

Standard machine equipment

- NC control Sinumerik 840 D solution line with 8 axes and 2 spindles
- Control panel with attached manual pulse generator
- 2 cutter heads and clamping collars for installation of 44 Konvoid blades in total
- Generation drum with heavy duty torque motor
- Tool column mounted on a NC rotary table for most accurate positioning
- Gearless drive for workpiece rotation by torque motor
- Gearless cutter spindle drive by 2 torque motors
- Axis drives of X, Y, Z and Z1 by servomotors, ball screws, completed with linear measuring systems

- Full protection of work area
- Cooling system with four separate loops for torque motors
- Hydraulic system
- Coolant system
- Electrical equipment in compliance with DIN EN 60204/VDE 0113
- Oil mist exhaust
- Chip conveyor

Options

- Automatic operator door with safety door lock
- 44 Konvoid blades with blade point sizes according to the requirements



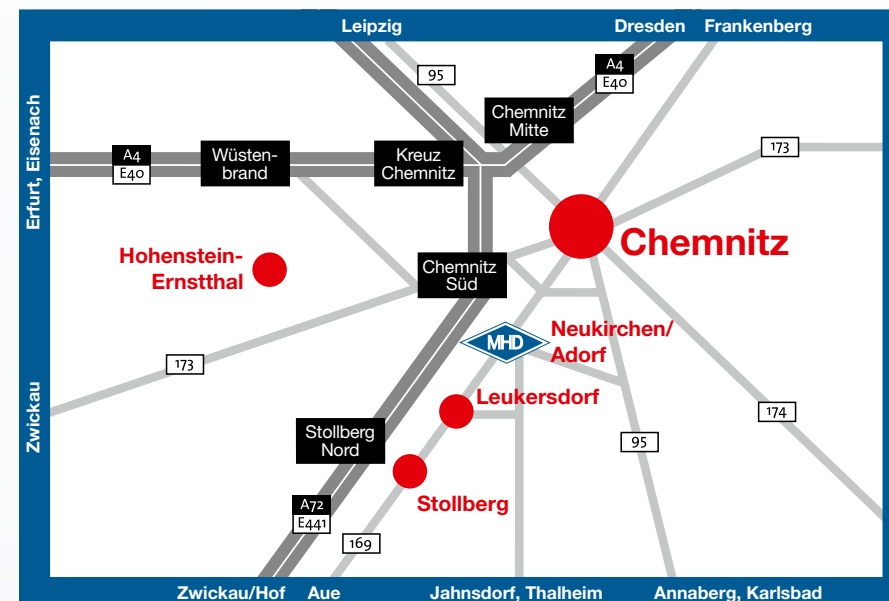
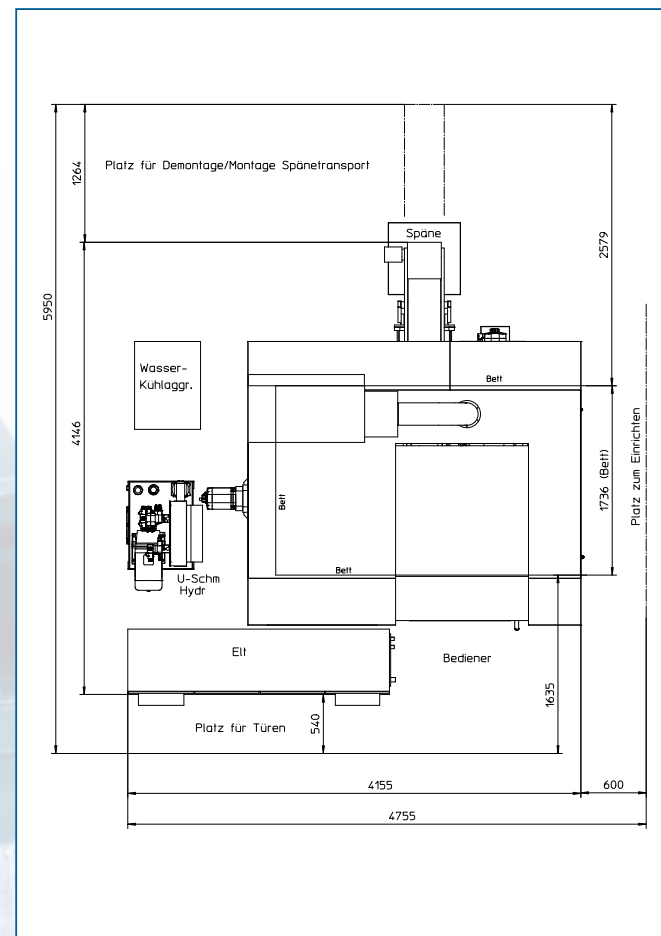
More services

- Remanufacturing of gear hobbors
- Remanufacturing of gear shapers
- New heavy duty hob heads with gearless drive for application of carbide hobs



Machine dimensions

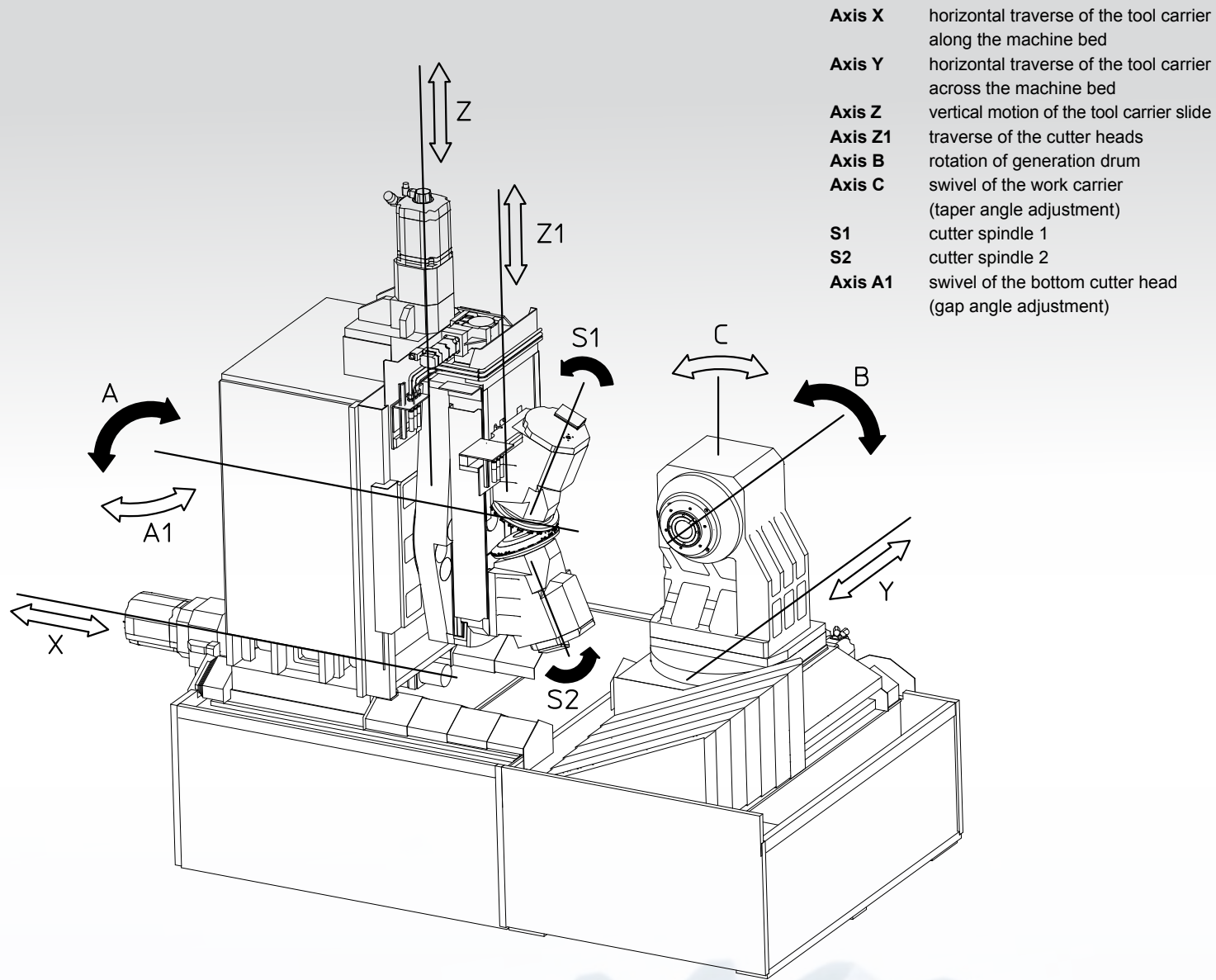
Max. job diameter at transmission ratio 1 : 6	315 (350) mm
Max. job diameter at transmission ratio 1:1	225 mm
Max. module	10 mm
Max. gear face width	50 mm
Number of teeth	6 – 100
Diameter of spindle nose	80 mm
Diameter of cutter head	355 mm
Speed of cutter head	35 – 310 min ⁻¹
Generating roll feed	0 – 12.0 mm/s
Infeed motion	0 – 30 Grad/s
Power of cutter spindles	2 × 11.0 kW
Length x width x height	4,300 × 3,000 × 3,100 mm
Machine weight	15,000 kg



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Bevel Gear Generator KFG 320 for Straight Bevel Gears



Machine design

- Rigid construction design for machine bed, tool column and workpiece column
- Central, large sized opening in the machine bed for most efficient chip removal
- All axes are NC controlled and equipped with direct measuring systems with output of absolute values

A drive concept with high reliability

Gearless drives with torque motors in four rotary axes, low-maintenance servo motors for all linear axes

Advantages

- Long-term precision of the machine due to gearless drives without any mechanical transmission
- Increased tool lifetime due to low vibration operation

NC control Sinumerik 840D sl and safety devices

- NC-continuous path control for 8 axes and 2 spindles, digital drives in all axes
- Sinumerik Safety integrated system providing functional safety for machine, NC control and related devices
- 15" colour screen
- Cycles for automatical approach of positions for cutter head exchange and clamping device exchange

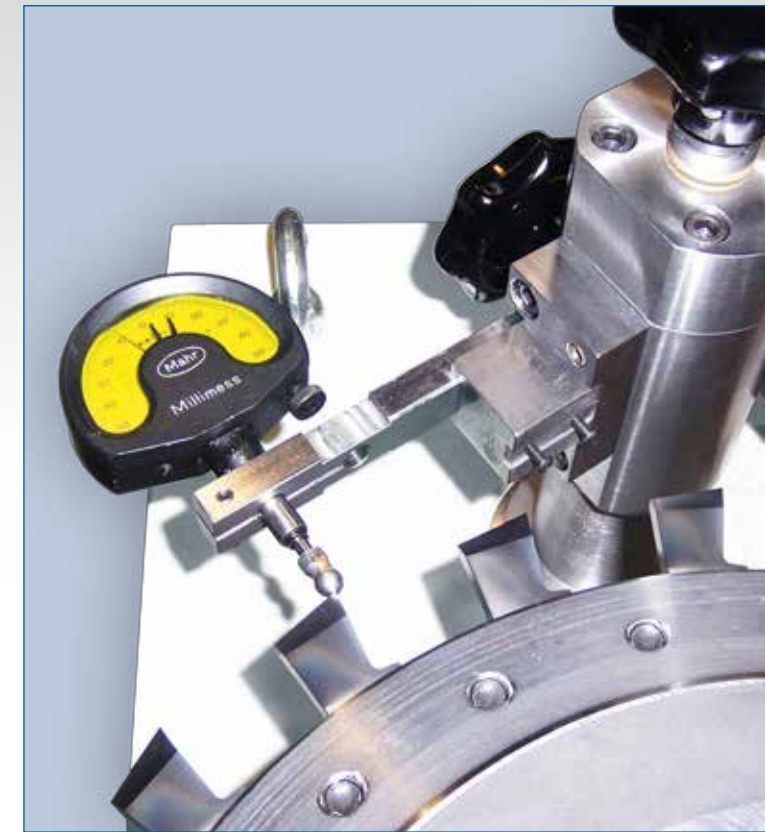
Short machine setting times

- Convenient exchange of the complete cutter heads, for that purpose both cutter spindles are disengaged and the top cutter spindle retracts in tangential direction
- With each new tooling the machine performs an automatical synchronization of both cutter spindles
- The gauging and inserting of new blades in the cutter heads outside the machine does not affect the production
- Automatical calculation of the starting positions (machine setting values) by our software, automatical approach of all NC-axes to their starting positions, cycle start

Description of the generation principle

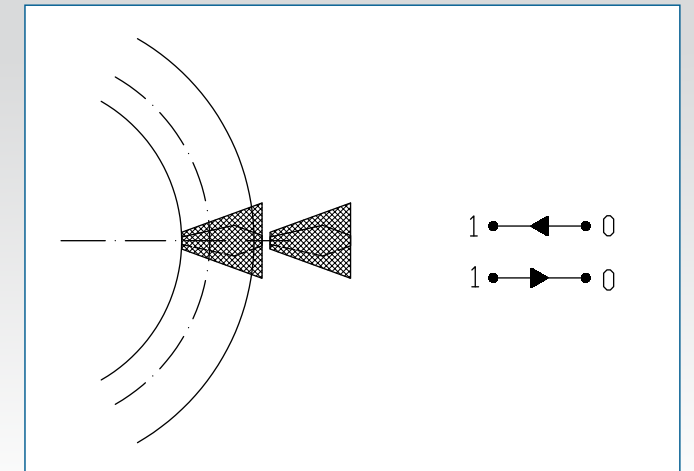
Two engaged disc shaped cutter heads with single blades generate involute flanks. The position of the contact pattern on the flanks is **symmetric** related to the tooth height. (Konvoid generation principle). Corrections of the contact pattern are feasible.

Both flanks are completed in one cycle by the two cutter heads.



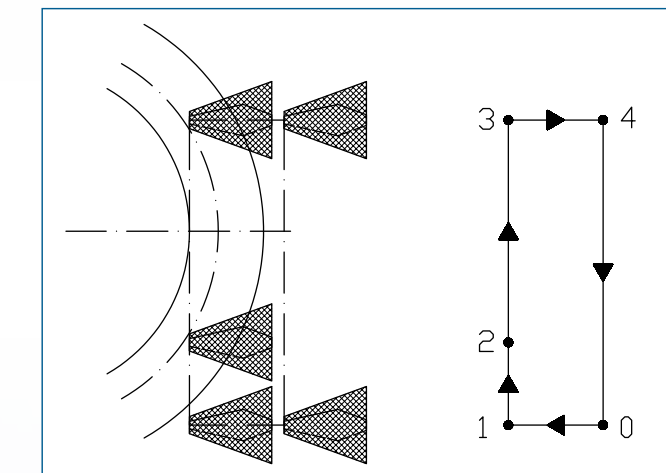
NC Software and operator interface

- Internal software for calculation of the machine setting values and starting positions
- Various screens for direct input of workpiece and tool related data
- Correction of contact pattern visible on screen
- Display of alerts in human readable messages

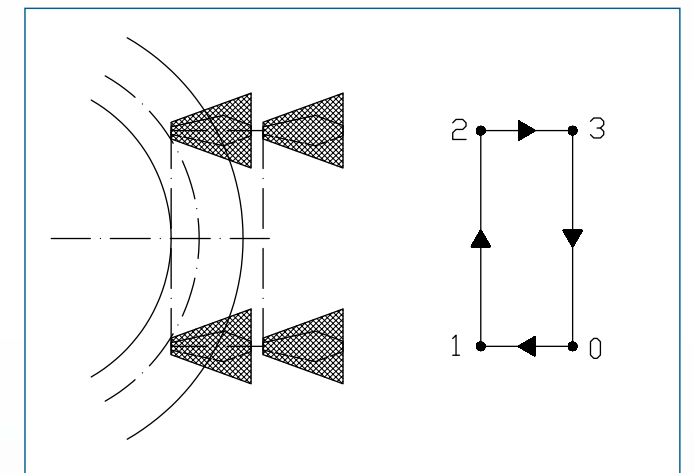


Plunge cutting for roughing of gears and couplings

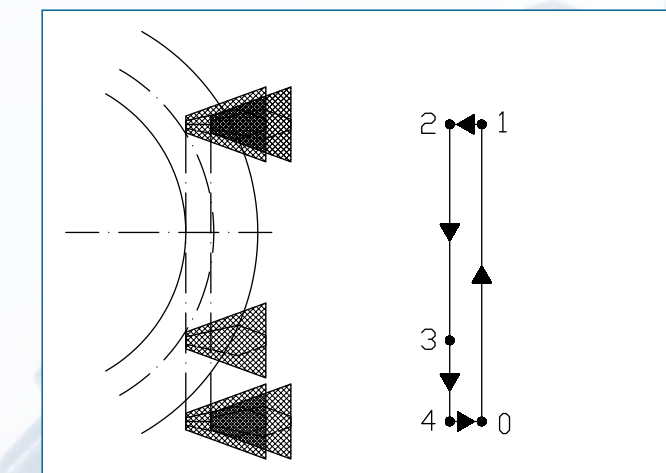
Working cycles



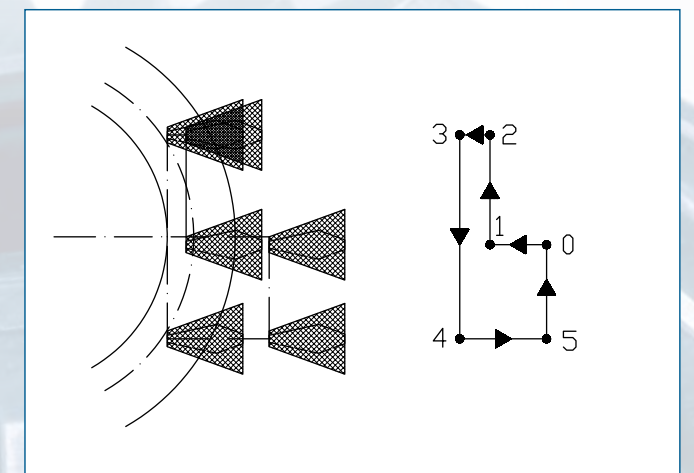
Generating of pinions in one cut



Plunge cut generating of gears in one cut



Generating of gears and pinions in two cuts



Plunge cut generation of gears and pinions in two cuts