

GRINDING



KELLENBERGER 100

The universal platform
for cylindrical grinding

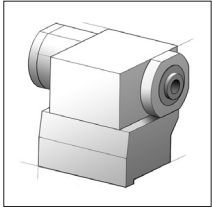


kellenberger.com

 **KELLENBERGER**

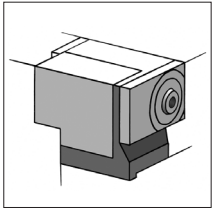
KELLENBERGER 100 – The new definition of a CNC cylindrical grinding machine

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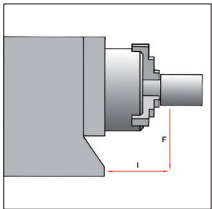
Universal workhead

- Applications with fixed or rotating spindle
- n 1-1'000 min-1
- Roundness accuracy < 0.4 μm (optionally 0.2 μm)
- integrated fine adjustment ± 0.01°



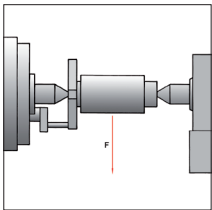
Workhead with direct drive and C axis

- for high-precision non-circular grinding
- n 1-1'000 min-1
- Roundness accuracy < 0.4 μm
- Base with fine adjustment ± 0.01°



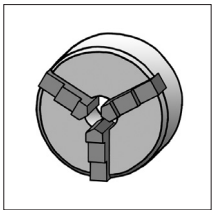
Load with chucked work

- 100 Nm
- 250 Nm with direct drive



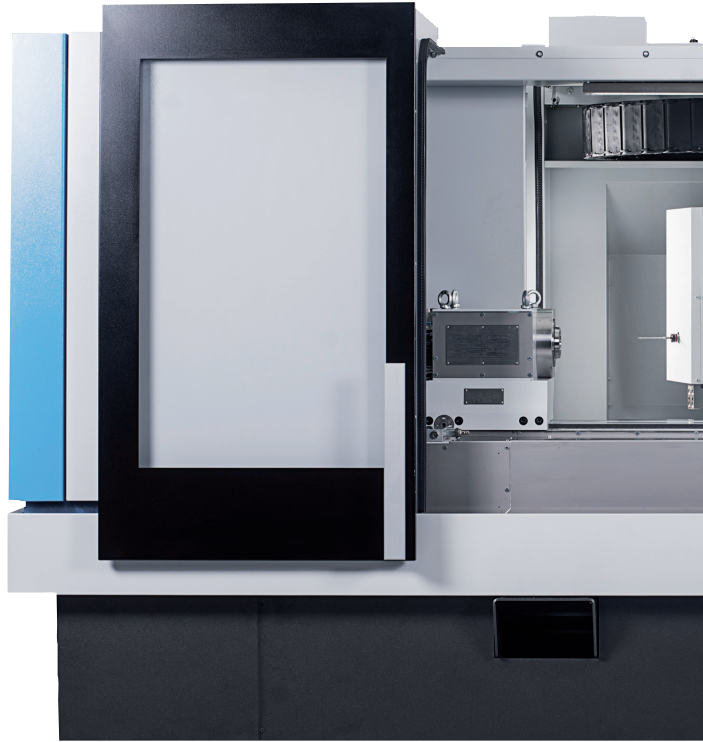
Load between centers

- 100 kg
- 150 kg with direct drive



Power clamping system

- Clamping force 5'000–20'000 N
- Power-actuated chuck
- Spring collets



CNC-Control System Fanuc 3 i i

- 19" LCD color monitor with touch operation, height-adjustable
- BLUE Solution teach-programming with OBJECT Guide for guided and easy creation of programs on the workpiece
- IPC Windows Embedded Standard 7 operating system
- Hand-held panel with axis & speed selector
- Ethernet (RJ45) and USB 2.0 connections

Basis

- FEM-optimized cast machine bed for high stability and longevity
- mechanical separation of machine and peripherals, for thermal stability and prevention of vibrations

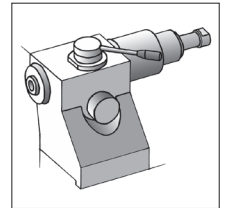
Table / slide

- Linear guide for X axis, low maintenance, high precision, proven a 1'000 times over
- Low-wear slide guide for Z-axis with special anti-stick-slip coating, for high-precision machining of contours



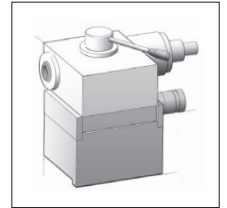
Tailstock 100

- up to 100 kg workpiece weight
 - Morse taper 4
 - retraction of sleeve 49 mm
- Adjustment range $\pm 60 \mu\text{m} / \varnothing$
 - pneumatic lifting



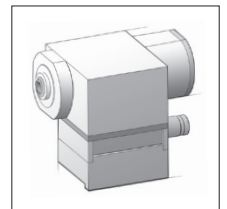
Tailstock 150

- up to 150 kg workpiece weight
 - Morse taper 4
 - retraction of sleeve 49 mm
- Adjustment range $\pm 150 \mu\text{m} / \varnothing$
 - pneumatic lifting



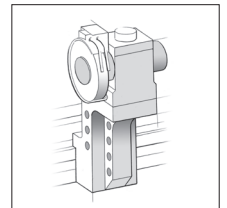
Synchronized tailstock

- Machining of shaft parts without drivers
- Sleeve with MT4 and 49 mm retraction
 - Adjustment range $\pm 150 \mu\text{m} / \varnothing$
- automatic cylinder correction (optional)



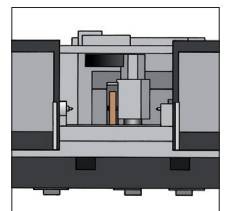
HF dressing device

- for rotating dressing tools
 - behind table assemblies
 - on the table



Automated sliding doors

- Relief for the operator
 - faster workpiece changeover times



- Glass measuring devices on X- and Z-axes
- high dynamics due to speeds of up to 20 m/min. in Z- and 10 m/min. in X-axis

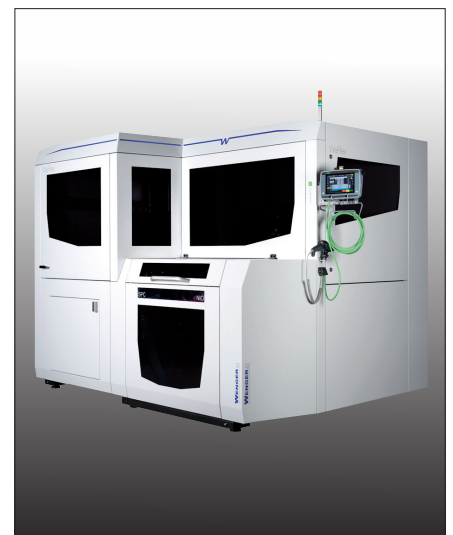
Ergonomics

- advanced optical and ergonomic design
- good overview of the grinding process
- Interfaces for table assemblies arranged centrally and for ideal access
- Swiveling and height-adjustable control panel for optimized operating convenience

- cleverly designed accessibility for low-cost maintenance and service

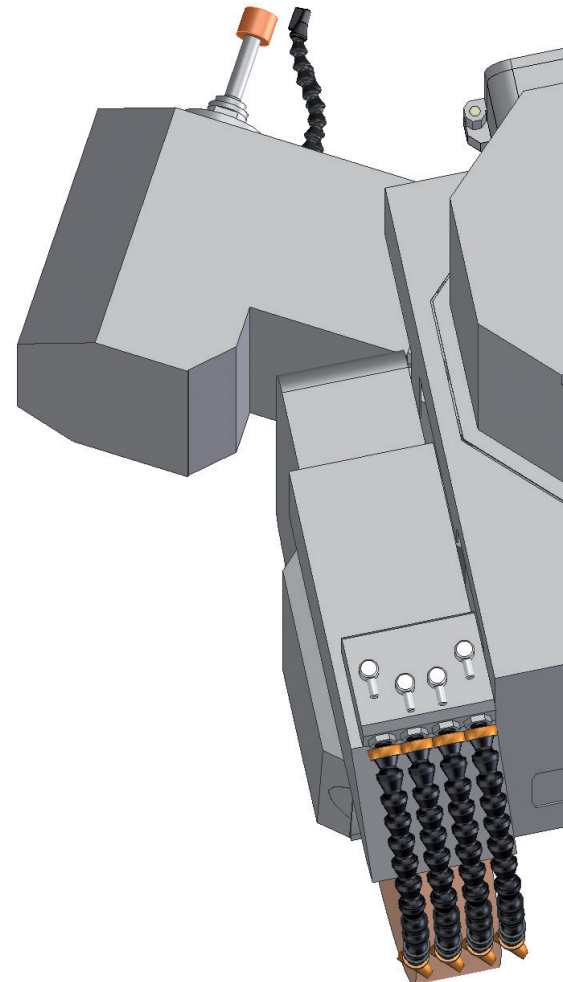
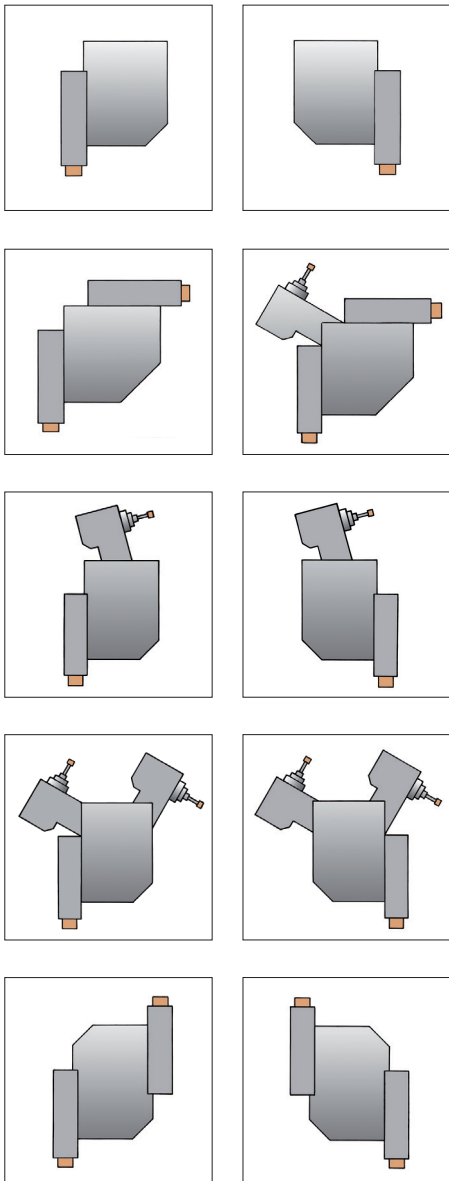
Automation

- PROFIBUS interface and prepared mechanical infrastructure
- Synchronous tailstock for complete machining of shafts
- Loading cell with highly autonomous operation and quick setup times
- project-specific solutions can be realized by request



Modular wheelhead systems — compact and innovative

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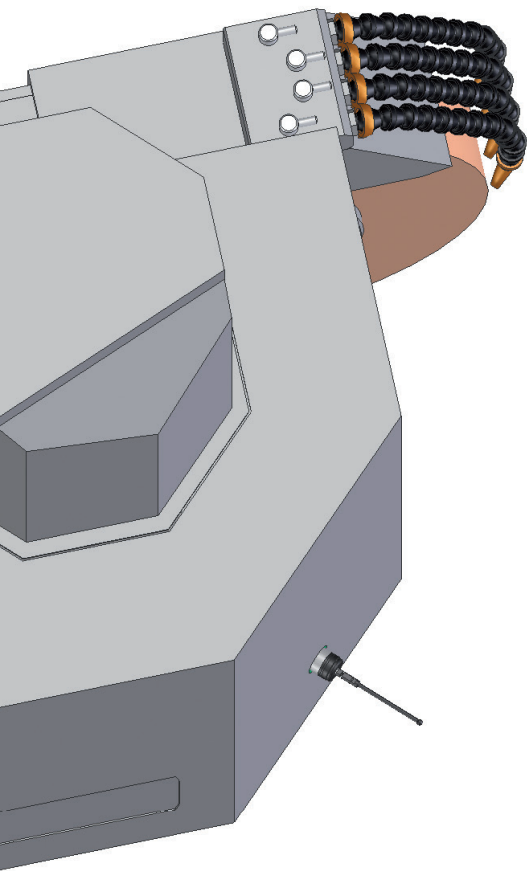
Wheelhead

The ingenious concept of the modular wheelhead allows 10 different wheelhead variants with up to 3 tool positions and one measuring head position. Each individual position is arranged in such a way that a maximum in collision-free operation is guaranteed. Combined with large axis paths, an optimum in flexibility is achieved in the machining of workpieces of different sizes.

- External grinding with water-cooled motor spindles and 11.5 kW power

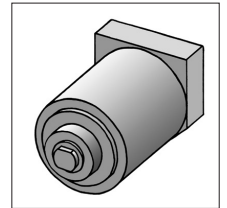
- special oil lubrication guarantees long service life
- Grinding wheel dimensions up to $\varnothing 500 \times 100$ mm
- High-frequency internal grinding spindles, available as grease-lubricated or oil-air-lubricated models
- 150 mm mounting bore allows internal grinding spindles with large radial rigidity

Internal grinding / swivel devices / accessories



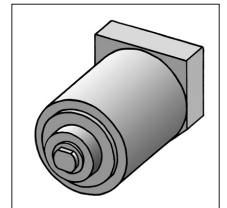
Internal grinding attachment

- grease-lubricated HF internal grinding spindle
 - 6'000 - 40'000 min⁻¹
 - 10'000 - 60'000 min⁻¹
- inexpensive and compact



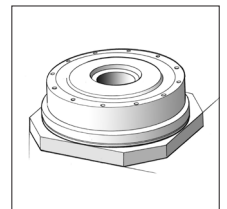
Internal grinding attachment

- Oil-air lubricated HF internal grinding spindle
 - 4'500 - 45'000 min⁻¹
 - 8'000 - 60'000 min⁻¹
 - 12'000 - 90'000 min⁻¹
- powerful and universal



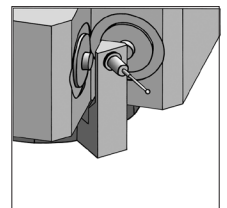
Swivel devices

- automatic indexing 1°
- B axis with direct drive (optional)
- quick tool changeover time and high-precision positioning



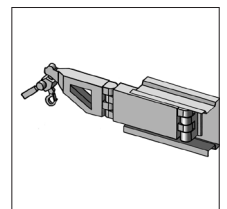
Tactile measuring head

- active measurement on external machining
 - Orientation of the workpiece position in Z- and C-position
 - mounted on wheelhead



Integrated lifting system

- ergonomic lifting system for table assemblies and grinding wheels



Swivel devices

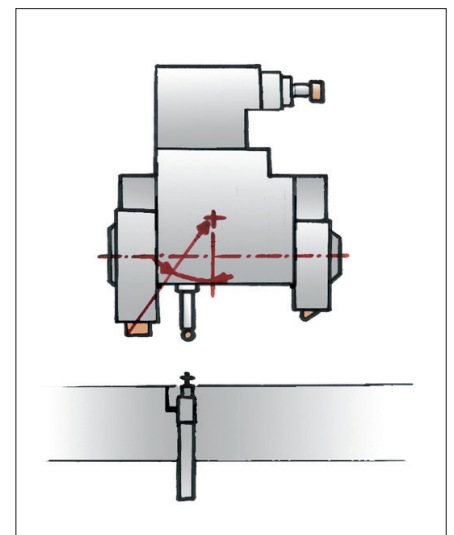
Two versions are available for positioning the wheelhead (tool change time approx. 5s):

- 1° indexing with automatic drive or
- B-axis with direct drive with resolution of 0.00003° and distortion-free clamping incl. KEL-SET (patented grinding wheel measurement)

Accessories

- tactile measuring head, fastened rigidly on wheelhead, for active measuring tasks
- integrated lifting system for grinding wheel changeover and for lifting table assemblies; saves having a crane at the machine
- various steady-rests, also including guiding steady-rests for grinding

KEL-SET



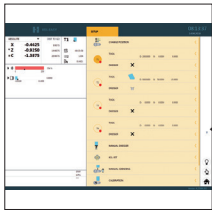
Fanuc Control System 3i – with intuitive BLUE Solution user interface

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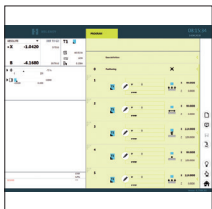
Home Screen

- 19" touch display
- one interface for all tasks
- no DIN-ISO skills necessary



Setup

- Tool definition
- Grinding wheel measuring
- manual grinding
- Calibration



Programming

- Tool
- Position
- Form
- Grinding cycle



Production

- Corrections
- Re-grinding
- Single-block grinding
- Monitoring

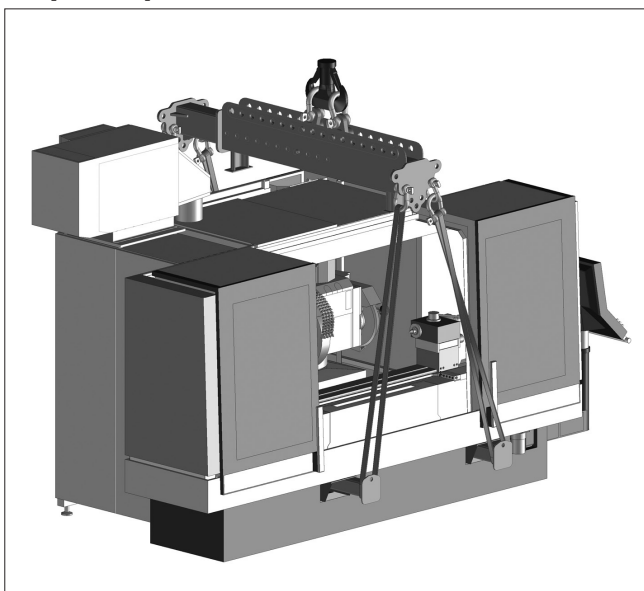


RED solution

- GRAPHIC Guide for graphic programming with DXF import
- ICON guide for free programming design, guided by form editor



Easy transport



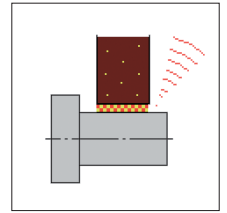
Technical data

Distance between centres	mm	600 / 1'000
Center high	mm	200
Weight of workpiece between centers	kg	bis 150
Load on chucked work	Nm	bis 250
Mains voltage required	V	400 / 460
Power consumption	A	bis 80
Space required / length x width	m	2.7 / 3.5 x 2.2
Total weight	kg	3'600 / 4'100
Longitdinal / slide Z-axis		
Travel	mm	750 / 1'150
rapid traverse speed	m/min	bis 20
Resolution	µm	0.01
Wheelslide X-axis		
Travel	mm	365
rapid traverse speed	m/min	bis 10
Resolution	µm	0.01
B-axis		
Swiveling range	Grad	280
automatic indexing	Grad	1
Resolution B-axis	Grad	0.00003



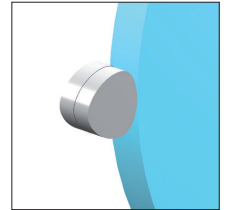
Gap control

- Gap control with up to 6 sensors
 - Operating system and display integrated in the controls



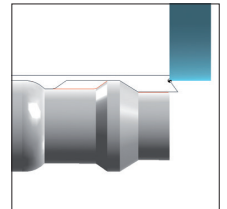
BLACK Cam solution, non circular

- 3D software for creating non-circular grinding programs
- Algorithms for error detection and rectification
 - Contour and grinding analysis function
 - Animation of the non-circular movement



BLACK Cam solution, profile

- Contour grinding or profile dressing programs
- CAD import, thread, clearing cycles



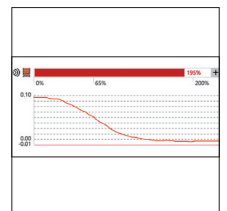
Security interface / remote diagnostics

- highest IT security standard
 - ready for Industry 4.0
- reduced standstill and maintenance times
- Cost reduction for service and maintenance



In-process gauge system

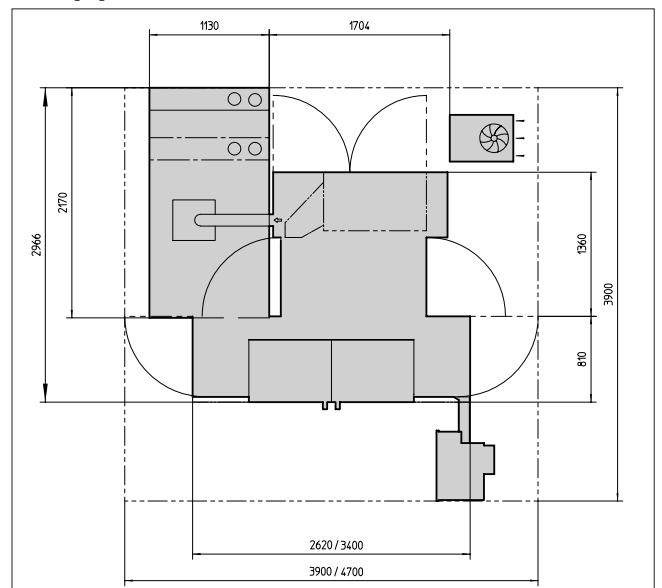
- up to 4 gauge heads
- interrupted diameters
 - non-interrupted diameters
- passive longitudinal positioning



Wheelhead		
water-cooled motor spindle	kW	11.5
Peripheral grinding wheel speed	m/s	bis 63
Grinding wheel dimensions	mm	bis Ø 500 x 100
Internal grinding attachment		
Bore for spindle	mm	Ø 150
Power; HF SI spindles	kW	4.2 - 15
Rotation speed	min-1	4'500 - 90'000
Workhead		
Resolution C-axis	Grad	bis 0.00003
Rotation spindle speed	min-1	1 - 1'000
Drive torque	Nm	bis 63
Interface		ISO 702-1, Gr. 5 / MT5
Roundness accuracy in chucked work	µm	bis 0.2
Tailstock		
Internal taper		MT4
Retraction of sleeve	mm	49
Micro-adjustment	µm	bis ±150 / Ø

All specifications and designs are subject to alterations without notice

Setup plan 600/1000



Competence and a world-wide partnership



Over the years the Hardinge Group has constantly evolved its range of products and areas of activity. As globally active and diversified company, the Hardinge Group has production sites in North America, Europe and Asia.

In addition to the development and construction of turning machines and work-holding fixtures, with Bridgeport the Hardinge Group also has a manufacturer of machining centers.

The Hardinge Group is a major global provider of customer-specific solutions for grinding applications. She encompasses all activities in the areas of cylindrical, surface and jig grinding, and includes the well known brands of Kellenberger, Hauser, Tschudin, Jones & Shipman, Usach and Voumard.

The Hardinge Group has a global network of partners with trained staff in sales, service and application engineering. This guarantees competent advice and support for evaluation, purchase, and use of the grinding systems.

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