Hobbing Machine
160

KOEPFER
EMAG

The K 160 combines an innovative design principle with state-of-the-art technology and the wealth of experience gained during generations of gear cutting. Whether used for dry or wet machining, customised automation equipment and an extensive technology package make the K 160 an optimal high-speed hobbing center for gear modules up to 2.5.

K 160

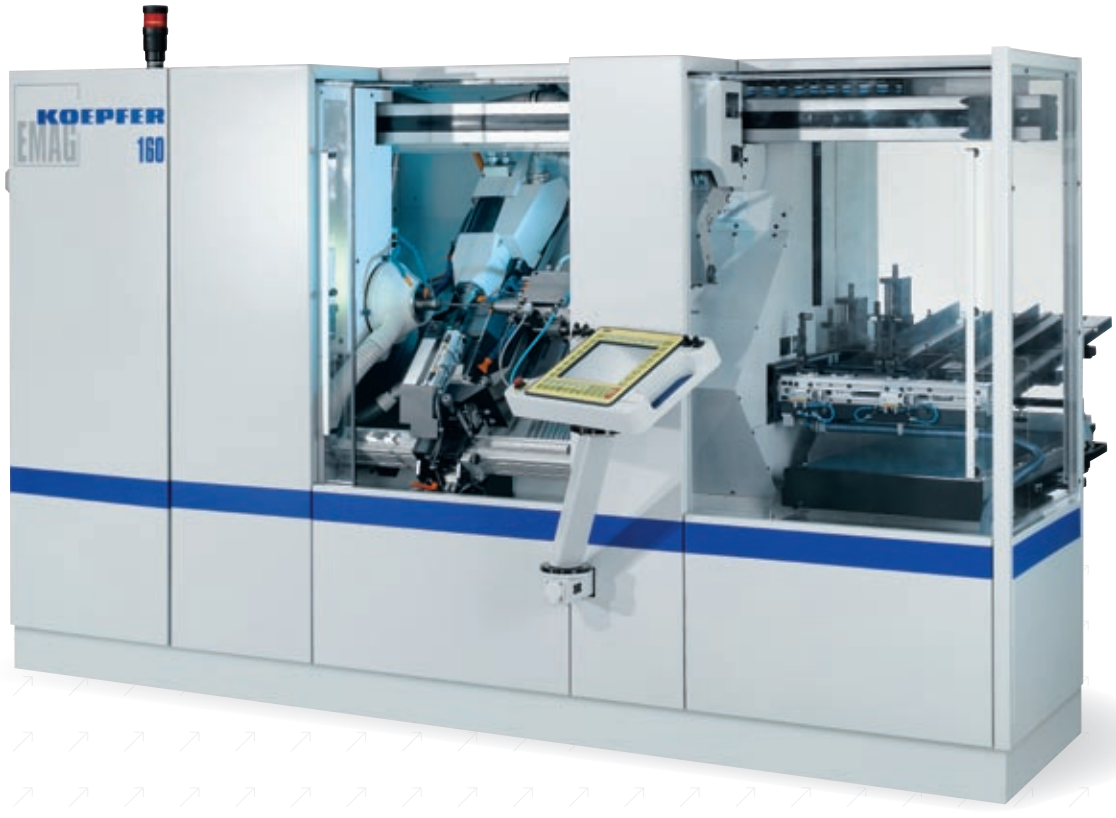
H O B B I N G M A C H I N E

The perfect shaft in record time.

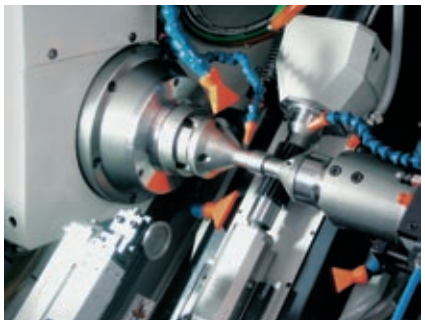
Throughput and idle times are governed, in the main, by cutting speeds, the workpiece loading process and ease of setting – all economically decisive factors in the machining of large batch sizes. For the machining of pinions and shafts with the lowest number of teeth the K 160 from KOEPFER is the world's fastest hobbing machine with the lowest chip-to-chip times. Where, some 8 to 10 years ago, the machining times for armature shafts, for example, lay in the region of 20 to 25 seconds, the K 160 has – for some years – been the world's only machine to reduce them to 8 to 10 seconds.

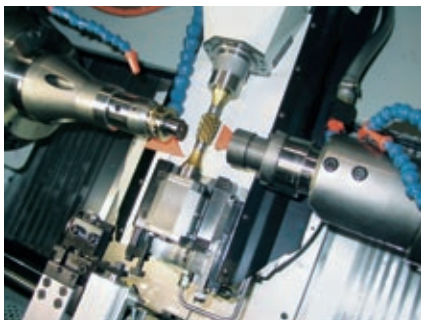
This position has been reached owing to the company's outstanding capabilities not only in the high-speed dry hobbing of planetary gears and the high-speed gear cutting of armature shafts but also in the tangential milling of worm gears.

K 160

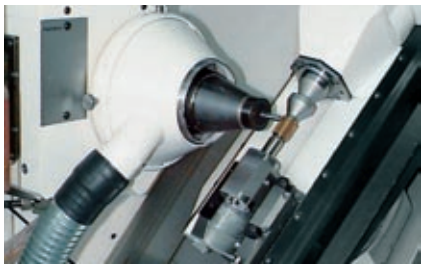


High-speed dry hobbing of planetary gears





High-speed dry gear cutting of armature shafts



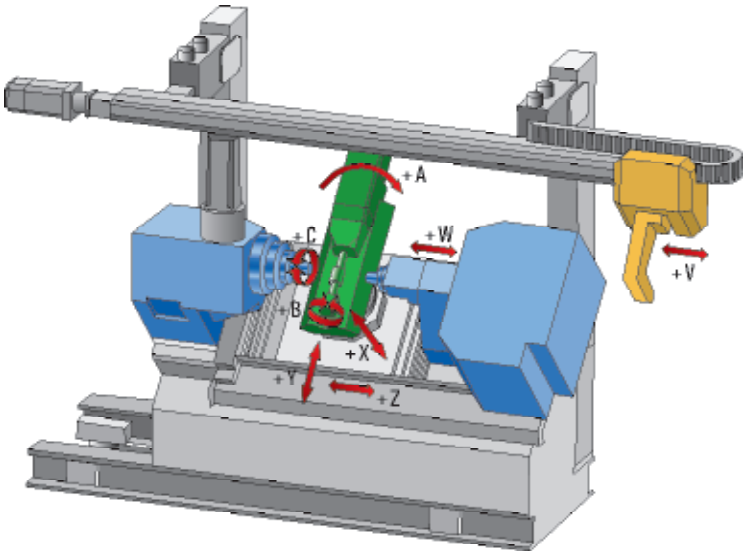
Worm gears can not only be radially milled, as is the common practice, but – where greater precision is demanded – they can be tangentially milled, with the shank cutter being clamped in a hydraulic expansion chuck

Steering pinions: soft pre-milling and hard finish-milling (skiving) of the gearing.
Manufacturing quality:
Pre-milling (soft) to DIN 7–8
Skiving (hard) to DIN 7

The perfect basis for precision and productivity.

The Hobbing Machine 160 is equipped with the latest generation of 8-axis control systems and offers high hobbing head and work spindle speeds. This makes it possible to use high cutting speeds, even on those pinions and shafts with the fewest number of teeth.

The machine base is a rigid, torsion-free, vibration-resistant slant bed in the mineral cast compound MINERALIT®, which offers ideal conditions for chip and coolant removal.



NC axes:

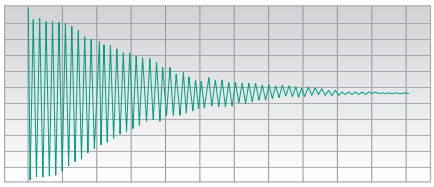
A – Hob head swivel movement
B – Hob rotation
C – Workpiece rotation
W – Tailstock travel
X – Radial movement
Y – Axial movement of hob
Z – Axial movement
V – Gantry loader travel

The machine base.

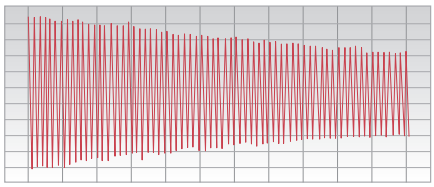
The machine base in high-grade MINERALIT® has outstanding damping qualities. This results in improved surface finishes and extended tool life.

The advantages:

- Excellent vibration damping, resulting in extended tool life and superb surface finishes
- MINERALIT® is a thermally very stable material and guarantees consistently good machining results



Vibration damping effect on EMAG machine base made from MINERALIT® polymer concrete

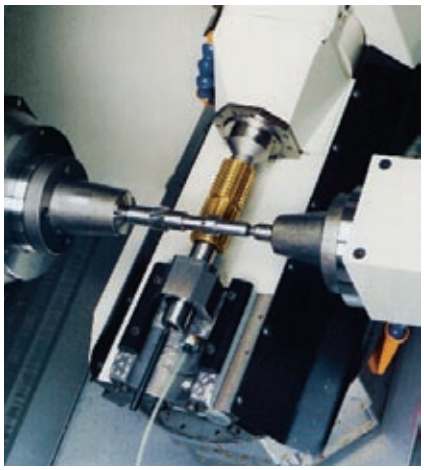


In comparison: vibration damping effect on machine bases made from cast iron

The machining area.

The slant-bed design of the machine provides easy access to the hobbing head and to the workpiece and offers outstanding conditions for chip and coolant removal.

The optional equipment includes a chip suction device for dry hobbing operations.



Machining area with hobbing head (direct drive)

The control system.

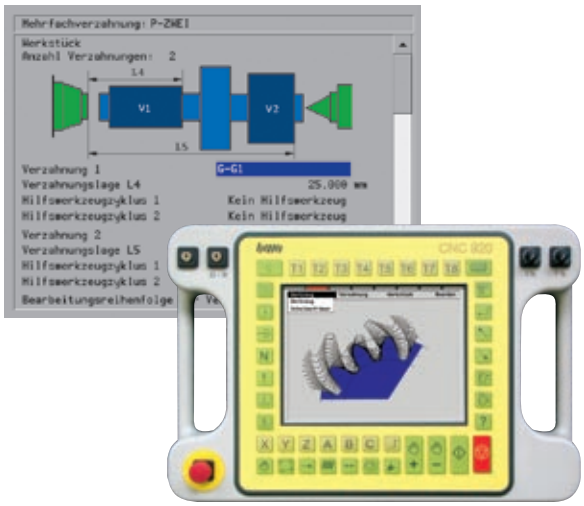
The K 160's control system is of the latest generation and has the following characteristics:

Its PC-operating control features a touch-screen panel in lieu of keyboard and mouse. The control has an integral program memory with a capacity of 1 MB (sufficient for over 750 different workpieces).

The user interface Windows "Look and Feel" is similar to that of office PCs.

The continuously developing, already extensive KOEPFER dialogue software allows for the easy generation of complex programs.

The control system also offers extensive diagnostic functions including online access to the controls by KOEPFER service personnel.

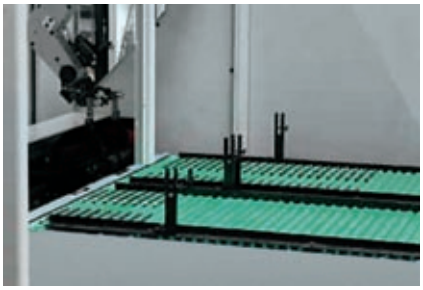


Highly flexible automation.

The integral gantry loader with rotary twin-grippers makes for shortest possible workhandling times. The available automation equipment covers the demands for autonomy and includes magazines for a variety of blanks and finish-machined components.

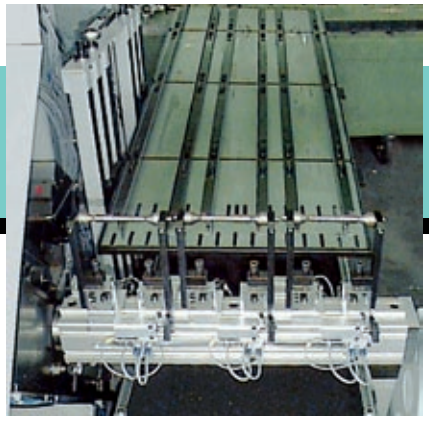
Long-time magazines, such as the recirculating storage conveyor, accept wheel- and shaft-type components alike and can be reset with very little effort, thus ensuring that the machine runs for hours without interruption.

Integral gantry loader with flexible workpiece magazines, feeder chain and belt conveyor



Multiple distributor system with multiple feeder rails

K 160



Multiple distributor system with multiple feeder rails

The capacity of a gravity-based magazine – and thus the autonomy of the machine – can be greatly enhanced with the use of multiple feeder rails.

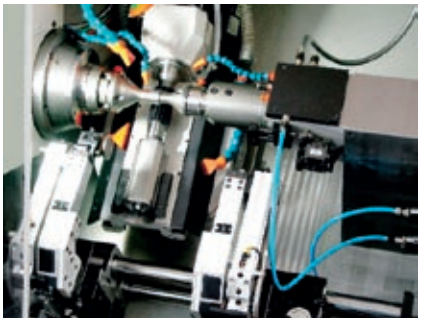
The triple distributor system can also be used as a twin or even a single distributor. Moving the distributor levers provides a practically unlimited number of settings to accommodate different workpiece lengths.

Options.

Auxiliary tool holders are available in single- or twin-head configuration. The latter can be used, for instance, to position and debur workpieces simultaneously.

Apart from being used for the deburring with wheel or cutting tool, the auxiliary tool holder can also be employed as a vibration damper or as a holder for the sensor used to automatically position the workpieces, or for special applications, such as holding driven deburring tools.

Also available is an angular milling head that can be fitted to the hobbing head to serve as an adaptor for the milling of multi-start worms.



K 160

Options:

- Workholding units for wheel-, pinion- and shaft-type workpieces and milling hobs
- Hydraulic expansion chucks for the clamping of shank hobs
- Hydraulic quick-chucking device for workpieces and milling hobs
- Workholding with expanding mandrels
- Deburring device (vibration damper, holder for sensor) in single- or twin-head configuration
- Automatic, sliding-type chip conveyor
- Oil mist extractor
- Suction device for dry hobbing operations
- Automatic orientation for skiving operations
- Software containing special commands, e.g. for the skipping of damaged sectors on the hob, or for various positioning tasks, etc.
- A selection of magazines for blanks and finish-machined components
- Workhandling with robots

Technical data.

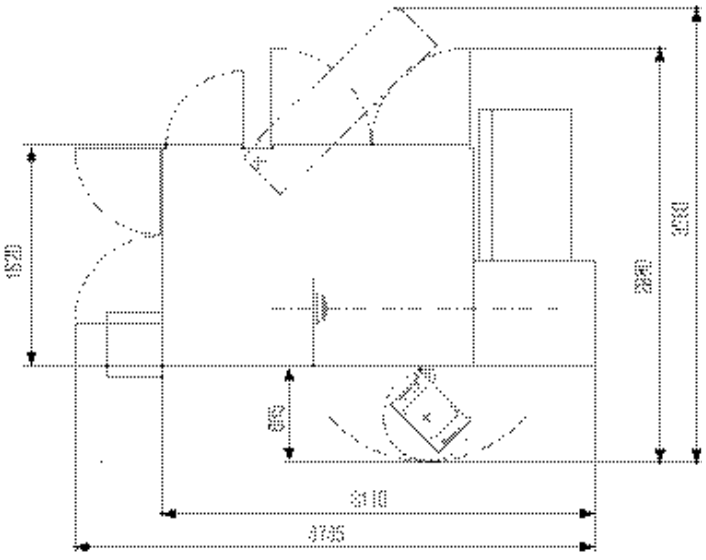
Capacity		K 160
Largest module		2.5
Max. workpiece dia.		
Standard (for automatic loading)	mm	60
Option (for automatic loading)	mm	90
Max. (for manual loading		
up to hob dia. 32 mm)	mm	140
Max. hobbing length	mm	200
Machine with extended base	mm	480
Max. workpiece length	mm	300
Machine with extended base	mm	1,000
Max. work spindle speed	rpm	1,000
Max. hobbing speed	rpm	5,000
Max. hob dia.	mm	63
Max. hob width	mm	130 (250)
Max. hob shift	mm	100 (160)
Swivel angle of hobbing head		± 50°

Angular milling head for the milling of worms

Speed of side milling cutter	rpm	400 – 1,500
Max. side milling cutter dia.	mm	80
Max. side milling cutter width	mm	30
Largest module		2.5

Floor plan K 160

Measurements in mm



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