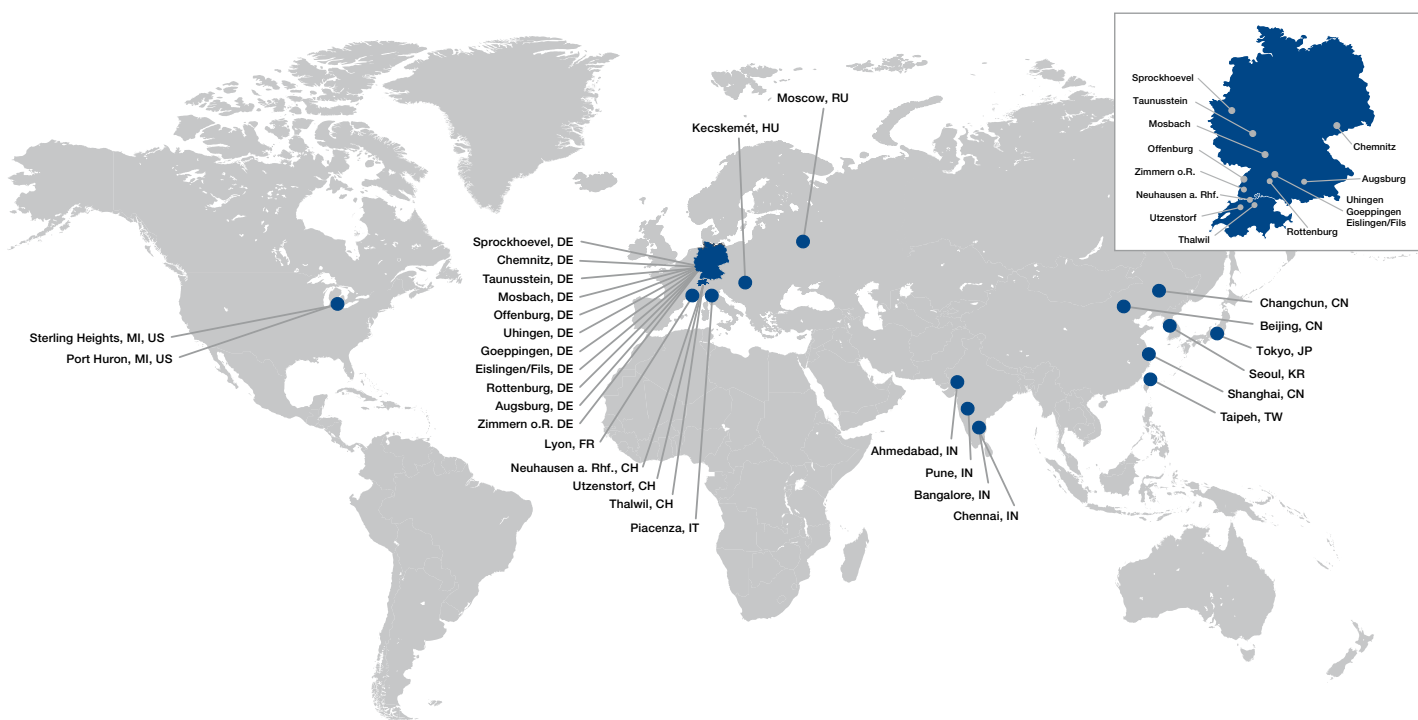




H 80–H 200 CDT, H 250–H 400 CDT/CDM,
CD/CDA/CDX

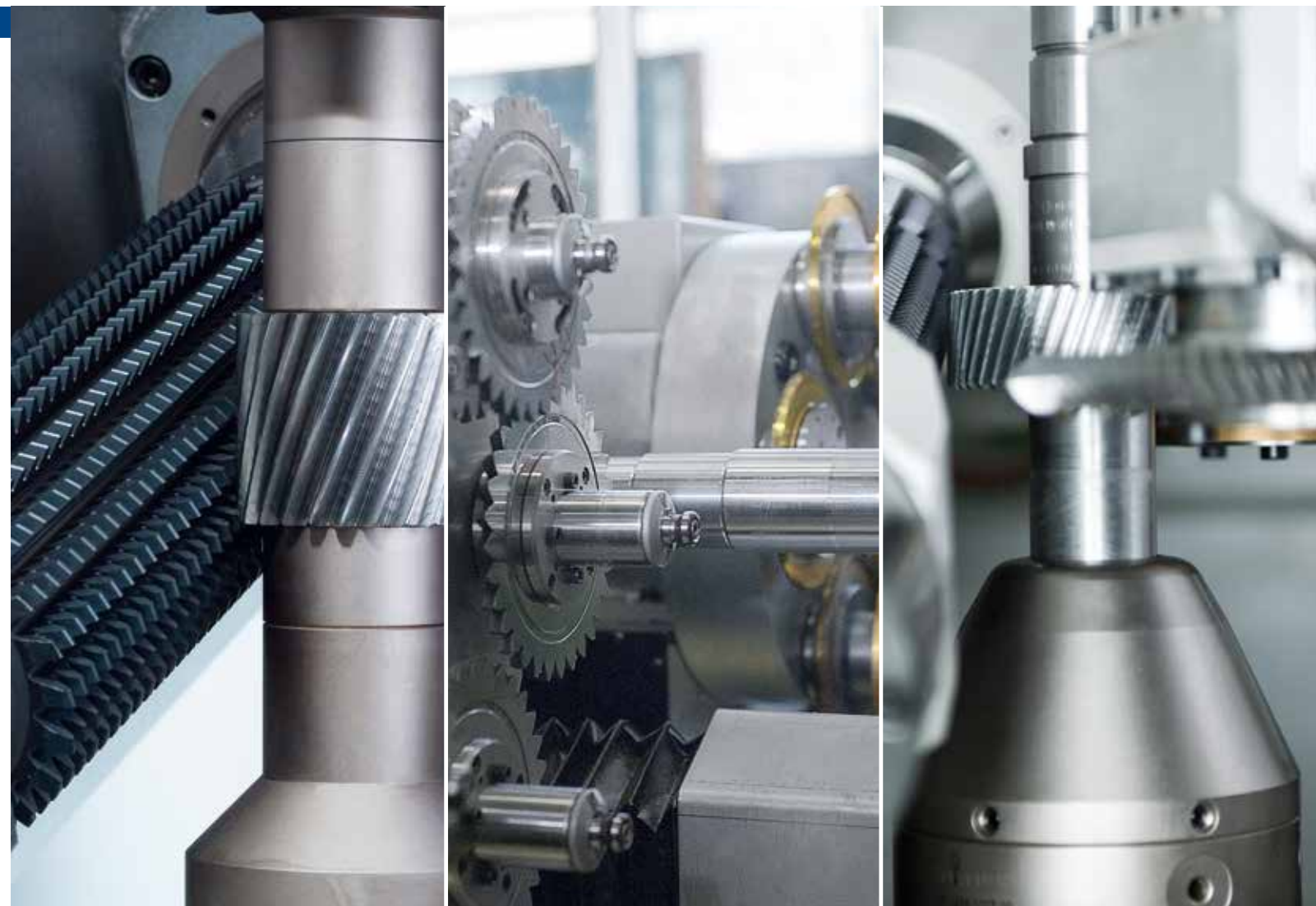
About FFG Europe & Americas

The FFG entities in Europe and North America unite major players from the German, Italian, Swiss and North American machine tool industry with a broad range of milling, turning, gear manufacturing technology and the knowhow of the renowned machine tool brands VDF Boehringer, Hüller Hille, Hessapp, Jobs, MAG, Modul, PfiFFner, Rambaudi, Sachman, Sigma, SMS and Witzig & Frank. Since 1789, these brands have substantially contributed to the progress in industrial manufacturing and are well known as reliable and innovative equipment and systems solutions suppliers for the automotive and truck, aerospace, machine building, general machining, railway industry, energy and heavy engineering industries. While being an independent group, these entities benefit from the strengths and opportunities of the global Fair Friend Group. They stand for premium technology within FFG.



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FFG Werke GmbH

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www.ffg-werke.com

Hobbing and Chamfering / Deburring



FFG 24/7 Service and Support: www.ffg-werke.com/24x7



Made in Germany since 1789



Hobbing and More

Small and Medium Machine Series

with Integrated Auxiliary Functions



H 80 – H 200



H 250 – H 400



H 250 CDM



CD/CDA 250



CDX 250

Versatile hobbing machines

Our small and medium H-series of hobbing machines are designed for the efficient production of geared workpieces with diameters up to 400 mm and module 8 mm. By choosing optional application-specific features and extensions we offer the optimum solution for every manufacturing task. Our machines are suited for all gear hobbing and form milling tasks including skive hobbing of hardened gears. Machine models can be equipped for dry or wet hobbing. Depending on your application you may employ HSS, solid carbide or inserted blade hobs. Apart from straight and helical gears as well as crowned and tapered gears, you can manufacture shafts with multiple gears, worm gears, chain gears and special profiles via optional software packages. Our patented CDT technology allows for the integration of several auxiliary functions like chamfering/deburring or radial drilling right into the workarea of the machine. The machine series CD for the chamfering and deburring of gears provides solutions with single machines, for manufacturing cells or for production lines.

Highlights

- ▶ Modular designs adapted to your application
- ▶ Thermally stable and vibration-damped structures
- ▶ Wet or dry hobbing processes
- ▶ Direct removal of chips
- ▶ Choice of different drive packages
- ▶ Integrated auxiliary functions as an option (CDT/CDM)
- ▶ CNC-optimized systems for fastest workpiece change
- ▶ Quick-change clamping systems
- ▶ Latest control technology
- ▶ MODUL dialogue programme
- ▶ Safety-integrated and HMI-Pro
- ▶ Service-friendly auxiliary units
- ▶ Fast plug and play installation
- ▶ Machine, tool and process from a single source



Cutting of pinion



Centering

H 80 – H 200

The Small One for All Requirements

Modular design to fit your requirements

By means of its modular construction principle the H 80 – H 200 series can be adapted to the requirements of the automotive industry as well as general industrial applications - from mass production tasks to the flexible manufacturing of smaller lots. Machine structures made from high-quality grey cast iron are combined with our patented closed-frame building principle guaranteeing machine stiffness and rigidity within the smallest footprint. The machine bed is equipped with a coolant circle to ensure thermal stability and keep temperature deviations to a minimum.

Closed frame design for maximum stiffness

The innovative machine structure provides for additional support of the tailstock quill through the machine cross beam and allows the application of concentric clamping pressure with maximum clamping control. The inclined planes of the workarea prevent the build up of chip nests. When dry hobbing special air nozzles ensure that even the smallest amount of residue is removed without contact. Chips are evacuated immediately via an integrated conveyor and do not come into contact with the machine structure. As no heat is transferred to the machine structure by chips, it remains thermally stable even under the harshest work conditions. Excellent clamping characteristics, quick-change systems and the universal loading concept by means of a flexible portal loader make the H 80 – H 200 series a true allrounder – equally well suited for pinions, gears or shafts.

All models of the H 80 – H 200 series can be equipped with CDT technology. This option allows for the integration of different auxiliary functions like chamfering/deburring, drilling, turning, milling or centering, directly in the workarea.

Highlights

- ▶ Up to workpiece diameter of 200 mm and module 4.0
- ▶ Optimum machining of gears and shafts on one machine
- ▶ Dry or wet hobbing
- ▶ Modular platform for application-specific adaption
- ▶ Grey cast machine strucure with integrated coolant cycle for exceptional vibration dampening and thermal stability
- ▶ Closed frame design for maximum stiffness with minimum space requirements
- ▶ Tailstock with electrical drice, NC controlled stroke and clamping force
- ▶ Direct drive hob head and worktable
- ▶ Workarea protected from corrosion (emulsion kit)
- ▶ Universal loading concept for gears and shafts
- ▶ CDT technology for integrated auxiliary functions



Stainless steel workarea enclosure for dry hobbing



The closed frame structure ensures maximum rigidity



H 80 – H 200
Universal gantry loader for direct feed from various work piece storage systems and automation devices. Easy integration into manufacturing cells and systems.



H 80 – H 200 is suited for a wide workpiece range and allows to invest in one machine model only for all required workpieces

H 250 – H 400

High Performance Hobbing for Automotive and Universal Applications

Options for all applications

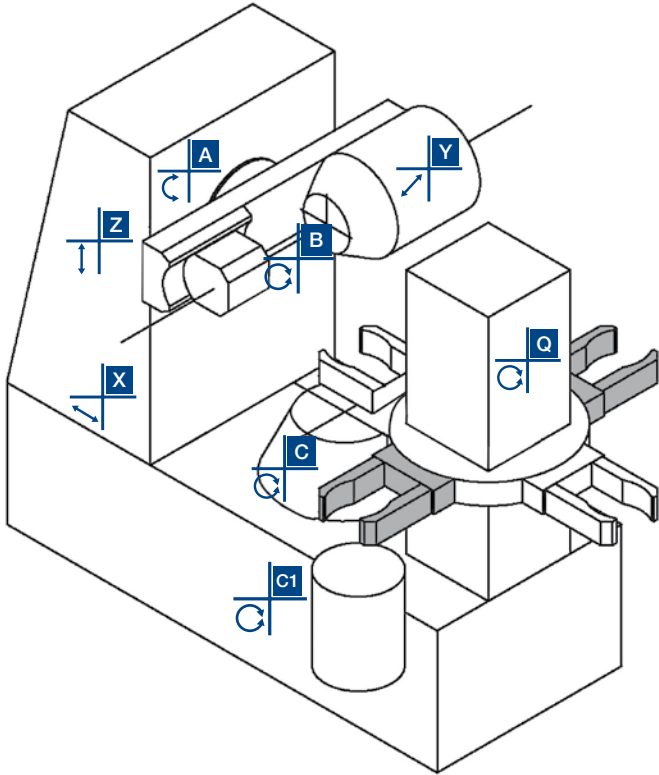
The H 250 and its larger sisters have been developed for dry or wet high speed cutting applications. The modular machine series features 3 different models up to 400 mm in diameter and module 8.0. The models can be equipped with a choice of different tool heads and table drives. Automation solutions include ring or gantry loaders which are adapted to your very application. Ring loaders can be fitted with two or four stations, depending on desired auxiliary processes like oil spin-off or chamfering/deburring. The H 250 – H 400 series can be equipped with CDT technology to integrate several auxiliary functions in the machine's workarea.

Highlights

- ▶ Up to workpiece diameter 400 mm and module 8.0
- ▶ State-of-the-art hobbing and form milling techniques
- ▶ Dry or wet cutting
- ▶ Modular platform for application-specific adaption
- ▶ Grey cast structure with integrated coolant circle
- ▶ Choice of hob heads and worktables
- ▶ Drives with power reserves to exploit future tools
- ▶ Optional powerful high-torque worktable drive for cutting large modules and ductile materials
- ▶ Various loading and workpiece magazine solutions
- ▶ Extended counter column for longer workpieces
- ▶ CDT technology for integrated auxiliary functions



H 400 with robot automation



- | | |
|--------------------------------|------------------------------------|
| A Hob head swivel | Y Tangential slide movement |
| B Hob spindle rotation | Z Vertical slide movement |
| C Work table rotation | Q Ring loader swivel |
| X Radial slide movement | C1 Table swivel |
| | 270° ring loader position |



High performance cutting of workpieces with large modules with optimum removal rates



Chamfering/deburring with chamfer hobs



Gantry loader



Ringloader variants in light and heavy execution



CDT Technology and SynchroCut

Auxiliary Functions for Highest Efficiency

Highlights CDT

- ▶ Available for the series H 80 – H 200 and H 250 – H 400 (module range depending on the application)
- ▶ Modular system for various auxiliary functions
- ▶ One or two CNC tool arms
- ▶ Universal interfaces for maximum flexibility
- ▶ Hobbing, chamfering/deburring, drilling, centering, turning, milling
- ▶ Combinations of auxiliary functions available
- ▶ Machining of gears and shafts on one machine type
- ▶ Shafts with multiple gears in one clamping
- ▶ SynchroCut for burr-free tooth flanks
- ▶ Easy, automatic tool arm adjustment via CNC
- ▶ One central control system for all processes



Integrated centering



Integrated drilling function



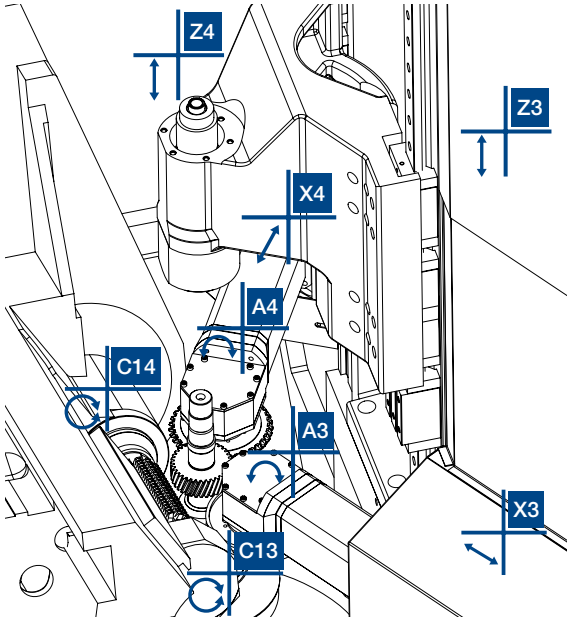
Integrated combination tool for chamfering/deburring on one spindle



Integrated turning function

More than just hobbing

The patented CDT technology integrates different auxiliary functions in your gear hobbing machine. Options include chamfering/deburring of gear teeth, centering, radial drilling and further operations with driven or static tools. One or two CNC controlled tool arms are mounted on the lateral side of the counter column. The functions of these units are integrated in the machine's operator software, allowing for highly effective data feed, adjustments and corrections. This allows for machining of various workpieces with multiple gears in one clamping, e.g. for rough machining processes before honing including milling first step, chamfering/deburring, milling second step. Chamfer cutters can also be applied depending on the use of respective tool heads. The basic unit is designed as a multi-functional element with universal VDI interfaces which can mount a variety of specific auxiliary functions fast and easy. This new multitude of machining variants paired with its flexibility enhances the economy of machining also smaller lot sizes with a highly productive machine. Models which are fitted with mit CDT technology are equipped with a fast and flexible gantry loader. They can be easily integrated into existing manufacturing cells or production lines.



- | | |
|----------------------------------|------------------------------|
| A3 Hob head swivel | X3 Radial tool travel |
| A4 Hob head swivel | X4 Radial tool travel |
| C13 Tool spindle rotation | Z3 Axial tool travel |
| C14 Tool spindle rotation | Z4 Axial tool travel |

Synchrocut for burr-free tooth flanks – hobbing, chamfering and deburring in one clamping

The innovative SynchroCut process is based on the CDT functions as well. The chamfering/deburring heads are synchronised with the hob head via CNC and are pitched into the running hobbing process working partly time-parallel to the main process. A specific 2-cut-chamfer-deburr strategy guarantees nearly burr-free tooth flanks. With this new process high-quality results without secondary burr are achieved while overall machining times can be reduced.



H 250 CDM

Completely Time-Parallel Processing

Hobbing and Chamfering/Deburring

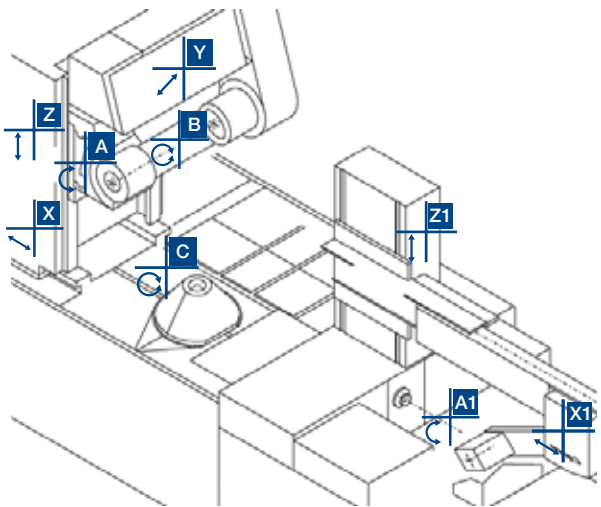
Maximum productivity – minimum space

The H 250 CDM is the ideal combination of full-scale hobbing and chamfering/deburring within a compact unit. With its space-saving dimensions this solution allows the manufacturing of straight and helical gears and pinion shafts in a fast and efficient manner - dry or wet. Both processes run time-parallel to reduce non-productive auxiliary times to a minimum. The integrated gantry loader feeds the working spindle of the hobbing machine, the machining position of the chamfering/deburring unit and the external automation interface.

During the hobbing process the gantry loader is retracted from the workarea thus protected from swarf, dust and heat. The H 250 CDM is equipped with a single control and operator unit for both operations. The standard operator interface allows simple control, fault diagnosis and correction of process variables. Furthermore, the different processes including the gantry loader may be run separately from each other, so the machine elements can be used for hobbing or chamfering/deburring tasks only.

Highlights

- ▶ Up to workpiece diameter 250 mm and module 8.0
- ▶ Time-parallel hobbing and chamfering/deburring
- ▶ Good accessibility for convenient operation
- ▶ Full-scale operation with 2 tool heads
- ▶ Completely integrated process with centralised control
- ▶ Fast part/workholding setup and changeover
- ▶ Direct and flexible automation
- ▶ Reduced maintenance and easy servicing



- A Hob head swivel
- B Hob spindle rotation
- C Work table rotation
- X Radial slide movement
- Y Tangential slide movement
- Z Vertical slide movement
- A1 Loader gripper swivel
- X1 Loader horizontal movement
- Z1 Loader vertical movement



Both units can be operated separately if workpieces do not require both operations



Geared shafts can be handled vertically or horizontally



Combined hobbing and chamfering/deburring machine

CD / CDA 250

Dedicated Solutions for Chamfering/Deburring



Universal design

The CD series is designed for chamfering, deburring and rolling of straight or helical gears and shafts. The horizontal design supports the continuous chip evacuation and tools are not clogged with chips for longer tool life and better workpiece quality. Workpiece and tools are automatically synchronized and positioned pneumatically. Speed and feed force can be adjusted. The tailstock can be adjusted axially to fit various workpiece lengths. Pneumatic clamping includes position monitoring.

Highlights

- ▶ Up to workpiece diameter 250 mm and module 8.0
- ▶ Sturdy and simple design
- ▶ Driven work spindle, speed steplessly adjustable
- ▶ Horizontal workpiece axis for optimum residue fall
- ▶ Idling or driven tool heads
- ▶ Auto-meshing and auto-centring of tool and workpiece
- ▶ Different tool types available
- ▶ Dry and wet processing
- ▶ Automation options
- ▶ Machine, tool and process from one single source

Various process options

The two tool heads of the CD machine can be adapted to mount tools of different manufacturers. Various tool variants are available as single tools or in combined tool setups: standard chamfering, deburring and rolling discs, combined chamfer-roller tools, deburring tools with serrations or deburring discs for sprocket wheels. Tool heads are executed in idling or driven design depending on the application. The handloaded machine version is operated via a Siemens Simatic S7-300 PLC. The CDA 250 is equipped with either a simple swivel loader or a gantry loader with double-gripper. Latter version is controlled by a Siemens 840 D Solution Line. The intuitive user interface guides the operator step-by-step through the manufacturing process.



Chamfering/deburring tools



Chamfer-roller tool



CDA 250 with rotary charger



Horizontal workpiece axis for optimum residue fall



Rotary charger configuration (gantry or robot load as option)



Deburring of chain sprocket gears

CDX 250
Flexible and Highly Productive
Chamfering/Deburring



Productivity and flexibility in one machine

The characteristic feature of the CDX 250 are its 2 sliding revolver heads of which each can mount up to 5 different tool groups: in total 10 tool groups for a wealth of tool combinations. The machine is controlled by means of a Siemens Sinumerik 840D. The CDX 250 can adapt to a wide range of automation systems. As a standard we offer an integrated gantry loader with double gripper, controlled by the machine CNC.

The functions of the gripper itself are pneumatically actuated (swivel, opening, closing). For the manufacturing of gears a pneumatically actuated gripper wrist is added in order to work the workpieces horizontally but to place them vertically on the pallets. Furthermore we offer options like pick & place gantries, palleting and storage systems as well as heavy-duty loaders for heavier workpieces.

Highlights

- ▶ Up to workpiece diameter 250 mm and module 4.0
- ▶ Chamfering and deburring of gears and shafts
- ▶ 2 revolving drums, up to 10 tool heads
- ▶ Up to 5 different gears in one setup
- ▶ Different tool types available
- ▶ Minimum tool change requirements during production
- ▶ Minimum setup requirement during production
- ▶ Integrated centering unit (option)
- ▶ Integrated drilling unit for lubrication holes (option)
- ▶ Different automation and workpiece storage solutions

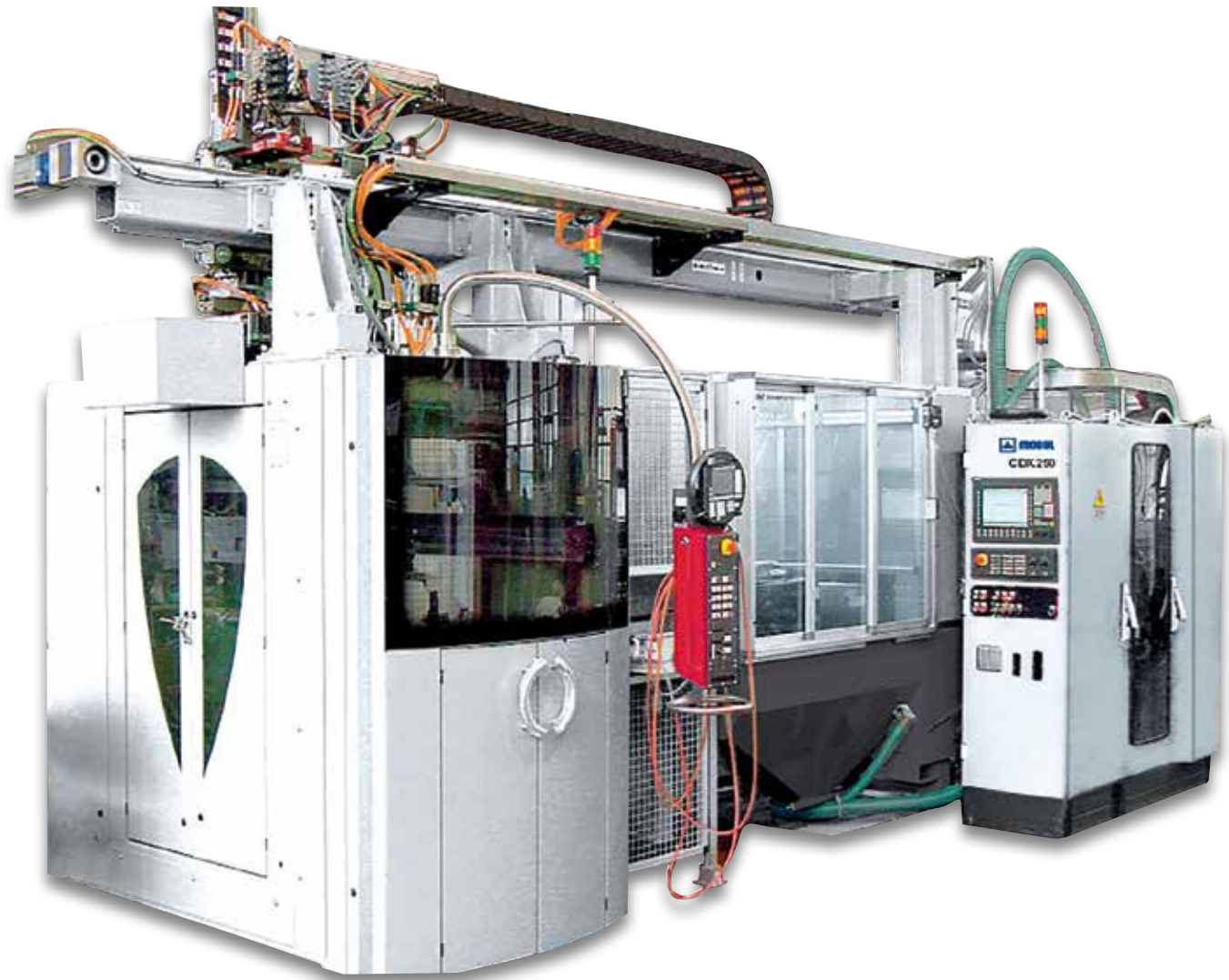


Auxiliary functions centering and drilling

Optionally the CDX 250 may be fitted with a drilling unit for the creation of lubrication holes on the workpieces. An integrated centering unit ensures the correct positioning of the workpiece, to avoid drill bit breakage. A laser unit checks if the drill tool is still intact.



Integrated unit for the drilling of lubrication channels in one setup



CDX 250 with integrated portal loader and palleting system



Integrated heavy-duty gantry loader and workpiece conveyor

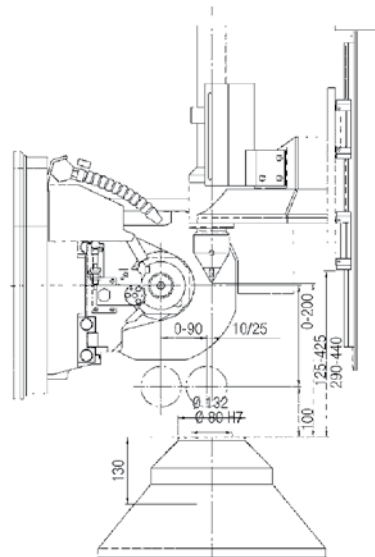
Technical Data

Technical Data		H 80/H 100	H 130	H 160	H 200	H 250	H 300	H 400
Workpiece diameter max.	mm	80/100	130	160	200	250	300	400
Module hobbing / form milling max.	mm	4.0	4.0	4.0	4.0	4.5 (8.0)	8.0	8.0
Radial travel (X-axis)	mm	10 – 100	25 – 115	45 – 135	60 – 150*	25 – 205	40 – 255	60 – 285*
Feed rate radial max.	mm/min	10 000	10 000	10 000	10 000	10 000	10 000	10 000
Tangential travel (Y-axis)	mm	200	200	200	200	240	240	240
Feed rate tangential max.	mm/min	7500	7500	7500	7500	7000	7000	7000
Axial travel (Z-axis)	mm	100 – 450	100 – 450	100 – 450	100 – 450	200 – 600 (200 – 800)	200 – 600 (200 – 800)	200 – 600 (200 – 800)
Feed rate axial max.	mm/min	10 000	10 000	10 000	10 000	7000	7000	7000
Spindle speed (B-axis)	rpm	250 – 3500	250 – 3500	250 – 3500	250 – 3500	225 – 1800 (300 – 3000)	225 – 1800 (300 – 3000)	225 – 1800 (300 – 3000)
Spindle power	kW	15	15	15	15	18.5 (14/31)	14 (31)	14 (31)
Spindle torque	Nm	190	190	190	190	275 (550/190)	550 (190)	550 (190)
Tool head swivel angle (A-axis)	degree	± 45	± 45	± 45	± 45	± 45**	± 45**	± 45**
Tool arbour clamping fixture taper		ø22, 27, 32 / SK25	ø22, 27, 32 / SK25	ø22, 27, 32 / SK25	ø22, 27, 32 / SK25	ø32 / SK25	ø32 / SK25	ø32 / SK25
main bearing / counter bearing						HSK-A80 / cylindrical	HSK-A80 / cylindrical	HSK-A80 / cylindrical
						HSK-A80 / SK25	HSK-A80 / SK25	HSK-A80 / SK25
Tool diameter max	mm	90	90	90	90	130 (175)	175 (130)	175 (130)
Tool length bore type / shank type	mm	225/285	225/285	225/285	225/285	250/325	250/325	250/325
Table speed (C-axis) max.	rpm	10 – 1000	10 – 1000	10 – 1000	10 – 1000	5 – 600 (1 – 400)	1 – 400	1 – 400
Table diameter	mm	132	132	132	132	170	250	330
Spindle bore diameter	mm	80 H7	80 H7	80 H7	80 H7	100 H7	100 H7	150 H6
Total connected load, approx.	kVA	35	35	35	35	40	40	40
Control		Siemens 840 D	Siemens 840 D	Siemens 840 D	Siemens 840 D	Siemens 840 D	Siemens 840 D	Siemens 840 D
		Solutionline	Solutionline	Solutionline	Solutionline	Solutionline	Solutionline	Solutionline
		Safety integrated	Safety integrated	Safety integrated	Safety integrated	Safety integrated	Safety integrated	Safety integrated
Number of NC axes hobbing		6	6	6	6	6	6	6
Machine weight, approx.	kg	6500 – 8000	6500 – 8000	6500 – 8000	6500 – 8000	9500 – 11 000	9500 – 11 000	9500 – 11 000
Dimensions, l x w x h, approx.	mm	2300 x 2600 x 2850	2300 x 2600 x 2850	2300 x 2600 x 2850	2300 x 2600 x 2850	4000 x 2420 x 2750 (3050)	4000 x 2420 x 2750 (3050)	4000 x 2420 x 2750 (3050)

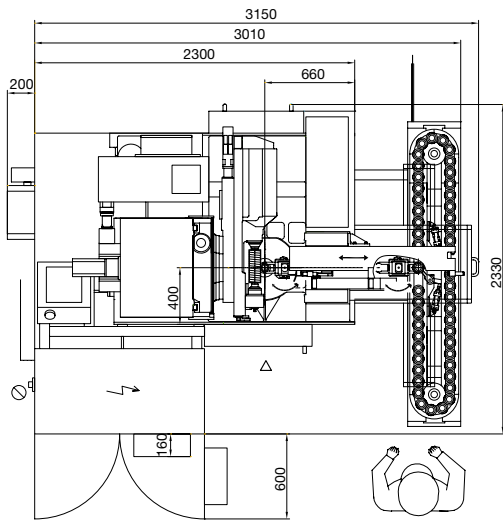
* available with extended radial stroke
** available with extended tool head swivel angle

Technical data subject to change.

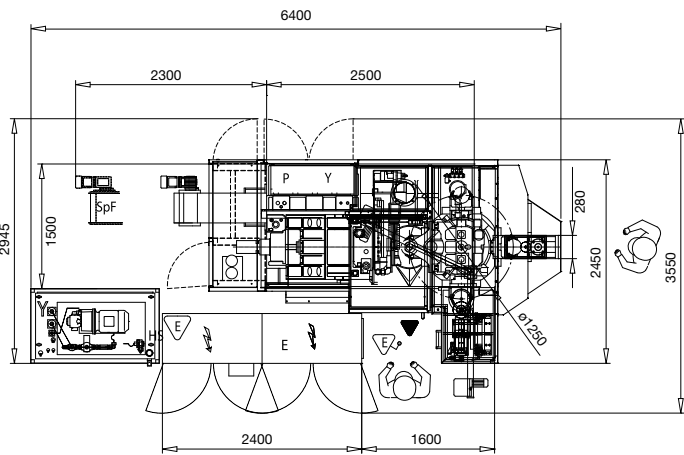
Machine Dimensions



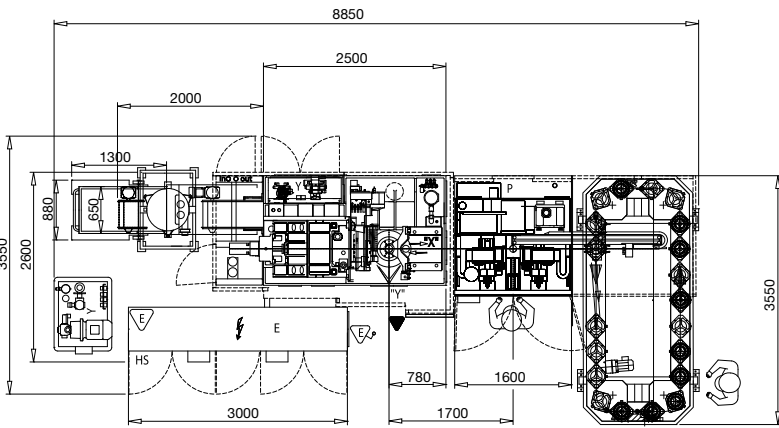
H 100 – H 130



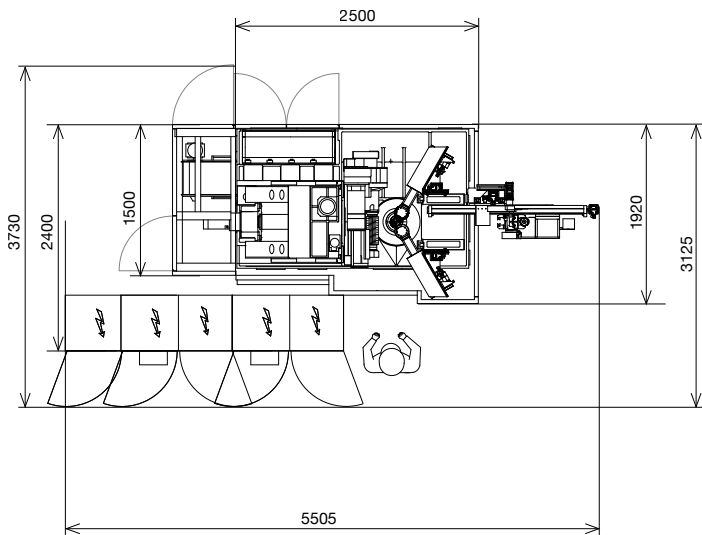
H 100 – H 130
with integrated gantry loader and
workpiece magazine



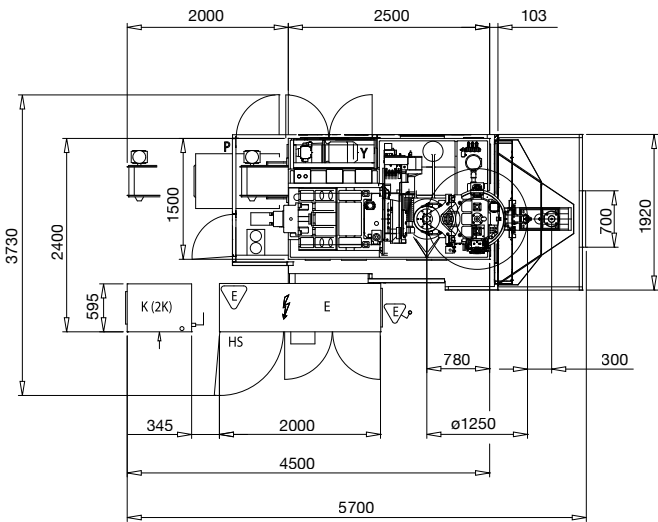
H 250 CD



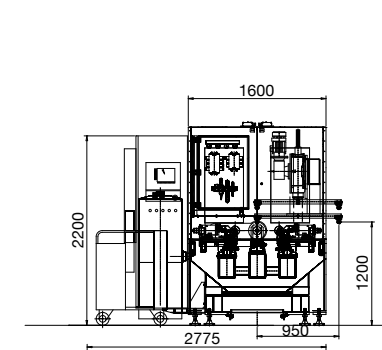
H 250 CDM



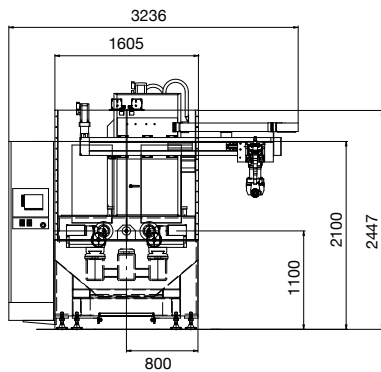
H 250 CDT



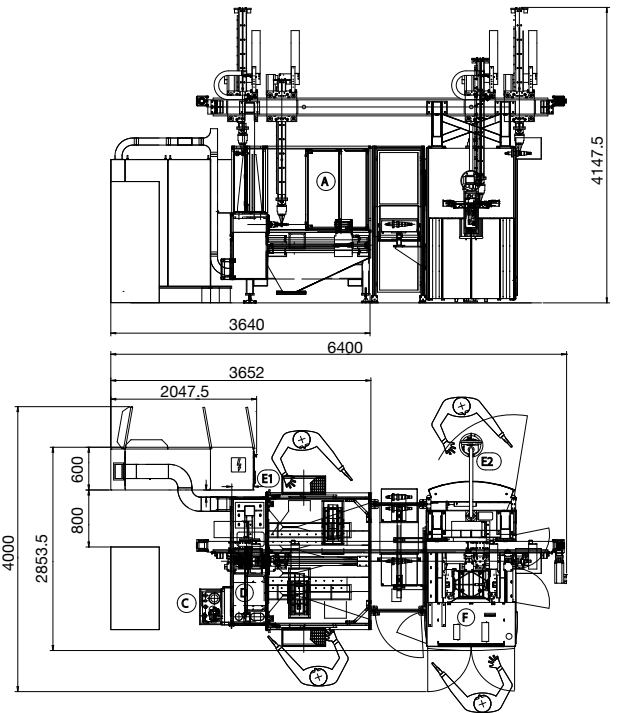
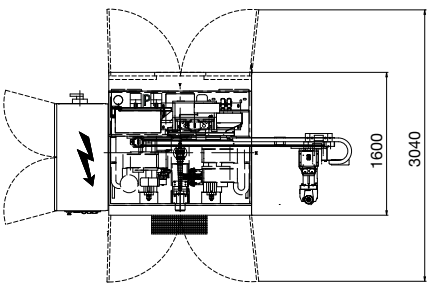
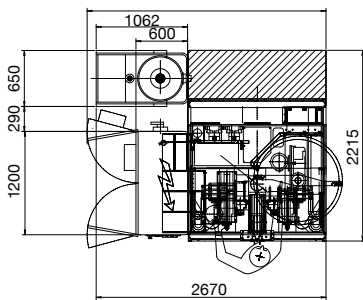
H 250 – H 400



CDA 250 with rotary charger



CDA 250 with gantry loader



CDX 250 with pallet storage

Latest Drive Technology and Easy Menu Guidance Guarantee Maximum Process Reliability

We build machines for efficient, error-free and safe manufacturing, for daily use and for people.
The H series is equipped with the latest Siemens 840 D Solution Line control unit.



MODUL operator dialogue
The userfriendly MODUL operator interface with full Windows environment provide step-by-step guidance. Easy and intuitive data entry interfaces facilitate operation and provide for continuous process data monitoring and error correction via software features.

- 1 Transline 2000 for line integration requirements
- 2 Easy and intuitive data entry interface
- 3 Fast and immediate correction possibilities
- 4 Safety-integrated for superior safety functions



- Highlights**
- ▶ Latest control technology ready for direct networking
 - ▶ USB interface included
 - ▶ Modular software packages
 - ▶ Profile and flank correction possibilities
 - ▶ Saftey-Integrated and HMI-Pro
 - ▶ Menu-guided operator interface
 - ▶ Integrated tool monitoring system

Remote diagnostics system
Connect our machines via a local network or the internet directly and safely with our service department for remote maintenance and fast software updates.

- Energy efficiency package**
- ▶ Energy saving drive concepts
 - ▶ Automatic shut down depending on raw part feed
 - ▶ Minimized hydraulics use

- Advantages**
- ▶ Faster data transfer to machine
 - ▶ Fast data validation and error correction
 - ▶ Safe operation
 - ▶ Fast and easy online updating and trouble-shooting



Our machine design concept incorporates service units in the hull of the machines
Self-sufficient units reduce the overall amount of time spent on regular maintenance work thanks to functions such as automatic part lubrication or maintenance intervals. Preventive maintenance requirements are therefore limited to periodic inspection and are automatically prompted by the CNC. All service components are located in clearly visible and accessible areas.

- Highlights**
- ▶ Auxiliary units incorporated in the hull of the machine
 - ▶ Service-friendly auxiliary units
 - ▶ Easily accessible auxiliary units
 - ▶ Automatic preventive maintenance cycles
 - ▶ Automatic periodic inspection prompts

- Advantages**
- ▶ Easily transported
 - ▶ No special hoisting equipment required
 - ▶ Fast and simple installation and setup
 - ▶ Simple relocation
 - ▶ Reduced maintenance requirements
 - ▶ Easier and more efficient maintenance
 - ▶ Less machine downtime for servicing purposes
 - ▶ Fast and easy servicing

Service for all Brands and Legacy Brands of FFG Werke GmbH

VDF BOEHRINGER **FEELER** **LEADWELL**



Service Center Uhingen
Stuttgarter Strasse 169, DE-73066 Uhingen
Tel.: +49 800 000 5639

HESSAPP



Service Center Taunusstein
Aarstrasse 157, DE-65232 Taunusstein
Tel.: +49 6128 243 260

Honsberg



Service Center North /West
Stefansbecke 30, DE-45549 Sprockhoevel
Tel.: +49 2339 9278 0

HÜLLER HILLE
DIEDESHEIM



Service Center Mosbach
Steige 61, DE-74821 Mosbach
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JOBS **RAMBAUDI** **SACHMAN**



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MODUL



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WITZIG & FRANK



Service Center Offenburg
Am Holderstock 2, DE-77652 Offenburg
Tel.: +49 781 289 1121

Service and support

- Commissioning
- Maintenance and inspections
- Repair service
- Spindle service
- Overhaul and retrofit
- Used machines
- Service contracts
- Machine relocation



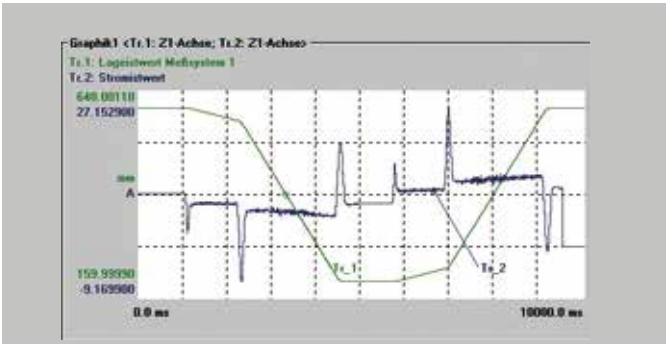
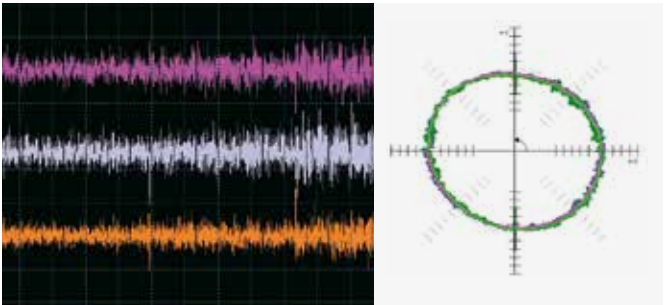
Spare parts

- 24/7 delivery
- Central warehouse
- Individual service concepts



Process and production optimization

- Process optimization
- Programming
- Software: machine data acquisition, diagnosis, condition monitoring, energy management, virtual machine



Machine condition monitoring "Finger print" via vibration analysis, ballbar test and trace measurement.

Training

- Operator training
- Maintenance training (mechanical, electrical)
- Programming training