

## Vertical and horizontal Turning/Grinding Centers



## Turning and grinding – of course with INDEX

The INDEX Turning/Grinding Centers combine the advantages of turning and grinding during hard machining. The results are shorter cycle

times and further improvements in quality and process safety. In addition, you will profit from the rigidity of our machine concept that is tradi-

tionally designed for the large process forces during turning and milling, while ensuring tolerances down to the nearest micron during grind-

ing. The high-quality guide systems ensure the high precision and long service life you expect from INDEX.



**The results speak for themselves**



**Three major advantages:**

1. Cycle time advantage:

- Hard preturning enables minimal grinding allowances
- Grinding replaces finishing operation during turning

2. Quality advantage:

- Utmost accuracy in the micron range
- Ultimate surface quality and dimensional accuracy even for interrupted cuts
- Surfaces ground flush in top quality

3. Process advantage:

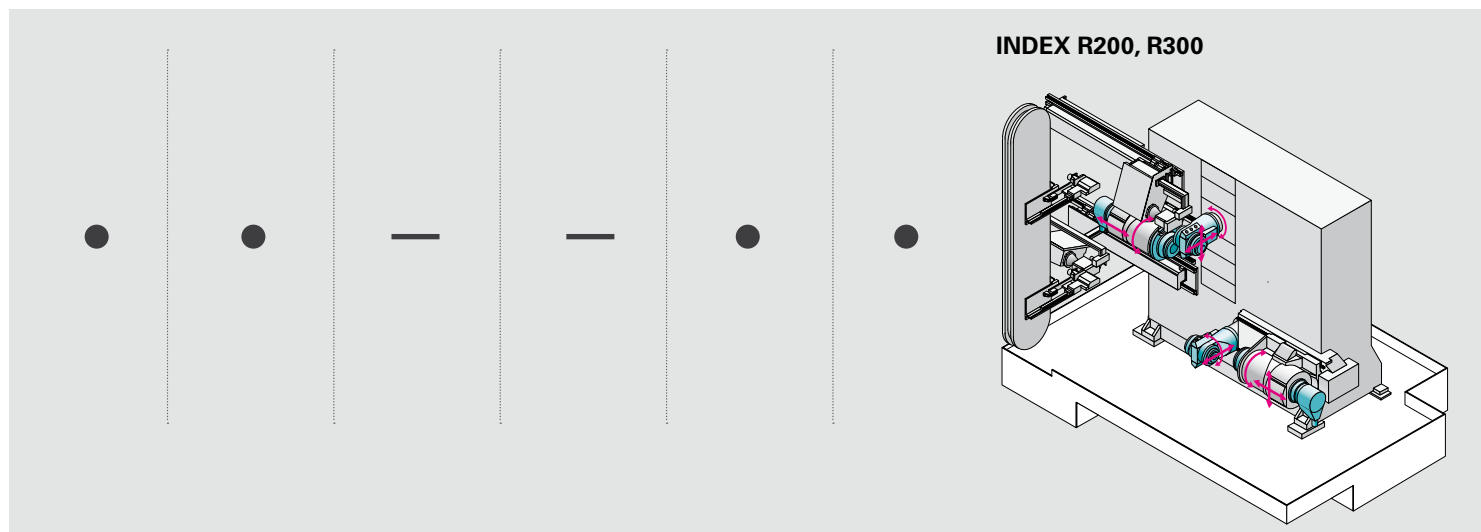
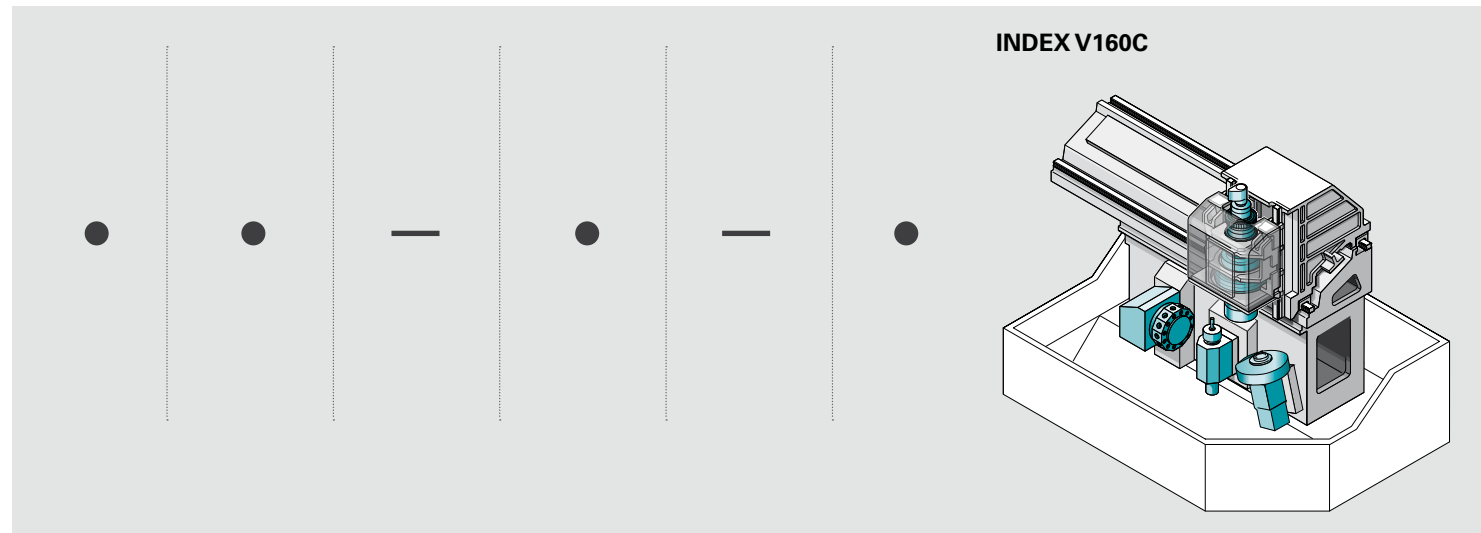
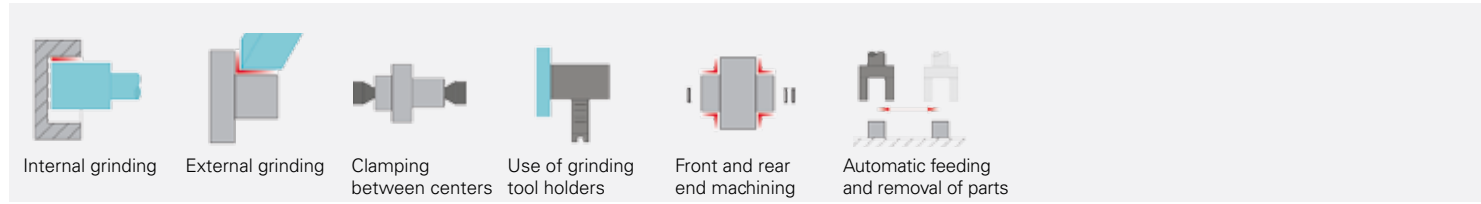
- Achieving high cmk values by combined hard turning and grinding

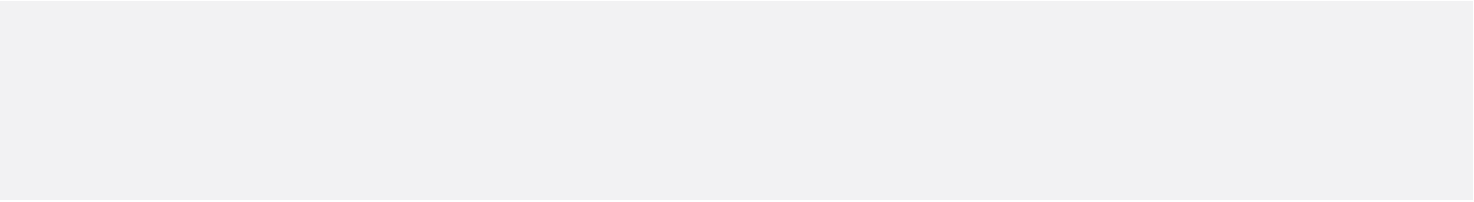
**Micron-precision:**

- Grinding roundness: 0.1 to 0.5  $\mu\text{m}$
- Roughness Ra: 0.1 to 4  $\mu\text{m}$
- Roughness Rz: 1 to 3  $\mu\text{m}$
- Very tight dimensional and positional tolerances by complete machining in one clamping setup

→ This means typical grinding qualities

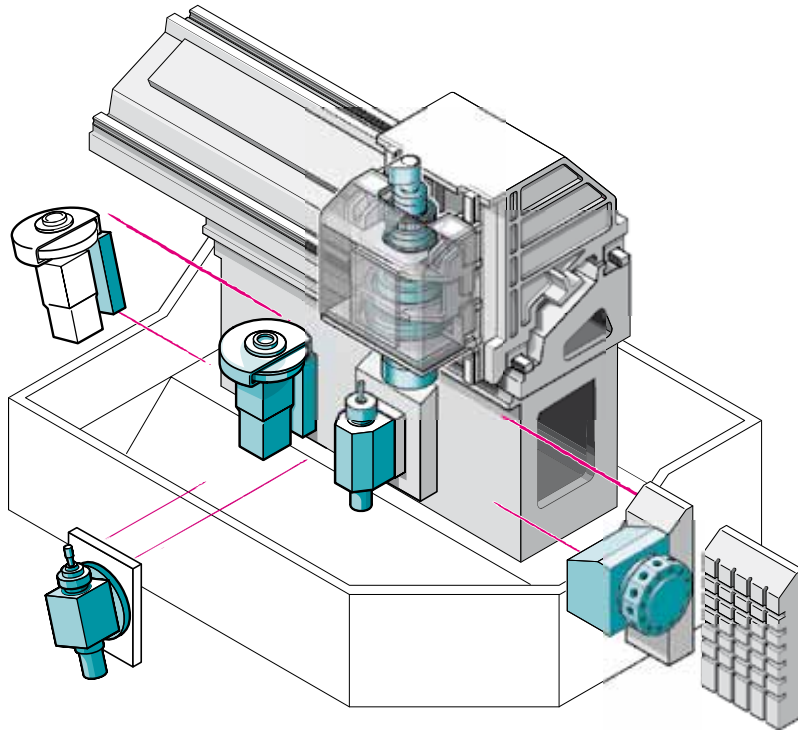
# We have the solution that fits your task





# The vertical grinding talent – the INDEX V160C

Whatever turning or grinding task you are faced with, you determine yourself which options you want. The clearly structured modular system offers you the unique advantage of incorporating in your machine precisely those functions that you need for your specific production requirements – nothing more and nothing less.



**Internal grinding units**

High-performance spindles running in anti-friction bearings with direct drive. Use of conventional, CBN, and diamond tools possible.

**External grinding units**

Typically for INDEX: Highest rigidity and precision through large high-precision anti-friction bearings. Use of conventional, CBN, and diamond tools possible.



**Grinding components**

Number of grinding spindles:

External	max.	1
Internal	max.	4

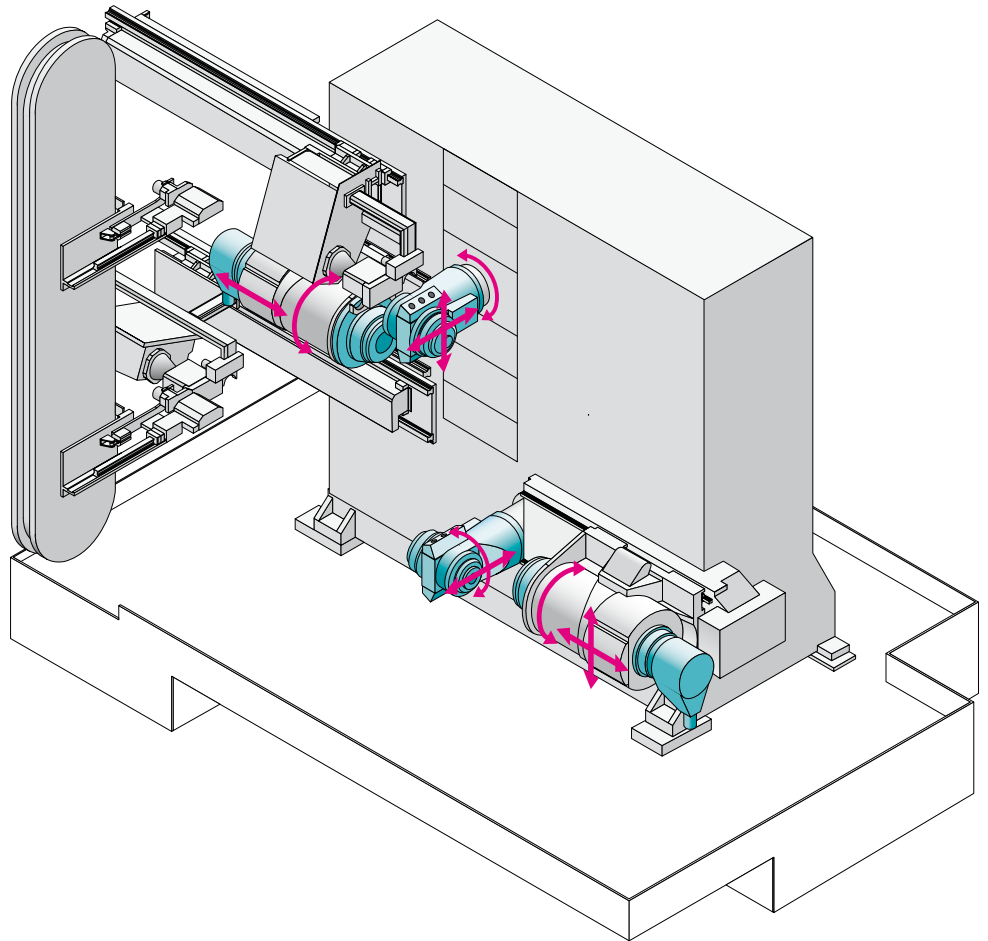
Grinding wheel dia.	mm	400
Grinding wheel width	mm	70
Power (at 100% / 25%) max.	kW	10 / 15
Speed external	max. rpm	6.000
Speed internal	max. rpm	105,000
Workpiece dia.	max. mm	220



## Limitless possibilities in 5 axes – the INDEX R200, R300

Kinematics perfectly suited for grinding allow simultaneous front and rear end machining in 5 degrees of freedom. This opens up so far unimagined possibilities for internal, external and flat grinding.

The magazine's large tool capacity saves you setup times and always gives you the best tool for the process.

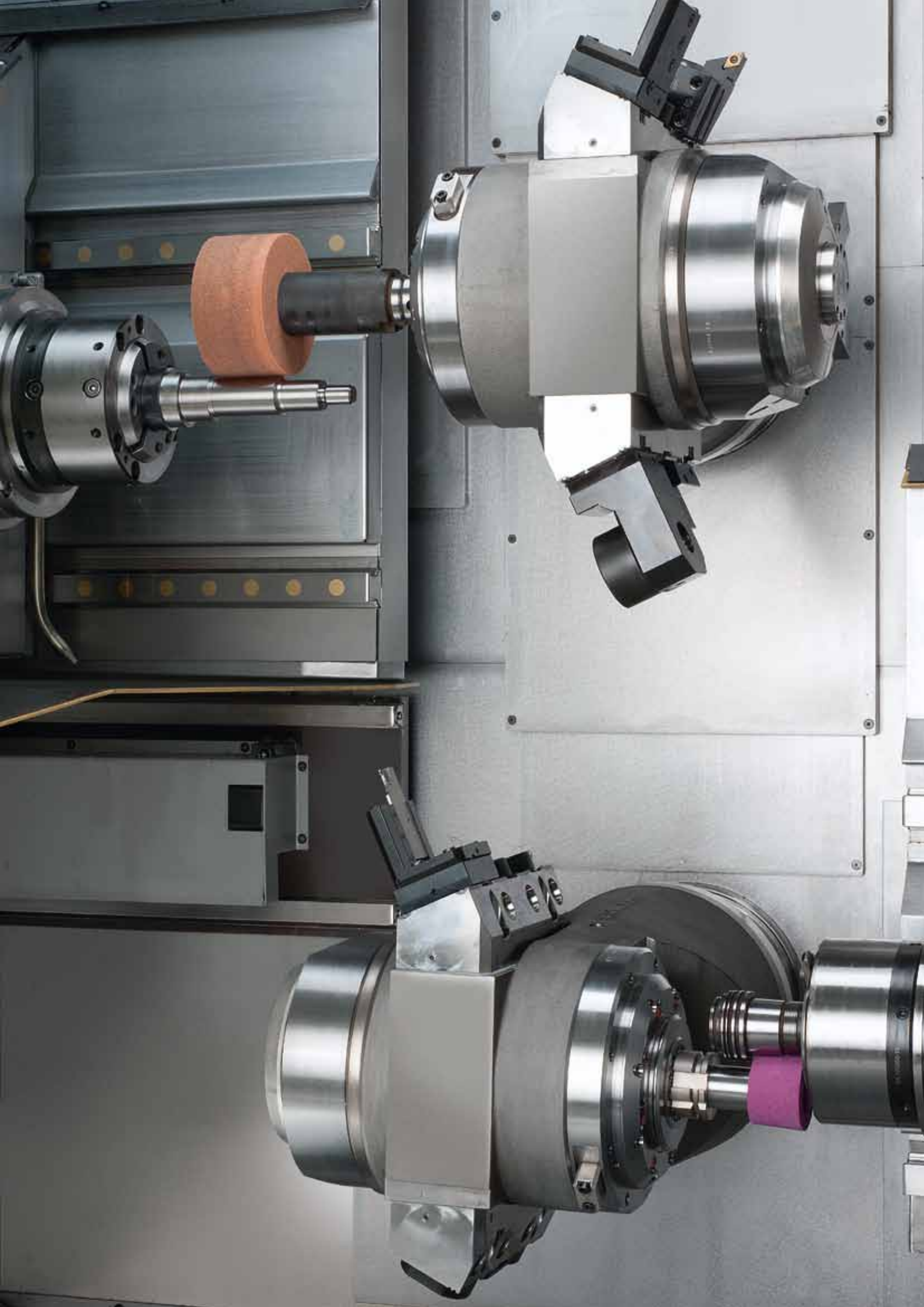


### Grinding components

		<b>R200</b>	<b>R300</b>
Grinding wheel dia.	mm	50 (80*)	63 (160*)
Mounting for grinding wheel arbors		HSK-A40	HSK-T63
Power (at 100%)	kW	11	24
Torque (at 100 / 25 %)	Nm	19 / 30	65 / 95
Rotational speed	rpm	18,000	9,000

\*Adjacent magazine stations must remain free





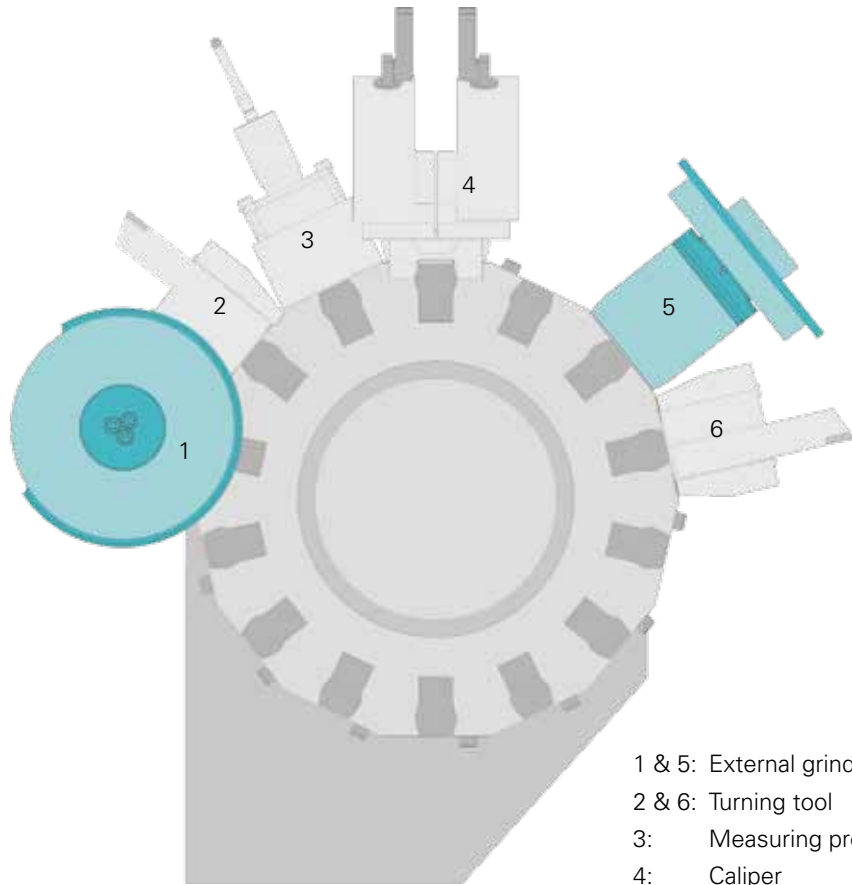
# Precise & setup-friendly – INDEX grinding tool holders

## Convert your INDEX lathe into a grinding machine

Thanks to their rigid structure, high precision and tightness, INDEX lathes are ideally suited for the use of grinding tool holders.

### Your benefits:

- Optimum condition for process-safe complete machining
- Saves grinding operations on a separate machine
- Reduces cycle times
- Avoids several clamping operations
- Grinding cycles also with Y-B-axes
- External, face, groove and flat grinding



1 & 5: External grinding spindle  
 2 & 6: Turning tool  
 3: Measuring probe  
 4: Caliper



**Radial and axial grinding tool holders**

<u>Grinding tool holder VDI 25</u>		
Grinding wheel dia., best	mm	125
Grinding wheel dia., max.	mm	150
Grinding wheel mounting		D20
Grinding wheel width, max.	mm	40 (radial 20)
Cutting speed vc max.	m/s	80
<u>Grinding tool holder VDI 30</u>		
Grinding wheel dia., best	mm	150
Grinding wheel dia., max.	mm	200
Grinding wheel mounting		D32 (radial D20)
Grinding wheel width, max.	mm	40
Cutting speed vc max.	m/s	80
For slanted type, please call.		



## Micron precision for various technologies

### Thread grinding

Cost-effective manufacturing of high-precision threads

- Any type of threads and pitches freely programmable
- Ratio effect through prechasing and finish-grinding
- Even ball-screw drives and high-precision nuts can be ground easily

*Of course, easily and flexibly available also as INDEX grinding tool holders.*



### Eccentric grinding

Grinding of various geometries and free shapes

- Finish-grinding of camshafts, polygons, Capto mountings, control cams, etc.
- Electronically coupled and precise
- Internal or external, cylindrical or conical

*Of course, easily and flexibly available also as INDEX grinding tool holders.*



### Face grinding

Grinding of various geometries and free shapes

- Flat grinding of width across flats, grooves, serrations, etc.
- Machining of all six sides
- High-precision surface shapes and positions

*Of course, easily and flexibly available also as INDEX grinding tool holders.*



# Measuring – verified quality

## In-process measurements

Continuous diameter monitoring by caliper during the grinding process

- 0.1  $\mu\text{m}$  resolution
- Ultimate process safety
- Time-independent measurements



## Post-process measurements

Dimensional verification using switching probe or air gap measurement on the clamped workpiece

- Shape and position verification of workpieces
- Flexible use for measuring diameters, chamfers and complex shapes
- Different measuring points can be probed



## External post-process measurements

Connecting an external measuring station for process monitoring

- Automatic loading / unloading of the measuring station
- Time-independent measurements
- Measurements of diameters, runs, positions, and surfaces
- Static and dynamic measurements possible

*External measuring allows integrating a variety of different measuring methods. Tell us your machining and measuring tasks.*



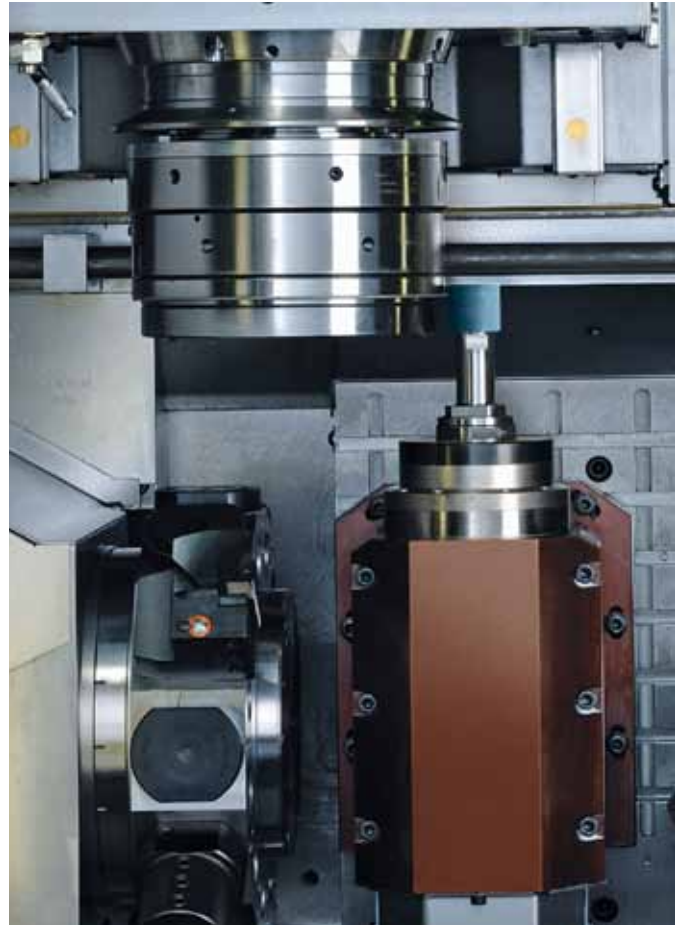
## Simply automatic – dressing, balancing and sparking

### Dressing

Whether aluminum oxide or CBN:

Highest quality by dressing with single grain diamonds, tiles, rondists or diamond rings from the clamping device.

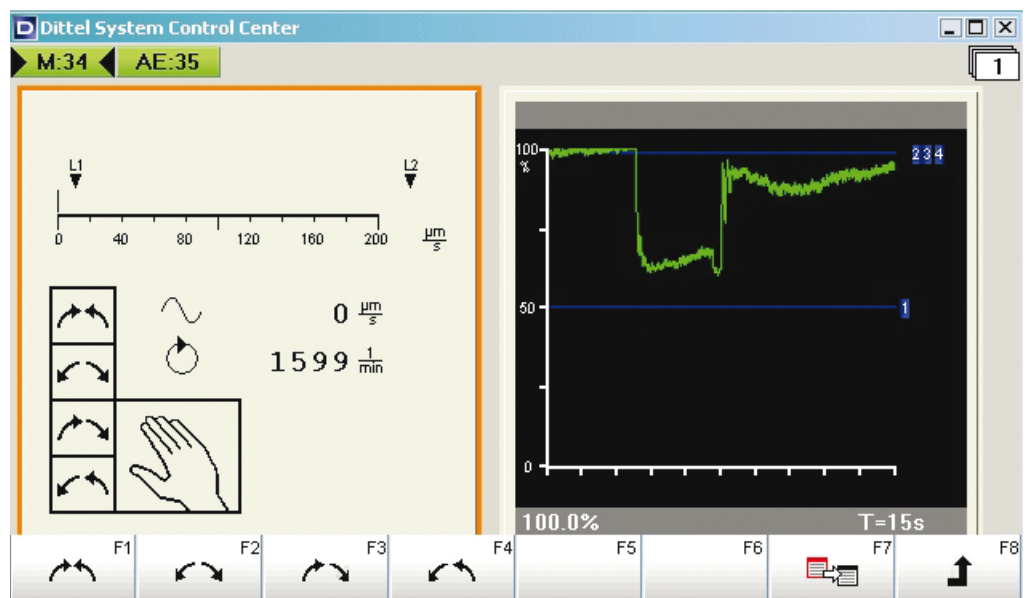
A large variety of grinding wheel contours can be programmed with ease. Periodically dressing your grinding wheel keeps it sharp and in shape.



### Balancing and sparking

Electromechanical balancing head and solid-borne sound sensor or motor current for controlling the grinding process.

Automatic sparking and balancing reduces your cycle times and produces highest surface qualities.



# The control – user-friendly in every situation

**Beneficial:** The INDEX C200-4D control concept is based on the powerful SIEMENS SINUMERIK 840D powerline. Optimal: The C200-4D control was enhanced by INDEX with intelligent features in application and speed to high-efficiency machining with several subsystems. Tailored machine cycles and time-optimized machining sequences thus result in true added value to the machine.

## Easy working

Operating the control makes it easy to safely handle several tool carriers simultaneously: whether during setup and run-in or by synchronized representation of the subsystems, also during programming.

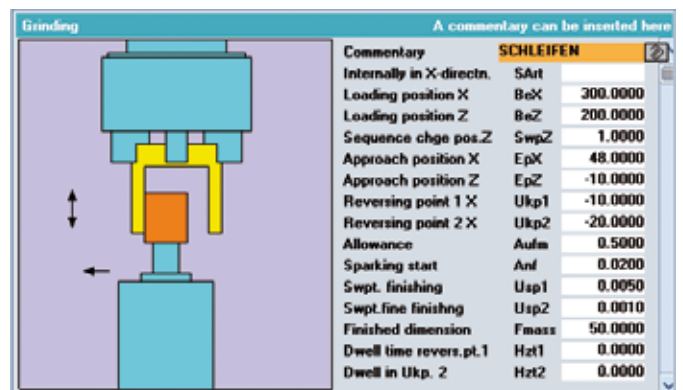
- All displays and controls in plain text
- Clear overview of all axes and spindles in one screen
- Start conditions for safe program launch by guided traversing to the machine home position
- In case of errors: display of error location and cause



## Grinding support

To support the operator during combined machining, each turn-grind center is equipped with a state-of-the-art user-friendly control similar to that of a lathe. Programs can be created quickly, safely and easily. For example, dressing and correction amounts are calculated automatically.

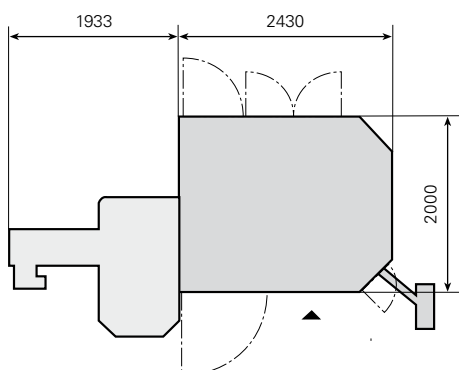
Convenient control cycles support recurring tasks and complex machining functions. Plain text messages in pop-up windows provide the user with detailed information and aid in troubleshooting.



# Technical data

## V160C

Work area		V160C			
Rotation diameter, max.	mm	310			
<b>Main spindle</b>					
Spindle bore	mm	65			
Spindle diameter in front bearing	mm	110			
Spindle nose ISO 702/1	Size	140 mm			
Chuck diameter	mm	160 (200)			
Rotational speed	rpm	5,000			
Power (at 100% / 40%)	kW	20 / 27			
Torque (at 100% / 40%)	Nm	105 / 145			
C-axis resolution	Degrees	0.001			
<b>Feed axes</b>		<b>X</b>	<b>Z</b>	<b>Y</b>	<b>B</b>
Slide travel	mm	955	260	120	360°
Rapid traverse	m/min	80	40	7,5	180°
Feed force	kN	8	10	10	
Acceleration	m/s <sup>2</sup>	10	7		
<b>Tool turret</b>					
Tool system DIN 69880	mm	25 x 48 / 30 x 55			
Number of stations		12			
Indexing time for 1 station / for 6 stations	s	0.2 / 0.4			
Tool drive speed	rpm	6,000			
Power (at 25%)	kW	8,5			
Torque (at 25%)	Nm	14			
<b>External grinding</b>					
Grinding wheel diameter	mm	400			
Grinding wheel width	mm	70			
Mounting for grinding wheel flanges	DIN 254	D63			
Rotational speed	rpm	6,000			
Power (at 100% / 25%)	kW	10 / 15			
<b>Internal grinding</b>					
Rotational speed	rpm	up to 105,000			
Spindle lubrication		oil-air			
<b>Additional options</b>					
Solid-borne sound measurement with contact-less signal transmission					
Dressing tools: single grain dresser, tile dresser, rondists, diamond rings					
In-process and post-process measuring, electrically and pneumatically					
Automatic part supply and removal					





# Technical data

## R200, R300

<b>Main spindle, counter spindle</b>		<b>R200</b>	<b>R300</b>
Bar capacity	mm	65	102
Chuck diameter	mm	175	315
Rotational speed	rpm	5,000	3,500
Power (at 100% / 40%)	kW	20 / 24	47 / 52
Torque (at 100% / 40%)	Nm	135 / 190	450 / 690

<b>Main spindle, counter spindle feed drives</b>			
Min. collet clearance	mm	20	22
Slide travel of Z-axis (main and counter spindle)	mm	390	610
Slide travel of X-axis (counter spindle only)	mm	600	780
Rapid traverse	m/min	45	40
Feed force	N	4,000	7,000

<b>Tool carriers 1 and 2</b>			
Quill diameter	mm	190	240
B-axis angle of rotation	Degrees	270	270
Brake holding torque B-axis	Nm	2,000	3,000
Slide travel X1	mm	350 (50 below spindle center)	580 (80 below spindle center)
Slide travel Y1 / Y2	mm	± 80	± 140

<b>Motorized milling spindle</b>			
Tool system DIN 69893		HSK-A40	HSK-T63
Max. rotational speed	rpm	18,000	9,000
Power (at 100 %)	KW	11	24,5
Torque (at 100% / 25%)	Nm	19 / 30	65 / 95
Brake holding torque	Nm	ca. 200	400
Fixed tool pockets on MMS		6 x VDI25	6 x VDI30

<b>Tool magazine</b>			
Number of tools		80 (120)	70 (140)

<b>External and internal grinding spindles</b>		<b>R200</b>	<b>R300</b>
Grinding wheel diameter	mm	50 (80*)	63 (160*)
Mounting for grinding wheel arbors		HSK-A40	HSK-T63
Rotational speed	rpm	18,000	9,000
Power (at 100%)	kW	11	24
Torque (at 100% / 25%)	Nm	19 / 30	65 / 95

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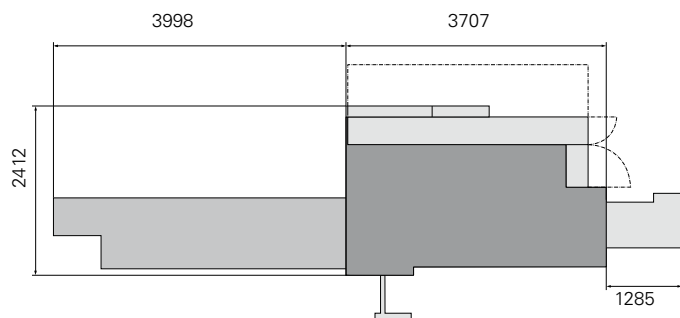
### Additional options

Solid-borne sound measurement with contact-less signal transmission, post-process measuring

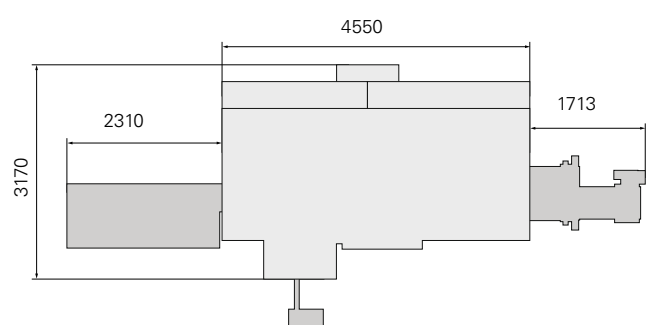
Dressing tools: single grain dresser, tile dresser, rondists, diamond rings

Automatic part supply and removal

R200



R300



# INDEX

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