzle set for 1.75 mm filament | 3562312 |
|---|---------|

- For nozzle size 0.4 mm / 0.6 mm / 0.8 mm

- Suitable for carbon material

| | |
|---|---------|
| Titanium nozzle set for 2.85 mm filament | 3562318 |
|---|---------|

- For nozzle size 0.8 mm / 1.0 mm / 1.2 mm

- Suitable for carbon material

| | |
|--|---------|
| Brass nozzle set for 1.75 mm filament | 3562322 |
|--|---------|

- For nozzle size 0.4 mm / 0.6 mm / 0.8 mm

- Suitable for PLA material

| | |
|--|---------|
| Brass nozzle set for 2.85 mm filament | 3562328 |
|--|---------|

- For nozzle size 0.8 mm / 1.0 mm / 1.2 mm

- Suitable for PLA material

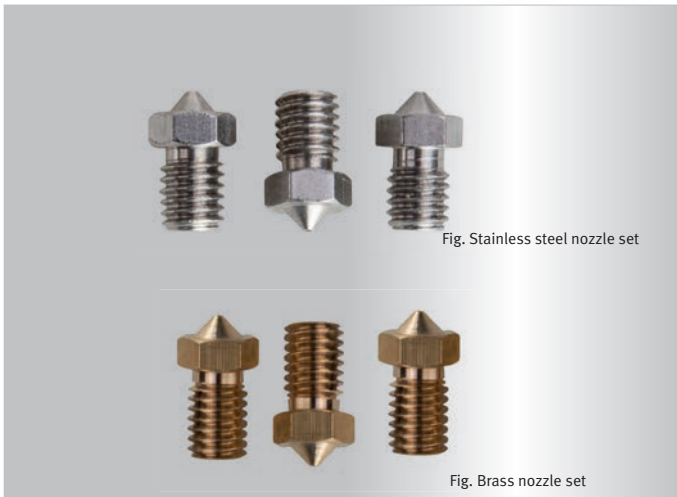


Fig. Stainless steel nozzle set



Fig. Brass nozzle set

Hot end feed-through, 3 pcs.

| | |
|-------------------------|---------|
| 1.75 mm filament | 3562401 |
|-------------------------|---------|

| | |
|-------------------------|---------|
| 2.85 mm filament | 3562402 |
|-------------------------|---------|



Nozzle cleaning set

- Nozzle drill
- Cleaning drill

Nozzle cleaning set, small

3562342

- for nozzle size 0.4 mm / 0.6 mm / 0.8 mm

Nozzle cleaning set, large

3562344

- for nozzle size 0.8 mm / 1.0 mm / 1.2 mm



Fig. Nozzle cleaning set, small

Fig. Nozzle cleaning set, large

Wire break monitoring

3562410

- Machine stops in case of wire break or at end of wire
- Error message is displayed on the control



Infrared radiant heater

3562420

- Size: 600 x 600 x 17 mm
- Utilisation of complete construction area
- Optimisation of construction area temperature
- Heating output 300 Watt, protection type IP 44
- without fastener



GRP permanent printing plate set

- 2x permanent printing plate set
- Fastening material
- Glass fibre black
- The printed part is removed from the printer with the plate.
- Bends easily to make removal of printed parts easier in cold state.
- Very strong adhesion to printed part in heated state
- Printed parts have a very smooth bottom surface
- Plate can be easily and thoroughly cleaned and is very durable

Size: 600 x 245 mm

3562260

Size: 980 x 500 mm

3562262

Size: 370 x 410 mm

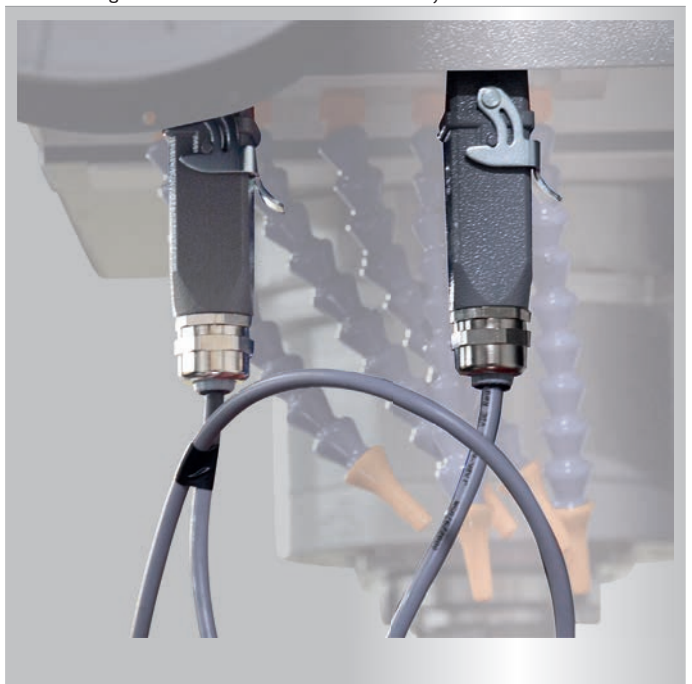
3562264



3-D printing interface

3562411

- Plug connector on milling head for OPTImill 3X printing head and 5X printing head
- The power supply is installed in control cabinet
- Prepared for connecting wire break monitoring
- Filament holder installed
- including installation ex warehouse Germany



NEW

Tool holder set 3-D print head

BT 30 3562188

- Collet chuck holder ER32 / BT 30
- Collet chuck spanner ER32
- Collet chuck ER32/16 mm
- Pull stud BT 30

NEW

BT 40 3562189

- Collet chuck holder ER32 / BT 40
- Collet chuck spanner ER32
- Collet chuck ER32/16 mm
- Pull stud BT 40

SK40 DIN69871 3562190

- Collet chuck holder ER32/SK40 DIN69871
- Collet chuck spanner ER32
- Collet chuck ER32/16 mm



Cleaning scraper

3562430

- Material: Stainless steel
- Colour: silver
- Protection due to complete retraction of the blade
- 40 mm blades
- 5 blades included



Spare blades

3562431

- 10 blades

Software Cura 4.5

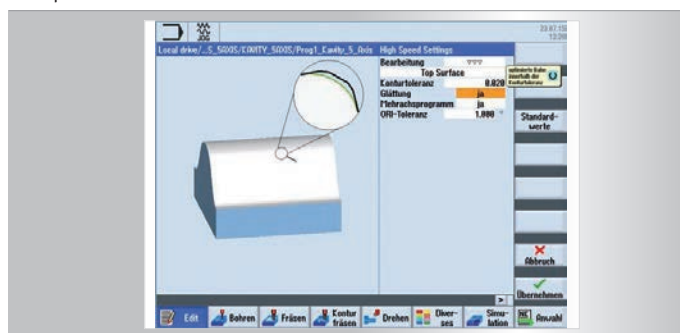
- <https://ultimaker.com/en/products/ultimaker-cura-software>
- Includes plugin via USB



Top surface for SIEMENS control

3584012

- The NC data from the CAM system are optimised online during processing.
- The result is excellent surface quality while milling complex free-form surfaces.
- All new functions are system integrated and available with Sinumerik Operate.



Torque supports

- for fastening on the main spindle
- Custom sizes on request

| | |
|--------|---------|
| 120 mm | 3562511 |
| 125 mm | 3562512 |
| 130 mm | 3562513 |
| 140 mm | 3562514 |
| 150 mm | 3562521 |
| 155 mm | 3562515 |
| 160 mm | 3562516 |
| 200 mm | 3562520 |



Filament roll holder

3562590

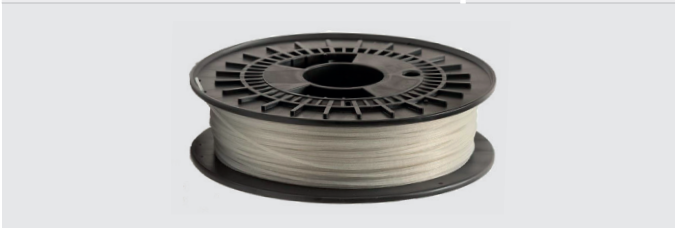
- Dimension L x W: 250 x 85 mm
- For machines with wide heads
- Holder must be bolted on (by customer)



Glass fibre filament

- Basic material PA 6
- 15 % extra long fibres
- Extremely good hardness/rigidity

| | |
|----------------|---------|
| 1.75 mm (1 kg) | 3568071 |
| 2.85 mm (2 kg) | 3568072 |



Carbon filament

- Basic material PA 6
- Carbon fibre/carbon filament
- Carbon look
- 15 % extra long carbon fibres
- Extremely high hardness/rigidity
- 1 kg reel

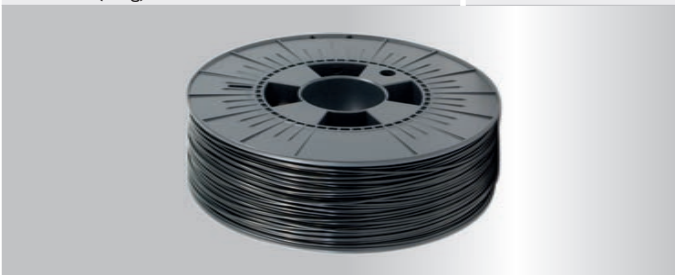
| | |
|---------|---------|
| 1.75 mm | 3568061 |
|---------|---------|



PA 6 (polyamide) filament

- High strength and load capacity
- Very durable and very high resistance against chemicals
- Perfectly suited for mechanically loaded components, e.g., gearwheels or screws

| | |
|----------------|---------|
| 1.75 mm (1 kg) | 3568081 |
| 2.85 mm (2 kg) | 3568082 |



PLA (Polylactide) filament

- Material processing 1A
- Saturated and clear colours
- PLA filament with good performance
- Excellent filament for daily use
- Characterised by high strength
- 1 kg reel

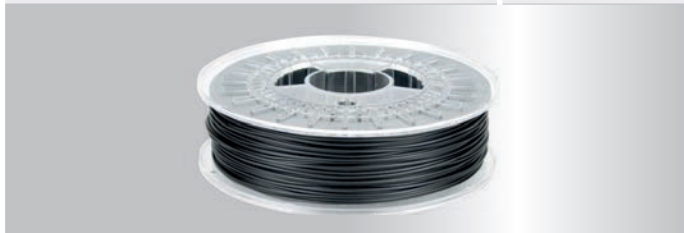
| | |
|---------------|---------|
| Black 1.75 mm | 3568014 |
| Black 2.85 mm | 3568015 |
| White 1.75 mm | 3568011 |
| White 2.85 mm | 3568012 |
| Red 1.75 mm | 3568017 |
| Red 2.85 mm | 3568018 |



XT-CF20 filament

- Basic material PLA
- Carbon fibre composite material on co-polyester basis with a carbon fibre content of at least 20 %
- Very good adhesion properties of the printed layers
- Odourless and free from styrenes
- High glass temperature (T_g = 80 °C)
- Very high melt strength
- Very high melt viscosity
- Matt black surface

| | |
|---------|---------|
| 1.75 mm | 3568051 |
| 2.85 mm | 3568052 |



ABS filament

- Synthetic (petrochemical based)
- High rigidity, toughness and strength achievable
- Very good impact and scratch resistance
- Excellent weathering resistance
- Specially suited for components exposed to high stress
- black

| | |
|----------------|---------|
| 1.75 mm (1 kg) | 3568040 |
| 2.85 mm (2 kg) | 3568041 |



3D printing on 5 axes

Optimill 5X as an extension to the CNC milling machine FU5

In cooperation with the University of Trier and a German engineering company, OPTIMUM Maschinen Germany GmbH has developed a new 3D print head that enables 5-axis 3D printing on the CNC milling machine OPTIMUM FU5 or another 5-axis milling machine with Siemens 840DSL control using Siemens NX software.

The new print head 5X is a further development of the well-known 3-axis print head Optimill 3X, which has already been successfully in use as a machine component for OPTIMUM's CNC milling machines since 2018. Compared to the 3-axis printing process, however, Optimill 5X offers a clear advantage: Printing on five axes not only saves time, but also achieves greater stability of the printed components. By adjusting the fourth and fifth axes, the Optimill 5X printhead eliminates the need for additional structures and allows the part to be printed in one piece without any additional supports. This improves the surfaces and avoids staircase effects.

Other components that have been optimised as part of this new development are the projection length of the hot end, which reduces interfering edges, and the heating, which in the toroidal core heating design now enables uniform and faster melting of the filament as well as large flow rates. This is necessary to speed up the printing process and/or to work with large nozzle diameters.

In order to exploit all the functionalities of the Optimill 5X printhead, it is recommended to use the Siemens NX software. In principle, however, other CAD/CAM systems are also capable of programming the complex 5-axis motion control.

Of course, you always have the option of performing ordinary 3-axis printing with the Optimill 5X printhead. To do this, you can use the Cura programming software.

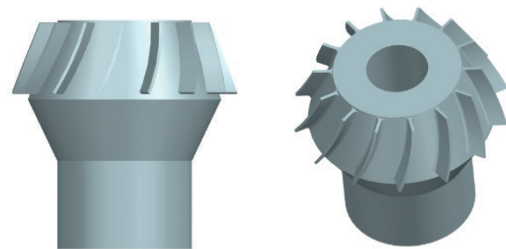
5-axis printing using Siemens NX

In order to be able to carry out a complete simulation of the machine tool in Siemens NX, a 3D model of the machine tool must first be available, which

has previously been kinematised and has a deposited postprocessor. In addition, the print head required for production must be stored as a model and the component to be printed must be created as a model. This can either be designed directly in NX or you can use alternative systems and file formats and then import the models into NX.

First, add both the print bed and the component to the machine in the production environment.

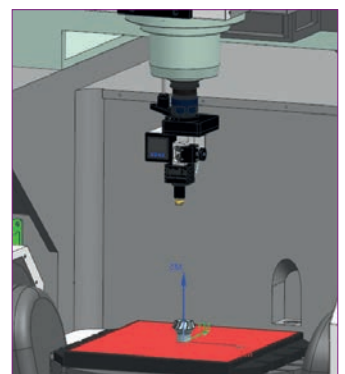
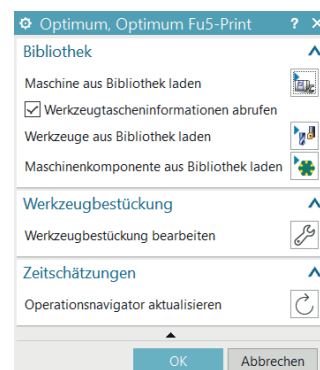
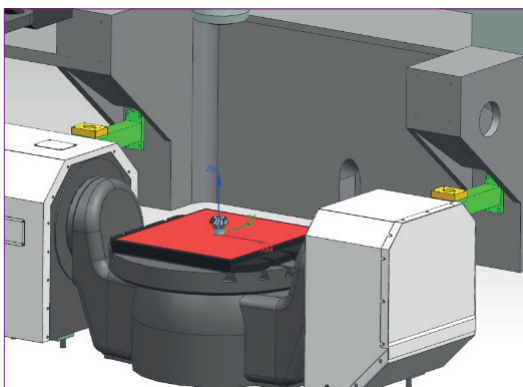
Then add the Optimill 5X 3D print head as a machine component.



Example: Printing of a cylindrical body.

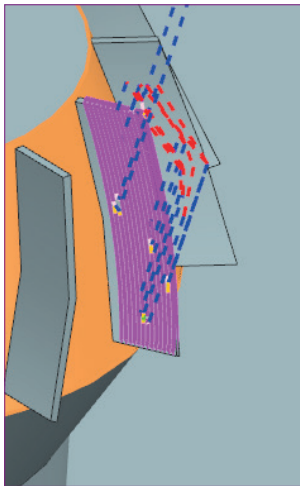
In the following example, we show you the individual work steps for producing a cylindrical body with the aid of the Optimill 5X 5-axis print head.

Now load the nozzle with the appropriate diameter from the tool library into this machine component.



When printing a cylindrical body, working with two operation types is recommended. The operation "Planar Additive Spiral inwards and outwards" can be used for the basic body. This operation creates round toolpaths and is therefore ideal for cylindrical bodies. The picture opposite shows the toolpaths of the first operation.

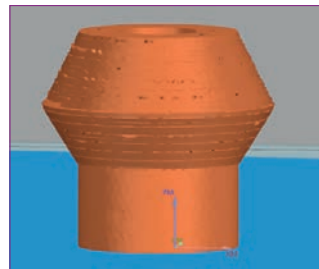
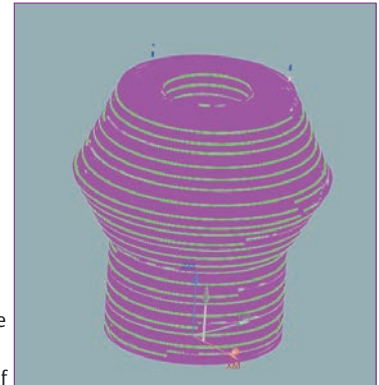
For the sides of the part, a second operation is used, "freeform additive build", as the orientation of the machine tool table should be adjusted for this. The aim is that the tool always remains in its initial orientation.



In addition, many other types of operations are available. These include operations for zig-zag build-up, build-up movements and movements on free-form surfaces as well as special operations for the production of tubes.

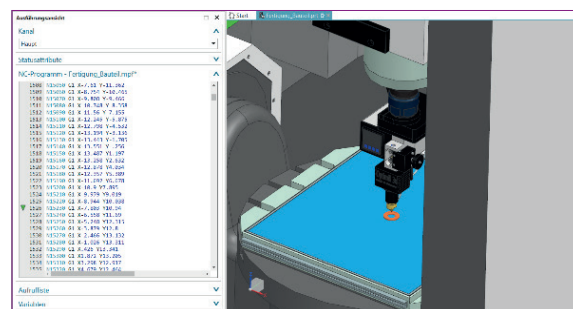
The normal of the component surface can be selected for the output axis. After creation, the toolpaths are then displayed directly. In this operation, all other side surfaces can also be made after the check.

The simulation can now be carried out either as a whole or - as shown below - in individual steps.



Once the simulation process has run smoothly, the programme is output via the postprocessor. If the machine has been correctly integrated beforehand, the simulation process is immediately specified to match the machine. In this case, this results in a programme for the Sinumerik 828D or 840DSL.

The following illustration shows the simulation of the post-processor output. This eliminates any collisions that may occur later.



Afterwards, the created programme can be transferred to the machine without any problems.



The programme sequence is designed in such a way that the table is adjusted to a certain angle and also rotated. As the heating plate is connected to a cable, it is possible that a message will prompt you to briefly disconnect the heating plate from the power supply so that the axis can swing over.

Franconian innovation helps fight Covid-19

Hallstadt-based company launches production of face shields for hospitals using innovative 3-D printing technology

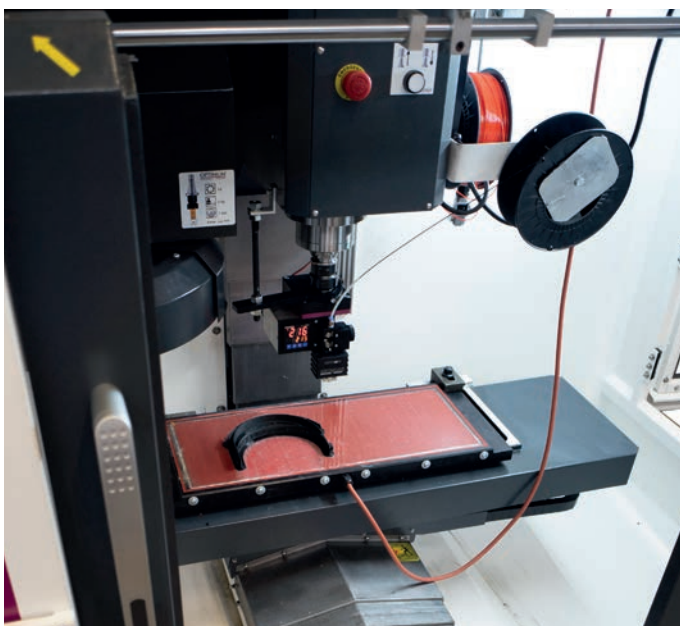
Optimum Maschinen Germany GmbH, in collaboration with a German engineering office and the University of Trier, has set up a 3-D print head that is ready for series production for industrial use in the production of urgently needed face shields. Since the end of last week, these visors, needed by doctors, hospital and nursing staff, can be produced using OPTIMUM brand CNC milling machines in a 3-D printing process. Starting next week, these visors will be made available free of charge to hospitals in the Bamberg area and northern Bavaria.

The great advantage of the technology used here is that such plastic parts can be additionally produced using the OPTIMUM OPTImill 3X 3-D print head in unmanned secondary shifts on standard CNC milling machines, which are used for other applications in the main shifts at the production plants. When the day shift starts, these parts, produced as a "positive side effect" can then be finished with very little manual effort and immediately distributed to the hospitals.

Although the quantities are not comparable to those achieved with conventional industrial plastics processing machines, for example, in injection moulding, the number of parts produced is still very high. However, there is no capital outlay for expensive moulds, and the additional costs for setup and machine operation are also extremely low. In addition, many different variants can be produced without any problems in line with individual requirements, even in the smallest batch sizes. All that is required is changes in the machine control programs, but no expensive plastics moulds, which would first have to be manufactured with a long lead time.



Follow this for the video presentation



In the production of the plastic components, Optimum uses PLA filament, which is particularly suitable for the production of the required components due to its light weight and good flexibility. In addition, this material is obtained from renewable and natural raw materials and is therefore easily biodegradable.

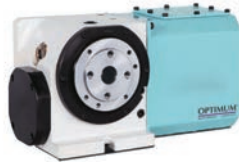
Stürmer printed initial prototypes of these face shields on its OPTImill F 80 3-axis milling centre at its logistics centre in Pettstadt near Bamberg. The products are now being supplied to hospitals. The software required for this comes from Prusa Research a.s. in the Czech Republic, a company specialising in 3-D printing processes, which has made it available specifically for combating the corona pandemic. Kilian Stürmer, owner of the group, did not hesitate for a moment and was immediately enthusiastic about the idea of joining forces across national borders to tackle the pandemic and provide several milling machines for the production of these visors: "We are very happy to combine this great concept of our Czech neighbours with our know-how and decades of experience in the field of CNC milling and thus support those people who are currently working unconditionally for the health of all of us".



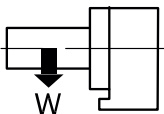
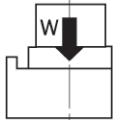
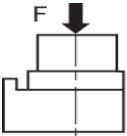
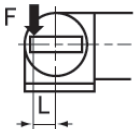
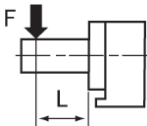
Starter sets
Vices
Fourth axis rotary indexing table
5-axis rotary/swivelling table
Workpiece/tool measuring

09 MILLING ACCESSORIES

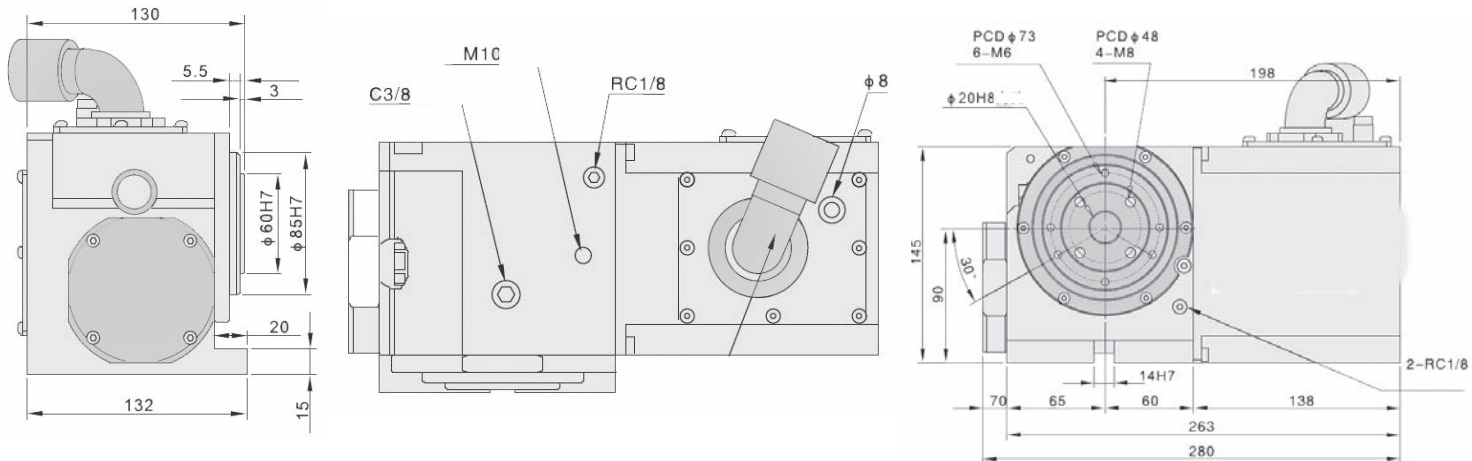
FOURTH AXIS ROTARY INDEXING TABLE



NEW

| Model | | F 80 | F 105 / F 150E | F 120X | F 210P | F 150 / 210 / 310 / 410 |
|--|---|-------------------|----------------|---------------------------|------------|-------------------------|
| Article no. | | 350108503* | 350110003* | 351512003* | 351121509* | 3511290210* |
| Technical data | | | | | | |
| Table diameter | | 80 mm | | 120 mm | | 120 mm |
| Vertical table centre height | | 90 mm | | 110 mm | | 115 mm |
| Horizontal table height | | 130 mm | | 150 mm | | 170 mm |
| Total vertical height without motor cover | | 200 mm | | 190 mm | | 193 mm |
| Through bore | | Ø 20 mm | | Ø 30 mm | | Ø 30 mm |
| T-slot width | | 14 H7 | | 12 H7 | | 10 H7 |
| Slot nut width | | 14 H7 | | 14 H7 | | 14 H7 |
| Servo motor type | | SIEMENS | | SIEMENS | | SIEMENS |
| Transmission ratio | | 1:60 | | 1:60 | | 1:60 |
| Minimum step width | | 0.001° | | 0.001° | | 0.001° |
| max. speed | | 100 rpm | | 44.4 with motor 4 000 rpm | | 33.3 rpm |
| when connected to compressed air: pneumatic clamping force at 5 bar operating pressure | | 78 Nm | | 118 Nm | | 120 Nm |
| when connected to hydraulics: hydraulic clamping force at 20 bar operating pressure | | | | | | 240 Nm |
| Indexing accuracy | | 30" | | 60" | | 30" |
| Unidirectional repeatability | | 4" | | +/- 2 | | 4" |
| Bidirectional repeatability | | 490 Nm | | 118 Nm | | 12" |
| Net weight | | 25 kg | | 38 | | 28 kg |
| max. vertical tool weight |  | W = 20 kg | | W = 50 kg | | W = 35 kg |
| max. horizontal tool weight |  | W = 50 kg | | W = 100 kg | | W = 75 kg |
| Max. radial load |  | F = 50 kg | | F = 5.8 kN | | F = 5.8 kN |
| |  | F x L = 8 kg x m | | F x L = 147 Nm | | F x L = 78.5 Nm |
| |  | F x L = 20 kg x m | | F x L = 196 Nm | | F x L = 176.5 Nm |

Article no. 350108503*



F 105 / F 150E

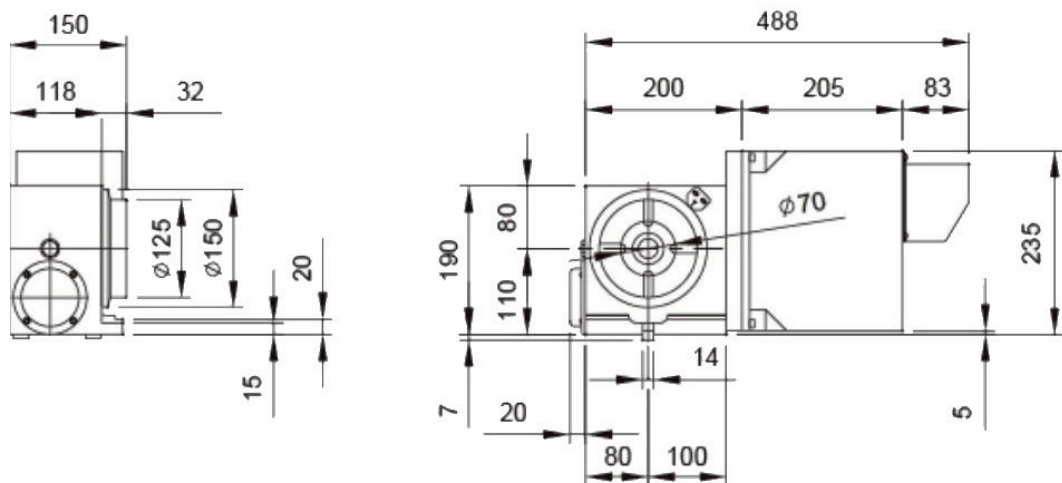
Article no. 350110003

F 120X

Article no. 351512003

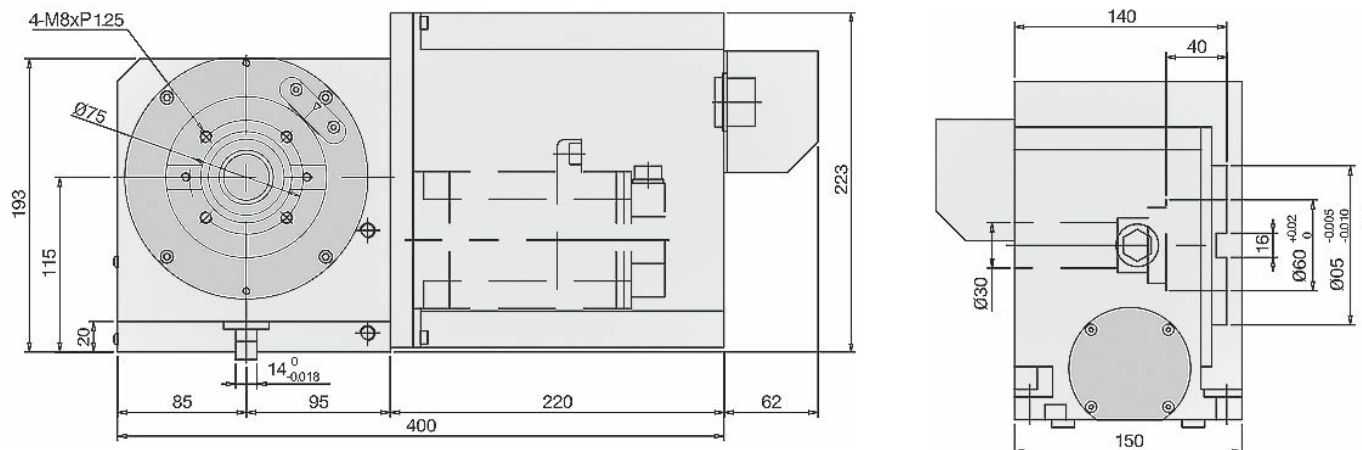
F 210P

Article no. 351121509



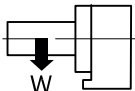
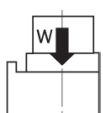
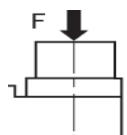
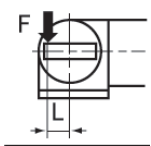
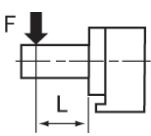
F 150HSC / F 210HSC / F 310HSC / F 410HSC

Article no. 351121509



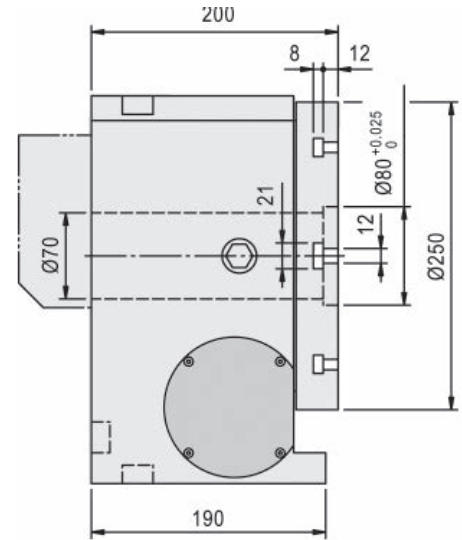
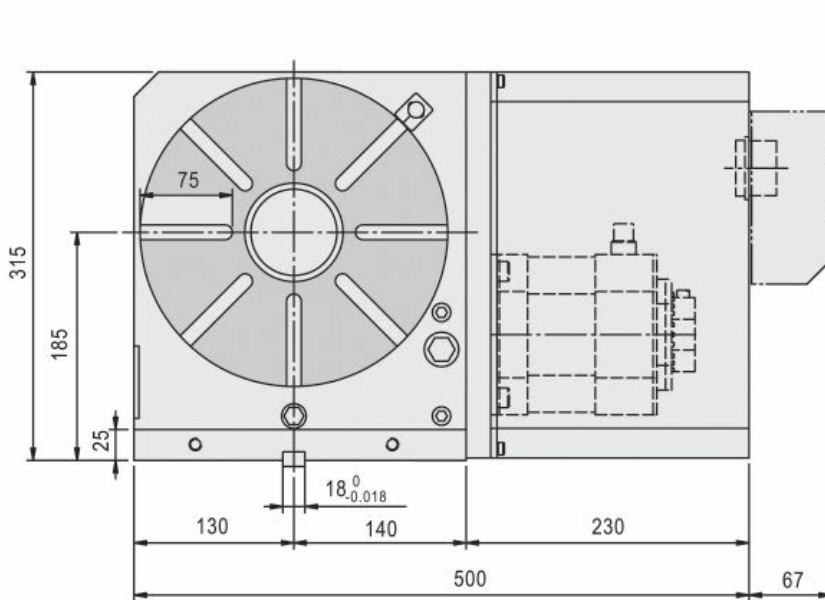
FOURTH AXIS ROTARY INDEXING TABLE



| Model | | F 410 HSC | F 610 HSC |
|--|---|-----------------------|------------------------|
| Article no. | | 3511290211* | 3511290212* |
| Technical data | | | |
| Table diameter | | 250 mm | 320 mm |
| Vertical table centre height | | 185 mm | 210 mm |
| Horizontal table height | | 200 mm | 240 mm |
| Total vertical height without motor cover | | 315 mm | 380 mm |
| Through bore | | Ø 70 ^{H7} mm | Ø 110 ^{H7} mm |
| T-slot width | | 12 ^{H7} mm | 14 ^{H7} mm |
| Slot nut width | | 18 ^{H7} mm | 18 ^{H7} mm |
| Servo motor type | | SIEMENS 1FK7060 | SIEMENS 1FK7083 |
| Transmission ratio | | 1:180 | 1:180 |
| Minimum step width | | 0.001° | 0.001° |
| max. speed | | 11.1/22.2 rpm | 11.1/22.2 rpm |
| when connected to compressed air: pneumatic clamping force at 5 bar operating pressure | | 250 Nm | |
| when connected to hydraulics: hydraulic clamping force at 20 bar operating pressure | | 500 Nm | |
| Indexing accuracy | | 15" | 15" |
| Unidirectional repeatability | | 4" | 4" |
| Bidirectional repeatability | | 50" | 50" |
| Net weight | | 124 kg | 210 kg |
| max. vertical tool weight |  | W = 150 kg | W = 175 kg |
| max. horizontal tool weight |  | W = 300 kg | W = 350 kg |
| Max. radial load |  | F=1 450 kg | F=2 500 kg |
| |  | F x L = 922 Nm | FxL=142 kg x m |
| |  | F x L =1770 Nm | FxL=200 kg x m |

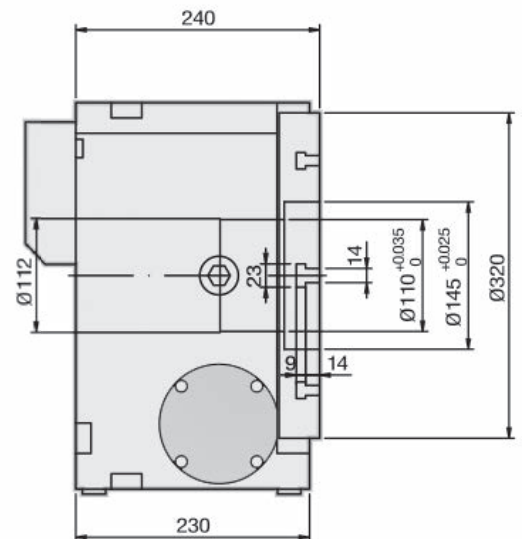
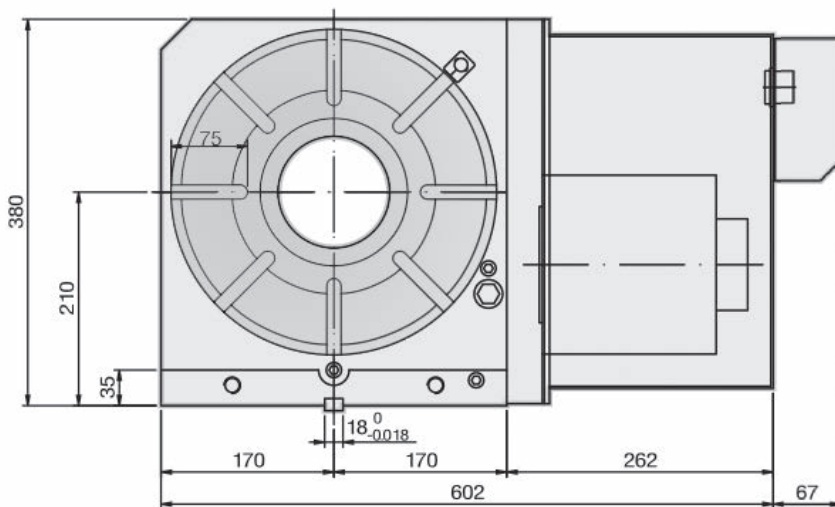
F 410 HSC

Article no. 3511290211



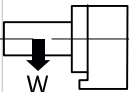
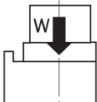
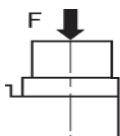
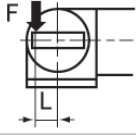
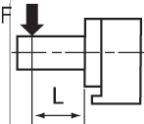
F 610 HSC

Article no. 3511290212



5-AXIS ROTARY/SWIVELLING TABLE



| Model | F 150 HSC | F 310 HSC F 410 HSC | F210P | F 310 HSC F 410 HSC F 610HSC | F 610 HSC |
|-----------------------------------|---|------------------------|------------|------------------------------------|--------------------------|
| Article no. | 3511290210* | 3511290202* | 351121510* | 3511290251* | 3511290252* |
| Technical data | | | | | |
| Possible machining diameter | 120 mm | | | 200 mm | 250 mm |
| Height of the tilting centre | 150 mm | | | 195 mm | 225 mm |
| Vertical overall height | 235 mm | | | 360 mm | 355 mm |
| Passageway | Ø 30 ^{H7} mm | | | Ø 35 ^{H7} mm | Ø 70 ^{H7} mm |
| T-groove size | 10 ^{H7} mm | | | 12 ^{H7} mm | 12 ^{H7} mm |
| Slot nut width | 14 ^{H7} mm | | | 18 ^{H7} mm | 18 ^{H7} mm |
| Rotate servo motor types | SIEMENS 1FK7042 | | | SIEMENS 1FK7060 | SIEMENS 1FK7060 |
| Tilting servo motor types | SIEMENS 1FK7042 | | | SIEMENS 1FK7063 | SIEMENS 1FK7063 |
| Rotate transmission ratio | 1:72 | | | 1:90 | 1:90 |
| Tilting transmission ratio | 1:120 | | | 1:180 | 1:180 |
| Minimum step width | 0,001° | | | 0,001° | 0,001° |
| Rotate / Tilting speed | max. 27.8 rpm / 16.7 rpm | | | max. 22.1 rpm / 11.1 rpm | max. 22.1 rpm / 11.1 rpm |
| Tilt angle | -20° ~ 120° | | | -110° ~ 110° | -110° ~ 110° |
| Rotate indexing accuracy | 30" | | | 20" | 15" |
| Tilting indexing accuracy | 60" | | | 50" | 30" |
| Net weight | 105 kg | | | 240 kg | 280 |
| max. vertical tool weight |  | W = 20 kg | | W = 50 kg | W=60 kg |
| max. horizontal tool weight |  | W = 35 kg | | W = 100 kg | W=100 kg |
| Max. radial load |  | F = 3.9 KN | | F = 4.9 KN | F=1200 kg |
| |  | F x L = 235 Nm | | F x L = 161 Nm | F x L = 100 kg x m |
| |  | F x L = 294 Nm | | F x L = 147 Nm | F x L = 120 kg x m |

F 150 HSC

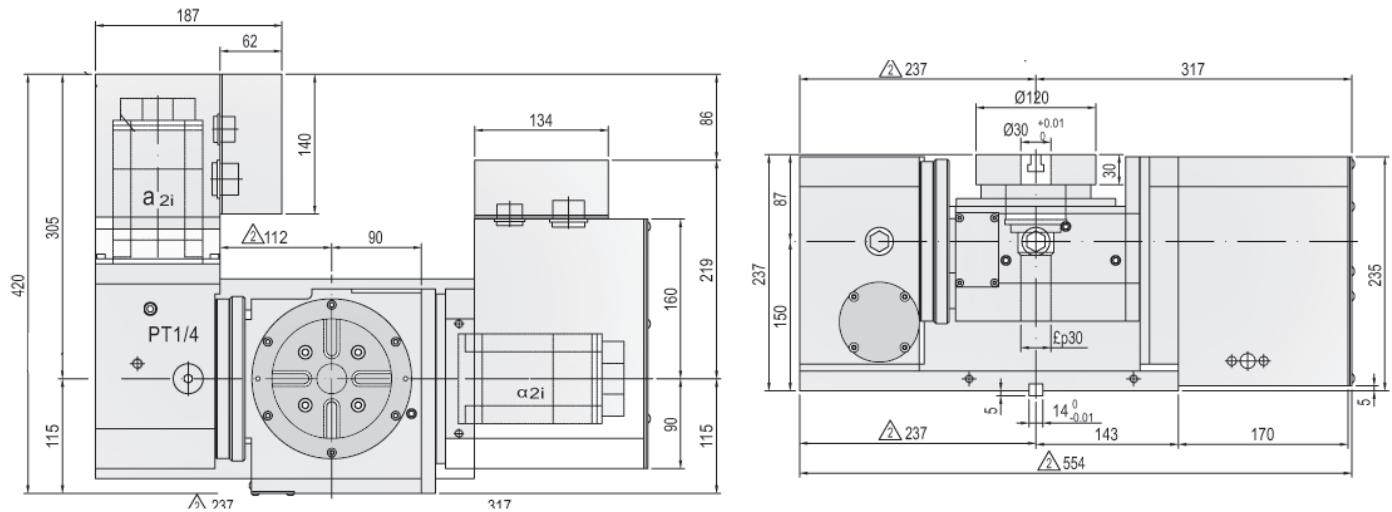
Article no. 3511290201

F 210P

Article no. 351121510

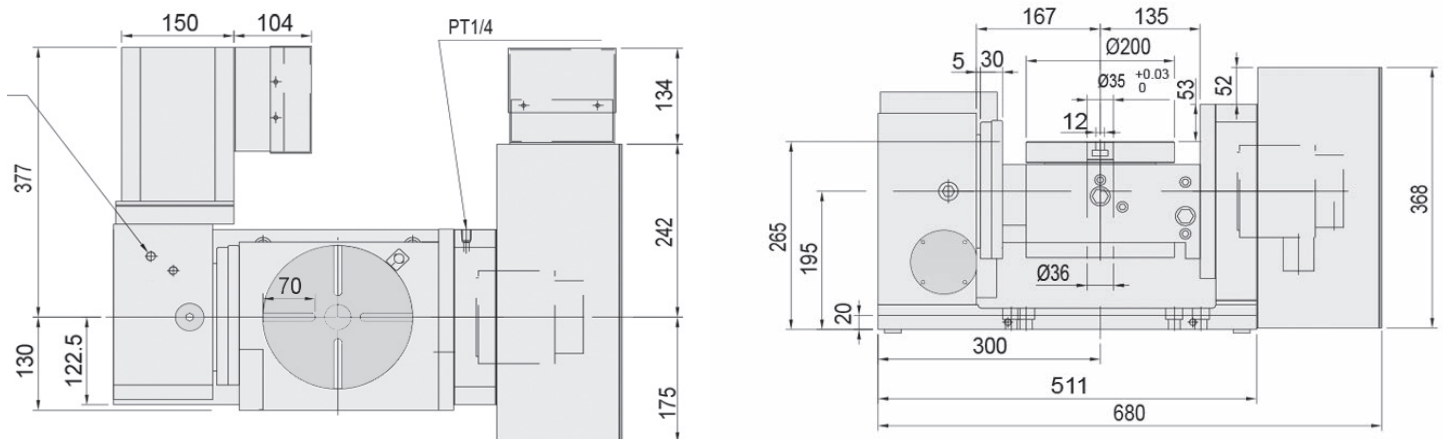
F 310HSC / F 410HSC

Article no. 3511290202



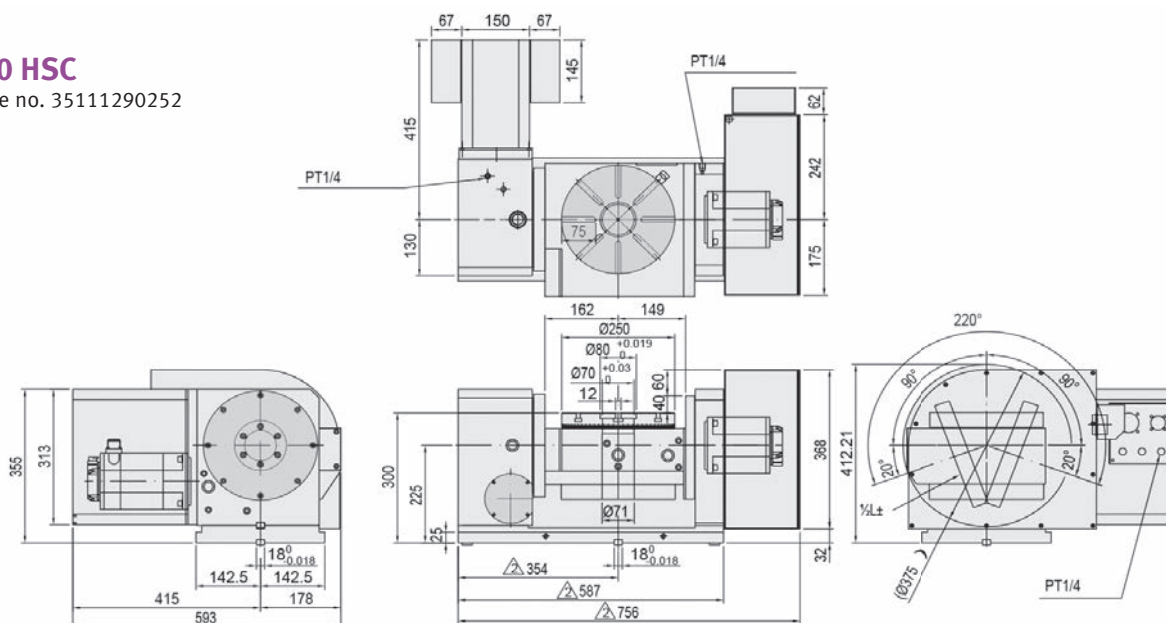
F 310HSC / F 410HSC / F 610 HSC

Article no. 3511290251



F 610 HSC

Article no. 3511290252



STARTER SET

BT 30

| Starter set BT 30 | 3536107 |
|--|---------|
| Comprises: | |
| · 1 pc. milling head holder | |
| · 1 pc. quick-release drill chuck 1 - 13 mm | |
| · 2 pcs. each Weldon 6 mm / 20 mm | |
| · 1 pc. each Weldon 8 mm / 10 mm / 12 mm / 16 mm | |
| · 1 pc. adapter BT 30 to MT 2 | |
| · 4 pc. collet chuck holder ER 32 | |
| · 1 pc. collet spanner ER 32 | |
| · 18-part collet set ER 32 | |
| · 1 pc. height adjuster | |
| · 1 pc. assembly and tool setting aid | |
| · 14 pcs. pull studs | |
| · 1 pc. taper squeegee | |

| Milling head holder | 3536306 |
|---------------------|---------|
|---------------------|---------|

- 22 mm seat



| Chuck | 3536303 |
|-------|---------|
|-------|---------|

- Clamping range 1 - 13 mm
- Concentricity 0.03 mm
- Max. speed 12 000 rpm



| Weldon holder | |
|---------------|---------|
| Ø 6 mm | 3536310 |
| Ø 8 mm | 3536311 |
| Ø 10 mm | 3536312 |
| Ø 12 mm | 3536313 |
| Ø 16 mm | 3536314 |
| Ø 20 mm | 3536315 |



| Adapter | |
|----------------|---------|
| BT 30 to MT 2 | 3536305 |
| BT 30 to MT 3* | 3536316 |

* not in starter set



| Holder BT 30 - B16* | 3353308 |
|---------------------|---------|
|---------------------|---------|

* not in starter set



| Collet chuck holder ER 32 | 3536304 |
|---------------------------|---------|
|---------------------------|---------|



| Collet chuck spanner ER 32 | 3536307 |
|----------------------------|---------|
|----------------------------|---------|



| Collet set ER 32 | 3441122 |
|------------------|---------|
|------------------|---------|

- 18-part collet chuck set size Ø 1 - 16 mm



| Height-adjuster | 3536290 |
|-----------------|---------|
|-----------------|---------|

- Analogue version
- For fast and easy determination of the reference point on the Z axis and/or for adjusting tools "to zero" (e.g., for milling or drilling) without damaging the workpiece



| Assembly and tool adjustment gauge | 3536193 |
|------------------------------------|---------|
|------------------------------------|---------|

- For easy and precise adjustment of tools
- Vertical and horizontal collet for tools with a steep-angle taper



| Taper squeegee | 3536301 |
|----------------|---------|
|----------------|---------|



| Pull stud JIS B 6339 | 3536302 |
|----------------------|---------|
|----------------------|---------|

- 30°



BT 40

09 ACCESSORIES

| Starter set BT 40 | 3536108 |
|---|---------|
| Comprises: | |
| <ul style="list-style-type: none"> • 1 pc. milling head holder with 27 mm collet • 1 pc. quick-release drill chuck 1 - 13 mm • 2 pcs. each Weldon 6 mm / 20 mm • 1 pc. each Weldon 8 mm / 10 mm / 12 mm / 16 mm • 1 pc. adapter BT 40 to MT 3 • 4 pc. collet chuck holder ER 32 • 1 pc. collet spanner ER 32 • 18-part collet set ER 32 • 1 pc. height adjuster • 1 pc. assembly and tool setting aid • 15 pcs. pull studs • 1 pc. taper squeegee | |

| Milling head holder | 3536336 |
|--|---------|
| <ul style="list-style-type: none"> • Collet 27 mm | |



| Chuck | 3536333 |
|--|---------|
| <ul style="list-style-type: none"> • Clamping range 1.5 - 16 mm | |



| Weldon holder | |
|---------------|---------|
| Ø 6 mm | 3536340 |
| Ø 8 mm | 3536341 |
| Ø 10 mm | 3536342 |
| Ø 12 mm | 3536343 |
| Ø 16 mm | 3536344 |
| Ø 20 mm | 3536345 |



| Adapter | 3536335 |
|---|---------|
| <ul style="list-style-type: none"> • BT 40 to MT 3 | |



| Holder BT 40 - B16* | 3353338 |
|---------------------|---------|
|---------------------|---------|

* not in starter set



| Collet chuck holder ER 32 | 3536334 |
|---------------------------|---------|
|---------------------------|---------|



| Collet chuck spanner ER 32 | 3536307 |
|----------------------------|---------|
|----------------------------|---------|



| Collet set ER 32 | 3441122 |
|------------------|---------|
|------------------|---------|

- 18 collet chucks; sizes Ø 1 - 16 mm



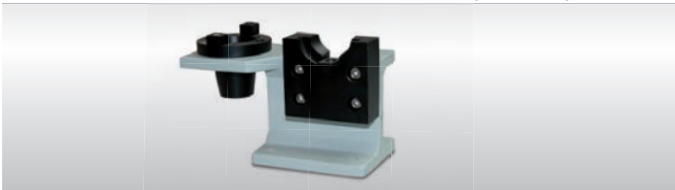
| Height-adjuster | 3536290 |
|-----------------|---------|
|-----------------|---------|

- Analogue version
- For fast and easy determination of the reference point on the Z axis and/or for adjusting tools "to zero" (e.g., for milling or drilling) without damaging the workpiece
- Housing height 50 mm



| Assembly and tool adjustment gauge | 3536204 |
|------------------------------------|---------|
|------------------------------------|---------|

- For easy and precise adjustment of tools
- Vertical and horizontal collet for tools with a steep-angle taper



| Taper squeegee | 3536331 |
|----------------|---------|
|----------------|---------|



| Pull stud JIS B 6339 | 3536332 |
|----------------------|---------|
|----------------------|---------|

- 30°



SK 40 / DIN 69871

| Starter set SK 40 / DIN 69871 | 3536109 |
|---|---------|
| Comprises: | |
| <ul style="list-style-type: none"> 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 4 pcs. collet chuck holder ER 32 1 pc. collet spanner ER 32 18-part collet set ER 32 1 pc. height adjuster 1 pc. assembly and tool setting aid 1 pc. taper squeegee 15 pcs. pull studs | |

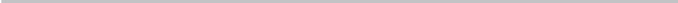
| Milling head holder | 3536366 |
|--|---------|
| <ul style="list-style-type: none"> Collet 27 mm | |



| Chuck | 3536363 |
|--|---------|
| <ul style="list-style-type: none"> Clamping range 1 - 13 mm | |



| Weldon holder | |
|---------------|---------|
| Ø 6 mm | 3536370 |
| Ø 8 mm | 3536371 |
| Ø 10 mm | 3536372 |
| Ø 12 mm | 3536373 |
| Ø 16 mm | 3536374 |
| Ø 20 mm | 3536375 |



| Reduction sleeve | 3536365 |
|---|---------|
| <ul style="list-style-type: none"> SK 40 to MT 3 | |



| Collet chuck holder ER 32 | 3536364 |
|---------------------------|---------|
|---------------------------|---------|



| Collet chuck spanner ER 32 | 3536307 |
|----------------------------|---------|
|----------------------------|---------|



| Collet set ER 32 | 3441122 |
|------------------|---------|
|------------------|---------|

- 18 collet chucks; sizes Ø 1 - 16 mm



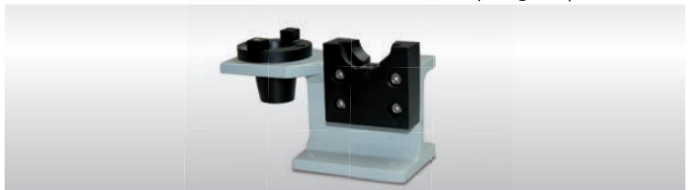
| Height-adjuster | 3536290 |
|-----------------|---------|
|-----------------|---------|

- Analogue version
- For fast and easy determination of the reference point on the Z axis and/or for adjusting tools "to zero" (e.g., for milling or drilling) without damaging the workpiece
- Housing height 50 mm



| Assembly and tool adjustment gauge | 3536195 |
|------------------------------------|---------|
|------------------------------------|---------|

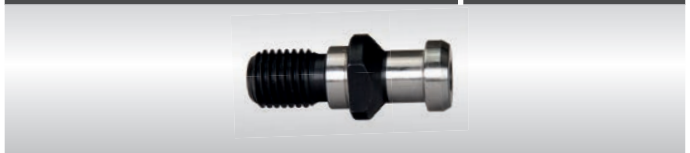
- For easy and precise adjustment of tools
- Vertical and horizontal collet for tools with a steep-angle taper



| Taper squeegee | 3536331 |
|----------------|---------|
|----------------|---------|



| Pull stud DIN 69872 | 3536362 |
|---------------------|---------|
|---------------------|---------|

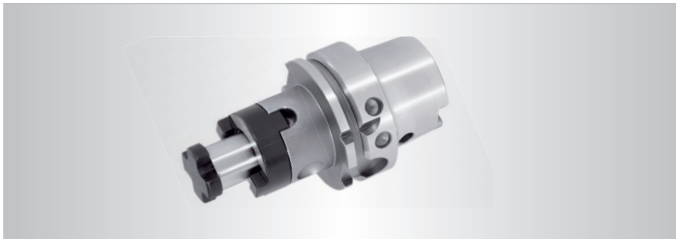


HSK A-63

09 ACCESSORIES

| Starter set HSK A-63 | 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. collet chuck holder ER 32 | |
| • 18-part collet set ER 32 | |
| • 1 pc. collet spanner ER 32 | |
| • 1 pc. swivelling assembly block | |
| • 1 pc. taper squeegee | |

| Milling head holder | 3536414 |
|---------------------|---------|
| • Collet 27 mm | |



| Chuck | 3536411 |
|--|---------|
| • 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 clockwise or anti-clockwise and in case of spindle stop | |

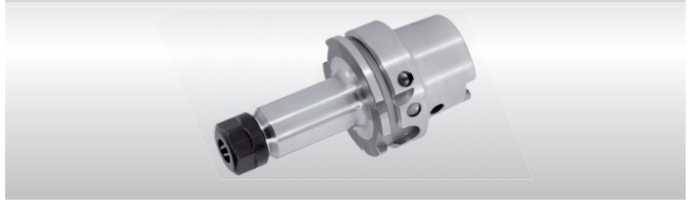


| Weldon holder | |
|---|--|
| • For clamping tools with a lateral carrier | |
| • Extremely smooth action | |

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

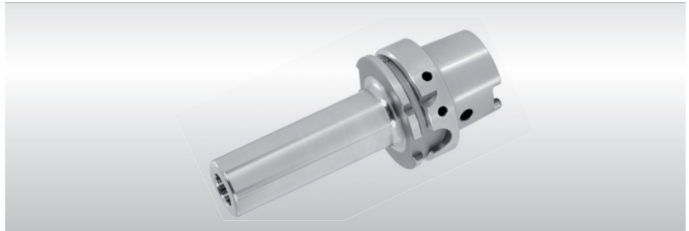


| Collet chuck holder ER 32 | 3536412 |
|---|---------|
| • For clamping tools with a cylindrical shank in ER collet chucks | |
| • Clamping range 0.5 - 10 mm | |



| Collet chuck spanner ER 32 | 3536307 |
|---|---------|
|  | |

| Reduction sleeve | 3536413 |
|--|---------|
| • HSK63 to MT 3 | |
| • Ground to precisely match helix gradient on inside and outside | |



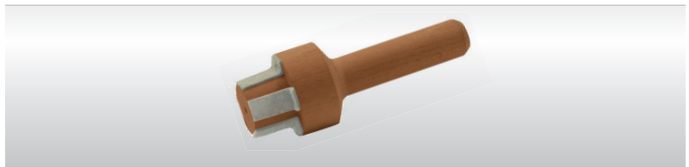
| Collet set ER 32 | 3441122 |
|---------------------------------------|---------|
| • 18 collet chucks; sizes Ø 1 - 16 mm | |



| Assembly block | 3536415 |
|--|---------|
| • For easy and precise adjustment of tools | |
| • Swivelling | |



| Taper squeegee | 3536410 |
|--|---------|
| • For cleaning the machine taper to remove dust, chips and soiling | |
| • Non-woven border | |



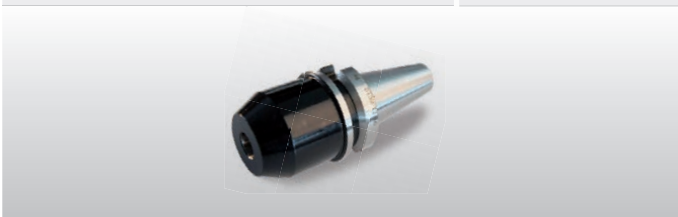
SK50 DIN 69871

| Starter set SK 50 / DIN 69871 | 3536111 |
|---|---------|
| Comprises: | |
| · 1 pc. milling head holder with 27 mm collet | |
| · 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 50 to MT 3 | |
| · 4 pcs. collet chuck holder ER 32 | |
| · 1 pc. collet spanner ER 32 | |
| · 18-part collet set ER 32 | |
| · 1 pc. height adjuster | |
| · 1 pc. taper squeegee | |
| · 15 pcs. pull studs | |

| Milling head holder | 3536506 |
|---------------------|---------|
| · Collet 27 mm | |



| Weldon holder | |
|---------------|---------|
| Ø 6 mm | 3536510 |
| Ø 8 mm | 3536511 |
| Ø 10 mm | 3536512 |
| Ø 12 mm | 3536513 |
| Ø 16 mm | 3536514 |
| Ø 20 mm | 3536515 |



| Reduction sleeve | 3536505 |
|------------------|---------|
| · SK 50 to MT 3 | |



| Collet chuck holder ER 32 | 3536504 |
|---------------------------|---------|
|---------------------------|---------|



| Collet chuck spanner ER 32 | 3536307 |
|----------------------------|---------|
|----------------------------|---------|



| Collet set ER 32 | 3441122 |
|------------------|---------|
|------------------|---------|



| Height-adjuster | 3536290 |
|-----------------|---------|
|-----------------|---------|

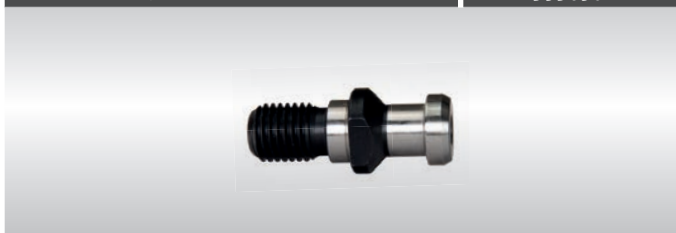
- Analogue version
- For fast and easy determination of the reference point on the Z axis and/or for adjusting tools "to zero" (e.g., for milling or drilling) without damaging the workpiece
- Housing height 50 mm



| Taper squeegee | 3536501 |
|----------------|---------|
|----------------|---------|



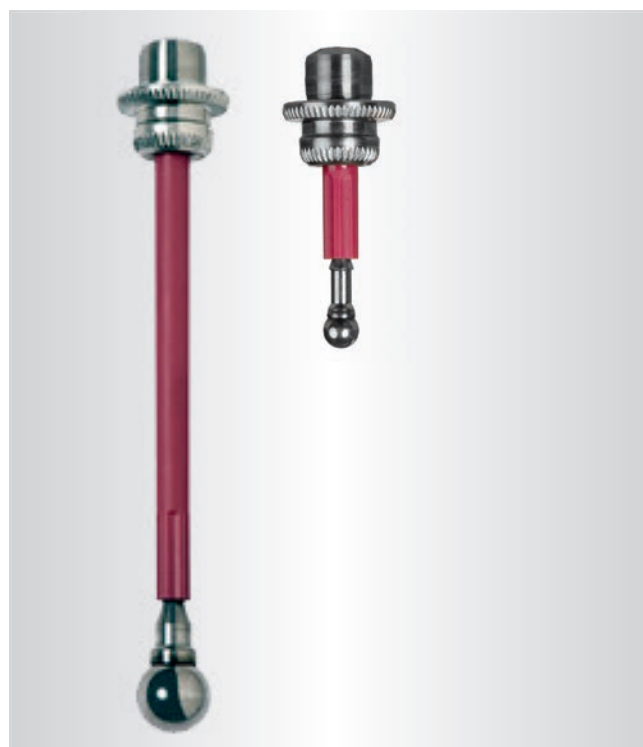
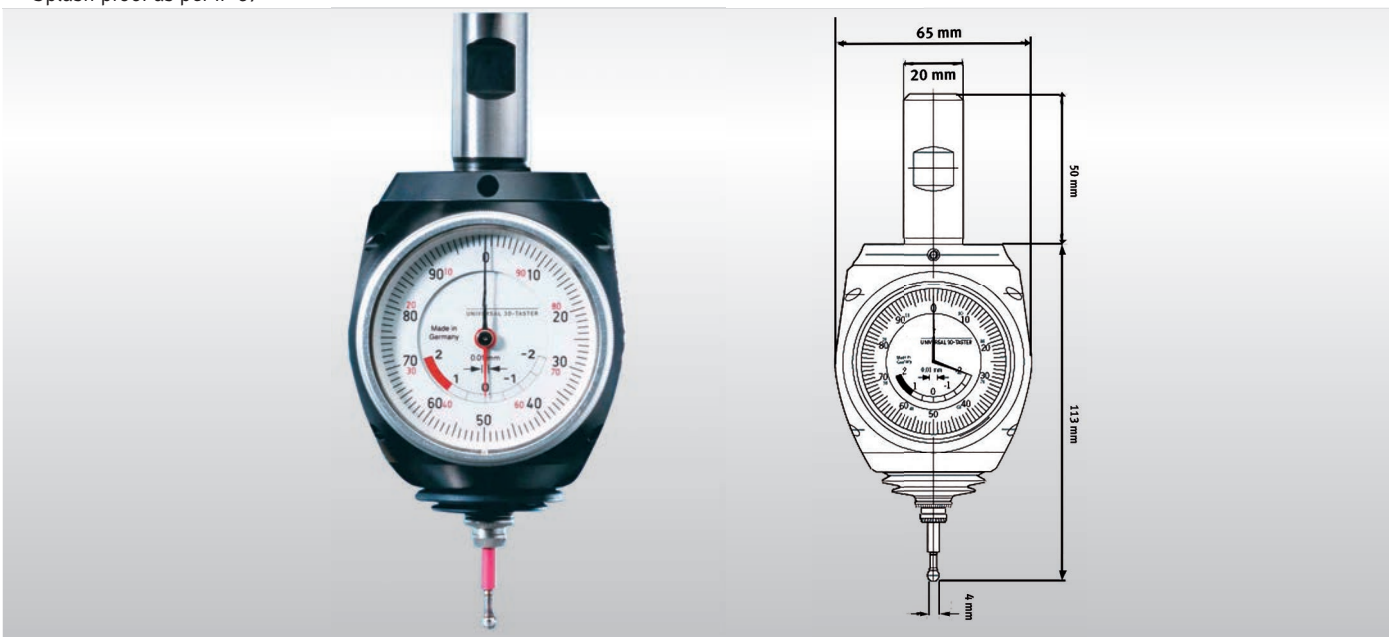
| Pull stud DIN 69872 | 3536502 |
|---------------------|---------|
|---------------------|---------|



Universal 3D probe

Article no. 354700201

- Including short probe insert Ø 4 mm
- High-precision, versatile measuring device for milling and erosion machines
- 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
- For fast and easy setting of workpiece zero points and for length measurement
- Arbitrary touch direction (X/Y/Z axis)
- Dial gauge shows the clearance between the spindle axis and the workpiece
- Reduces overheads, improves productivity and reduces staff workload
- Probe inserts of different lengths available, interchangeable without tools
- To maximise measuring accuracy and precision, all Universal 3D probes are individually measured and calibrated in installation
- Meets all currently applicable safety regulations
- Splash proof as per IP 67



| Replacement tip for 3-D Haimer probe | Article no. |
|--------------------------------------|-------------|
| short Ø 4 mm | 354700201S1 |
| long Ø 8 mm | 354700201S2 |

- › Both short (ball Ø 4 mm) and long (ball Ø 8 mm) tips are available for the probe, and can be changed without tools
- › No re-calibration is needed after replacing the probe
- › The tips are, of course, compatible with all HAIMER 3-D probes

RENISHAW

OMP 40-2 /OMP 400 measuring probe

Ultra-compact with optical signal transmission for workpiece set-up and testing

OMP 40-2 measuring probe

- The OMP40-2 transmits signals over 360° at an angle of 90° to the spindle axis and with a range of up to 5 m
- Modulated optical signal transmission is also resilient to malfunctions caused by light interference
- The repetition accuracy in one direction is 1.0 µm (determined with an approach speed of 480 mm/min and 50 mm probe insert)
- The probe can be switched off by an M command or via a configurable switch-off time

- Protection class IPX8, developed for tough deployment in machining centres.
- Visible LED display diagnostics

| Renishaw OMP 40-2 | Article no. |
|-----------------------------|-------------|
| Ex warehouse Germany | 3582010 |
| • Including installation | |

| Workpiece and tool measuring probe | Article no. |
|------------------------------------|-------------|
| OMP 40-2 and OTS | 3582012 |
| • Includes assembly | |

OMP 400 measuring probe

- Unrivalled 3D precision and repetition accuracy
- Reliably modulated, optical signal transmission
- Proven and patented Rengage technology
- Excellent resistance to light interference with modulated signal transmission
- 360° transmission range
- Ultra-compact design
- 3D measuring performance ideal for 5-axis machines
- Excellent 3D precision, specially for measuring 3D freeform surfaces
- High repetition accuracy independently of the probing direction
- Due to the very low probing force and probing uncertainty even longer

- probe inserts can be used
- Up to 10 times longer service life than with conventional switching probes
- Elimination of reset errors
- Switching on and off is possible in any spindle position

| Renishaw OMP 400 | Article no. |
|-----------------------------|-------------|
| Ex warehouse Germany | 3582020 |
| • Including installation | |



OTS - tactile 3-D tool measuring probe for tool measuring and tool break monitoring

Contact switching 3-D measurements

- Compact, tactile 3-D tool probe with optical signal transmission for tool breakage checking and fast measurement of the tool length and diameter on a variety of different tools
- Compatible with Renishaw receivers with optical signal transmission



Benefits and features

- Proven kinematic design
- Excellent resistance to light interference with modulated signal transmission
- Directionally adjustable optical infrared module
- Cable-free for unrestricted machine movement and easy installation
- Repetition accuracy of 1.00 µm (2)

| Touch probe | Article no. |
|--------------------------|-------------|
| OTS | 3582011 |
| • Including installation | |

| Workpiece and tool measuring probe | Article no. |
|------------------------------------|-------------|
| OMP 40-2 and OTS | 3582012 |
| • Includes assembly | |

RENISHAW

Renishaw Primo set* - Includes everything you need.

Start with automatic workpiece and tool measurement in your production environment now and enjoy the benefits

| Renishaw Primo Set | Article no. |
|---|-------------|
| with collet BT 30 | 3582030 |
| with collet BT 40 | 3582031 |
| <ul style="list-style-type: none"> • Radio Part Setter • Radio 3D Tool Setter • Primo Interface • GoProbe Software • Primo CREDIT-6 - Six month credit token including Primo Total Protect | |

| Primo Credit Token | Article no. |
|---------------------------------------|-------------|
| Primo CREDIT-6- six months | 3582040 |
| • Includes Primo Total Protect (PTP) | |
| Primo CREDIT-U - unlimited use | 3582041 |

Primo™ Radio Part Setter
(Tool measuring probe)

This probe automatically determines the workpiece reference point before machining and performs in-process measurements of the roughing or finishing workpiece dimensions.


Primo™ Radio 3D Tool Setter
(Tool measuring probe)

This measuring probe is used for automatic length and diameter measurement of a tool. It also enables tool breakage control during machining process.


Primo™ Interface
(Interface)

The interface communicates with the workpiece and tool measuring probe and the machine tool control via Renishaw's highly reliable Frequency Hopping Spread Spectrum (FHSS) radio transmission.


Primo Credit Token
(Credit token)

Each Primo Kit contains the first 6-month credit token. The 6-month credit token supports operation of the Primo System for six months. It offers flexibility in terms of credit payment, because you can postpone the purchase of a Primo credit token during quieter periods, until you need your Primo system back. The upgrade credit token - Primo CREDIT-U - offers unlimited use of the Primo system for a one-off payment.


GoProbe Software

supports cycles for workpiece and tool measurement and calibration. All cycles use a single line of code, making the software quick to learn and easy to use in daily operations. Including: Manual, programming disk, app, e-training, training workpiece, programming manual


Primo Total Protect (PTP)*
(Primo total protection)

Primo Complete Protection is an extended guarantee to protect your investment when you have activated a credit token. If your Primo probe is accidentally damaged during this period, your Renishaw representative will supply you with a free replacement.

*Renishaw's terms and conditions apply



BLUM

TC 52IR / TC 62RC

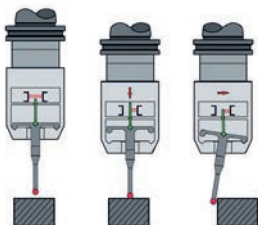
Workpiece measuring probe

Compact high speed measuring probe for workpiece measurement

Unrivalled precision and fast workpiece measuring thanks to modern, multidirectional measuring system with optical/electronic switching signal generation.

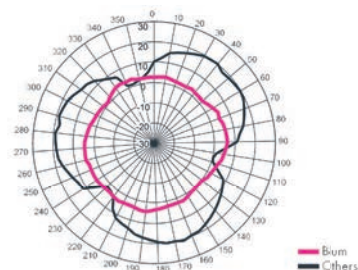
Wear-free, optical-electronic signal generation:

- Switching signal generated by interrupting a miniature light barrier
- Switching point repeatability of $0.3\mu\text{m}$ at 2 m/min. Measuring speed
- Wear-free and durably stable
- Very compact probe with $\varnothing 40\text{ mm}$



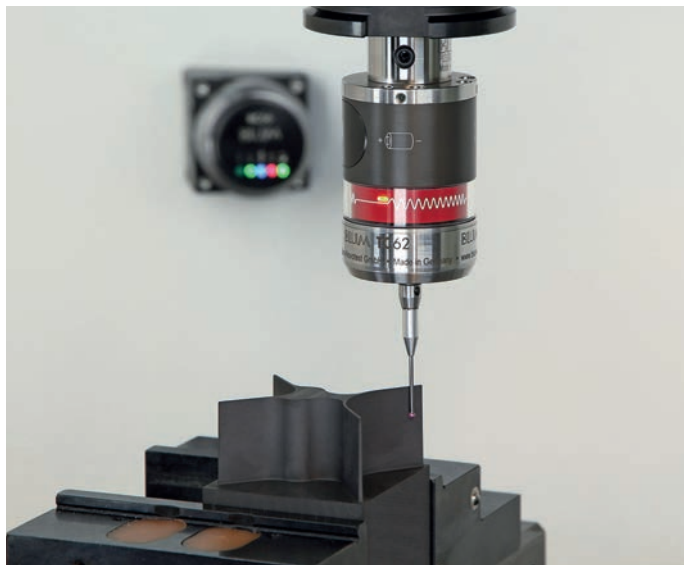
High-precision, rotationally symmetrical measuring system

- Precise, directionally independent approach behaviour
- Constant deflection forces
- Spindle orientation not required
- No detrimental 3-leg principle with lobing effect



Only for machines with an 828D control

| Tool measuring probe TC | Article no. Ex warehouse Germany | Article no. ex work |
|--|--|------------------------|
| TC 52IR- Infrared transmission | 3582102 | 3511290604 |
| TC 62RC- BRC wireless technology (without tool fitting) | 3582103 | - |
| • SIEMENS licence | | |
| • Including installation | | |



Reliable and proven transmission technology

- Sequential actuation of up to 2 measuring systems with one infrared receiver
- Switching on and off with M command



| Rubin measuring insert | Article no. |
|---|-------------|
| Length 30 mm, $\varnothing 3\text{ mm}$ carbide | 3582140 |
| Length 30 mm, $\varnothing 5\text{ mm}$ carbide | 3582141 |
| Length 50 mm, $\varnothing 3\text{ mm}$ carbide | 3582142 |
| Length 50 mm, $\varnothing 5\text{ mm}$ carbide | 3582143 |

| Accessories for TC 52IR / TC 62RC | Article no. |
|-----------------------------------|-------------|
| SK 40 Holder* | 3582125 |
| HSK-A63 holder* | 3582126 |
| BT 30 holder* | 3582124 |
| BT 40 holder* | 3582127 |

*To be ordered according to the spindle holder

BLUM

ZX speed

Tool measuring probe

Universal 3-D probe heads for tool adjustment and tool break monitoring

Economical solutions for tool length and radius adjustment and tool break monitoring Precise and process-assured measurements due to state-of-the-art metrology equipment with optoelectronic switching signal generation

Wear-free, optical/electronic signal generation

- Switching signal is generated by interrupting a miniature light barrier
- Allows for faster measuring speeds and measuring precision than comparable probes
- Reliable tool adjustment under the toughest conditions

High-precision state-of-the-art measuring equipment

- Precise, directionally independent switching behaviour
- Constant deflection forces
- Premium BLUM measuring equipment, latest generation
- No detrimental 3-leg principle
- No highly-sensitive switching elements

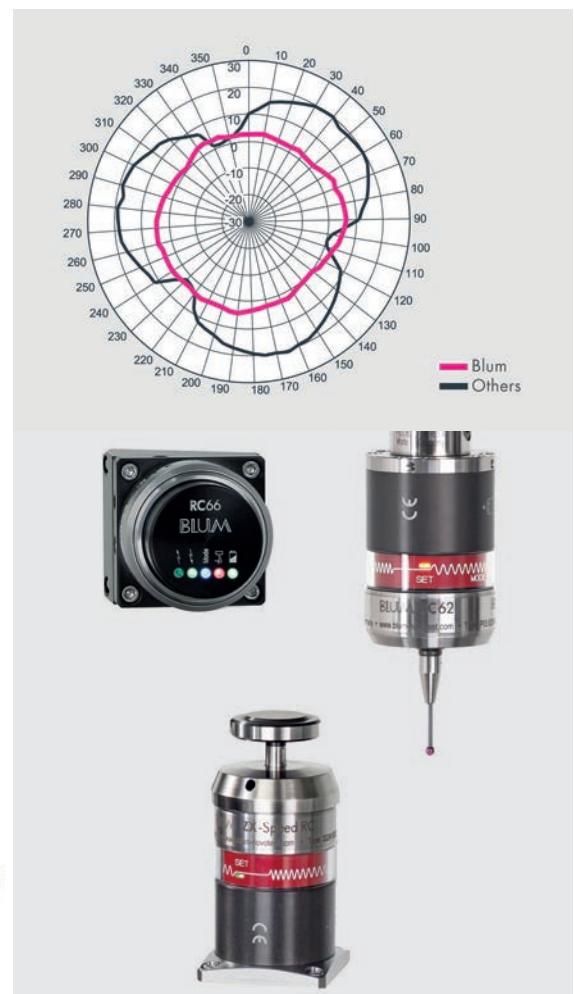
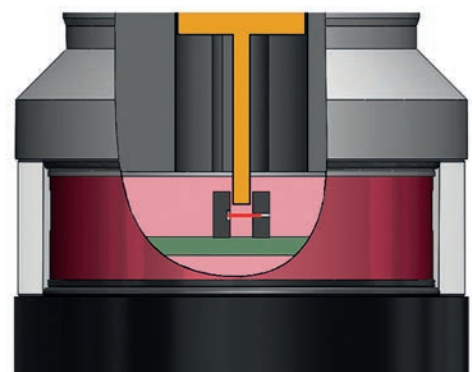
Latest transmission technologies

- ZX speed: Cable-connected
- ZX speed IR: Infrared transmission

| Tool measuring probe ZX-Speed | Article no. |
|---|-------------|
| IR - Infrared transmission | 3582104 |
| RC - BRC wireless technology | 3582105 |
| <ul style="list-style-type: none"> • SIEMENS licence • Including installation | |

| Workpiece and tool measuring probe | Article no. |
|---|-------------|
| TC 52IR and ZX-speed IR infrared transmission | 3582108 |
| TC 62IRC and ZX-Speed RC BRC wireless technology (without tool fitting) | 3582109 |
| <ul style="list-style-type: none"> • SIEMENS licence • Including installation | |

| Reference tool | Article no. |
|--|-------------|
| <ul style="list-style-type: none"> • made by EMUGE • without pull stud | |
| BT 30 | 3582502 |
| BT 40 | 3582504 |
| SK 40 | 3582506 |



BLUM

NEW

Blum Novotest for LC50-DIGILOG

Premium laser measuring system for tool measurement and tool monitoring



The most advanced laser measuring system worldwide

- Highly dynamic measurements of all tool characteristics
- Touchless measuring of all tool types, shapes and cutting materials
- Detection of geometry changes, such as cutting edge wear
- Continuously good part precision thanks to process-integrated temperature compensation
- Reliable compensation for spindle growth and orbital errors
- Automatic concentricity check detects poor tool holders and soiling
- Automated operation at low staffing levels



| LC50-DIGILOG | 3582116 |
|--|---------|
| <ul style="list-style-type: none"> • Blum LC50 Digilog length 200 mm • Smart Dock 1 • Connecting cable 10 m • Spiral hose 3 m • Interface • Software Laser NT SIE • Max. tool diameter max. 80 mm • Including installation | |
| Attention: Don't forget the reference tool | |

| Laser control and measuring system | Article no. |
|---|-------------|
| TC 52IR and LC50-DIGILOG - Infrared transmission | 3582117 |
| TC 62RC and LC50-DIGILOG - BRC wireless technology | 3582118 |
| <ul style="list-style-type: none"> • for tools up to 80 mm diameter • SIEMENS licence • Including installation | |

| Reference tool | Article no. |
|------------------------|-------------|
| SK 40 holder* | 3582121 |
| HSK-A63 holder* | 3582122 |



Starter sets
Bar feeder
Bar gripper

09 TURNING ACCESSORIES

STARTER SET

VDI 30

| Starter set VDI 30 | 3536115 |
|--|---------|
| Comprises: | |
| 3 pcs. square transverse holder | |
| 1 pc. square transverse overhead holder | |
| 1 pc. square longitudinal holder | |
| 5 pcs. boring bar holder Ø 10 / 12 / 16 / 20 / 25 mm | |
| 3 pcs. cap | |
| 1 pc. collet chuck holder ER 25 | |
| 1 pc. collet spanner ER 25 | |
| 15-part collet set ER 25 | |
| 1 pc. tool holder | |
| 1 pc. chuck | |

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



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



| Square longitudinal holder | 3536233 |
|---|---------|
| <ul style="list-style-type: none"> Right-hand type Large adjustable conical tipped nozzle | |



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



| Collet chuck holder ER 25 | 3536237 |
|---------------------------|---------|
| | |

| Collet spanner ER 25 | 3536240 |
|----------------------|---------|
| | |

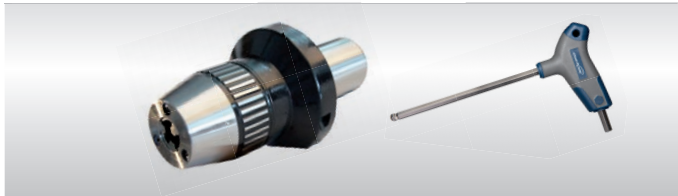
| Collet set ER 25 | 3441109 |
|--|---------|
| <ul style="list-style-type: none"> 15 pcs.; sizes Ø 1 - 16 mm | |



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



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



| Drill rod holder | |
|------------------|---------|
| Ø 10 mm | 3536241 |
| Ø 12 mm | 3536242 |
| Ø 16 mm | 3536243 |
| Ø 20 mm | 3536244 |
| Ø 25 mm | 3536245 |



VDI 40

09 ACCESSORIES

| Starter set VDI 40 | 3536116 |
|--|---------|
| Comprises: | |
| 3 pcs. square transverse holder | |
| 1 pc. square transverse overhead holder | |
| 1 pc. square longitudinal holder | |
| 5 pcs. boring bar holder Ø 10 / 12 / 16 / 20 / 25 mm | |
| 3 pcs. cap | |
| 1 pc. collet chuck holder ER 25 | |
| 1 pc. collet spanner ER 25 | |
| 15-part collet chuck set ER 25 | |
| 1 pc. tool holder | |
| 1 pc. chuck | |

| Square transverse holder | 3536251 |
|---|---------|
| <ul style="list-style-type: none"> Right-hand type, short DIN 69880 Large adjustable conical tipped nozzle | |



| Square transverse holder | 3536252 |
|--|---------|
| <ul style="list-style-type: none"> For overhead work Right-hand type, short DIN 69880 Large adjustable conical tipped nozzle | |



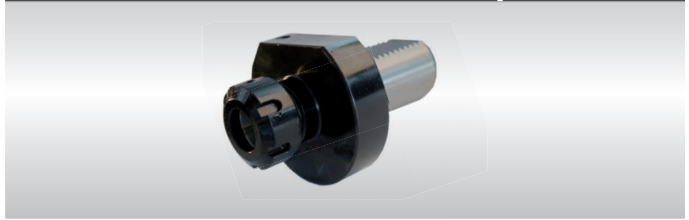
| Square longitudinal holder | 3536253 |
|---|---------|
| <ul style="list-style-type: none"> Right-hand type Large adjustable conical tipped nozzle | |



| Sealing cover | 3536256 |
|---|---------|
| <ul style="list-style-type: none"> Protects the tool changer against soiling | |



| Collet chuck holder ER 25 | 3536257 |
|---------------------------|---------|
|---------------------------|---------|



| Collet spanner ER 25 | 3536260 |
|----------------------|---------|
|----------------------|---------|



| Collet set ER 25 | 3441109 |
|------------------|---------|
|------------------|---------|

- 15 pcs.; sizes Ø 1 - 16 mm



| Tool holder | 3536258 |
|-------------|---------|
|-------------|---------|

- Pre-worked
- Round blank



| Chuck | 3536259 |
|-------|---------|
|-------|---------|

- Clamping range 1 - 13 mm



| Drill rod holder | |
|------------------|--|
|------------------|--|

| | |
|---------|---------|
| Ø 10 mm | 3536261 |
| Ø 12 mm | 3536262 |
| Ø 16 mm | 3536263 |
| Ø 20 mm | 3536264 |
| Ø 25 mm | 3536265 |



Short bar loader AM 90N/AM 90L the ideal solution for automatic loading

Automatic short bar loading magazine for machining bars with $\varnothing 4 \text{ mm} - \varnothing 80 \text{ mm} / \varnothing 120 \text{ mm}$
Maximum bar lengths 1 270 mm for AM 90N or 1 620 mm for AM 90L

Easy operation with control panel

- Low energy consumption: The average energy consumption is less than 50 Watt
- Low maintenance
- Programmable logic controller: Several programme variants are available for special applications.
- Feed speed: All movement sequences can be optimised via throttles.
- Control panel: Easy handling due to user-friendly designed removable control panel
- Each type also available as "CCW" version. Loading frame can be loaded from the front side for locations where there is little space at the rear next to the CNC lathe.
- Noise and vibration free. During machining, there is no connection via the material bar to the loading magazine, this ensures problem-free machining of round, square and hexagonal material



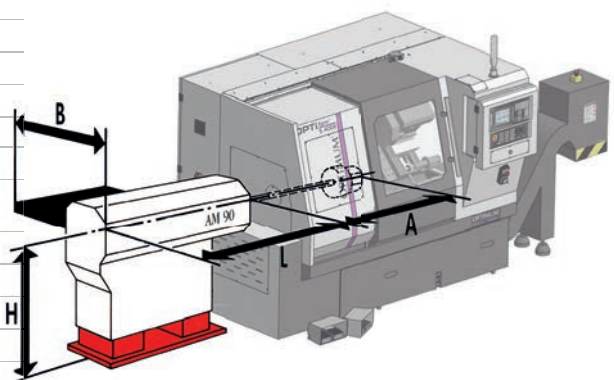
Fig.: AM 90N (S)



Fig.: AM 90L (S)

On request

| Technical data | | AM90N (S) | AM90L (S) |
|----------------------------|--------------|--|-----------------|
| Bar diameter | | $\varnothing 4 \text{ mm}$ to $\varnothing 80 \text{ mm}$ ($\varnothing 6 \text{ mm}$ to $\varnothing 120 \text{ mm}$) | |
| Bar length | | 100 to 1 270 mm | 100 to 1 620 mm |
| Rod weight max. | | 35 kg (65 kg) | |
| Spindle height adjustable | H | 850 mm to 1 250 mm | |
| Total length | L | 1 600 mm | 1 950 mm |
| Distance | A | max. 1 250 mm | max. 1 600 mm |
| Overall height | H +200 mm | 1 050 mm to 1 450 mm | |
| Width with loading frame | B | 1 150 mm | |
| Weight | | approx. 250 kg | approx. 270 kg |
| E - energy supply | | 110/220 V; 0.4 A; 50/60 Hz; max. 50 W; | |
| Compressed air requirement | | approx. 0.6 Mpa (6 bar); max. 20 l/min | |
| Control | | logic programmable | |



Short bar loader Pro Conqueror hydrodynamic model

The Pro Conqueror bar loaders are the ideal solution for automatically loading CNC lathes with short bars. They combine maximum productivity with a small footprint, and is equipped with one magazine (in the E version) for up to 3 200 mm bar length

Easy to use control unit

- Hydraulic
- High rotation load and quiet turning
- Various parameter settings, alarm detection and function display
- Mitsubishi AC servo motor
- Excellent stability and easy operation
- High-density steel construction for rigidity and durability
- The machine synchronised unit fits on the CNC lathe with sliding headstock and ensures fast and stable feeding
- Fast change channel for easy and convenient changes



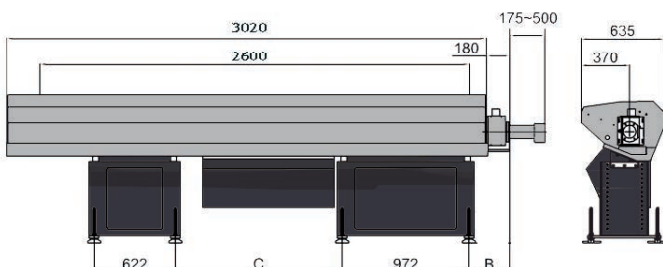
Material stop

- › Easy adjustment of the material stop without tools.
- › Saves time and effort



Clamping cutter in feed unit

- › Automatic positioning in the infeed centre to save time for material change.
- › Robust clamping cutter



Multilingual control panel

- › Settings and functions are displayed
- › Alarm list display, easy troubleshooting

| | Pro Conqueror |
|--------------------------|--------------------------|
| Material bars | Ø 5- 51 mm |
| Bar length ¹⁾ | 3 200 mm |
| Operating voltage | 3 x 200 - 240 |
| Compressed air | 5 - 7 kg/cm ² |
| Dimensions L x W | 3 020 x 635 mm |
| Weight | 850 kg |

| Pro Conqueror | Article no. |
|----------------|-------------|
| L 44 | 351433019 |
| L 440 | 351441038 |
| L 460 | 351442038 |
| S 600 | 351506023 |
| S 620 / S 620L | 351506538 |
| S 500 / S 500L | 351515012 |
| S 750 / S 750k | 351517012 |

Short bar feeder Pro V65E / Pro V 65LE the ideal solution for automatic loading

The Pro V 65E / Pro V 65LE 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 (in the E version) for up to 1 200 mm bar length – up to 1 500 mm with the LE variant.

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

- Bar diameter Ø 5.0 mm ~ F 65 mm
- Fast loading speed, specially developed design
- No special requirements or restrictions in terms of material straightness.
- The material rotates within the machining area and spindle length of the lathe.
- The lathe spindle speed can be maximised.
- The material can be round, hexagonal and moulded.
- The material lengths can be uniform or different.
- Easy to operate and maintain.



Remote control for checks and adjustments



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



| | Bar feeder interface | Pro V 65 E | Pro V 65 LE |
|----------------|----------------------|-------------------|-------------|
| | Article no. | Article no. | Article no. |
| L 440 | 351441037 | 351441033 | 351441034 |
| L 460 | 351442037 | 351442033 | 351442034 |
| S 600 | 351506011 | 351506012 | 351506013 |
| S 620 / S 620L | - | 351506535 | 351506536 |
| S 500 / S 500L | - | 351515003 | - |
| S 750 / S 750k | - | 351517003 | - |
| | | Pro V 65 E | Pro V 65 LE |
| Diameter | | Ø 5 mm - Ø 65 mm | |
| Bar length | | 1 200 mm | 1 500 mm |
| Spindle height | | 920 mm / 1 300 mm | |
| Loading weight | | 210 kg | 240 kg |



Automatic bar grab GRIPPEX Lightweight and compact

The Grippex bar grab boosts production and automation on your CNC lathe!

Only a small minority of all CNC lathes installed today is equipped with a bar feeder magazine. There are various reasons for this, such as the relatively high procurement costs or lack of space in the workshop. For small-batch production, however, a bar feeder that makes use of the existing conditions on the machine, such as hollow spindles and hollow clamping cylinders, is often sufficient. These devices only need to be supplemented with a guide tube and the GRIPPEX bar gripper. The Grippex bar gripper can be added to almost any lathe turret.

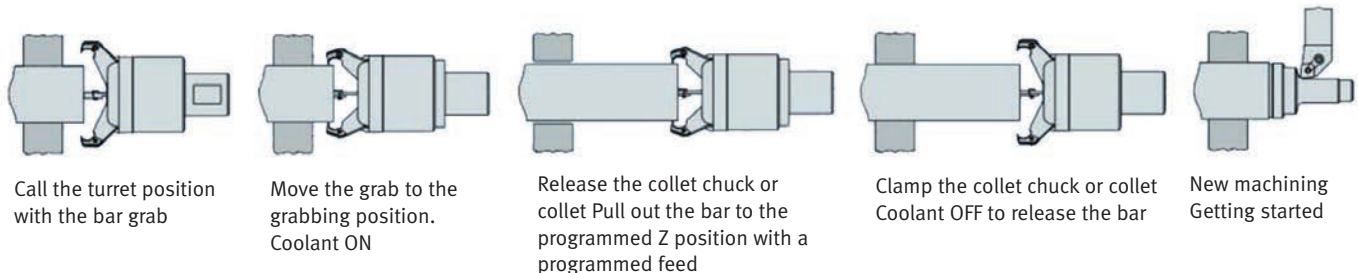
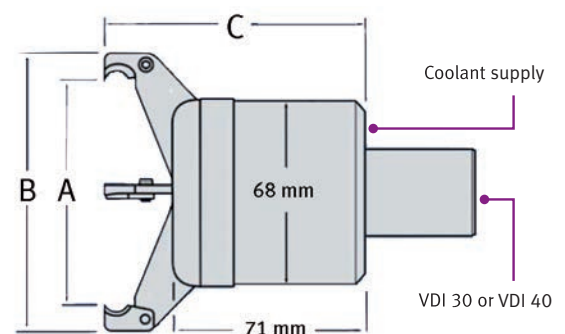
Benefits and main features of the GRIPPEX bar grab

- Fast and easy installation - the grab's work range can be fully utilised without conversion
- Lightweight and compact - thus allowing the turret to be fully occupied
- Resists high coolant pressure (20 bar). No need for a pressure reduction valve
- Works reliably as of 0.5 bar coolant pressure
- Clamps directly at the chuck - resulting in stable cutting of the turned parts.
- Clamps with 3 legs - thus ensuring trouble-free processing of hexagonal bars at any angle to the spindle.
- Equipped with robot clamping jaws, the device can also be used as a workpiece grab.



| Grippex II | VDI 30 | VDI 40 |
|---------------------|-------------|-------------|
| | Article no. | Article no. |
| Grab range 2-60 mm | 354500100 | 354500103 |
| Grab range 3-80 mm | 354500101 | 354500104 |
| Grab range 7-105 mm | 354500102 | 354500105 |

| Gripping ranges | A | B | C |
|-----------------|--------|--------|--------|
| 2-60 mm | 64 mm | 83 mm | 89 mm |
| 3-80 mm | 83 mm | 102 mm | 94 mm |
| 7-105 mm | 110 mm | 129 mm | 108 mm |



High-precision manually pivoting HPPA arm with probe for tool measurement, featuring a 3-axis RP3 probe.

Why measure on the machine?

Your lathe represents a considerable investment. Fast machining of complicated workpieces is just one of the many benefits. However, this investment can only be profitable if your machines produce as many workpieces as possible.

But why do some machines stand still for hours? Quite simple: Tools are often set manually and workpieces are checked for dimensional accuracy outside the machine. In both cases an expensive piece of equipment is idle, and this inevitably leads to long, unprofitable and avoidable standstill periods.

Reduce downtimes, avoid scrap

Manual tool measurement, position detection of workpieces and dimensional checks take a lot of time. In addition, these work steps offer no repetition accuracy and susceptible to operating errors. The use of measuring probes eliminates the need for set-up 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).

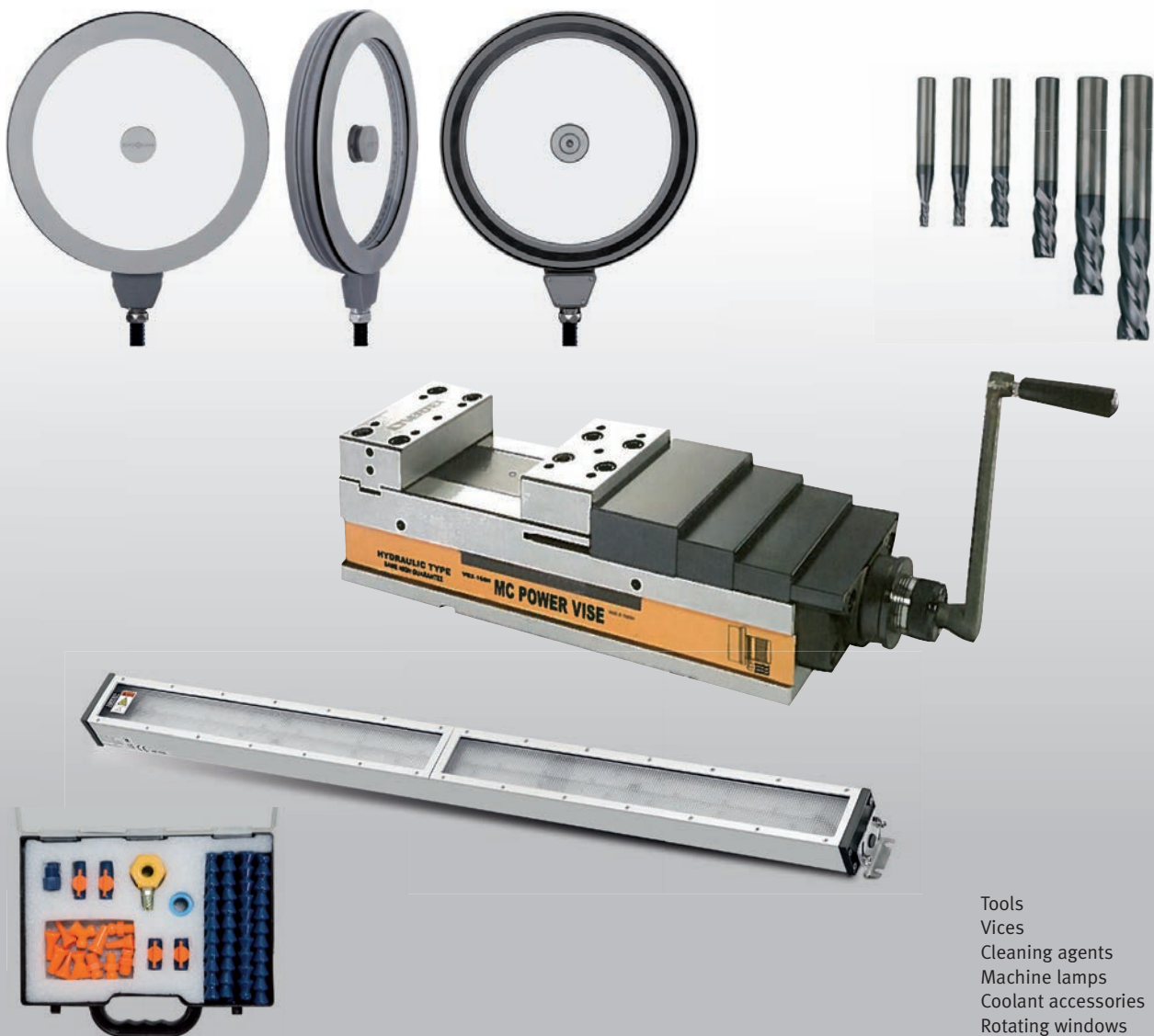
Benefits

- 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.



| Renishaw measuring arm with probe | Article no. |
|---|-------------|
| L 44 for Ø 150 mm lathe chuck | 3582080 |
| L 440 / L 460/ L 50P for Ø 200 mm lathe chuck | 3582081 |
| L 440 / L 460/ L 50P for Ø 250 mm lathe chuck | 3582082 |
| · Including installation | |
| · TSI2 Interface | |
| · User Manual | |

| System specification | | |
|---|--|------------|
| Application | Tool measurement on CNC lathes | |
| Touch directions | Measuring probe | ±X, ±Y, ±Z |
| | Machine | ±X, ±Z, ±Y |
| Typical position accuracy (measuring speed 36 mm/min) | 5 µm 2σ X/Z | |
| Protection against environmental influences | IPX8 (static) | |
| Temperature range for operation | 5° C to 60° C | |
| Arm pivoting angle | 91°/90° (if the probe protection housing by Renishaw is not use, the max. arm pivoting angle is 91°) | |



Tools
Vices
Cleaning agents
Machine lamps
Coolant accessories
Rotating windows

09

GENERAL ACCESSORIES

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
- › Chip angle 35°



3 pc. each

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
- › Chip angle 30°



3 pc. each

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 taps: M3 / M4 / M5 / M6 / M8 / M10 / M12
- › 7 pcs. twist drills 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



7 pcs.
2.5 mm- 10.2 mm



7 pcs.
M3-M12



| Twist drill HSS with morse taper | Article no. |
|---|-------------|
| › 9-part; 14.5/16/18/20/22/24/26/28/30 mm | |
| › Long service life. | |
| › Good chip removal | |
| › Right handed | |
| MT 2 | 3051002 |
| MT 3 | 3051003 |



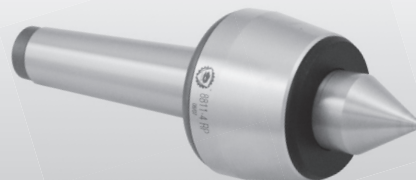
| Twist drill set | Article no. |
|--|-------------|
| › As per DIN 338 HSS-CO 5 % | |
| › Tetrahedral 135° split point allows for excellent self-centring | |
| › High speed/feed properties | |
| › Strong core design optimises the structural strength of the bit and minimises the risk of bit breakage | |
| › Practical OPTIMUM plastic case | |
| 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) | |



| OPTIMUM Precision quick-action drill chuck | Article no. |
|--|-------------|
| Concentricity better than 0.06 mm | |
| 1 - 8 mm; B16 | 3050608 |
| 1 - 10 mm; B16 | 3050610 |



| Travelling centre tip | Article no. |
|--|-------------|
| max. radial run-out 0.005 mm | |
| MT 2 | 3451002 |
| › Max. speed 7 000 rpm; radial load max. 2 000 N | |
| › NSK ball roller bearings and INA needle bearings | |
| MT 3 | 3451003 |
| › Max. speed 5 000 rpm; radial load max. 4 000 N | |
| › NSK ball roller bearings and INA needle bearings | |
| MT 4 | 3451004 |
| › Max. speed 3 800 rpm; radial load max. 8 000 N | |
| › NSK ball roller bearings and INA needle bearings | |
| MT 5 | 3451005 |
| › Max. speed 3 000 rpm; radial load max. 20 000 N | |
| › 2-row SKF angular contact bearings | |



| Quick release chuck | Article no. |
|----------------------------------|-------------|
| DKC13 / 0-13 mm 4 800 rpm | 3050632 |
| DKC16 / 0-16 mm 4 000 rpm | 3050633 |



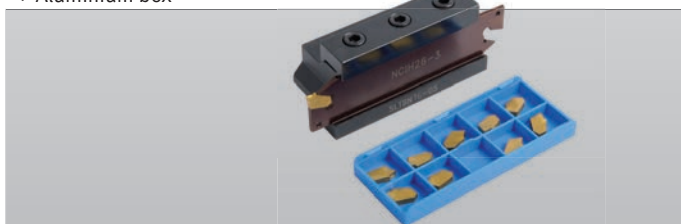
| Clamping tool assortment SPW | Article no. |
|--|-------------|
| › Metric thread | |
| › 58-part: 24 pcs. tightening bolts, 6 pcs. T-nuts, 6 pcs. nuts, 4 pcs. extension nuts, 6 pcs. clamping punches, 12 pcs. clamping blocks | |
| Size 8 | 3352015 |
| › T-slot nuts 10 mm; locking thread M 8 | |
| Size 10 | 3352016 |
| › T-slot nuts 12 mm; locking thread M10 | |
| Size 12 | 3352017 |
| › T-slot nuts 14 mm; locking thread M12 | |
| Size 14 | 3352018 |
| › T-slot nuts 16 mm; locking thread M 14 | |
| Size 16 | 3352019 |
| › T-slot nuts 18 mm; locking thread M16 | |



| 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 | |

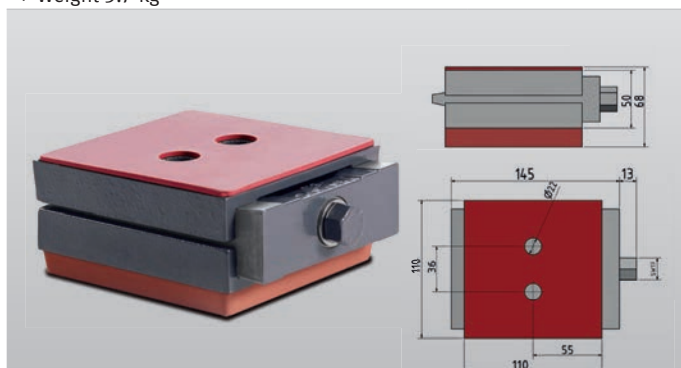
| Clamping block set 20-05 | 3440654 |
|---|---------|
| › 1 pc. clamping block SLTBN 20-05 | |
| › 1 pc. parting off tool SLIH 26-3 | |
| › 1 pc. parting off tool SLIH 26-4 | |
| › 5 pcs. cutting plates GTN3 (cutting width 3.1 mm) | |
| › 5 pcs. cutting plates GTN4 (cutting width 4.1 mm) | |
| › Aluminium 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 | |



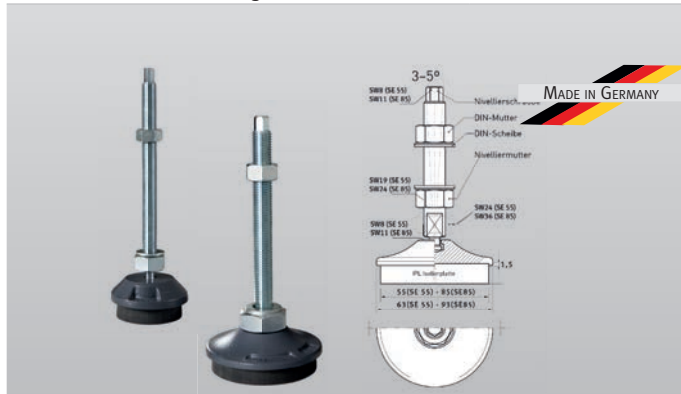
| Replacement cutting insert set (10 pcs.) | Article no. |
|--|-------------|
| for cutting inserts GTN 2 | 3440663 |
| for cutting inserts GTN 3 | 3440664 |
| for cutting inserts GTN 4 | 3440665 |

| Precision machine shoe SEU1 | 3352985 |
|--|---------|
| › Patented double spindle bearing | |
| › With slip-protection plate at top | |
| › Maximum load 60 kN | |
| › Suitable for M16 threaded rod | |
| › Vibration-insulation plate for particularly loads. Good structure-borne noise insulation | |
| › Adjustment range +5 / -4 mm | |
| › High-precision, jerk-free levelling even of heavy machines | |
| › Installation time savings of up to 50 % thanks to precision levelling and freedom of installation. | |
| › Improves the dynamic behaviour of machines while reducing noise | |
| › Weight 3.7 kg | |



| Vibration damping machine base | Article no. |
|--|-------------|
| › Excellent vibration and structure-borne noise insulation | |
| › Noise reduction | |
| › Eliminates floor unevenness up to 5° | |
| › Precision levelling by means of a regular threaded screw | |
| › Better distribution of impact-like axial forces due to the geometrically larger contact surface with the screw | |
| › No notching effect - like for example with conical screw tips | |
| › The levelling screw and the levelling disc are captively connected by a very simple system. | |
| › Problem-free changeover of the machine possible, as the complete levelling disc remains on the machine foot when the machine is lifted | |

| SE 55 | 3352981 |
|-----------------------------|---------|
| › Jackscrew M12 x 1 x 150 | |
| › Maximum load: 600 kg | |
| SE 85 | 3352982 |
| › Levelling screw M16 x 150 | |
| › Maximum load: 1 500 kg | |



| Thread repair assortment | 3202010 |
|---|---------|
| › 5 pcs. twist drill bit (5.2 mm/6.3 mm/8.3 mm/10.4 mm/12.4 mm) | |
| › 5 pcs. thread tap (M5 / M6 / M8 / M10 / M12) | |
| › 5 pcs. inserter for threaded inserts | |
| › 5 pcs. tang breaker | |
| › 100 pcs. threaded inserts: 25 pcs. each M5x0.8 mm / M6x1.0 mm/ M8x1.25 mm/ M10x1.5 mm | |
| › 10 pcs. threaded insert: M12x1.75 mm | |
| › For repairing defective threads | |
| › For reinforcing the thread on materials with a low shear strength | |
| › Practical OPTIMUM metal case | |

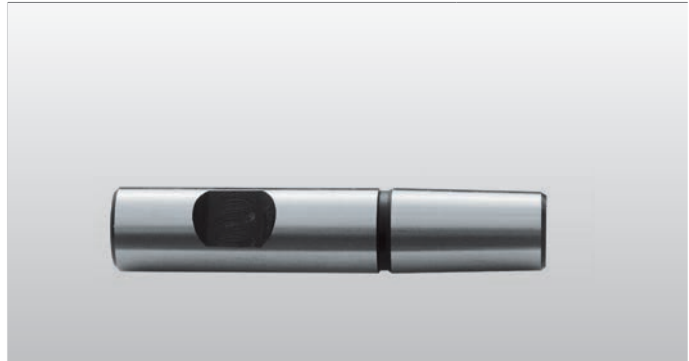


| Flat countersink set | 3201051 |
|--|---------|
| › As per standard 373 | |
| › 6-part: for M3 / M4 / M5 / M6 / M8 / M10 mm screws | |
| › HSS | |
| › Piloted counterbore size 6.5 x 3.2 mm / 8 x 4.3 mm / 10 x 5.3 mm / 11 x 6.4 mm / 15 x 8.54 mm / 18 x 10.5 mm | |
| › Fine grade for countersinking screws and nuts as per DIN 74 | |
| › Practical OPTIMUM plastic case | |

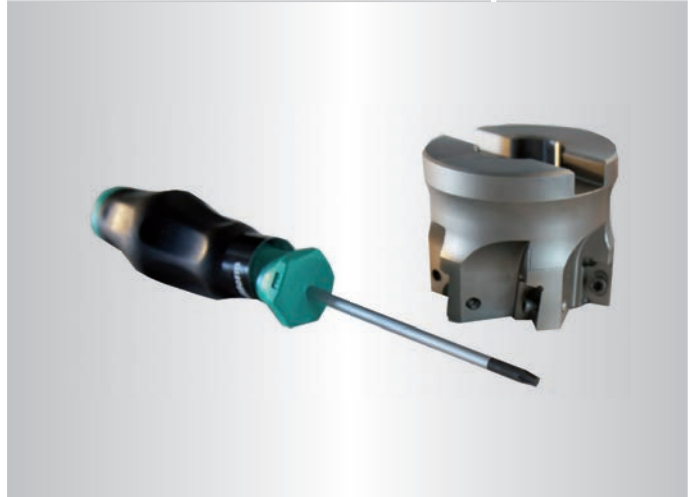


| Shank | 3535170 |
|-------|---------|
|-------|---------|

- cylindrical seat Ø 16 mm for B16 drill chuck



| Face-milling cutter without indexable inserts | Article no. |
|---|-------------|
| Ø 63 mm bore, 27 mm | 3536390 |
| Ø 50 mm bore, 22 mm | 3536391 |



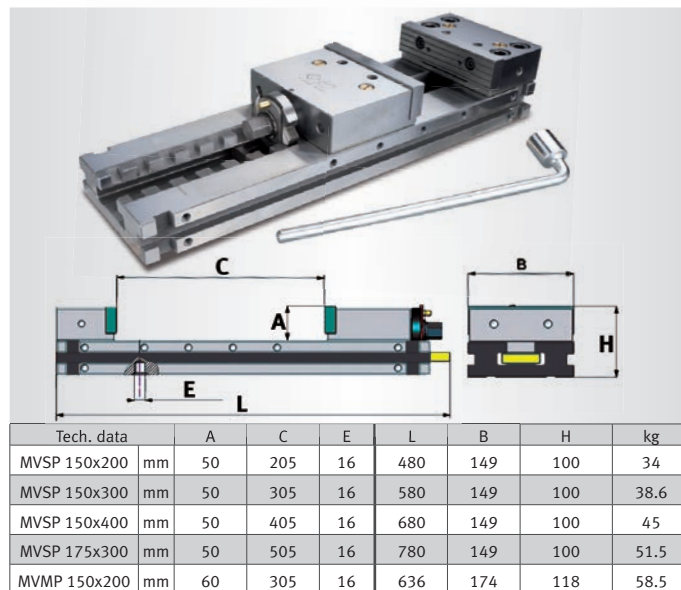
| Indexable inserts | 3536392 |
|--|---------|
| <ul style="list-style-type: none">· For face-milling cutter 3536390/3536391· Ten pcs. | |

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




| Modular machine vice | Article no. |
|----------------------|-------------|
| MVSP 150x200 | 3530104 |
| MVSP 150x300 | 3530108 |
| MVSP 150x400 | 3530110 |
| MVSP 175x300 | 3530114 |
| MVMP 150x300 | 3530138 |


- Modular machine vice with high precision and repetition accuracy for series production and single-part machining on CNC milling machines and machining centres
- Modular machine vice made completely of NiCrMo steel with hardness HRC60, tolerance 0.0015 mm
- Mobile jaws with extra long guides to prevent lift-off and slingshot risk
- Guide surfaces tempered and polished
- Large clamping range due to lock bolts with various hole spacings
- Long service life thanks to high quality
- Includes spanner
- Model MVSP with fixed jaws, Model MVMP with pull-down jaws




| Clamping jaw set | Article no. |
|---------------------------------|-------------|
| 150 mm - smooth for MVSP | 3530216 |
| 175 mm - smooth for MVSP | 3530217 |
| 150 mm - smooth for MVMP | 3530256 |



| Clamping jaw set | Article no. |
|----------------------------------|-------------|
| 150 mm - knurled for MVSP | 3530231 |
| 175 mm - knurled for MVSP | 3530232 |
| 175 mm - knurled for MVMP | 3530271 |




| Side clamping blocks | Article no. |
|-------------------------------|-------------|
| 150 mm - soft (2 pcs.) | 3530406 |
| 175 mm - soft (2 pcs.) | 3530407 |



| Cylindrical T-slot nuts | Article no. |
|-------------------------|-------------|
| Ø 12 mm (2 pcs.) | 3530390 |
| Ø 14 mm (2 pcs.) | 3530391 |
| Ø 16 mm (2 pcs.) | 3530392 |
| Ø 18 mm (2 pcs.) | 3530393 |




| T-slot nuts | Article no. |
|-------------------------|-------------|
| Ø 12 mm (2 pcs.) | 3530380 |
| Ø 14 mm (2 pcs.) | 3530381 |
| Ø 16 mm (2 pcs.) | 3530382 |
| Ø 18 mm (2 pcs.) | 3530383 |



| A | mm | 12 | 14 | 16 | 18 |
|---|----|----|----|----|----|
|---|----|----|----|----|----|

| Intermediate jaw | Article no. |
|------------------------|-------------|
| 150 mm - mobile | 3530351 |
| 175 mm - mobile | 3530352 |

For parallel workpieces



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

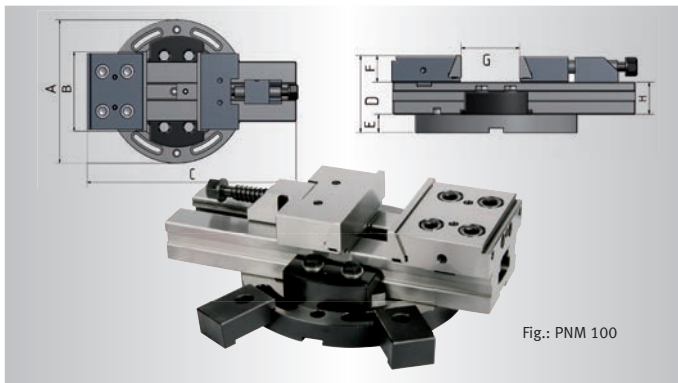
| Clamping jaw set | Article no. |
|---|-------------|
| 150 mm for extending the clamping area | 3530361 |
| 175 mm for extending the clamping area | 3530362 |



| Precision modular vices PNM | Article no. |
|-----------------------------|-------------|
| PNM 100 | 3355551 |
| PNM 125 | 3355553 |

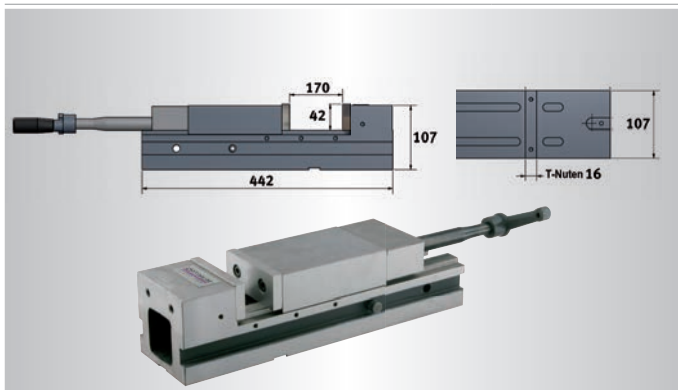
- Modular vice for series production and single-part machining on CNC milling machines and machining centres
- Turntable
- Fast alignment via longitudinal and transverse grooves
- High precision
- High clamping force
- For horizontal and vertical use
- Low extension height
- Easy to use

| Technical data | A | B | C | D | E | F | G | H | kg |
|----------------|-----|-----|-----|-----|----|----|-----|----|------|
| PNM 100 mm | 180 | 100 | 270 | 85 | 20 | 30 | 95 | 35 | 10.3 |
| PNM 125 mm | 226 | 125 | 345 | 103 | 23 | 40 | 150 | 40 | 18.2 |



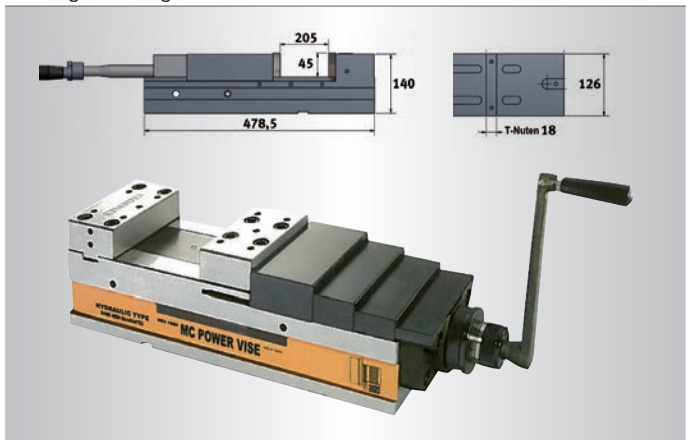
| Hydraulic machine vice HCV 105 | Article no. |
|--------------------------------|-------------|
| HCV 105 | 3536210 |

- 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



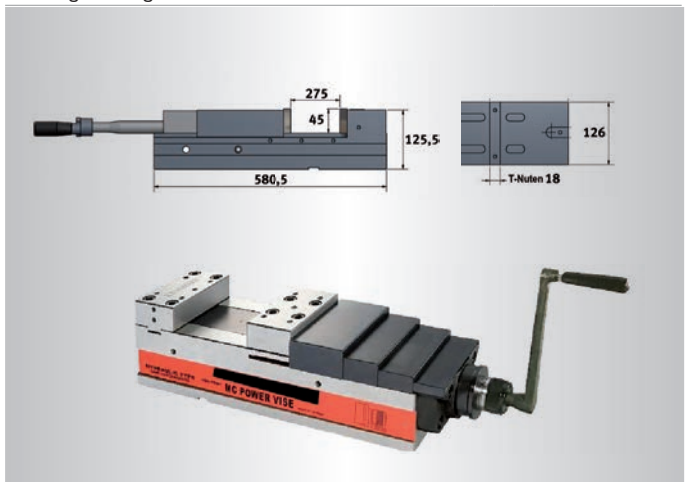
| Hydraulic machine vice HCV 125 | Article no. |
|--------------------------------|-------------|
| HCV 125 | 3536214 |
| Soft jaws 2 pcs. | 3536221 |
| L jaws 2 pcs. | 3536222 |

- 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



| Hydraulic machine vice HCV 160 | Article no. |
|--------------------------------|-------------|
| HCV 160 | 3536215 |
| Soft jaws 2 pcs. | 3536225 |
| L jaws 2 pcs. | 3536226 |

- 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



COOLANT ACCESSORIES

| AQUACUT C1 | 3530030 |
|---|---------|
| <ul style="list-style-type: none"> › 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 | |



NEW




| Motorex coolant for spindle cooling | 354590005 |
|---|-----------|
| <ul style="list-style-type: none"> › 5 litre cannister | |




NEW

| Distilled water | 354590020 |
|--|-----------|
| <ul style="list-style-type: none"> › 25 litre cannister | |

NEW

| Motorex CS Cleaner | 354590010 |
|---|-----------|
| <ul style="list-style-type: none"> › 1 litres › System cleaner for CNC machines | |

| | Designation | Size | Article no. |
|---|---|------|-------------|
|  | Coolant hoses basic equipment 1/4" - no. 1 <ul style="list-style-type: none"> › 8 pcs. articulated hose 150 mm › 2 pcs. each round nozzle 1/16" / 1/8" / 1/4" › 2 pcs. NPT coconnection 1/4" and 1/8" › 1 pc. flat nozzle › 1 pc. Y-distributor › 2 pcs. shut-off valve inside and outside › 2 pcs. shut-off valve inside - 1/4" › 2 pc. NPT extension › 1 pc. magnetic base › 1 pc. flexible sealing tape | 1/4" | 3356704 |
|  | Coolant hoses basic equipment 1/4" - no. 2 <ul style="list-style-type: none"> › 6 pcs. articulated hose 150 mm › 2 pcs. each round nozzle 1/16" / 1/8" / 1/4" › 2 pcs. each NPT connection 1/4" and 1/8" › 5 pcs. flat nozzle › 4 pcs. 90° nozzle › 1 pc. Y-distributor › 1 pc. shut-off valve, inside and outside › 1 pc. shut-off valve, inside - 1/4" › 1 pc. clamping tong | 1/4" | 3356705 |
|  | Coolant hoses basic equipment 1/2" - no. 1 <ul style="list-style-type: none"> › 6 pcs. articulated hose 150 mm › 2 pcs. each round nozzle 1/2" / 3/8" / 1/4" › 2 pcs. each NPT connection 1/4" and 1/2" › 1 pc. flat nozzle › 3 pcs. 90° round nozzle 1/2" / 3/8" / 1/4" › 1 pc. Y-distributor › 1 pc. shut-off valve, inside and outside › 1 pc. shut-off valve, inside - 1/2" › 1 pc. clamping tong | 1/2" | 3356800 |

| | Designation | Size | Article no. |
|---|--|------|-------------|
|  | Coolant hose set 2 pcs. articulated hose; 300 mm 2 pcs. round nozzles, 1 pc. shut-off valve 1 pc. magnetic base | 1/4" | 3356700 |
| | | 1/2" | 3356801 |
|  | Coolant hoses 4 pcs. articulated hose; 150 mm | 1/4" | 3356701 |
|  | Coolant hose set 2 pcs. articulated hose; 150 mm 2 pcs. NPT connection 1/4" and 1/8" 3 pcs. round nozzle 1/16" / 1/8" / 1/4" 1 pc. flat nozzle | 1/4" | 3356702 |
|  | Coolant hose set 2 pcs. articulated hose; 150 mm 2 pcs. NPT connection 1/4" and 1/8" 3 pcs. round nozzle 1/16" / 1/8" / 1/4" | 1/2" | 3356802 |
|  | Coolant hose set 2 pcs. articulated hose; 150 mm 2 pcs. NPT connection 1/4" and 1/8" 2 pcs. round nozzle 1/8" / 1/4", 2 pcs. shut-off valve | 1/4" | 3356703 |
|  | Grips | 1/4" | 3356710 |
| | | 1/2" | 3356810 |
|  | Articulated hose Hose roll 15 metres | 1/4" | 3356711 |
| | | 1/2" | 3356811 |
|  | Circular nozzles | 1/4" | 3356712 |
| | | 1/2" | 3356812 |
|  | Flat nozzles 5-hole 5 pcs. | 1/4" | 3356713 |
| | | 1/2" | 3356820 |
|  | Flat nozzles 5 pcs. | 1/4" | 3356714 |
| | | 1/2" | 3356813 |
|  | Flat nozzle 75 mm wide 2 pcs. | 1/4" | 3356715 |
| | | 1/2" | 3356814 |
|  | Connector Threaded connection RP3/8" 5 pcs. | 1/4" | 3356716 |
| | | 1/2" | 3356815 |
|  | Connector Threaded connection RP1/2" 5 pcs. | 1/2" | 3356816 |
|  | Y connector 5 pcs. 1/4" 2 pcs. 1/2" | 1/4" | 3356717 |
| | | 1/2" | 3356817 |
|  | Cap 5 pcs. | 1/4" | 3356718 |
| | | 1/2" | 3356818 |
|  | Shut-off valve for Articulated hose 2 pcs. | 1/4" | 3356719 |
| | | 1/2" | 3356819 |

SPECIAL VACUUM CLEANERS

flexCAT 378 EOT-PRO – Special vacuum cleaner for industrial applications with special insert for extracting cooling lubricants, liquids with a high oil content, and high volumes of coarse metal swarf

- › Designed for vacuuming liquids, swarf and other solid particles, e.g., for extracting cooling lubricants, liquids with a high oil content, and coarse metal swarf
- › Removable strainer insert for separate disposal of the metal swarf
- › Ball valve for draining fluids
- › Motors equipped with copper windings and motor protection
- › For exacting machine cleaning in professional metalworking
- › The special seal between the head and the tank is resistant against oil and chemical residues without compromising on flexibility
- › Oil-resistant suction hose resilient to heavy loads and any kind of twisting
- › Stainless steel container is insensitive to sharp-edged metal chips.
- › Side hose connection for improved suction power
- › Metal hose connection on tank with locking mechanism prevents the hose coming loose during cleaning
- › Suction motors with noise damping to ensure quiet operation
- › Three motors with separate on/off switches. The operator can choose how many motors to work with. This allows for substantial energy savings

| Model | flexCAT 378 EOT-PRO |
|------------------------|---------------------|
| Article no. | 7003380 |
| Vacuum cleaner type | Wet & dry |
| Rating | 3 300 W |
| Tank volume | 78 l |
| Electrical connection | 230 V ~50 Hz |
| Tank material | Stainless steel |
| Dimensions (L x W x H) | 635 x 58 x 1030 mm |
| Weight | 34 kg |



flexCAT 3100 EOT-PRO – special vacuum for liquids with oil content and metal chips



| Model | flexCAT 3100 EOT-PRO |
|------------------------|----------------------|
| Article no. | 7003382 |
| Vacuum cleaner type | Wet & dry |
| Rating | 3 800 W |
| Air volume | 10 500 l/min |
| Tank volume | 100 l |
| Hose diameter/length | 50 mm/3 m |
| Sound pressure level | 76 dB(A) |
| Electrical connection | 230 V ~50 Hz |
| Tank material | Stainless steel |
| Dimensions (L x W x H) | 850 x 650 x 1350 mm |
| Weight | 65 kg |

CHOOSE YOUR ACCESSORIES!

| | |
|--|--|
| | Hose and nozzle set Art no. 7013423 |
| | 3m oil resistant suction hose Art no. 7013435 |
| | Floor nozzle Art no. 7013436 |
| | Rubber lip insert for floor nozzle Art no. 7013437 |
| | Rubber surface nozzle Art no. 7013438 |
| | Adapter cable 230V Schuko - CEE coupling 16A, 1.5m Art no. 7013800 |
| | Adapter cable 400V CEE plug - CEE coupling 16A, 1.5m Art no. 7013805 |



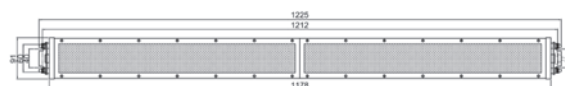
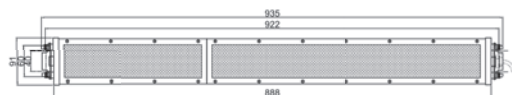
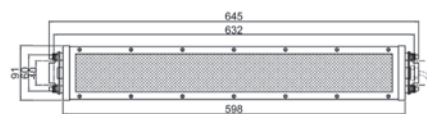
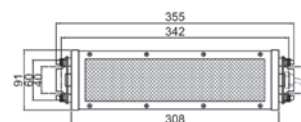
Robust machine lamps for individual use:

LED machine and workshop lighting

- | | |
|--|--|
| › Electrical connection DC 24V | › LED service life > 60 000 h |
| › Colour temperature neutral white 5 000 K | › Vibration-proof at 10 to 55 Hz (amplitude 0.35 mm), shockproof up to 50 g |
| › Safety glass | › Degree of protection IP65, protection class I (operation with PE connection) |
| › Robust, high-luminosity machine lamp | › Operational mode: Continuous operation |
| › Aluminium housing with black side parts | › Maximum permissible ambient temperature T _{max} . 50° C° |
| › Reflection angle 120° (reflector) | › Bracket-mounted, swivel angle ± 45° |

| Model | MWL 1 | MWL 2 | MWL 3 | MWL 4 |
|--------------------|----------|----------|-----------|-----------|
| Article no. | 3351040* | 3351041* | 3351042* | 3351043* |
| Output | 28 Watts | 56 Watts | 84 Watts | 112 Watts |
| Lamp length | 340 mm | 630 mm | 920 mm | 1 210 mm |
| Luminosity (Lumen) | 3 456 Lm | 6 800 Lm | 10 300 Lm | 13 600 Lm |

* Required safety transformer as per EN 61558-2-6 not included in scope of delivery



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 workspace – operator safety is thus always ensured in line with currently applicable safety regulations..

The product

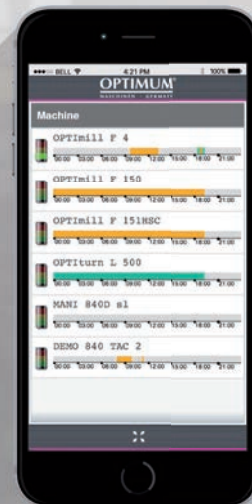
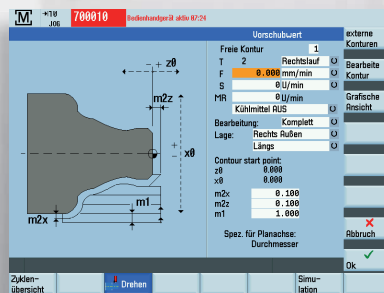
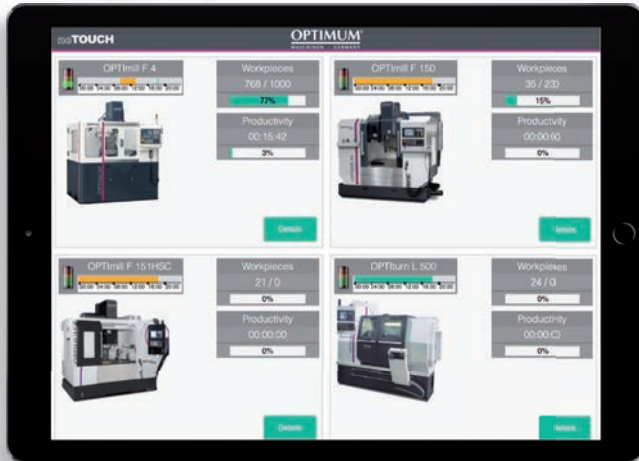
- The lowest installation depth worldwide - just 34 mm
- Maximises the clear view thanks to a larger view panel with a revolutionary drive concept
- Unobtrusive design
- Wear panel can be replaced with just one screw in less than 1 min without removing the entire device
- Easy assembly of the system thanks to screw-type or adhesion bonded version
- Improves functional safety thanks to integrate barrier air supply
- Low power consumption
- High torque for deployment under the toughest conditions



| Rotoclear S3S | 354700101 |
|--|-----------|
| <ul style="list-style-type: none"> • Screw-type version | |
| <ul style="list-style-type: none"> • 1 x Rotoclear® S3 - Basic 460 • Screw-type flange (6 - 17 mm pane) • Perforated positioning template • Hose 1.6 m • Compressed air hose 8.5 m • Cable 2 x 0.75 mm² shielded 10 m • Adapter electro-pneumatic for hose • Threaded fitting for hose • 2 x Threaded fitting for protective tube • Screw-in bracket 90° • Without installation | |

| Assembly Rotoclear S3S / S3K | 354700129 |
|---|-----------|
| <ul style="list-style-type: none"> • Assembly kit including installation | |

| Rotoclear S3K | 354700121 |
|--|-----------|
| <ul style="list-style-type: none"> • Adhesion bonded version | |
| <ul style="list-style-type: none"> • Rotoclear® S3 - Basic 460 • Adhesive flange with cover plate • 2-component adhesive for adhesive flange 50 ml • Dosing gun for 2-component adhesive • Perforated positioning template • Hose 1.6 m • Compressed air hose 8.5 m • Cable 2 x 0.75 mm² shielded 10 m • Adapter electro-pneumatic for hose • Threaded fitting for hose • 2 x Threaded fitting for protective tube • Screw-in bracket 90° • Primer for PC pane 25 ml • Swab for primer • Adhesion bonding guide • Without installation | |



NCTouch
Sympius
Sinutrain
Manual machine MM+

10
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!

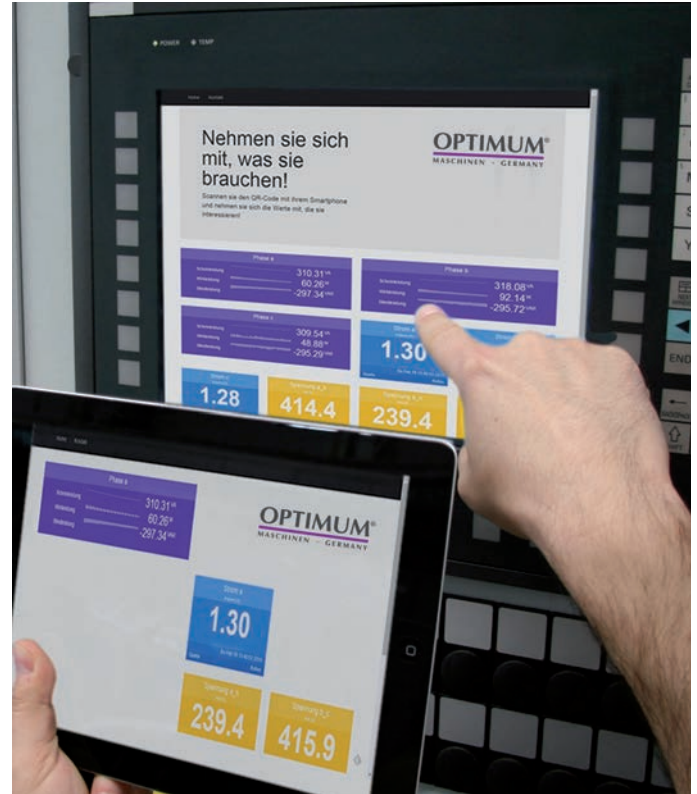
Easy-to-use, integrated middleware for connecting any smart device to the SINUMERIK 828 and SINUMERIK 840D sl CNC controls.

Benefits

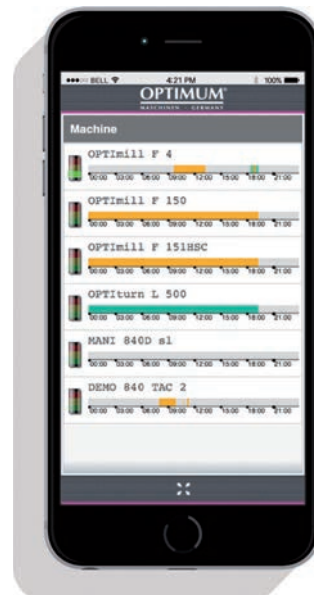
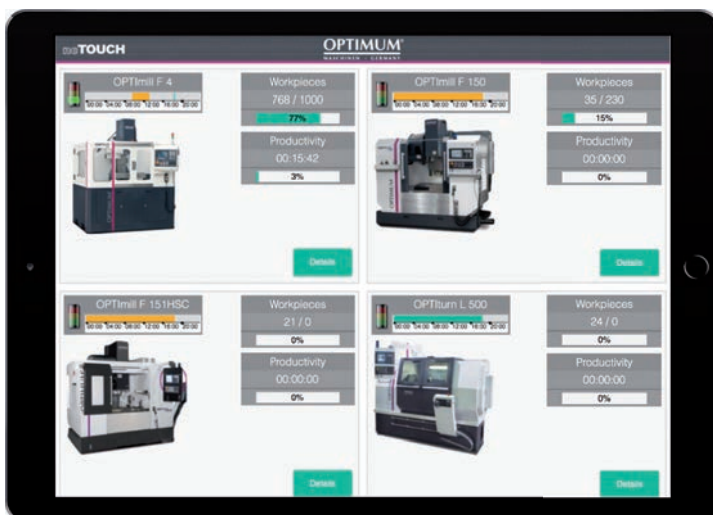
- Runs on any smart device
- Simple scripting language for rapid development
- Customer-specific adaptation of screens
- Integrated solution for the SINUMERIK CNC controls; no additional hardware required
- Allows access to information on the SINUMERIK 840D sl / 828D
- Important information, such as 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.

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



➔ For more details, go to www.Mill-IT.de



SinuTrain for SINUMERIK Operate

The NC programming workstation that is identical to a control

SinuTrain, the NC programming workstation that is identical to a control, brings SINUMERIK Operate including a realistic animated machine control panel to the PC. This allows for convenient work preparation in your standard work environment. NC programs can be directly created and verified here thanks to the original SINUMERIK CNC kernel before they are uploaded to the physical machine. Users benefit from improved machine availability and safety. On top of this, SinuTrain is ideal for training users in SINUMERIK operations and programming, as well as for presentations and testing new SINUMERIK functions.



Features - Technology overview

- Identical NC programming language scope of the SINUMERIK: Standard ISO / DIN & SINUMERIK CNC code, ShopMill / ShopTurn, programSYNC for multi-channel
- Full graphical CNC simulation and plotting
- Tutorials and programming guides
- Software-based machine control panel – easy to control with mouse and keyboard
- Integrated DXF reader for importing DXF files
- Printing function for DIN/ISO and ShopMill/ShopTurn work step programming
- Program transfer via network and USB
- Preconfigured machine examples
- Option: Customisation to match your physical machine

To make it easier for newcomers and trainees to learn the machine's functions, the computer-based training includes programming tasks that have to be worked through in various modules.

This means that trainees can familiarise themselves with details such as control, workspace and tool change in the best possible way.



For effective training

SinuTrain Software makes training more effective while substantially improving cost efficiency.

In particular due to its excellent functionality and operational assurance, SinuTrain is appreciated by many training institutes as a top ranking solution for basic and on-going training. More than 25 000 licences are currently in use

The advantages at a glance

■ Safe:

Virtually 100 percent offline verification/evaluation of NC programs thanks to the original CNC kernel

■ Tailor-made:

Use as an optimal programming workplace thanks to adaptation to match the physical machine (e.g., by the machine manufacturer)

■ Flexible:

Perfectly tailored packages for training and work preparation

■ Hands-on:

Operations and programming exactly like the genuine SINUMERIK

NEW

| SinuTrain for SINUMERIK Operate* | V 4.7 Article no. | V 4.8 Article no. |
|---|----------------------|----------------------|
| ** Please quote the control software version with your order | | |
| SinuTrain Single | 3584106 | 3584107 |
| <ul style="list-style-type: none"> • Single station license • commercial use | | |
| SinuTrain Trainer Package XL | 3584112 | 3584113 |
| <ul style="list-style-type: none"> • commercial use • 18 x single station license | | |
| SinuTrain Trainer Package XL | 3584130 | 3584131 |
| <ul style="list-style-type: none"> • Only for schools (not for commercial use) • 18x single station licenses for students | | |
| SINUMERIK 808D on PC free download | | |

Milling

SYMplus Fräsen plusCARE™ is the ideal software add-in for all **SIEMENS** controlled Optimum milling machines. For low-cost, fast and economic work.

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.

System requirements for the plus systems:

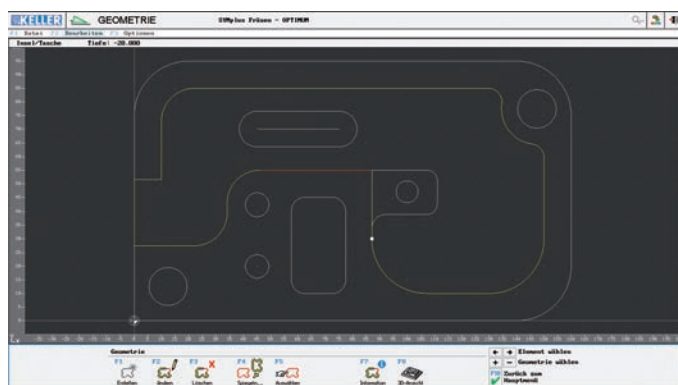
- Supported operating systems: Microsoft Windows® 7/8/10 (32/64 Bit)
- Screen resolution min. 1024 x 768
- OpenGL-compatible 3D graphics card, e.g. GeForce GT 210 (1024 MB)
- RAM: min. 2 GB
- Approx. 2 GB free disc space per technology for system data

Selection of licencing models:

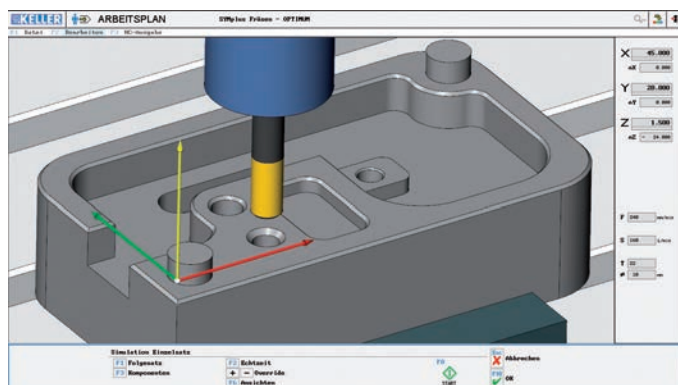
- CodeMeter (licence is stored on USB dongle)
- CodeMeterWAN (licensing via internet connection, login with ID and password)

■ CAD - Geometry Creation

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.



2D simulation shows many details, such as allowances and the cutting path of every single milling run. You can also "capture" control dimensions (not shown). 3D simulation gives you the best possible overview of machining.



| CNC software SYMplus milling plusCARE™ | Article no. |
|--|-------------|
| Milling | 3581010 |
| <ul style="list-style-type: none"> • commercial use • Also available as a package for 2, 5, 10 or 20 users • Includes post-processors for SINUMERIK 802C, 802D, 808D, 810D/840D, 840D sl/828D | |

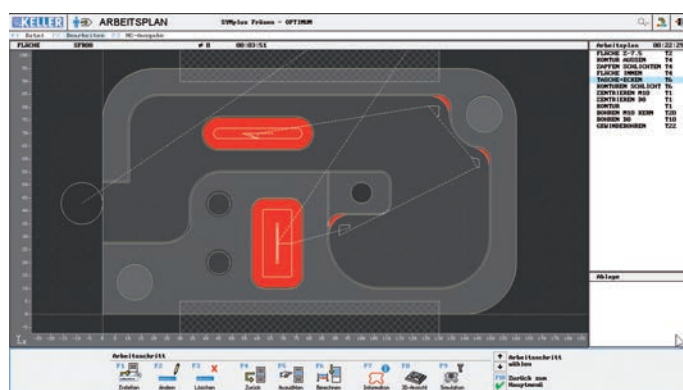
plusCARE™

- annual charge includes regular updates, telephone and email support, and remote maintenance by the manufacturer

■ CAM - work schedule generation

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

The residual material detection refers to the entire process, the unmachined part is continuously tracked.



Alternatively, you can use CAD contours from DXF.

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

SYMplus plusCARE™ Milling runs under Windows 7, 8 and 10. Further information and additional modules on request.

Turning

10 SOFTWARE

SYMplus Turning plusCARE™ is the ideal software complement to OPTIMUM CNC lathes. Workshop capable CAD/CAM system with 802S training.

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:

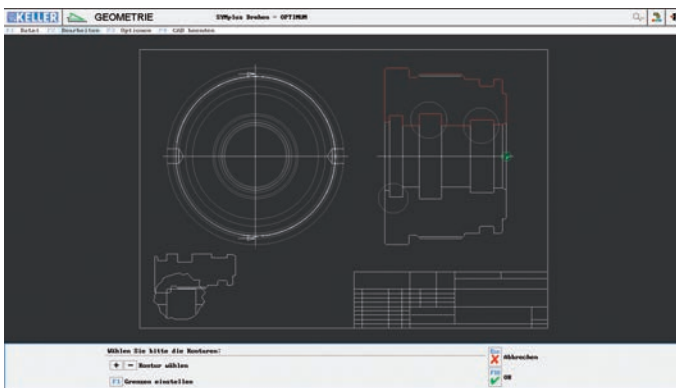
- Supported operating systems: Microsoft Windows® 7/8/10 (32/64 Bit)
- Screen resolution min. 1024 x 768
- OpenGL-compatible 3D graphics card, e.g. GeForce GT 210 (1024 MB)
- RAM: min. 2 GB
- Approx. 2 GB free disc space per technology for system data

Selection of licencing models:

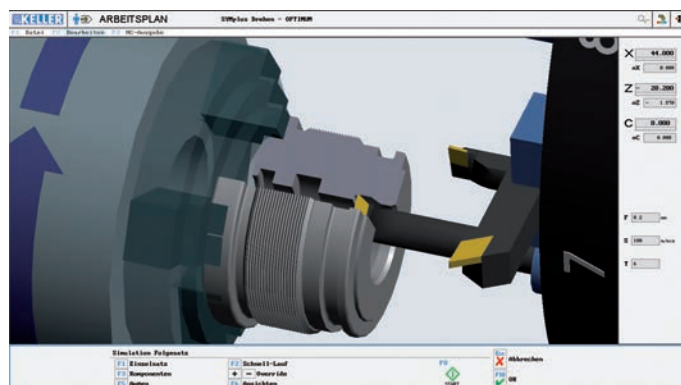
- CodeMeter (licence is stored on USB dongle)
- CodeMeterWAN (licensing via internet connection, login with ID and password)

CAD - Geometry Creation

If you have a drawing in an electronic format, you can transfer the turning contour with just a few clicks or key presses.



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



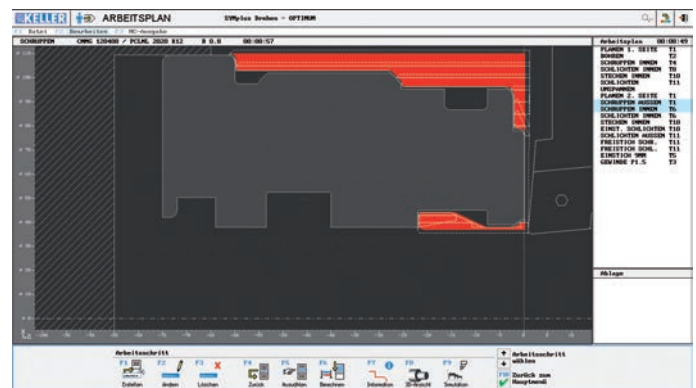
| CNC software SYMplus turning plusCARE™ | Article no. |
|--|-------------|
| Turning | 3581012 |
| <ul style="list-style-type: none"> • commercial use • Also available as a package for 2, 5, 10 or 20 users • Includes post-processors for SINUMERIK 802C, 802D, 808D, 810D/840D, 840D sl/828D | |

plusCARE™

- annual charge includes regular updates, telephone and email support, and remote maintenance by the manufacturer

CAM - work schedule generation

Like in milling, you define the work steps in a graphical interface and benefit from residual material detection throughout the entire production process (incl. re-clamping).



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

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

SYMplus plusCARE™ Milling runs under Windows 7, 8 and 10. Further information and additional modules on request.

MANUAL MACHINE PLUS (MM+)

SIEMENS Manual Machine Plus (MM+) enables the transition from conventional machines to CNC programming.

Simple cycle control.

With the Manual Machine + (MM+) package, the SINUMERIK 808D offers you simple operation of the machine tool, in that all operating actions are supported by graphic help images and operation is as easy as with a conventional machine tool.

The functions provided give you a fast, practical machine setup for machining. This specifically includes determining the workpiece position in the machine and maintaining and measuring the tools used.

A comfortable DIN/ISO editor with complete GCode according to DIN66025 and ISO dialect is available for programming. Graphical input for technological machining cycles and contours supports you during programming.

With the SINUMERIK 808D, you have a powerful complete system at your disposal that covers all required applications without subsequent commissioning and training overhead:

- Intuitive user interface for all machine functions
- Flexible completion of individual machining actions without programming
- DIN/ISO programming on the machine
- DIN/ISO programming offline via CAD/CAM system
- Automatic measuring of the tool in setup mode

In Manual Machine operating mode, you can machine workpieces without having to create a part program. You have access to the following functions:

- Axis-parallel travel
- Taper turning
- Radius turning
- Centre drilling
- Thread tapping
- Grooving/Cutting off
- Thread tapping
- Machining of contours

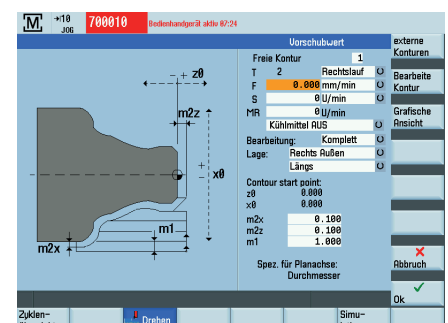
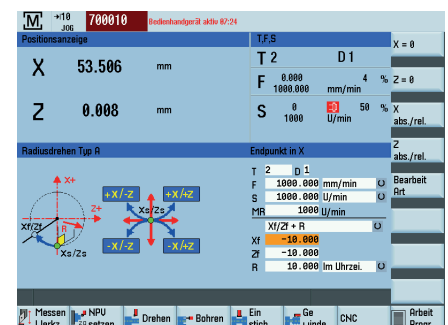
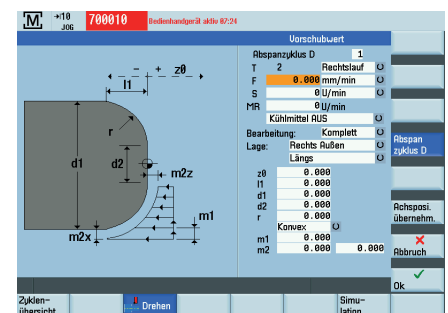
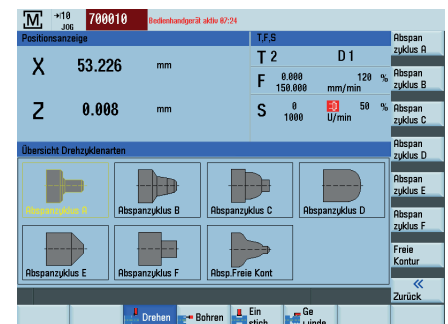
For the definition/parameterization of the function you are supported by comfortable input windows with images as an aid.

The cross slide is controlled via handwheels or axis direction switches/enabling switches or via the axis direction buttons. The spindle is controlled via spindle direction switches or via individual buttons for forward, stop and return.

Note: The machine manufacturer can define in which mode the start-up of the control should take place (MM+ or standard).

The advantages at a glance

- Save time with simple machining operations, e.g., repairs or reworking of individual pieces, because no parts program is necessary
- Flexible design of work steps
- No programming skills needed



Manual Machine Plus (MM+)

3584150

- User Manual
- for CNC lathes L 28HS / L 34HS / L 50E



support

Maintenance contracts
Service packages
Service data backup
Service geometry check

11

SERVICE & SUPPORT

SERVICE PACKAGES

For prevention and 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.



FAST & RELIABLE

With decades of experience

Whether it's a planned service appointment or quick help after a sudden machine failure: In the event of service, our intensively trained OPTIMUM technicians are at your disposal with their sound knowledge and many years of experience. They quickly and reliably take care of repairing your CNC machines. With our carefully considered service solution we help to keep your OPTIMUM CNC machine working in a trouble-free way.

Know-how for satisfied customers: Our Engineering department has a well-coordinated team of specialists with excellent engineering qualifications. We view the clear, technical orientation of our staff as the basis for a high level of customer satisfaction. This is what you can expect of us:

- Fast and comprehensive advice
- Expert on site service
- Reliable help with maintenance, servicing and incidents

Our preventive maintenance options, check-ups and service packages ensure trouble-free and economic use of your CNC machines. Our staff handle all of this in an expert way. Big plus: Regular maintenance and servicing by our service department increases the functional reliability and thus extends the service life of the machines!



MAINTENANCE CONTRACTS

Comfort, Medium or Basic

The objective of our service is to make maintaining and repairing make your OPTIMUM CNC machine a simple as possible. This is why OPTIMUM offers you a variety of maintenance contracts that you can tune to perfectly match your requirements and wishes.

You can choose between our Comfort, Medium and Basic maintenance contract options. You can be sure: Our technicians are there to help with any problem - whether on the phone, through remote maintenance via Teamviewer or in person.

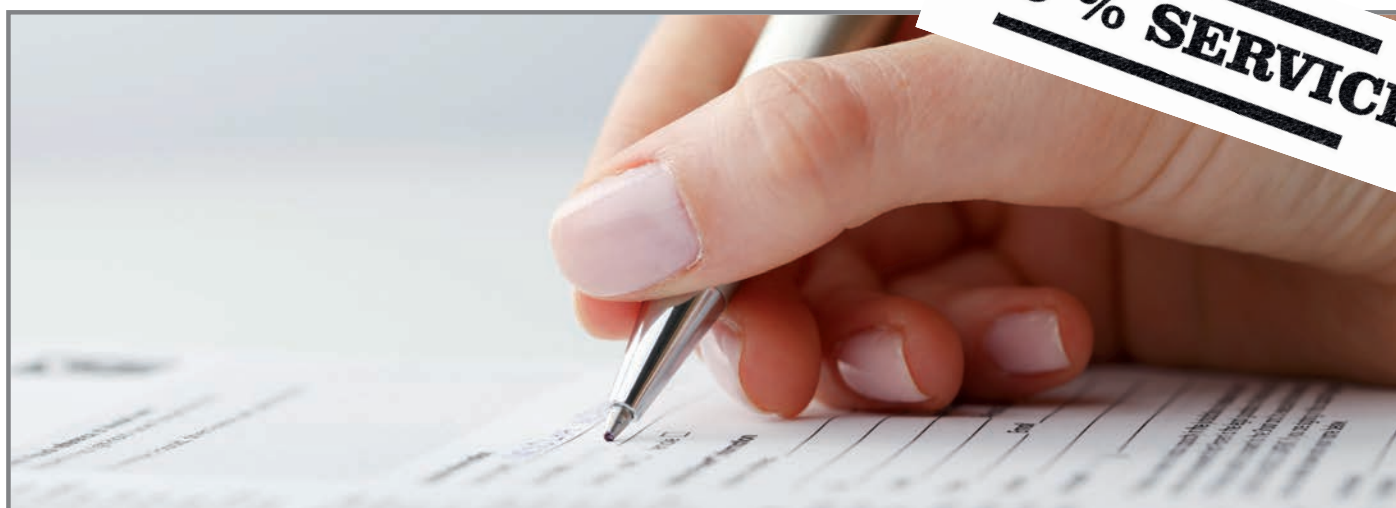
The following options are available:



| Options * | Comfort: | Medium | basic |
|-----------------------|-------------|-------------|-------------|
| | Article no. | Article no. | Article no. |
| with less than 5 axes | 3589106 | 3589107 | 3589108 |
| 5 axes or more | 3589120 | 3589121 | 3589122 |

| | | | |
|--|-------------------------|-------------------------------|-------------------------------|
| Response to a problem | within 1 working day | Within max. 2 working days | Within max. 3 working days |
| Technical troubleshooting by phone | ✓ | ✓ | ✓ |
| Preventive maintenance options | Every 6 months | Annually | Annually |
| Remote maintenance via Teamviewer** | ✓ | ✓ | |
| Spare parts supply for non-wearing parts via express | ✓ | | |

- incl. 400 km total (200 km one way)
- each additional kilometre is invoiced at EUR 0.69
- plus travel expenses at EUR 66.00 per hour or part thereof
- Accommodation costs and expenses at cost



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
- Performing a function test of the central lubrication system

Compressed air system:

- Perform pressure test
- Performing of maintenance unit check
- Check and/or replace filters

For CNC lathes

- Replace oil filter on hydraulic unit
- Check hoses and screw connections for leak tightness

Electrical system:

- Clean switch cabinet
- Check terminals and connections
- Replace air filter
- Check limit switches and safety equipment

Mechanical system:

For CNC milling machines

- Geometric measurement of the machine with Renishaw QC20 test report
- Check and adjust levelling of machine
- Check reverse clearance of the X, Y, and Z axes and adjust electronically
- Check spindle positioning
- Check covers and scrapers
- Check concentricity of the spindle taper
- Check spindle taper for damage
- Check counterweight system or compressed air cylinders
- Check axis running noise
- Check spindle running noise
- Completely check/lubricate tool changer system
- Check drive belt on main spindle drive
- Visual check of lines and screw connections

For CNC lathes

- Check and adjust levelling of machine with Renishaw QC20 test report
- Check reverse clearance of the X, Y, and Z axes and adjust electronically, or adjust wedge rails
- Check covers and scrapers
- Measure concentricity of main spindle
- Check axis running noise
- Check main spindle running noise
- Completely check/lubricate tool changer system
- Check of main spindle belt drive and replace if needed
- Visual check of lines and screw connections
- Check and adjust turret alignment
- Check and adjust spindle alignment based on a sample part

DETAILS:

- Work package approx. 8 working hours
- incl. 400 km total (200 km one way)
- each additional kilometre is invoiced at EUR 0.69 plus travel expenses at EUR 66.00 per hour or part thereof
- Accommodation costs and expenses at cost

NEW

LIQUID COOLING MAINTENANCE

Maintenance of liquid cooling system

3589180

Including:

- Motorex coolant concentrate 5 litres
- Motorex CS Cleaner 1 litre
- Distilled water 25 litres

Material for maintenance of liquid cooling system

3589200

if customer does not have material in stock

Preventive maintenance options

3589112

Lathes/Milling machines

SERVICE DATA BACKUP

We offer various service packages for maintaining and repairing your OPTIMUM CNC machine. You can choose from various offers to suit your individual requirements.

MACHINE TYPE:

Lathes/Milling machines

Our state-of-the-art data backup fully backs up your machine data. This includes axis compensation values, parameters, NC and PLC data, zero points and CNC programs. This saves a huge amount of time, and thus money, for re-entering the data in case of data loss. Thanks to a data backup, your information can be simply and quickly restored. While restoring the data, our technician also checks the memory buffer battery* and replaces it if needed.

FEATURES:

- Backup of all relevant data
- Backup to a storage medium
- Buffer battery* check and replacement if needed
- CNC program backup option

Service data backup

3589110

Lathes / Milling machines

YOUR BENEFITS:

- Prevents data loss as you have a backup of your machine data in case of a malfunction
- Avoids downtime

DETAILS:

- Duration individual
- incl. 400 km total (200 km one way)
- each additional kilometre is invoiced at EUR 0.69
- plus travel expenses at EUR 66.00 per hour or part thereof
- Accommodation costs and expenses at cost



SERVICE GEOMETRY CHECK

Completely carefree!

MACHINE TYPE:

Lathes/Milling machines

During the Service Geometry Check, our engineers precisely and comprehensively verify your machine's geometry. The measuring results are documented, thus allowing conclusions on any anomalies to be drawn. In case of problems, our staff give you expert advice, showing you where the problems lie and providing an inexpensive solution. The Service Geometry Check is especially useful in the scope of preventive maintenance to discover and compensate for wear at an early stage. This avoids malfunctions and machine failures

FEATURES:

Geometry check

- Circular shape test with Renishaw QC20 (milling machines)
- Detailed test report of all measuring results
- Analysis and evaluation of the measuring results
- Quotation for eliminating any identified defects

Geometry check

3589111

Lathes / Milling machines

YOUR BENEFITS:

- Discovers wear at an early stage
- Machine maintenance can be scheduled in good time
- Boost production quality
- Plan your service costs
- Production assurance

DETAILS:

- incl. 400 km total (200 km one way)
- each additional kilometre is invoiced at EUR 0.69
- plus travel expenses at EUR 66.00 per hour or part thereof
- Accommodation costs and expenses according to expenditure



NEW

|| SERVICE

POWER CHECK 2

In order to be able to guarantee consistently precise machining results, monitoring the feed force is an essential part of quality assurance in machine tool technology.

TOOL PULL-IN FORCE

The tool draw-in force is of essential importance for machining quality, machine availability and process reliability. If the force with which the tool is drawn into the spindle taper falls below a specified threshold value without being noticed, this can have far-reaching and cost-intensive consequences:

PRODUCTION SCRAP

- Vibrations leave ugly machining marks on the workpiece.

MACHINE FAILURE

- Malfunctions and repairs as a result of insufficient draw-in force cause unplanned downtimes.

TOOL WEAR

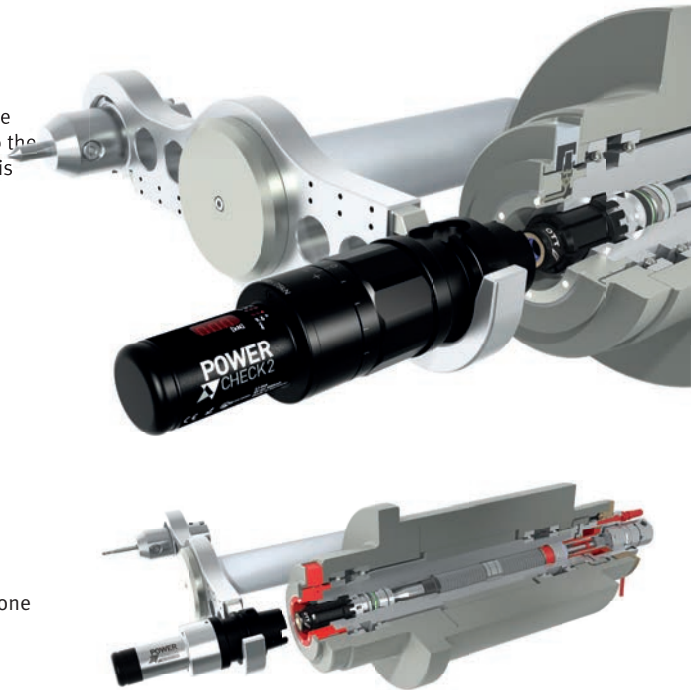
- Tool life decreases due to increased wear and tool breakage

SAFETY RISK

- Increasing risk potential for the operating personnel

SPINDLE DAMAGE

- Micromovements can lead to bearing damage and corrosion of the spindle cone



In the form of Power Check 2 we offer a reliable and highly accurate testing technology for monitoring the tool draw-in force of a clamping system. The intelligent measuring device is used to regularly query status information and thus enables early detection of a loss of clamping force. Power Check 2 is suitable for all tool standards and tool clamping systems.

- Exchangeable adapters for all common taper standards
- Adapter with gripper groove for use in tool magazines
- Automatic mode for self-activation during tool change
- Energy saving mode for long battery life
- Adjusting sleeve for simulation of tool tolerances
- Memory with capacity for 4000 individual measurements

LED display to show the measured data

- USB port for reading the memory and charging the battery
- Software for recording and further processing of the measured values

LONG-LIFE
CLAMPING
TECHNOLOGY
INSIDE



On request



Fig. Basic unit



Fig. Adapter

Power Check 2

Basic unit:

Measuring range 2.5 – 20 kN
Connection thread M16 x 1.5

Power Check Adapter:

BT 30 - DIN 69871/69872
BT 40 - MAS 403-30°
SK 40 - MAS 403-30°



YOUR TRAINING MANAGER



Technical Manager

Martin Trepesch

Phone +49(0)951 96 555-850
m.trepesch@optimum-maschinen.de



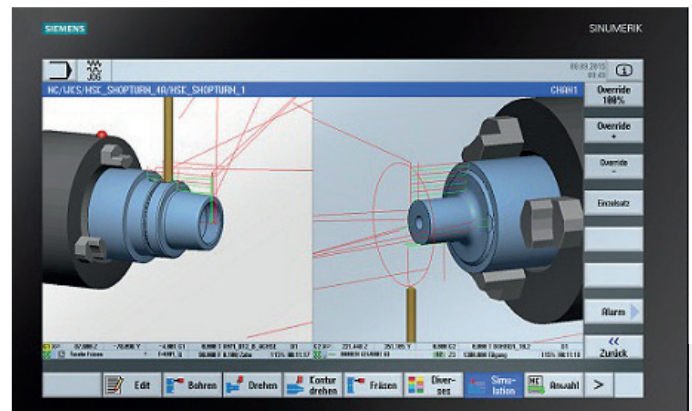
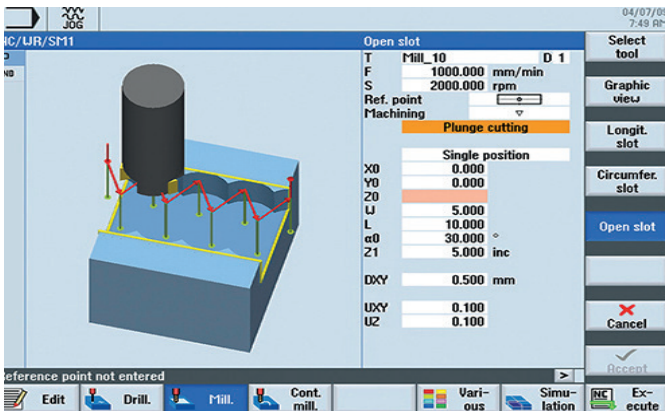
Head of CNC

Thomas Laschimke

Phone +49(0)951 96 555-129
t.laschimke@stuermer-maschinen.de

SINUMERIK Operate training up to max 5 days (turning or milling)

SINUMERIK CNC controls offer the right solution for every machine concept - from simple CNC standard machines to standardized machine concepts and modular premium machine concepts



CONTENT

OVERVIEW

This course familiarises you with the operation of SINUMERIK Operate, the machine guidance and the basics of programming part programs.

CONTENT

- SINUMERIK system overview
- Machine operating and control panel
- Operating modes, operating areas, control elements
- File system, editor
- Cycle description with application examples
- Basics of programming
- Tool correction data and tool management
- Conversion and parametrisation of standard cycles
- Backing up program data
- Practical operating exercises based on existing NC programs on training equipment

REQUIREMENT

- Basic knowledge of automation technology

OBJECTIVES

- This course familiarises you with the operation of SINUMERIK Operate, the machine guidance and the basics of programming part programs.
- Practical operating exercises on our training devices using predefined part programs are an important part of the training.
- To make the exercises even more practice-oriented, we use the graphic simulation and the simultaneous recording function of SINUMERIK Operate. This allows knowledge to be conveyed even more clearly and learning success can be improved.
- After completing the course, you will be able to operate the SINUMERIK Operate with the standard user interface and make changes to sub-programs. This helps you gain confidence in handling machine tools while minimising the risk of operator error.

TARGET GROUP

- Machine operators
- Operators
- CNC programmers

Date

Course number

Subject to agreement

CNC GS1

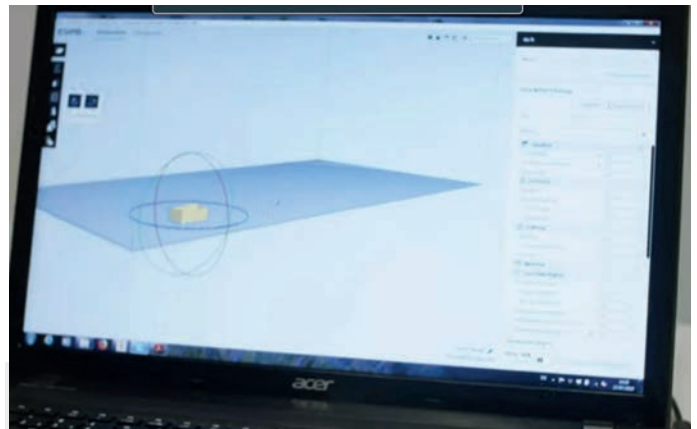
Trainers:

Martin Trepesch, Thomas Laschimke

3-D printing basic training

3-day seminar

Many companies have already recognised the great potential of 3-D printing and are benefitting from it. As materials and processing methods continue to evolve, industrial 3-D printing continues to qualify for an increasing number of applications.



CONTENT

OVERVIEW

In this course you will discover the entire process chain of 3-D printing using concrete examples. From component preparation and machine operation to the production of your 3-D objects with final finishing, you will learn how to put your knowledge of industrial 3-D printing into practice.

CONTENT

- Part preparation
- Getting to know relevant 3-D printing technologies and systems
- Getting to know our 3-D printing system
- Component creation
- 3-D printer operation
- Optimising parts and troubleshooting with the help of CAD tools
- Part reworking

REQUIREMENT

- Basic knowledge of automation technology

OBJECTIVES

- Our 3-D printing workshop prepares you optimally for your own practical application by taking you through the process chain of additive manufacturing and creating industry-relevant components.
- After a short theoretical introduction to the equipment used, you will learn how to select the appropriate print head (3x and 5x print head) based on given component data and material properties.
- In the second step, you will create your part and become familiar with the operation of the selected 3-D printing device. At the end of the workshop, the group will analyse the parts for errors and make optimisations using CAD tools to identify design difficulties.

TARGET GROUP

- Parties interested in a purchase
- Engineers
- Technicians
- Industrial designers
- Professional 3-D printing users

| Date | Course number |
|---|---------------|
| Subject to agreement | 3D GS1 |
| Trainers: Martin Trepesch, Thomas Laschimke | |

3-D printing advanced seminar 2-day seminar

Here you will acquire the basic knowledge of our CNC programme including 3D printing. In this way, they are later able to provide their clients with basic advice.
We then advise your potential client fully for you after their basic consultation.



CONTENT

OVERVIEW

Our 3-D printing workshop prepares you optimally for your own practical application by taking you through the process chain of additive manufacturing and creating industry-relevant components.

CONTENT

- Extended settings in CURA
- 5-axis printing. How the system works
- Avoiding printing errors
- Handling of various materials and accessories
- Time optimisation of components

REQUIREMENT

- 3-D printing basic training

OBJECTIVES

- In this course you will learn about common sources of error in 3D printing and we will give you practical tips on how to avoid errors.
- After a short theoretical introduction to the equipment used, you will learn how to select a suitable print head (3x and 5x print head) based on given component data and material properties.
- In the second step, you will create your part and become familiar with the operation of the selected 3-D printing device.
- At the end of the workshop, the group will analyse the parts for errors and make optimisations using CAD tools to identify design difficulties.

TARGET GROUP

- Engineers
- Technicians
- Industrial designers
- Professional 3-D printing users

Date

Course number

Subject to agreement

3D GS2

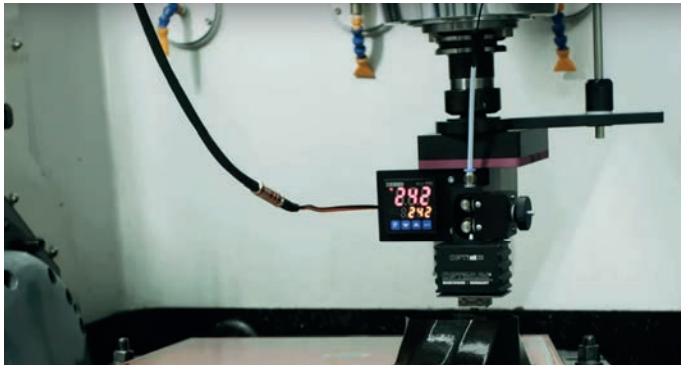
Trainers:

Martin Trepesch, Thomas Laschimke

Retailer training

2-day seminar

In the dealer training, you will acquire sound specialist knowledge in order to be able to advise your customers competently and professionally on OPTIMUM CNC machines. In this way, you create the basis for a firm integration of CNC-controlled machine concepts into your trade and, with the knowledge you have acquired, you can optimise existing structures so that your customers use the technology optimally and successfully.



CONTENT

OVERVIEW

In this course, you will learn about the entire process chain of computer-controlled turning and milling using concrete examples and put your knowledge of industrial CNC processes into practice. Starting with preparation and machine operation through to the production of your components with final finishing, you will receive many practical tips on modern CNC technologies.

CONTENT

- Recognising the versatile application possibilities of CNC machine tools
- Tools for understanding further production methods
- Knowledge of current developments, design and manufacturing processes with CNC technologies
- Selection, application and sale of the appropriate CNC machine
- Initial experience in the planning, design and manufacture of components using CNC milling and turning machines

REQUIREMENT

- Basic knowledge of automation technology

OBJECTIVES

- Getting to know new developments in the field of CNC technology
- Optimal preparation for the customer visit
- Acquire practical and technical product knowledge to be able to advise your customers even more expertly on site.
- Conduct sales talks with the existing sales documents
- Optimal needs assessment for the customer
- Getting to know the potential of CNC machines in production and logistics and selecting the appropriate technology.
- Consulting and concept development in a wide range of production areas.
- Understand differences to competitor products

Extended in-depth training available on customer request

TARGET GROUP

- Resellers

| Date | Course number |
|---|---------------|
| Subject to agreement | 3D GS3 |
| Trainers: Martin Trepesch, Thomas Laschimke | |

PLEASE NOTE

- The publication of this catalogue renders all previous price lists invalid.
- 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

- For products with a stated guarantee: Information on scope, duration, content and guarantor at www.optimum-machines.com or to be requested at Optimum Maschinen Germany GmbH

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 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.
- ⁽¹⁾ 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.

YOU WILL FIND MORE PRODUCTS IN OUR MAIN CATALOGUES



optimum-maschinen.de



holzkraft.de



metallkraft.de



holzstar.de



schweisskraft.de



uncraft.de



aircraft-kompressoren.de



cleancraft.de

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Optimum Machines



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Your specialist retailer:



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