

# favoritCNC

The price hit  
for a large range of applications.



## Key data

The favoritCNC is a CNC universal cylindrical grinding machine for the individual and batch production of medium-sized workpieces. It has distances between centres of 650/1000 mm and a centre height of 175 mm. It can machine workpieces with a maximum weight of 80/120 kg.

GLOBAL  
TECHNOLOGY LEADER  
PERFECTION  
CUSTOMER FOCUS  
EFFICIENCY  
SAFETY  
SOPHISTICATED PROCESSES  
PRECISION

# The Art of Grinding.

TECHNOLOGY LEADER  
EFFICIENCY  
PERFECTION  
CUSTOMER FOCUS  
PRECISION  
GLOBAL  
SOPHISTICATED PROCESSES  
SAFETY

## Fritz Studer AG

---

The name STUDER stands for more than 100 years of experience in the development and production of precision cylindrical grinding machines. «The Art of Grinding.» is our passion, highest precision is our aim and top Swiss quality is our benchmark.

Our product line includes both standard machines, as well as complex system solutions in high-precision cylindrical grinding for machining small and medium-sized workpieces. In addition we offer software, system integration and a wide range of services. As well as receiving a complete tailor-made solution the customer also benefits from our 100 years of know-how in relation to the grinding process.

Our customers include companies from the machine tool industry, automotive engineering, tool and die makers, the aerospace industry, pneumatics/hydraulics, electronics/electrical engineering, medical technology, the watch industry and job order production. They value maximum precision, safety, productivity and longevity. 24000 manufactured and delivered systems make us the market leader and are clear evidence of our technological leadership in universal, external, internal and noncircular grinding. Around 800 employees, including 75 apprentices, make it their goal every day to ensure that «The Art of Grinding.» will continue to be closely linked to the name STUDER in the future.

# favoritCNC

If you think a STUDER machine will exceed your budget, we recommend the favoritCNC. Top of the list with regard to price-performance ratio, this machine can be used universally and is quick and easy to program, thanks to StuderPictogramming. It's Granitan<sup>®</sup> S103 mineral casting machine bed largely equalizes temporary temperature fluctuations.

# Characteristics

## Dimensions

- Distance between centres 650 / 1 000 mm
- Height of centres 175 mm
- Max. workpiece weight 80 / 120 kg

## Hardware

- Turret wheelhead with grinding wheel on the right and internal grinding unit (optional) with manual swivel 2.5° Hirth
- External and internal grinding possible in one setup
- Granitan® S103 mineral-casting machine base
- Complies with CE standards



## Software

- Extremely easy programming with StuderPictogramming
- StuderGRIND programming software optionally available to create grinding and dressing programs on an external computer.



### **The CNC Universal cylindrical grinding machine for small budgets and high standards**

This CNC universal cylindrical grinding machine is designed for grinding medium-sized workpieces in individual and serial production. With the various options, such as in-process gauging, balancing system, contact detection and length positioning, the machine can be adapted for other grinding applications at a later date.

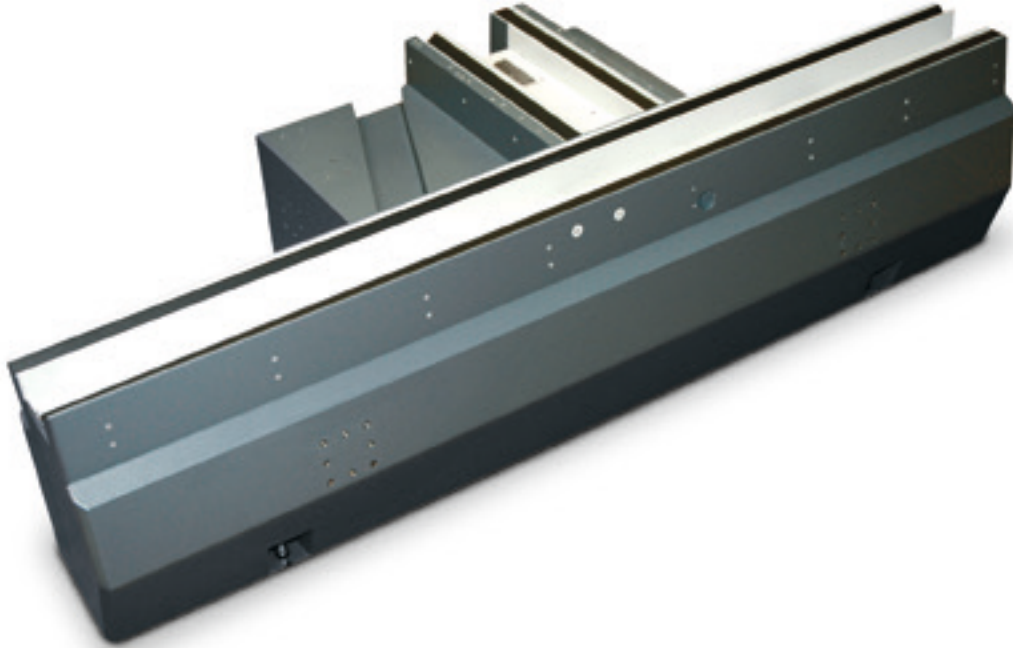
The machine bed made of solid Granitan® S103 forms the basis of the cylindrical grinding machine, which is equipped with high-quality components and can therefore guarantee exacting precision, performance and reliability for years. The full enclosure ensures an optimal view of the grinding process.

The practical STUDER grinding software with its proven StuderPictogramming means that even lesser-experienced users can quickly and practically program grinding and dressing cycles. The additional, optional StuderGRIND software is also available, with which special applications such as profiling grinding wheels for complex workpiece shapes can be programmed efficiently. Development, production, assembly and testing of Studer products all take place in a process-oriented manner and comply with the stringent directives stipulated in VDA 6.4 and ISO 9001.



# Granitan<sup>®</sup> S103 mineral-casting machine base

1



- Vibration-damping
- Thermal stability
- Non-wearing

The material structure developed by STUDER and which has proved its superb efficiency over many years is produced in the company's own plant using the most modern industrial techniques.

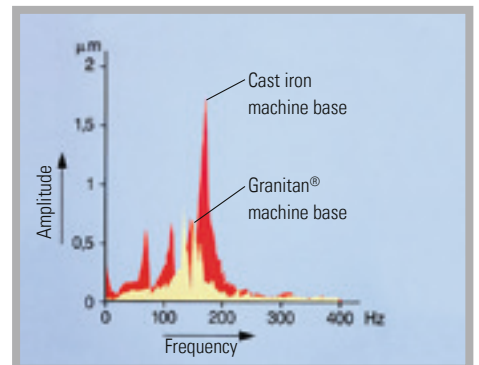
- The excellent dampening behavior of the machine base ensures outstanding surface quality of the ground workpieces. The service life of the grinding wheel is also increased, leading to reduced downtimes.
- Temporary temperature fluctuations are extensively compensated by the favorable thermal behavior of Granitan<sup>®</sup>. This provides high stability throughout the day.

- The V and flat guideways for the cross slides are moulded directly into the machine base and are finished with a non-abrasive Granitan<sup>®</sup> S200 slideway coating. The patented surface structure prevents the slides from swimming and also eliminates the stick-slip effect, which is otherwise noted in conventional guideways. The guideways offer the best possible accuracy through the entire speed range with high load capacity and cushioning levels. Thanks to the robust and maintenance-free design, these excellent guideway characteristics are retained more or less without limit.

2

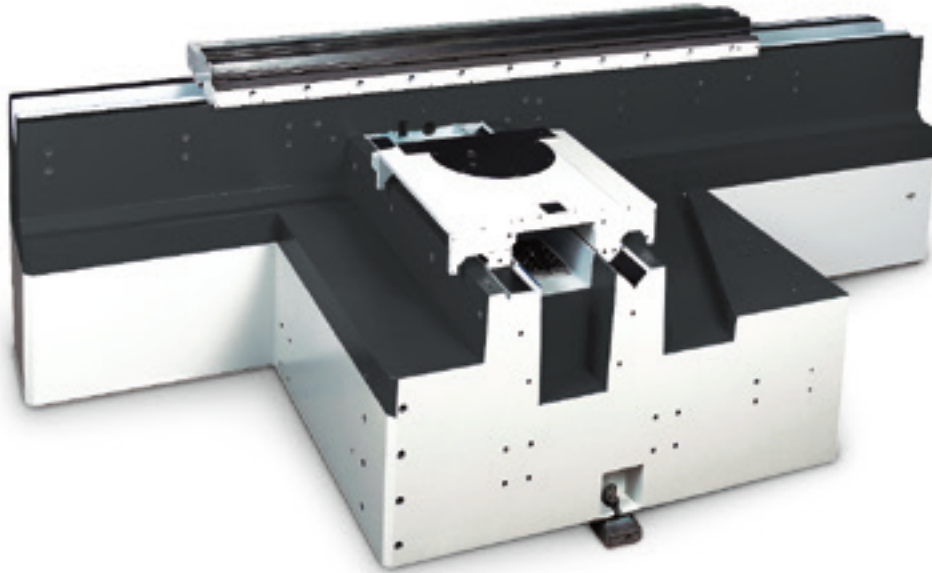


3



# Longitudinal and cross slides

①



- High-accuracy axis movements
- Effective covering of the guideways
- Auxiliary scale for setup and resetting
- Swiveling longitudinal table 8.5°

②



The longitudinal and cross slides are manufactured from high-quality gray cast iron and have highly precise, ground V and flat guideways, with the distance between the guideways optimally suited to the machine's overall rigidity. These distances are optimally coordinated to benefit the overall rigidity of the machine. The slides rest completely on the guideways of the machine bed through the entire speed range, which is the basis for the excellent straightness of 0,0025 mm over 650 mm measuring length. The slides are advanced by 40 mm diameter circulating ball screws connected to a three-phase

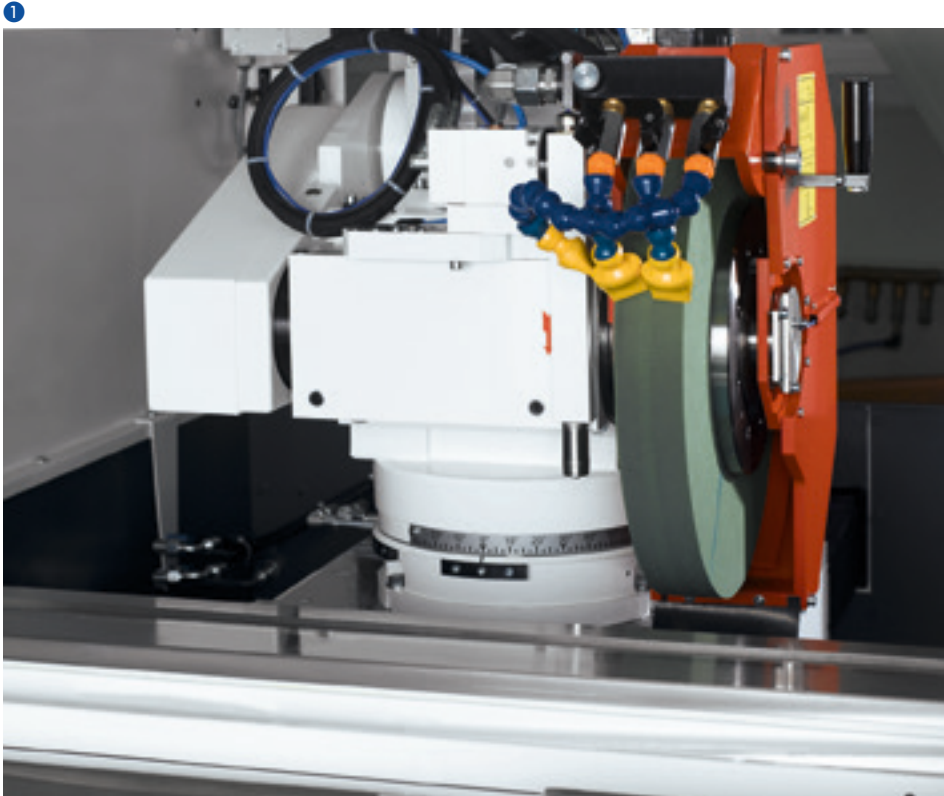
servomotor via torsion-resistant, bellow-type couplings.

Use of the swiveling machine table on the longitudinal slide enables the whole length of the surface to be ground and acts as a support for the workhead, the tailstock, and also accessories and devices.

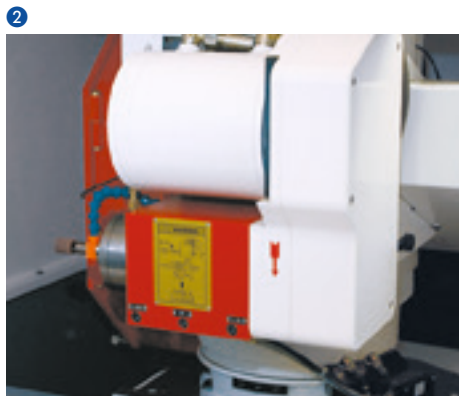
① Machine bed with both longitudinal and cross slides

② Workpiece table with swivel unit and set-up scale

# Wheelhead



- Turret wheelhead
- Complete machining
- High performance of 9 kW
- Cutting speed of up to 50 m/s
- Internal grinding spindle includes infinitely variable speed adjustment



The turret wheelhead can be used for both external and internal grinding; it can be equipped with an external grinding wheel (right) and an internal grinding spindle for this purpose. With extreme precision, the user can manually (2.5°) index the turret wheelhead in a Hirth gear within a swiveling range of -15°/+195°.

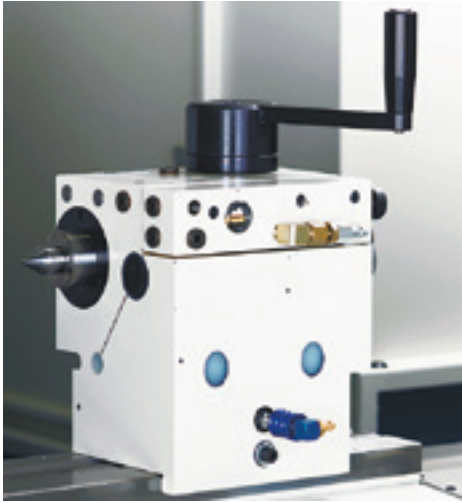
Grinding wheel dimensions: Diameter 500 mm, width 63 (80 F5) mm, bore 203 mm. It has a drive power of 9 kW. The cutting speed of maximum 50 m/s enables efficient removal values during the grinding process.

The speed of the belt-driven internal grinding spindle can be infinitely variably regulated. Spindles are available with nominal speeds of 20 000, 40 000 and 60 000 min<sup>-1</sup>.



# Tailstock

1



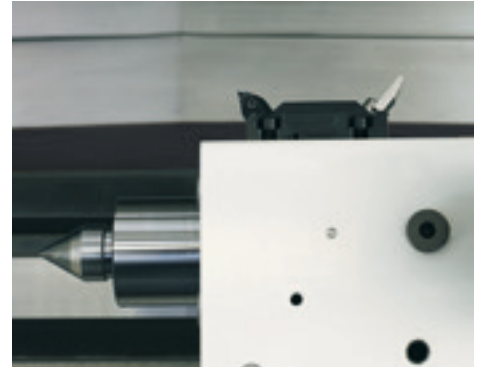
- Taper corrections
- Thermal stabilization via overflow capacity

2



The generously dimensioned barrel, designed for the deployment of Morse 4 taper centres, glides in the tailstock housing. The centre pressure can be adjusted with the delicate precision required for grinding high-precision workpieces. The fine adjustment enables taper corrections

3



in the range below 1  $\mu\text{m}$  when grinding between centres.

In order to guarantee optimum thermal stability, a cooling lubricant is passed through the tailstock, and totally covers the barrel and diamond holder.

# Workhead

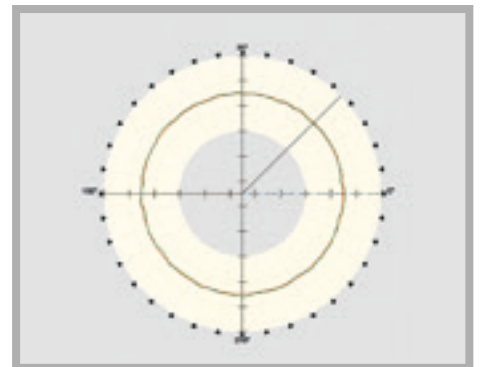
4



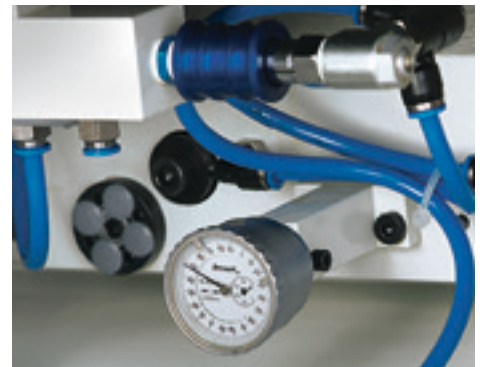
- Pneumatic lifting
- High roundness accuracy < 0.0004 mm
- Large speed range 1 – 1500 rpm

The versatile universal workhead with MT5 fitting taper is capable of both live spindle grinding and grinding between centres. The workhead spindle is mounted on roller bearings, is low-maintenance and possesses an excellent roundness accuracy of below 0.0004 mm. The fine adjustment allows for cylindrical corrections in the 1  $\mu\text{m}$  range during live spindle operations. A pneumatic lifting process facilitates movement of the workhead during setup and resetting.

5



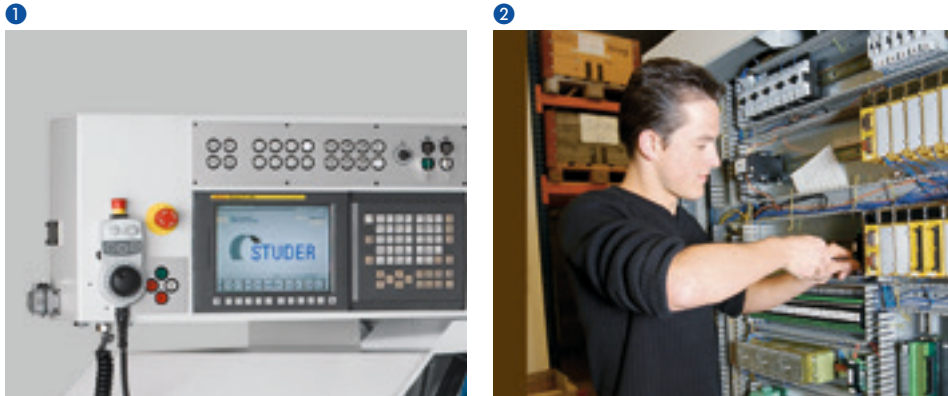
6



- 1 Tailstock
- 2 Fine adjustment for cylindrical corrections on the tailstock
- 3 Dressing tool holder behind tailstock

- 4 Universal workhead
- 5 Roundness during live spindle grinding operations
- 6 Fine adjustment for cylindrical corrections

# Machine control and operation



The Fanuc Oi CNC control with active flat color monitor (10.4") is extremely reliable and optimally matched to the drive elements.

The control cabinet is bolted to the machine bed. The electrical equipment complies with established safety standards and is EMC-tested.

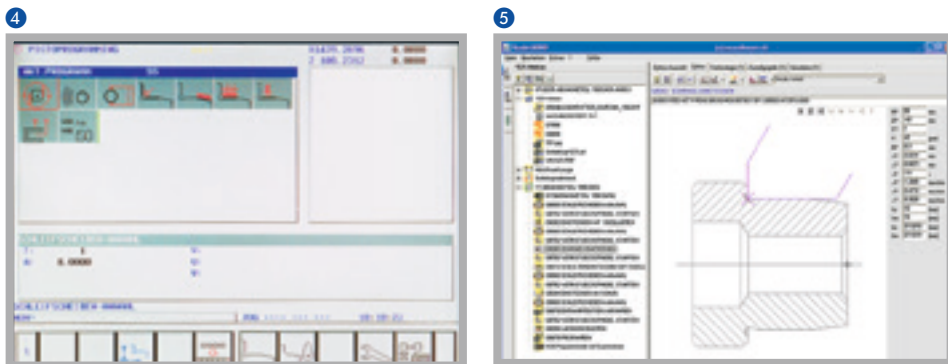
All controls are clearly and ergonomically arranged. An important role is played by the manual control unit, which facilitates setup close to the grinding process.

The special electronic contact detection sensor (optional) function enables downtimes to be reduced to a minimum.



- PCU manual control unit
- EMC-tested control cabinet
- Ergonomically arranged controls
- Latest software technology
- StuderPictogramming
- Programming software StuderGRIND (Option)

# Programming



The sophisticated mechanical engineering concept of the favoritCNC is completed by a grinding software program developed in-house by STUDER and which is continuously further optimized in collaboration with users of the software. This software offers:

- StuderPictogramming: The operator strings the individual grinding cycles together, and the control system generates the ISO code.
- Grinding and dressing process sequences

can be programmed freely to optimize the grinding process.

- StuderGRIND (Option): Programming software for special applications such as profiling the grinding wheel for complex workpiece forms. The program is created on the PC and transferred directly to the machine control unit.

## Additional options

1



One strength of the favoritCNC is that the machine can be adapted to suit different requirements. The range of application can be extended with additional options that are quickly available. The following options are available:

### Sensitron 6 electronic cut-in detection:

The Sensitron 6 contact control unit automatically switches from infeed to grinding feed. The air gap between the set allowance and the contact point is by-passed very quickly with a high infeed speed.

### In-process gauging unit:

This accessory kit has two measuring circuits with which it controls the automatic feed sequence relative to the workpiece dimension during external grinding. It thus helps to further increase process reliability, productivity and quality. Products are available from Movomatic and Marposs.

### Length positioning:

This allows the workpiece zero point to be captured in the Z-axis.

2



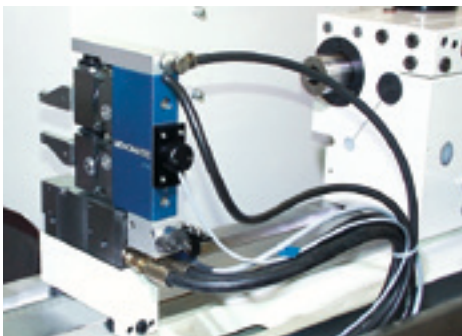
### Dynamic balancing system:

An optimally balanced grinding wheel is a precondition for good grinding results. The dynamic balancing system displays the imbalance, and the grinding wheel can be balanced directly on the machine by manually adjusting weights.

- Configuration is flexible
- Simple to retrofit
- Diameter measuring head
- Length positioning measuring head

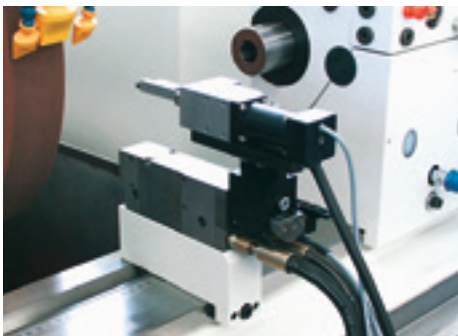
## Measuring heads for the in-process gauging unit

3



Depending on the application, different diameter measuring heads are available. They have an electric or pneumatic probe lift-off and use one or two measuring circuits, depending on the application.

4



The length positioning measuring head is suitable for the passive length positioning of interrupted or non-interrupted surfaces. It has an electric or pneumatic probe lift-off and uses one measuring circuit.

Measuring range:  $\pm 2.5$  mm.

# Customer Care

STUDER cylindrical grinding machines should fulfil the customer's requirements for as long as possible, work cost-effectively, function reliably and be available at all times. From «start up» through to «retrofit» – our Customer Care is there for you throughout the working life of your machine. 30 professional helplines and more than 60 service technicians are available in your area, wherever you are in the world.

- We will provide you with fast, uncomplicated support.
- We will help to increase your productivity.
- We work professionally, reliably and transparently.
- We will provide a professional solution to your problems.



**Start up**  
Commissioning  
Warranty extension



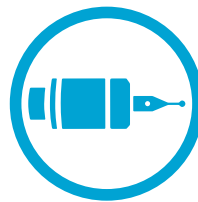
**Qualification**  
Training  
Production support



**Prevention**  
Maintenance  
Inspection



**Service**  
Customer service  
Customer consultation  
HelpLine  
Remote service



**Material**  
Spare parts  
Replacement parts  
Accessories



**Rebuild**  
Machine overhaul  
Assembly overhaul



**Retrofit**  
Modifications  
Retrofits

# Technical specifications

## Main dimensions

Distance between centres	650 / 1 000 mm (25.6" / 39.4")
Height of centres	175 mm (6.9")
Max. workpiece weight between centres	80 / 120 kg (176 / 264 lbs)

## Cross slide: X-axis

Max. travel	285 mm (11.2")
Speed	0.001 – 10 000 mm/min (0.000.04 – 394 ipm)

Resolution	
Rotative encoder	0.0001 mm (0.000.004")

## Longitudinal slide: Z-axis

Max. travel	800 / 1 150 mm (31.5" / 45.3")
Speed	0.001 – 20 000 mm/min (0.000.04 – 787 ipm)

Resolution	
Rotative encoder	0.0001 mm (0.000.004")
Machine table - swiveling range	8.5 deg

## Wheelhead

Swiveling range	-15 to +195 deg
Swiveled manually	2.5 deg Hirth
Fitting taper	dia. 63 mm (2.48")
Driving power	9 kW (12 hp)
Right grinding wheel, Ø x width x bore	500 x 63 (80F5) x 203 mm (20" x 2.5" (3.15"F5) x 8")
Peripheral speed	Up to 50 m/s (9840 sfpm)
Internal grinding attachment for belt spindle	dia. 100 mm (3.94")
Speeds	20 000 / 40 000 / 60 000 rpm

## Universal workhead

Rpm range	1 – 1 500 rpm
Fitting taper	MT5
Bar capacity	dia. 30 mm (1.18")
Driving power	1,8 kW (2.4 hp)
Load for live spindle grinding	70 Nm (52 ft lbs)
Roundness during live spindle grinding operations	0.0004 mm (0.000.016")

## Tailstock

Fitting taper	MT4
Barrel stroke	35 mm (1.37")
Barrel diameter	50 mm (1.97")
Fine adjustment for cylindrical corrections	±40 µm (0.0016")

The information given is based on the technical levels of our machine at the time of this brochure going to print. We reserve the right to further develop our machines technically and make design modifications. This means that the dimensions, weights, colors, etc. of the machines supplied can differ. The diverse application possibilities of our machines depend on the technical equipment specifically requested by our customers. The equipment specifically agreed with the customer is therefore exclusively definitive for the equipping of the machines, and not any general data, information or illustrations.

## Control system

Fanuc Oi

## Guaranteed working precision

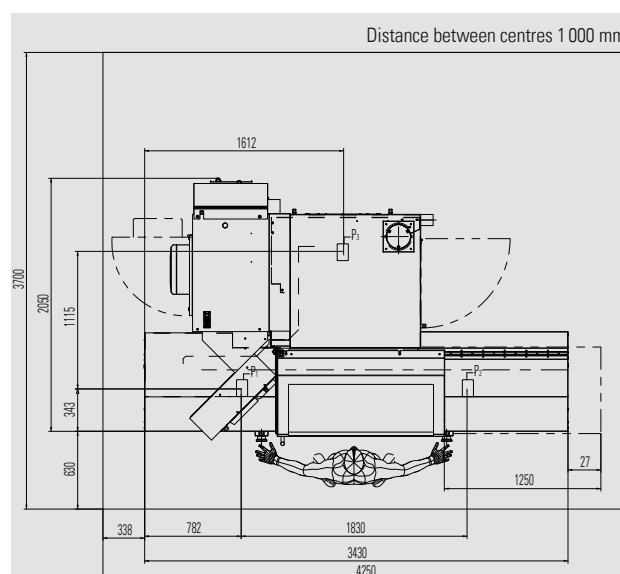
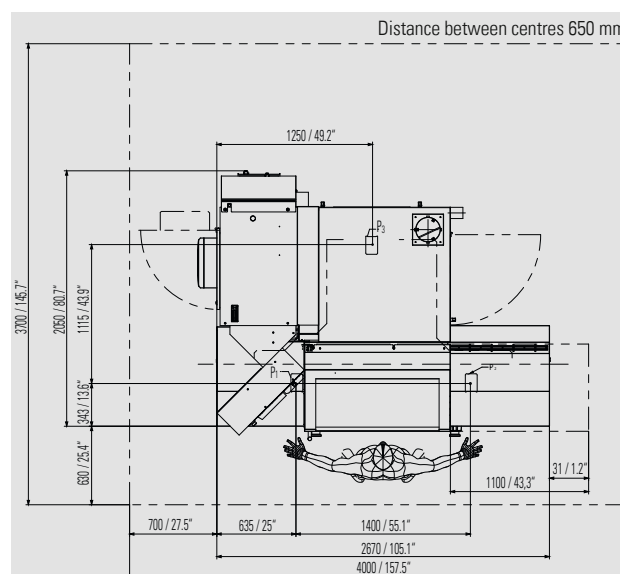
Straightness of the generating line	
Gauge length 650 mm (25.6")	0.0025 mm (0.000.10")
Gauge length 1000 mm (39.4")	0.0030 mm (0.000.12")

## Connected loads

Total connected load	20 kVA
Air pressure	5.5 bar (80 psi)

## Total weight

Distance between centres 650 mm (25.6")	4 000 kg (8 800 lbs)
Distance between centres 1 000 mm (39.4")	5 000 kg (11 000 lbs)









Fritz Studer AG  
3602 Thun  
Switzerland  
Phone +41 33 439 11 11  
Fax +41 33 439 11 12  
info@studer.com  
www.studer.com



United Grinding  
North America, Inc.  
Miamisburg, OH 45342  
Tel. +1 937 859 1975  
info@grinding.com  
www.grinding.com



**ISO 9001**  
**VDA6.4**  
certified

