

400 COMBI

innovative

4-axes grinding center for the manufacturing of complex indexable inserts in different materials and shapes



Machine

flexible



400 COMBI (front view)

Fully protective hood

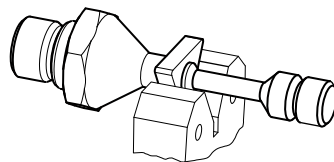
Four sliding doors on the front and one sliding door on the side of the machine provide easy access to the grinding area. A large (service) door is located at the back of the machine that provides unrestricted access to the grinding spindle head and to the entire rear section of the machine. A fully automatic sliding door separates the robot from the grinding area. The machine monitors and controls the door operations. The machine enclosure complies with the latest CE safety regulations.

Digital drives

- FireWire (IEEE 1394) to control the digital drives.
- High dynamics (acceleration and speed) therefore high productivity.
- High accuracy and resolution also for extended travel ranges.

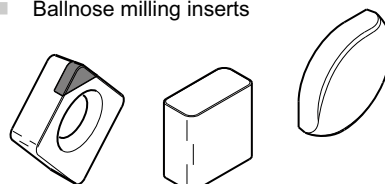
Clamping system B1

The workpiece is clamped between clamping and drive anvils.



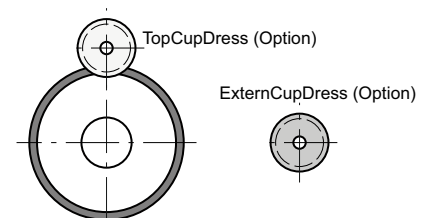
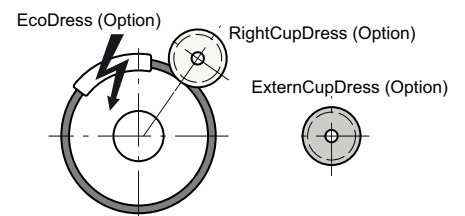
Workpiece range

- ISO standard and special indexable inserts
- Double sided K-landed inserts and splines
- Ballnose milling inserts



Innovative dressing methods

- In-Process cleaning
- Off-Process profiling
- In-Process sharpening with EcoDress



Control unit / Hydraulics / Pneumatics / Cleaning system

compact



400 COMBI (rear view)



Robot control and Stacking system



Fully automatic cleaning system TwinPur (option)

AGATHON-Software AGC+

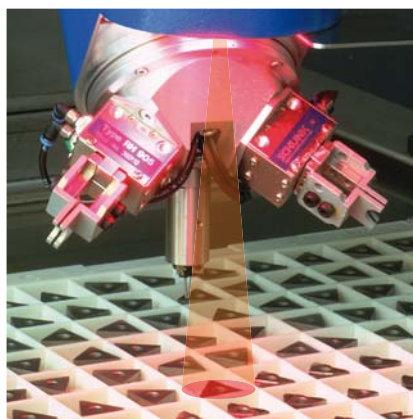
Proven software by AGATHON stands out for its short, precise and very flexible syntax compared to other competitive products. The process know-how, compared to other standard controls, is in favour to the machine user and not of the machine supplier. In the long run this will be definitely an advantage in today's competitive market.

Teleservice via Internet

Using the Teleservice via Modem or Internet, AGATHON offer customers the shortest possible reaction times if expert advice is required.

- Fast and reliable diagnostics
- Error analysis
- Quick programming support
- Cost savings

Handling- and Robot System



- Gripper head can be equipped with magnet, vacuum, bore or regular grippers
- Vision system with integrated flash installed in the gripper head (optional)
- Diascopic light (optional)
- Any type of pallet (horizontal, vertical) can be used
- Elevator/Stacking system for up to 15 pallet carriers

Automatic transfer movements

When grinding a workpiece, the machine uses different virtual models. These models are three-dimensional replicas of the workpiece geometry and clamping elements that the AGATHON-Software AGC+ generates. The virtual models are used to monitor as well as to avoid collisions between grinding wheel and workpiece and/or clamping elements. This provides the machine with safety and efficiency. The intensive time consuming calculations of transfer movements are no longer needed. The operator can fully concentrate on programming the workpiece.

External programming station

The external programming station (optional) is used to write grinding programs on a stand-alone PC.

Technical Data

Connection data

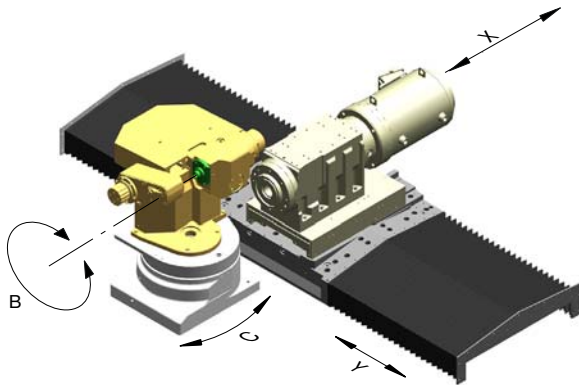
Electrical connection	3x400/220/460/500 V P/E (+/- 10%) 50/60Hz (+/- 1Hz)
Power consumption (without coolant cleaning unit)	23 [kVA]
Ambient temperature	5 - 40 [°]
Humidity	30% to 95%
<i>All specifications in accordance with Standard EN 60204-1</i>	

Air pressure

Required air pressure	5 - 6 [bar]
Compressed air consumption (with 5bar air pressure)	approx. 25 [m³ h⁻¹]

Compressed air quality (accordance DIN/ISO 8573-1/ < Class 5)

Solid impurities, particle size	max. 50 [µm]
Quantity of particles	max. 0.020 [g m⁻³]
Water contents	max. 10 [g m⁻³]
Oil contents	max. 0.025 [g m⁻³]



Grinding spindle

Grinding wheel diameter	400 [mm]
Max. grinding wheel speed	3000 [min⁻¹]
Motor power	7.5 [kW]
Max. grinding wheel speed	63 [m s⁻¹]

Workpiece dimensions (clamping system B1)

Smallest insert inscribed circle (inscribed circle 3.75mm with restrictions)	4.76 [mm]
Largest insert circumscribed circle (with measuring probe)	90 [mm]

Workpiece clamping system B1

Clamping pressure	2000 - 11000 [N]
Clamping range	max. 29 [mm]

Inscribed circle measurement DX

Measuring range	max. 45 [mm]
Measurement resolution	0.2 [µm]

Thickness measurement DT (clamping system B1)

Measuring range	max. 29 [mm] (total clamping range)
Measurement resolution	0.5 [µm]

Dimensions

	W x D x H
Machine (approx. dimensions)	3500 x 2100 x 2700 [mm]
Coolant cleaning unit (optional)	1500 x 1000 x 1600 [mm]
Coolant mist collector unit (optional)	690 x 532 x 595 [mm]

Weights

	Netto
Machine	approx. 6500 [kg]
Coolant cleaning unit (optional)	approx. 650 [kg]
Coolant mist collector unit (optional)	approx. 75 [kg]

Travel ranges and speeds

B axis

Vmax	500 [° s⁻¹]
Travel speed (programmable)	0.1 - 60 [° s⁻¹]
Travel range	8
Resolution of the measuring system	0.0003 [°]

C axis

Vmax	90 [° s⁻¹]
Travel speed (programmable)	0.1 - 100 [° s⁻¹]
Swiveling range	-100° to +110° ³⁾

³⁾ Swiveling range from machine 201

^{*)} The indicated travel and swiveling ranges are maximum values and can vary in accordance with the application (grinding geometry).

Resolution of the measuring system	0.0001 [°]
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X axis

Vmax	160 [mm s⁻¹]
Travel speed (programmable)	0.06 - 60 [mm s⁻¹] ^{*)}
Travel range	140 [mm]
Resolution of the measuring system	0.1 [µm]

Y axis

Vmax	0.5 [m s⁻¹]
Travel speed (programmable)	0.06 - 4800 [mm s⁻¹] ^{*)}
Travel range	max. 539 [mm] ^{*)}
Resolution of the measuring system	0.1 [µm]
Oscillation speed	max. 63 [mm s⁻¹]
Oscillation frequency	0 - 2 [Hz]
Oscillation amplitude	max. ±10 [mm]

Machine Layout / Floor Plan

