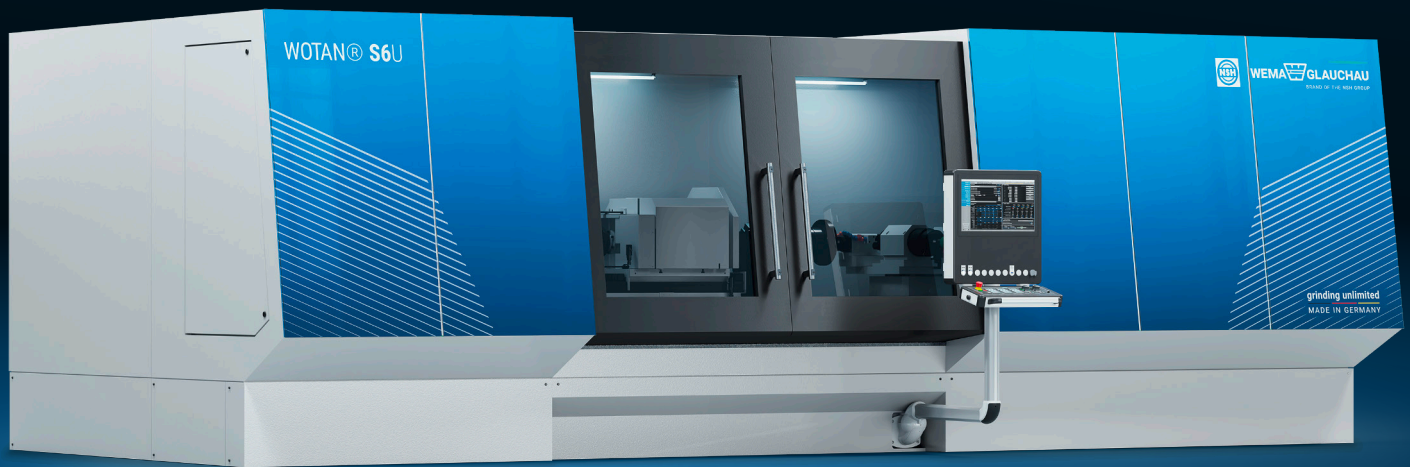


WEMA GLAUCHAU

WOTAN® S6U

UNIVERSAL GRINDING MACHINE
with maximum flexibility
for the complete machining
of complex components



THE NSH GROUP



WOTAN® S6U INFO

Maximum flexibility for great challenges

Universal grinding machines of the WOTAN® S6U series are designed for machining medium-sized to large workpieces. The workpiece spindle can be loaded with up to 1,300 kg. Our flexible machine design enables us to optimize each machine for your specific grinding jobs.

The **WOTAN® S6U** in its configuration as **WOTAN® S6U-F** is suitable for the internal, external and face machining of chuck parts with a **swing diameter of up to 820 mm** and a **workpiece length of up to 800 mm**, which are **clamped on one side only** (>flying<) without additional support.

Alternatively, shaft-type workpieces can also be externally ground **between centers** without additional support. Here, the workpiece can have a maximum length of approx. **1,450 mm**.

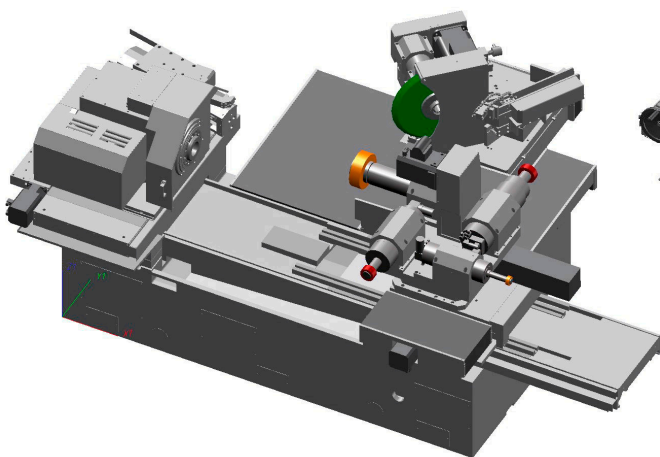
The **WOTAN® S6U** is therefore ideal for grinding **internal diameters**, **internal front surfaces**, and **internal tapers**, as well as **external diameters**, **external front faces**, and **external tapers**. Chuck parts can thus be **processed effectively on 4 sides with the workpiece being clamped once only**.

The internal grinding unit is used for the internal processing, while the separately working external and surface grinding unit is used for the external processing.

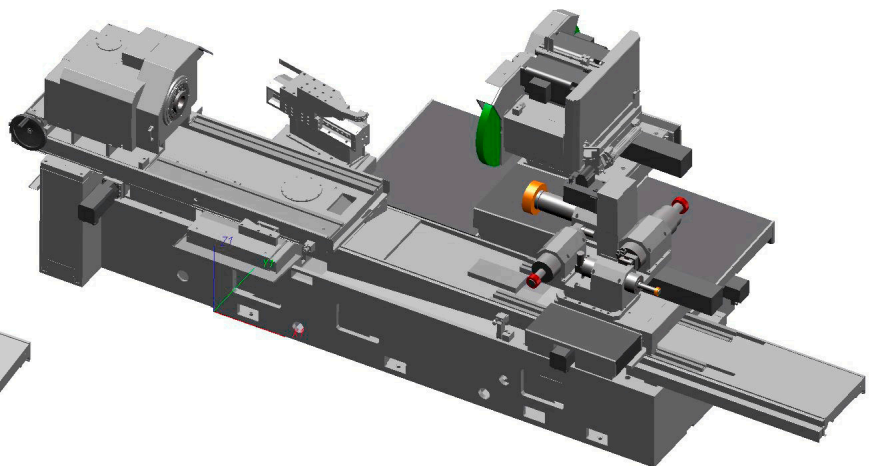
As an alternative, the machine can be configured with an **extended work area** as **WOTAN® S6U-L**. In this configuration, in addition to chuck parts clamped on one side only, shaft-type components with **lengths of up to 1,200 mm or 1,800 mm** can also be machined; due to their geometry, these components require additional support in a **steady rest**. The **diameter in the steady rest** can range **up to 500 mm**.

This will ensure an effective **4-side processing** with the workpiece being **clamped once only** which includes grinding internal diameters, internal front surfaces, external diameters, internal tapers, external tapers and external front faces. However, external processing in this position will only be possible in front of the steady rest.

Of course, this machine configuration also allows **shaft-type components** (self-supporting, without additional support) to be ideally ground **externally between centers**. The component length that can be clamped may, thanks to the longitudinal adjustment of the workpiece spindle headstock in Z-direction (L-adjustment), be extended to a **maximum of 3,200 mm**.



Example of the configuration of a **WOTAN® S6U-F** with 4 internal grinding spindles and an external grinding spindle



Example of the configuration of a **WOTAN® S6U-L** with 4 internal grinding spindles, 2 external grinding spindles and the longitudinal adjustment on the side of the workpiece spindle

WORKPIECE SPINDLE

On the workpiece side, the machine is equipped with a swivel axis (B1 axis), designed as a CNC-controlled axis. The workpiece spindle headstock is swivelled by means of the B1-axis. This allows not only cylinder correction, but in particular the optimum grinding of **internal and external tapers** on components not machined between centers.

Moreover, the entire workpiece spindle headstock is mounted on a transverse axis (U-axis). This extends the machine's working range by allowing the entire workpiece spindle headstock to be positioned transversely in the X-direction. Since the U-axis is a **positioning axis**, it remains stationary during the grinding process.

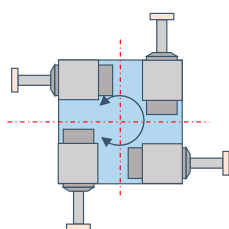
LARGE SELECTION OF SPINDLES

Depending on the accuracy requirements, the workpiece spindle can be configured as a belt-driven spindle, a direct-drive spindle, or a hydrostatic spindle. If the **workpiece spindle is equipped with a measuring system** (C axis), you can perform high-precision **non-round grinding operations** in various applications on a cylindrical grinding machine.

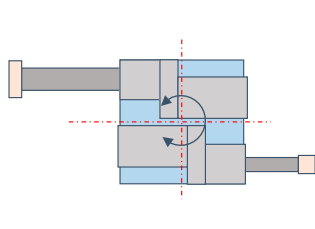
The internal grinding unit of the machine is mounted on a cross table consisting of a Z1 axis and an X1 axis, with the X1 axis arranged at right angles to the Z1 axis, allowing stepped internal diameters, internal tapers and internal front faces to be machined **economically and efficiently in a single setup**, even with just one internal grinding spindle.

FLEXIBLE WITH INTERNAL GRINDING SPINDLE ROTARY TABLE

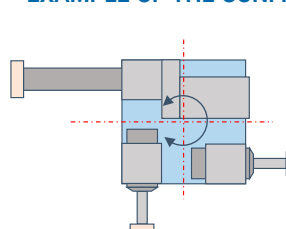
An optional **internal grinding spindle rotary table** (B2-axis) with 2 to a maximum of **4 internal grinding spindles** significantly increases flexibility and versatility – without any spindle changeover. Depending on the application, **belt-driven internal grinding spindles** and/or **high-frequency internal grinding spindles** can be used. Belt-driven spindles can be exchanged manually for even greater variability.



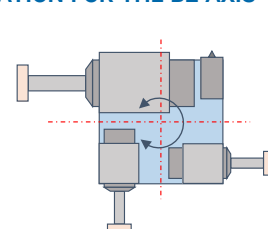
4 high-frequency spindles



2 belt-driven spindles



1 belt-driven spindle +
2 high-frequency spindles



3 high-frequency spindles +
1 tailstock

EXTERNAL AND SURFACE GRINDING

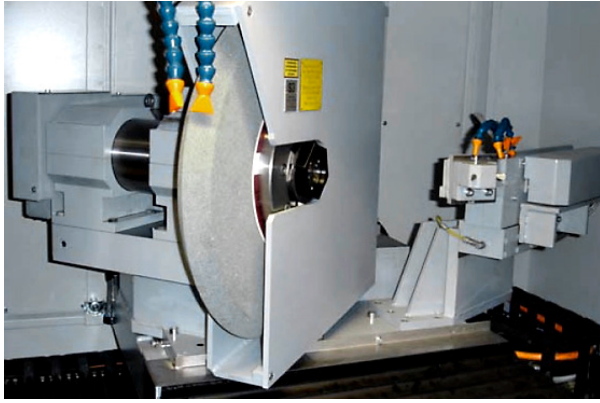
Apart from the internal processing, **external grinding between centers** is, of course, also possible. In order to do so, an **additional tailstock** will be put up on the internal grinding spindle rotary table (B2 axis). This configuration makes it also possible to install up to 3 internal grinding spindles for a wide range of internal grinding jobs.

The **separately operating external and face grinding unit** is – like the internal grinding unit – mounted on a cross table consisting of a Z2 axis and an X2 axis, with the X2 axis arranged at right angles to the Z2 axis. This allows **stepped external diameters, external tapers and external front faces** to be machined economically and efficiently in a single setup.

The machine will be equipped in its basic configuration with a stationary external and surface grinding unit. The grinding unit can be positioned at angles of 30°/45°/90° in relation to the workpiece axis. If, as an example, the grinding unit is positioned at an angle of 30° or 45° in relation to the workpiece axis, an external and surface grinding wheel profiled on both sides can be used. This will allow the clean processing of external front faces by way of **peripheral grinding** and the processing of external diameters by applying **inclined plunge cut grinding** or **longitudinal grinding techniques**.

If the external and surface grinding unit is positioned at an angle of 90° to the workpiece axis, a straight (cylindrical) external grinding wheel can be employed so that **external diameters** can be machined optimally by longitudinal grinding. Of course, **external front faces** can also be ground by relieving the face of the external grinding wheel.

EXAMPLE OF THE CONFIGURATION FOR THE B2 AXIS



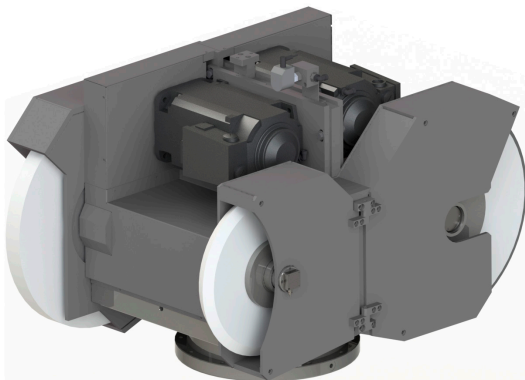
An example of an external and surface grinding unit at an angle of 45° in relation to the workpiece axis with external and surface grinding wheel profiled on both sides

FLEXIBLE WITH EXTERNAL GRINDING SPINDLE ROTARY TABLE

The flexibility can be further increased without any spindle changeover by adding an external grinding spindle rotary table (B3 axis) with up to 4 external grinding wheels in theory to the external and face grinding unit. This also allows, for example, external tapers on shaft-type components between centers to be ground efficiently.

External grinding wheels can also be used for grinding external (male) threads and much more, when properly dressed. A possible setup may contain, as an example, 1 external and surface grinding wheel profiled on both sides for grinding external diameters and external front faces, 1 cylindrical external grinding wheel for the longitudinal grinding of shaft-type components between centers and 1 external grinding wheel with thread profile for grinding external (male) threads.

Each of the three external grinding wheels commonly used in practice can be finely balanced by its own automatic balancing system.



An example of a configured external grinding spindle rotary table with 3 external grinding wheels

VARIOUS DRESSERS SELECTABLE

The machine is equipped both with an internal dressing unit and with an external dressing unit. Both dressing units can be equipped with stationary and driven dressing tools, which will allow working not only with conventional corundum grinding wheels but also with Cubic Boron Nitride (CBN) grinding wheels.

MODERN CONTROL AND EASY USER INTERFACE

The drive package is based on a SINUMERIK ONE from SIEMENS with the latest generation of servo motors.

In addition to the standard SIEMENS user interface, all machines are equipped with our own user-friendly WOP™ Touch operator interface for workshop-oriented programming, which allows simple, menu-guided operation and programming without any CNC knowledge.

All operations necessary for the process allow the continuous handling of the machine, regardless of its operating status.

NUMEROUS OPTIONS AVAILABLE

Depending on the grinding task, we also integrate spark-in/ cutting-in detection via fluid sensor technology, additional measuring systems, tool and/or workpiece changing systems, and much more.



Example of a 52-position tool changer and the tool changing process for the complete machining of complex components in a single setup

WOTAN® S6U at a glance:

WOTAN® S6U-F

(without longitudinal adjustment of the workpiece spindle-stock)

WOTAN® S6U-L

(with longitudinal adjustment of the workpiece spindle-stock)
1 400mm | 2 000mm

Work area of the machine			
swing/workpiece diameter in front of the swivel plate	mm (max.)	820	820
swing/workpiece diameter above the swivel plate	mm (max.)	–	650
workpiece diameter in the steady rest	mm (max.)	–	500
workpiece length that can be clamped			
› for components clamped on one side only (chuck parts)	mm (app.)	800	800
› for shaft-type components between centers	mm (app.)	1.450	2.950 3.200
› for shaft-type components with steady rest	mm (app.)	–	1.200 1.800
grinding diameter during the internal grinding	mm (max.)	620	620
grinding depth during the internal grinding	mm (max.)	650	1.200
grinding diameter during the external/surface grinding	mm (max.)	800	800
grinding length during the external/surface grinding	mm (max.)	1.000	2.000
load-bearing capacity at the spindle head (200 mm from the spindle nose)			
› for components clamped on one side only (chuck parts)	kg (max.)	650	650
› Workpiece weight between centers	kg (max.)	400	400
› for shaft-type components with steady rest	kg (max.)	–	1.300
Workpiece spindle stock			
workpiece spindle			
› belt-driven		standard	standard
› directly driven		option	option
› with hydrostatic bearing		option	option
automatic angle adjustment via B1 axis (CNC)	from/to °	+12 / -1	+12 / -1
C axis for out of round grinding		option	option
U axis (CNC) for positioning the entire workpiece spindle stock crosswise			
› travel	mm (max.)	300	300
› calculation accuracy in the control system	mm	0.0001	0.0001
› minimum adjusting increment	mm	0.001	0.001
› speed	m/min	10	10
› resolution of the scale	mm	0.000 01	0.000 01
adjustment of the workpiece spindle stock in Z-direction	mm (max.)	–	1.400 2.000
option to use steady rests		–	standard
option of external grinding between centers		standard	standard
coolant flow in through the workpiece spindle		option	option
incision detection/spark-in control via the fluid sensor system when grinding		option	option

WOTAN® S6U-F (without longitudinal adjustment of the workpiece spindle-stock)	WOTAN® S6U-L (with longitudinal adjustment of the workpiece spindle-stock) 1 400mm 2 000mm
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Internal grinding unit			
Z1 axis (CNC)			
› travel	mm (max.)	800 / 1.100	1.100 / 1.380
› calculation accuracy in the control system	mm	0.0001	0.0001
› minimum adjusting increment	mm	0.001	0.001
› speed	m/min	15	15
› resolution of the scale	mm	0.000 01	0.000 01
X1 axis (CNC)			
› travel	mm (max.)	245	245
› calculation accuracy in the control system	mm	0.0001	0.0001
› minimum adjusting increment (on the radius)	mm	0.0005	0.0005
› speed	m/min	15	15
› resolution of the scale	mm	0.000 01	0.000 01
stationary grinding spindles (without grinding spindle rotary table)		1	1
internal grinding spindle rotary table (B2 axis)		option	option
› grinding spindles on grinding spindle rotary table	max. Pcs.	4	4
› grinding spindles on rotary table with tailstock	max. Pcs.	3	3
continuously variable speed adjustment		standard	standard
grinding with conventional corundum grinding wheels		standard	standard
grinding with CBN grinding wheels		option	option
spark-in control via power shut-down		standard	standard
spark-in control via acoustic emission / structure-borne sound		option	option

Internal dressing unit		
designed to be operated with stationary dressing tools		standard
designed to be operated with driven dressing tools		option
spark-in control via acoustic emission (AE) sensors during dressing		option

External and surface grinding unit			
Z2 axis (CNC)			
› travel	mm (max.)	830/1.200	1.200/2.200
› calculation accuracy in the control system	mm	0.0001	0.0001
› minimum adjusting increment	mm	0.001	0.001
› speed	m/min	15	15
› resolution of the scale	mm	0.000 01	0.000 01
X2 axis (CNC)			
› travel	mm (max.)	500	500
› calculation accuracy in the control system	mm	0.0001	0.0001
› minimum adjusting increment (on the radius)	mm	0.0005	0.0005
› speed	m/min	15	15
› resolution of the scale	mm	0.000 01	0.000 01

WOTAN® S6U-F (without longitudinal adjustment of the workpiece spindle-stock)	WOTAN® S6U-L (with longitudinal adjustment of the workpiece spindlestock) 1 400mm 2 000mm
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stationary external/surface grinding unit (without rotary table)	standard	standard
‣ external grinding wheels	max. Pcs. 1	1
‣ dimensions of external grinding wheel (standard)	mm (max.) Ø600 x 50 x Ø203,2	Ø600 x 50 x Ø203,2
external/surface grinding unit with grinding spindle rotary table (B3 axis)	option	option
‣ external grinding wheels (practical / theoretical)	max. Pcs. 3 / 4	3 / 4
‣ dimensions of the straight external grinding wheel (standard)	mm (max.) Ø600 x 50 x Ø203,2	Ø600 x 50 x Ø203,2
‣ dimensions of the profiled external grinding wheel (standard; depending on the number of external grinding wheels)	mm (max.) Ø600 x 50 x Ø203,2/ Ø450 x 50 x Ø127	Ø600 x 50 x Ø203,2/ Ø450 x 50 x Ø127
automatic balancing system for external grinding spindles	standard	standard
continuously variable speed adjustment	standard	standard
grinding with conventional corundum grinding wheels	standard	standard
grinding with CBN grinding wheels	option	option
spark-in control via power shut-down	standard	standard
spark-in control via acoustic emission / structure-borne sound	option	option

External dressing unit

designed to be operated with stationary dressing tools	standard	standard
designed to be operated with driven dressing tools	option	option
spark-in control via acoustic emission (AE) sensors during dressing	option	option

Automatic workpiece and/or tool changing system

for workpieces or grinding tools, measurement sensors, etc.	option	option
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Measuring instruments

measurement sensor for zero point detection	option	option
further measuring equipment	on request	on request
laser measurement of all CNC linear axes in-house	standard	standard

Machine control & operation

SINUMERIK ONE from SIEMENS	standard	standard
proprietary operator interface WOP™ Touch	standard	standard
option of remote diagnosis	standard	standard
CNC knowledge required for operating the machine	none	none

Other items

maintenance contract	option	option
spare and wear parts package	option	option
operator training / production support	option	option



WOTAN®-I

INTERNAL GRINDING



WOTAN®-U

UNIVERSAL GRINDING



WOTAN®-A

EXTERNAL GRINDING



WOTAN®-W

ROLLING BEARING



Special Solutions

TAILORED PRODUCTS

Our experts will accompany you on the way from the first inquiry to the after-sales service thus ensuring the daily operations of your machine, so that you will get an optimal grinding machine from us.


-  exact agreement of the requirements
-  individual offer for a grinding machine
-  individual design
-  production
-  quality assurance
-  test grinding
-  pre-acceptance of the machine
-  delivery & installation
-  training & familiarization
-  after-sales service




We will be pleased to demonstrate the potential of all our WOTAN® machines at our headquarters in Glauchau, where we also accept grinding jobs for test purposes and on a contract basis.

NSH TECHNOLOGY GmbH

Branch Glauchau

 Dieselstrasse 2
08371 Glauchau
Germany

 +49 3763 61-0

 wema-glauchau@nshgroup.com

 WEMA-GLAUCHAU.DE



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WEMA GLAUCHAU