

Universal Internal Cylindrical Grinding Machine



S151 – The Powerful

for large and complex workpieces

The Art of Grinding.

STUDER
Schleifring Group

S151 – The Powerful

for large and complex workpieces

The powerful CNC Internal Cylindrical Grinding Machine for individual and small series production.

With its very broad working range, this powerful, compactly designed machine permits internal and external grinding of workpieces up to 300 mm (11.8") in diameter. The substantial accommodation capacity of the sturdy workhead and the double spindle turret together open up a wide area of applications and are suitable for complete machining in one setup.

This exceptionally precise and efficient machine has been specially developed for individual components and small series production operations. The beneficial price-performance ratio means lower part costs.

The unique, workshop-oriented Studer Pictogramming software ensures reliable and efficient programming of grinding and dressing cycles. Even the CNC newcomer will master simple setup and resetting processes without any difficulty in the shortest possible time. And the possibilities are so great that even the grinding specialist will be astonished by the machine's performance.

The systematic development, production, assembly and testing of our products is carried out in a process-oriented manner, complying with the strict VDA 6.4 and ISO 9001 directives.





Advantages:

S151 – Dimensions

- Swing 360 mm (14.17")
- Grinding diameter 300 mm (11.8")
- Grinding depth 200 mm (7.87")
- Spindle speeds
 - internal grinding 24,000–51,000 min⁻¹
 - external grinding 6,000 min⁻¹
- Workpiece weight including chuck max. 150 kg (330 lbs)

Hardware

- Compact machine for the internal and external grinding of a wide range of workpieces in one setup
- Exceptionally precise and efficient machine
- Specially developed for individual components and small series production
- Can be equipped with one grinding spindle or a 2-spindle turret (192 deg automatically adjustable every 3 deg)
- Workhead on swivel table -5/+30 deg (manual)
- Beneficial price-performance ratio means lower part costs
- Short delivery times through advance production and availability of variable components

Software

- Easy, workshop-oriented Pictogramming programming for short setup times and high usage
- StuderGRIND Software for the creation of grinding and dressing programs for all grinding wheel and workpiece forms on a PC



Grinding spindle holder

The basic version of the S151 is fitted with a single grinding spindle holder, which can be fixed manually in one of the following three positions: $+6^\circ$, 0° , -6° . This enables functional face grinding for contact and sealing surfaces. The large mounting bore permits the use of HF Internal grinding spindles of up to 170 mm (6.7") in diameter.

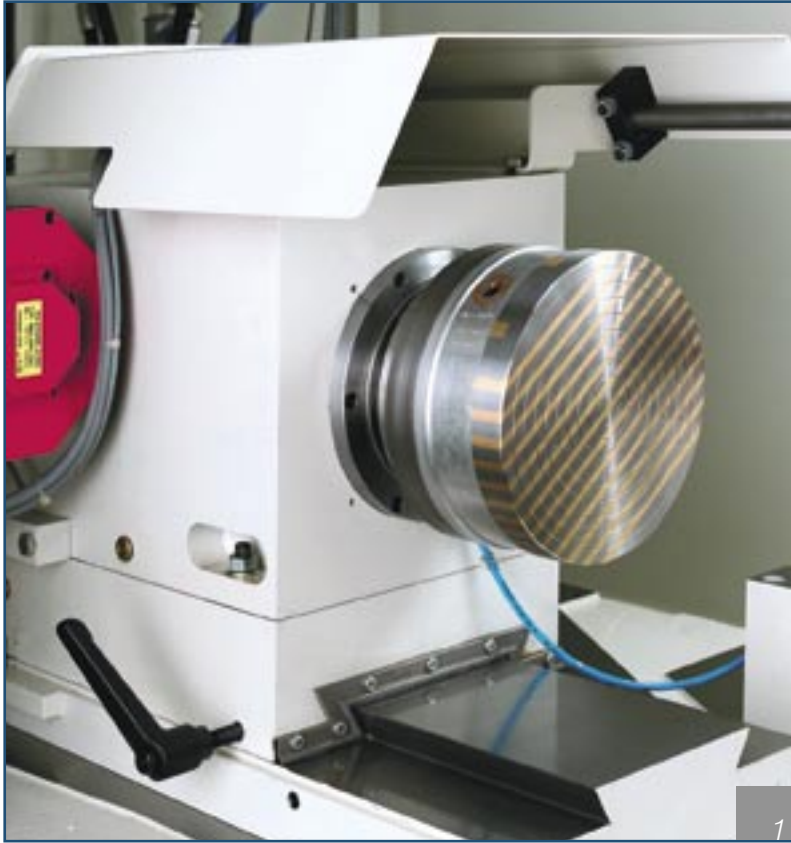
As an option, an automatically swivelling grinding spindle turret head can be fitted to the cross-slide unit to take 2 HF grinding spindles. In this twin-spindle variation, secure fixing of the swivel axis with a swivel angle of 192° is ensured by a Hirth serration. This means that even complex machining on internal and external diameters can be performed with high precision and with suitable machining parameters. And all this with minimal downtimes and high precision at the same time.

1 Turret-type spindle holder

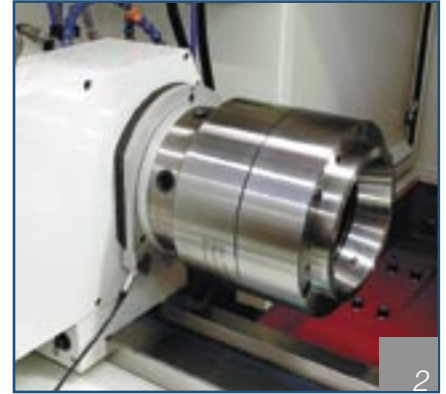
2 Single-spindle holder

3 External grinding spindle

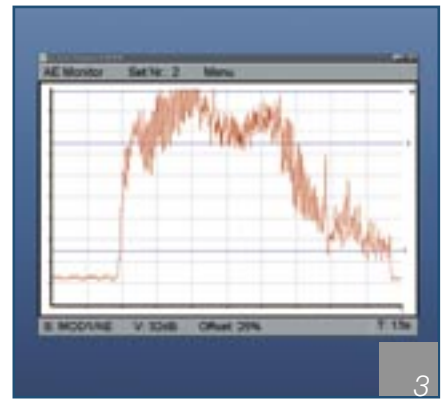
- Single-spindle or turret-type spindle holder
- Spindle holder bore dia. 170 mm (6.7")
- Complete machining in one setup



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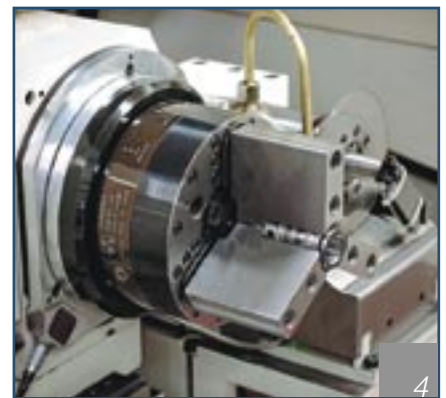
Workhead

The workhead is movable and is fitted to a swivel table that can be swivelled from -5° to $+30^\circ$ via a fine taper adjustment. This enables easy setting of the machine for the efficient production of internal and external tapers, also on long workpieces.

The rigidly designed workhead with preloaded precision ball bearings ensures the secure clamping of maximum loads of up to 300 Nm on the A6 spindle head interface fitted as standard in accordance with DIN55026.

The integrated ring sensor (optional) guarantees reliable wheel contact detection even with small diameters. Downtimes are reduced to a minimum and process safety enhanced. Adaptation to the different grinding wheels and materials is carried out via control parameters.

Chucks specially adapted to the workpiece and the handling device ensure a secure and precisely defined grip.



4

1 Workhead

2/3 Integrated ring sensor on workhead with wheel contact detection

4 Large selection of chucks

- Massive construction
- Low maintenance
- High roundness values



Dressing

Fixed dressing tool holder plus fixtures to accommodate rotating dressing tools mean that the S151 can be adapted to the customer's requirements. Rotating dressing tools are particularly suitable for dressing ceramic-bonded CBN grinding wheels.

1 Fixed dresser

2 Dressing turbine (rotating dressing unit)



Machine base

The grey cast-iron, torsion-resistant machine base has very good damping properties. The mounting surfaces for the guiderails are machined directly in the machine base.

1 Machine bed

2 Cross-slide with spindle holder

Cross-slide

The rigidly ribbed cross-slide on the S151 provides the ideal basis for universal operations. The transverse X axis and the longitudinal Z axis glide on high-precision, maintenance-free guiderails and are driven by a three-phase servomotor drive via a ball screw with a direct coupling. The spindle nuts and the roller guideways are greased by means of a central greasing unit, which acts as a pulse greasing device. The high rigidity of the axis concept ensures slip-stick-free fine in-feed and optimum grinding results. A linear absolute measuring system with a resolution of 0.0001 mm (0.000,004") provides for the highest possible positioning and repetition accuracy, while the high dynamic axes allow travel speeds of up to 25,000 mm/min (984 ipm).

- Compact design with cross-slide
- high rigidity



Machine control and operation

The S151 is equipped with the extremely reliable Fanuc 21i-TB control, optimally attuned to the other drive elements.

The clearly and ergonomically arranged controls make setup and part changeover very easy for the user. The entire grinding and dressing programs are created and corrected directly on the machine. Measurement offsets can be carried out during the grinding process without modifying the workpiece program.

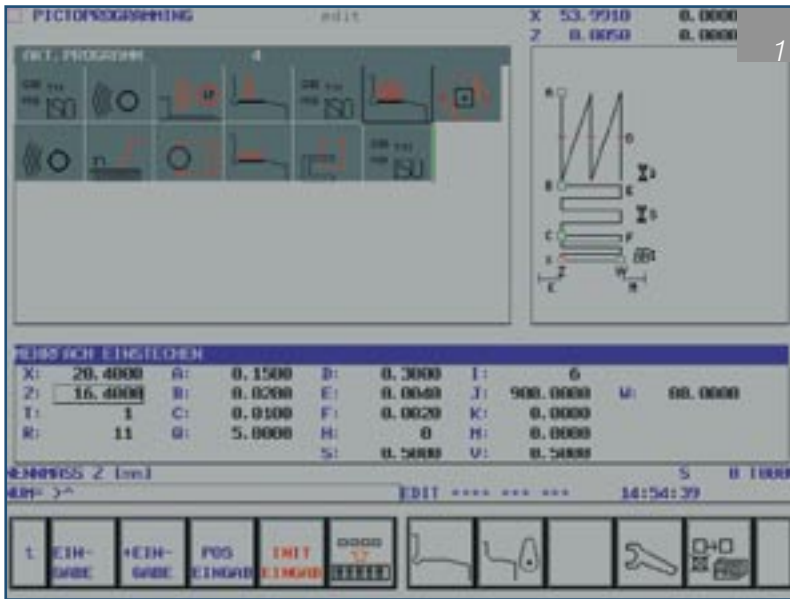
The portable control unit makes setup close to the grinding process child's play.

1 Control

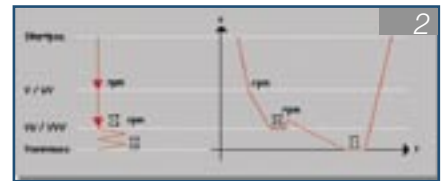
2 PCU – Portable control unit

3 Interior view of the control cabinet

- Manual control device PCU
- Control cabinet EMV-tested
- Ergonomically arranged controls



1



2



3

Programming

The outstanding mechanical engineering concept of the S151 is completed by the grinding software designed by Studer's software engineers and optimised by users.

- Pictogramming: sequencing individual grinding cycles – the control unit generates the ISO Code.
- Microfunctions: free programming of grinding and dressing process sequences – optimisation of the grinding process.
- StuderGRIND software for special applications such as form and thread grinding and profiling the grinding wheel for complex workpiece forms – programs are created on a PC and transferred directly to the machine control unit.

1 Pictogramming

2 Microfunctions

3 Programming Software StuderGRIND

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- Latest software technology
 - Pictogramming
 - Programming software StuderGRIND



Accessories and services

There is an extensive range of accessories available for the S151, including chucks, grinding spindles, dressing tools and grinding arbours.

Our Training Department organises courses for hundreds of customers every year specialising in programming and machine use - a recipe for success in using your machine to the optimum. Machine maintenance courses take account of the specific needs of operational maintenance departments. On request, we can also run training courses on the customer's premises or make our specialists available to resolve particular grinding problems.

Our After Sales Service speak your language. Our service engineers are active around the globe and are based in your vicinity. A well thought-out range of services is available to you after purchase to enable you to exploit your machine to the full. Spare parts can be delivered up to 10 years after conclusion of the machine range.

1 Teleservice

2 Engineers working on the customer's premises

3 Operating worldwide

4 Training on simulators

- Commissioning
- Training
- Production support
- Warranty extension
- Maintenance
- HelpLine
- Repair
- Spare parts
- Teleservice
- Inspection
- Overhaul

Main dimensions

| | |
|---------------------------|----------------|
| Swing (with splash guard) | 360 mm (14.2") |
| Grinding depth | 200 mm (7.85") |

Cross-slide: longitudinal axis

| | |
|-------------|-------------------------|
| Max. travel | 530 mm (20.8") |
| Max. speed | 25'000 mm/min (984 ipm) |
| Resolution | 0,0001 mm (0.000,004") |

Transverse axis

| | |
|-------------|-------------------------|
| Max. travel | 360 mm (14.2") |
| Max. speed | 12'500 mm/min (492 ipm) |
| Resolution | 0,0001 mm (0.000,004") |

Grinding spindle holder

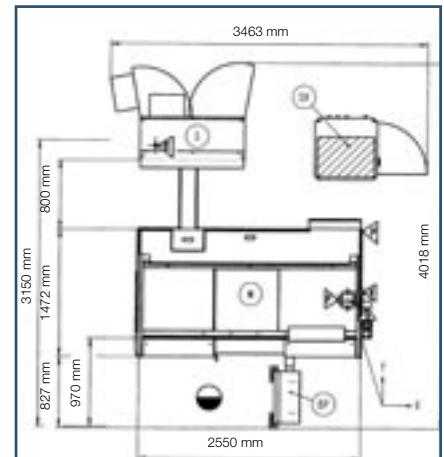
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|--|--|
| Spindle diameter for HF spindles | dia. 170 mm (6.7") |
| (diameter differences via reduction sleeves) | dia. 120 and 150 mm (4.7", 5.9") |
| Can be fixed manually to 3 positions | +6/0/-6 deg |
| Spindle speeds for internal grinding | 24'000–51'000 rpm |
| Spindle speeds for external grinding | 6'000 rpm |
| Option: turret-type spindle holder | |
| Swivel range | 198 deg |
| Working range | 192 deg / programmable to 3 deg increments |

Workhead

| | |
|---|---------------------|
| Speed range | 1–800 rpm |
| Spindle head in accordance with DIN 55026 | A6 |
| Spindle feedthrough | 50 mm (1.95") |
| Driving power | 2,8 kW (3.8 hp) |
| Load during live grinding | 300 Nm (223 ft lbs) |
| Max. spindle load | 1500 N (330 lbs) |
| Manual longitudinal adjustment | 200 mm (7.85") |

Connected loads

| | |
|--|------------------------|
| Total connected load | 45kVA |
| Air pressure | 5–10 bar |
| Extraction capacity for cooling lubricant mist | |
| -emulsion | 1200 m ³ /h |
| Total weight | 4000 kg (8800 lbs) |



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, colours, 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.



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