

SEMI plus

The cost-efficient



Highly precise 4-axis grinding center for
the manufacturing of indexable inserts for
periphery and one-sided K-Land grinding

flexible

Machine design

The AGATHON SEMI plus is a robust, highly precise and cost-efficient grinding center for grinding of tough materials such as CBN, Ceramics and Cermet. The SEMI plus can be equipped with the latest post and in-process dressing techniques.



Proven system

Since 2003, the 400 Series machines have successfully established themselves in the market place. So far hundreds of these types of machines are in daily use world-wide. The machine has been continuously developed over the past few years and has been adapted to new customer requirements.

Compatibility

The tools of the *plus*- Series are interchangeable. The program syntax is identical. Workpiece data and programs are 100% upward compatible.

Upgrade to COMBI plus

The AGATHON SEMI plus can be converted at any time (at the customer site) to a COMBI plus.

Swiss precision

All machine key components are manufactured in-house at the factory in Switzerland.

Easy maintenance

The machine is easily accessible from every side, and meets all relevant technical safety requirements and conforms to the latest CE regulations.

Consistent dressing

With AGATHON wheel dressing concepts improved values are reached in regards to grinding wheel wear, stock removal and insert edge quality.

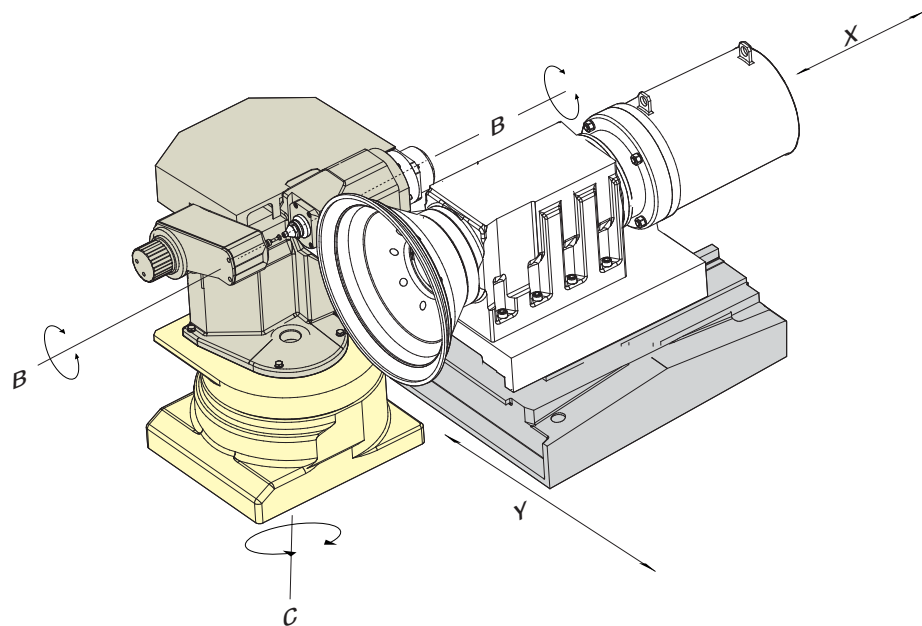
Cost-efficient
precise and stable



Axis overview and workpiece range

The swiveling ranges of all axis and clamping systems enable the production of highly complex indexable inserts.

Axis overview



Travel ranges and speeds

	B axis	C axis	X axis	Y axis
V_{\max}	$500^{\circ} \text{ s}^{-1} ^{*)}$	$90^{\circ} \text{ s}^{-1}$	160 mm s^{-1}	500 mm s^{-1}
V_{\min}	$0.06^{\circ} \text{ s}^{-1}$	$0.01^{\circ} \text{ s}^{-1}$	$0.001 \text{ mm min}^{-1}$	$0.001 \text{ mm min}^{-1}$
Grinding speed	max. $300^{\circ} \text{ s}^{-1}$			
Travel range max.		$-100^{\circ} / +45^{\circ}$	$-10 \text{ mm} / +130 \text{ mm}$	$-85 \text{ mm} / +115 \text{ mm}$
Travel range min.			0.001 mm	0.001 mm
Resolution of measuring system	0.00034°	0.0001°	$0.1 \mu\text{m}$	$0.1 \mu\text{m}$

The stated travel and swivel ranges are maximum values and may, depending on the application (abrasive geometry and wheel adaptor) vary considerably.

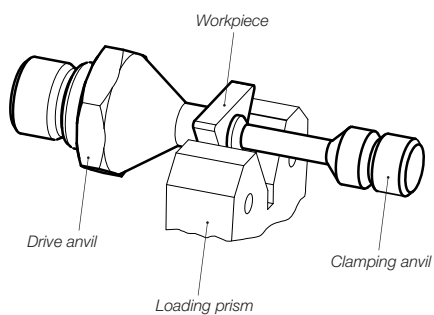
**) V_{\max} for continuous use = $300^{\circ} \text{ s}^{-1}$*



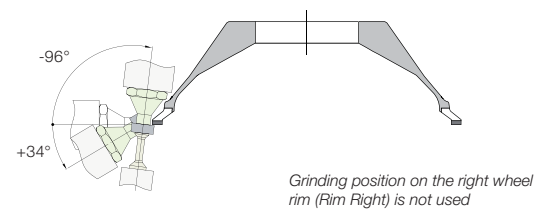
The mechanical rigidity of the proven axis concept guarantees maximum material removal rates. The tremendous axis accelerations and speeds contribute to the highest possible productivity.

Clamping system

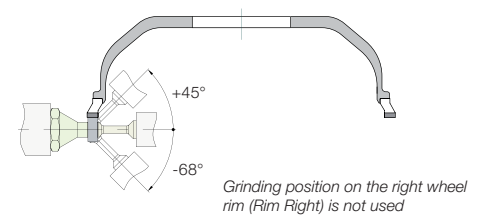
The workpiece is positioned in a loading prism and clamped between clamping and drive anvils. These are individually adapted to match the workpiece shape.



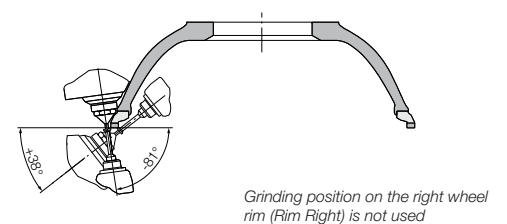
Tapered wheel adaptor



Cylindrical wheel adaptor



Parabolic wheel adaptor



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optimized

Handling

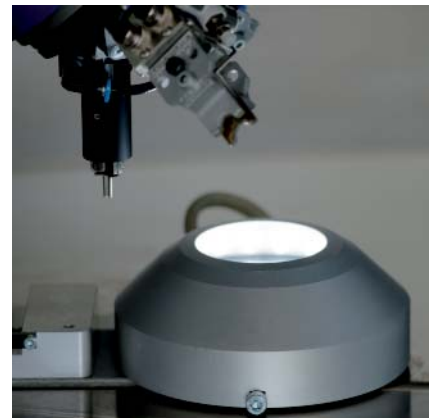
The SEMI plus is equipped with the latest generation of robots. The TS SCARA robot has been successfully integrated into the productivity concept of SEMI plus.

Handling

The newest Stäubli robot featuring 4 axis guarantees maximum flexibility and highest utilization during loading and unloading of indexable inserts. The robot offers shortest loading cycles and is capable of self-optimizing its travel pattern.

Vision-Spot detection (option)

The Vision-Spot detection (option) enables reliable position detection of the blank using the outer contour and surface characteristics (e.g. sintered markings). This guarantees a continuous identical orientation of the workpieces in the clamping system and thus constant sequence of processing stages.

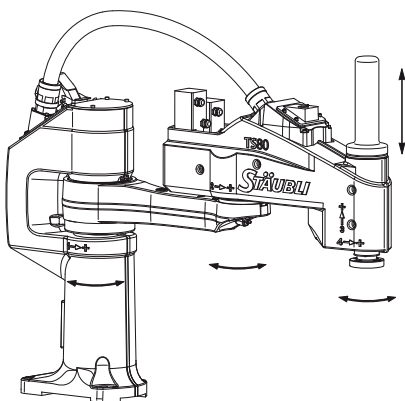
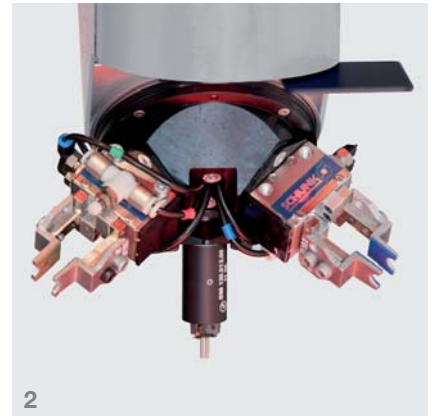


Vision-Spot detection (option)

Handling and robotic system

- 1 Gripper head equipped with magnetic, vacuum or internal hole part grippers.
- 2 Vision system with integrated camera inside the gripper head with diascopic light (option).
- 3 Indexing of inserts based on sintered markings with Vision-Spot detection (option).
- 4 Elevator system with up to 15 horizontal or 7 vertical pallets with Job management.

Changing of pallets without interrupting production is possible at any time.



simply brilliant

Software

The programming language (syntax) was originally developed by AGATHON specifically for the indexable insert programming. It is constantly adapted and improved to meet latest customer demands.

AGATHON software AGC+

With very few commands a workpiece can be easily programmed – fast, precise, flexible.

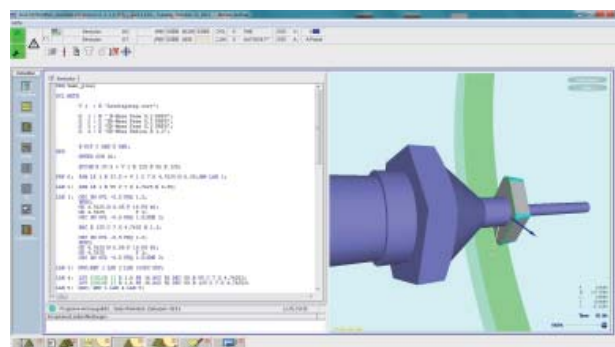
Flexible programming and automatic rapid movements

The special characteristic of the AGATHON AGC+ software lies within insert geometry related programming. The necessary axis rapid movements are determined automatically by the software selecting only the shortest and fastest real time movements. To achieve this, only the programming of the workpiece is necessary.

External programming station

On an optional external programming station the programs can be created without interrupting the machine's production runs. The written program is then simulated and tested with the optional Graphical Program Simulation software. After the successful program testing has been concluded the workpiece can be transferred to the machine via the optional AGATHON Data Pool software and can also be dry-simulated (option).

GPS (Graphical Program Simulation)

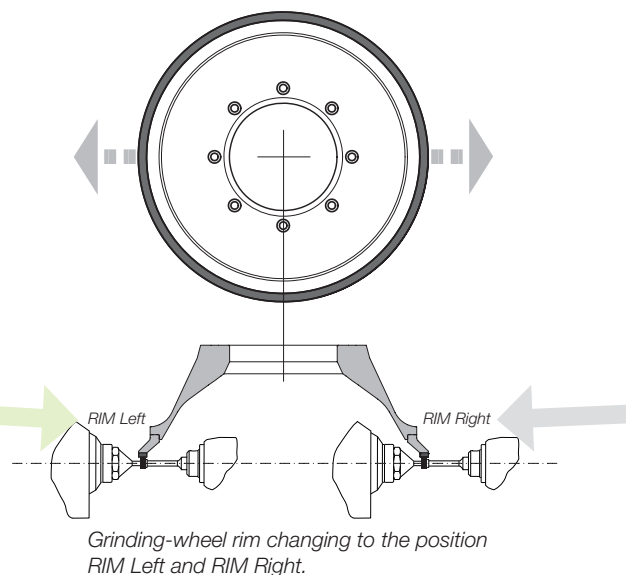
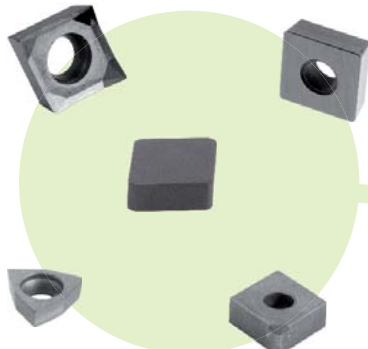


Unbeatable advantage (upgrading the SEMI to a COMBI)

If one day the need arises to expand the SEMI plus, the conversion to a COMBI plus is possible at any time. With the possibility of changing the grinding-wheel rim position from RIM Left to RIM Right, the diversity of grinding indexable inserts is significantly expanded. Please contact us.

SEMI plus

Workpieces ground on the grinding-wheel rim position RIM Left.



real-time

Connected

AGATHON provides global real-time customer support connected directly to your machine with the Teleservice.

Teleservice

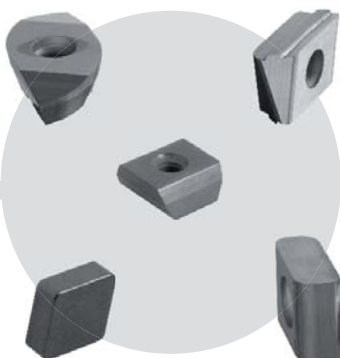
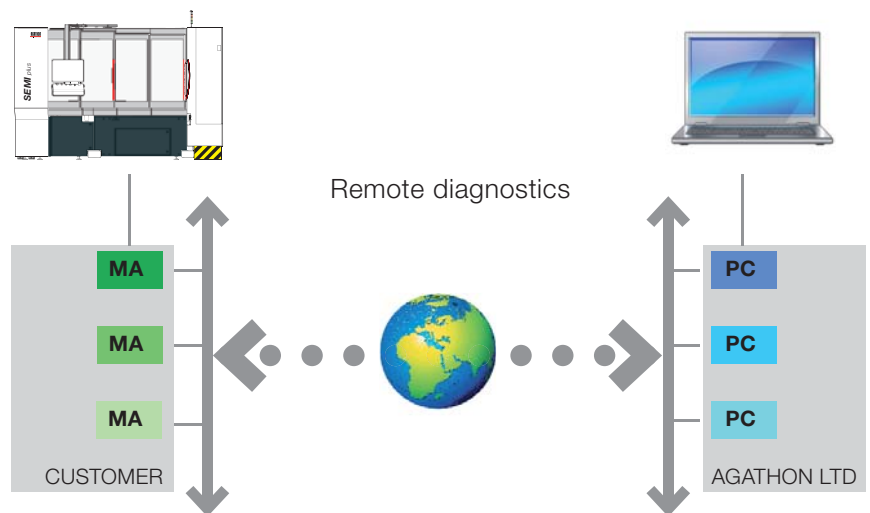
With our Teleservice feature we are able to log on and directly follow your machine. This option simply guarantees highest machine utilization rates which AGATHON is known for.

Remote diagnostics and support

The optional AGATHON Teleservice ensures competent support by AGATHON specialists.

Advantages:

- Immediate error diagnostics
- Error analysis and immediate solutions
- Parallel communication by phone
- User and expert team view the same screens
- Programming support
- Significant cost savings
- Your know-how remains safe with us. AGATHON treats all information absolutely confidential.



COMBI plus

Workpieces ground on the grinding-wheel rim position RIM Right.



highly precise

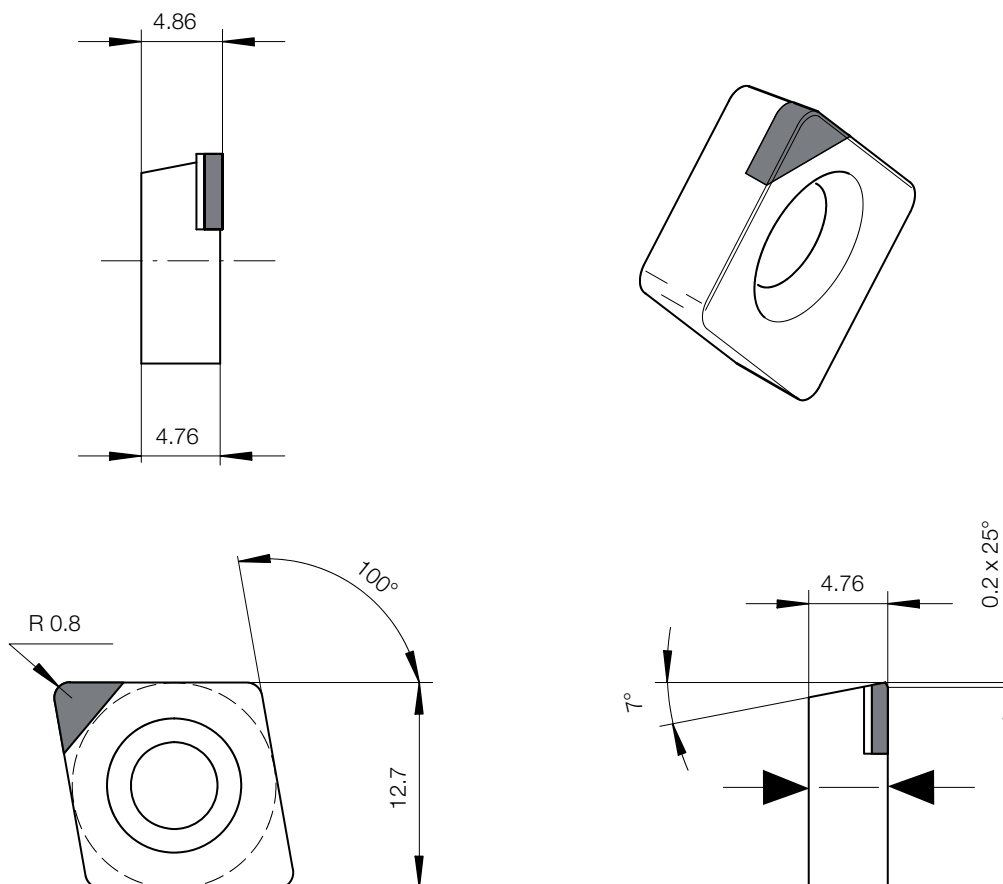
Machining examples

AGATHON has extensive knowledge of all types of indexable inserts.

All this knowledge has been incorporated into the SEMI plus.

Application example:

Carbide insert with CBN tip

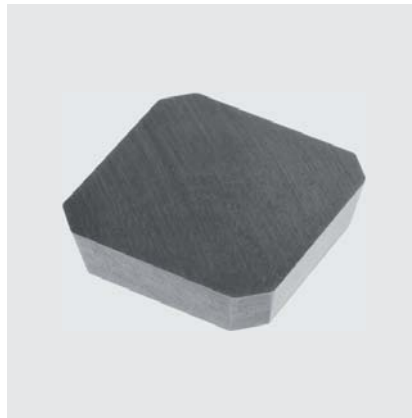


Quality experienced together

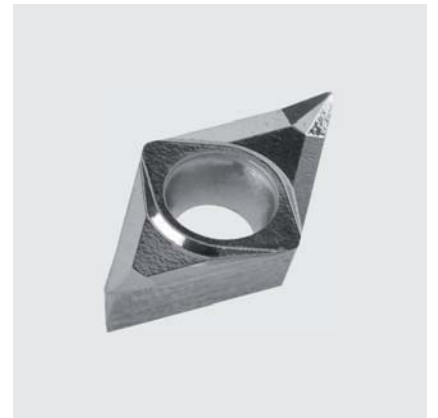
Other machining examples:



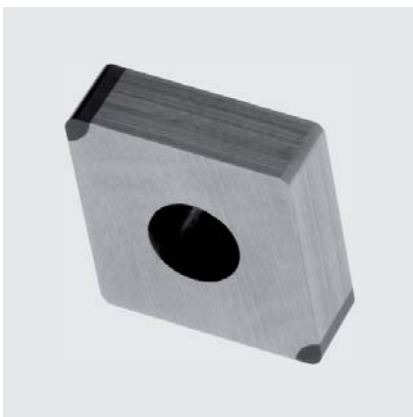
With CBN tip



Tungsten carbide



Micrograin carbide



With CBN tips



Ceramics



Tungsten carbide

innovative

Dressing concepts

The pre-requisite for an excellent and consistent grinding result is by selecting the appropriate dressing and cleaning process.

Dressing concepts

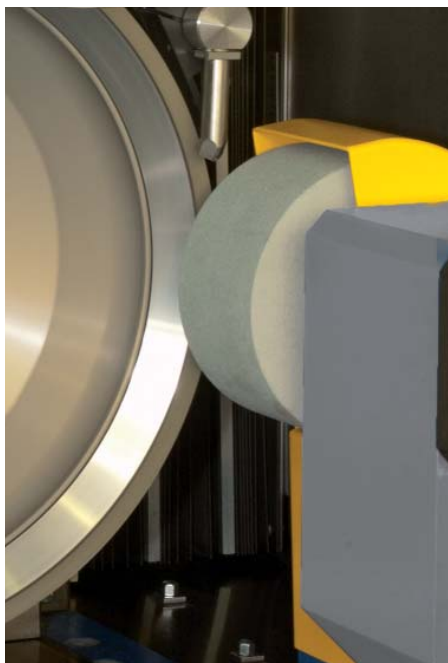
AGATHON offers three dressing devices whereby some can be combined. The TopCupDress in-process cleaning method can be utilized by one of the two external dressing devices. By integrating many years of established developments into the software, new processes have become possible and existing ones have been greatly improved.

Maximum expansion variant

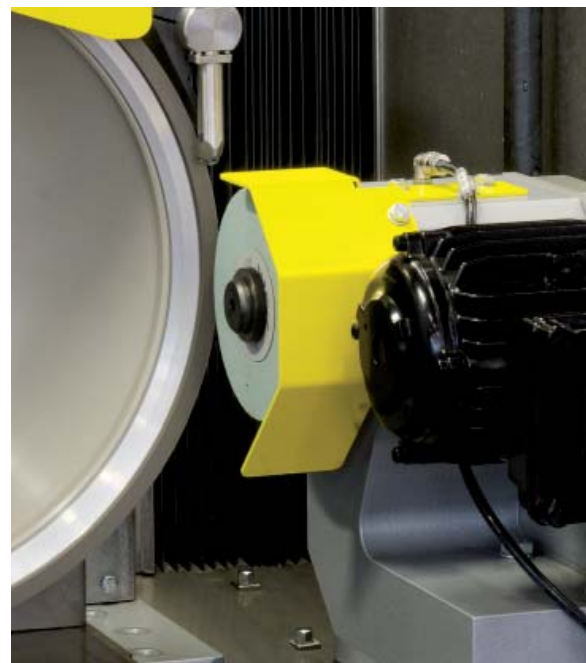
In-process cleaning with a soft aluminum oxide cup dressing wheel (TopCupDress) and external dressing with a hard SiC cup dressing wheel ExternCupDress or ExternPeriDress.



*In-process cleaning
TopCupDress (option)*



*External cup dressing
ExternCupDress (option)*



*External periphery dressing
ExternPeriDress (option)*

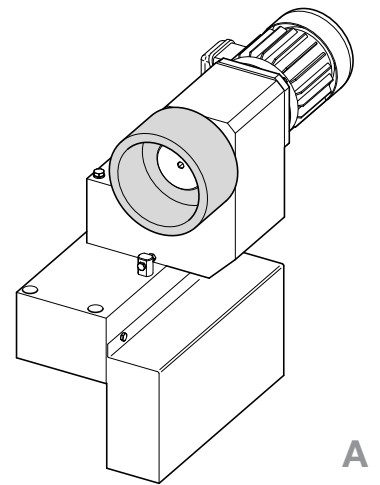
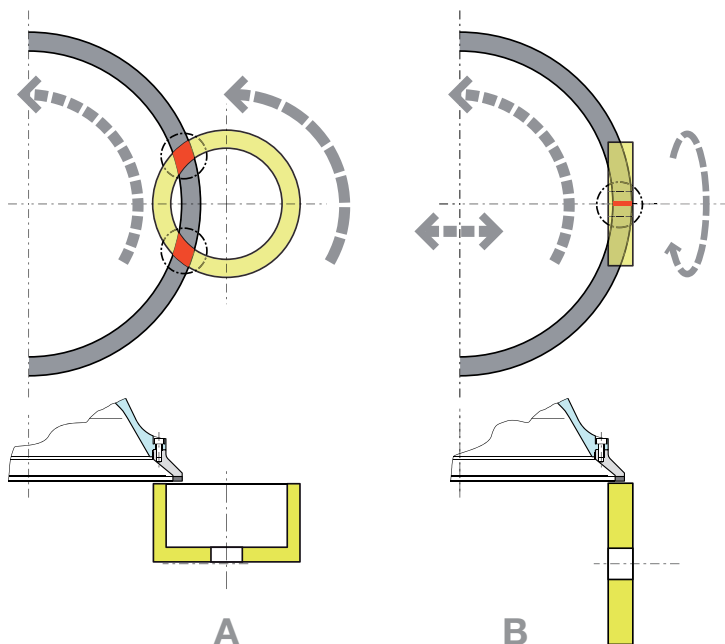
Cleaning and dressing the grinding wheel

External dressing options

Amongst the two external dressing devices offered, select the most appropriate and economical unit:

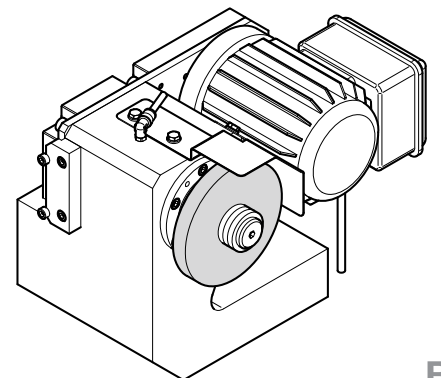
ExternCupDress (A) - A proven dressing method with a cup wheel for high removal rates and constant dressing speed.

ExternPeriDress (B) - Lower costs for dressing wheels, different dressing-wheel widths can be achieved simply by stacking multiple wheels.



A

External cup dressing
ExternCupDress (option)



B

External periphery dressing
ExternPeriDress (option)

new

Special possibilities

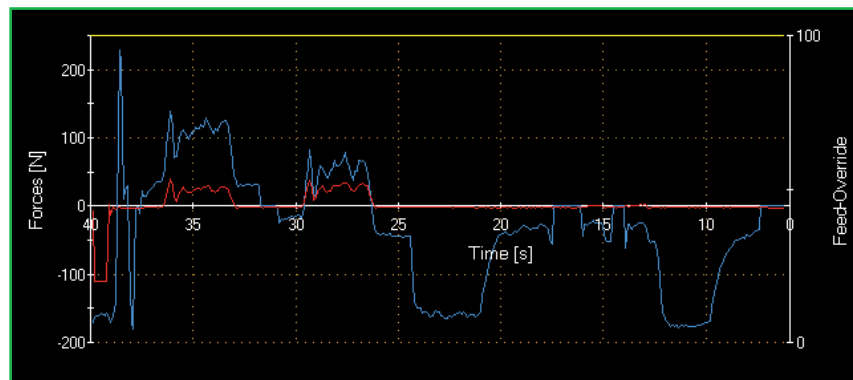
Advanced and sophisticated grinding methods result in added value.

Special possibilities

Internal MONITORING (option) is a visualized force measurement which is displayed on the user interface. The grinding process can be closely monitored and evaluated. Possibility of manual intervention if needed (e.g. to optimize infeed rates or spark-out time).

This enables to optimally adjust the grinding wheel to the material to be ground. The option is very useful especially when machining hard cutting materials.

The sensor is located in the X axis and measures the normal force. The tangential force is measured with the performance measurement at the frequency converter. These two forces are visually displayed as a graph.



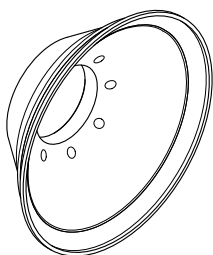
Visualized force measurement is displayed on the user interface

Everything counts

In addition to selecting the appropriate grinding wheel your choice of the correct wheel adaptor is equally important. Different shapes of wheel adaptors provide you with different axis swivel ranges. The high rigidity and stability is achieved thanks to the easy and well-proven adaptor mount. For maximum shape consistency along with a harder grinding wheel the peripheral speed of the grinding wheel can be increased up to 63m/s on the SEMI plus.

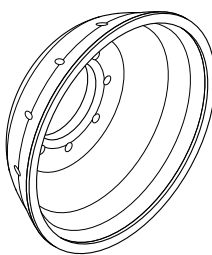
Tapered wheel adaptor

- full C-axis range
- complex shapes



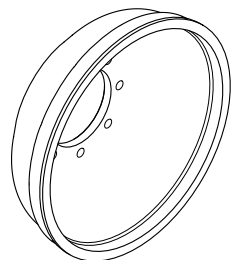
Parabolic wheel adaptor

- tough materials
- CBN with chamfers
- PCD



Cylindrical wheel adaptor

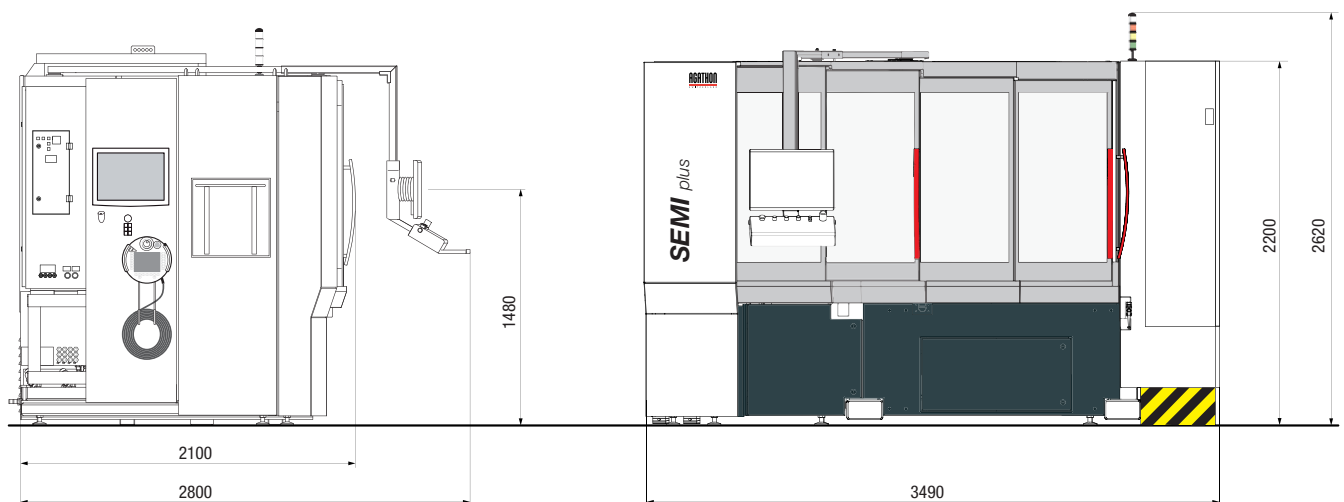
- for all materials
- heavy cutting operations
- CBN without chamfer
- PCD without chamfer



Technical data

General dimensions and connection data. Additional specific data can be found in our customer specific quotations.

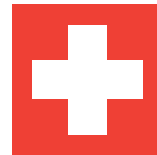
Dimensions of the machine



Connection data

	Data
Electrical connection	3×400 V
Maximum power consumption	40 kVA
Compressed air	5–6 bar
Grinding wheel diameter	400 mm
Maximum grinding wheel speed	63 ms ⁻¹
Smallest insert inscribed circle	4.76 mm
Largest insert circumscribed circle (with measuring probe)	90 mm
Clamping range	max. 29 mm
Machine weight	approx. 6500 kg

SEMI plus 3003.2 / Date: 22.10.2013 / Subject to technical modifications



Quality
Precision
Innovation ■

Agency close to you:
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