

# The reasonably priced for individual requirements.



The Art of Grinding.



# Advantages

#### S33 – Dimensions

- Distance between centres 650/1000 mm (25.6"/39.4")
- Centre height 175 mm (6.9")
- Max. workpiece weight 80/120 kg (176/264 lbs)

#### Hardware

- Optional wheelhead:
  - Turret wheelhead with two motor spindles (right/right) and an internal grinding attachment with manual swivel 2.5° Hirth or automatic swivel 1° Hirth.
  - External wheelhead with grinding wheel on the right, can be swivelled on 0 deg and 30 deg end stops.
- External and internal grinding possible in one setup
- C axis for the workhead enabling form and thread grinding
- Granitan<sup>®</sup> mineral-casting S103 machine base

#### Software

- Easy programming with StuderWIN on Fanuc 0*i*-TD with integrated PC
- StuderGRIND programming software for producing grinding and dressing programs on a PC
- Reduced setup and resetting times with Studer Quick-Set
- Standardized interfaces for peripheral devices





### Universally unique

Even more complex workpiece geometries can be ground in a single clamping! This is made possible by a new wheel head with two motor spindles for external grinding and an internal grinding unit. Three grinding wheels ensure that the workpiece can be machined even more individually and quickly – complete machining in a class of its own!

# **Customer value**

- Utilize the max. grinding length with both wheels
- Motor spindle incl. frequency convertor
- Constant cutting speed is included in the standard package
- Two grinding wheels Ø 500mm
- High-frequency internal grinding spindle

# The reasonably priced for individual requirements.

# The CNC universal grinding machine for small budgets and high demands.

The S33 CNC universal cylindrical grinding machine – designed for grinding medium-sized workpieces in individual and series production – is manufactured with distances between centers of 650 mm (25.6") and 1000 mm (39.4").

The solid Granitan<sup>®</sup> S103 machine base forms the basis for a cylindrical grinding machine that is equipped with high quality components, thus guaranteeing maximum precision, performance and reliability over many years. The choice of partial or complete enclosure provides an optimum insight into the grinding process.

The practical Studer grinding software with its proven pictogramming allows even less experienced users to quickly optimize the potential of this machine. The StuderGRIND software is also available; this enables efficient programming of special applications, such as form and thread grinding. The systematic development, production, assembly and testing of Studer products are carried out in a process-oriented manner and in strict compliance with the VDA 6.4 and ISO 9001 directives.

#### Changeover in two minutes

Changing over from grinding between centers to live spindle grinding is particularly easy on the S33. Only a few movements are needed to withdraw the tailstock to its «park position» and free up the space required for internal grinding. Reference points from grinding wheels to dressing tool and workpiece can be registered very quickly with the help of Quick-Set, the softwarecontrolled set-up device from Studer. The new grinding cycle can then be started.



# Granitan® mineral-casting S103 machine base

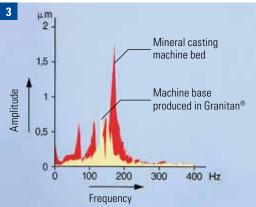
The material structure developed by Studer and which has proved its superb efficiency over many years is produced in the company's own plant using the most modern industrial techniques.

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- The excellent dampening proprieties of the machine base ensures outstanding surfacequality 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<sup>®</sup>, resulting in high dimensional accuracy at all times.
- The V and flat guideways for the longitudinal and cross slides are moulded directly into the machine base and are provided with a nonabrasiveGranitan<sup>®</sup> S200 slideway coating. The patented knobbed structure of the guideways largely eliminates the slip-stick effect or floating of the slides observed on conventional guideways. The guideways offer the highest possible accuracy through the entire speed range with high load capacity and dampening levels. Thanks to the robust and maintenancefree design, these excellent guideway characteristics are more or less completely retained.

- Vibration-damping
- Thermal stability
- Non-wearing





- 1 | Machine bed with longitudinal and cross guideways
- 2 | Guideways with patented surface structure
- 3 | Vibration behavior of gray cast iron and Granitan® \$103
- 4 | Swivelling table with setup scale
- 5 | Machine base with longitudinal and cross slides

# Longitudinal and cross slides

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. The slides rest completely on the guideways of the machine bed through the entire speed range. This provides the cornerstone for the excellent inherant grinding straightness of 0.0025 mm (0.000,010") over 650 mm (25.6") measured length. The slides are advanced by 40 mm (1.57") diameter circulating ball screws connected to a three-phase servomotor via torsion-resistant, bellow-type couplings. These axes achieve high process speeds, on the one hand, while on the other hand the short auxiliary times also guarantee maximum precision with in-feed movements of 0.0001 mm (0.000,040"). These axes can be equipped with rotative or linear measuring systems, depending on requirements.

The top of the longitudinal slide has a surface that is ground over its entire length and acts as a support for the workhead, the tailstock, as well as accessories and devices. The scale, recessed in the table, makes it easy to set up and reset the machine.

- High-accuracy axis movements
- Auxiliary scale for setup and resetting
- Effective covering of the guideways







- Complete machining
- High output
- High cutting speed of 50 m/s (9842 sfpm)





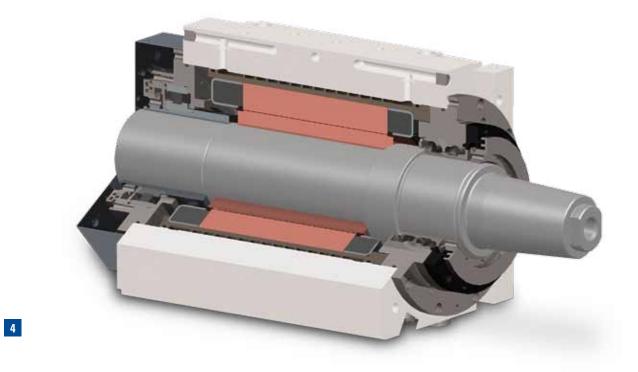
#### Wheelheads

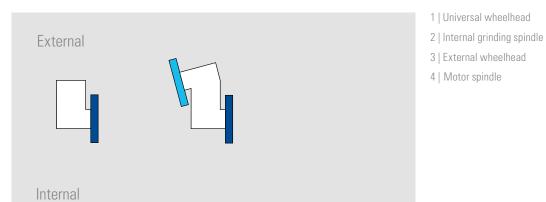
Two variants are available:

- The new turret wheelhead with two motor spindles and an internal grinding attachment enables grinding of even more complex workpiece geometries in a single clamping.
- An **external wheelhead** with belt-driven spindle is available for production applications. It can be manually adjusted to 0° or 30°.

The S33 offers maximum grinding lengths for both distances between centers.

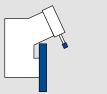
The new turret wheelhead can be equipped exactly to customer requirements. Thanks to the sophisticated geometry, the entire distance between centers can be traversed with all grinding wheels. The motor spindles make a large contribution to the legendary Studer precision. They are manufactured entirely in-house.



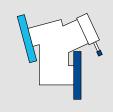


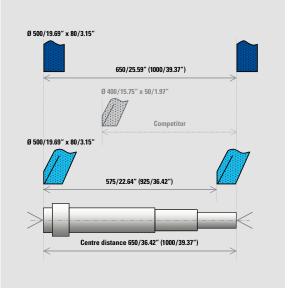


Universal









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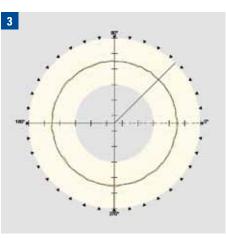


# Workhead

The versatile universal workhead enables both live spindle grinding and grinding between centers. The machine can also be fitted with a specially designed chuck workhead for chuck applications. The workheads are equipped with roller bearings, are low-maintenance and have an excellent roundness accuracy of under 0.0004 mm (0.000,016"), which can be optionally improved to under 0.0002 mm (0.000,008") during live spindle operations. The fine adjustment allows for taper corrections in the 1 µm range during live spindle operations. Like the tailstock, the workhead is also equipped with a pneumatic lifting device to facilitate movement during setup and resetting.

The optional C-axis enables thread and form grinding, increasing the machine's potential applications. A controlled power chucking cylinder which actuates power chuck and spring collets is available for automatic workpiece clamping.





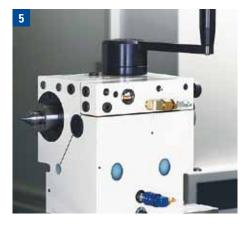


- Pneumatic lifting
- Low-maintenance
- High roundness accuracy

# Tailstock

The generously dimensioned barrel, designed for the use of Morse 3 (4) taper centers, glides in the tailstock housing. The center pressure can be adjusted with the delicate precision required for grinding high-precision workpieces. The tailstock can be equipped with a hydraulically actuated barrel retraction for workpiece changeover. The fine adjustment enables taper corrections in the range below 1 µm when grinding between centers. A pneumatic lifting process facilitates movement during setup and resetting.

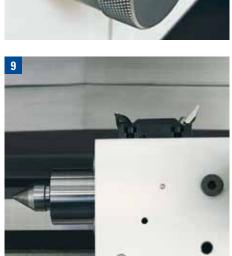
In order to guarantee optimum thermal stability, the tailstock is flooded with cooling lubricant, as are the barrel and the diamond holder. The machine is also equipped with an optional synchronous tailstock for direct driving of workpieces between centers.



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- Taper corrections
- Barrel flooding







- 1 | External and internal thread grinding
- 2 | Fine adjustment for taper corrections
- 3 | Roundness during live spindle grinding operations
- 4 | Universal workhead
- 5 | Tailstock
- 6 | Fine adjustment for taper corrections
- 7 | Tailstock in «Park» position for live spindle grinding
- 8 | Dressing spindle for rotative dressing
- 9 | Dressing tool holder

# Machine control and operation

The Fanuc 0*i*-TD CNC control with integrated PC and 15" touch screen 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.

A special function – the Sensitron electronic contact detection device – reduces downtimes to a minimum.

- StuderWIN operator interface
- Touch screen (PC control unit 15")
- Graphic operator prompting
- PCU2 manual control unit

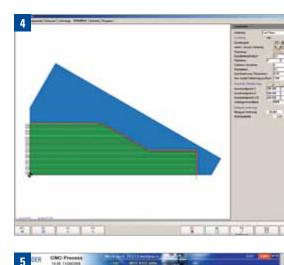






- 1 | Machine control
- 2 | Internal view of the control cabinet
- 3 | Manual control unit
- 4 | StuderDress integrated
- 5 | Contact detection
- 6 | Wheelhead set-up

- Latest software technology
- Pictogramming
- StuderGRIND programming software



# StuderWin

StuderWIN as user interface and the software modules of StuderGRIND create a stable programming environment and contribute to the efficiency of the machine. A PC is integrated into the CNC control. The possibility of fully integrating the in-process gauging and sensor technology for process monitoring as well as contact detection and automatic balancing systems in the Windows control enable standardised programming of the different systems. The software for an internal loading system is also integrated in the control. The drive elements are optimally adapted to the control.

The sophisticated mechanical engineering concept of the S33 is completed by a grinding software program developed in-house by Studer and continuously further optimized in collaboration with customers.

This software offers:

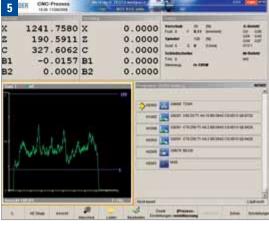
- Pictogramming: The operator strings the individual grinding cycles together – the control unit generates the ISO code.
- Quick-Set: The software for grinding wheel alignment reduces changeover times by up to 90%.

- Microfunctions: Free programming of grinding and dressing process sequences for optimization of the grinding process.
- The proven StuderGRIND software modules now also run under StuderWIN. A valuable asset for all customers is StuderTechnology integrated with the technology computer for automatic calculation of grinding parameters.

# Further modules:

#### StuderDress integrated StuderContour integrated StuderForm integrated StuderThread integrated

StuderGRIND also continues to show its strengths in offline programming. The program is created on the PC and transferred directly to the machine control unit.







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Summary key data				
Range of workpieces	Shaft parts			
Dimensions	Workpiece weight approx. 5 kg (1			
	Workpiece length	20-300 mm (0.8"-11.8")		
	Workpiece dia.	6–100 mm (0.2"–3.9")		
	Gripper dia.	6-60 mm (0.2"-2.4")		
Workpiece feed	Prepositioned on prism conv	Prepositioned on prism conveyor		
Autonomy	max. 36 parts (with gripper o	max. 36 parts (with gripper dia. 30 mm (1.2")		
	and max. workpiece dia. 38 mm (1.5")			
Positioning accuracy	vertical ± 0.1 mm/horizonta	vertical $\pm$ 0.1 mm / horizontal $\pm$ 0.1 mm (0.004")		

# STUDER smartLoad

The STUDER smart*Load* is the ideal solution for automation of the S33 universal cylindrical grinding machine. The add-on loader is suitable for shaft components up to a part length of 300 mm and a diameter of up to 100 mm, thus covering a good portion of the component range possible on this machine. The dual gripper unit as a H-configuration allows a very short workpiece loading/unloading time. The workpieces are fed by a synchronized conveyor with an autonomy of maximum 36 parts. The smart*Load* housing, coordinated with the machine design, enables safe and clean operation of the system.

# **Content of supply**

- User interface integrated into machine control (Teach-In)
- SPC- and scrap channels / SPC via softkeys
- Mechanical and electrical interface

### Accessories and services

There is an extensive range of accessory equipment available for all Studer cylindrical grinding machines, including centers, dressing tools, grinding wheels, clamping devices, internal grinding spindles, in-process gauging devices, etc.

The Studer Training Department organizes courses for hundreds of customers every year specializing in programming and machine use – a sound basis for optimum use of your Studer machines. Maintenance courses are tailored to the respective requirements of the maintenance departments.

On request, they can also take place on the customer's premises. Studer specialists collaborate in grinding problems, in order to achieve the optimal solution

The after sales service is able to speak the user's language and operates on a worldwide basis. This ensures that the service technicians do not have to travel far to make customer visits. The well thought-out service offer enables them to support the user to operate the machine in an optimal manner. And spare parts availability is guaranteed for a minimum of 10 years after installation.

#### - Commissioning

- Training
- Production support
- Warranty extension
- Maintenance
- HelpLine

- Repair
- Spare parts
- Teleservice
- Inspection
- Overhaul

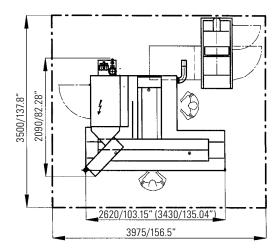
1 | Add-on loader smartLoad

- 2 | Parts feed
- 3 | Deployment of engineers on the customer's premises
- 4 | Training on simulators





Main dimensions				
Distance between centres	650/1000 mm (25.6"/39.4")	650/1000 mm (25.6"/39.4")		
Centre height	175 mm (6.9")			
Max. workpiece weight between centres	80/120 kg (176/264 lbs)	80/120 kg (176/264 lbs)		
Cross slide: X axis				
Max. travel	285 mm (11.2")	285 mm (11.2")		
Speed	0,001-10000 mm/min (0.000,04-394 ipm)	0,001—10 000 mm/min (0.000,04—394 ipm)		
Resolution	0,0001 mm (0.000,004")			
Longitudinal slide: Z axis				
Max. travel	800/1150 mm (31.5"/45.3")			
Speed	0,001 – 20 000 mm /min (0.000,04 – 787 ipm)			
Resolution	0,0001 mm (0.000,004")			
Machine table swivelling range	8.5 deg			
Wheelhead				
	Type: external	Type: universal		
Positive stop	0 deg/30 deg			
Swivel range		-15 deg to +225 deg		
Manual swivelling axis		2,5 deg Hirth		
Automatic swivelling axis		1 deg Hirth		
Fitting taper	dia. 63 mm (2.48")	dia. 63 mm (2.48")		
Drive power	7.5 kW (10 hp) [9 kW (12 hp)]	11 kW (15 hp)		
Grinding wheel right, dia. x width x bore	500 x 63 (80F5) x 203 mm 20" x 2.5" (3.15"F5) x 8"	500 x 63 (80 / 110F5) x 203 mm 20" x 2.5" (3.15" / 4.33"F5) x 8"		
Circumferential speed	up to 50 m/s (9840 sfpm)	up to 50 m/s (9840 sfpm)		
Internal grinding device for high frequency internal grinding spindles		dia. 120 mm (4.73")		
Speeds		24 000 – 120 000 rpm		



Fitting taperMorse 4Morse 4Morse 4Bob 50Spindle feadthroughdia. 26 mm (1.02")dia. 30 mm (1.18")dia. 50 mm (1.97")Spindle feadthrough34 W (4 hg)1.7 / 3 W (2 / 2 / hg)3 / 4 W (4 / 5 h hg)Sund during live grinding70 Nm (52 / 1 kb)70 Nm (52 / 1 kb)70 Nm (52 / 1 kb)Boundness accuracy during live grinding0.0001 mm (0.000016")(Option: 0.0002 mm / 0.0000 mm (0.000010")(Option: 0.0002 mm / 0.0000 mm (0.000010")Option:UUUUUUParticitititititititititititititititititit	Universal workhead			
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Drive power3 kW (2 96 hp)3/ kW (2 96 /s) 95 hp)Lead during live grinding100 Nm (74 ft lbs)250 Nm (186 ft lbs)Boundness accuracy during live grinding0.0004 mm (0.000,016") (Option: 0.0002 mm /0.000,008")0.0004 mm (0.000,016") (Option: 0.0002 mm /0.000,008")Doption:0.0001 deg0.0001 degCaxis standard, indirect measuring system0.0001 deg0.0001 degFailstock0.0001 deg0.0001 degFristerMK3/MK4Fravel of barrel35/50 mm (1.38"/1.97")Diameter of barrel50 mm (1.97")Fine adjustment for cylindricality corrections±40 µm (0.0016")Control unitStraightness of the surface lineStraightness of the surface line <t< td=""><td>Fitting taper</td><td>Morse 4</td><td></td><td>IS050</td></t<>	Fitting taper	Morse 4		IS050
coad during live grinding100 Nm (74 ft lbs)250 Nm (186 ft lbs)Boundness accuracy during live grinding0,0004 mm (0.000,016") (Option: 0.0002 mm /0.000,008")0,0004 mm (0.000,016") (Option: 0.0002 mm /0.000,008")Doton:0.0001 deg0.0001 degCaxis standard, indirect measuring system0,0001 deg0.0001 degInterpret MK3/MK4Interpret	Spindle feedthrough	dia. 26 mm (1.02")		dia. 50 mm (1.97")
Nondness accuracy during live grinding0.0004 mm (0.000,016") (Option: 0.0002 mm /0.000,008")0.0004 mm (0.000,016") (Option: 0.0002 mm /0.000,008")Detrion:Caxis standard, indirect measuring system0.001 deg0.001 degGaistockFitting taperMK3/MK4Travel of barrel35/50 mm (1.38"/1.97")Diameter of barrel50 mm (1.97")Diameter of barrel50 mm (0.0016")Entro of barrel440 µm (0.0016")Farue O/F D Standalone Panel /Straightness of the surface lineStraightness of the surface lineGauge length 650 mm (25.6")0.0025 mm (0.000,10")Gauge length 1000 mm (39.4")0.0025 mm (0.000,12")Connected load20 kVAAir pressure50 bar (80 psi)Contact using the surface lineContact using the surface line	Drive power	3 kW (2.96 hp)		3/4 kW (2.96/3.95 hp)
(Option: 0.0002 mm/0.000,08")         (Option: 0.0002 mm/0.000,088")           Option:         0.001 deg         0.001 deg           Caxis standard, indirect measuring system         0.001 deg         0.001 deg <b>Faitstock</b> Itting taper         MK3/MK4         Itting taper           Travel of barrel         35/50 mm (1.38"/1.97")         Itting taper           Diameter of barrel         50 mm (1.97")         Itting taper           Diameter of barrel         50 mm (1.0016")         Itting taper           Diameter of barrel         50 mm (1.97")         Itting taper           Diameter of barrel         0.0016")         Itting taper           Diameter of barrel         0.0016")         Itting taper           Straightmest of revindricality corrections         ±40 µm (0.0016")         Itting taper           Generated working precision         Itting taper         Itting taper           Straightness of the surface line         Itting taper         Itting taper           Gauge length 650 mm (25.6")         0.0025 mm (0.000,10")         Itting taper           Gauge length 1000 mm (39.4")         0.0030 mm (0.000,12")         Itting taper           Gauge length 1000 mm (39.4")         0.0030 mm (30.000,12")         Itting taper           Gauge length 1000 mm (39.4")         0.0030	Load during live grinding	100 Nm (74 ft lbs)		250 Nm (186 ft lbs)
Carsis standard, indirect measuring system         0.0001 deg         0.0001 deg           Failstock         0.0001 deg         0.0001 deg           Failstock         MK3/MK4         Commercision         Commercision           Fravel of barrel         0.0001 deg         Commercision         Commercision           Diameter of barrel         0.0001 deg         Commercision         Commercision           Control unit	Roundness accuracy during live grinding			
Failstock       MK3/MK4         Fitting taper       MK3/MK4         Fitting taper       35/50 mm (1.38"/1.97")         Diameter of barrel       50 mm (1.38"/1.97")         Diameter of barrel       50 mm (1.97")         Fine adjustment for cylindricality corrections       ±40 µm (0.0016")         Control unit       50 mm (1.97")         Fance O/-TD Standalone Panel /       Gauranteed working precision         Straightness of the surface line       0.0025 mm (0.000,10")         Sauge length 650 mm (25.6")       0.0025 mm (0.000,12")         Connected load       20 kVA         Total connected load       20 kVA         Air pressure       5.5 bar (80 psi)         Fotal weight       4000 kg (8800 lbs)	Option:			
Fitting taperMK3/MK4Iravel of barrel35/50 mm (1.38"/1.97")Diameter of barrel50 mm (1.97")Fine adjustment for cylindricality corrections±40 µm (0.0016")Control unit±40 µm (0.0016")Fance 0/-TD Standalone Panel iStatemeter of barrelGuaranteed working precision50 mm (0.000,10")Straightness of the surface line0.0025 mm (0.000,10")Gauge length 650 mm (25.6")0.0025 mm (0.000,10")Sauge length 1000 nm (39.4")0.0030 nm (0.000,12")Connected load20 kVAAir pressure5.5 bar (80 psi)Fotal weight5.5 bar (80 psi)Distance between centres 650 mm (25.6")4000 kg (8800 lbs)	C axis standard, indirect measuring system	0.0001 deg		0.0001 deg
Travel of barrel         35/50 mm (1.38"/1.97")           Diameter of barrel         50 mm (1.97")           Eine adjustment for cylindricality corrections         ±40 μm (0.0016")           Control unit	Tailstock			
Diameter of barrel50 mm (1.97")Fine adjustment for cylindricality corrections±40 µm (0.0016")Control unitFance 0/-TD Standalone Panel /Fance 0/-TD Standalone Panel /Guaranteed working precisionStraightness of the surface lineStraightness of the surface lineGauge length 650 mm (25.6")0.0025 mm (0.000,10")Gauge length 1000 mm (39.4")0.0030 mm (0.000,12")Connected load20 kVAIorla connected load20 kVAAir pressure5.5 bar (80 psi)Total weight4000 kg (8800 lbs)	Fitting taper	MK3/MK4		
Fine adjustment for cylindricality corrections       ±40 μm (0.0016")         Control unit	Travel of barrel	35/50 mm (1.38"/1.97")		
Control unit         Fanuc 0/-TD Standalone Panel /         Guaranteed working precision         Straightness of the surface 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       20 kVA         Air pressure       5.5 bar (80 psi)         Fotal connected load       4000 kg (8800 lbs)	Diameter of barrel	50 mm (1.97")		
Fanuc 0 <i>i</i> -TD Standalone Panel <i>i</i> Guaranteed working precision         Straightness of the surface 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 load       20 kVA         Total connected load       20 kVA         Air pressure       5.5 bar (80 psi)         Fotal weight       4000 kg (8800 lbs)	Fine adjustment for cylindricality corrections	±40 μm (0.0016″)		
Guaranteed working precision         Straightness of the surface line       0.0025 mm (0.000,10")         Gauge length 650 mm (25.6")       0.0025 mm (0.000,12")         Gauge length 1000 mm (39.4")       0.0030 mm (0.000,12")         Connected loads       20 kVA         Fotal connected load       20 kVA         Air pressure       5.5 bar (80 psi)         Fotal weight       4000 kg (8800 lbs)	Control unit			
Straightness of the surface 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       20 kVA         Total connected load       20 kVA         Air pressure       5.5 bar (80 psi)         Fotal weight       4000 kg (8800 lbs)	Fanuc O <i>i</i> -TD Standalone Panel i			
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         20 kVA           Total connected load         20 kVA           Air pressure         5.5 bar (80 psi)           Total weight         4000 kg (8 800 lbs)	Guaranteed working precision			
Gauge length 1000 mm (39.4")       0.0030 mm (0.000,12")         Connected loads       Image: Connected load         Fotal connected load       20 kVA         Air pressure       5.5 bar (80 psi)         Fotal weight       Image: Connected load         Distance between centres 650 mm (25.6")       4000 kg (8800 lbs)	Straightness of the surface line			
Connected loads     20 kVA       Total connected load     20 kVA       Air pressure     5.5 bar (80 psi)       Total weight     Jistance between centres 650 mm (25.6")	Gauge length 650 mm (25.6″)	0.0025 mm (0.000,10")		
Fotal connected load     20 kVA       Air pressure     5.5 bar (80 psi)       Fotal weight     Value (8 800 lbs)	Gauge length 1000 mm (39.4″)	0.0030 mm (0.000,12")		
Air pressure     5.5 bar (80 psi)       Total weight     4000 kg (8 800 lbs)	Connected loads			
Total weight         Distance between centres 650 mm (25.6")         4000 kg (8 800 lbs)	Total connected load	20 kVA		
Distance between centres 650 mm (25.6") 4000 kg (8 800 lbs)	Air pressure	5.5 bar (80 psi)		
	Total weight			
Distance between centres 1000 mm (39.4") 5000 kg (11 000 lbs)	Distance between centres 650 mm (25.6″)	4000 kg (8 800 lbs)		
	Distance between centres 1000 mm (39.4")	5000 kg (11 000 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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