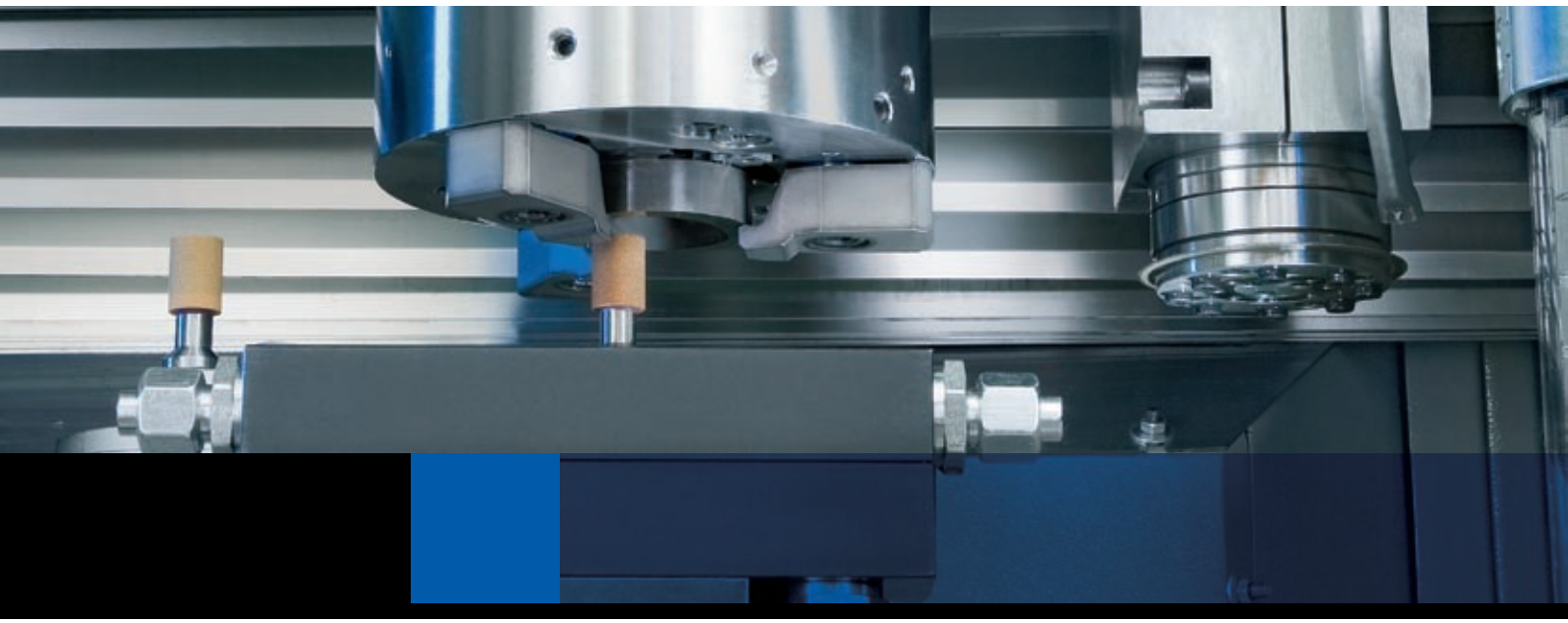
Internal and Face Grinder
VG 110



REINECKER
EMAG

THESE MACHINES STAND EVERYTHING ON ITS HEAD

Efficient production for medium and
large quantities

Vertical Turning and Grinding Center VG 110 DS

The concept ...

- Vertical machining
- Combined manufacturing processes
- Integrated automation
- Linear drives (Z-axis)
- Separate axes
- State-of-the-art CNC control system
- Turn-key machine design

... and its advantages

- Complete machining in one set up
- Downwards chip flow
- Short chip-to-chip times
- Highest precision
- Small footprint
- Optimal accessibility, fast setup
- Easy to operate
- Multi-machine operation on minimal footprint

Hard Pre-Turning, internal and face Grinding on one Machine

Hard pre-turning ... has its advantages

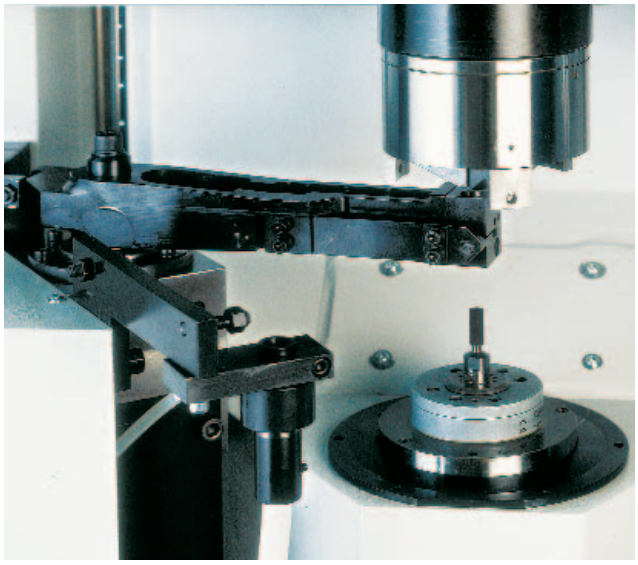
Application of the optimal and most economical machining process for every workpiece and quality requirement.
The VG 110 turns and internal/external finish grinds chucked components in one set up operation.
This makes the cost-effective manufacture of a large number of high-precision workpieces a most attractive proposition. Typical examples are:

- ♦ Cup valve pistons
- ♦ Bearing rings
- ♦ Gears
- ♦ Valve bodies
- ♦ Pump rings

The workpiece range:

- ♦ External dia. 6 - 80 mm
- ♦ Clamping length max. 125 mm
- ♦ Machining dia. 2 - 60 mm
- ♦ Machining length max. 60 mm

Loading and Unloading of round Components: Flexible or workpiece-specific



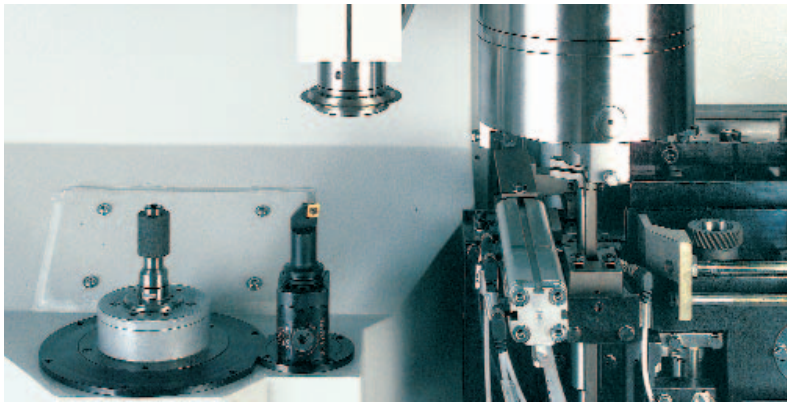
Different loading systems are available for automated production.

Loading through the spindle

The workpiece is automatically fed directly through the spindle into the chuck. This system achieves loading times of as little as 1.5 seconds.

Lift-up loader

The workpiece is transferred from the storage conveyor and inserted into the chuck from below. Loading times depend on the workpiece and can be as little as 4 seconds.



THE MACHINING AREA

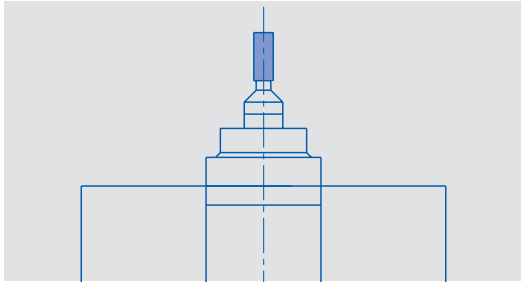
The machining area

Tools and chuck are easily accessible.

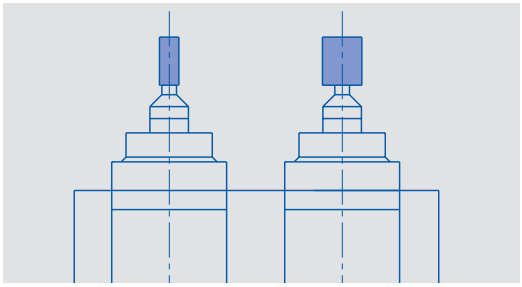
Machining:
Conventional or in Combination

Internal grinding

The Z-axis slide unit accommodates one or two grinding spindles.



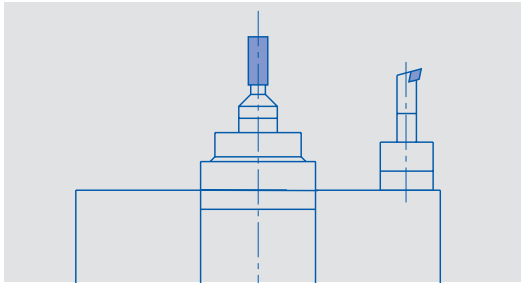
The grinding spindles are designed to suit the workpiece range.



Pre-turning and finish grinding

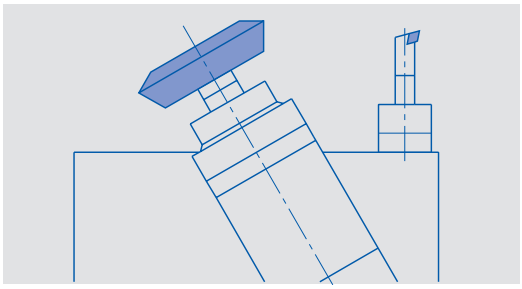
The vertical Z-axis slide unit can be equipped with a turning tool instead of the second internal grinding spindle.

This allows for both cost- and time-saving complete machining of workpieces.

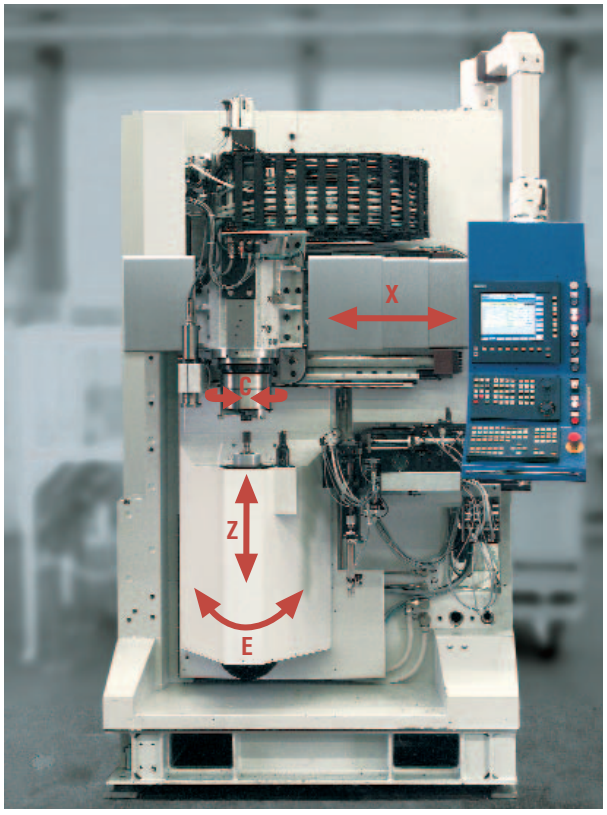


Turning and face grinding

In this combination the vertical Z-axis slide unit carries a face grinding spindle and a turning tool.



Separate axis slide units for highest Precision



Short travel, high speeds, extreme rigidity and an integrated cooling system guarantee short idle times, high productivity and high precision.

X and Z axis

Rapid-reaction drives and precision guideways traverse the axes without stick-slip. Soft direction change through linear drive in the Z-axis offers superb surface finishes.

The machine base

The machine base in high-grade Mineralit® offers maximum thermal stability and an exceptional dampening effect (see diagrams on the right).
This results in a better surface finish and extends tool life.

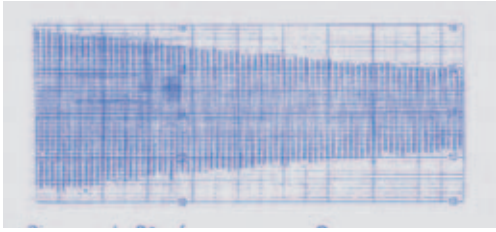


Diagram: Vibration damping effect on cast iron machine base

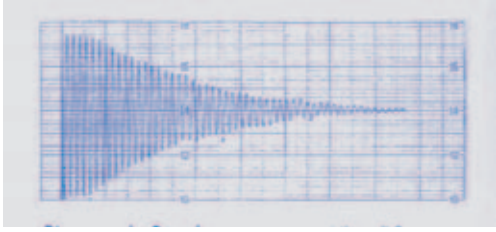


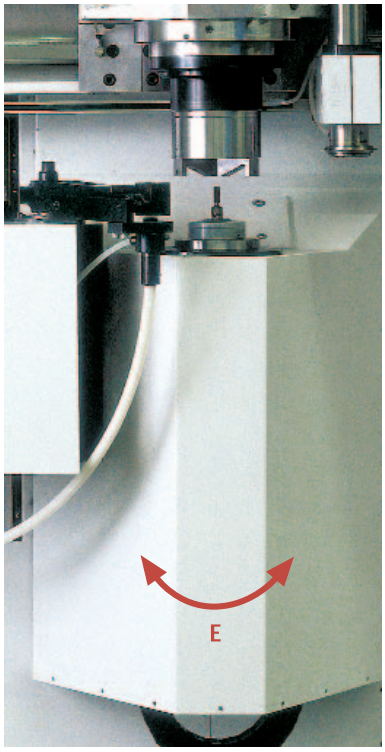
Diagram: Vibration dampening effect on Mineralit® machine base

C-axis

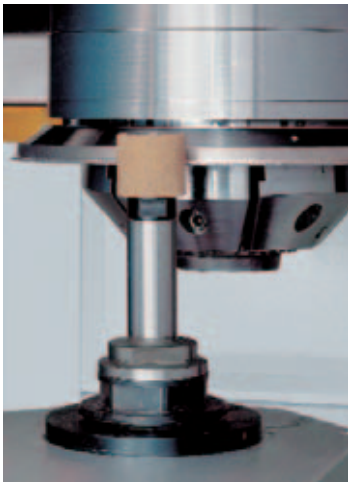
The work spindle is characterised by its high precision bearings and a high degree of positioning accuracy.

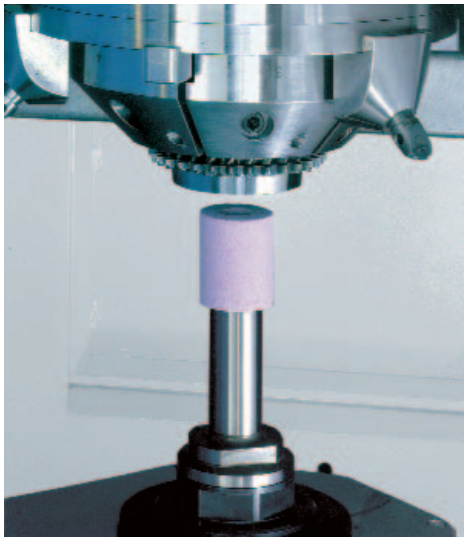
E-axis

The vertical Z-axis slide incorporates an E-axis for taper correction.



The Dressing Tools





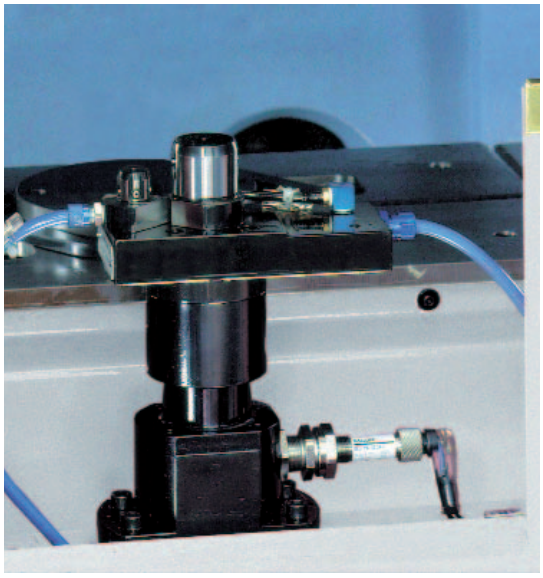
According to the grinding wheel in use, dressing will be done by

- Dressing ring
- Dressing spindle
- Single point diamond
- Dressing plate

Gauging equipment according to requirements

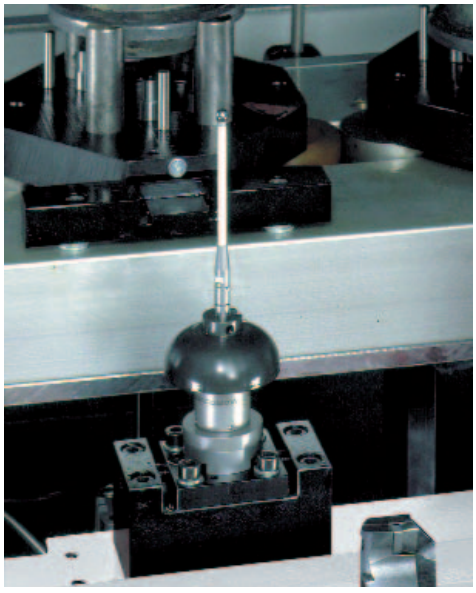
Post-process gauging

a suitable solution for
every workpiece



Air plug gauge
or
3D measuring probe

alternatively:
measuring device integrated into
workpiece unloading system



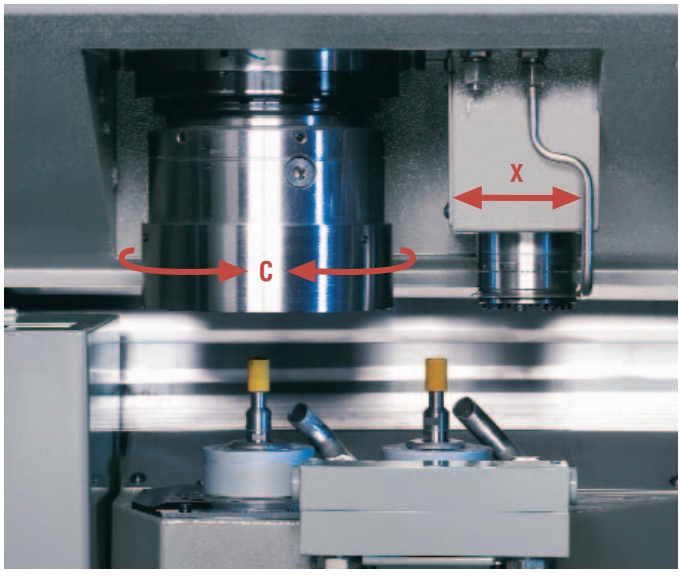
Out-of-round Machining

Internal and external high-speed contour grinding

Typical applications

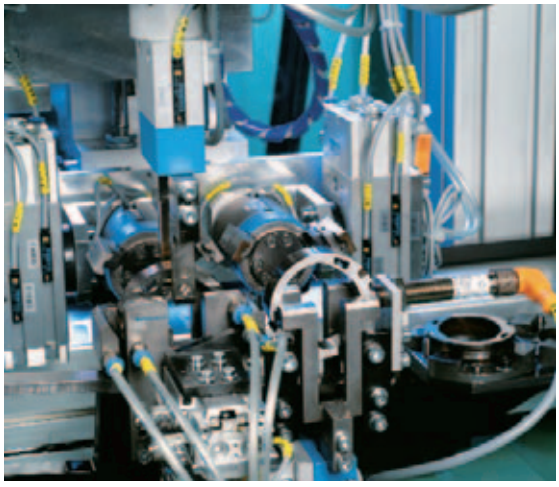
- Cam rings for vane pumps
- Cam rings for fuel injection pumps
- External and internal polygons
- Out-of-road contours for a multitude of applications in the mechanical engineering and tool-making industries

- Pre- and finish-grinding of cam rings, using advanced CBN technology
- Interpolation of C- and X- axis
- Axial grinding wheel oscillation, with Z-axis and linear drive
- Dressing of the pre- and finish-grinding wheels with a diamond dressing wheel
- Highest contour accuracy through separation of X-and Z-axes

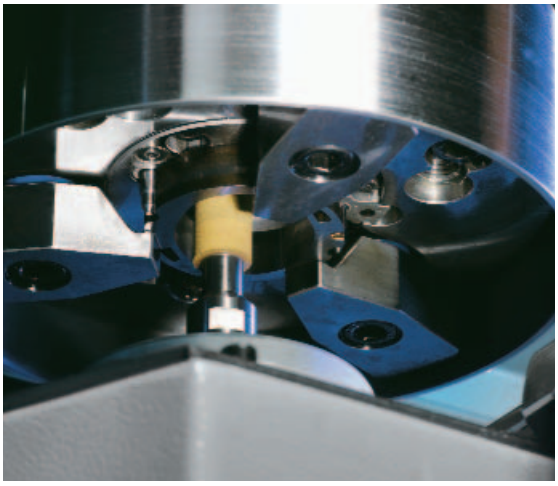


Fully Automatic and with Low-Attendance Requirment

In combination with an automatic workhandling system the VG 110 offers optimal economic viability in volume production and maintains a low-attendance requirement.
For example, the raw-parts are automatically collected from pallets and the finish machined components returned to them.



Automatic rotary orientation of cam rings

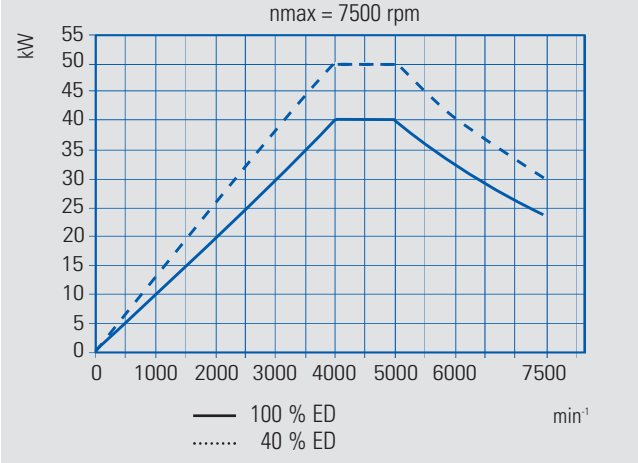


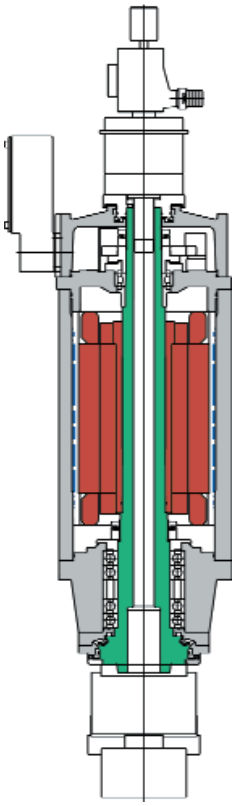
Hydraulic chuck for cam rings

Designed for Grinding and Turning

The work spindle

The frequency-controlled AC motor spindle revolves at 7500 rpm.

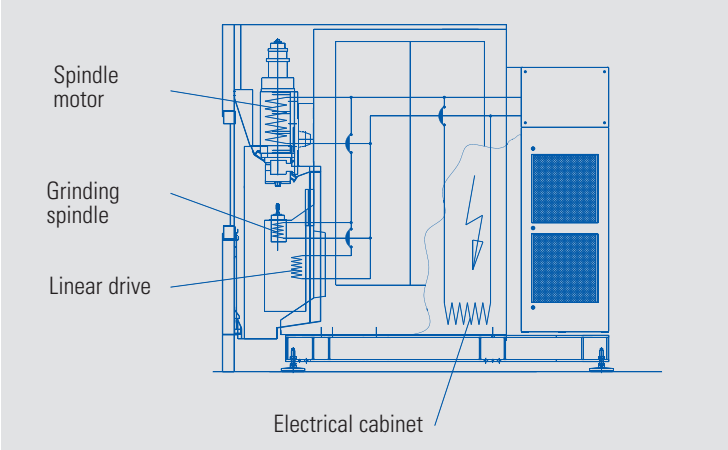




Low mass and high torque rates ensure excellent dynamics.

Constant temperature - constant quality

Spindle motor, grinding spindle(s), linear drive and electrical cabinet are all fluid-cooled. A cooling unit ensures that the temperature of these components is maintained at the ambient temperature.



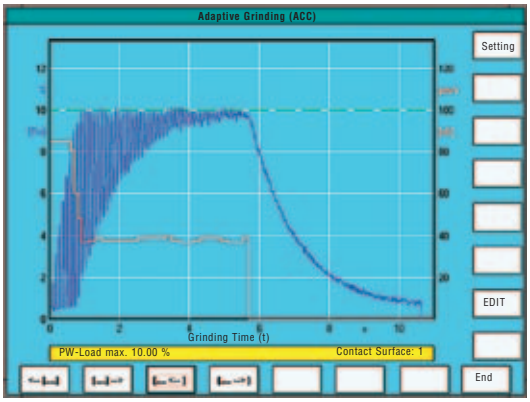
All machine elements that influence the accuracy of the component, are connected to the fluid cooling system.

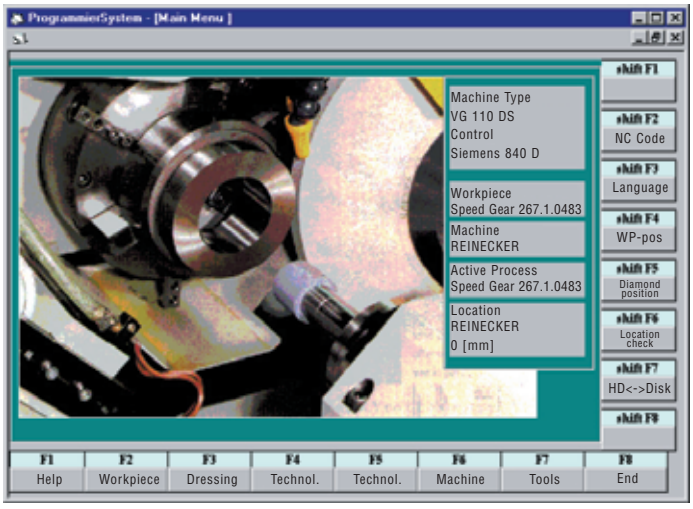
Software and sensory Modules

Sensory analysis modules

The VG 110 features a number of sensory modules:

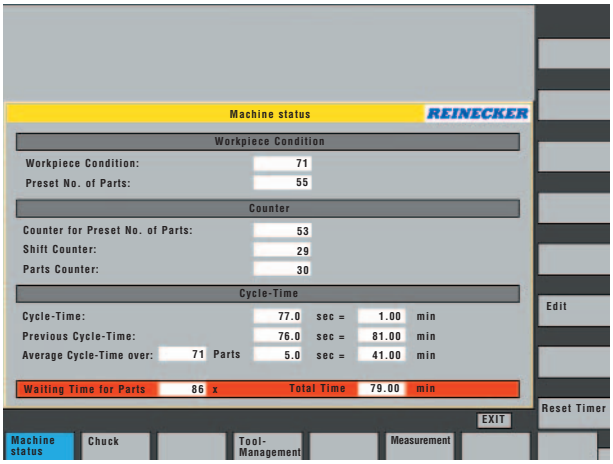
- ♦ adaptive grinding
- ♦ touch-recognition
- ♦ touch-dressing





The programming system

The CNC control system features an operator-friendly programming suite.



Technical Data

Capacity

Chuck diameter	100 - 190 mm
Max. machining diameter	30 mm
Max. grinding length	60 mm
X-travel	460 mm
Z-travel	225 mm

Loading Time

(depending on workpiece, chuck, etc.)

loading through the work spindle	1,5 - 2 s
loading with lift-up-loader	3 - 5 s

Work Spindle

Spindle nose to DIN 55026	Size 5
Front spindle bearing dia.	80 mm
Max. spindle capacity	40 mm
Max. spindle speed	7500 rpm

Work Spindle Drive

AC motor at 100% duty cycle	30 kW
Max. torque	95 Nm

Axes Drives

X-axis:	
Rapid traverse speed	30/60 m/min
Resolution	0,0001 mm
Travel range	460 mm
Ball screw dia. X-axis	32 mm
Z-axis:	
Rapid traverse speed	80 m/min
Resolution	0,0001 mm
Travel range	225 mm

Tooling Console

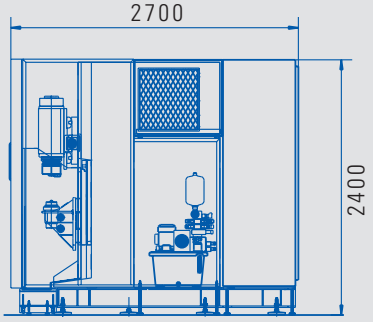
VG 110	1 oder 2
Grinding spindle register, dia.	120 mm
Turning tool register, cylindrical shank, dia.	32 mm
Selection of grinding spindle / turning tool	accord. to workpiece

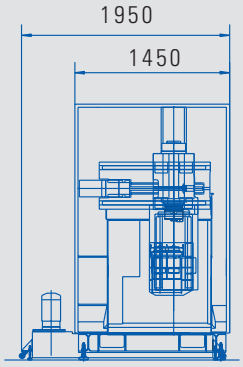
Electrical Equipment

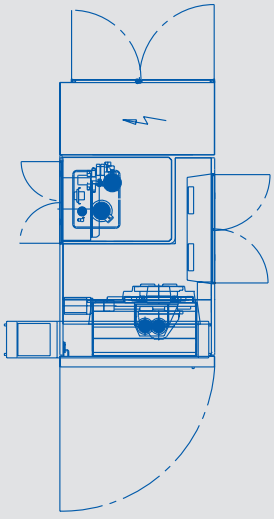
Operating voltage	400 V
Control voltage - DC	24 V
AC	230 V
Frequency	50 Hz
Installed load VG 110	35 kW
Lead fuse VG 110	60 A

Weights and Measurements

	VG 110 DS
Length	2650 mm
Width	1425 mm
Height	2400 mm
Weight (approx.)	7500 kg







VG 110 DS

Subject to change without prior notice.

At home in the world.

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