

# Hobbing Machine 160



**KOEPFER**

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, customized 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





HOBGING MACHINE



## The perfect shaft in record time.

Throughput and idle times are governed, 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 smallest number of teeth the K 160 from KOEPFER is the world's fastest hobbing machine with the lowest chip-to-chip times. About 8 to 10 years ago, the machining times for armature shafts, for example, were in the

region of 20 to 25 seconds, the K 160 has – for a few years – been the world's only machine to reduce them to 8 to 10 seconds.

This position has been reached due 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

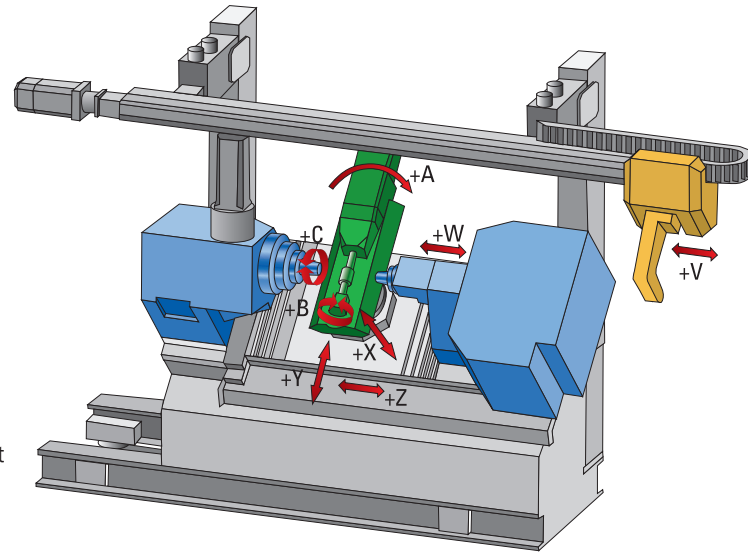
Steering pinions: soft pre-milling and hard finish-milling (skiving) of the gearing.  
Manufacturing quality:  
Pre-milling (soft) to DIN 7–8  
Skiving (hard) to DIN 7



# 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 base of the machine is made out of MINERALIT® polymer concrete in a slant bed design. This machine base is great for vibration dampening and is also torsion and bending resistant. The slant bed design has an appropriate chip and coolant removal system.



- NC axes:
- |                                  |   |
|----------------------------------|---|
| A – Hobbing head swivel movement | X – Radial movement of hobbing head       |
| B – Hob rotation                 | Y – Tangential movement of hob (shifting) |
| C – Workpiece rotation           | Z – Axial movement                        |
| W – Tailstock travel             | V – Gantry loader travel                  |

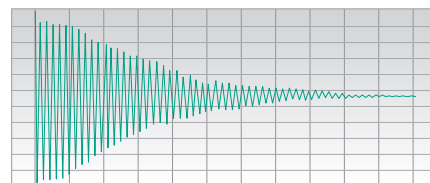
K 160

## The machine base.

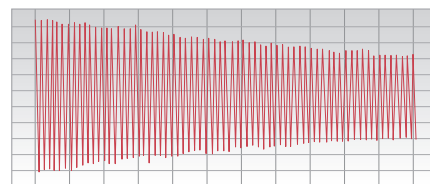
The machine body is made of high-grade MINERALIT® polymer concrete and provides excellent damping properties. This results in better surface quality and long tool service lives.

The advantages:

- Excellent vibration damping, resulting in extended tool life and superb surface finishes
- MINERALIT® polymer concrete is thermally stable which ensures constant production results



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



In comparison to: Vibration damping effect on machine bases in 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.



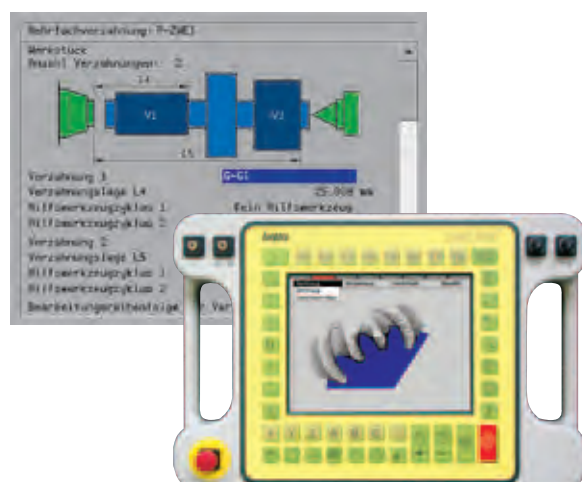
Machining area with hobbing head (direct drive)

## 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 improving, already extensive KOEPFER dialogue software allows for the easy generation of complex programs.

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



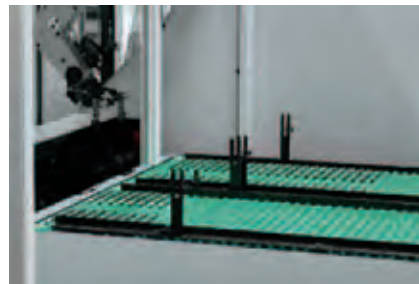
# Flexible automation.

The integral gantry loader with rotary twin-grippers makes for the 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.



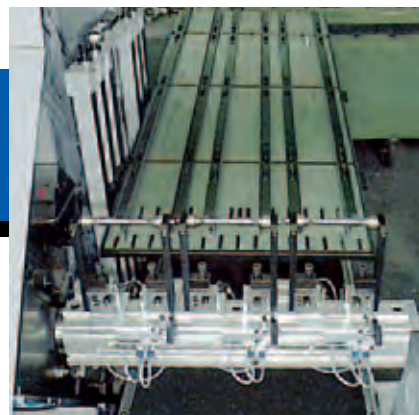
Integral gantry loader with flexible workpiece magazines, feeder chain and belt conveyor

Long-time magazines, like the circulating storage conveyor, make sure that machines are running for a number of hours and are not only suitable for both wheel- and shaft-type components but can also be reset without much effort.



Long-time recirculating storage conveyor

K 160



Multiple distributor system with multiple feeder rails

The capacity of a gravity-based magazine, and therefore, 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.





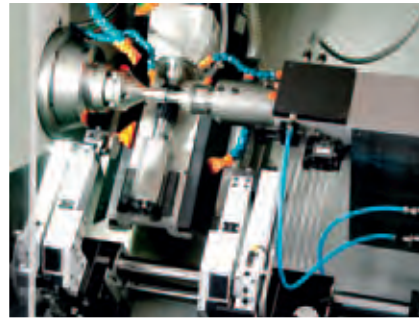


# Options.

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:

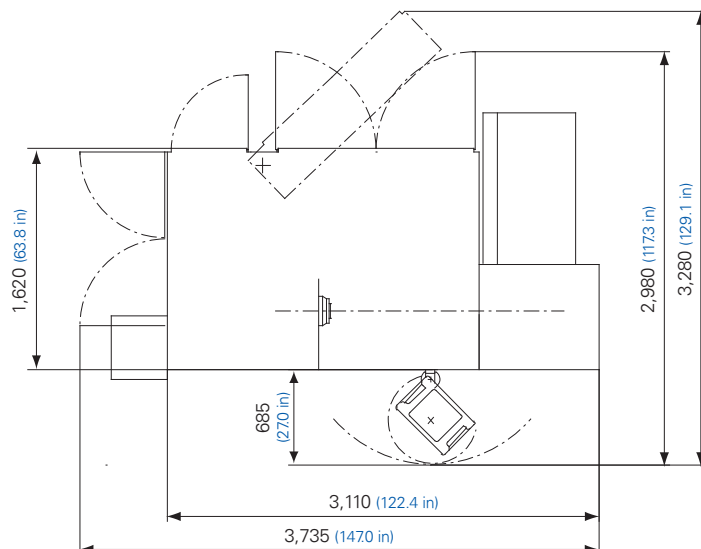
- Workholding units for wheel-, pinion- and shaft-type workpieces and milling hobs
- Hydraulic expansion chucks for the clamping of shank hobs
- Hydraulic quick-chucking device for workpieces and milling hobs
- Workholding with expanding mandrels
- Deburring device (vibration damper, holder for sensor) 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	
	in	2.4	
Option (for automatic loading)	mm	90	
	in	3.5	
Max. (for manual loading up to hob dia. 32 mm)	mm	140	
	in	5.5	
Max. hobbing length	mm	200	
	in	7.9	
Machine with extended base	mm	480	
	in	18.9	
Max. workpiece length	mm	300	
	in	11.8	
Machine with extended base	mm	1,000	
	in	39.4	
Max. work spindle speed	rpm	4,000	
Max. hobbing speed	rpm	5,000	
Max. hob dia.	mm	63	
	in	2.5	
Max. hob width	mm	250	
	in	9.8	
Max. hob shift	mm	160	
	in	6.3	
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	
	in	3.2	
Max. side milling cutter width	mm	30	
	in	1.2	
Largest module			2.5

## Floor plan K 160

Dimensions in mm



Subject to technical changes

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Subject to technical changes.

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