S242

The flexible Machine
for grinding and turning operations.

Key data

The S242 is a flexible hard-fine machining centre for grinding, turning and milling operations on medium-sized workpieces.
It has a distance between centres of up to 1000 mm.
It can machine workpieces with a maximum weight of 60 kg.

STUDER

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 tailormade 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. 24 000 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.

S242

If you want to combine grinding and turning, we recommend the S242. Complete machining in a single clamping reduces error sources and increases precision during machining. The S242 produces small to medium-sized workpieces up to 180 mm in diameter and 1000 mm in length. External/internal grinding and hard turning in a single clamping will reduce primary processing and auxiliary times in your operation. You can optionally upgrade the S242 with powered tools for drilling and milling.

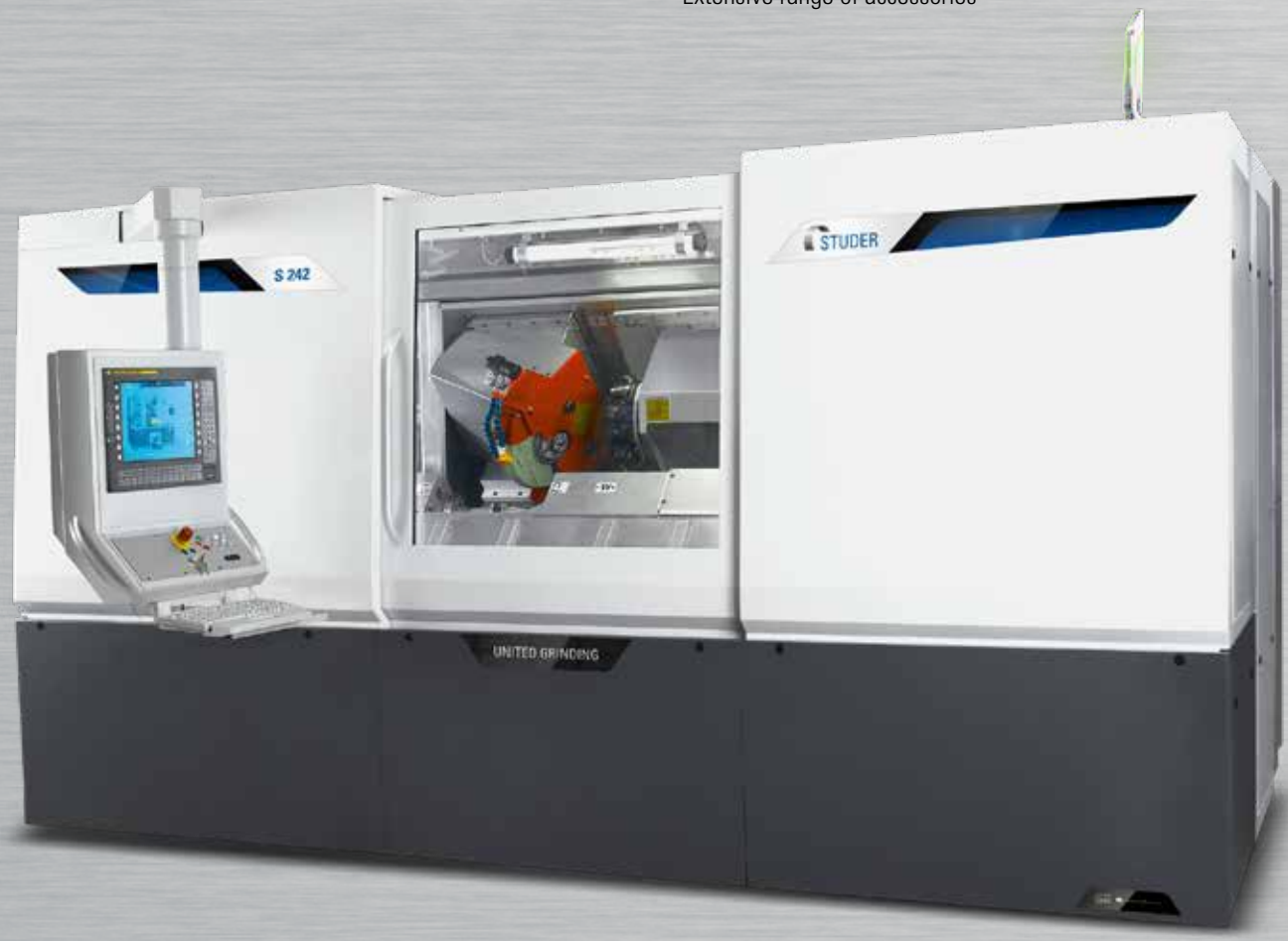
Characteristics

Dimensions

- Distance between centres 400/800/1000 mm (15.7"/31.5"/39.4")
- Swing diameter 180 mm (7.1")
- Max. workpiece weight 60 kg (132 lbs)

Hardware

- X axis: stroke 220 mm (9.1"); v_x 15 m/min; resolution 0,00001 mm
- Z axis: stroke 850/1600 mm (33.4"/62.8"); v_z 25 m/min; resolution 0,00001 mm
- 2 or 3 cross slides configured with either one External grinding spindle, up to 3 internal grinding spindles or a tool turret
- Grinding spindle: 6,8 kW, v_s 50 m/s; Position 0 deg or ± 25 deg; automatic balancing, grinding wheel diameter 400 x 50/63 mm (15.7" x 2"/2.5")
- Rotating turret: 8/12 tool positions Option: driven tools for drilling and milling
- Workhead: motor spindle 10,5 kW; 7500 rpm, adapter for center MT4; autom. chuck; chuck fixture DIN 55026 A4
- W-axis (tailstock slide): Stroke 450/1050 mm (17.7"/41.2"); resolution 0,01 mm; v_w 15 m/min
- Tailstock version
  Barrel tailstock option: Barrel Ø 60 mm; Stroke 45 mm; Adaptor for centers MK4; Programmable clamping force
  Synchronous tailstock option: 10.5 kW; 7500 rpm; Adaptor for centers MK4/ DIN 55026 A4; Programmable clamping force
- In-process gauging: Length positioning, length and diameter measurements, multi-range in-process gauging with R-axis
- Full enclosure with sliding door
- Granitan® S103 mineral-casting machine base
- Extensive range of accessories



Software

- Extremely easy programming with StuderWIN on Fanuc 31*i*-A
- StuderGRIND programming software for producing grinding and dressing programs on a PC
- Standardized interfaces for loader and peripheral devices
- CAM turning software

Grinding – turning – milling for small to medium-sized workpieces with a maximum diameter of 180 mm and up to 1000 mm long.

The S242 combined machine tool ideally combines the technologies of cylindrical grinding and hard turning. Thanks to its design concept, it can easily cope with both processes. Consequently, it enables highly efficient hard fine machining of shafts and chucking components with a high manufacturing quality and production reliability, and is therefore the cost-optimal manufacturing method for machining high-precision hardened workpieces.
Short changeover times are a further strength of the S242. This makes it attractive for both large-scale production and for small batch sizes and single parts.

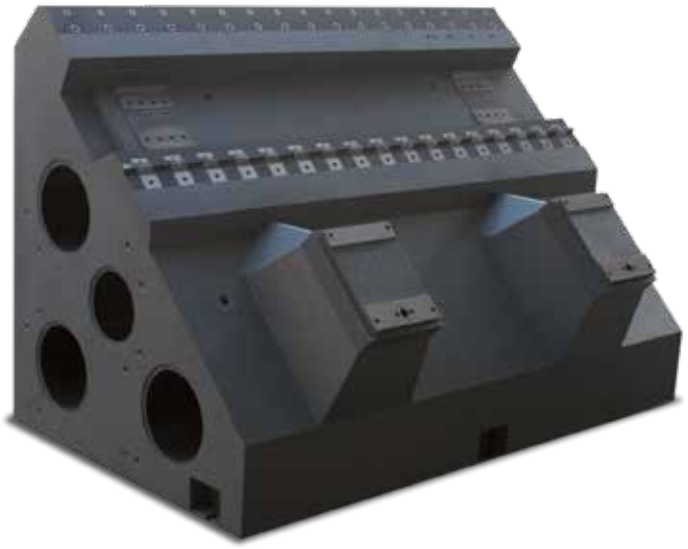
Lower unit costs – highest precision

The combination of different hard-fine machining methods produces the following advantages:

- Machining in one clamping
- Reduction of production and auxiliary times
- Optimization of grinding stock
- Function related surface structures
- Use of in-process gauging during grinding
- Reduction of logistic costs

Granitan® S103 mineral casting machine bed

1



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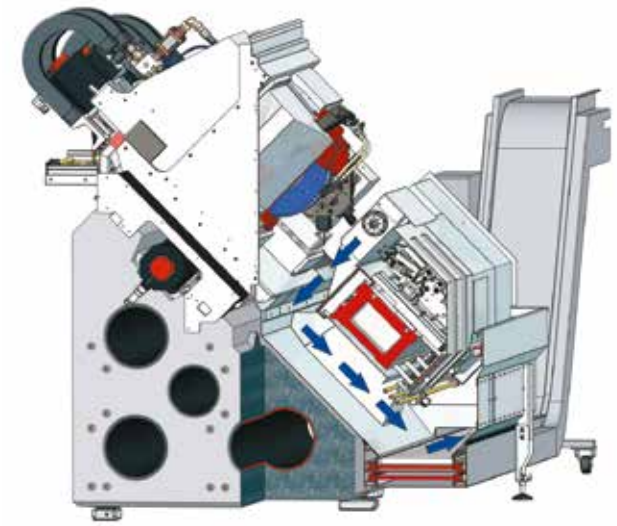

- Vibration-damping
- Thermal stability

The material structure developed by STUDER, 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 cushioning 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 for by the favorable thermal behavior of Granitan®, resulting in high dimensional accuracy at all times. This provides high stability throughout the day.

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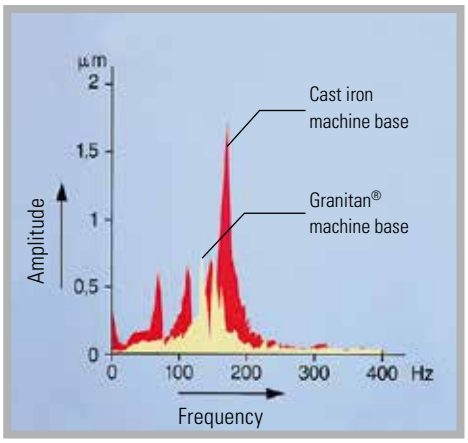
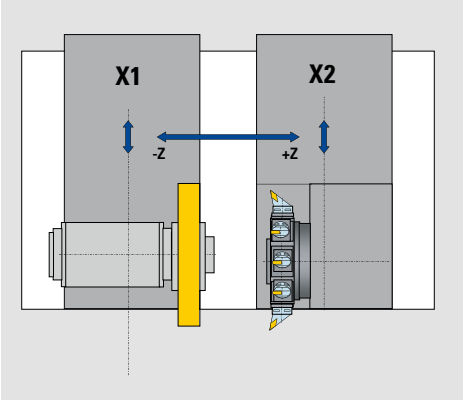


1 Machine base
2 Inclined bed concept for optimal chip flow
3 Vibration behavior of gray cast iron and Granitan® S103

Cross-slides

1



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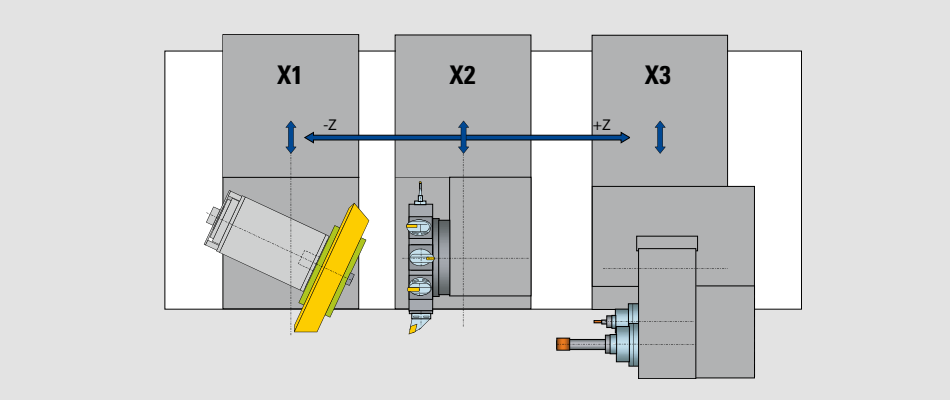

Efficiency through short travels

An extremely rigid longitudinal slide with two independently controlled cross slides for the tool holders ensures short travels for combined machining and the flexible use of a large number of tools. The cross slides can be individually equiped with an external wheelhead, internal grinding attachment for max. 3 spindles or a tool turret for max. 12 tools.

Highly dynamic axis drives with pre-tensioned linear guideways and linear measuring systems guarantee the highest precision.

External grinding unit

3

The grinding head is mounted in a fixed position on the cross slide and is non-swiveling. The following mounting brackets are possible:

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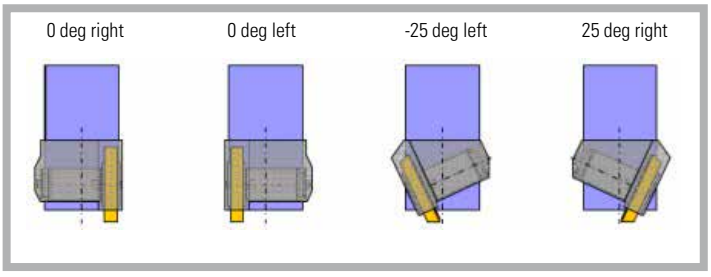

1 2 Choice of possible combinations of external grinding, internal grinding and hard turning

3 External grinding unit 25 deg right

4 Grinding wheel arrangement

Turret

1

The turrets are hydraulically clamped. As well as dry machining, the tools can be cooled with emulsion or compressed air. The supply is provided directly via the turret.

Turret with fixed tools

8-position Capto 5
8-position VDI 40
12-position VDI 30

Turret with powered tools

12 x VDI 30 *
Drive speed 4 000 rpm
Driving power 2.5 kW

* Use of powered and fixed tools possible

Internal grinding turret

2

3

The internal grinding turret is automatically positioned and hydraulically clamped via a gear wheel. HF internal grinding motor spindles with up to 120 000 rpm are used.

A swiveling dresser with one dressing spindle or fixed dressers is available for dressing internal grinding wheels.

Number of spindle positions on swiveling spindle holding fixture	3
Mounting bores	1 x dia. 100 mm / 2 x dia. 120 mm
Speeds	24 000 - 120 000 rpm

1 Turret
2 Internal grinding turret
3 Swivel-in dressing unit

Flexible clamping and driving

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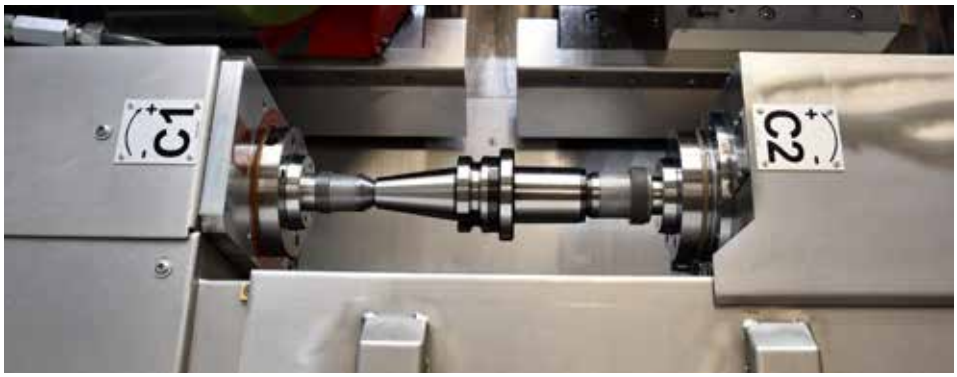
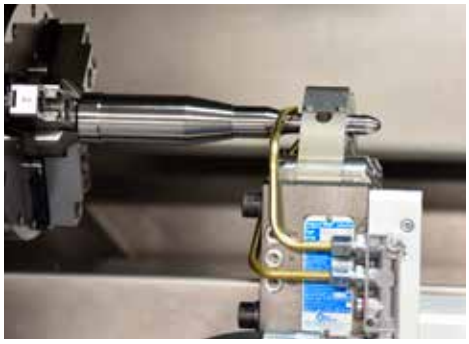


The workhead is fitted with an efficient motor spindle. The tailstock is mounted on the W-axis. This can be automatically positioned over the entire clamping length.

The following tailstock versions with integrated cylindricity correction are available:

- Barrel tailstock
- Synchronous tailstock

2



3

4

5

The positioning of the dressing modules close to the machining process ensures simple handling and short auxiliary times. The workhead can be used with an automatic swivel axis.

1 Workpiece drive between centers with synchronous tailstock
2 Workpiece fixture in chuck/rotating steady-rest
3 Workpiece fixture with rotor tip in barrel tailstock
4 Workhead with dressing turbine
5 Workhead with automatic swivel axis

Control system and operation

1

- PCU manual control unit
- EMC-tested control cabinet
- Ergonomically arranged controls

The S242 is equipped with a 31*i*-A series Fanuc control with integrated PC. The 15" touch screen facilitates intuitive operation and programming of the machine.
The electrical cabinet is positioned behind the machine. The power and control compartments are spatially separated. The layout of the elements complies with the relevant safety norms 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.
A special function – the Sensitron electronic contact detection device – reduces downtimes to a minimum.

2

1 Machine control
2 Manual control unit

StuderWIN

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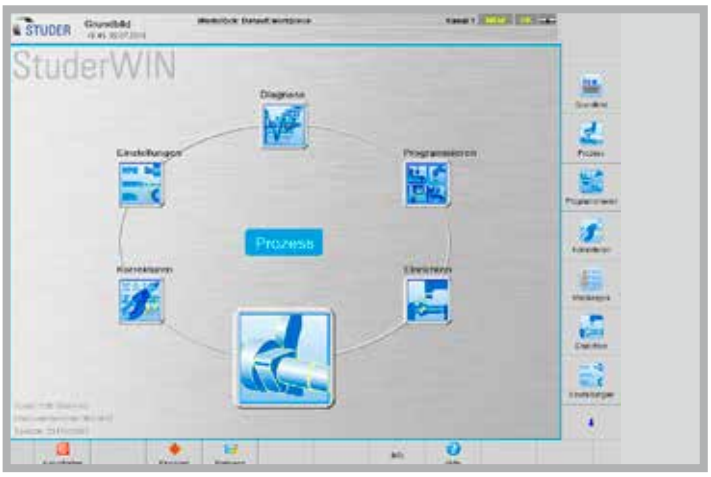

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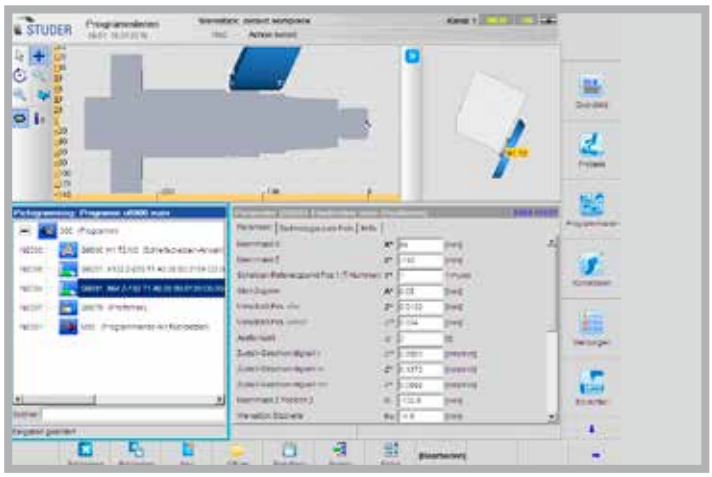

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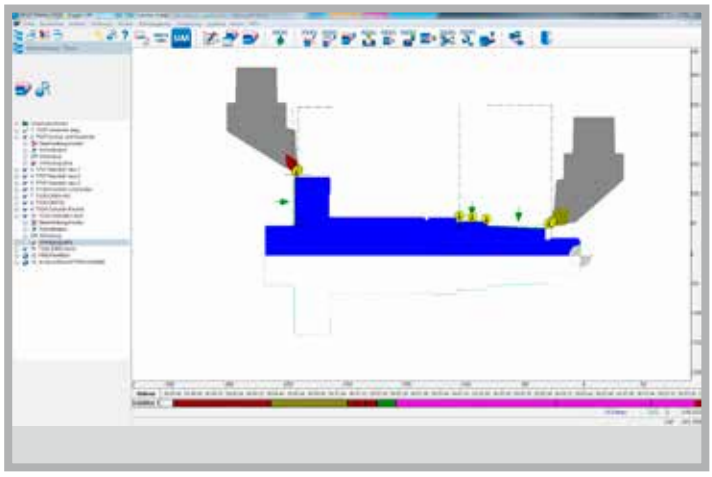


- Latest software technology
- StuderPictogramming

The user interface StuderWIN creates a stable programming environment and contributes to efficient use of the machine. The possibility of fully integrating the in-process gauging and sensor technology for process control as well as contact detection and automatic balancing systems in the operator interface enables standardized programming of the different systems. The software of an optional loading system is also integrated. The drive elements are optimally matched to the control system.

The sophisticated mechanical engineering concept of the S242 is completed by a grinding software program developed in-house by STUDER and which is continuously optimized in collaboration with users of the software. This software offers:

- StuderPictogramming: The operator strings the individual grinding cycles together – the control generates the ISO code.
- STUDER Quick-Set: The software for grinding wheel alignment reduces resetting times by up to 90 %.
- Microfunctions: Free programming of grinding and dressing process sequences for optimization of the grinding process.
- Integrated operating instructions assist safe machine operation.
- The software options for the grinding technology calculations, optimized dressing as well as the Contour-, Thread- and Formgrinding cycles increase the functionality of the machine.
- Offline CAM turning software designed for StuderWIN

1 StuderWIN
2 Workpiece programming
3 Assisted setup
4 Turning programming

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 Data

Main dimension

Distance between centres	
Short version – 2 cross slides	400 mm (15.7")
Long version – 2 cross slides	1 000 mm (39.4")
Long version – 3 cross slides	800 mm (31.5")
Swing diameter	180 mm (7.1")
Max. workpiece weight	60 kg (132 lbs)

Cross slide: X axis

Max. travel	220 mm (8.7")
Speed	0,001–15 000 mm/min (0.000,04–590 ipm)
Resolution	0,00001 mm (0.000,002")

Longitudinl slide: Z axis

Max. travel	850/1 600 mm (33.4"/62.8")
Speed	0,001–25 000 mm/min (0.000,04–984 ipm)
Resolution	0,00001 mm (0.000,002")

Rotating turret

8 x	Capto 5 fixed
8 x	VDI 40 fixed
12 x	VDI 30 fixed
12 x	VDI 30 driven
Maximum drive speed	4 000 rpm
Drive power	2.5 kW (3.4 hp)

option: length measuring gauge (active) on turret head (Capto or VDI)

Wheelhead

Wheelhead mounting angle	-25 deg/0 deg/+ 25 deg
Drive power vc 50 m/s	6.8 kW (9.2 hp)
Grinding wheel	dia. 400 x 50/63 x 127 mm (15.7" x 2"/2.5" x 5")

Internal grinding attachment

Number of spindle holders on swivelling ID attachment	3
Automatic positioning in 3 positions	0 deg/± 45 deg
Spindle dia.	1x dia. 100 mm (3.9") / 2x dia. 120 mm (4.7")
Speeds	24 000–120 000 rpm

Workhead fixed

Speed range	1–7 500 rpm
Drive power	10.5 kW (14.2 hp)
Tool holding fixture	MK4/DIN 55026 A4
Load during live spindle grinding	50 Nm
Roundness	0,0004 mm

Workhead swivelling

Swivel range	0–10 deg
Resolution	0–0,0001 deg
Speed range	1–4 000 rpm
Drive power	4.5 kW (6.1 hp)
Tool holding fixture	MT5/DIN 55026 A6
Load during live spindle grinding	50 Nm
Roundness	0,0004 mm (0.000,016")

W-axis / Tailstock

Max. travel	450/1 050 mm (17.7"/41.2")
Speed	0,001 – 15 000 mm/min (0.000,04–590 ipm)
Resolution	0,01 mm (0.000,04")
Fine adjustment	± 40 µm (0.0016")
Optional barrel tailstock	
Barrel diameter	60 mm (2.4")
Fitting taper	MT4
Barrel travel	45 mm (1.8")
Optional synchronous tailstock	
Speed range	1–7 500 rpm
Drive power	10,5 kW (14 hp)
Fitting taper	MT4/DIN 55026 A4

Dressing

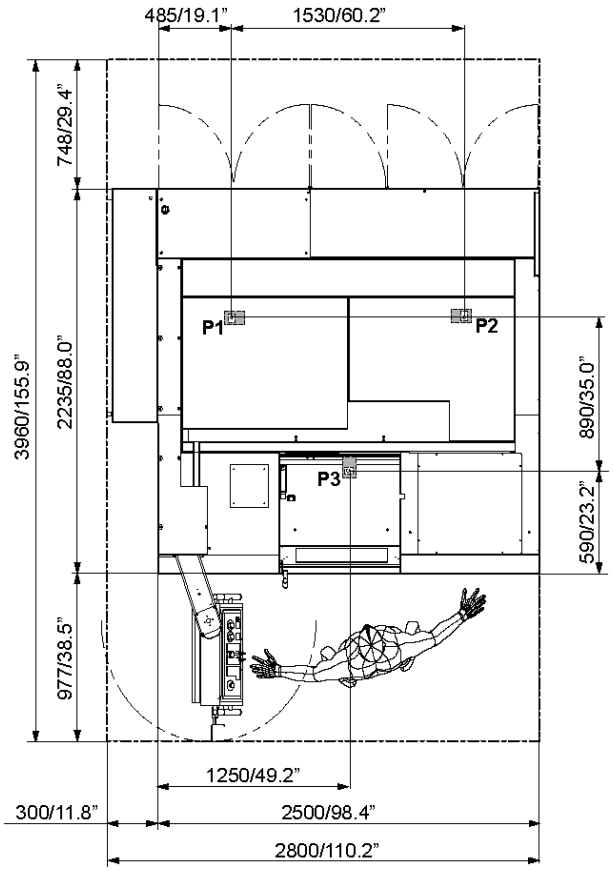
Fixed dressing tool, MK1 short	Single point diamond/fliess
Dressing spindle with dressing wheel on swiveling dresser	max. dia. 58/90 mm (2.3"/3.5")
Dressing spindle with dressing wheel behind workhead	max. dia. 100 mm (3.9")

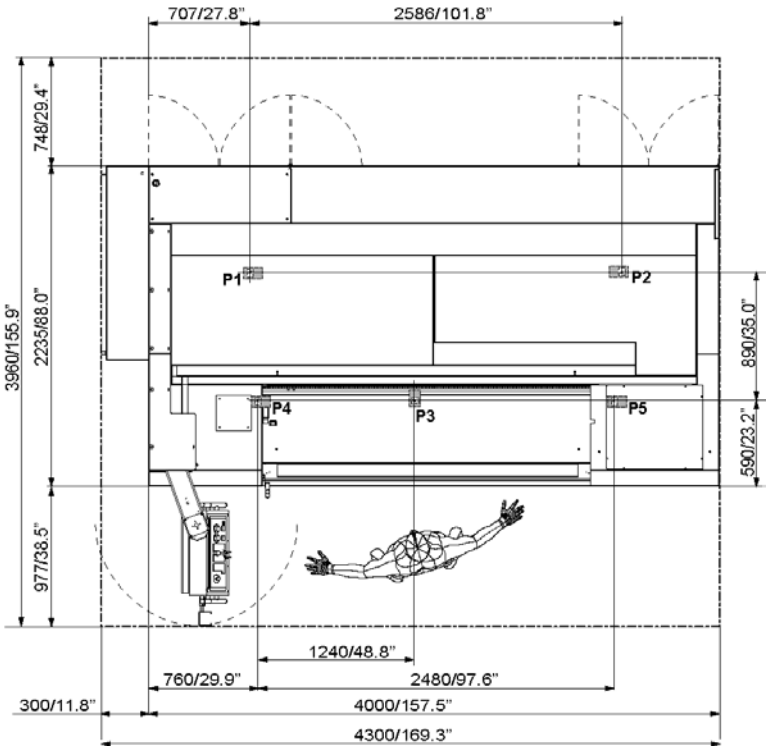
Control unit

Fanuc 31*i*-A

Connected loads

Total connected loads	45 kVA
Air pressure min.	5,5 bar (80 psi)
Total weight	7 600/12 000 kg (16 500/26 400 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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