ALFLETH ENGINEERING

MACHINE CATALOGUE

Werkzeuge
Werkzeugmaschinen
ALFLETH Engineering AG

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Who are we?

Swiss engineering and trading company representating first class european machine-tool manufacturers

Around 70 employees, 10 subsidiaries, more than 25 years of strong experience in central and eastern Europe

"Swiss quality and Swiss precision is top priority for us with the focus on you as the customer."

Established in 1996 in Lenzburg, Canton Aargau, Switzerland

Around 30 min from Zurich Airport

Our potential for success

Customer focus

We offer competent consultation and provide solutions which fulfil customer requirements. We consider the customer to be a partner and work together to achieve the objective:
to increase capability and productivity

Know-how

Due to long-standing experience in our market sectors as well as good relationships with our local partners we are able to provide our customers with the optimal solution for production, research and development.

Quality

Quality is our highest maxim. We only sell high-value products of perfect quality.

Service

Though the proximity to customers afforded by our local branches we are able to provide a reliable, efficient and flexible *AFTER SALES SERVICE.*

Activity - Application

We represent quality brands in the field of mechanical processing

Technology		Brand
Milling	Horizontal and vertical, (portal design) machining / milling-grinding / milling-drilling centers	Fehmann, Huron
Gear hobbing	Gear trains / gear hobbing / microtechnology	Affolter
Turning	Precise conventional, cycle controlled and CNC lathes Lathe machines / Turn-mill centers for precision parts Swiss type lathes for mass production CNC and multi-tasking machines High precision turning / hard turning / turngrind machines	Weiler Benzinger Star Jyoti Hembrug
Grinding	Cylindrical grinding machines in manual, PLC and CNC CNC centreless grinding machines Universal OD/ID cylindrical grinders / jig grinders / modular grinders Horizontal and vertical centre grinding machines - angle heads and spindle speeders Surface grinder, tangential grinding machines with travelling column	Robbi Ghiringhelli Hardinge Group Henninger, Klein Delta, Bergamini
Sharpening	CNC grinding machines for tool and component manufacturing. Cylindrical and profile grinding machines	Schneeberger
Deep Drilling	Gundrill & milling machines for molds - centerline deep drilling machines for cylindrical workpieces	I.M.S.A
Honing - lapping - polishing	Side lapping & polishing / flat honing & fine grinding / optics polishing - cylindrical lapping	Stähli
Riveting	Radial, orbital, roller forming	BalTec
Microtechnology	CNC rotary transfer machines / micromachining- / turning centers	PreciTrame
EDM	Erosive fine drilling - thread sinking & start hole drilling	Agema

Many of these brands offer high automation and are Industry 4.0 ready

Catalogue Overview

AFFOLTER · agema GERMANY · BalTec · BENZINGER PRÄZISIONSMASCHINEN · Bergamini RETTIFICATRICI

DELTA THE POWER OF GRINDING · FEHLMANN · RETTIFICATRICI GHIRINGHELLI · HARDINGE HAUSER · HARDINGE KELLENBERGER

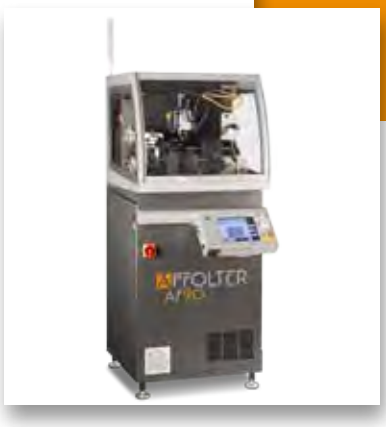
HARDINGE TSCHUDIN · HARDINGE VOUMARD · HEMBRUG DANOBAT · Henninger we create precision · HURON

I.M.S.A · JYOTI · klein · PRECI TRAME · ROBBI

SCHNEEBERGER · STÄHLI FEELING FOR FINISHING · star · WEILER

Gear hobbing and micro machining centres

AF90



AF90 is designed to be compact in order to replace conventional machines, while being just as productive and precise as the AF100 plus.

AF100plus

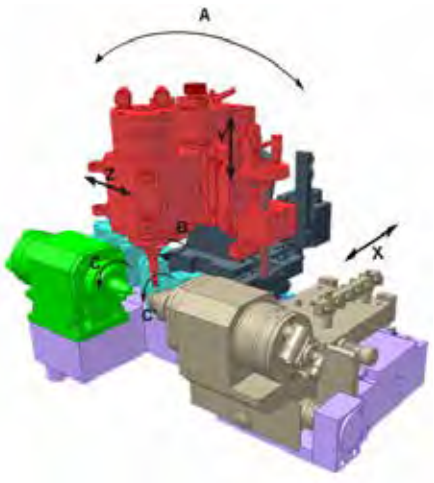
AF100plus is fitted with a variety of loader and options to offer solutions to suit many applications in the microtechnical industrial sectors. It is the most flexible GEAR line machines.

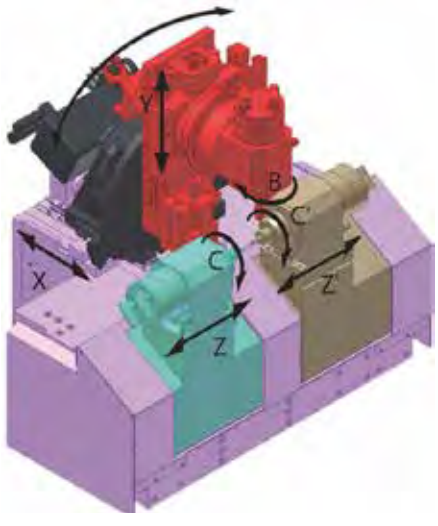
AF160

AF160 is the most versatile Gear Hobbing Machine in the GEAR line, with increased performance and extra options dedicated to cutting larger parts.

Technical data		AF90	AF100plus	AF160
Workpiece data				
Max. part diameter	*mm*	30	36	60*
Max. cutting length	*mm*	40	50	110-180**
Max. headstock and tailstock rotation	*min⁻¹*	5000	5000	5000-12000***
Minimal module	*mm*	0,02	0,02	0,02
Max. module *(depending on material and number of passes)*	*mm*	0,5 - 0,8	0,5 - 0,8	2,0
Tool data				
Max. hob cutter diameter	*mm*	24	24	100
Max. hob cutter width	*mm*	20	20	80
Cutting spindle inclination angle	*degrees*	-/+ 10	-/+ 30 auto	-/+ 50 auto / -115***
Max. cutting spindle rotation	*min⁻¹*	16000	16000	9000 - 16000

** According to the setup and the quality required.* *** According to clamping of tools.* **** Option* *All information is subject to change without notice*





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Loaders and robots

AF20

Drum loader for small watchmaking and microtechnical parts.

Cost-effective solution for hobbing medium to large series.

The drums and gripper are manufactured based on thepart to be loaded.

Technical data		AF20
Capacities		
Ø part	*mm*	0,4 - 6
Part length	*mm*	0,8 - 12
Feed time	*sec*	0,3 - 1,2
Range		up to 100000 parts
Rotary drum performance		symmetrical, asymmetrical, shaped

All information is subject to change without notice

Technical data		AF45				
Feed type		**magazine**	**vibrating bowl**		**oil pulse**	
Type of parts			thin parts	cubic parts	thin parts	cubic parts
Ø part (min.-max.)	*mm*	2 - 12	4 - 12	3 - 12	1 - 10	1 - 5
Part length (min.-max.)	*mm*	2 - 30	2 - 5	3 - 12	1 - 5	1 - 5
Max. fill volume	*L*	0,5 - 5	1	1	0,06	0,06
Parts weight	*gr*	0,5 - 5	0,2 / 8	0,2 / 8	- / 0,2	
Feed time	*sec*	0,5 - 1,0				
Repeatability	*mm*	0,01				

All information is subject to change without notice

AF45

Slide loader for small and medium watchmaking and microtechnical parts.

Fast, precise solution for medium to large series gear hobbing.

The magazine, gripper and vibrating bowl are adjustable to the part to be fed

Three different types of units enable parts feeding:

- Cartridge magazine loader
- Vibrating bowl feeding system
- Oil pulse feeding system

AF71

Universal feed and unloading system for all types of parts.

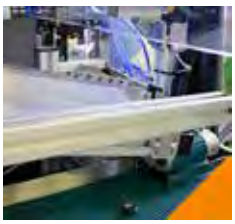
With dual grip, fast, precise solution for medium to large series gear hobbing.

This loader does not require specific tooling to the part.

The grab clamps are adjusted to a range of diameters.

Three different types of units enable parts feeding:

- Adjustable feed rail
- Belt conveyor
- Vibrating bowl loader with feed rail



AF72

Universal feed and unloading system for all types of larger parts.

This loader with dual grip, dedicated to the AF160 machine, is a fast, precise solution to cutting larger parts with medium to large autonomy series gear hobbing.

This loader does not require specific tooling to the part.

The grab clamps are adjusted to a range of diameters.

Three different types of units enable parts feeding:

- Adjustable feed rail
- Vibrating bowl loader with feed rail
- Robot

Technical data		AF71			AF72
Capacities		**feed rail**	**belt conveyor**	**vibrating bowl**	**feed rail**
Ø part	*mm*	50	50	20	60
Part length	*mm*	120	120	40	250
Maximum weight	*gr*	300	300	40	2500
Repeatability	*gr*	+/- 0,05 / 0,002			+/- 0,1 / 0,004
Feed time	*sec*	1,5 - 2			1,5 - 2
Preparation time for a new part	*mm*	5			5

All information is subject to change without notice

agema GERMANY®

AGEMA Germany GmbH
www.agema-germany.de

Erosive micro drilling and thread sinking on one EDM

AS

AGEMA machines offer intuitive operation and easy handling, e.g. through stored erosion technologies and data transfer from all common programming systems.

Technical Data		AS 320	AS 430
Working table			
Clamping area	mm	500 x 350	650 x 400
Workpiece weight max.	kg	200	300
Workpiece dimensions max.	mm	750 x 500	1000 x 600
Distance table/quill max.	mm	400	580
Electrodes weight max.	kg	5	5
Total of required space	mm	2200 x 2510 x 2300	2920 x 2690 x 2450
Range of traverse, measurments			
X-axis	mm	300	400
Y-axis	mm	200	300
Continious eroding hub Z	mm	250	270
Rough adjustment Z	mm	220	250
Net weight of machine	t	1	1,5
Resolution	mm	0,001	
Dielectric system			
Content of dielectric system	L	200	400
Number of filter cartridges		2	2
Control and pulse generator			
Power supply		3 phase + N + PE 400 V AC	
Connected load		2,5 KVA	
Open circuit voltage		180 V	
Medium working current		25 A	
		All information is subject to change without notice	

Two Technologies – One Machine

Hole Drilling

Die Sinking

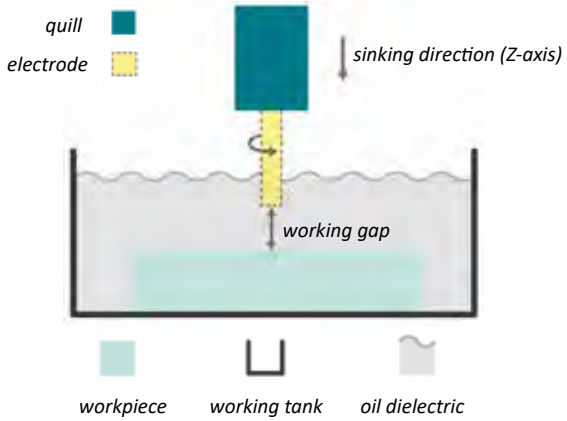
Hole Drilling as technology enables:

- Start holes: electrode diameters from 0.30 up to 10.00 mm
- Micro drillis: electrode diameters from 0.08 up to 0.30 mm
- Functional drill holes, also at an acute angle to the workpiece axis
- Precision drill holes in carbide and steel with a proven minimal damage of the material
- High accuracy of the drill holes (position, straightness, cylindricity)
- High ablation speed

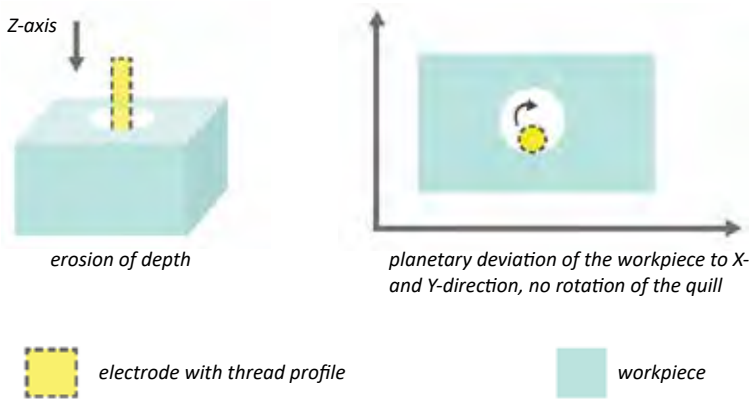
Machines are also suitable to perform Die Sinking

- Planetary deviation for expansion, e.g. manufacturing of fittings
- Thread sinking in carbide and steel on the basis of predefined technologies e.g. M3 to M8
- Realisation of a variety of roughness levels in the sinking process

Electrical Discharges during Hole Drilling & Die Sinking Process



Functional Sketch about Enlargening with Hole Drilling & Die Sinking



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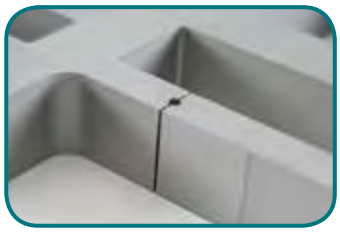
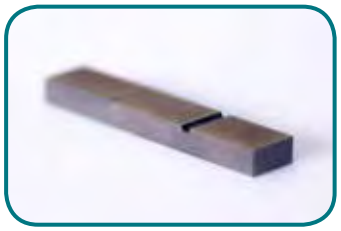
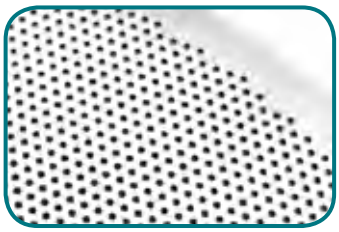
Agema EDM Examples of use

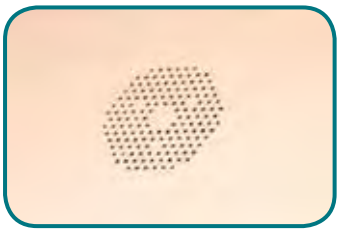





Precision & Fine Drilling

- Cooling holes in taps with coating
- Drilling holes in carbide cutter with an angle of approx. 10° or smaller
- Drilling holes > 40 mm with an electrode diameter ≥ 0,2 mm
- Drilling holes > 60 mm with an electrode diameter ≥ 0,3 mm
- Blind holes with precise depth
- Start hole drilling for precision stamped parts
- Extruder for synthetic granules manufacturing
- Insert Threads into Carbide and hardened steel
- Micro drilling ≤ 0,3 mm for stamped parts



Agema EDM Some options

Tool Changer

Automatic electrode changer for electrodes from ≥ 0,3 mm; as well as automatic changer for sapphire guidances

Fifth or Further Axes

E.g. CNC-controlled dividing heads as fifth axis; up to eight axes possible

Handbox

The handbox can be used additionally to operate the machine via touch screen. Hence it can be used to move the axes.

Centering Microscope

For regular control and adjustment of the center position when changing the electrode guide with increased precision requirements / small drillings

Riveting machines

ELECTRIC

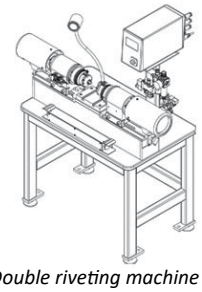
ELECTRIC	CLASSIC-HPP	CLASSIC
Process		
Radial	Radial	Radial
Orbital	Orbital	Orbital
Roller forming	Roller forming	-
Process monitoring		
YES	YES	NO
Rivet-/form-starting detection		
Integrated in the stroke movement, flexible and dynamically definable	Integrated in the stroke movement, flexible and dynamically definable	NO
Process control		
Motion profiles can be totally customized. One process cycle can consist of an unlimited number of profile segments	6 control parameters 40 pre-installed programs	Time controlled
Control parameter		
S = Stroke F = Force T = Time E = Position of spindle / stroke vl = Feed rate vr = Rotation speed B = Basic reference (with NHE) H = Rivet height (with NHE) Z = Stroke pre position	S = Stroke F = Force T = Time E = Position of spindle (stroke) B = Basic reference (with NHE-U) H = Rivet height (with NHE-H)	T = Time
		All information is subject to change without notice

CLASSIC-HPP

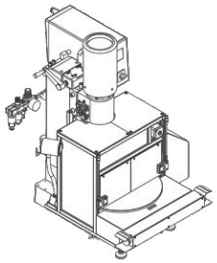
BalTec offers the perfect machine for every application thanks to flexible and modular configurations - for riveting, joining and forming!

Various configurations offer maximum flexibility and can be adapted very easily.

Basis of all machines is the basic unit which produces high-quality connections by either radial riveting, orbital riveting or roller forming.

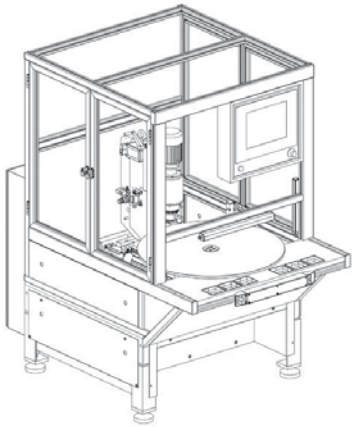


Double riveting machine RND



Rotary indexing table riveting machine RNR

Work cells with coordinate riveting machine and HPP



For example:

- Combined with round table
- For belt transfer system

CLASSIC

MRX – Multiple riveting

With the multiple riveting head you can carry out several riveting operations simultaneously within a certain area.

Multiple riveting heads can be mounted on standalone machines as well as on units in any desired position.

Rotary riveting station to secure the terminals on a capacitor using two radial riveting machines RN 081

Baltec AG
www.baltec.com

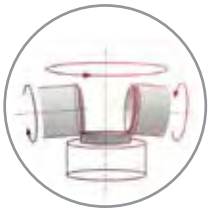
Riveting machines Forming Processes

RADIAL

- Excellent surface structure of the closing heads
- Forming tool does not rotate – minimal friction between tool and workpiece
- Allows the processing of products which contain e.g. bakelite, ceramic or other brittle materials
- Simple workpiece holding thanks to minimal lateral forces. Clamping of the workpiece not usually required
- Long lifetime of machines and tools

ORBITAL

- Hardening on the formed work-piece is clearly visible
- Suitable for forming pieces with larger diameters and annular forms



ROLLER FORMING

- Allows forming of tight angles
- Good sealing properties of the formed workpiece
- Minimal axial force – minimal com-pression of the workpiece
- Specially suitable for large diameters or thin wall applications
- Roller forming head is manufactured specific to the application
- Axial or radial forming direction possible

10 typical tool profiles

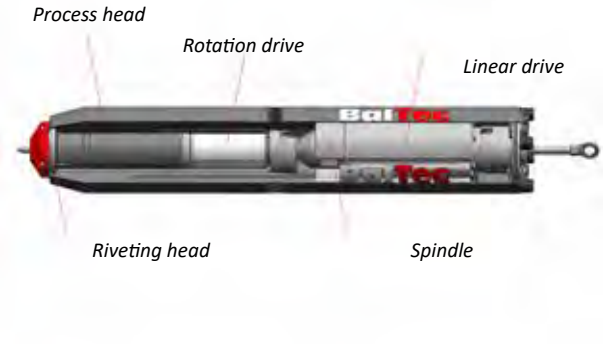
flat | conical | crown | eyelet-flare | flat-flare | flare | ring stake | high-crown | roll-in | draw-in

ELECTRIC

Riveting, Joining, Roller Forming
One Machine - three Processes

With servo drive and the HPPi PC software for riveting process monitor-ing. The fastest process times, as well as energy-saving, characterize the new generation of electric riveting and roller burnishing machines.

- Force range from 0.3 kN to 50 kN covered by four basic models
- Linear stroke of up to 100 mm or 200 mm
- Linear speed from 0 - 120 mm/s, or 0 - 180 mm/s, servo regulated
- Rotation speed from 0 - 3000 min^{-1}, servo regulated
- Easily exchangeable process heads (radial, tangential, orbital, roller burnishing)



Radial Riverting Head

Orbital Riverting Head

Roller Forming Head

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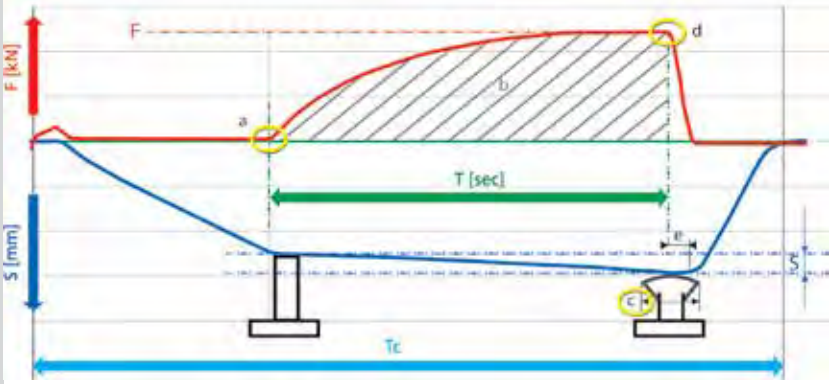
Riveting machines Process Monitoring

- Compliance and verification of predefined quality characteristics
- Proof of quality through complete documentation of the process
- Reduction of rejects and rework costs
- Reduced process times thanks to dynamic forming contact point (NA)
- Important for proof of process capability and product liability



Legend

T: Forming time
Tc: Total cycle
S: Stroke
F: Force
a: Forming contact point (NA)
b: Forming of workpiece
c: Achieved dimensions within specifications
d: End of forming process
e: Response time lag

Process Control HPPi (ELECTRIC)


Process data


Process curves


Logger


Diagnosis

Process Control HPP-25 (CLASSIC-HPP)


Process data

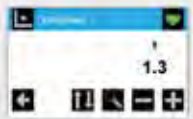

Process curves


Logger


Diagnosis

Time Based Control RC-30 (CLASSIC)

Setup operating mode | Cycle operating mode | Info | Setup | Diagnosis


Setup operating mode


Cycle operating mode


Info


Diagnosis

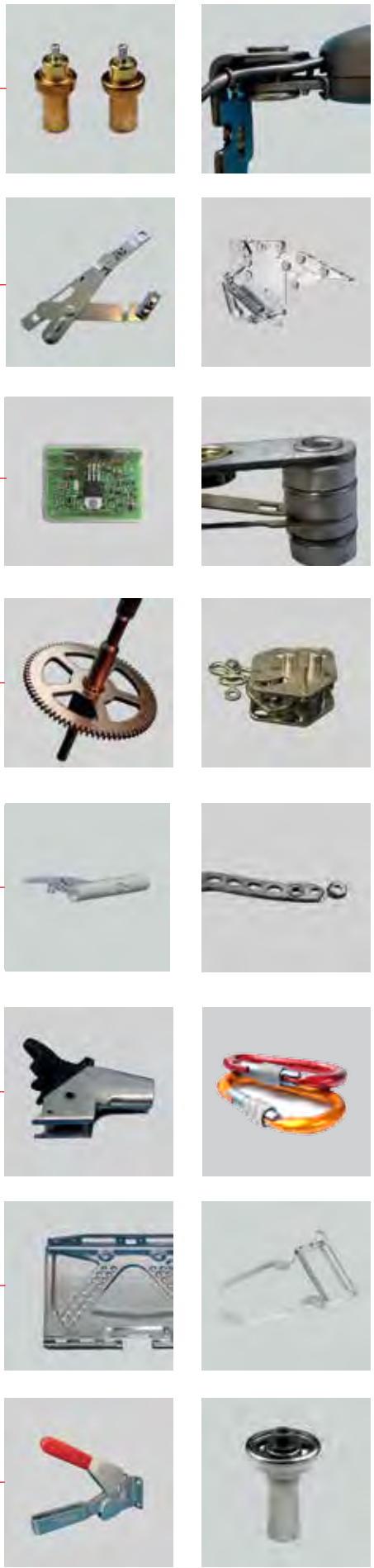
Rivet base detection device NHE

Depending on the equipment, the NHE checks before riveting the presence of the components, the position and the rivet protrusion. Processing components out of tolerance or missing components shall be prevented.

As a result, cost for most pre- or post-inspection stations of parts can be eliminated and saved, since the HPP-25 handles quality monitoring.

Application Examples

- Automotive
- Hardware Industry
- Electrical & Electronics
- Fine mechanics & Watches
- Medical device industry
- Consumable Goods & Leisure
- Home & Gardening
- General Industry



High-precision - lathes

GO Future

Advantages of the machine:

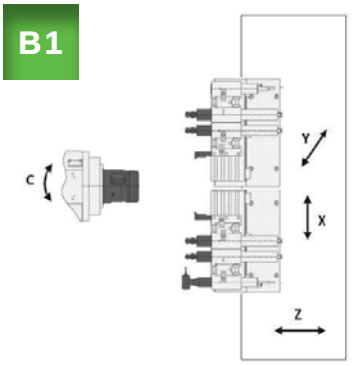
- Complete machining of high-precision complex workpieces
- Compact installation surface
- Best damping characteristics of the whole machine
- Full featured, extremely rigid constructed Y-axis
- Diverse Benzinger- automation solutions for insert parts as well as robotic solutions
- Processing from bar material

Technical Data		GO Future	B1	B2	B3	B4	B6
X1-axis	mm	180 / 370	-/●	●/○	●/-	●/-	●/-
X2-axis	mm	195	-	-	-	-	●
Z1-axis	mm	260	●	●	●	●	●
Z2-axis	mm	292	-	-	●	●	●
Y-axis	mm	80	○	○	○	○	○
Y2-axis	mm	50 (±25)	-	-	-	-	○
Rapid motion X / Z / Y	m/min	45 / 45 / 15	●	●	●	●	●
Acceleration X / Z / Y	m/s²	10 / 10 / 5	●	●	●	●	●
Measuring systems X / Y /Z	type	Glass scale X (Y / Z)	●(○)	●(○)	●(○)	●(○)	●(○)
Main spindle							
Motor spindle	type	Water-cooled	●	●	●	●	●
Bar capacity	mm	16 / 26 / 32 / 42	○/●/○/○	○/●/○/○	○/●/○/○	○/●/○/○	○/●/○/○
Spindle speed	rpm	6000 to 15000	●/○	●/○	●/○	●/○	●/○
Driving power (S1)	kW	12 to 15	●/○	●/○	●/○	●/○	●/○
Capacity (Spindle nose)	mm	26 - 42 *(DIN55026 A4)*	●	●	●	●	●
		16 *(BENZINGER Standard)*	○	○	○	○	○
C-axis resolution	degrees	0,001	○	○	○	○	○
Workpiece clamping		Pneumatic / hydraulic	●/○	●/○	●/○	●/○	●/○
		Sensitive clamping	○	○	○	○	○
Counter spindle							
Motor spindle	type	Water-cooled	-	-	●	-	●
Bar capacity	mm	16 / 26	-	-	○/●	-	○/●
Spindle speed	rpm	6000 to 15000	-	-	●/○	-	●/○
Driving power (S1)	kW	12 / 13	-	-	●/○	-	●/○
Capacity (Spindle nose)	mm	26 *(DIN55026 A4)*	-	-	●	-	●
		16 *(BENZINGER Standard)*	-	-	○	-	○
C-axis resolution	degrees	0,001	-	-	○	-	○
Workpiece clamping		Pneumatic / hydraulic	●/○	●/○	●/○	●/○	●/○
		Sensitive clamping	○	○	○	○	○
Linear system	type	BENZINGER linear system	●	○	-	-	●
Tool turret							
VDI 25 DIN 69880 tool pockets	positions -rpm	12/ opt. with 12 driven - 6000	-	●/○	●/●	●/○	●/●
		16/ opt. with 16 driven - 6000	-	○	○	○	○/○
		48/ opt. with 12 driven - 6000	-	○	○	○	○
Tailstock							
Stroke of sleeve/ Travel path	mm	110 / 270	-	-	-	●	-
NC-controlled rotary table	type	BENZINGER	○	○	-	-	-
Control system		Siemens 840D sl / Fanuc 31i-B	●/●	●/●	●/●	●/●	●/●

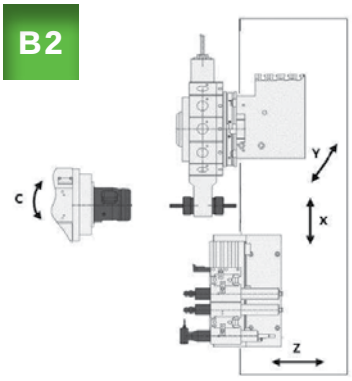
● *Standard* ○ *Option* *All information is subject to change without notice*

MACHINE VARIANTS:

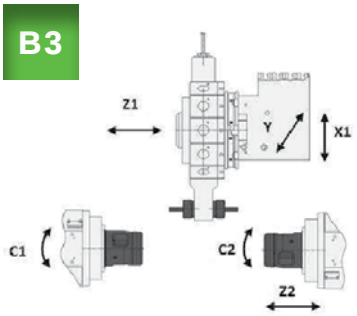
B1



B2



B3



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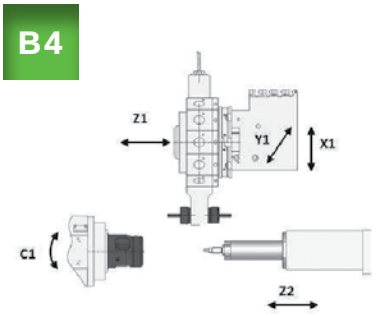
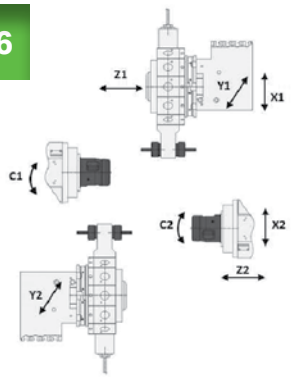


B6



High-precision - lathes

TNI

CNC precision turning machine for simultaneous machining on main and counter spindle

Technical Data		TNI	B2	B6	B10
X1-axis	mm	180	●	●	●
X2-axis	mm	195	-	●	●
X3-axis	mm	170	-	-	●
Z1-axis	mm	340	●	●	●
Z2-axis	mm	440	●	●	●
Z3-axis	mm	180	-	-	●
Y-axis	mm	+ / -40	o	o	o
Y2-axis	mm	+40 / -25	-	-	o
Rapid motion X / Z / Y	m/min	30 / 45 / 15	●	●	●
Acceleration X / Z / Y	m/s²	10 / 10 / 5	●	●	●
Measuring systems X / Y / Z	type	Glass scale	●/o/o	●/o/o	●/o/o
Main spindle					
Motor spindle	type	Water-cooled	●	●	●
Bar capacity	mm	16 / 26 / 32 / 42	o /o/●/o	o/o/●/o	o/o/●/o
Spindle speed	rpm	6000 to 15000	●/o	●/o	●/o
Driving power (S1)	kW	12 to 15.5	●	●	●
Capacity (Spindle nose)	mm	26 -42 *(DIN55026 A4)*	●	●	●
		16 *(BENZINGER Standard)*	o	o	o
C-axis resolution	degrees	0,001	o	o	o
Workpiece clamping		Pneumatic / hydraulic	●/o	●/o	●/o
		Sensitive clamping	o	o	o
Counter spindle					
Motor spindle	type	Water-cooled	●	●	●
Bar capacity	mm	16 / 26	o/●	o/●	o/●
Spindle speed	rpm	6000 to 15000	●/o	●/o	●/o
Driving power (S1)	kW	12 to 13	●	●	●
Capacity (Spindle nose)	mm	26 *(DIN55026 A4)*	●	●	●
		16 *(BENZINGER Standard)*	o	o	o
C-axis resolution	degrees	0,001	o	o	o
Workpiece clamping		Pneumatic / hydraulic	●/o	●/o	●/o
		Sensitive clamping	o	o	o
Tool turret					
Star-type tool turret	type	VDI 25 DIN 69880	●	●	●
Tool positions	amount	12 / 16	●/o	●/o	●/o
Single drive	rpm	6000	●/o	●/o	●/o
Control system		Siemens 840Dsl / Fanuc 31 i-B	●/●	●/●	●/●

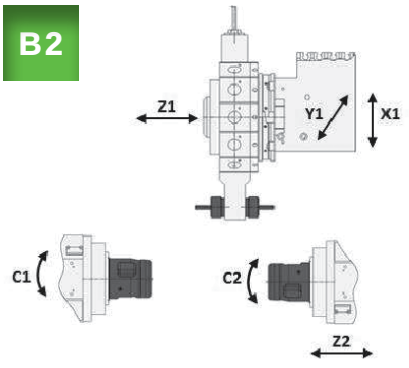
● *Standard* ○ *Option* *All information is subject to change without notice*

Advantages of the machine:

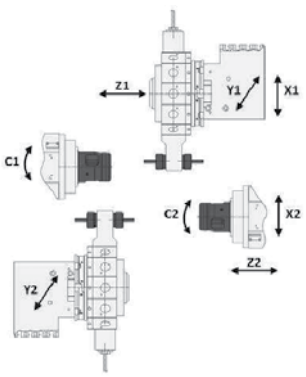
- Complete machining of high-precision complex workpieces on up to 10 axes
- Compact installation surface
- Best damping characteristics of the whole machine
- Full featured, extremely rigid constructed Y-axis
- Simultaneous- and parallel processing trough "submerging" counter spindle
- High number of tools on 3 turrets
- Diverse Benzinger- automation solutions for insert parts as well as robotic solutions
- Processing from bar material

MACHINE VARIANTS:

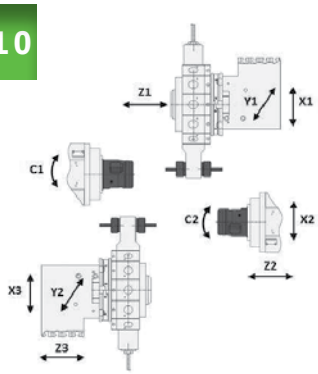
B2



B6



B10



High-precision - lathes

mµFuture

Technical Data		mµFuture	B1	B5
X-axis	mm	470	●	-
X1 / X2-axis	mm	each 200 (independent movement)	-	●
X1 / X2-axis	mm	each 320 (coupled movement)	-	●
Z1-axis	mm	210	●	●
Z2-axis	mm	210	-	●
Rapid motion X / Z / Y	m/min	45	●	●
Acceleration X / Z / Y	m/s²	10	●	●
Main spindle				
Motor spindle	type	Water-cooled	●	●
Bar capacity	mm	16 / 26 / 32 / 42	○/●/○/○	○/●/○/○
Spindle speed	rpm	6000 / 15000	●/○	●/○
Driving power (S1)	kW	12 bis 15.5	●/○	●/○
Capacity (Spindle nose)	mm	26 - 42 *(DIN55026 A4)*	●	●
		16 *(BENZINGER Standard)*	○	○
C-axis resolution	degrees	0,001	○	○
Workpiece clamping		Pneumatic / hydraulic	●/○	●/○
		Sensitive clamping	○	○
Tool holder	type	Linearsystem BENZINGER	○	○
Disc-type turret	type	VDI 25 DIN 69880	●	●
Number of tools	amount	12 / 12 driven	●/○	●/○
Single drive	rpm	6000	○	○
Max. drive power	kW/Nm	6 / 12,5	○	○
Control system		Siemens 840D	●	●

● *Standard* ○ *Option* *All information is subject to change without notice*

Highest precision in turing and hard turning through separate X- and Z-axes, combined with Benzinger automation for shortest cycle times

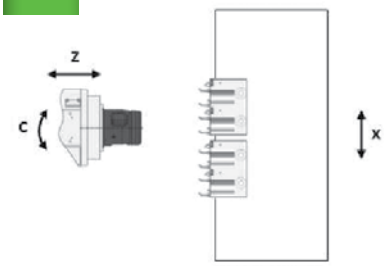
mµFuture is ideally suited for hard turning and can be expanded to a highly productive lathe / grinding machine by the additional installation of various grinding spindles.

Advantages of the machine:

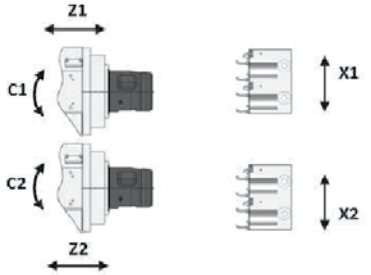
- Process capability at 1-2µm under production conditions
- Significant reduction of the set-up time
- Automation concept about 50% faster as previously applied automation solutions
- Flexibility trough higher usable total stroke
- Compact installation surface
- Optimal damping characteristics and machine rigidity
- Development, production, construction- and machining technology „Made by Benzinger“

MACHINE VARIANTS:

B1



B5



High-precision - lathes

GORing

Turning centre which has been specially developed for turning rings (wedding and jewellery rings)

Possible internal and external machining of rings

Optionally with:

- Manual, semi-automatic, or automatic loading and unloading device for rings, with collet changer
- Rotary table
- Milling spindles

Technical Data		GORing	R2	R3
X-axis	mm	385	●	●
Z1-axis	mm	250	●	●
Z2-axis	mm	270	-	●
Y-axis	mm	80	○	○
Rapid motion X / Z / Y	m/min	45 / 45 / 15	●	●
Acceleration X / Z / Y	m/s²	10 / 10 / 5	●	●
Measuring systems X / Y / Z	type	Glass scale X	●	●
Main spindle				
Motor spindle	type	Water-cooled	●	●
Bar capacity	mm	26 / 32 / 42	-	●/○/○
Spindle speed	rpm	6000	●	●
Driving power (S1)	KW	12 (S1)	●	●
Counter spindle				
Spindle speed	rpm	6000	●	●
Driving power (S1)	KW	12 (S1) / (2,6 (S1))	(●)	●
Tool turret (disc-type tool turret)				
Tool pockets	amount	31 for external machining (21 with rotary table)	●	-
		12 for internal machining	●	-
		24 main spindle machining	-	●
		12 counter spindle machining	-	●
		12 driven tools 6000 rpm	-	○
Milling spindle				
2 milling spindle	rpm	each 60000	○	-
4 milling spindle	rpm	each 60000	○	-
Rundtisch		Peeling operation with up to three tools*	○	-
Loading and unloading device for rings		One loading bar	○	-
		Two loading bars	○	-
Clamping collet changer	amount	For 35 intermediate collets	○	-
Control system		Siemens 840 Dsl	●	●

● *Standard* ○ *Option* *only in combination with the Y-axis **All information is subject to change without notice***

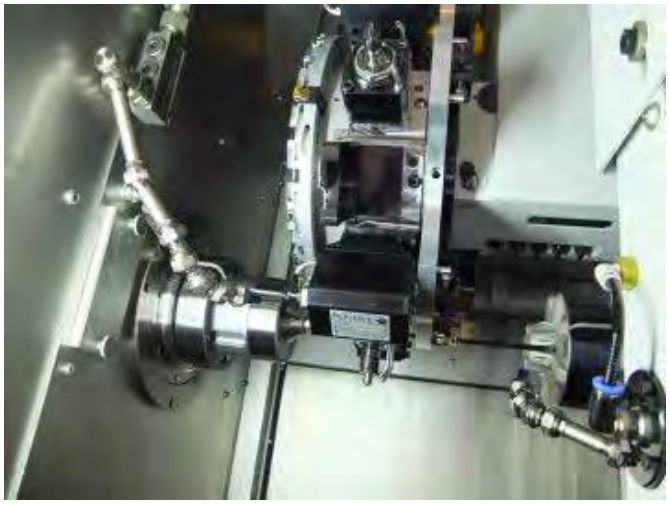
MACHINE VARIANTS:

R2

The main and counter spindles, inside the turning lathe machine, each have their own turning turret with a large number of tool positions.

R3

For the main and the counter spindle, a separate turning turret with a large number of tool positions is available, optionally with live tools.



High-precision - lathes

DOLittle

The answer to increasing accuracy requirements and miniaturisation of the workpieces

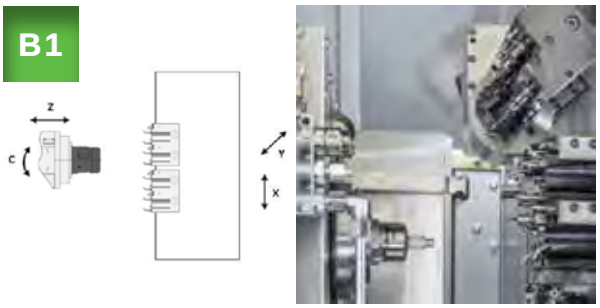
- Highest precision for smallest turning parts
- Space-saving and compact design
- Optionally with opposed spindle
- Y-axis as standard
- Lowest setting-up times by external setting
- Driven tools with speed up to 18.000 rpm
- Spindle speed up to 15.000 rpm

Technical Data		DOLittle	B1	B2	B3	B5
X-axis	mm	320 (B5 : 140)	●	●	●	(●)
Z1-axis	mm	185	●	●	●	●
Z2-axis	mm	90 (B5 : 185)	-	-	●	(●)
Y-axis	mm	80	●	●	●	○
Rapid motion X / Z / Y	m/min	30	●	●	●	●
Acceleration X / Z / Y	m/s²	5	●	●	●	●
Measuring systems X / Y / Z	type	Glass scale X/ Z2/ (Y / Z1)	●/-/(○)	●/-/(○)	●/●/(○)	●/●/(○)
Main spindle						
Motor spindle	type	Water-cooled	●	●	●	●
Bar capacity	mm	16 / 26	●/●	●/●	●/-	●/○
Spindle speed	rpm	15000 / 6000	●/●	●/●	●/-	●/○
Driving power (S1)	kW	13 / 12	●/●	●/●	●/-	●/○
Capacity (Spindle nose)	mm	26 (DIN55026 A4)	●	●	-	○
		16 (BENZINGER Standard)	●	●	●	●
Workpiece clamping		Pneumatic / hydraulic	●/●	●/●	○/●	●/●
		Sensitive clamping	○	○	○	○
C-axis resolution	degrees	0,001	○	○	○	○
Counter spindle						
Motor spindle	type	Water-cooled	-	-	●	-
Bar capacity	mm	16	-	-	●	-
Spindle speed	rpm	15000	-	-	●	-
Driving power (S1)	kW	13	-	-	●	-
Capacity (Spindle nose)	mm	16 (BENZINGER Standard)	-	-	●	-
Workpiece clamping		Pneumatic / hydraulic	-	-	○/●	-
		Sensitive clamping	-	-	○	-
C-axis resolution	degrees	0,001	-	-	○	-
Werkzeugträger	type	Linearsystem BENZINGER	●	●	●	●
Tool turret						
Disc-type tool turret	type	VDI 20	-	●	-	-
Tool positions / driven	amount	12 / 6	-	●/○	-	-
Swiveling milling spindle unit	positions	3 / 6	○/○	○/○	○/○	-
	rpm	50 - 6000/ 18000	○	○	○	-
	degrees	Swiveling 0 - 90 against tight stop	○	-	○	-
	degrees	Swiveling 0 - 90 via NC axes	○	-	○	-
Control system		Siemens 828D / 840 Dsl	●/○	●/○	-/●	-/●
		Fanuc 31i-B	○	○	-	-

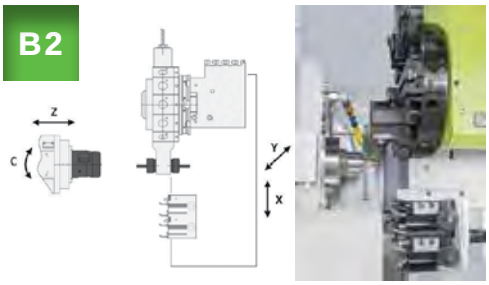
● *Standard* ○ *Option* *All information is subject to change without notice*

MACHINE VARIANTS:

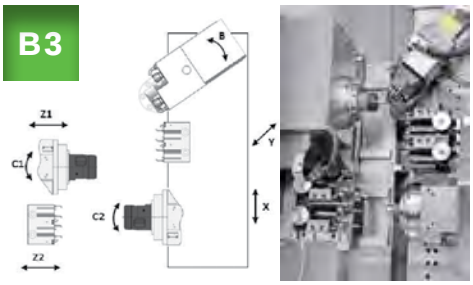
B1



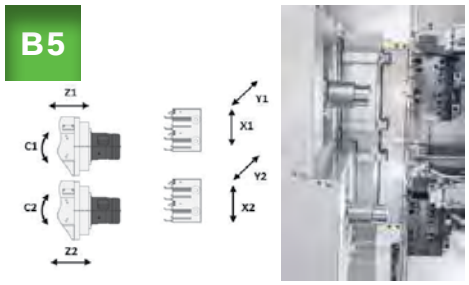
B2



B3



B5



High-precision - turning milling center

Take5

Advantages of the machine:

- Simultaneous machining of complex workpieces 5 axes with Y/B- Unit
- Significant set-up times reduction
- Increased efficiency and flexibility trough tool changer
- Optimal damping characteristics and machine rigidity
- Compact installation surface
- Development, production, construction- and machining technology „Made by Benzinger“

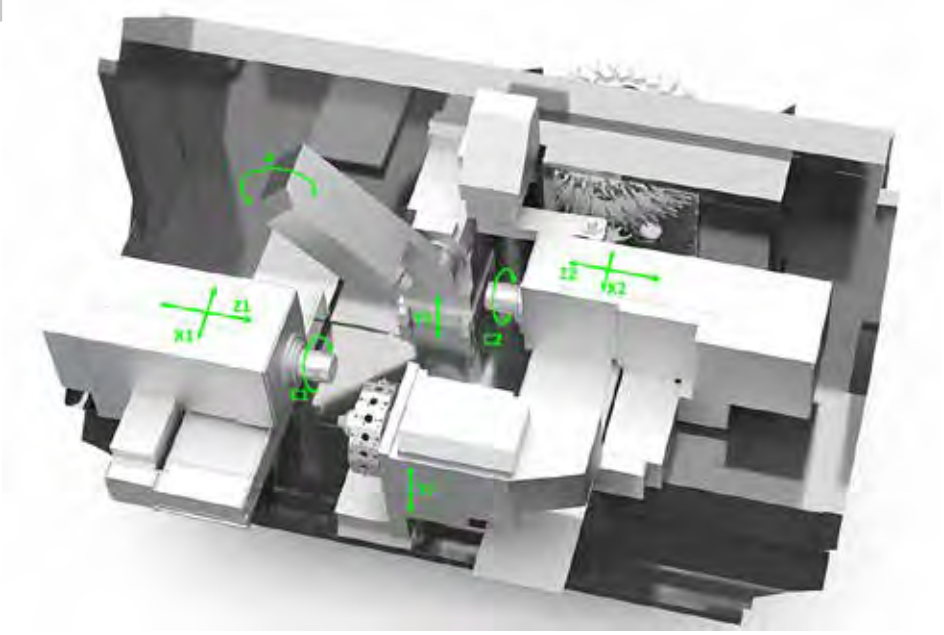
Technical Data		Take5	
X1	mm	370	●
Z1 / Z2 axis	mm	190	●
Y1-axis	mm	125 (-40 / +85)	●
Y2-axis	mm	+ / -25	●
Measuring systems X / Z / Y	type	Glass scale	●
Main spindle			
Motor spindle	type	Water-cooled	●
Bar capacity	mm	26 / 32 / 42	○/●/○
Spindle speed	rpm	6000 / 8000	●/○
Driving power	kW	12 bis 15.5	●
Spindelnase		DIN 55026 A4	●
C-Achse Auflösung	degrees	0,001	●
Counter spindle			
Motor spindle	type	Water-cooled	●
Bar capacity	mm	26	●
Spindle speed	rpm	6000 / 8000	●/○
Driving power (S1)	kW	12	●
Spindle nose	type	DIN 55026 A4	●
C-axis resolution	degrees	0,001	●
Tool turret			
Star-type tool turret	type	VDI 25 DIN 69880	●
Number of tools	amount	16	●
Single drive	rpm	6000	●
Milling spindle			
Spindle speed	rpm	30000	●
Driving power (S1)	kW	10	●
Tool holder	Type	HSK-T40 DIN 69893	●
Tool changer	amount	50	●
Control system		Siemens 840Dsl	●
All information is subject to change without notice			

● *Standard* ○ *Option*

5-axis turning milling centre

- Machining on main spindle and counter spindle
- Simultaneous complete machining of high-precision and complex workpieces

Working space Take5



High-precision - turning milling center

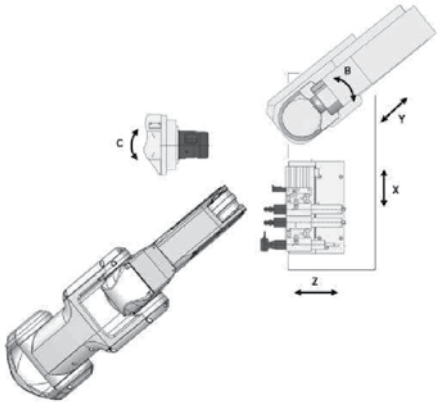
GOFutureBX

5-axis turning milling centre

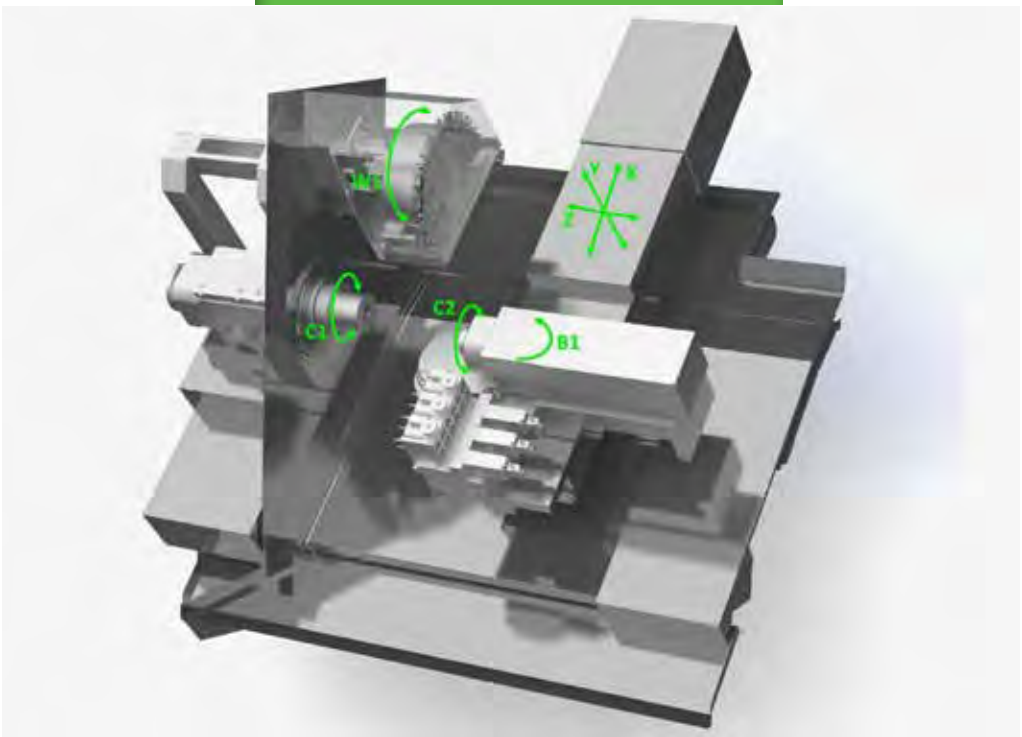
- Ideal for subsequent machining of complex workpieces or for machining from bar.
- The flexible automation allows economical production even with small and medium-sized batches.

Technical Data		GO*Future* BX	BX - 12	BX - 100
X1-axis	*mm*	370	●	●
Z1-axis	*mm*	295	●	●
Y-axis	*mm*	90	●	●
Rapid motion X / Z / Y	*m/min*	45 / 45 / 15	●	●
Acceleration X / Z / Y	*m/s²*	10 / 10 / 5	●	●
Measuring systems X / Y / Z	*type*	Glass scale X (Y / Z)	●/○	●/○
Main spindle				
Motor spindle	*type*	Water-cooled	●	●
Bar capacity	*mm*	16 / 26 / 32 / 42	○/●/○/○	○/●/○/○
Spindle speed	*rpm*	6000 up to 5000	●/○	●/○
Driving power (S1)	*KW*	12 up to 15	●/○	●/○
Capacity (Spindle nose)	*mm*	26 - 42 *(DIN 55026 A4)*	●	●
		16 *(BENZINGER Standard)*	○	○
C-axis resolution	*degreees*	0,001	○	○
Workpiece clamping	*type*	Pneumatic / hydraulic	●/○	●/○
		Sensitive clamping	○	○
Milling spindle (S1)	*rpm; KW*	HSK-T32: 36000; 5	●	-
		HSK-T40: 30000; 7,8	-	●
Tool changer	*positions*	12	●	-
		100	-	●
Control system		Siemens 840 Dsl / Fanuc 31i-B	●/○	●/○

● *Standard* ○ *Option* *All information is subject to change without notice*



Working space GO*Future* BX



Automation

All our lathes and milling machines can generally be automated.

Some Automatisation Examples:

- Part feeding via a loading shuttle
- Part removal via the unloading arm from the counter spindle
- Part deposit directly onto a conveyor belt

Exemplarily shown on a GOFuture B3 lathe. Compatible with other machine variants.

- Part feeding from a vibratory bowl via a feed rail
- Part loading via the integrated loading/ unloading device
- Part unloading via the integrated loading/ unloading device
- Part deposit directly into a box

Exemplarily shown on a DOLittle-B1. Compatible with other machine variants.

- Material feeding via a bar feeder
- Part removal via the unloading arm from the counter spindle
- Part deposit directly onto a conveyor belt

Exemplarily shown on a GOFuture-B3 lathe. Compatible with other machine variants

- Part loading via a robot directly into the spindle
- Part unloading via the robot

Exemplarily shown on a DOLittle-B3 lathe. Compatible with other machine variants.

- Part feeding from a robot via a loading shuttle
- Part loading via the integrated loading/ unloading device
- Part unloading via the integrated loading/ unloading device
- Part removal via an unloading shuttle back to the robot

Exemplarily shown on a GOFuture-B1 lathe. Compatible with other machine variants.

- Part feeding via Portal directly into the spindel
- Part removal via Portal directly into the the pallet

Exemplarily shown on a DOLittle-B3 lathe. Compatible with other machine variants.

ALFLETH Engineering AG
mail@alfleth.com
www.alfleth.com

Surface grinding machines

BERMI M

Technical data		Bermi 500 Matic
Usable table surface	mm	500 x 180
Maximum longitudinal movement in manual and automatic mode	mm	505
Lateral movement in manual and automatic mode		200
Vertical path between spindle axis and work surface	mm	350
Speed of automatic longitudinal table	m/min	0 - 20
Cross feed scale for impulse operation	mm	0 - 15
Cross feed scale for continuous operation	m/min	0 - 5
Jog wheel for cross feed 1 scale line	mm	0,02
Jog heel with fine adjustment 1 scale line	mm	0,002
Vertical jog wheel with graduation 1 scale line	mm	0,002
Grinding wheel dimensions	mm	220x20 ÷ 40x50
Power grinding wheel motor with 3000 revolutions (with inverter optional from 1500 to 4800 revolutions)	kW	2,2
Motor power hydraulic system with 1400 revolutions	kW	1,1
Net weight of the machine	mm	1150
		All information is subject to change without notice

BERMI C

Technical data		Bermi 500 C
Usable table surface	mm	500 x 180
Maximum longitudinal movement in manual and automatic mode	mm	505
Lateral movement in manual and automatic mode		200
Vertical path between spindle axis and work surface	mm	400
Speed of automatic longitudinal table	m/min	0 - 25
Cross feed scale for impulse operation	mm	0 - 15
Cross feed scale for continuous operation	m/min	0 - 5
Jog wheel for cross feed 1 scale line	mm	0,02
Jog heel with fine adjustment 1 scale line	mm	0,002
Electronic jog wheel for manual movement of the vertical axis with selectable value	mm	0,001 - 0,010
Grinding wheel dimensions	mm	220 x 20 ÷ 40 x 50
Power grinding wheel motor with 3000 revolutions (with inverter optional from 1500 to 4800 revolutions)	kW	2,2
Motor power hydraulic system with 1400 revolutions	kW	1,1
Net weight of the machine	mm	1250
		All information is subject to change without notice

Surface grinding machines Accessories

Profiling device for Diaform® grinding wheels

M	C	U

Profiling device for Optidress® grinding wheels

M	C	U

Automatic linear diamond device "Bermi" on head

-	C	-

Upsetting tool for "Bermi" grinding wheels with 2 slides

M	C	-

Cross slide with 0.001 release

M	C	-

Balancing device

M	C	U

Precision clamping jaws also with precision sinus table "Bermi MIL-MIF"

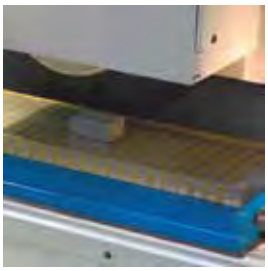
M	C	U

Magnetic plates with sinus table in different sizes "Bermi PIL"

M	C	U

Display "Bermi Control" with 2 or 3 axes

M	-	-



Electro-permanent magnetic clamping plate "EP-BLU"

M	C	U

Supplied accessories	Matic	C
Hydraulic diamond device grinding wheel holding head with 1 diamond	●	○
Fixed table - diamond device	●	●
Cooling unit with container	●	○
Blocking of the cross slides	●	○
3 pcs. disc flange and 1 pc. universal disc	●	●
Balancing bolt	●	●
Halogen lighting machine 24 V	●	●
Disc remover and tool wrench	●	●
Levelling plates	●	●
Spare oil, air filter and spare halogen lamp	●	●

M	C	U
Bermi 500 Matic	Bermi 500C	Generally

Surface grinding machines with fixed, rotary and oscillating table

ELLE

Rotary table models:

- Toothed belt drive and planetary gear unit
- Electro-permanent magnetic chuck with standard electronic control unit

Oscillating table models:

- Toothed belt drive
- Electro-permanent magnetic chuck with standard electronic control unit

Displayed electronic millesimal feed (L11e)

SCOPE OF USE

- Precision mechanics
- Aeronautical, shipbuilding, motor, and automotive industries, wood processing, machine tools, household appliances, food industry
- Sheet metal processing to sharpen punches and dies
- Material testing laboratories
- Toolrooms
- Technical and vocational schools

Technical Data		LB300	LF350	LC400	LC500	LP500[200]
Distance between column axis and wheel axis	mm	300	315			
Max. distance between table-level and wheel	mm	280	280	-	-	-
Max distance between magnetic chuck and wheel	mm	-	-	205	205	205
Max. grindable surface	mm	140 x 330	155 x 360	Ø400	Ø500	500 x 200
Rapid feed per turn of andwheel	mm	2				
Micrometric feeds	mm	0,01				
Size of the cup-wheel	mm	178 x 78 x 78	200 x 80 x 78			
Dimensions of the abrasive segments	mm	50 x 16 x 90	50 x 20 x 90			
Grinding wheel speed	min^{-1}	2 840				
Oscillation table	deg.	-	-	-	-	90
Rotating table speed	min^{-1}	-	-	20 - 40 (2 - 30)	15 - 30 (2 - 30)	-
Spindle motor power	kW	2,2	3			
Motor power of rotating table	kW	-	-	0,33 - 0,48	0,15 - 0,48	-

All information is subject to change without notice

Travelling column grinding machines

ROTAX

Technical data		Rotax 7	Rotax 9	Rotax 12
Max grindable diameter	mm	700	900	1200
Rotary table diameter	mm	400	700	1100
Vertical grinding height with new wheel	mm	330 (530)*	530	600
Rotary table speed	min^{-1}	0-100	0-100	0-70
Table load max.	kg	500	700	1500
Transversal axis travel	mm	450	550	900
Max. distance between table and spindle axis	mm	530 (730)*	730	850
Transversal axis speed	m/min	0-3		
Minimum increment	mm	0,001		
Spindle motor power	kW	7,5 (11)*		18,5 (30)*
Grinding wheel speed	min^{-1}	1450 (1000 - 2000)*		
Grinding wheel dimensions	mm	400 x 50 x 127		450 x 100 x 127 (500 x 100 x 127)*

*On request

All information is subject to change without notice

Rotary table supported

- In the Rotax 7, by a pair of pre-loaded high precision ball bearings with 25° contact angle
- In the Rotax 9 and 12, by an hydrostatic journal bearing

and driven by a torque servomotor, which can be equipped with electro-permanent magnetic chuck.

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Travelling column grinding machines

MINI

Rotax, Mini, Maxi

Hydrostatic support on all machine axes with full grip slideways

All the machine axles feature full grip hydrostatic slideways; therefore, the table always rests on the basement for the entire longitudinal travel; the same criterion applies to the column and the wheelhead.

This involves

- Absence of anti-friction material (turcite)
- Zero friction (optimal exploitation of the installed power)
- Zero wear (geometry guaranteed for a long period of time)
- No stick-slip. Extremely smooth movements

Machensen hydrodynamic spindle

The spindle line has a Mackensen hydrodynamic bearing on the front and a pair of pre-loaded precision ball bearings on the rear.

- Zero wear and, therefore, maximum durability
- Zero friction (super accurate surface finishes)
- High geometric and machining precision

Easy control developed through DELTA software:

- Full machine operation ensured only after half-day training
- Self-diagnostics and alarm messages allow unattended machining operations

Technical data		Mini 7	Mini 12	Mini 15
Max grindable surface Table surface	mm	800 x 550 700 x 400	1300 x 650 1200 x 500	1600 x 650 1500 x 500
Max longitudinal traverse	mm	900	1400	1700
Longitudinal / Transversal work speed	m/min	0 - 40 / 0 - 3		
Min.prog. transversal /vertical feed	mm	0,001		
Spindle rotation speed	min^{-1}	1450 (1000 - 2000)*		
Rapid vertical feed	m/min	1,5		
Spindle motor power	kW	7,5 (11)*		
Max. table load	kg	800	1200	1500

**On request* — *All information is subject to change without notice*

MAXI

DIASTEP

CN PLUS Touchscreen

CNC

Technical data		1200^{750}	1500^{750}	2000^{750}	2000^{1000}	2500^{1000}	3000^{1000}	2000^{1100}	2500^{1100}	3000^{1100}
Max grindable surface Table surface	mm	1200 x 775 1200 x 600	1500 x 775 1500 x 600	2000 x 775 2000 x 600	2000 x 1000 2000 x 800	2500 x 1000 2500 x 800	3000 x 1000 3000 x 800	2000 x 1100 2000 x 800	2500 x 1100 2500 x 800	3000 x 1100 3000 x 800
Max longitudinal traverse	mm	1500	1800	2300	2300	2800	3300	2300	2800	3300
Longitudinal / Transversal work speed	m/min	0 - 40 / 0 - 5								
Min.prog. transversal /vertical feed	mm	0,001								
Spindle rotation speed	min^{-1}	1450 (1000 - 2000)*								
Rapid vertical feed	m/min	2								
Spindle motor power	kW	18,5 (30)*								
Max. table load	kg	1800	2300	3000	4000	5000	6000	4000	5000	6000

**On request* — *All information is subject to change without notice*

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Milling and drilling machines

PICOMAX® 21

The well-proven quick change system SF 32. Tool changing accuracy 0.002 mm, changing time approx. 3 sec.

A large set of drawers is incorporated in the machine base and ensures a good overview, tidiness and quick accessibility.

Technical data		PICOMAX 21-D	PICOMAX 21-M
Travel			
Travel X / Y / Z	*mm*	450 / 260 / 110	450 / 260 / 110
Max. head movement W	*mm*	450	450
Working area			
Clamping area L x W	*mm*	770 x 320	770 x 320
Distance table - spindle nose	*mm*	0 - 511	0 - 511
Permissible table load	*kg*	200	200
Work spindle			
Drive power at S6 (40% ED)	*kW*	4,3	4,3
Max. torque at S6	*Nm*	43	43
Speed infinitely variable	*min^{-1}*	50 - 6300	50 - 6300
Toolholder		SF 32	SF 32
Feed drive			
Feed rate X	*mm/min*	manual	1 - 2000
Feed rate Y	*mm/min*	manual	1 - 2000
Feed rate Z	*mm/min*	manual	manual
Tool magazine			
Number of magazine pockets		8 / 12	8 / 12
Digital display/control		**Heidenhain Touchscreen-Positip 8013**	
Weight			
Incl. base/control box	*kg*	895	930
			All information is subject to change without notice

APPLICATIONS

For drilling and milling in:

- Prototype making / test workshops
- Tool and jigs & fixtures making
- Repair departments
- Apprentice training

PICOMAX® 21-M incl. motorised feed adjustment and automated positioning in a closed loop

Optional tool magazine for clean, space-saving storage for 12 hanging tools. The close proximity to the spindle allows quick access to the required tool.

Coolant unit

Coolant unit comprising electro-pump, coolant tank incorporated in machine base and piping.

3D edge probe

Using the electronic 3D edge probe, corners and circle centers are easily captured and entered directly as the zero point of the workpiece.

Horizontal and vertical dividing unit

Milling and drilling can be done on horizontal as well as vertical planes with the rigid and easy-to-handle direct dividing unit DT 100. 2, 3, 4, 6, 8, 12 and 24 divisions can be set directly with just one lever movement, in less than a second.

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Milling and drilling machines

PICOMAX® 56

Technical data		PICOMAX	
		56 TOP and *mill*	56L TOP and *mill*
Travel			
Travel X / Y / Z	*mm*	500 / 400 / 400	800 / 400 / 400
Working area			
Clamping area L x W	*mm*	908 x 480	1400 x 480
Distance table - spindle nose	*mm*	120 - 520	120 - 520
Permissible table load	*kg*	250	350
Work spindle			
Drive power at S6 (40% ED)	*kW*	9,7	9,7
Max. torque at S6	*Nm*	61	61
Speed infinitely variable	*min⁻¹*	50 - 12000	50 - 12000
Toolholder		SK 30	SK 30
Feed drive			
Feed rate X	*mm/min*	1 - 20000	1 - 30000
Feed rate Y, Z	*mm/min*	1 - 20000	1 - 20000
Positioning accuracy (ISO 230-2)			
Position tolerance (A)	*mm*	0,006	0,006
Position repeatability (R)	*mm*	0,004	0,004
Tool changer			
Number of magazine pockets		20 (30)	20 (30)
Digital display/control		TNC 620	TNC 620
Connectable axis (optional)		A	A
Weight			
Incl. base/control box	*kg*	3250	4000
			All information is subject to change without notice

APPLICATIONS

Machining of single parts up to small lots:

- Precision parts manufacturing
- Prototype manufacturing
- Tool and jig manufacturing
- Laboratories
- Apprentice training

Manual

Thanks to the Fehlmann user-oriented operation concept (TOP – Touch Or Program™, or mill-functions), the machine is also easy to operate manually. Using the drill lever and the two conventional handwheels, (TOP-version) respectively 3 handwheels (mill version), single operations are finished in no time and simple parts can be machined easily.

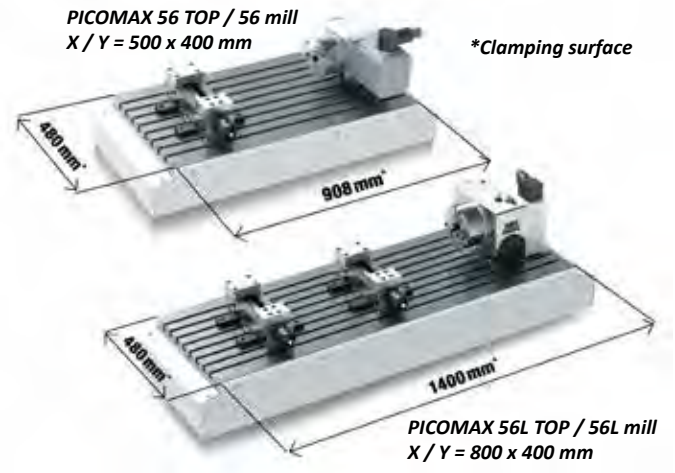
The motor spindles are made by Fehlmann.

CNC

Using the Heidenhain CNC controls, serial parts can be machined quickly and fully automatically in 3-to 4-axes simultaneously.

PICOMAX 56 TOP / 56 mill
X / Y = 500 x 400 mm

****Clamping surface***



PICOMAX 56L TOP / 56L mill
X / Y = 800 x 400 mm

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Machining centers

PICOMAX® 75

PICOMAX® 95

Technical data		PICOMAX 75		PICOMAX 95	
Travel					
Travel X/Y/Z	*mm*	600 / 400 / 610		800 / 500 / 610	
Working area					
Clamping area L x W	*mm*	1160 x 475		1600 x 550	
Distance table - spindle nose	*mm*	125 - 735		160 - 770	
Permissible table load	*kg*	400		600	
Work spindle		**SK 30**	**HSK-E50**	**HSK-A63**	**HSK-A63**
Drive power at S6 (40% ED)	*kW*	10,5	13,7 (19,5)	25,3	25,5
Max. torque at S6	*Nm*	75	31 (16)	120	74
Speed infinitely variable	*min⁻¹*	50 - 14 (20000)	50 - 30 (36000)	50 - 14 (18000)	50 - 24000
Feed drive					
Feed rate X, Y, Z	*mm/min*	1 - 30000		1 - 30000	
Positioning accuracy (ISO 230-2)					
Position tolerance A (X/Y/Z)	*mm*	0,005 (0,003)		0,005 (0,003)	
Position repeatability R (X/Y/Z)	*mm*	0,003 (0,002)		0,003 (0,002)	
Tool changer					
Magazine pockets		50 (80)		48 (80)	
Digital display / control		**TNC 640**		**TNC 640**	
Connectable axis (optional)	*amount*	B / C		B / C	
Weight					
with standard coolant system	*kg*	5300		9300	
				All information is subject to change without notice	

Save valuable time during tool change

The FEHLMANN automatic tool changer can be loaded during machining. A double gripper takes the tool from the chain in a flash and quickly puts it back again after use. The tools can be checked or replaced at any time during machining.

Automation at any time

Automation for the PICOMAX 75 and PICOMAX 95 can easily be installed at any time. According to requirements, pallets of up to 320 × 320 mm for P75 and 400 × 400 mm for the P95 can be automatically loaded and unloaded.

In-house motor spindle production

FEHLMANN motor spindles meet even the most demanding requirements — due to direct drive, these spindles ensure low vibration and high torque operation, thus assuring best surfaces and tool life.

APPLICATIONS

Machining of high-precision workpieces

- Precision parts in all materials
- 5-axis machining of small cubic parts, mould & die making
- HSC-machining of hardenend mould inserts
- Mould plates in tool steel
- 3 and 5-axis electrodes in copper and graphite

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Automatic CNC dividing / swiveling units

ATS 200 DD

AT 125 DD

AT 100

Technical data		ATS 200 DD
Center height	mm	200
Travel		
Travel B	degrees	-10 / 120
Travel C	degrees	360
Working area		
Clamping diameter	mm	300
Permissible table load	kg	30
Feed drive		
Feed rate B	degrees/min	7600
Feed rate C	degrees/min	10000
Clamping		
Clamping torque B	Nm	1000
Clamping torque C	Nm	600
Positioning accuracy (ISO 230-2)		
Position tolerance A (B/C)	degrees	0,005 (0,003)
Position scatter band R (B/C)	degrees	0,003 (0,002)
Weight		
Without cable	kg	150

All information is subject to change without notice

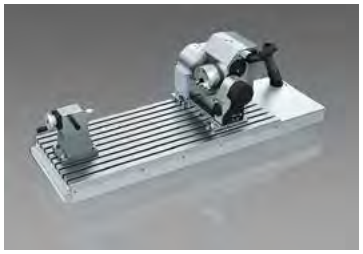
Technical data		AT 100 CNC	AT 125 CNC	ATS 200 CNC
Center height	mm	100	125	200
Weight	kg	32	60	150

All information is subject to change without notice

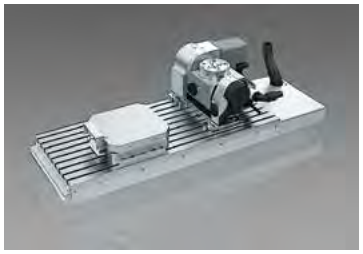
High precision FEHLMANN dividing and swiveling units, which are developed and produced in-house at Fehlmann, are perfectly tuned for use on PICOMAX® machines.

Complete standard chucking materials available from Fehlmann:

- 3 jaw chuck
- Various collets
- Tables
- Tailstocks
- Chucking devices for multi-face machining of cubic parts
- Integrated Erowa, Mecatool and 3R quick-action chucks



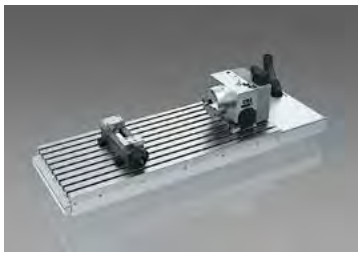
ATS 200 and tailstock



ATS 200 and EROWA UPC 320 x 320mm.

Multiple clamping

AT 125 and bench vice



AT 125 and bench vice

ATS 200 and bench vice

Machining centers in portal design

VERSA® 640 linear

VERSA 645 linear

Machining simple or complex precision parts- whether 5-axis with positioning or 5-axis simultaneous milling, the machine masters any demanding complex task with flying colours - accurately and reliably.

VERSA 643 linear

Instead of the integrated tilting rotary table, the 3-axis version features a table size of 620 × 500 mm perfectly suited for high- precision and high-dynamic 3-axis machining. Guarantees long tool life, optimal surface finish and high accuracy.

Technical data		VERSA 640 linear	
Travel		**VERSA 643**	**VERSA 645**
Travel X/Y/Z	*mm*	350 / 500 / 320	
Swivel axis A	*degrees*	-	+120 / - 135
Dividing axis C	*degrees*	-	360
Working area			
Clamping area L x W	*mm*	620 x 500	D 350
Distance table - spindle nose	*mm*	80-400	100 - 400
Permissible table load	*kg*	400	150
Work spindle		**HSK-E50**	**HSK-E40**
Drive power at S6 (40% ED)	*kW*	13,7	16,9
Max. torque at S6	*Nm*	31	7
Speed infinitely variable	*min⁻¹*	50 - 30000	50 - 42000
Feed drive			
Feed rate X, Y, Z	*mm/min*	1 - 50000	
Feed rate A	*rpm*	-	60
Feed rate C	*rpm*	-	120
Positioning accuracy (ISO 230-2)			
Position tolerance A (X/Y/Z)	*mm*	0,005 (0,003)	
Position repeatability R (X/Y/Z)	*mm*	0,003 (0,002)	
Position tolerance A (A/C)	*degrees*	-	0,003 (0,002)
Position repeatability R (A/C)	*degrees*	-	0,002 (0,0015)
Tool changer pockets		50 (86, 160 - 600)	
Digital display / control		**TNC 640**	
Weight	*kg*	7500	
All information is subject to change without notice			

Tool changer

Standard with 50 tools

Option with 86 tools

Optional 160 - 600 tools, scalable

Various clamping systems on the rotary swivelling table

Table plate square 320 × 320 mm

PCP: ø = 148 mm

GPS 240: 240 × 240 mm

PC 210: ø = 210 mm

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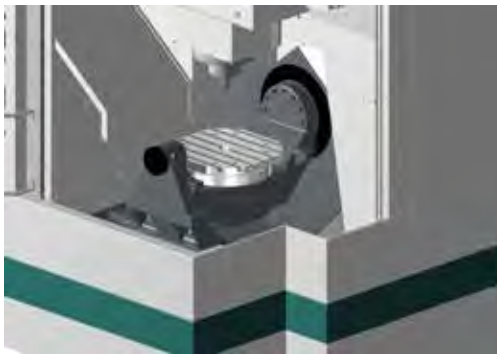
Machining centers in portal design

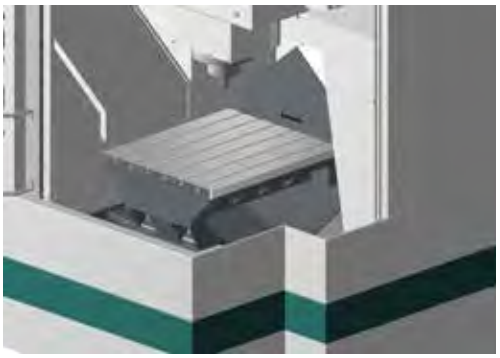
VERSA® 740

NEW

Newest member of the VERSA Family!

Technical data		VERSA 740	
Travel		**VERSA 743**	**VERSA 745**
Travel X/Y/Z	*mm*	500 / 650 / 420	
Travel A	*degrees*	-	+120 / - 135
Travel C	*degrees*	-	360
Working area			
Clamping area L x W	*mm*	770 x 660	D 460
Distance table - spindle nose	*mm*	100 - 520	
Permissible table load	*kg*	800	250
Work spindle		**HSK-A63**	**HSK-E50**
Drive power	*kW*	25,3 (25)	13,7
Torque	*Nm*	120 (74)	31
Speed infinitely variable	*min⁻¹*	50 - 18 (24000)	50 - 30000
Feed drive			
Feed rate X, Y, Z	*mm/min*	1 - 50000	
Feed rate A	*rpm*	-	50
Feed rate C	*rpm*	-	60
Positioning accuracy (ISO 230-2)			
Position tolerance A (X/Y/Z)	*mm*	0,005 (0,003)	
Position repeatability R (X/Y/Z)	*mm*	0,003 (0,002)	
Position tolerance A (A/C)	*degrees*	-	0,003 (0,002)
Position repeatability R (A/C)	*degrees*	-	0,002 (0,001)
Tool changer pockets		42 (74, 112 - 600)	
Digital display / control		**TNC 640**	
Weight	*kg*	10500	
		All information is subject to change without notice	





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Machining centers in portal design

VERSA® 940

VERSA 945

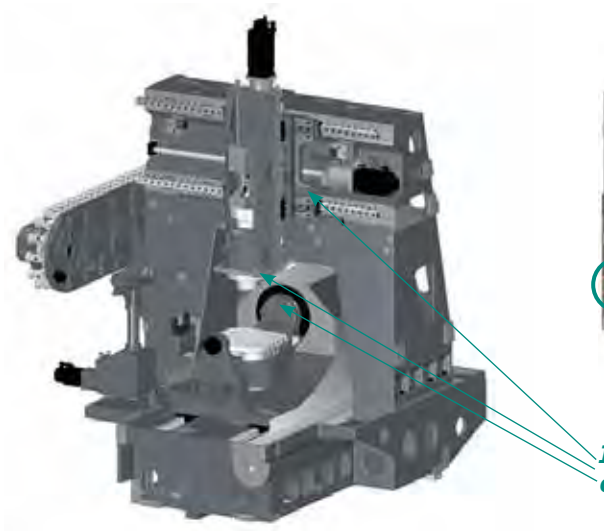
For 5-sided and 5-axis machining- workpieces up to Ø 650 mm can be precisely machined in 5 axes. The largest machine in the VERSA family also combines the latest technology with proven features.

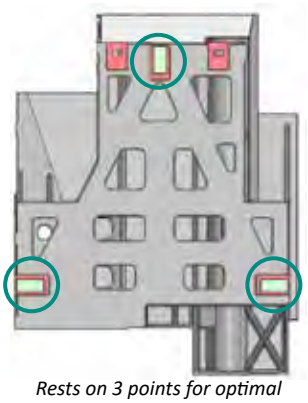
VERSA 943

This 3-axis machining center with a fixed table offers a generously sized clamping area of 870 x 760 mm. Workpieces up to 1000 kg can be machined with high precision and dynamics.

Technical data		VERSA 940	
Travel		**VERSA 943**	**VERSA 945**
Travel X/Y/Z	mm	650 / 800 / 500	
Travel A	degrees	-	+120 / -135
Travel C	degrees	-	360
Working area			
Clamping area L x W	mm	870 x 760	D 650
Distance table - spindle nose	mm	150 - 650	100 - 600
Permissible table load	kg	1000	400
Work spindle		**HSK-A63**	**HSK-E50**
Drive power	kW	25,3 (25)	13,7
Torque	Nm	120 (74)	31
Speed infinitely variable	min^{-1}	50 - 18 (24000)	50 - 30000
Feed drive			
Feed rate X, Y, Z	mm/min	1 - 50000	
Feed rate A	rpm	-	50
Feed rate C	rpm	-	60
Positioning accuracy (ISO 230-2)			
Position tolerance A (X/Y/Z)	mm	0,005 (0,003)	
Position repeatability R (X/Y/Z)	mm	0,003 (0,002)	
Position tolerance A (A/C)	degrees	-	0,003 (0,002)
Position repeatability R (A/C)	degrees	-	0,002 (0,001)
Tool changer pockets		48 (80, 112 - 432)	
Digital display / control		**TNC 640**	
Weight	kg	12000	
		All information is subject to change without notice	

Excellent dynamic accuracy due to weight-optimized moving parts made of spheroidal cast iron.





Rests on 3 points for optimal stability.

Insulation/cooling of heat sources

Various clamping systems on the rotary swiveling table

Table plate square 460 x 460 mm

EROWA PC210 clamping chuck D 210 mm

EROWA UPC clamping chuck 320 x 320 mm

Tool changer

Standard with 48 tools

Optional with 80 tools

Optional 112 - 432 tools, scalable

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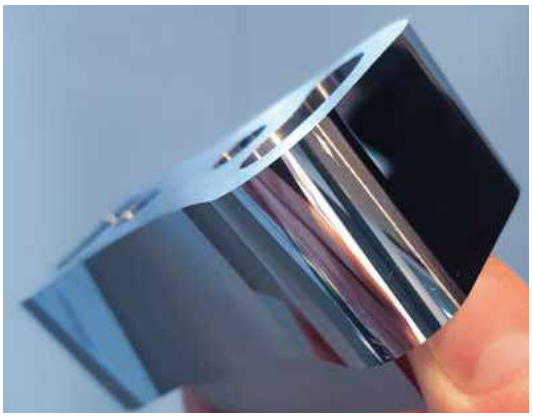
VERSA series with a coordinate grinding function

Advantages of combining hard milling and grinding:

- Versatile and economical – one machine for two processes
- Time-savings with one-time clamping of workpiece for milling and grinding. No more re-clamping necessary
- Shorter machining times thanks to two processes on same machine
- Multi-use of precision: make a one-time investment in high precision and benefit twice, thanks to the combination of milling and grinding
- Increased efficiency due to high process reliability. Parts can be precisely pre-milled before grinding, ensuring a perfectly pre-finished part. Elimination of varying offsets caused, for example, by warpage during hardening
- Consistent excellent surface quality and contour accuracy - due to choice of most suitable machining strategy and automatic dressing of grinding tool
- Simple programming - grinding functions such as pendulum stroke and dressing can be easily integrated into the program after milling

Before

After



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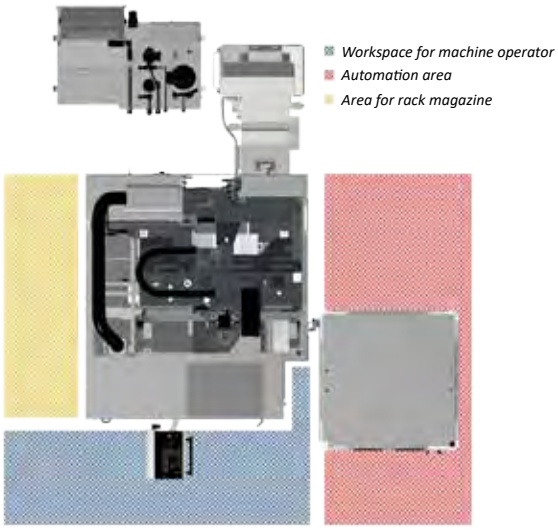
Automation solutions - everything from one source

VERSA 945 with Erowa Robot Leonardo pallet handling system

VERSA 645 linear with Erowa Robot Compact workpiece loading system for pallets and rack magazine for up to 250 tools (left). Various sizes of extended magazines available.

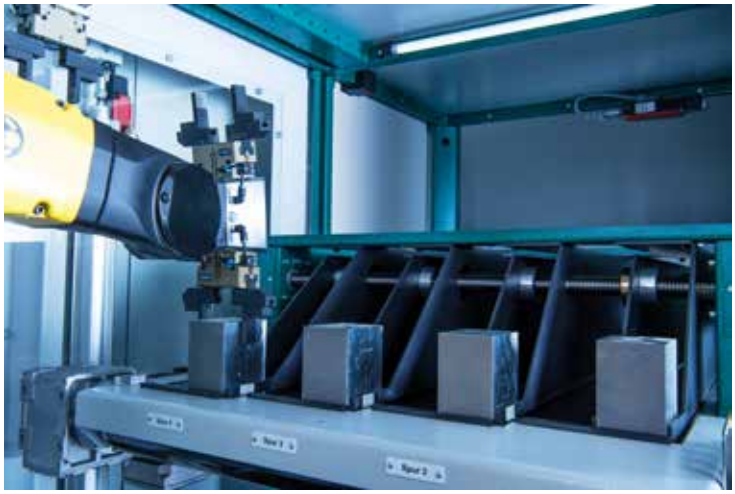


Perfect accessibility, small footprint

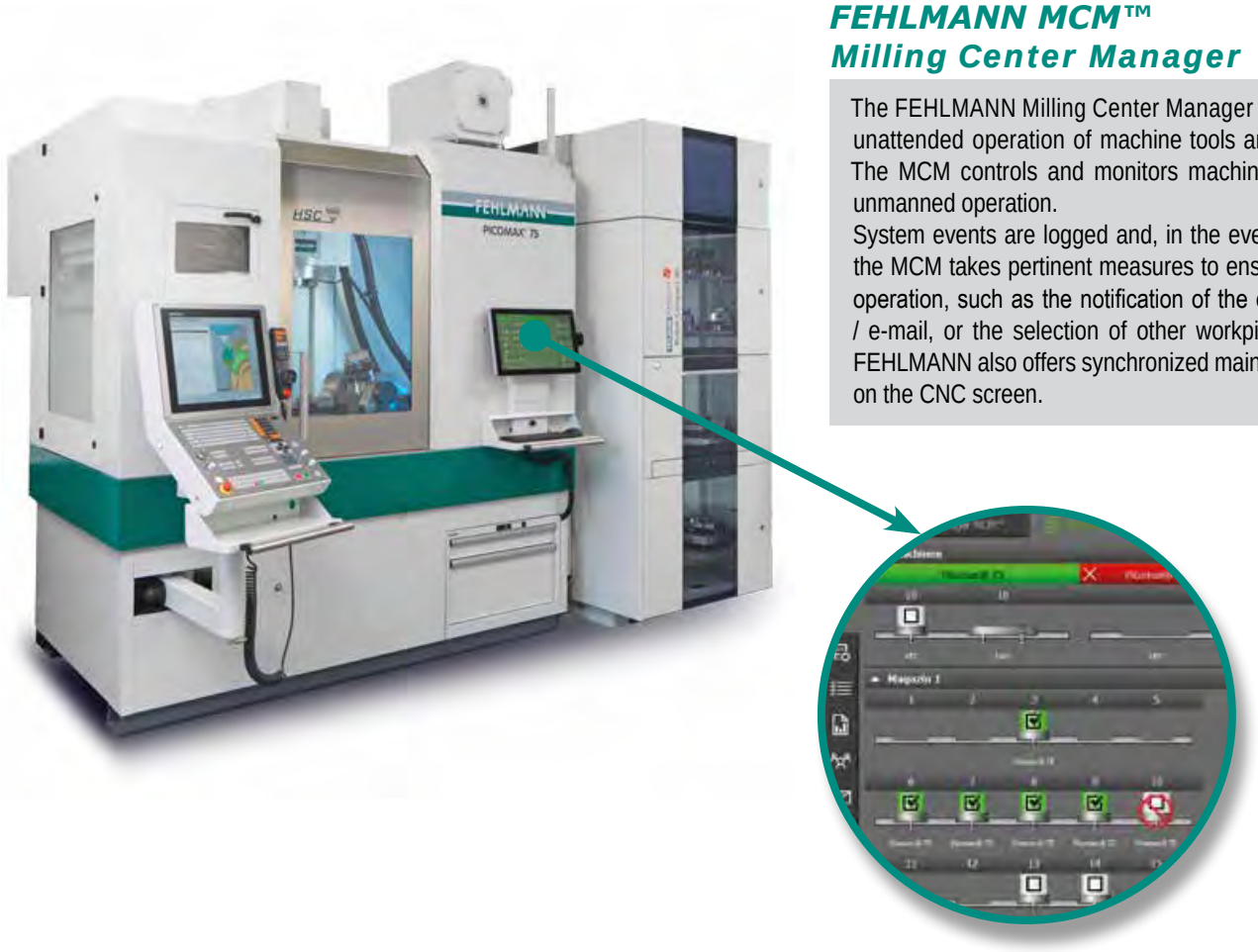
PICOMAX 75 with modular 6-axis articulated arm robot for blank parts handling

Automation solutions - everything from one source

The part feeding system with pallet handling is perfectly suited for medium- sized batches and single parts. Various clamping devices may be mounted on the pallets without having to program a robot.



Robotic parts handling with compact and modular 6-axis robot system for all-around processing of round as well as angular blanks.



FEHLMANN MCM™
Milling Center Manager

The FEHLMANN Milling Center Manager (MCM™) enables unattended operation of machine tools and loading robots. The MCM controls and monitors machines and robots in unmanned operation.
System events are logged and, in the event of malfunction, the MCM takes pertinent measures to ensure uninterrupted operation, such as the notification of the operator via SMS / e-mail, or the selection of other workpieces. In addition, FEHLMANN also offers synchronized maintenance requests on the CNC screen.

Centreless cylindrical grinding machines

A80

APG

Technical Data		A80	M100	APG-S			APG-M	CF400	CF600
Operating range									
Min. grinding diameter	*mm*	0,3	0,5	1,5			2	3	5
Max. grinding diameter	*mm*	10	20	70			90	90	150
Max. grinding length	*mm*	80	130	150	200	250	300	400	650
Grinding wheel									
Grinding wheel width	*mm*	80	130	150	200	250	300	400	660
Grinding wheel o.d.	*mm*	200	450	610-508			610*	610	660
Grinding wheel bore	*mm*	76,2	203,2	304,8					
Grinding wheel peripheral speed	*m/s*	50	50 (63)*						
Drive power	*kW*	4	11	30			37	51	74
Control wheel									
Control wheel width	*mm*	80	130	150	200	250	300	400	660
Control wheel o.d.	*mm*	100	200	305			355	355	400
Control wheel bore	*mm*	40	127	152,4			203,2		
Min. control wheel	*rpm*	5		2			5		
Max. control wheel	*rpm*	140						200	
Control wheel during dressing cycle	*rpm*	200	400						
Control wheel motor turque	*Nm*	1,15	5	11				20	60
Weight	*kg*	1700	3900	10000	10500	10700	11000		20500

Optionaly 660** — ***All information is subject to change without notice

M100

Technical feautures common to all models

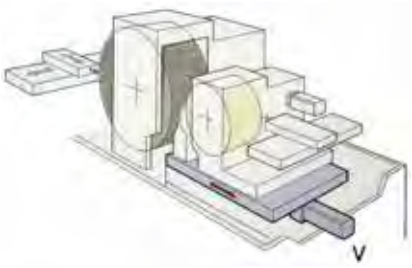
- Machine bed in 100% recyclable material designed in CAD and engineered with FEM analyses to guarantee high machine damping and verygood stiffness
- Working and dressing slides mounted on highly precise pre-loaded guideways
- High-precision hydrodynamic or with bearings grinding and control wheel spindles
- SIEMENS or FANUC numerical control for the machine handling with iHMI interface developed by Ghiringhelli, communication protocol, remote monitoring, diagnostics, ordinary and predictive maintenance
- Main control panel on a vertical tilting support or integrated into the electric cabinet
- Fume extraction hood com1 plete with exhausfers and/ or sprinklers for grinding with cutting oil
- Safety guards and protections according to fhe current European regulations. Highest attention to the safety of the operator in all steps of the machine use
- Digitalization solutions in compliance with the requirements of Industry 4.0

CF

RETTIFICATRICI GHIRINGHELLI

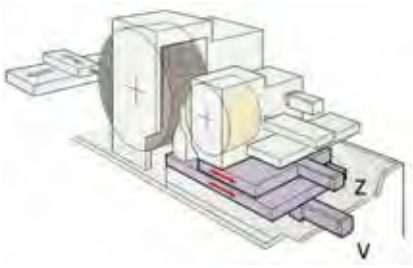
Rettificatrici Ghiringhelli S.p.a.
www.ghiringhelli.it

Centreless cylindrical grinding machines



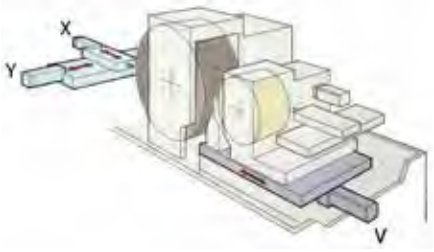
1 axis

Possibility of controlling the upper or lower regulator wheel slide



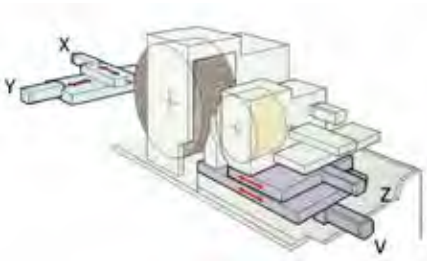
2 axes

The combined control of the two regulator wheel slides provides the highest flexibility for an automatic grooving cycle



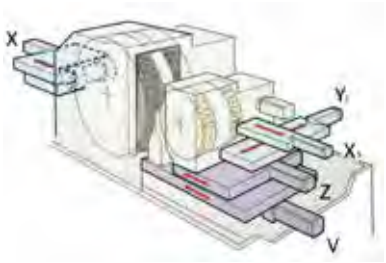
3 axes

3 axes CNC dressing with interpolation of the grinding wheel and CNC controlled lower slide



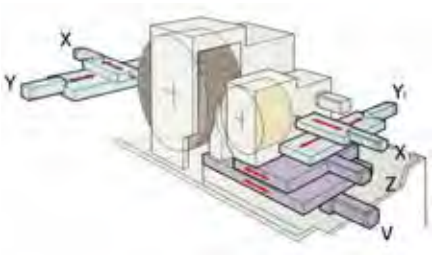
4 axes

CNC controlled lower and upper slides and dressing with interpolation of the grinding wheel



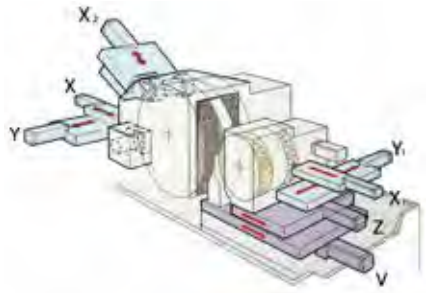
5 axes

1 axis for dressing the grinding wheel with profiled diamond roll
2 axes for dressing the regulator wheel
2 axes for movement of the lower and upper slides



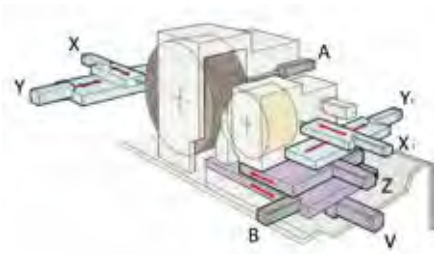
6 axes

2 axes for dressing with interpolation of the grinding wheel
2 axes for dressing the regulator wheel
2 axes for movement of the lower and upper slides



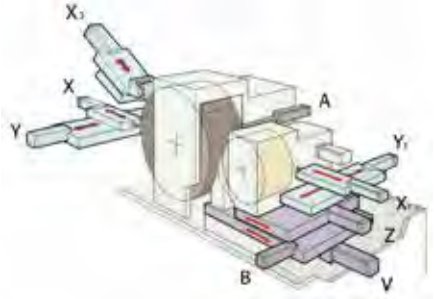
7 axes

2 axes for dressing with interpolation of the grinding wheel
2 axes for dressing the regulator wheel
2 axes for movement of the lower and upper slides
1 axis for the axial displacement of the grinding wheel spindle



8 axes

2 axes for dressing with interpolation of the grinding wheel
2 axes for dressing the regulator wheel
2 axes for movement of the lower and upper slides
1 axis for the axial movement of the grinding wheel spindle
1 axis for taper correction



9 axes

2 axes for dressing with interpolation of the grinding wheel
2 axes for dressing the regulator wheel
2 axes for movement of the lower and upper slides
1 axis for the axial movement of the grinding wheel spindle
1 axis for taper correction
1 axis for dressing the grinding wheel with profiled diamond roll

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Hard turning Horizontal

MIKROTURN

Achievable tolerances in hardened steel workpieces up to 70 HRC

- Size: < 2 µm
- Form: 0.1 – 2 µm
- Surface finish (Ra): 0.1 – 0.4 µm

Workpieces such as:

- Ball screw nuts
- Bearings rings and roller bearings
- Hydraulic components
- Drive shafts and gears
- Various mold & die components

Automated solutions

Hembrug provides various automation solutions, such as gantry loaders or robotized systems depending on the application. These solutions are delivered turn-key and also can be supplemented with post-process measuring systems.

Technical Data		Baseline	100	100 XLS	100 XLD
Max. turning diameter	mm	Ø 380	Ø 380	Ø 350	Ø 610
Max. turning diameter between centers	mm	200 x 350	200 x 350	890 x 190	-
Max. part weight / between centers	kg	50 / 100	50 / 100	50	300
Max. spindle speed	rpm	4000*	4000*	4000*	2000*
Main spindle run-out	µm	0,15	0,1	0,1	0,2
Z - axis travel	mm	350	350 / 450	890	350
X - axis travel	mm	240	240	190	340
Rapid travers rate	m/min	12	12	12	12
Max. feed rate	m/min	0 - 12	0 - 12	0 - 12	0 - 12
Positioning accuracy	µm	1	1	1	1
Slide repeatability	µm	0,2	0,2	0,2	0,2
CNC resolution	µm	0,1	0,01	0,01	0,01
CNC control system		Fanuc 0i	Siemens 840 SL - Fanuc 32i		

**Optional 2000 and 8000 rpm* — *All information is subject to change without notice*

Surface finishing options

Grinding spindle or stone finish technology, can be integrated. This technology incorporates a stone finish unit that mounts directly into the tool changer. The rotation of the workpiece and movement of the stone are controlled out by the machine.

Hard turning Vertical

MIKROTURN

Technical Data		650 V	800 V	1000 V	1000 V4	1500 V4
Max. turning diameter	mm	650	800	1000	1000	1500
Max. turning length	mm	350	350	350	350	350
Max. weight of workpiece incl. chuck	kg	800	800	2000	2000	3000
Max. table speed	rpm	1200	600	200	200	200
Nominal torque	Nm	270	300	800	800	1200
True running accuracy of main spindle/rotary table	µm	0,2	0,2	0,2	0,2	0,2
Z axes travel	mm	400	400	400	400	400
X axes travel	mm	700	700	700	750	750
Reproducibility of the sideways +/-	µm	0,1	0,1	0,1	0,1	0,1
Max. travel speed	m/min	10	10	10	10	10
Max. feed rate	m/min	0 – 10	0 – 10	0 – 10	0 – 10	0 – 10
Resolution of control system	µm	0,01	0,01	0,01	0,01	0,01
Positioning accuracy	µm	1	1	1	1	1

All information is subject to change without notice

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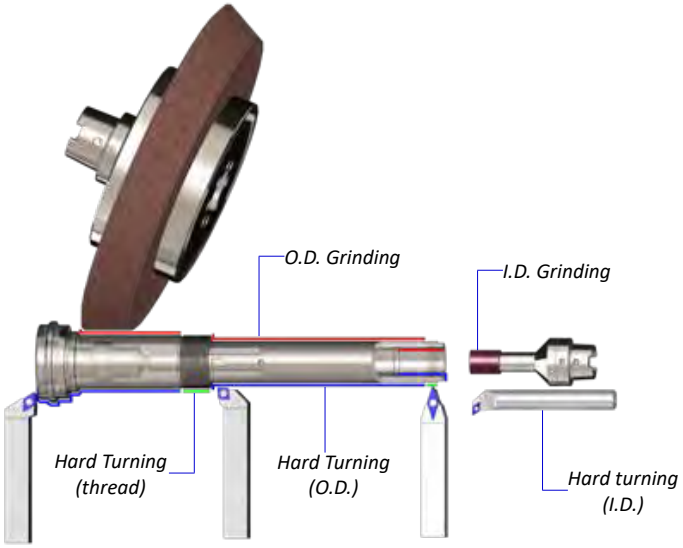
Combi proccesses

MIKROTURN

Technical Data		MTG 1000
Max. turning diameter	mm	Ø 380
Max. workpiece size between centers	mm	200 x 1000
Max. part weight including clamping	kg	100
Max. spindle speed	rpm (Nm)	4000 (50)
Spindle run-out	µm	0,1
Z - axis travel	mm	1180
X - axis travel	mm	355
Max. feed rate	m/min	0 - 12
Positioning accuracy-linear axis	µm	1
Repeatability-linear axis	µm	0,2
B-axis		Adjustable in 90 positions over 270°
CNC resolution	µm	0,01
O.D. Grinding spindle (Option)		
Spindle position		on B-axis
Fixture	HSK	63
Drive power	kW	17
Wheel dimensions	mm	Ø 300 / 40 x 76.2
I.D. Grinding spindle (Option)		
Spindle position		on B-axis
Fixture	HSK	50
Drive power	kW	6,5
All information is subject to change without notice		



Achievable tolerances in workpieces up to 70 HRC

- Form accuracies: < 2 µm
- Shape accuracies: 0.1 – 2 µm
- Surface finish (Ra): 0.1 – 0.3 µm

Suitable materials

- Bearing steels such as 100Cr6
- High speed steels
- Die steels
- Case hardened steels
- Carbide
- Exotic materials such as Inconel

Combi process with high precision **hard turning**

Mikropolisch®	***Mikrogrind®***	***Mikrofinisch®***
Hard turning + polishing	Hard turning + grinding	Hard turning + band finishing
Ra 0.05 µm	Ra 0.05 µm	Ra 0.02 – 0.05 µm

Centre grinding machines

ZS 102

OPTIONS ZS 102-202

- **Pneumatic quick lift-up on Z axis** of grinding head (around 25 mm) for fast workpiece changing
- **Workpiece drive unit** with long dead centre for parts already ground
- **Micro adjustment of the X axis** for a specific offset of the centre

ZS 1000

Technical data		ZS 102[1200]	ZS 202[1200]	ZS 202[1500]	ZS 1000[1000]	ZS 1000[2000]	ZS 1000[3000]
Max. workpiece length	*mm*	1160	1220	1565	1086	2086	3086
Centre	*mm*	Ø 1 - 58	Ø 2 - 88 (125)		Ø 2 - 148		
Clamping range	*mm*	Ø 5 - 100	Ø 5 - 105 (95 - 160)		Ø 30 - 275		
Special clamping range	*mm*	-	Ø 140 - 225		Ø 10 - 250		
Max. workpiece weight	*kg*	100	500		1000		
Grinding spindle speed	*rpm*	16000 - 40000	9600 - 24000		5000 - 35000		

All information is subject to change without notice

OPTIONS ZS 202 ONLY

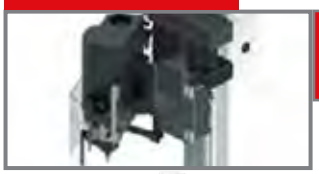
- **Control unit** clamping vice & height adjustment with Siemens control touch screen with section detection
- **Automation interface** preparation of the hardware interface to a later upgrade
- **Electrically driven vice** operator-independant, fast & automated workpiece clamping with Siemens control
- **Electric vice** for highly accurate micrometer adjustment & sensiti-ve workpiece clamping for thin-walled work pieces
- **Motorised tailstock adjustment** for a fast & automated set-up with Siemens control
- **Motorised eccentric adjustment** for a fast & automated set-up with Siemens control

→ **READY FOR 4.0 !**

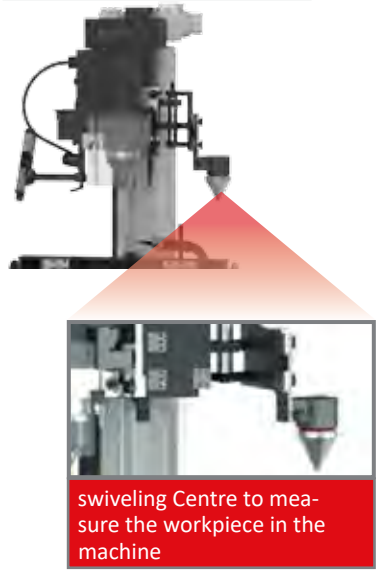
ZS 102-202

SOME OPTIONS

ZS 1000



swiveling grinding head for comfortable loading with crane



swiveling Centre to measure the workpiece in the machine

Henninger GmbH u. Co. KG
www.henningerkg.de

Centre grinding machines

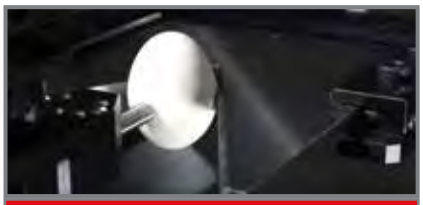
ZS 2000

swiveling dressing device for the utilisation of corundum grinding pin

Technical data		ZS 2000^{800}	ZS 2000^{1200}
Max. workpiece length	mm	800	1 200
Max. workpiece weight	kg	20	50
Max. workpiece diameter	mm	5 - 100	5 - 120
Workpiece clamping		Two centrally clamping, electrically driven vices	
Number of grinding heads	pc.	2	
Grinding area of the centre holes	mm	2 - 60	
Grinding spindle speed	rpm	10000 - 60000	

All information is subject to change without notice

SOME OPTIONS



vice for thin-walled workpieces
this clamping system can even clamp an egg!

ZS ONE

Technical data		ZS ONE
Max. workpiece length	mm	250
Centre	mm	1 - 10
Clamping range - Ø	mm	5 - 40
Special clamping range - Ø	mm	-
Max. workpiece weight	kg	5
Grinding spindle speed	rpm	20000 / 60000

All information is subject to change without notice

- Compact, high-precision & simplified design
- Simple & fast handling of loading station
- Manual centre process grinding
- Table-top machine: intuitive to operate & flexible at the point of use

SOME OPTIONS

- Digital display with 5 µm resolution & reset
- Dressing device for the usage of corundum grinding pin
- Holding fixture MT 4 for centring the workpiece

Centre Grinding Unit

ZS 251

Centre grinder is designed for the use on a machine bed or lathe

Technical data		ZS 251
Travel path of the eccentric	mm	50
Eccentric speed	rpm	40
Grindable centre		
With stationary workpiece	mm	148
With rotating workpiece	mm	148
Grinding spindle speed	rpm	5000 - 35000

All information is subject to change without notice

- Inclusive cabinet
- Installation on a lathe board
- Machine base on request

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www.alfleth.com

HURON

HURON GRAFFENSTADEN S.A.S.
www.huron.fr

Vertical milling centres, 3 axes

PX 40

Technical data		PX40	
Travel distances X/Y/Z	mm	760 / 510 / 510	
Rapid traverse X/Y/Z	m/min	40 / 40 / 32	
Table size	mm	915 x 460	
Distance spindle nose / top table	mm	100-610	
Max. admissible load on table	kg	500	
Spindle			
Spindle speed - tool holder	rpm	8 000 / ISO40 (BT40)	
Spindle power - torque	kW/Nm	10.5 - 50 (Siemens)	11 - 70 (Fanuc)
Tool changer capacity	pockets	20	
Control system	CN	Siemens 828D - Fanuc Oi MF	
Standard equipment			
low pressure coolant - washing gun - chips collector tray - AC on electrical cabinet - 3 colors signal tower			
All information is subject to change without notice			


Tool Changer


Table


Chip Removal

PX40 milling centre is dedicated to productivity. Its compact and rigid design allows excellent surface finishes in short cycle times. This product combines dynamism and machining precision and is perfectly suited to series production lines.

All structure parts in cast iron

VX

Technical data		VX8	VX12	VX15	VX18
Travel distances X/Y/Z	mm	820 / 510 / 510	1220 / 600 / 610	1510 / 810 / 810	1810 / 810 / 810
Rapid traverse X/Y/Z	m/min	24			
Table size	mm	1000 x 530	1400 x 630	1700 x 810	2000 x 810
Distance spindle nose / top table	mm	150 - 660	150 - 760	150 - 960	150 - 960
Max. admissible load on table	kg	500	1200	2000	2500
Spindle					
Spindle speed - toolholder	rpm	10000 - ISO40 (BT40)			
Spindle power - torque	kW/Nm	14,5 - 69 (Siemens) - 14 - 89 (Heidenhain)			
Spindle options	rpm	15000 / 18000 - 8000		6 000* - 8 000 - 15000 - 18000	
Tool changer capacity	pockets	40			
Control system	CN	Siemens 828D SI - Heidenhain TNC 620 - Fanuc Oi MF (VX8-12)			
Standard equipment					
air through nozzles - low pressure coolant - washing gun - chips conveyor - preparation for coolant thru the spindle - AC on electrical cabinet - handwheel					
**with gearbox (1:4) ISO50*					*All information is subject to change without notice*

VX is the ideal investment for milling, drilling, boring and tapping in sectors like tooling and production in small and medium series.

- 3 axes machining for workpiece up to 2.500 kg
- Hard material machining in a minimal time
- High chip removal capacity
- Very high accuracy in contouring and profiles

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Vertical milling centres, 3 axes

RDX 30

Technical data		RDX30	
Travel distances X/Y/Z	mm	1020 / 600 / 610	
Rapid traverse X,Y,Z	m/min	30	
Table size	mm	1200 x 550	
Distance spindle nose / top table	mm	125 / 635	
Max. admissible load on table	kg	900	
Spindle			
Spindle speed - toolholder	rpm	10 000 - ISO40 (BT40)	
Spindle power - torque	kW/Nm	14.3 - 68 (Siemens)	11 - 70 (Fanuc)
Tool changer capacity	pockets	24 (40)	
Control system	CN	Siemens 828D SI – Fanuc Oi MF	
Standard equipment			
low pressure coolant - washing gun - chips collector tray - AC on electrical cabinet - 3 colors signal tower			
All information is subject to change without notice			

Tool Changer

Table

Reinforced ribbed cast iron

RDX30 milling centre has been specially designed for the production of parts with high requirements for precision and quality, such as general and precision engineering. Its compact and rigid design allows to achieve excellent surface finishes.

All structure parts in cast iron

Tachyon

Vertical drilling and tapping centre 3 axes

Dynamic, Accurate, Compact, machine dedicated to drilling, tapping and milling 3 axes, high performances.

TACHYON range is entirely dedicated to drilling, tapping and milling operations for the production of mechanical components in small and medium series. These compact vertical milling centers with fixed bed and reduced footprint have all the required qualities to be at the highest level in their category. These machines combine dynamism and accurate precision machining. They are perfectly suited to production lines in series.

Technical data		Tachyon 4	Tachyon 5	Tachyon 5	Tachyon 7
		Fix table		Roto palett	
Travel distances X/Y/Z	mm	400 / 400 / 450	550 / 400 / 450	550 / 400 / 450	750 / 400 / 450
Rapid feedrate	m/min	60	60	60	60
Working feedrate	m/min	30	30	30	30
Table size	mm	800 x 600	1200 x 800	2x (600 x 400)	2x (800x400)
Max. admissible load on table	kg	500	1500	2 x 250	2 x 350
Distance spindle nose / top table	mm	200 / 650	200 / 650	200 / 650	200 / 650
Accuracy					
Positioning accuracy P	mm	0,006	0,006	0,006	0,006
Repeatibility accuracy Ps	mm	0,004	0,004	0,004	0,004
Spindle					
Spindle speed - toolholder	rpm	15000 - BBT30	15000 - BBT30	15000 - BBT30	15000 - BBT30
Spindle power - torque	kW/Nm	7.4 - 41	7.4 - 41	7.4 - 41	7.4 - 41
Tool changer capacity	pockets	24	24	24	24
Control system	CN	Siemens 828D PPU 260 - Fanuc Oi MF		Siemens 828D - Fanuc Oi MF	
Standard equipment					
air through nozzles - chips conveyor - preparation for coolant thru the spindle - handwheel					
All information is subject to change without notice					

Vertical milling centres, 3 axes

KMILL

Technical data		KMILL 8	KMILL 10
Travel distances X/Y/Z	mm	700 / 600 / 500	1000 / 700 / 600
Rapid traverse X/Y/Z	m/min	40	30 (X-Y) - 18 (Z - box way construction)
Table size	mm	800 x 600	1250 x 700
Distance spindle nose / top table	mm	100 / 600	140 / 740
Max. admissible load on table	kg	500	1500
Spindle			
Spindle speed - toolholder	rpm	15000 - ISO40	15000 - ISO40
Spindle power - torque	kW/Nm	23.6 - 110	23.6 - 110
Spindle options	Nm	15 000 - 18 000 (HSK63A)	
Tool changer capacity	pockets	30	
Control system	CN	Siemens 828 D SI – Heidenhain TNC 620	
Standard equipment			
low pressure - washing gun - chip conveyor - linear scale on Z axis (Kmill10 only) - handwheel			
All information is subject to change without notice			

Kmill range, portal-structured machine, incarnates the most efficient concept for machining complex parts along three axes, from roughing to finishing. This Series of machines combines dynamic action and precision for top quality surface finishes, especially for 3D shapes for moulds, forgings and tooling.

- 3 axes machining for workpiece up to 1.500 kg
- Hard material machining in a minimal time

K2X KX

- 3 axes machining for workpiece up to 4.000 kg
- Hard material machining in a minimaltime
- Very high accuracy in contouring and profiles

Technical data		K2X10	K2X20	KX30
Travel distances X/Y/Z	mm	1000 / 800 / 500	1200 / 1000 / 500	1800 / 1000 / 700
Rapid traverse X/Y/Z	m/min	60 / 60 / 60	50 / 60 / 60	30 / 30 - 18 box way construction
Table size	mm	1150 x 800	1400 x 1000	2000 x 1000
Distance spindle nose / top table	mm	115 / 615	250 / 750	225 / 925
Max. admissible load on table	kg	1000	2000	2500 (4000 max)
Accuracy				
Positioning accuracy P	mm	0,004	0,005	X: 0,009 Y, Z: 0,007
Repeatibility accuracy Ps	mm	0,002	0,003	0,005
Spindle				
Spindle speed - toolholder	rpm	18 000 - HSK63A		
Spindle power - torque	kW/Nm	30 - 30 / 30 - 40	30 - 40 / 24 - 32	30 - 30 / 30 -40
Spindle options	rpm	24000 - HSK63A / 36000 - HSK50E		24000 - HSK63A
Tool changer capacity	pockets	36 (60)		
Control system	CN	Siemens 840D SI – Heidenhain TNC 640		
Standard equipment				
low pressure - washing gun - chip conveyor - linear scales on all axes - handwheel				
All information is subject to change without notice				

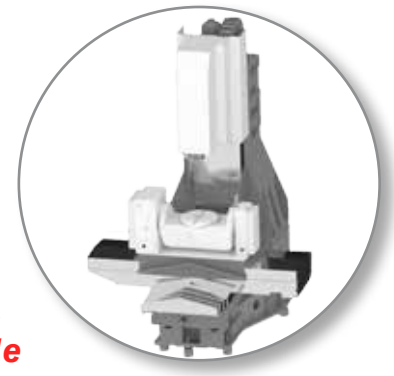
NX

Technical data		NX40	NX50	NX60
Travel distances X/Y/Z	mm	2200 / 1500 / 800 (1000)	3200 / 1500 / 800 (1000)	3200 / 2200 / 800 (1000)
Rapid traverse X/Y/Z	m/min	15 / 20 /15	15 / 20 /15	15 / 15 /15
Table size	mm	2200 x 1250	3000 x 1250	3000 x 2000
Distance spindle nose / top table	mm	20 / 1000	200 / 1000	200 / 1000
Max. admissible load on table	Kg	6 000	8 000	10 000
Spindle				
Spindle speed - toolholder	rpm	6000 - ISO50		
Spindle power - torque	kW / Nm	32.3 - 170		
Spindle options	rpm	6000-ISO50* / 10 000-ISO50 - 18 000-HSK63A		
Tool changer capacity	pockets	40 (60)		
Steuerung	CN	Siemens 840 D SI – Heidenhain TNC 640		
Standard equipment				
low pressure - washing gun - chip conveyor - linear scales on all axes - handwheel				
**(with gear ISO50 box 1:4)*				***All information is subject to change without notice***

- Designed for machining large mould frames, as well as moulds
- Admissible load : up to 10.000 kg
- Very high machining accuracy and reduction of production costs
- Hydraulic balancing of the Z axis for better machining stability

Vertical milling centres, 5 axes

VX8 3+2



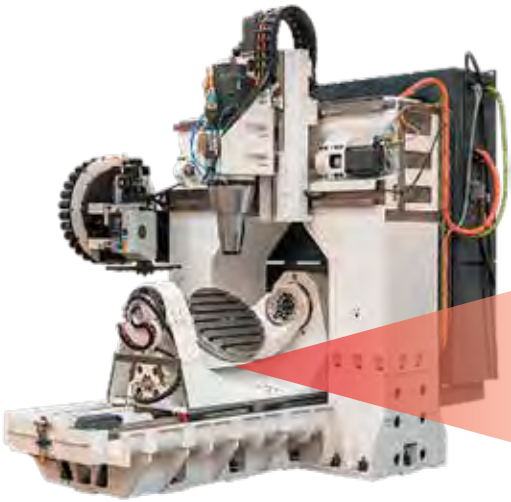
The 5-axis entry level, with rotary tilting table

Technical data		VX8 3+2
Travel distances X/Y/Z	mm	700 / 510 / 460
Rapid traverse X/Y/Z	m/min	24
Max. admissible load on table	kg	60
Distance spindle nose / top table	mm	70 / 530
Table – A/C Axes		
Table dimension	mm	Ø348
C-axis / clearance	degrees	360
C-axis / rotation speed	rpm	25
A-axis / clearance	degrees	110 / -30
A-axis / rotation speed	rpm	25
Spindle		
Spindle speed - toolholder	rpm	10 000 - ISO40
Spindle power - torque	kW/Nm	14.3 - 28 (Siemens)
		14 - 89 (Heidenhain)
Spindle options	rpm	12 000 - ISO40 / 15 000 - ISO40 (HSK63A) / 18 000 - HSK63A
Tool changer capacity	pockets	40
Control system	CN	Siemens 828D SI – Heidenhain TNC 620
Standard equipment		
air through nozzles - low pressure coolant - washing gun - chips conveyor - preparation for coolant thru the spindle - AC on electrical cabinet - handwheel		
All information is subject to change without notice		

U mill

With a portal structure and a swivelling rotary table on craddle.

Technical data		U mill 5	U mill 6
Travel distances X/Y/Z	mm	500 / 560 / 450	700 / 740 / 550
Rapid traverse X/Y/Z	m/min	40	40
Max. admissible load on table	kg	450	600
Distance spindle nose / top table	mm	40 / 490	200 / 750
Table – A/C axes			
Table dimension	mm	Ø500	Ø630
C-axis / clearance	degrees	360	360
C-axis / rotation speed	rpm	45	20
A-axis / clearance	degrees	20 / -110	20 / -110
A-axis / rotation speed	rpm	25	35
Spindle			
Spindle speed - toolholder	rpm	10 000 - ISO40	
Spindle power - torque	kW / Nm	18 - 173	
Spindle options	rpm	15 000 - ISO40(HSK63A) / 18 000 - HSK63A	
Tool changer capacity	pockets	30 (60)	
Control system	CN	Siemens 840 D SI – Heidenhain TNC 640	
Standard equipment			
low pressure - washing gun - chip conveyor - encoder on both rotary axes - handwheel			
All information is subject to change without notice			



- Swivelling rotary table fixed on cradle and moving along the X axis for higher rigidity
- Travels are optimized to offer an important distance under the spindle nose
- Direct measurement on each rotating axes with absolute encoder

Vertical milling centres, 5 axes

KX FIVE

KXFive 5-axis high-speed milling range enables the machining of all complex parts such as injection molds, aeronautical parts or parts of precision mechanics, on 5-sided and in 5 simultaneous axes, from roughing to finishing.

Technical data		K3X8FIVE	K2X10FIVE
Travel distances X/Y/Z	mm	780 / 700 / 500	900 / 900 / 500
Rapid traverse X/Y/Z	m/min	50	50
Max. admissible load on table	kg	250 (300 max)	500 (750 max)
Max Workpiece	mm	Ø 700	Ø 800
Distance spindle nose / top table	mm	520	700
Table – A/C Achsen			
Table dimension	mm	Ø 500 (630)	Ø 630 (800)
C-axis / clearance	degrees	360	360
C-axis / rotation speed	rpm	50	90
A-axis / clearance	degrees	30 / -180	+45 / -180
A-axis / rotation speed	rpm	50	40
Accuracy			
Positioning accuracy P	mm	0,004	0,004
Repeatibility accuracy Ps	mm	0,002	0,002
Spindle			
Spindle speed - toolholder	rpm	18 000 - HSK63A	24 000 - HSK63A
Spindle power - torque	kW / Nm	30 - 110	25 - 40
Spindle options	rpm	*16 000 - HSK63A / 24 000 - HSK63A / 36 000 - HSK50E / 42 000 - HSK40E	
Tool changer capacity	pockets	36 (60 - *90 - *135)	
Control system	CN	Siemens 840 D SI – Heidenhain TNC 640	
Standard equipment			
low pressure - washing gun - chip conveyor - handwheel - encoder on both rotary axes - linear scales on all axes - rotary union on the table			
*only on K2X10Five		***All information is subject to change without notice***	

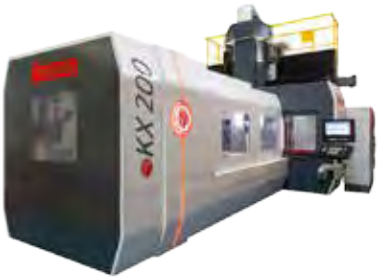
- High performance both in roughing and finishing
- 5 axes machining for workpieces with weight up to 500 kg (up to 750 kg reducing feedrates and accelerations)
- Hard material machining in minimal time
- Very high accuracy in contouring and profiles

Palletizing (optional for K3X 8 Five)

Tool Changer

Vertical milling centres, 5 axes

KX Large



KX Large a range of very high performance milling machines for 5-sided and 5-axes machining of complex parts.

- High performances in roughing as well as in finishing
- High accuracy performance in positioning and in 5 axes contouring
- Wide distance between columns for the maximal exploitation of the part volume
- High performance spindle in roughing as well as in surfacing

Mechanical Head KX 200

Technical data		KX50 M	KX50 L	KX100	KX200	KX300
Travel distances X/Y/Z	*mm*	2000 / 1700 / 900	3000 / 1700 / 900	2300 / 2300 / 1000	3300 / 2300 / 1000	5000 / 3100 / 1500
Rapid traverse X/Y/Z	*m/min*	40 / 40 / 40		40 / 40 / 40	25 / 40 / 40	20 / 20 / 20
B- axis	*degrees*	+/- 105		+/- 95		
C- axis	*degrees*	+/- 200		+/- 190		
Usable table surface	*mm*	2200 x 1250	3300 x 1250	2500 x 1250 (1500)	3500 x 1250 (1500)	5200 x 2000
Max. admissible load on table	*kg*	4000	2500 (6000 max)	6000 (12000 max)	9000 (12000 max)	13000 (20000 max)
Spindle std						
Spindelspeed - toolholder	*rpm*	20000 - HSK 63A		18000 - HSK63A		
Spindle power - torque	*kW/Nm*	75 / 75		30 - 240		
Spindle Options	*rpm*	15000 - HSK100A / 18000 - HSK63A / 24000 - HSK63A		10000 - HSK100A / 12000 - HSK100A / 24000 - HSK63A		
Mechanical head /spindle*	*rpm*			4000 rpm - 14,5/21 kW - 550/810 Nm - HSK 100A		
Accuracy						
Positioning accuracy P	*mm/ arc sec*	X – Y – Z : 0,007 A – C : 10		X – Y – Z : 0,007 A – C : 10		X : 0.02 Y – Z : 0,007 A – C : 10
Repeatibility accuracy Ps	*mm/ arc sec*	X – Y – Z : 0,004 A – C : 5		X – Y – Z : 0,004 A – C : 5		X : 0.005 Y – Z : 0,004 A – C : 5
Tool changer	*pockets*	30 (60, 120,180 and more upon request)		40 (60, 120 and more upon request)		
Control system	*CN*	Siemens 840 D Sl – Heidenhain TNC 640				
Standard equipment						
low pressure - washing gun - chip conveyor - handwheel						

**Option*

All information is subject to change without notice

Vertical milling centres, 5 axes

Milling (M) and Mill/Turn (MT) centre

MX

- 5 axis machining for workpiece up to 12.000 kg
- Hard material machining in a minimal time
- Very high accuracy in contouring and profiles
- Complete automation of the machine

MX multifuncion machining centre is a high flexibility machine enabling machining operations in 5 axes and on 5 sides, in one setup part clamping, from roughting to finishing, as well as turning operations.

Universal Head MX10-12

Technical data		MX8 M	MX8 MT	MX10 M	MX10 MT	MX12 M (L)	MX12 MT	MX11 M		
Travel distances X/Y/Z	*mm*	1160 / 1000 / 900		1200 / 1200 / 1000		1200 (2000) / 1600 / 1000		1250 / 1250 / 1000		
Rapid traverse X/Y/Z linear axes	*m/min*	40 / 40 / 40						40 / 40 / 40		
A axis - universal head										
Speed	*rpm*	100						30		
Clearance	*degrees*	-45 / 180						-45 / 180		
C axis - rotary table										
Speed	*rpm*	50	500	65	500	50	250	30		
Clearance	*degrees*	360						360		
Table surface	*mm*	Ø 1000 x 800	Ø800	Ø 1250 x 900	Ø 1000	Ø 1600 x 1250	Ø 1400	Ø 1250 x 1000		
Permissible table load	*kg*	2 000		2 500		4 000		2 000		
Spindle Std - toolholder		**HSK 63-A**	**HSK 100-A**	**HSK 63-A**	**HSK 100-A**	**HSK 63-A**	**HSK 100-A**	**HSK 63-A**		
Speed	*rpm*	14000	10000	14000	10000	14000	10000	14000		
Spindle power - torque	*kW*	29 - 277	43 - 415	29 - 277	43 - 415	29 - 277	43 - 415	29 - 277		
Accuracy										
Positioning accuracy P	*mm/arc sec*	X – Y – Z : 0,007 A – C : 10						X – Y – Z : 0,007 A – C : 10		
Repeatibility accuracy Ps	*mm/arc sec*	X – Y – Z : 0,004 A – C : 5						X – Y – Z : 0,004 A – C : 5		
Tool changer	*pockets*	60 (120, 180)						60 (120, 180)		
Control system	*CN*	Siemens 840D SI - Heidenhain TNC640						Heidenhain TNC640		
Variants - C axis with pallet changer		**Option**						**Standard**		
Speed	*rpm*	50	500	65	500	50	250	30		
Table surface	*mm*	Ø 800 x 630	Ø800	Ø 1000 x 800	Ø 1000	Ø 1400	Ø 1400	Ø 1250 x 1000		
Max. admissible load on table	*kg*	1 200		1 500		2 500		2 000		
Spindle - option		M		M - MT		M		M		
Speed - Toolholder	*rpm*	10 000 - HSK 100-A	18 000 - HSK 63-A	8 000 - HSK 100-A		10 000 - HSK 100-A	18 000 - HSK 63-A	8 000 - HSK 100-A	10 000 - HSK 100-A	18 000 - HSK 63-A
Spindle power - torque	*kW*	29 - 277	43 - 415	29 - 277	43 - 415	29 - 277	43 - 415	29 - 277		
Mechanical Head / Spindle										
Spindle				M - MT						
Spindle speed - toolholder	*rpm*			6 000 – HSK100 A						
Spindle power - torque	*kW / Nm*			38 - 1 350						
Standard equipment										
low pressure - washing gun - chip conveyor - handwheel										

All information is subject to change without notice

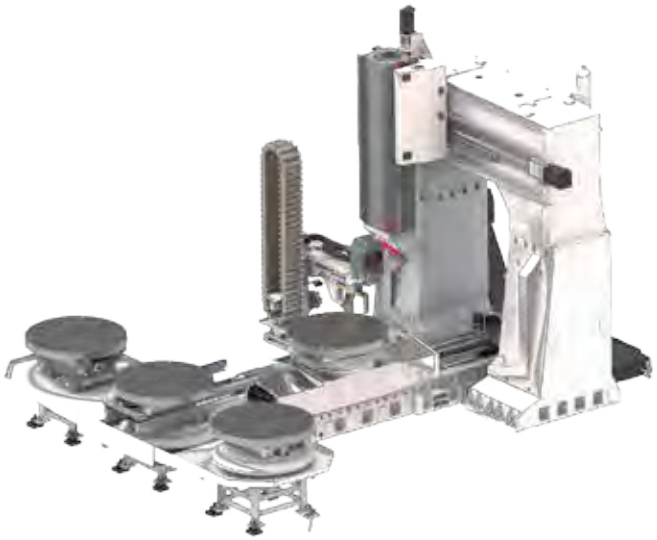
Vertical milling centres, 5 axes

MX

Extension of the range - MX 16 M/MT, MX 20 M/MT

MX range has been extended to include extra-large models, with MX 16 and MX 20. The larger workpiece clearance will be appreciated in the aeronautic and energy industries.

Technical data		MX16 M	MX16 MT	MX20 M	MX20 MT
Travel distances X/Y/Z	mm	2300 / 2300 / 1250		3000 / 3100 / 1500	Upon request
Rapid traverse X/Y/Z linear axes	m/min	40		20	
A axis - universal head					
Speed	rpm	100		100	
Clearance		-45 / 180		-45 / 180	
C axis - rotary table					
Speed	rpm	7	250	5	
Clearance	degrees	360		360	
Table surface	mm	Ø 1750	Ø 1600	Ø 2200	
Permissible table load	kg	10000	5000	12000	
Spindle Std toolholder		HSK 100-A			
Speed - toolholder	rpm	10 000			
Spindle power - torque	kW	43 - 415			
Accuracy					
Positioning accuracy P	mm/arc sec	X – Y – Z : 0,007	A – C : 10		
Repeatibilty accuracy Ps	mm/arc sec	X – Y – Z : 0,004	A – C : 5		
Tool changer	pockets	60 (120, 180)			
Control system	CN	Siemens 840D SI - Heidenhain TNC640			
VARIANTS - C axis with pallet changer		**Option**		**Upon request**	
Speed	rpm	7 / 9	250		
Table surface	mm	Ø 1 600	Ø 1 600		
Max. admissible load on table	kg	6 000	5 000		
Spindle		M - MT			
Speed - Toolholder		8 000 - HSK 100-A			
Spindle power - torque	kW	43 - 415			
Mechanical Head / Spindle		M			
Spindle speed - toolholder	rpm	6 000 – HSK100A			
Spindle power - torque	kW / Nm	38 / 1 350			
Standard equipment					
low pressure - washing gun - chip conveyor - handwheel					
All information is subject to change without notice					



Pallet device with 2 pallets and available up to 4 pallets for MX 16 and MX 20

Vertical milling centres, 5 axes

KXG

Machining centre with mobile traverse

- 5-axis machining for workpieces up to 52.000 kg
- Very high accuracy in contouring and profiles
- Complete automation of the machine

Technical data		KXG45 - 14	KXG45 - 25	KXG60 - 25	KXG90 - 25
Travel distances X/Y/Z	mm	4500 / 1500 / 800 (1250)	4500 / 2500 / 800 (1250)	6000 / 2500 / 800 (1250)	9000 / 2500 / 800 (1250)
Rapid traverse X/Y/Z	m/min	60 / 60 / 45			
B axis	degrees	+/- 105			
C axis	degrees	+/- 200			
Usable table surface	mm	4700 x 1390	4700 x 2480	6200 x 2480	6200 x 2480
Max. admissible load on table	kg	18000	21000	25000	52000
Spindle std					
Spindelspeed - toolholder	rpm	20000 - HSK 63A			
Spindle power - torque	kW / Nm	75 / 75			
Spindle Options	rpm	15000 - HSK100A / 18000 - HSK63A / 24000 - HSK63A			
Accuracy					
Positioning accuracy P	mm / arc sec	X : 0.025 Y / Z : 0.010 B,C : 10	X : 0.025 Y / Z : 0.010 B,C : 10	X : 0.035 Y / Z : 0.010 B,C : 10	X : 0.050 Y / Z : 0.010 B,C : 10
Repeatibility accuracy Ps	mm / arc sec	X / Y / Z : 0.005 B,C : 5	X / Y / Z : 0.005 B,C : 5	X : 0.006 Y / Z : 0.005 B,C : 5	X : 0.006 Y / Z : 0.005 B,C : 5
Tool changer	pockets	40 (60, 100 and more upon request)			
Control system	CN	Siemens 840 D SI – Heidenhain TNC 640			
Standard equipment					
low pressure - washing gun - chip conveyor - handwheel					
All information is subject to change without notice					

Horizontal milling centres, 4 axes

HSX

Technical data		HSX650
Travel distances X/Y/Z	mm	800 / 730 / 750
Rapid traverse X/Y/Z	m/min	50
Palett Changer		
Table surface	mm	2 x (500x630)
Permissible table load	kg	2 x 700
Spindle		
Speed	rpm	10000
Toolholder	kW/Nm	SK50
Spindle power / torque	kW	41 / 170
Accuracy		
Positioning accuracy P	mm	X/Y/Z: 0,010
Repeat accuracy Ps	mm	X/Y/Z: 0,005
Control system	CN	Siemens 828D SI
All information is subject to change without notice		

Cycles CN HURON

PRECILIFE

or how to manage tool life automatically ?*

This cycle provides automatic tool checking during machining or at tool change. If critical wear or a broken tool is detected, the system automatically triggers the replacement of the tool at the most appropriate time. It therefore safeguards the integrity of the workpiece and the cutting tools and optimizes tool use. The profitability of the machine is increased by reducing downtime and tooling costs.

Main futures

- Automated tool measurement, inspection and replacement done in the machining process
- No change to the NC program
- Implemented by HURON
- Configurable wear and breakage detection tolerance for each tool
- Automatic replacement of tools

(*) Only with 3 axes machines, spindle in vertical position

PRECIPOWER

or how to optimise roughing operations ?

It takes care of optimizing the roughing operation by automatically modulating and adapting the feedrate, in real time, to the value that result in peak material removal.

Main futures

- Full use of available spindle power
- Automatic feedrate modulation
- Maximize material removal rate
- Spindle and rotating axes overload protection during roughing

PRECIFIVE

or how to get an accurate and automatic calibration of the machine kinematic ?

Automate the calibration of the kinematics by carrying out the measurement of the position and the orientation of the rotation axes.
The calibration can be executed directly in an NC program to ensure optimum accuracy during critical machining operations.

Main futures

- Quick, accurate, repeatable measuring system
- Optimized machining accuracy
- Compensation of the thermal expansion of the machine
- Reduces rejected parts
- Rapid evaluation following a machine collision
- Control report

PRECIPROTECT

or how to save time while protecting the machine and the workpieces ?

This cycle allows real-time monitoring of toolpaths and machine movements in order to anticipate any form of collision. The machine and the part are thus preserved.

Main futures

- Conserve machine accuracy
- Save time : no simulation required, control is done in real-time
- Save money : No more repair or machine stop due to a collision
- Increase profitability : preserve integrity of the machine and workpiece ; no more delivery delays to customers
- Reliability : detection of an imminent collision triggers an immediate and automatic stop of the movements of the machine
- Peace of mind : let the machine work unsupervised

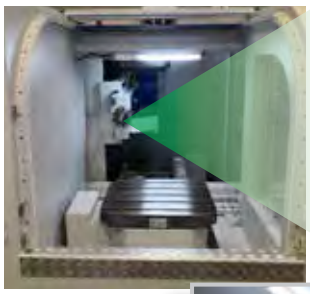
Gun drill machines for molds and blocks

MF-C

MF800C

3-4 Axes deep drilling machine for blocks and mechanical parts up to 2 tonnes

Technical Data		MF800C
Specifications		
Horizontal X-axis (gantry column)	*mm*	800
Vertical Y-axis	*mm*	500
Drilling Depth max, in single operation	*mm*	800
Optimal drilling diameter range	*mm*	4 - 18
Drilling spindle	*kW - rpm*	7 (S1) - 6.000
Fixed table 800 x 800 mm	*load in kg*	4000
Rotary table 600 x 600 mm	*load in kg*	2000
Workpiece diameter in rotation inside the machine	*mm*	1100
Milling capabilities:		
Tapping "Kit" to be mounted on the spindle head, ER32 collet.		
All information is subject to change without notice		



MF-C

MF1000C

Gun drilling and milling machine with rotary table, or rotary tilting table, for small to middle-size molds up to 4 tons

Technical Data		MF1000C
Specifications		
Horizontal X-axis (gantry column)	*mm*	1000
Vertical Y-axis	*mm*	500
Drilling Depth max, in single operation	*mm*	1000
Optimal drilling diameter range	*mm*	4 - 25
Drilling and Milling spindle	*kW - rpm*	13 (S1) - 6000
Rotary table size 700 x 800 mm	*load in kg*	2000
Rotary table size 800 x 900 mm	*load in kg*	4000
Rotary-Tilting table size 800 x 800 mm	*load in kg*	2000
Tilting angle	*degrees*	+25...-20
Workpiece diameter in rotation inside the machine	*mm*	1250
Milling capabilities:		
Thanks to the new "Swing on Top IMSA System" the whole drilling unit is rotated upwards, setting the ISO40 spindle free to execute milling operations. The operator has to put the cutting tool into the taper.		
All information is subject to change without notice		

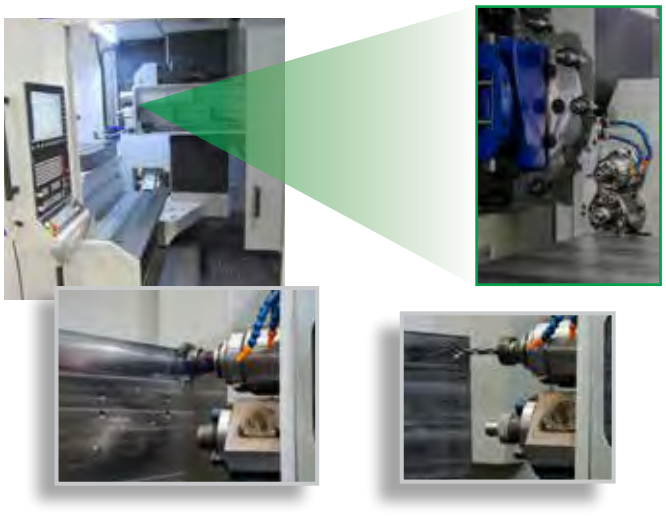
Gun drill machines for molds and blocks

MF-2F

MF1000/2F

Gun drilling and milling machine with rotary table, or rotary tilting table, for small to middle-size molds

Technical Data		MF1000/2F
Specifications		
Horizontal X-axis (gantry column)	*mm*	1400
Vertical Y-axis	*mm*	700
Drilling Depth max, in single operation	*mm*	1000
Optimal drilling diameter range	*mm*	4 - 25 (32)
Drilling spindle	*kW - rpm*	11 (S1) - 6000
Rotary table size 800 x 1000 mm	*load in kg*	4000
Rotary table size 1000 x 1200 mm	*load in kg*	6500
Rotary-Tilting table size 1000 x 1000 mm	*load in kg*	5000
Tilting angle	*degrees*	+22,5...-22,5
Workpiece diameter in rotation inside the machine	*mm*	1600
Milling capabilities:		
Second spindle dedicated to milling operations, ISO40 taper, 13 kW, 6000 rpm. No removal of any part of the gundrill unit is required to use IMSA's milling spindle. Switchover drill/mill and back in 8 seconds, in auto mode by M function.		
Different capacity ISO40 tool storages available in option.		
All information is subject to change without notice		



MF-2FL

MF1250/2FL

Gundrilling and milling machine with rotary tilting table, for middle size molds up to 6 tons

Technical Data		MF1250/2FL
Specifications		
Horizontal X-axis (gantry column)	*mm*	1700
Vertical Y-axis	*mm*	800
Drilling Depth max, in single operation	*mm*	1250
Optimal drilling diameter range	*mm*	4 - 25 (32)
Drilling spindle	*kW - rpm*	9 (S1) - 6000
Rotary/Tilting table size 1000 x 1000 mm	*load in kg*	6000
Tilting angle	*degrees*	+22,5...-22,5
Workpiece diameter in rotation inside the machine	*mm*	1900
Milling capabilities:		
Second spindle dedicated to milling operations, ISO40 taper, 9 kW, 4000 rpm. No removal of any part of the gundrill unit is required to use IMSA's milling spindle. Switchover drill/mill and back in 8 seconds, in auto mode by M function.		
Different capacity ISO40 tool storages available in option.		
All information is subject to change without notice		

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Gun drill machines for molds and blocks

MF1350 EVO

Gun drilling and milling center of our Evo Series, with tilting headstock, for molds up to 12 tons

Technical Data		MF1350 EVO
Specifications		
Horizontal X axis (gantry column)	*mm*	1900
Vertical Y axis	*mm*	1250
Drilling depth max, in single operation	*mm*	1350
Headstock tilting movement	*degrees*	+20...-20
Optimal drilling diameter range	*mm*	5 - 40
Drilling spindle 11 kW (S1)	*rpm*	4200
Rotary table *(1200 x 1500 mm)*	*load in kg*	12000
Workpiece Ø (in rotation inside the machine)	*mm*	2600
Milling capabilities:		
Second spindle for machining operations: liquid-cooled electro-spindle for medium volume metal cutting. ISO40 taper, 18 kW, 6000 rpm. The milling spindle has a 400 mm extra movement. No removal of any machine part for commutation from drilling to milling operation and back. Switch over drilling/milling (and back) in 8 seconds, by M function.		
Different capacity ISO40 tool storages available in option.		
All information is subject to change without notice		

MF1450 EVO

Gun drilling and milling center of our Evo Series, with tilting headstock, for molds up to 12 tons

Technical Data		MF1450 EVO
Specifications		
Horizontal X-axis (gantry column)	*mm*	2010
Vertical Y-axis	*mm*	1500
Drilling Depth max, in single operation	*mm*	1450
Headstock tilting angle	*degrees*	+20...-20
Optimal drilling diameter range	*mm*	5 - 40
Drilling spindle 11 kW (S1)	*rpm*	4200
Rotary traversing table *(1200 x 1500 mm)*	*load in kg*	12000
Translation	*mm*	500
Workpiece Ø (in rotation inside the machine)	*mm*	2750
Milling capabilities:		
Second spindle for machining operations: liquid-cooled electro-spindle for high-volume metal cutting. ISO50 taper, 29 kW, 6000 rpm, 200 Nm. The milling spindle has a 450mm extra movement. No removal of any machine part for commutation from drilling to milling operation and back. Switchover milling/drilling (or back) in 8 seconds, by M function.		
Different capacity ISO50 tool storages available in option.		
All information is subject to change without notice		

MF1750 EVO

Gun drilling and milling center of our Evo Series, with tilting headstock, for molds up to 20-45 tons

Technical Data		MF1750 EVO
Specifications		
Horizontal X-axis (gantry column)	*mm*	2950
Vertical Y-axis	*mm*	1500
Drilling Depth max, in single operation	*mm*	1750
Headstock tilting angle	*degrees*	+20...-20
Optimal drilling diameter range	*mm*	5 - 40
Drilling spindle 15 kW (S1)	*rpm*	4200
Rotary traversing table *(1600x1800 mm)*	*load in kg*	30000
Rotary traversing table *(2000x2000 mm)*		40000
Rotary traversing table *(2000x2500 mm)*		40000
Rotary traversing table *(2200x2200 mm)*		45000
Workpiece Ø (in rotation inside the machine)	*mm*	4300
Milling capabilities:		
Second spindle for machining operations: liquid-cooled electrospindle for high-volume metal cutting. ISO50 taper, 45 kW, 4500 rpm, 430 Nm. The milling spindle has a 500 mm extra movement. No removal of any machine part for commutation from drilling to milling operation and back. Switchover milling/drilling (or back) in 8 seconds, by M function.		
Different capacity ISO50 tool storages available in option.		
All information is subject to change without notice		

ALFLETH ENGINEERING

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Gun drill machines for molds and blocks

MF1600S

Technical Data		MF1600S
Specifications		
Horizontal X-axis (traversing table)	*mm*	3000
Vertical Y-axis	*mm*	1600
Drilling Depth max, in single operation	*mm*	1600
Headstock tilting movement	*degrees*	+30...-15
Optimal drilling diameter range	*mm*	5 - 32 (40)
Drilling and milling spindle	*kW - rpm*	17,0 (S1) - 4500
Rotary table size 1600 x 1800 mm	*load in kg*	20000
Workpiece diameter in rotation inside the machine	*mm*	3600
Milling capabilities:		
Thanks to the new "Swing on Top IMSA System" the whole drilling unit is rotated upwards, setting the ISO50 spindle free to execute milling operations. Switchover drilling/milling and back takes place by M function in just 40 seconds, without human intervention.		
Different capacity ISO40 tool storages available in option.		
All information is subject to change without notice		

MF1600S

Gun drilling and milling center, with tilting headstock, for molds up to 20 tons

Specific IMSA functions for deep drilling process control:

- Electronic work piece approach
- Electronic check against gun drill breaking, by spindle load monitoring
- Special coordinate transformation function for angled machining.

IMSA's "Swing on Top" drilling/milling switchover system

The new MF1600S features a fully-evolved SWING ON TOP system. No machine part has to be removed/added and moreover in MF1600S the switchover is completely automatic. The commutation takes 120 seconds, is programmed by M function and doesn't require human intervention.

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Deep hole drilling machines for centerline drilling of cylindrical parts

MFT 750 6CR

750 6/12CR

Centerline deep hole drilling machine for cylindrical parts, especially for the medical industry. Small diameter drilling, workpiece in counter-rotation.

1000 - 750 /6 CR
- from Ø1,5 to 6 mm

750 /12 CR
- from Ø2,5 to 12 mm

500/1000/1500 CR

Centerline deep hole drilling machine for steel shaft and other cylindrical parts that have to be drilled on their rotation axis such as: gear shafts, aerospace industry, flanges for industrial applications.

1000 - 1500 /32 CR
- until Ø32

1000 - 1500 /43 CR
- until Ø43

such as:
- Gear shafts
- Aerospace industry
- Flanges for industrial applications
- Deep drilling job shops

Technical Data		MFT750 6 CR		MFT750 12 CR	MFT500/1000/1500 CR	MFT1000/1500 32CR	MFT1000/1500 43CR
Specifications							
Drilling diameter range min-max	*mm*	1,5 - 6		3 - 12	(4) 6 - 25	6 - 32	8 - 43
Drilling depth max.	*mm*	120 (Ø 1,5 - 3)	750 (Ø 3 - 6)	750	500 / 1000 / 1500	1000 / 1500	1000 / 1500
Workpiece counter-rotation	*rpm*	150		150	150	150	150
Locking		pneum./opt.CNC		pneum./opt.CNC	pneum./opt.CNC	by Cnc	hydraulic
Drilling spindle	*kW - rpm*	5,8 - 15000		9 - 9000	7,5 - 6000	9,0 - 6000	17,0 - 4200
Oil pressure max.	*bar*	180		120	(120) 80	(120) 80	80

All information is subject to change without notice

MFT-2TCR

2T 2 drilling heads on one single carriage, to drill 2 identical workpieces in each cycle. This machine is specially designed in order to manage high-volume production. A pre-settable connection for the gun drills enable the compensation of slight differences in gun drill tool length.

2Ti these machine models are equipped with 2 INDEPENDENT drilling carriages, resulting in higher flexibility and adaptability to different production needs. The 2 drilling axes, independent in motors and controls, enable to drill different workpieces on the 2 units.

Technical Data		MFT 750 /2T CR MFT 1500 /2T CR	MFT 1000 /2Ti CR MFT 1500 /2Ti CR
Specifications			
Drilling diameter range min-max	*mm*	6 - 24	(4) 6 - 25
Drilling depth (respectively)	*mm*	750 / 1500	1000 / 1500
Workpiece counter-rotation	*rpm*	150	150
Locking		pneumatic	pneum./opt.CNC
Drilling spindle	*kW - rpm*	12,0 - 4.000	2x 7,0 - 6.000
Drilling heads		2 on one carriage	2, independent
Oil pressure max.	*bar*	80	(120) 80

All information is subject to change without notice

IMSA "MFT" Deep Hole Drilling Machines are dedicated to cylindrical parts such as transmission housings, cam shafts, gear shafts, injectors, lubricators, couplings, valves, drive valves ... in general, all solids of revolution with a deep drilling in their axis. The automatic gun drilling machines of IMSA series MFT are customized for drilling depth, diameters, number of spindles; our range starts from machines for small lots to high-productivity lines. We also propose solutions for automated load, as a completion to the supply.

ALFLETH Engineering AG
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www.alfleth.com

I.M.S.A. S.r.l
www.imsaitaly.com

Deep hole drilling machines for centerline drilling of cylindrical parts

Technical Data		MFTB 1000/1500/2000 *51 CR*	MFTB 1000/2000/3000 *76 CR*	MFTB 3000 *110 EVO*	MFTB 2000 *200*	MFTB 3000 *110 EVO*
Specifications						
Drilling diameter range min-max	*mm*	18 - 51	18 - 76	30 - 110	50 - 200	30 - 110
Drilling depth (respectively)	*mm*	1000 /1500 /2000	1000 / 2000/3000	3000	2000	3000
Workpiece counter-rotation	*rpm*	80	80	400	no	400
Locking		hydraulic	by CNC	by CNC	hydro-mechanical	by CNC
Drilling spindle	*kW - pm*	17,0 - 2.000	38,0 - 1.500	54,0 - 1.400	71,0 - 1250	54,0 - 1.400
Oil pressure max.	*bar*	50	35	35	25	35
All information is subject to change without notice						

MFTB

MFTB - 1000/1500/2000 51CR

Single-spindle BTA

MFTB -3000110EVO

Dedicated to cylindrical workpieces that have to be drilled on their rotation axis, more specifically, this machine has been developed for aeronautical materials.

MFTB-GDK

Single-spindle Gundrill + BTA

GDK

In the intermediate diameter range between the Gun Drilling and the BTA Drilling, IMSA proposes a Double-Setup flexible solution called "GDK" System. This enables you to better take advantage of both tool types.

Technical Data		MFTB 1000/1500/2000 *51 CR GDK*
Specifications		
Drilling diameter range min-max with Gun Drill tool	*mm*	8 - 24
Drilling diameter range min-max with BTA tool	*mm*	18 - 51
Drilling depth (respectively)	*mm*	1000/ 1500/ 2000
Workpiece counter-rotation	*rpm*	80
Locking		hydraulic
Drilling spindle	*kW - rpm*	22,0 - 3500
Oil pressure max.	*bar*	50 / 80
All information is subject to change without notice		

IMSA "MFTB"

BTA Deep Hole Drilling Machines are dedicated to cylindrical parts such as transmission housing, cam shafts, injectors, lubricators, couplings, valves, drive valves ... in general, all solids of revolution with a deep drilling on their axis.

Counter-rotation

Differently from the series MF for drilling of moulds and blocks- the series MFTB puts in rotation both the drill (cutting movement) and the piece (counterotation movement). The counterotation gives the drill a centering movement that gives as a result values of axiality 3 times better than in the machine with still piece. The drill axiality also allows higher feed rates and a better superficial finish.

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www.alfleth.com

Turning centre with NC

DX200

Rigid structure

- Bed and single piece 30° slant saddle concept enables consistent machining performance because of widely space guideways, event at bigger diameter
- Rigid bed and single piece saddle made with high grade cast iron
- Increasing of stability and least distortion enabling heavy cuts and faster production
- Decreasing of vibrations for excellent surface finishing even on hard materials
- 3-points leveling system for higher rigidity and elimination of bed twisting
- Compact machine with reduced footprint

DX200 two-axis turning centre, is ideal for the production of parts in a single setup. Particularly flexible and equipped with a bi-directional tools-holder turret for drilling, boring and turning operations

Technical Data		DX100	DX200	DX350-1000
Feeds				
Turning diameter over bed	*mm*	470	500	740
Max. turning length	*mm*	200	500	1000
Max. turning diameter	*mm*	100 / 200	250 / 330	415 / 600
Max bar capacity	*mm*	44	52	65
X axis	*mm*	360	200	310
Z axis	*mm*	200	500	1000
Chuck diameter	*mm*	169	210	304
Spindle				
Spindle nose	*size*	$A_2$5	$A_2$6	$A_2$8
Drive power S1	*kW*	9,8	9,2	15,6
Material feed through	*mm*	38	52	298
Speed	*min⁻¹*	50 - 4500	50 - 4500	50 - 2500
Turret				
Number of tools	*pc.*	4 tools on table	12	12
Toolholder	*size*	-	VDI 30	VDI 30
Tool size	*mm*	-	20 x 20	25 x 25
Max. boring bar diameter	*mm*	-	32	40
Tailstock				
Tailstock quill - diameter	*mm*		85	100
Tailstock quill stroke	*mm*		120	120
Controling System		**Fanuc Oi-MF**		

All information is subject to change without notice

Tailstock

- Manual tailstock with hydraulic controlled quill in standard feature

Automatic tool probe

- Allows the measurement of tool gauges on the X and Z axes as well as the detection of tool breakage
- Mounted on a fully automated arm and controlled by the NC

Servo-turret

- Bi-directional servo-turret with high speed and accurate positioning
- Hydraulic clamping system achieved by Hirth coupling

Turning centre with steady rest (option)

Turning centre multi-axes

AX

Structure and axes

- Architecture with 45° slant bed
- High-quality cast iron structure for maximum stiffness
- Rigid and robust monoblock construction for excellent vibration damping
- Very high quality of surfacing
- Linear guide rails equipped with roller recirculating bearings to increase stiffness with feedrates up to 35 m/min
- Positioning accuracy and high repeatability thanks to the measuring scales on X and Z linear axes
- Machining of complex parts in one setup
- Linear scales standard on all axes

AX can be equipped with a C axis, a Y axis or a secondary spindle and is able to performe all types of turning and milling operations.

Technical Data		AX					
		200 M	200 MY	200 MSY	300 M	300 MY	300 MSY
Feeds							
Turning diameter over bed	*mm*	550			650		
Max. turning length	*mm*	330			420		
Max. turning diameter	*mm*	625			600 / 1200		
X axis	*mm*	200			254		
Y axis	*mm*	-	± 40		-	± 50	
Z axis	*mm*	625			625 / 1225		
Main Spindle (Motor spindle)							
Spindle nose	*size*	$A_2$6			$A_2$8		
Drive power	*kW*	9,2			28		
Material feed through	*mm*	175			65		
Speed	*min⁻¹*	4500			4000		
Max bar capacity	*mm*	52			65		
Opposed spindle (motor spindle)							
Spindle nose	*size*	-	-	$A_2$5	-	-	$A_2$6
Drive power / torque S1	*kW*	-	-	7 / 95	-	-	9,2 / 175
Max bar capacity	*mm*	-	-	65	-	-	65
Speed	*min⁻¹*	-	-	5000	-	-	4500
Chuck diameter	*mm*			170			210
Turret							
Number of tools/driven	*pc.*	12			12		
Toolholder	*size*	BMT45			BMT55		
Speed	*min⁻¹*	4500			4000		
Drive power (Siemens/Fanuc)	*kW*	4,8			4,8		
Tailstock (type)							
Taper		MT3			MT4		
Tailstock quill stroke	*mm*	630		-	620		-
Tailstock quill diameter	*mm*	85		-	130		-
Control		**Fanuc Oi-MF**					

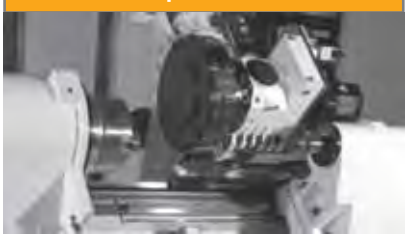
All information is subject to change without notice

Turret

Bi directional 12 stations turret equiped with BMT toolholder attachments

AX 300 with motorized tailstock

Electrospindle + Chuck



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www.alfleth.com

Universal OD/ID Cylindrical Grinders

K10

FEATURES

- Price-Performance Ratio - Unmatched value for performance and function in market
- BLUE Solution Software on a 19” touch display
- Guided programming and retooling, even for inexperienced operators
- The standard machine for beginners and experts in the precision grinding segment
- Designed for workpieces smaller than Ø 400 mm x 1000 mm
- Between tips up to 100 kg, Flying up to 80 kg

Technical Data		K10
Specifications		
Distance between centres	*mm*	1000
Centre height	*mm*	200
Workpiece weight between centres	*kg*	up to 100
Load on chucked work	*Nm*	up to 100
Input voltage	*V*	400 / 460
Power requirement	*A*	up to 40
Space requirement	*m*	2.7 x 2.2 / 3.5 x 2.2
Total weight	*kg*	4,000
Longitudinal slide: Z-axis		
Travel	*mm*	1.150
Rapid traverse speed	*m/min*	up to 20
Resolution	*mm*	0,00001
Wheelslide: X-axis		
Travel	*mm*	365
Rapid traverse speed	*m/min*	up to 10
Resolution	*mm*	0,00001
Swivel devices w		
Swivelling range	*degrees*	240
Automatical indexing Resolution	*degrees*	1
Grinding head		
Water-cooled drive motor	*KW*	7,5
Power Peripheral speed	*m/s*	up to 50
Grinding wheel dimensions	*mm*	up to Ø 500 x 80
Internal grinding attachment		
Locating bore	*mm*	150
Power HF spindle SI	*KW*	up to 7.5
Speed range	*min^{-1}*	up to 60000
Workpiece headstock		
Rotation spindle speed	*min^{-1}*	1 - 1000
Speed range		ISO 702-1, Size .5/MK5
Roundness accuracy in chucked work	*µm*	0.4 (optional 0.2)
Tailstock		
Internal taper		Mk4
Retraction of sleeve	*mm*	49
Micro-adjustment	*µm / Ø*	± 60

All information is subject to change without notice

Universal OD/ID Cylindrical Grinders

K100

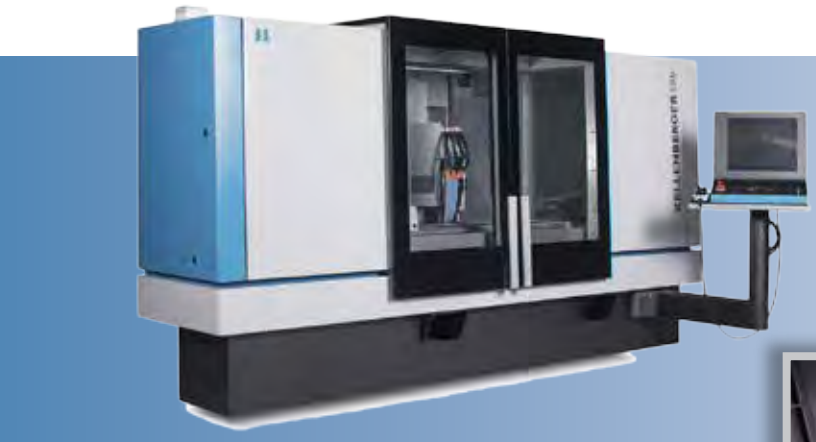
FANUC 31i-B

FEATURES

- Global innovation of a new grinding wheel-head with choice of 10 wheelhead versions
- Redesigned Z-guideways
- Greater profile accuracy
- C-axis with direct drive
- Increased accuracy for noncircular grinding
- Extended options available as standard
- Integrated automatic technology calculation
- Consistent operator guidance
- Simple and convenient training

Technical Data		K100
Specifications		
Distance between centres	*mm*	600 / 1000
Centre height	*mm*	200
Workpiece weight between centres	*kg*	100 / 150
Load on chucked work	*Nm*	100 / 200
Input voltage	*V*	400 / 460
Power requirement	*A*	35-63
Space requirement	*m*	2620 x 2170 / 3400 x 2170
Total Weight	*kg*	3600 / 4000
Longitudinal slide: Z-axis		
Travel	*mm*	750 / 1150
Rapid traverse speed	*m/min*	20
Resolution	*mm*	0,0001
Wheelslide: X-axis		
Travel	*mm*	365
Rapid traverse speed	*m/min*	10
Resolution	*sec*	0,00001
Swivel devices		
Swivelling range	*degrees*	280°
Swivelling time	*sec*	1
Automatical indexing	*degrees*	1
Resolution B-axis	*sec*	0.1
Grinding head		
Water-Cooled Motor Spindle	*KW*	11,5
Peripheral speed	*m/s*	50 / 63 (option)
Grinding wheel dimensions	*mm*	Ø 500
Internal grinding attachment		
Locating bore	*mm*	Ø 150
Power HF spindle SI	*KW*	4.2 - 15
Speed range	*min⁻¹*	4500 - 90000
Workpiece headstock		
Resolution C-axis	*degrees*	0,00003
Speed range	*min⁻¹*	1 - 1000
Drive torque	*Nm*	up to 63
Interface		ISO 702-1, Size .5/MK5
Roundness accuracy in chucked work	*µm*	optional 0.2
Tailstock		
Internal taper		Mk4
Retraction of sleeve	*mm*	49
Micro-adjustment	*µm*	±60 and ±120

All information is subject to change without notice



KELLENBERGER®

L. Kellenberger & Co. AG
www.hardinge.com

Universal OD/ID Cylindrical Grinders

K1000

Best in class for Taper-, Thread-, Profile- and out of Round Grinding

Features the newest generation of hydrostatic guideways for superb precision and productivity.

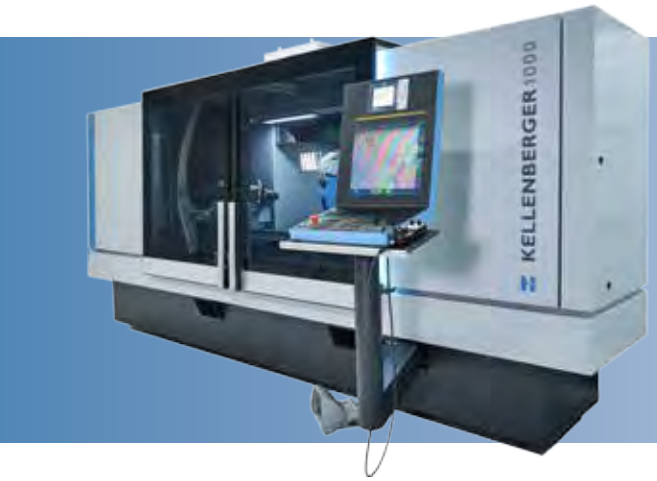
More extensive machining possibilites:

- Out-of-Round
- Profiles
- Thread grinding
- Jig grinding
- Numerous sensors and measuring systems

Heidenhein GRINDplus 640

FANUC 31i-B

Technical Data		K1000
Specifications		
Distance between centres (Grinding length)	*mm*	1000 / 1600 (1000 / 1500)
Centre height	*mm*	200 / 250 / 300
Weight of workpiece between centres	*kg*	150 / 200 / 300
Load on chucked work	*Nm*	160 / 320 / 750
Mains voltage required	*V/Hz*	3 x 400 / 50 - 3 x 460 / 60
Power consumption depending on equipment	*A*	35-63
Space required / length x width	*mm*	3600 x 2050 / 4600 x 2050
Longitudinal slide: Z-axis		
Travel	*mm*	1170 / 1670
Rapid traverse speed	*m/min*	20
Resolution	*µm*	0,1
Wheelslide: X-axis		
Travel	*mm*	365
Rapid traverse speed	*mm*	10
Resolution	*mm*	0.0001
B-axis		
Resolution	*degrees*	0.00002
Swiveling range	*degrees*	max. 240
Wheelhead general		
Drive motor water-cooled	*kW*	10
Peripheral grinding wheel speed	*m/s*	max: 45
Wheelhead Universal		
Grinding wheel dimensions, left - righthand side	*mm*	400 / 500 - 300 / 400 / 500
Wheelhead Tandem-type		
Grinding wheel dimensions, left - righthand side	*mm*	400 / 500 -400 / 500
Wheelhead Diagonal		
Grinding wheel dimensions, left - righthand side	*mm*	400 / 500 - 400 / 500
Internal grinding attachment		
Bore for spindles up to	*mm*	120
HF spindles MFM	*kW*	10 / 15
Rotational speed 1224 / 42 (1242 / 60)	*min^{-1}*	42000 (60000)
Workhead Standard / Direct drive 200 / 300		
Rotational spindle speed	*min^{-1}*	1 - 1000 / 1 - 1000 / 1 - 500
Internal taper		MT5 / MT5 / MT6
Short taper holder, outside	*degrees*	ISO 702-1: Size 5 / Size 5 / Size 8
Micro-adjustment	*sec*	±60
Tailstock		
Internal taper		MT4
Retraction of sleeve	*mm*	50 optional 80
Micro-adjustment	*µm*	±150
		All information is subject to change without notice



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Some wheelhead options

UR 1-3

K10 K100 K1000

UR 1-2-3

K10 K1000

R 1

K100 K1000

R 1-2

K1000

UR 1-6-7

K100 K1000

UR 1-2-6-7

K1000

RS 2

K100 K1000

RS 1-2

K1000

URS 2-3

K100 K1000

URS 2-6-7

K100 K1000

R-RS 1-5

K100 K1000

R-RS 1-2-5

K1000

R-RS 1-2-4-5

K1000

UR RS 1-5-8

K1000

2R 1-4

K100 K1000

2RU 1-4-6

K100 K1000

RS-R 2-4

K1000

RS-R 1-2-4

K1000

RS-R 1-2-4-5

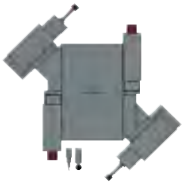
K1000

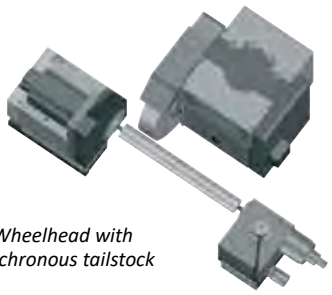
URS R 2-4-5

K1000

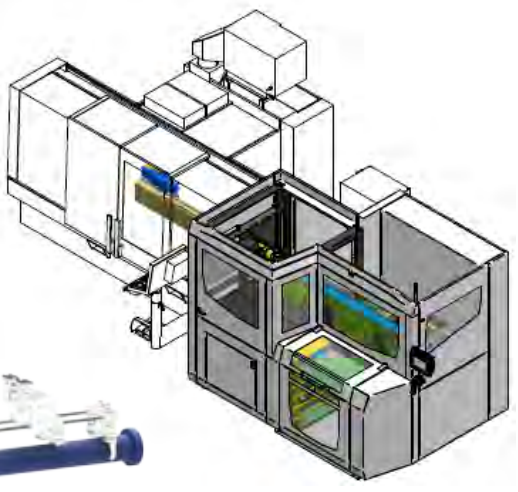
2RS 2-5

K100 K1000

2RU 1-2-4-6

K100 K1000


Wheelhead with synchronous tailstock

Some automation solutions




Chuck part gripper


Shaft gripper


Shaft gripper


Long shaft gripper

Universal OD/ID Cylindrical Grinders

T35

TSCHUDIN

Modular cylindrical grinding machine, satisfying the most varied applications needs in the production of medium and large series.

Technical Data		T35
Specifications		
Distance between centers	*mm*	400
Grinding length	*mm*	400
Centre height	*mm*	125 / 175
Max. workpiece diameter	*mm*	249
Workpiece weight		
Between centres	*kg*	150
Base / Table slide		
Travel Z- axis	*mm*	600
Rapid traverse	*m/min*	15
Resolution	*µm*	0,1
Upper table		
Swivelling range	*degrees*	+/- 6°
Wheel slide		
Travel X- axis	*mm*	350
Rapid traverse	*m/min*	7,5
Resolution	*µm*	0,1
Wheelhead OD		
Wheel (appl. spez.)	*mm*	400 - 500 x 80 x 203,2
Diameter	*mm*	up to 600
Width	*mm*	up to 120
Optional	*mm*	500 x 120 x 203,2
Peripheral roller bearing	*m/s*	0 - 120
Peripheral hydrodynamic	*m/s*	45 / 60
Spindle speed	*min^{-1}*	V const (opt.)
Motor output	*kW*	10 (opt. bis 20)
Workhead		
Spindle speed	*min^{-1}*	5 - 1500 (opt. 3000)
Motor output	*kW*	2,1
Spindelnose taper		MK5 / Ø70mm // MK6 / Ø90mm
Spindlenose bore	*mm*	34
Spindle torque	*Nm*	20
Tailstock		
Sleeve retraction	*mm*	80
Internal taper		MT3
Control		Siemens

All information is subject to change without notice

FEATURES

- Axes configuration
- Straight or angular
- Range +6° to -30° configurable
- Burr-free grinding
- Production of sharper, burr-free edges
- Prismatic grinding system
- Shortest part changing time, rapid retooling
- Fully integrated handling with modular peripherals and great autonomy
- Match grinding
- Automatic cylindrical correction within 0.1µm range
- High precision parts can be finish-ground directly from hardened bar stock
- Hydrostatics with holding device X and Z guideways
- No stick slip
- Wheelhead
- Hydrodynamic spindle bearings
- Roller bearing variant for applications up to 120 m/sec.
  Grinding wheels 400 - 600 mm
- Tailstock in manual or automatic versions
- Version for automatic taper correction
- Workhead MT5 and MT6 versions in modular construction
- Synchronously running workheads left and right for special grinding applications
- Dressing device
- Formed dressing roll unit installed behind workhead, tailstock or on the table
- CNC controlled profiling roll unit fitted behind the wheelhead

Cylindrical ID/OD Grinders

VM1000

VOUMARD

FANUC 31i

The new standard in ID Grinding!

FEATURES

- Innovative HYDROLIN®
- Hydrostatic Guideways
- Linear Motor with Thermodynamics
- New Kinematic Machine Design with Two Linear and Two Rotary Axis
- Reduce to two high end axis with positioning in sub micron range
- Compact Machine Design
- Control Fanuc31i with Blue Solution
  (Black Solution for CAM Functionality also available)

Technical Data		VM 1000
Specifications		
Max. workpiece length	*mm*	150 / 300
Swing diameter	*mm*	<300
Max. workpiece diameter	*mm*	<150 / <300
Power consumption	*V*	400 / 460
Supply voltage	*A*	35-80
Atmospheric pressure	*bar*	5,5
Total weight	*kg*	5700 / 5800
Floor loading	*N/m²*	9300 / 8100
X- / Z-axis		
Travel	*mm*	450
Speed	*m/min*	<20
Resolution	*mm*	2.5×10^{-6}
B axis		
Instrument / Workpiece swivel range	*degrees*	330 / 225
Resolution	*degrees*	1×10^{-3}
Turret wheel head		
Rotational speed range (depending on the spindle)	*min⁻¹*	<120000
Max. number of spindles	-	4
Peripheral speed	*m/s*	50
Internal grinding wheel	*mm*	max. 150 x 40
Max. internal grinding length	*mm*	150 / 250
Mounting hole of the internal grinding spindle	*mm*	150
External grinding wheel	*mm*	300 x 40
Max. external grinding length	*mm*	150
Work head		
Rotational speed range	*min⁻¹*	1 - 1000 / 1 - 3000
Mounting cone	-	MK5 / -
External short taper adapter	-	ISO 702-1, Size 5 / Size 3
Workpiece weight	*kg*	<200 / <50
Load on chucked work	*Nm*	<320 / <100
Resolution	*degrees*	1×10^{-3} / -

All information is subject to change without notice

Jig Grinders

H45-55

HAUSER

Expandable jig grinding machine, from simple bore and form grinding machine to fully automatic high-tech grinding and hard milling cell.

FANUC 30i

Technical Data		H45	H55
Work range			
Range of adjustment X, Y	mm	700 X 500	1300 x 800
Vertical adjustment of grinding head (W)	mm	500	635
Clearance between table surface and U-axis carrier plate for grinding motor	mm	max. 785	max. 905
Clearance between upright columns	mm	750	970
Diameter ground in planetary mode, with grinding wheel Ø 50 mm/70S:			
grinding motor 70S in U-axis center position, automatic grinding mode	mm	max. 144	max. 144
grinding motor 70S with extension plates, semi-automatic mode	mm	max. 360	max. 360
Diameter ground in planetary mode, with grinding wheel Ø 100 mm/40S:			
grinding motor 40S in U-axis center position, automatic grinding mode	mm	max. 194	max 194
grinding motor 40S with extension plates, semi-automatic mode	mm	max. 360	max. 360
Taper grinding, included angle (divergent and convergent)	degrees	max. 120	max. 120
Table			
Working surface	mm	770 x 630	1440 x 860
6/7 T-slots, width	mm	14	14
Permissible table load	kg	max. 500	max. 800 (1500)
Feeds			
Table and saddle X, Y, W			
Machining speed	mm/min	0 - 2000	0 - 2000
Traversing speed	mm/min	4000	4000
Grinding spindle Z, C, U			
Diameter of the spindle sleeve	mm	125	125
Basic machine is prepared for use of the following grinding spindle speeds:			
for electric grinding motor 40S, infinitely adjustable & programmable	mm^{-1}	4000 - 40000	4000 - 40000
for electric grinding motor 22S, infinitely adjustable & programmable	mm^{-1}	4500 - 22500	4500 - 22500
for electric grinding motor 45S, infinitely adjustable & programmable	mm^{-1}	9000 - 45000	9000 - 45000
for electric grinding motor 70S, infinitely adjustable & programmable	mm^{-1}	9000 - 70000	9000 - 70000
System to allow use of grinding turbine T13	mm^{-1}	up to 130000	up to 130000
C-axis planetary mode:			
Planetary mode, infinitely adjustable and programmable	mm-1	5 - 350	5 - 350
C-axis follow-up mode, AC servo drive	mm-1	up to 10	up to 10
Z-axis in alternating stroke mode:			
Z-alternating stroke movement, infinitely adjustable	mm/min	Vmax.0,500	Vmin.0,500
Z-alternating stroke movement, infinitely adjustable	mm/min	Vmax. 22000	Vmax. 22000
Z-stroke frequency	Hz	max. 8	max. 8
Z-stroke length, infinitely adjustable	mm	0,1 up to 170	0,1 up to 170
U-axis radial travel capacity (in CNC-mode)	mm	from -3 up to +47	from -3 up to +47
Accuracy			
Positional uncertainty of the axes X, Y and W (corresponding to VDI/DGQ 3441)	mm	0,0025	0,0025
		All information is subject to change without notice	

Jig Grinders

H2000

HAUSER

Universal jig grinder with proven technical features

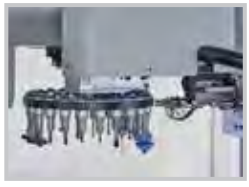
Such as:

- Automatic taper grinding
- Automatic grinding tool changer (ATC)
- Automatic pallet changer (APC)

It can be expanded easily to an autonomous grinding unit

FANUC 30i

Technical Data		H2000
Work range		
Range of adjustment X, Y	*mm*	550 x 300
Vertical adjustment of grinding head (W)	*mm*	450
Clearance between table top and U-axis reception face grinding motors	*mm*	max. 745
Clearance between table top and grinding motor reception nose (70HS)	*mm*	0 - 550
Diameter ground in planetary mode, with grinding wheel Ø 50 mm/70S:		
Grinding motor 70S in U-axis central position, automatic grinding mode	*mm*	max. 144
Grinding motor 70S in U-axis offset position, semi automatic mode	*mm*	max. 234
with extension plates	*mm*	max. 360
Diameter ground in planetary mode, with grinding wheel Ø 100 mm/40S:		
Grinding motor 40S in U-axis central position, automatic grinding mode	*mm*	max. 194
Grinding motor 40S in U-axis offset position, semi automatic mode	*mm*	max. 284
with extension plates	*mm*	max. 360
Taper grinding, included angle, divergent and convergent (Option)	*degrees*	max. 120
Table		
Working surface	*mm*	650 x 432
6 T-slots, width	*mm*	10
Permissible table load	*kg*	max. 300
Feeds		
Table and saddle X, Y:		
Machining / traversing speed	*mm/min*	0-4000 / 8000
Vertical traversing speed W:		
Machining / traversing speed	*mm/min*	0-4000 / 8000
Grinding spindle Z, C, U		
Diameter of the spindle sleeve	*mm*	125
Basic machine is prepared for use of the following grinding spindle speeds:		
for electric grinding motor 40S, infinitely adjustable & programmable	*min^{-1}*	4000 - 40000
for electric grinding motor 22S, infinitely adjustable & programmable	*min^{-1}*	4500 - 22500
for electric grinding motor 45S, infinitely adjustable & programmable	*min^{-1}*	9000 - 45000
for electric grinding motor 70S, infinitely adjustable & programmable	*min^{-1}*	9000 - 70000
System to activate grinding turbine T15	*min^{-1}*	150000
For electric slot grinding attachment, infinitely adjustable	*min^{-1}*	3900-18300
C-axis planetary mode		
Planetary mode, infinitely adjustable and programmable	*min^{-1}*	1 - 350
C-axis follow-up mode, AC servo drive	*min^{-1}*	up to 10
Z-axis in alternating stroke mode		
Z-alternating stroke movement, infinitely adjustable, from	*mm/min*	Vmin. 0,500
Z-alternating stroke movement, infinitely adjustable, up to	*mm/min*	Vmax. 26000
Z-stroke frequency	*Hz*	max. 10
Z-stroke length, infinitely adjustable	*mm*	0,1 up to 170
Z-axis in CNC mode		
Z-axis machining speed / traversing speed	*mm/min*	0-4000 / 8000
U-axis radial travel capacity in CNC mode	*mm*	from -3 to +47
Accuracy		
Positional uncertainty of the axes X, Y and W, P (corresp. to VDI/DGQ 3441)	*mm*	0,0015
Planetary grinding accuracy C		
Achievable roundness accuracy provided max care is taken	*mm*	0,0005
Room Temperature Conditions (essential to achieve stated accuracy)		
Ambient temperatur	*°C*	20 -0 / +2
Permissible temperature changes	*°C*	2° per 24 hours, (resp. 0.5° per hour)
Permissible temperature variations within the machine volume	*°C*	0,5°
Relative humidity	*%*	25-75
		All information is subject to change without notice



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Centre grinding machines

ZSS

Technical Data		ZSS I	ZSU S	ZSU L	ZSU SL	ZSU SF
Max. workpiece length (type I)	mm	1000	1000	1000	1000	1000
Max. workpiece length (type II)	mm	1500	1500	1500	1500	1500
Centre height	mm	165	160	160	160	200
Largest workpiece Ø	mm	325	320	320	320	180
Lapping area centring Ø	mm	1 - 120	-	1 - 120	1 - 120	-
Centring Ø	mm	-	1 - 170	-	1 - 120	1 - 170
Cone angle	degrees	60 / 90	60 / 90	60 / 90	60 / 90	60 / 90
Infinitely adjustable grinding spindle						
Speed I	rpm	27 - 440	10000 - 60000	30 - 440	20000 - 60000	10000 - 60000
Speed II	rpm	430 - 3450	-	430 - 3450	27 - 440 / 430 - 3450	-
Power	kW	0,75	0,45	0,75	0,45 / 0,75	0,45
Stroke	mm	60	60	60	60	60
Clamping Ø grinding spindle	mm	2 - 10	1 - 7	2 - 10	1 - 7 / 2 - 10	1 - 7
Tailstock						
Morse taper	MK	2	4	4	4	4
Load capacity	kg	50	160	160	160	160
Dressing spindle						
Dressing wheel Ø	mm	120	120	120	120	120

All information is subject to change without notice

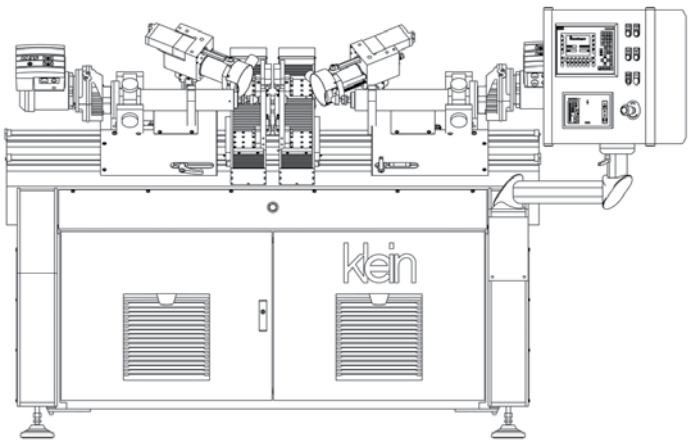
stepless variable spindel drive for centres Ø 1 - 120 mm

dressing device with dressing wheel

OPTIONAL

belt tensioner to hold the workpiece

ZSS DUO

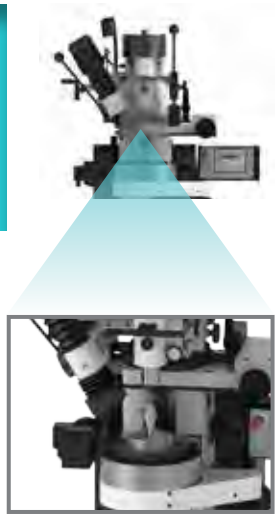


Technical Data		ZSS-A	ZSS-duo
Max. workpiece length type I	mm	600	50 - 600
Max. workpiece length type II	mm	-	-
Centre height	mm	165	165
Largest workpiece Ø	mm	100	325
Lapping area centring Ø	mm	2 - 50	1 - 120
Centring Ø	mm	-	-
Cone angle	degrees	60 / 90	60 / 90
Infinitely adjustable grinding spindle			
Speed I	rpm	100 - 440	27 - 440
Speed II	rpm	430 - 3450	430 - 3450
Power	kW	0,75	0,75
Stroke	mm	60	60
Clamping Ø grinding spindle	mm	2 - 10	2 - 10
Tailstock			
Morse taper	MK	2	-
Load capacity	kg	10	20
Dressing spindle			
Dressing wheel Ø	mm	120	120

All information is subject to change without notice

Centre grinding machines

ZSU



Centre Grinding

Roundness of the centre

< 1 µm

higher process stabilty

smaller grinding allowance

highest accuracy

lower reject rate

increased profitability

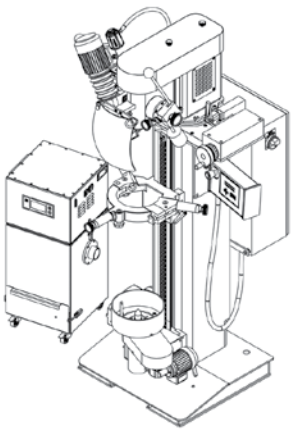
Centre Grinding Machine of the ZSU series

With all advantages of the ZSS as well as features such as

- Simultaneous roundness and runout accuracy
- For centres that have to be an offset
- Workpieces that have to run with the external diameter
- For heavy workpieces: ≤ 160 kg
- For large centres: ≥ 120 mm
- With hoist motor for tailstock

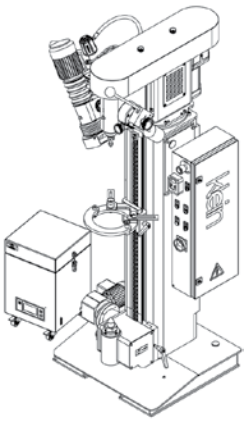
The Centre Grinding Machines from Klein Maschinenbau GmbH & Co. KG stand for many high end qualities.
However, when it comes to roundness, they are as brilliant and unique as no one else: the roundness measured in the centre hole comes down to 1 µm and below.

Moreover the ZSS and ZSU captivate the operator with their effortless and facile handling.
They for sure are the favorite pieces of many satisfied customers from a wide range of industries:
from automotive to tool manufacturers and many others in between.



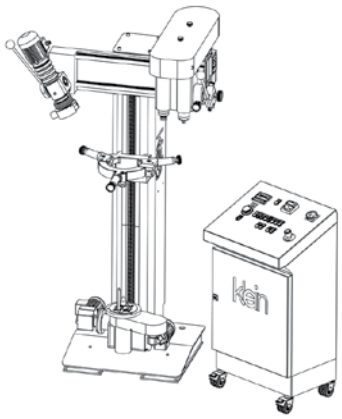
ZSU S

- Workpiece is turned by workpiece drive within steady rest
- Workpieces should be rough-ground at pivot point
- Possibility to swivel the grinding head



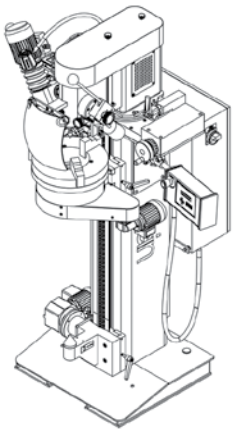
ZSU L

- Workpiece holder to secure large workpieces
- Workpiece is processed without piece centering
- Possibility to swivel the grinding head



ZSU SL

- Swivel-operated grinding heads
- Workpiece is turned by workpiece drive within steady rest (runout)
- Centres can be offsetted



ZSU SF

- Swivel-operated grinding head
- Grinding chuck with high precision bearing
- Simultaneous high runout and concentricity
- Axis adjusted & turned by an adjustable chuck

CNC - Rotary transfer machines

MTR

MTR200	3 axis machining above and below
MTR300/H	3 axis / 4 axis machining
MTR400H	Machining on 5 faces with C axis and horizontal spindles
MTR400HR	5 sides machining with 4-axis interpolation

PRECISION

- Workpiece machining in one clamping operation
- Numerically controlled rotary table
- Innovative PRECITRAME palletisation system
- Repeat accuracy in µ range

MODULARITY

- Sophisticated modular machine design with 5 to 20 stations
- Modular stations for milling and turning
- Compatible with all Precitrame machining units
- Easy configuration changing and high upgrade flexibility

FLEXIBILITY

- CNC design with state-of-the art control unit
- Up to 62 axes and more than 50 tools are simultaneously available
- Short changeover times; workpiece pallets and tools quickly changeable
- Machining concept for parts families and high-volume production
- Batch sizes from 500 to several million

ECONOMY

- Designed for the highest productivity
- Long-term safeguarding of investment thanks to dynamic configuration (possibility of adapting the system to requirements)

The autonomous automated robotic cell CA61 is the ultimate solution in terms of robotic and automation for PRECITRAME transfer machines.

ALFLETH ENGINEERING

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www.alfleth.com

Machining units

- Spindle speed from 2500 to 40,000 min^{-1}
- Drive power 0.5 kW to 5.5 kW
- Spindle nose HSK25, HSK32 und HSK40
- Internal coolant feed to max. 150 bar
- Minimum quantity lubrication air/oil

UV160-3

UV160-4

UH160-3

UH200-3

Technical data		UV160-3	UV160-4	UH160-3	UH200-3
X / Y / Z axis	*mm*	120 /160 /130			200 /200 /120
A axis	*degrees*	-	0 - 30	-	-
Rapid traverse	*m/min*	20	20	20	15
Max. number of spindles		4	2	1 to 2 horizontal	1 to 3 horizontal
				1 to 4 vertical	1 to 6 vertical
Precision	*mm*	0,001	0,001	0,001	0,001
					All information is subject to change without notice

Automated transfer finisching

CP

Technical Data	920T	940T
Type	Belt grinding, lapping, polishing, felting	
Stations /tools per station	2 /1 to 2	4 /1 to 2
Tool type	Belt, grinding wheel, disc, lapping plate	
Loading	Manual or automatic	
Max. workpiece size /weight	Ø 160 mm diamether sphere / 4 kg	
Robot /Software	Stäubli TX90 / CyberMotion 5	
Sound level in dB	< 75	
Cell dimensions 4 stations *(in mm)*	3100 x 2900 x 2600	4000 x 4550 x 2700
Weight in kg	2500	4000
	All information is subject to change without notice	

Fields of application:

Watchmaking, electronics, medical, aeronautics,energy, etc.

CyberMotion 5
High-performance trajectory tracking

- New high-performance trajectory tracking kernel with 4 trajectory tracking modes, of which 2 are optional advanced modes
- Integrated trajectory creation and modification module
- Multi-robot control, up to 6 robots (5 working robots, one loading robot)
- Internal coolant feed to max. 150 bar
- Robot axis speed validation

Options and accessories

- Automated loading cell
- NC rotation spindle with position and speed control
- Numerically adjustable station base (7th axis)
- Integrated measurement
- Carding and wireless measuring
- Spray cooling or minimum quantity lubrication
- ATEX extraction
- Intermediate cleaning station
- Preparation, editing and simulation on offline station
- Automatic calibration of tools and stations
- Production monitoring by batch and MO management
- Two advanced traverse tracking modes

Micromachining center

Technical data		K5-3	K5-4	K5-5
Type		HSC milling		+turning
Number of axes		3	4	5
Machinable volume	mm	50 x 50 x 50		
Course of X/Y/Z axes	mm	78 / 56 / 50		
Rotary axis B		-	+/- 90° / 400 rpm	
Rotary axis C		-	-	360° / 5000 rpm
Tool changer		Up to 54 HSK-15 positions, optional intermediate buffer for 3 tools		
Electrospindle	rpm	60000 Kummer		
Loading		Manual or automatic; blank or micro-rods		
Controller / HMI		Beckhoff / Precitrame Machine Manager (PMM) (available in 2022)		
Cooling / vapour extraction		Fully integrated system		
Pneumatic supply		6-10 bar, purity class 4/5		
Cold water supply	L/min	<18°C, 5 L/min		
Overall dimensions	mm/kg	1300 x 900 x 2300 mm / 1000 kg		

All information is subject to change without notice

Fields of application:

Watchmaking, electronics, medical, aeronautics,energy, etc.

- Reduced floor space and energy consumption
- High-speed machining with 2.5G accelerations of the machining axes
- Automatic tool changer up to 54 positions and intermediate buffer for 3 tools
- Compatible with several clamping interfaces on the market

Options and accessories

- Additional vertical axis (W)
- Optical tool breakage detection
- Automatic fire extinguisher system
- Automated system for loading and unloading
- Tool changer with 18, 36 or 54 positions

MCK flexible microcell machining concept

MCK this set can be composed of different t ypes of K5 machines. In addition to the machining modules, this flexible cell can also integrat e, for example, dimensional, qualit at ive measurement, marking or washing. Automation linking the different workstations ensures aut omatic funct ioning and flexible installation. This cell resembles a microfactory,because several operating modes can be selected.

- High productivity, whereby the cell is intended for one part.
- Machining on demand, several parts are machined as needed.
- Small batch machining, whereby each module produces a different type of part.
- Combined modes, with operation adapted to the needs of the customer.

ALFLETH ENGINEERING

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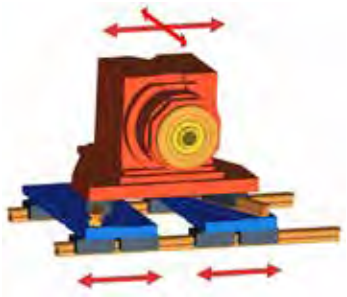
Compact high dynamics side autoloading chucker

KUMMER

K50

Technical data		K50
Strokes X/Z	mm	100 / 50
Guideways		High precision central-lubricated preloaded roller bearings
Drives		Linear motors
Acceleration	m/s²	10
Rapid override	m/min	50
Scales		Direct reading on optical scale
Resolution	µm	0,01
Workheads		From 8000 to 20000 rpm, direct drive with ball or hydrostatic bearings
Controler		Siemens 840 Dsl
Floor space / weight		1280 x 800 / approx. 1800 kg
		All information is subject to change without notice

Linear slides kinematics



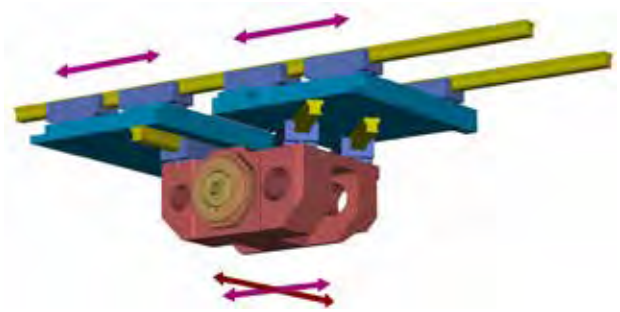
High precision front loading chucker

KUMMER

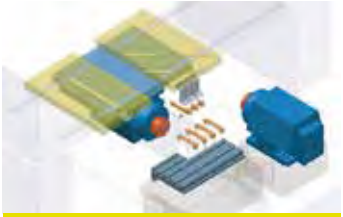
K250

Technical data		K250
Strokes X/Z	mm	250 / 100
Guideways		High precision central-lubricated preloaded roller bearings
Drives		Linear motors
Acceleration	m/s²	10
Rapid override	m/min	Jusqu'à 60
Scales		Direct reading on optical scale
Resolution	µm	0,01
Workheads		From 8000 to 12000 rpm, direct drive with ball or hydrostatic bearings
Controler		Siemens 840 Dsl
Floor space / weight		4250 x 3215 mm / env. 7000 kg
		All information is subject to change without notice

Linear slides kinematics



Single spindle SOLO



Double spindle DUO2

Double spindle DUO4

Double spindle TANDEM

Conventional grinding machines

OMICRON

The range of Conventional Universal Cylindrical Grinding is composed of:

Model R - Light Version
Model E - Suitable for heavier work

- Main handwheel with division of 0.01 mm on diameter
- 2 axis digital readout (SPACE 2000)
- Automatic Zero Stop
- Incremental linear encoder for wheelhead micropositioning
- Incremental linear encoder for table micropositioning

Technical Data		OMICRON				
		R		E		
		600	1000	600	1000	1500
Max. distance between centres	mm	600	1 000	630	1030	1530
Max. grinding length	mm	600	1 000	630	1030	1530
Max. centre height	mm	160		180 / 230*		
Max. swing	mm	315		355 / 455*		
Max. workpiece weight between the tips	kg	120		250 / 300*		
Table						
Max. automatic table movement	mm	680	1 080	780	1 180	1 680
Table speed	m/min	0 - 5		0 - 5		
Swivel table	degrees	+ 9 /- 5	+ 8 /- 4	+ 9 /- 5	+ 8 /- 4	+ 7 /- 3
Headstock						
Headstock speed range	rpm	30 - 600		0 - 600		
Max. spindle bore	mm	26		31		
Internal cone	MK	4		5		
External cone	ASA	5		5		
Headstock, swivelling	degrees	90		90		
Tailstock						
Stroke	mm	25		35 - 70*		
Spindle diameter	mm	43		48		
Internal cone	MK	4		4		
Grinding spindle						
Grinding wheel (D x d)	mm	450 x 127		450(500*) x 127		
Grinding wheel width	mm	20 - 50		20 - 80		
Grinding spindle head, swivelling	degrees	-20 / 180		-20 / 180		
Internal grinding		Option				

*Upon request ** for hydraulic tailstock All information is subject to change without notice

Optional rear guard

The following parameters are set on the touch screen panel encoder:

- Workhead and wheelhead speeds
- Automatic cycle parameters, for example:
  - Dwell time at reverse
  - Number of spark-out passes.

Manual Handwheel for Table and Workhead Feeds

- Main handwheel with division of 0.01 mm on diameter
- Micrometric handwheel with division of 0.001 mm on diameter
- Automatic Zero Stop

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Semi- automatic grinding machines

OMICRON T7

Standard operator panel

Optional operator panel

Standard Programs	OD	ID
Pass	✓	✓
Plunge	✓	✓
Multi-Plunge	✓	
Facing	✓	✓
Multi Diameter	✓	✓

No hydraulic movement

The semi-automatic grinding machines Robbi are driven by brushless motors The movements are driven by a ball screw. The manual micrometric movements are performed by multi-scale electronic flyers.

This implies:

- More constant speed movements
- More stiffness
- Greater positioning accuracy

Semi-Automatic Grinding Machines Software

- CNC based software developed on the last SIEMENS CNC 840 D SL
- Self teach of table positions
- Touch panel with easy interface
- Improved axis positioning and quick response
- Availability of axis interpolation
- Parametrical program for pass and plunge grinding

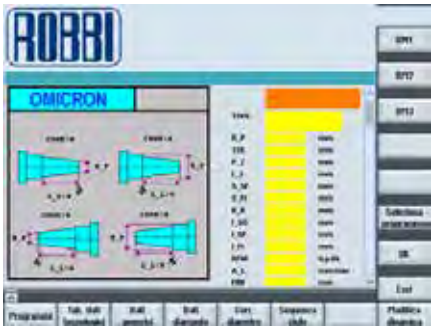
In process measuring gauge and gap control systems (On Request)

Technical Data		OMICRON T7														
		R		E				P				M				
		600	1000	600	1000	1500	2000	1000	1500	2000	3000	2000	3000	4000	5000	6000
Distance between centres	mm	600	1000	630	1030	1530	2030	1350	1750	2250	3150	2000	3000	4000	5000	6000
Grinding length	mm	600	1000	630	1030	1530	2030	1100	1600	2100	3000	2000	3000	4000	5000	6000
Centre height	mm	160		180 / 230*				300 / 350*				400 / 500*				
Swing over table	mm	315		355 / 455*				595 / 695*				795 / 995*				
Weight on centers	kg	120		250 / 300*				1 200				4 000				
Table																
Automatic tablemovement	mm	680	1080	780	1180	1680	2180	1150	1650	2150	3050	2200	3200	4200	5200	6200
Speed	mm/min	0 - 5000		0 - 5				0 - 4				0 - 4				
Swivel on eather side	degrees	+ 9 /- 5	+ 8 /- 4	+ 9 /- 5	+ 8 /- 4	+ 7 /- 3	+ 6 /- 2	8/-3	7/-2	6/-2	5/-1	6/-2	5/-1	4/-1	3/-1	2/-1
Headstock																
Headstock speed range	rpm	0 - 600		0 - 600				0 - 300				0 - 150				
Spindle hole diameter	mm	26		31				44				70				
Internal taper	MK	4		5				6				80				
External taper	ASA	5		5				8				8				
Headstock, swivelling	degrees	90		90				90				90				
Tailstock																
Stroke	mm	25 (50*)		35 - 70**				70				80				
Spindle diameter	mm	43 (70*)		48				80				120				
Internal cone	MK	4		4				5				6				
Grinding spindle																
Grinding wheel (D x d)	mm	450 x 127		450 x 127				610 x 203/305*				760 x 305				
Grinding wheel width	mm	20 - 50		20 - 80				50 - 100				50 - 150				
Grinding spindle head, swivelling	degrees	-20 / 180		-20 / 180				-20 / 180				-20 / 180				
Internal grinding		Option														

Upon request* * for hydraulic tailstock* *All information is subject to change without notice*

CNC grinding machines

OMICRON CNC



Shoulder grinding in 3 modes

- Manually
- Automatically
- Automatically with gap control

Dressing programming

The dressing operation may be executed:

- Outside the grinding cycle
- Automatically inside the grinding cycle (beginning before finishing or end of cycle),
- Automatically using a cycle counter
- On demand, during the grinding cycle

Standard Programs	OD	ID
Pass	✓	✓
Plunge	✓	✓
Facing	✓	✓
Multi diameter	✓	
Angular plunge	✓	✓
Taper	✓	✓

The power of the CNC and the process simplicity

- Work cycle can be optimised in-process with geo-metrical and working parameters.
- Latest-generation of SIEMENS 840D sl control system
- Can be equipped with automatic measurement devices to process complex components
- Optional third interpolated axis and a bespoke soft-ware for high precision crowning operations.

Technical Data		OMICRON CNC														
		32XX		36XX				60XX				80XX				
		3206	3210	3606	3610	3615	3620	6010	6015	6020	6030	8020	8030	8040	8050	8060
Max. distance between centres	*mm*	600	1 000	630	1 030	1 530	2 030	1 350	1 750	2 250	3 150	2000	3 000	4 000	5 000	6 000
Max. grinding length	*mm*	600	1 000	630	1 030	1 530	2 030	1 100	1 600	2 100	3 000	2000	3 000	4 000	5 000	6 000
Max. centre height	*mm*	160		180 / 230*				300 / 350*				400 / 500*				
Max. swing	*mm*	315		355 / 455*				595 / 695*				795 / 995*				
Max. workpiece weight between the tips	*kg*	120		250 / 300*				1 200				4 000				
Table																
Max. automatic table movement	*mm*	680	1 080	780	1 180	1 680	2 180	1 150	1 650	2 150	3 050	2200	3 200	4 200	5 200	6 200
Table speed	*m/min*	0 - 5		0 - 5				0 - 4				0 - 4				
Swivel table	*degrees*	+ 9 /- 5	+ 8 /- 4	+ 9 /- 5	+ 8 /- 4	+ 7 /- 3	+ 6 /- 2	8/-3	7/-2	6/-2	5/-1	6/-2	5/-1	4/-1	3/-1	2/-1
Headstock																
Headstock speed range	*rpm*	30 - 600		0 - 600				0 - 300				0 - 150				
Max. spindle bore	*mm*	26		31				44				70				
Internal cone	*MK*	4		5				6				80				
External cone	*ASA*	5”		5”				8”				8”				
Headstock, swivelling	*degrees*	90		90				90				90				
Tailstock																
Stroke	*mm*	25		35 - 70**				70				80				
Spindle diameter	*mm*	43		48				80				120				
Internal cone	*MK*	4		4				5				6				
Grinding spindle																
Grinding wheel (D x d)	*mm*	450 x 127		450 x 127				610 x 203/305*				760 x 305				
Grinding wheel width	*mm*	20 - 50		20 - 80				50 - 100				50 - 150				
Grinding spindle head, swivelling	*degrees*	-20 / 180		-20 / 180				-20 / 180				-20 / 180				
Internal grinding		Option														

Upon request* * for hydraulic tailstock* *All information is subject to change without notice*

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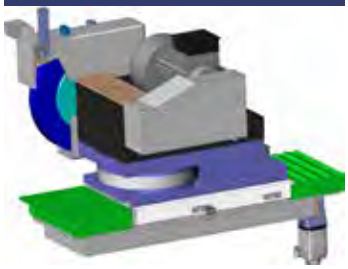
Accessories

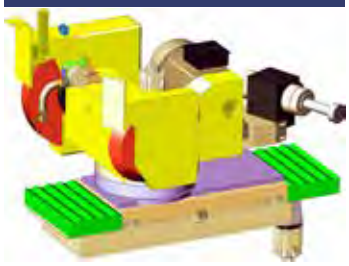
Some examples of Wheelhead Customization

1 External (Standard)



1 External + 1 Internal

2 External + 1 Internal



2 External + 1 Internal

Internal grinding attachment in two versions

Drop down over wheel head

On rear side of wheel head

Robbi Group offers a large range of internal grinding spindles that can be:

- Belt driven spindles up to 42,000 RPM
- Electric spindles up to 120,000 RPM

Tailstock Options

- Manual opening
- Hydraulic opening
- Hydraulic opening / closure and micrometric correction of the cylindricity

Workhead Customization

Customization	S	R
Manual	✓	
Manually with DRO		✓
Manually with indexing 1” hirth coupling		✓
Automatically with indexing 1” hirth coupling		✓

Measuring systems and controls

Workpiece setting

In Process measuring System

Gap control

The grinding machines may be equipped with measuring systems to:

- Detect sub-micron contacts (gap control)
- Monitor constantly the work to prevent collision (anti-crash)
- Generate feedback signals for adaptive control actions

Grinding wheel balancing

Continuously monitors the machine conditions and in in real time compensates eventual grinding wheel umbalance.

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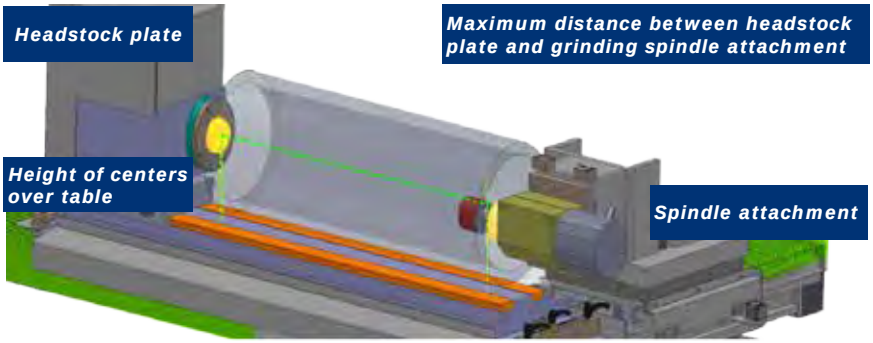
Semi-automatic and CNC internal grinding machines

OMICRON IGR

Technical Data		OMICRON	
		IGR-250	600
Max. grinding diameter	mm	250	600
Centre height	mm	180 / 230*	300/350*
Max. distance headstock - grinding spindle	mm	1 000	1000
Internal grinding spindle - diameter	mm	100	100
Table speed	mm/min	0 - 6000	0-4000
Swivel table	degrees	8	8
Headstock speed range	rpm	0 - 600	0-300
Maximum chuck diameter	mm	250	400
Grinding spindle - motor	kW	3	3
Headstock - motor	kW	1,5	4
Front side - grinding apparatus			
Max. grinding diameter	mm	355	355
Grinding wheel diameter	mm	125	125
Inclination	degrees	10	10
Grinding spindle - motor	kW	1.1	1.1
** Upon request*		*All information is subject to change without notice*	



Semi- Automatic

SIEMENS TP700

Standard Programs	
Pass	✓
Plunge	✓
Facing	✓
Multi diameter	
Angular plunge	✓
Taper	✓

CNC

Latest-generation of SIEMENS 840D sl

Standard Programs	
Pass	✓
Plunge	✓
Facing	✓
Multi diameter	✓
Angular plunge	✓
Taper	✓

Facing grinding device

Cup wheel

Periferical wheel

Automatic grinding cycles plunge and plunge and pass with parameters:

- Automatic increments – rough and finish, for pass grinding cycles
- Automatic feeds – rough and finish, for plunge grinding cycles
- Stock removal - rough and finish
- Dwell - table inversion
- Sparkout time
- Sparkout pass

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Semi-automatic and CNC internal grinding machines

OMICRON IGU

Technical Data		OMICRON IGU-400
Center heght	mm	325
Rotating diameter	mm	650
Workpiece lenght	mm	300
Internal grinding depth	mm	200
External grinding diameter	mm	200
Spindle turret positioning		
Max number of spindles		4
Turret diameter	mm	120
Swiveling range	degrees	-5 / +275
Swiveling time for 180 deg	sec	<10
Work head		
Spindle speed	rpm	1 - 800
Spindle taper	MK	5
Spindle bore diameter	mm	35,5
Driving power	kW	1,6
** Upon request*	*All information is subject to change without notice*	

Z AXIS		
Max travel	mm	650
Max speed	mm/min	10000
Resolution	mm	0,0001

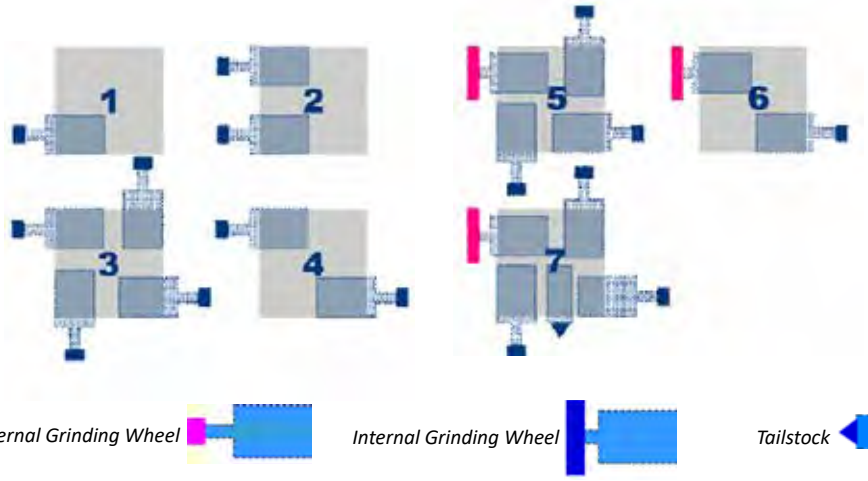
X AXIS		
Max travel	mm	450
Max speed	mm/min	10000
Resolution	mm	0,0001

B AXIS		
Swiveling Range	degrees	+30 / -20
Repetition accuracy	mm/min	10000
Resolution	mm	0,001

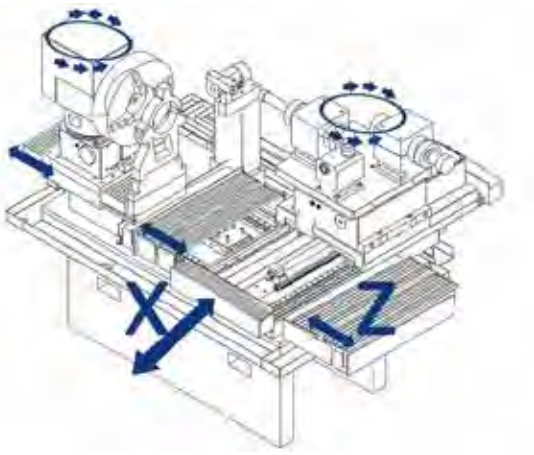
Up to 4 grinding spindles on Rotating Turret

An important component of the Internal Grinding Machine IGU 400 is represented by the spindle turret that, in the maximum configuration, can be equipped with:

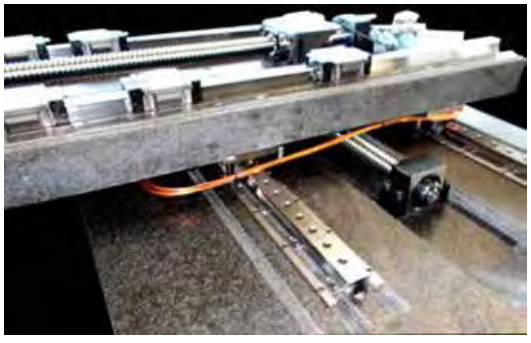
- 4 spindles (one of which for external)
- 4-spindles for internal grinding
- Tailstock to facilitate the grinding bore centering



FLEXIBILE X AND Z AXIS



- Granite Base
- Roller Linear Guides
- Incremental linear encoder on both Axis
- High Precision Re-circulating ball screws



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CNC tool grinding and regrinding machines

ARIES

Long tools

Large diameters

Ultra-precision tools

Small tools like burrs

ariesNGP maximum flexibility thanks to innovative 5-axis concept. Ideally suited for the re-sharpening of universal cutting tools, as well as the production of small series.

Smallest 5-axis grinding machine

- NGP W x H x D: 990 (+280*) x 1750 x 1640
- NGP⁺ W x H x D: 1190 (+280*) x 1900 x 1790

** coolant unit*

ariesNGP4 4-axis processing of large and long tools. Ideally suited to the re-sharpening of hobs, profile end mills, dovetail end mills and planing heads.

3D machine simulation

Kinematic simulation and collision checking of Quinto Qg1 provides safety. All of the machine movements and elements are considered, including 3D probe, grinding wheels, tailstock, steady rest and fixturing.

Integrated Tool Loader

Easy management of various tool types per pallet, almost unlimited number of pallets in the program memory. Collet chucking system W20 or W25.

Technical Data		aries		
		NGP	NGP⁺ tools up to ø 400mm	NGP4
Axes		5-axis CNC		4-axis CNC
X - longitudinal slide	*mm*	420		420
Y - cross slide	*mm*	360		360
Z - vertical column	*mm*	270	360	270
A - workpiece carrier	*degrees*	∞		∞
C - rotation of the grinding head	*degrees*	320		320, manual
Workpiece carrier				
Centre height	*mm*	151	210	151
Interface		HSK 80	ISO 50	HSK 80
Max. speed	*rpm*	96		96
Grinding head				
Grinding motor (100%)	*kW*	5		5
Double grinding spindle		HSK 50 (2 + 2 grinding wheels) direct drive		HSK 50 (2 + 2 grinding wheels)
Max. grinding spindle speed	*rpm*	12000		12000
Grinding wheel diameter	*mm*	50 - 250		50 - 250
Control System		Fanuc 3x Series, 5 controlled axes		Fanuc 3x Series, 4 controlled axes
Handling* - integrated parts loader				
Workpiece loader		1 pallet 200 x 200 mm, 25 - 100 workpieces		-
Weight	*kg*	1700	2000	1700

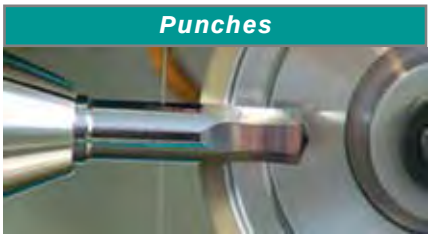
Option** — **All information is subject to change without notice

Grinding Spindle

Motor spindle with optimal torque for carbide or HSS tools. 5 kW (100%) to 7 kW (60%), HSK 50 on both sides. Liquidcooled for optimum thermal stability.

CNC tool grinding and regrinding machines

NORMA



norma NGC complete processing around OD and face, up to 300 mm cutting length, diameter up to 400 mm, maximum workpiece length that can be clamped 500 mm.

norma NGC750 complete processing around OD and face, up to 600 mm cutting length, diameter up to 400 mm, maximum workpiece length that can be clamped 800 mm.

- Cutting tools such as end mills, ball nose cutters for mold making, high-performance drills, reamers, profile end mills, indexable profile inserts in HSS, carbide gear cutting tools.
- There are specific software, grinding processes and clamping systems for regrinding gear cutting tools, end mills, pinion cutters and bevel gear cutters.
- Production grinding of knives for the paper, food and plastics industries. Wheel-shaped workpieces with special clamping and automatic loading.

Technical Data		norma NGC	norma NGC750
Axes			
X - longitudinal slide	mm	470	750
Y - cross slide	mm	390	
Z - vertical column	mm	325	
A - workpiece carrier	degrees	∞	
C - rotation of the grinding head	degrees	345	
Control System		Fanuc 3x Series, 5 controlled axes	
Workpiece carrier			
Centre height	mm	210	
Interface		ISO50	
Max. speed for cylindrical grinding*	rpm	1000	
Grinding head			
Grinding motor (100%)	kW	10	
Double grinding spindle, direct drive		HSK 50 (3 + 3 grinding wheels)	
Max. grinding spindle speed	rpm	12000 (16 000)	
Grinding wheel diameter	mm	50 - 250	
Loader for grinding wheel packages and coolant tubes*			
Wheel package	pc.	7	
Max. number of grinding wheels	pc.	21	
Handling* - integrated parts loader			
Workpiece loader		1 pallet 300 x 300 mm	
		49 - 400 workpieces	
Weight	kg	5000	

*Option — All information is subject to change without notice

Integrated Tool Loader

Loader programs can be saved for an almost unlimited number of pallets, job list organization offers flexible production of multiple tool types per pallet.

AWL-7 Grinding Wheel Loader

Grinding wheel loader with 7 positions for HSK50 wheel holders and coolant nozzle manifolds, up to 21 wheels can be stored. Data management for grinding wheel geometries, grinding data and processes.

Tool Axis A Rapid

Automatic linear or profile dressing for diamond grinding wheels, CBN and vitrified. 0.55 kW motor, 200-4000 RPM.

Tool Axis A Rapid

Dividing head with direct drive motor, infinite rotation, up to 600RPM, 123 Nm max. torque, direct scale feedback system with a resolution of 0.001°, clamping taper ISO50.

CNC tool grinding and regrinding machines

SIRIUS

For the serial production of:

- Turning inserts
- Profile tools
- Grinding of high-precision components.
- Workpieces where multiple cutting edges have to be ground
- Kinematic design is ideally suited for small workpieces

Bevel Gear Cutter

Multi-Tooth Cutters

Inserts

siriusNGS 6-axis CNC grinding machine with linear and direct drive motors for the serial production of all types of profiles with grinding wheels up to 300 mm in diameter. The 6-axis robot loads complex parts to be ground on multiple sides into the specific clamping system and can simultaneously carry out additional tasks such as laser marking while grinding the next tool time.

Technical Data		sirius NGS
Axes		
X - longitudinal slide	*mm*	400
Y - vertical column	*mm*	350
Z - cross slide	*mm*	280
A - workpiece carrier	*degrees*	∞
B - swivel axis	*degrees*	270
C - rotation of the grinding head	*degrees*	270
Controling system		Fanuc 3x Series, 6 controlled axes
Workpiece carrier		
Interface		HSK 80
Grinding head		
Grinding motor	*kW*	5 (10)
Double grinding spindle		HSK50 (HSK 80) (3 + 3 grinding wheels)
Max. grinding spindle speed	*rpm*	12000
Grinding wheel diameter	*mm*	50 - 300
Loader for grinding wheel packages and coolant tubes*		
Wheel package	*pc.*	7
Max. number of grinding wheels	*pc.*	21
Handling* - robots		
Pallets	*pc.*	2 (10)
Pallet dimensions	*mm*	300 x 300
		49 - 400 places
Weight	*kg*	4000
***Option**		***All information is subject to change without notice***

Tool Loader

FANUC robot with 6 axes.Loader programs can be stored for an almost unlimited number of pallet configurations, organization for flexible production of multiple batches per pallet.

CNC Dresser

Automatic linear or profile dressing for diamond grinding wheels, CBN and vitrified. 0.55 kW motor, 200-4000 RPM.

AWL Grinding Wheel Loader

Grinding wheel loader with 7 positions for HSK50 grinding wheel holders and coolant nozzle manifolds, up to 21 wheels can be stored.

CNC tool grinding and regrinding machines

GEMINI

Gear Tools

Threats

Workpiece Clamping

Standard & Profile Tools

gemini NGM 5-axis CNC grinding machine for the serial production of cutting tools. Complete processing around OD and face, up to 300 mm cutting length, diameter up to 300 mm, maximum workpiece length that can be clamped 500 mm.

- Cutting tools such as end mills, ball nose cutters for mold making, high-performance drills, reamers and profile end mills are all part of the standard requirement.
- There are specific software packages, grinding processes and clamping systems for the production of shaper cutters with highly dynamic segmented hob grinding, the regrinding of gear cutting tools, end mills, shaper cutters and bevel gear cutters.
- CNC grinding of knives for the paper, foodstuffs and plastics industries, profile grinding, cylindrical grinding and surface grinding.

Technical Data		gemini NGM
Axes		
X - longitudinal slide	*mm*	500
Y - cross slide	*mm*	400
Z - vertical column	*mm*	380
W - oscillating axis	*mm*	-
A - workpiece carrier	*degrees*	∞
C - rotation of the grinding head	*degrees*	365
Control System		Fanuc 3x Series, 6 controlled axes
Workpiece carrier		
Centre height	*mm*	210
Interface		ISO 50
Cylindrical grinding	*rpm*	50 (1000)
Grinding head		
Grinding motor (100%)	*kW*	10 (24)
Double grinding spindle direct drive		HSK 50 (HSK 80) (3 + 3 grinding wheels)
Max. grinding spindle speed	*rpm*	12000
Grinding wheel diameter	*mm*	50 - 250
Loader for grinding wheel packages and coolant tubes*		
Wheel package	*pc.*	8, 14
Max. number of grinding wheels	*pc.*	24, 42
Handling* - robots		
Pallets	*pc.*	2, 4, 10
Pallet dimensions	*mm*	300 x 300, 49 to 400 places
Weight	*kg*	7000
***Option**	***All information is subject to change without notice***	

AWL Grinding Wheel Loader

Grinding wheel loader with 8, 14 or 24 positions for HSK50 grinding wheel holders and coolant nozzle manifolds, up to 24, 42 or 72 wheels can be stored.

Grinding Spindle

SCHNEEBERGER electric spindle with optimized performance curve for carbide or HSS tools.

Tool Loader

FANUC robot with 6 axes. The robot's flexibility is enhanced with double tool clamp for fast loading. A tool turning station can be used inside the robot room, as can another options such as laser marking.

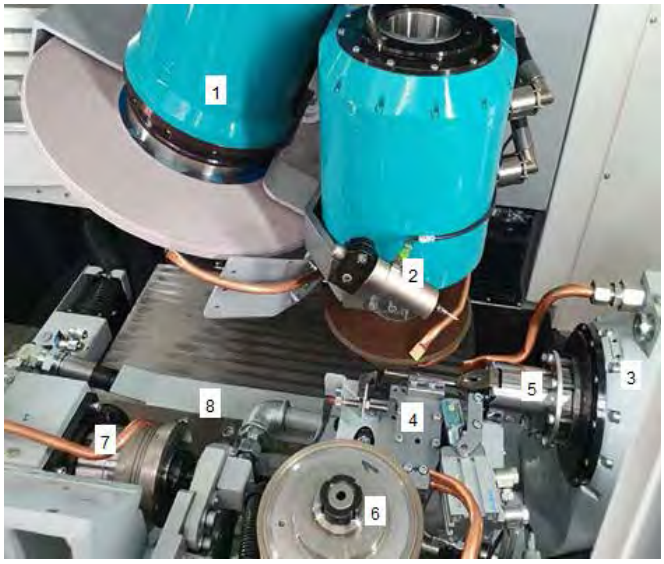
Workpiece Clamping

Collet chucks for ultra-precise concentricity, internal clamping, zero point systems, shafts with driver and drive dog, systems for drilling tools. The center height of 210 mm offers room for customized tool holders.

gemini Variants

6 axis tap grinder

gemini NGM TAP for the serial production of threading tools with the capability of carrying out the complete processing of flutes, point, lead angle and thread forms in a single clamping.



Technical Data		gemini TAP for the serial production of threading tools	
Axes			
X - longitudinal slide	mm	445	
Y - cross slide	mm	370	
Z - vertical column	mm	370	
W - oscillating axis	mm	10	
A - workpiece carrier	degrees	∞	
B - Rotation of the grinding head	degrees	315	
Control System		Fanuc 3x Series, 5 controlled axes	
Workpiece carrier			
Interface		HSK 80	
Grinding head with two grinding spindles with direct drive			
Grinding head		**threads and chamfer**	**flutes and cut-off**
Grinding motor (100%)	kW	24	24
Grindling spindle		HSK 190	HSK 50 (Double ended grinding spindle)
Max. grinding spindle speed	rpm	6000	12000
Grinding wheel diameter	mm	300 - 450	50 - 250
Handling - robots*			
Pallets	pc.	2, 4, 10	
Pallet dimensions	mm	300 x 300 (49 to 400 places)	
Weight	kg	7000	
*Option		*All information is subject to change without notice*	

1. Spindle for thread and chamfer
2. Spindle for flute and spiral point
3. Workholder (A-axis)
4. Tailstock with integrated position sensor and steady rest
5. 2-Jaw chuck with pendulum compensation
6. Dressing unit up to 5'000 rpm for flute wheel
7. Dressing unit up to 5'000 rpm with form dressing roll for thread wheel
8. Hydrostatic oscillation axis with corresponding hydraulic unit

Robot Loader

Integrated easily changable pallets. 6-axes robot. Additional functions such as ultrasonic cleaning and laser marking are possible in the automatic cycle.

Tailstock and Tool Holders

Hydraulically actuated, fine adjustment of the clamping force, robust, stable, and precise. Virtually zero run-out, accurate steady rest assisted rotation.and driver system.

- Production: Taps, forming taps, thread mills
- Materials: HSS or carbide
- Diameter: 1 – 60 mm, any profile
- Spiral angle: No restriction
- Length: Up to 250 mm

Dressing

Production know-how can be precisely implemented in the CNC-controlled dressing process. Experience and standards can be easily stored and retrieved.

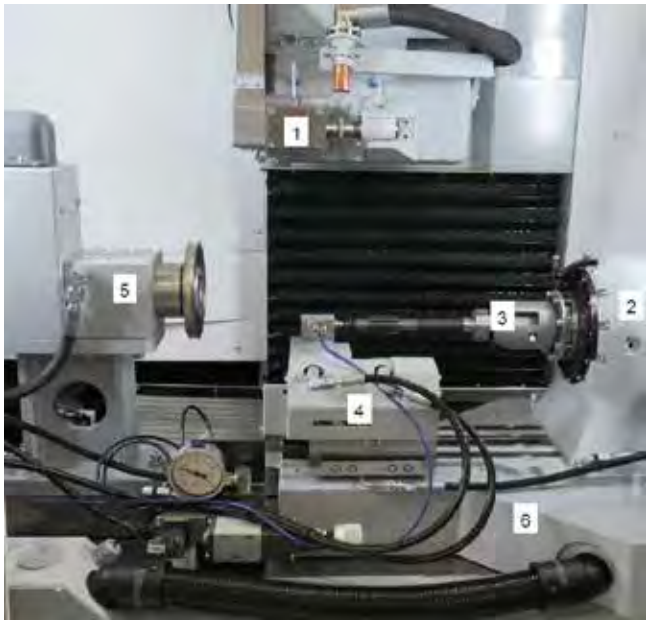
Software Qg1

Geometry, process-parameters, process-sequences and measuring cycles are programmed through QUINTO, in a well- structured and intuitive manner.

gemini Variants

6 axis gear hob profiler

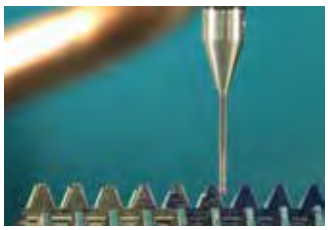
gemini NGM-GHP for the profile back off grinding of hob cutters. The oscillating grinding process is the heart of the system for generating precision back off grinding.



1. Spindle-head ghp25/35
2. Workholder (A-axis)
3. Dog & driver (between centers clamping)
4. Tailstock with integrated contact-sensor
5. Dressing unit up to 16'000 rpm with integrated contact-sensor
6. Hydrostatic oscillation axis with corresponding hydraulic unit

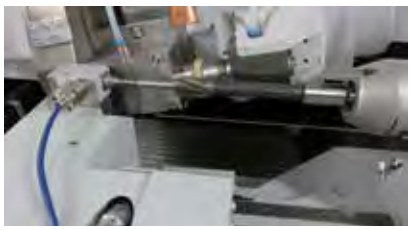
- Production: gear hob profile, any profile according to standard or special
- Material: HSS or carbide
- Diameter: up to 200 mm
- Spiral angle: +/- 45°
- Length: up to 250 mm

Technical Data		gemini NGM-GHP for relief grinding of hob cutters
Axes		
X - longitudinal slide	*mm*	430
Y - cross slide	*mm*	380
Z - vertical column	*mm*	400
W - oscillating axis	*mm*	10
A - workpiece carrier	*degrees*	∞
B - Rotation of the grinding head	*degrees*	270
Control System		Fanuc 3x Series, 5 controlled axes
Workpiece carrier		
Centre height	*mm*	151
Interface		HSK 80
Cylindrical grinding	*rpm*	400
Grinding head		
Grinding motor (100%)	*kW*	5
Double grinding spindle, direct drive		-
Max. grinding spindle speed	*rpm*	15000 - 25000
Grinding wheel diameter	*mm*	26 - 100
Loader for grinding wheel packages and coolant tubes*		
Wheel package	*pc.*	-
Max. number of grinding wheels	*pc.*	-
Handling* - robots		
Pallets	*pc.*	-
Pallet dimensions	*mm*	-
Weight	*kg*	7000
***Option**		***All information is subject to change without notice***



3-D Probe

Work piece locations, center-lines, grinding surfaces, and leads are quickly determined, calculated, and transformed into grinding paths.



Tailstock and Tool Holders

Hydraulically actuated, fine adjustment of the clamping force, robust, stable, and precise. Virtually zero run-out, accurate steady rest assisted rotation.and driver system.

Dressing

Production know-how can be precisely implemented in the CNC-controlled dressing process. Experience and standards can be easily stored and retrieved.

Software Qg1

Geometry, process-parameters, process-sequences and measuring cycles are programmed through QUINTO, in a well- structured and intuitive manner.

CNC tool grinding and regrinding machines

CORVUS

Splines

Screws

corvusNGB traveling column machine with linear motors. Machine bed made of polymer concrete provides tremendous stability and is resistant to thermal expansion. Loading large workpieces is very ergonomic.

Broach

- **C-type:** A / X Y Z C, universal machine
- **B-type:** A / X Y Z B, universal machine, threaded parts
- **BBA:** A / X Y Z B BC, double swivel head, broaches
- **F-type:** F / X Y Z B , production grinding of cubic parts up to 400 x 400 x 300 mm

Technical Data		Corvus			
		C type	B type	BBA	F type
		Universal machine	Universal machine, threaded parts	Double swivel head broaches	Production grinding cubic parts
Axes		**Linear motor in X axis - ballscrew or linear motor in Y & Z**			
X - longitudinal slide	*mm*	850 / 1250 / 2100 / 3100 / 4500			850 / 1250 / 2100
Y - vertical column	*mm*	400			
Z - cross slide	*mm*	400			
A - workpiece carrier	*ISO*	∞			
C - rotation of the grinding head	*degrees*	365	-		
B - swing of the grinding head	*degrees*	-	220	220	220
BC - Rotation of the grinding head	*degrees*	-		290	-
F - rotary table	*degrees*	-			x
Control System		Fanuc 3x Series, 4, 5 or 6 controlled axes			
Grinding head		**Double ended grinding spindle with direct drive**			
Grinding motor (100%)	*kW*	10 - 24 - 40		10	10 - 24
Grinding spindle	*HSK*	HSK 50 - HSK 80 - HSK 190		HSK 50	HSK 50 - HSK 80
Max. grinding spindle speed	*rpm*	12000 (16000) - 12000 - 6000		12000 (16000)	12000 (16000) - 12000
Grinding wheel diameter	*mm*	50 - 450		50 - 250	50 - 350
Weight / Dimentions					
For X Stroke longitudinal slide	*mm*	850	1250	2100	3100 / 4500
Machine length	*mm*	2885	3285	4135	5365 / 8000
Machine weight	*kg*	12000	13500	17000	20500 / 40000

All information is subject to change without notice

Wheel changer

Wheel loader with 8 positions for HSK50 or HSK80 grinding wheel holders and coolant nozzle plates, up to 24 wheels can be stored. Data management for wheel geometries, cutting data and processes.

Workpiece loader

Large 6-axis FANUC robot with a payload of 35 kg. The tools are presented on 4 pallets of 300 x 300 mm, or in a Arbor Arena.

Grinding spindle

Motor spindles from SCHNEEBERGER with optimum torque characteristics for all grinding applications. Available spindles HSK50, HSK80 or HSK190. A permanent balancing unit is optionally available for HSK190 spindles. The 40 kW spindle can be additionally equipped with a counter bearing and is therefore ideally suited for grinding racks.

Tool measurement machine

GALILEO

Technical Data		Galileo measurement machine
Axes		
X - vertical column	mm	300
Z - longitudinal slide	mm	250
A - rotation	mm	free ISO 50
Weight		
Machine weight	kg	600
All information is subject to change without notice		

galileo measures the following dimensions: Tool diameter, cutting length, taper angle, torus radius, corner chamfer, DXF profiles, variable pitch, pitch, cutting angle, clearance angle.

Measurement head:

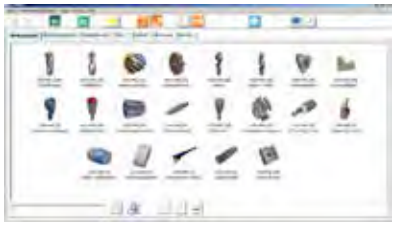
- Diascopic camera with telecentric LED lighting
- Episcopic camera with telecentric LED lighting
- 3D electronic probe (option)
- Coarse and fine axes control via joystick

Automation solutions and Software

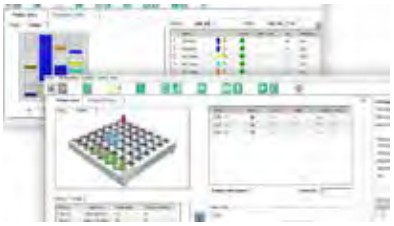
Robot loader

Portal loader

Qg1 CAD CAM grinding

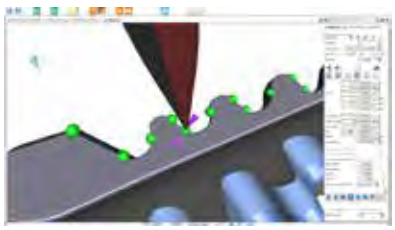


Developed by SCHNEEBERGER Qg1 stands out with appealing 3D graphics and simple operation.
Ideally suited for the development of cutting tools as well as for efficient regrinding.



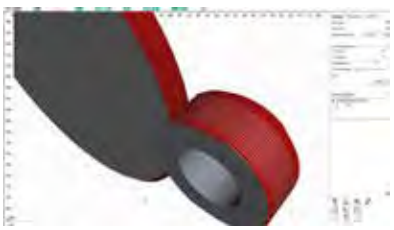
Industry 4.0

Links multiple machines and provides information about the current and statistical operating situation.



ariesNGP
Uptime: 04h 20m 37s
Tools: 63

normaNGC
Uptime: 02h 28m 51s
Tools: 51



1-Side Lapping and Polishing machines

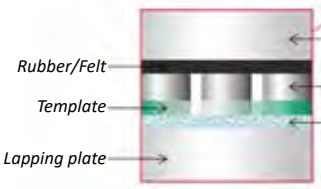
FLM

Technical data		FLM500	FLM550	FLM750	FLM1000	FLM1250	FLM1500
Lapping plate, outer Ø	mm	500	550	750	1000	1250	1500
3 conditioning rings inner Ø	mm	190	220	300	400	500	600
Speed lapping plate	rpm	0 - 75	0 - 75	0 - 70	0 - 60	0 - 50	0 - 35
Timer		Touchscreen					
Main drive	kW	2,2	2,2	4	7,5	15	22
Weight	kg	480	480	1 500	2 500	3 950	5 850
Compressed air supply	bar	6	6	6	6	6	6
Cooling system (capacity coolant reservoir)	L	20	20	90	90	120	300
All information is subject to change without notice							

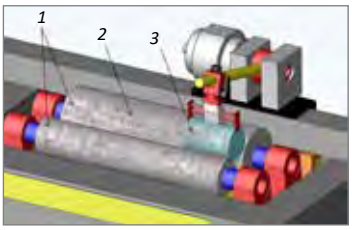
PROCESSES

Polishing

Lapping



Cylindrical Lapping



1. Rollers
2. Process liquid
3. Work piece

Cylindrical Lapping

FLM

500-R

Technical data		FLM 500-R
Outside Ø (lapping plate)	mm	500
Pneumatic lift 6 bar	daN	0 - 110
Timer		Touchscreen
Speed of the lapping plate, (infinitely variable)	rpm	0 - 75
Motor main drive	kW	2,2
Dimensions L x W x H	cm	85 x 100 x 200
Weight	kg	approx. 450
Workpiece dimensions	mm	Ø 0,7 - 30
		length 5 - 200
All information is subject to change without notice		

CLM

150-2 500

Technical data		CLM 150-2	CLM 500
Lapping roll pairs		2	1
Roll length	mm	150	500
Workpiece Ø	mm	6 - 150	6 - 150
Motor main drive	kW	0,55	1,1
Dimensions (L x W x H)	cm	100 x 60 x 110	100 x 60 x 110
Weight	kg	480	550
All information is subject to change without notice			

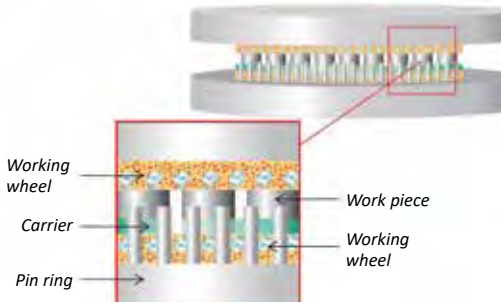
1-Wheel Flat Honing and Fine Grinding

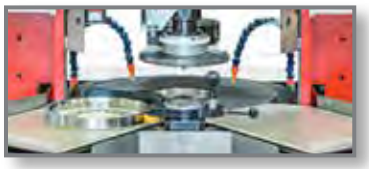
FH

602-H

Technical data		FH 602-H
Working wheels Ø	mm	550 - 600 / 190
Workpiece cage Ø	mm	245
Achievable switch-off accuracy	µ	1
Drive power	kW	4
Speeds of working wheels	rpm	0 - 130
Rotational direction of all drives		freely selectable
Working power		pneumatic
Working power/ ramps		programmable
Workpiece height	mm	0.4 - 50
Spray liquid		monitored
Operating voltage	V DC	24
Weight	kg	approx. 1400
All information is subject to change without notice		

Flat honing process





2 and 3 Wheel Flat Honing and Fine Grinding

DLM

705-805
1005-1405

FH2-3

FH2-505

FH3-505-805

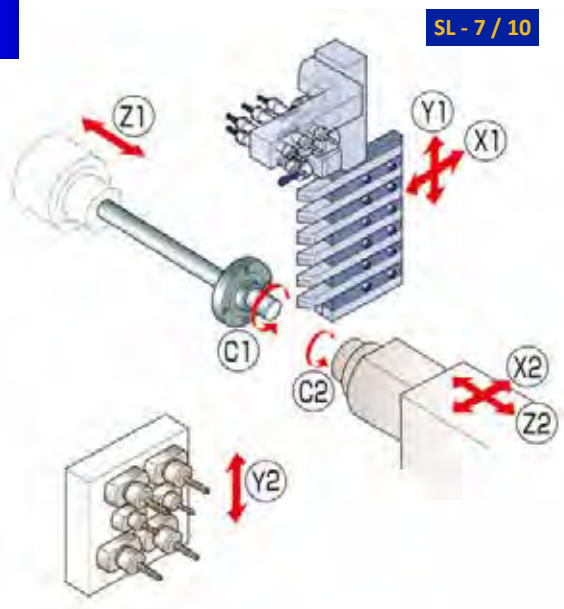
Technical data		DLM 705 - 805	DLM 1005 - 1405
Outside Ø of the working wheels	mm	650 - 870	1020 - 1360
Number of carriers		4 - 8	
Distance between working wheels	mm	<390	
Workpiece load infinitely variable	daN	0 - 2000 (3000)	0 - 3500 (5000)
PC operated control system		freely programmable	
Switch-off accuracy	µ	0,1	
Cooling of working wheel		yes	
Speeds of upper and lower working wheels infinitely variable			
Flat honing and fine grinding	rpm	0 - 250, 300, 400, 600	0 - 210, 300
Centre drive	rpm	0 - 125, 220	0 - 100, 150
Rotational direction of all drives		freely programmable	
Weight	kg	8000	from 13000
All information is subject to change without notice			

Technical data		FH2-505	FH3-505	FH3-805
Working wheel diameter, external	mm	534/234	534	860
Carrier reference-Ø	mm	160	180	285
Switch off precision	µ	0.1	0.1	0.1
Optimal work piece thickness	mm	0.5-50	1.0 - 60.0	1.0 - 110.0
Drives spindle	kW	7.5	9.5	21
Speeds	rpm	0 - 520	0-400	0-400
Workload upper spindle	daN	0 - 800	0-1350	0-2400
Pressure preset / ramps		freely selectable		
Types of workload		electrical cylinder	electrical cylinder	hydraulic cylinder
Weight	kg	approx. 4500	approx. 6000	approx. 11000
Dimensions W x L x H	mm	2700x1800x2350	1700x3550x2300	2150x4225x2685
Pneumatic connection	bar	6		
All information is subject to change without notice				

CNC Swiss type automatic lathes BASIC

SL SERIES

SL SERIES for the micro and watch industry with modular tool holder system, which can be individually adapted to every demand.
Machining of very small diameters is guaranteed. The newly designed and very stable Y2 axis for backworking is worthy of special mention with 6 tool stations are available.



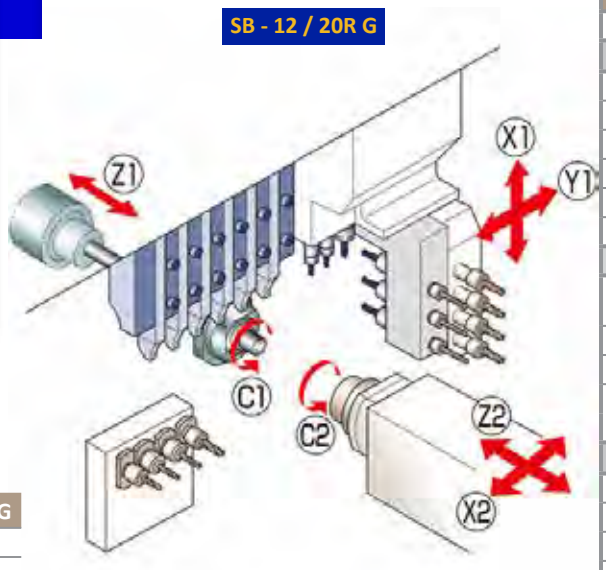
General Data		SL-7	SL-10
CNC		Fanuc 32i-B	
Rapid feed rate	*m/min*	35	
Dimensions (W x D x H)	*mm*	1865 795 1815	
Weight	*kg*	1600	

Technical data		SL-7	SL-10
Number of axes		8	
Front side			
Main spindle	*axis*	C1 / Z1	
Tool post	*axis*	X1 / Y1	
Max. machining Ø	*mm*	7	10
Headstock stroke	*mm*	105	105
Drive power	*kW*	3,7/5,5	
Max. speed	*min⁻¹*	15000	
Tools gang tool post			
Turning tools	*pc (mm)*	6 (□8)	6 (□10)
Drilling tools		4 (ER11) - 6 (ER11 / 16)	4 (ER11)
Cross working tools	*pc.*	5 (ER11)	
Max. speed	*min⁻¹*	12000	
Back side			
Sub spindle	*axis*	C2 / X2 / Z2	
Vertical backworking	*axis*	Y2	
Max. machining Ø	*mm*	7	10
Drive power	*kW*	0,55 / 1,1	5,5 / 1,1
Max. speed sub spindle	*min⁻¹*	12000	
Backworking tools			
Standard tools	*pc.*	6 (4 ER11 driven)	
Max. speed	*min⁻¹*	12000	

All information is subject to change without notice

SB SERIES

SB SERIES (Hybrid) convertible lathes, with or without guide bush, offering great flexibility, thanks to the use of modular tool holders.
With spindle speed of up to 15'000 min^{-1} on the SB12R G and diameter up to 23mm on the SB20R G they offer a compact design and low space requirement.



General Data		SL-12RG	SB-20RG
CNC		Fanuc Oi-TD	
Rapid feed rate	*m/min*	35 *X1-2, Y1, Z1-2*	
Dimensions (W x D x H)	*mm*	2070 1177 1760	
Weight	*kg*	1750	

Technical data		SB-12R G	SB-20R G
Number of axes		7	
Front side			
Main spindle	*axis*	C1 / Z1	
Tool post	*axis*	X1 / Y1	
Max. machining Ø	*mm*	12 (opt. 13)	20 (opt. 23)
Max. headstock stroke	*mm*	205	
Drive power	*kW*	2,2/3,7	
Max. speed	*min⁻¹*	15000	10000
Tools gang tool post			
Turning tools	*pc. (mm)*	6 (□ 12) opt. 7 (□ 10)	
Drilling tools	*pc.*	4	
Cross working tools	*pc.*	max. 5	
Max. speed	*min⁻¹*	6000 (ER16) 8000 (ER11)	10000 (ER16) 6000 (ER11)
Back side			
Sub spindle	*axis*	C2 / X2 / Z1 / Z2	
Max. machining Ø	*mm*	12 (opt. 13)	20 (opt. 23)
Drive power	*kW*	0,55 / 1,1	
Max. speed	*min⁻¹*	12000	9000
Backworking tools			
Number of tools	*pc.*	4 (fix or driven)	
Max. speed	*min⁻¹*	8000	

All information is subject to change without notice

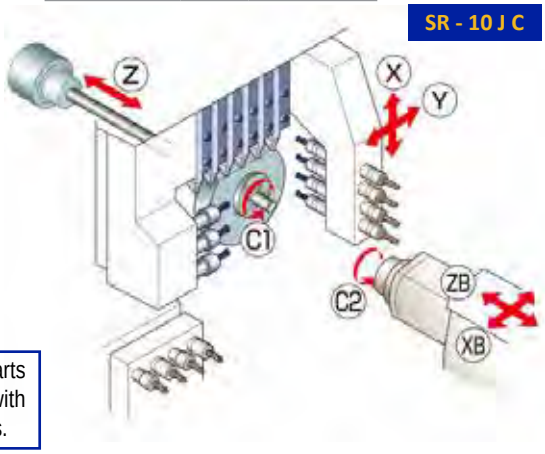
Star Micronics AG
www.starmicronics.ch

CNC Swiss type automatic lathes EXTENDED

SR 10J C

General Data		SR - 10J
CNC		Fanuc 32i-B
Rapid feed rate	*m/min*	35 *except C-axis*
Dimensions (W x D x H)	*mm*	1865 775 1695
Weight	*kg*	1400

SR - 10 J C



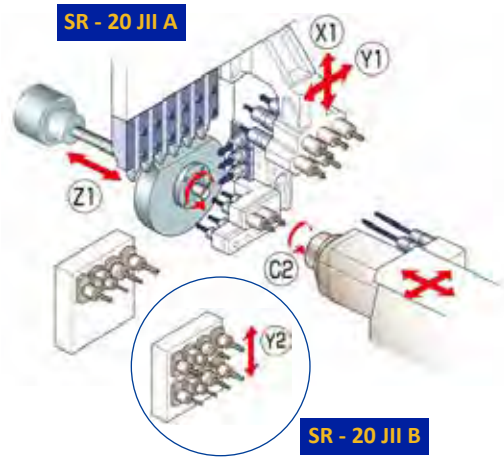
SR-10J High-precision watch parts can be manufactured with specially developed gearing and polygonizing units.

Technical data		SR-10J
Number of axes		7
Front side		
Main spindle	*axis*	C1 / Z1
Tool post		X1 / Y1
Max. machining Ø	*mm*	10
Headstock stroke	*mm*	105
Drive power	*kW*	2,2 / 3,7
Max. speed	*min⁻¹*	15000
Tools gang tool post		
Turning tools	*pc. (mm)*	6 (□8)
Drilling tools (front-/rear)	*Pcs*	4 (ER11)
Cross working tools	*Pcs*	3 (ER11)
Back side		
Sub spindle		X2 / Z2 / C2
Max. gripping Ø	*mm*	10
Gripping spindle motor	*kW*	0,5 / 1,1
Max. speed	*min⁻¹*	10000
Backworking tools		
Standard tools	*pcs*	4 (2 x ER11 driven)
Max. speed	*min⁻¹*	8000
All information is subject to change without notice		

SR JII-JIII SERIES

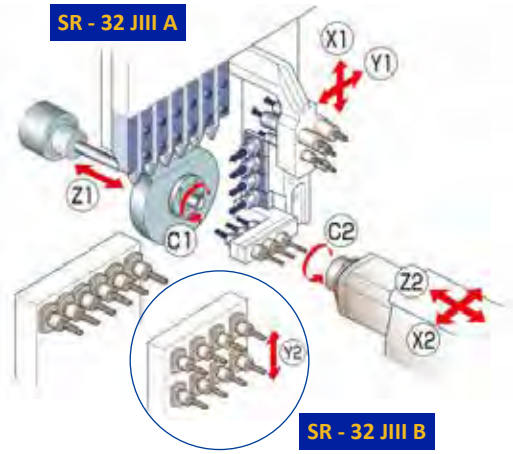
SR-20JII with or without guide bush (Hybrid). Type-B, equipped with a Y2 axis for counter-operational machining. The recovery station has 8 tool positions (fixed or driven).

SR - 20 JII A



SR - 20 JII B

SR - 32 JIII A



SR - 32 JIII B

SR-32JIII can be equipped with 5 or 6 driven cross stations. Z2 axis travel has been extended for more space of backworking. Type-B, equipped with a Y2 axis for backworking. 8 tool stations are available (fixed or driven).

General Data		SR-20JII	SR-32JIII
CNC		Fanuc 32i-B	
Rapid feed rate	*m/min*	35 *except C*	35 *X1-2, Y1, Z1-2*
Dimensions (W x D x H)	*mm*	2250 1200 1700	2690 1345 1780
Weight	*kg*	2200	4100

Technical data		SR-20JII	SR-32JIII
Number of axes		A:7 / B:8	A:7 / B:8
Front side			
Main spindle	*axis*	C1 / Z1	C1 / Z1
Tool post	*axis*	X1 / Y1	X1 / Y1
Max. machining Ø	*mm*	20 (opt. 23)	32 (opt. 36)
Max headstock stroke sliding/fixed	*mm*	205 / 50	320/80
Max. drive power	*kW*	2,2 / 3,7	7,5 / 11
Max. speed	*min⁻¹*	10000	8000
Tools gang tool post			
Turning tools	*pc. (mm)*	6 (□ 12)	6 (□ 16)
Drilling tools	*pc.*	5 (ER16)	3 (ER16) 2 (ER20)
Cross working tools	*pc.*	5 (ER16)	5 (ER20)
Max. speed	*min⁻¹*	8000	3 x 6000 2 x 8000
Tool deep drilling / milling unit			
Number of tools	*pcs.*	2	-
Back side			
Sub spindle	*axis*	C2 / X2 / Z2	C2 / X2 / Z2
Vertical backworking	*axis*	Y2 (Type B)	Y2 (Typ B)
Max. gripping Ø	*mm*	20 (opt. 23)	32 (opt. 36)
Drive power	*kW*	2,2 / 3,0	3,7 / 5,5
Max. speed	*min⁻¹*	10000	8000
Backworking tools			
Number of tools	*pc.*	A:4 (fix or driven) B:8 (fix or driven)	A:6 (fix or driven) B:8 (fix or driven)
Max. speed	*min⁻¹*	8000	6000
All information is subject to change without notice			

ALFLETH ENGINEERING
ALFLETH Engineering AG
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www.alfleth.com

CNC Swiss type automatic lathes EXTENDED

SR SERIES

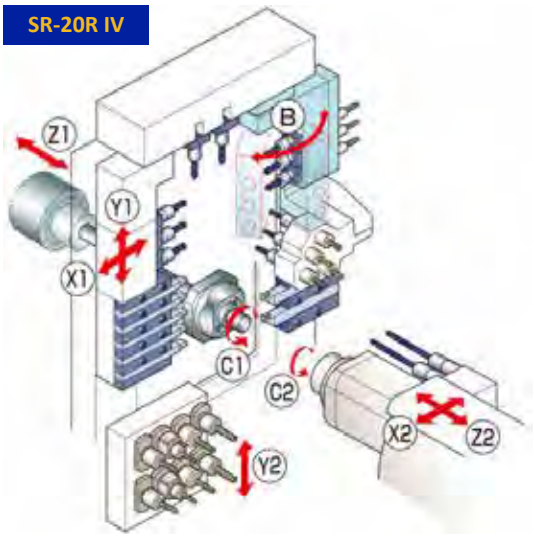
SR-20RIV with or without guide bush (Hybrid), offers an additional B-axis, for angular operations, both in main and secondary spindle. The FANUC 31i-B5 control allows the programming of 5 axes simultaneously . In addition, two deep-hole drilling stations and an 8-position back working station (fixed or driven) with Y-2 axis are available.

SR-38 with or without guide bush (Hybrid) has a material passage of 38 mm. Since two turning tools can be used at the same time (X1 and X3), roughing and finishing can be carried out in one pass. With the controlled B-axis, machining is possible at any angle.

Technical data		SR 20R IV A,B	SR 38 A,B
Number of axes		A:8 / B:9	B:10
Front side			
Main spindle	*axis*	C1 / Z1	C1 / Z1
Tool post	*axis*	A: X1 / Y1	X1 / X3 / Y1
		B: X1 / Y1 / B	
Max. turning Ø	*mm*	20 (23)	38 (42)
Max headstock stroke (sliding/ fixed)	*mm*	205 / 50	320 / 95
Max. drive power	*kW*	2,2 / 3,7	7,5 / 11,0
Max. speed	*min⁻¹*	10000	7000
Tools linear slides			
Turning tools front	*pc. (mm)*	7 (□ 12)	5 (□ 16)
Turning tools on X3 side	*pc. (mm)*	-	2 (□ 16)
Drilling tools	*pc.*	4 (ER16)	3 (ER16), 2 (ER20)
Cross working tools	*pc.*	5 (ER16)	6 (ER20)
B axis	*pc.*	3 (ER16) front side	3 (ER16) front side
		3 (ER11) back side	3 (ER16) back side
Max. Speed	*min⁻¹*	8000	6000
Tools deep drilling / milling unit			
Number of tools	*pc.*	2	-
Back side			
Sub spindle	*axis*	X2 / Z2 / C2 / Y2	X2 / Z2 / C2
Axis vertical backworking	*axis*	Y2	Y2
Max. gripping Ø	*mm*	20 (23)	38 (42)
Drive power	*kW*	2,2 / 3,7	3,7 / 5,5
Max. speed	*min⁻¹*	10000	7000
Backworking tools			
Number of tools	*pc.*	8 (fix or driven)	8 (fix or driven)
Max. speed	*min⁻¹*	8000	6000
			All information is subject to change without notice

General Data		SR 20R IV A,B	SR 38 A, B
CNC		Fanuc 31i-B	Fanuc 31i-B (Type A)
			Fanuc 31i-B5 (Type B)
Rapid feed rate	*m/min*	35 *except C*	36 *X1-2* *Y1* *Z1-2*
Dimensions (W x D x H)	*mm*	2334 1200 1700	3192 1315 2120
Weight	*kg*	2200	4300

SR-20R IV



SR-38

ALFLETH ENGINEERING

ALFLETH Engineering AG
mail@alfleth.com
www.alfleth.com

CNC Swiss type automatic lathes EXTENDED

SW SERIES

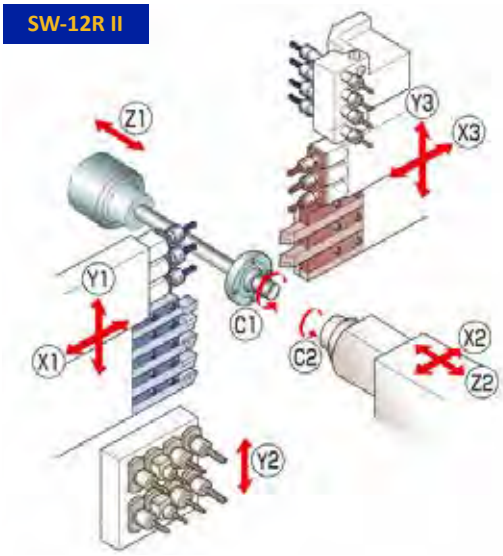
SW-12RII convertible automatic lathe, with or without guide bush (Hybrid), is designed for fast, simultaneous machining. With high rotational speeds, on the spindles and the modular tool holders, workpieces can be processed efficiently. Reworking station with 8 tool stations (fixed or driven) with Y2 axis available.

SW-20 equipped with three Z-axes which allow three tools to be engaged simultaneously with different using feeds. Therefore, substantially reducing cycle times. With regard to counter-operations, thanks to the Y2 axis, the center of gravity of the tools can be adjusted by the numerical control. A total of 8 tool stations (8 fixed or 6 powered) are available.

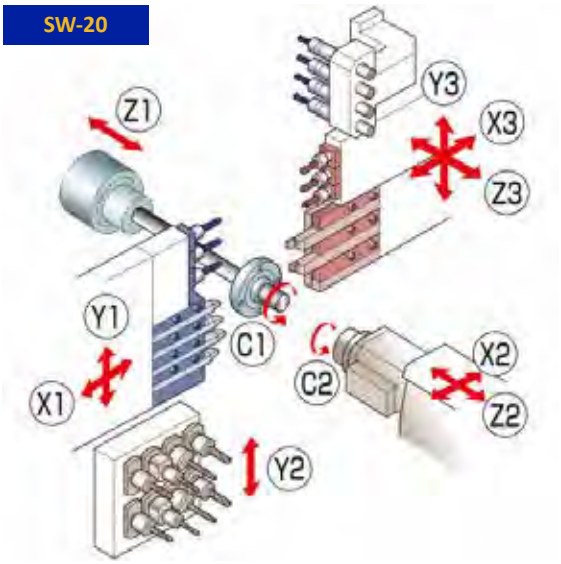
General Data		SW-12RII	SW-20
CNC		Fanuc 31i-B5	Fanuc 31i-B5
Rapid feed rate	*m/min*	35 *X2* *Y1* *Y3* *Z1-2*	35 *X2* *Y1* *Y3* *Z1-2*
Dimensions (W x D x H)	*mm*	1995 920 1700	2558 1150 1765
Weight	*kg*	2100	3400

Technical data		SW-12R II	SW-20
Number of axes		10	11
Front side			
Main spindle	*axis*	Z1 / C1	Z1 / C1
2 tool post	*axis*	X1 / Y1 X3 / Y3	X1 / Y1 front X3 / Y3 /Z3 back
Max. turning Ø	*mm*	12 (opt. 13)	20 (opt. 23)
Max. headstock stroke (sliding/ fixed)	*mm*	135 / 30	205
Drive power	*kW*	2,2 / 3,7	2,2 / 3,7
Max. speed	*min⁻¹*	15000	10000
Tool gang tool post			
Turning tools	*pc. (mm)*	5 (□ 10) front	4 front
		2 (□ 10) back	2 back
Drilling tools	*pc.*	4 (ER11)	4 (ER16)
Cross working tools	*pc.*	3 front	3 front
		3 back	3 back
Max. Speed	*min⁻¹*	12000	8000
Back side			
Sub spindle	*axis*	C2 / Y2 / Z2	C2 / Y2 / Z2
Axis vertical	*axis*	Y2	Y2
Max. gripping Ø	*mm*	12 (opt. 13)	20 (opt. 23)
Drive power	*kW*	2,2 / 3,7	2,2 / 3,7
Max. speed	*min⁻¹*	15000	10000
Backworking tools			
Number of tools	*pc.*	8 (fix or driven)	8 (6 driven)
Max. speed	*min⁻¹*	12000	8000
			All information is subject to change without notice

SW-12R II



SW-20



CNC Swiss type automatic lathes COMPLEX

SV 20R

SV-20R

With or without guide bush (Hybrid), is the further development of the successful SV series. An 8-speed revolver with integrated B-axis was added. With the X2 axis it is possible to work at the back in an out-of-the-middle position. With the Y2 axis, 8 additional tool stations (fixed or powered) are available.

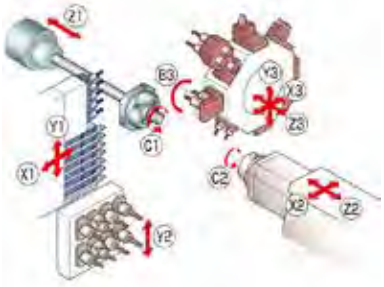
SX 38

SX-38

With or without guide bush (Hybrid), convinces with excellent stability. The swallow tail guide on various axes as well as the hydraulic clamping device on the B-axis guarantee high-performance machining. The revolver is equipped with 10 tool stations and can be used for highly complex components.The Y2 axis completes the overall package.

General Data		SV - 20R
CNC		Fanuc 31i-B5
Rapid feed rate	*m/min*	30 *(X1-2-3, Y1, Z1-2-3)*
Dimensions (W x D x H)	*mm*	2730 1350 1865
Weight	*kg*	4750

SV-20R



General Data		SX - 38
CNC		Fanuc 31i-B5
Rapid feed rate	*m/min*	30 *(X1-2-3, Y1, Z1-2-3)*
Dimensions (W x D x H)	*mm*	2955 1430 1975
Weight	*kg*	4150

SW-38

Technical data		SV-20R
Number of axes		12
Front side		
Main spindle	*axis*	C1 / Z1
Tool post	*axis*	X1 / Y1
Turret	*axis*	X3 / Y3 / Z3 / B3
Max. machining Ø	*mm*	20 (opt. 23)
Max headstock stroke (sliding/fixed)		205 / 55
Max. drive power	*kW*	3,7 / 5,5
Max. speed	*min⁻¹*	10000
Tools gang tool post		
Turning tools	*pc. (mm)*	7 (□ 12)
Cross working tools	*pc.*	5 (ER16)
Max. speed	*min⁻¹*	8000
Turret tools		
Number of tool stations	*pc.*	8 (4 with B axis function)
Stationary tools	*pc.*	max 3 per station
Driven tools	*min⁻¹*	max 2 per station
Drive power	*min⁻¹*	5750
Back side		
Sub spindle	*axis*	X2 / Z2 / C2
Vertical backworking	*axis*	Y2
Max. gripping Ø	*mm*	20 (23)
Max. drive power	*kW*	2,2 / 3,7
Max. speed	*min⁻¹*	10000
Backworking tools		
Number of tools	*pc.*	8 (fix and driven)
Max. speed	*min⁻¹*	8000
All information is subject to change without notice		

Technical data		SX38
Number of axes		12
Front side		
Main spindle	*axis*	C1, Z1
Tool post	*axis*	B1, X1, Y1
Turret	*axis*	X3, Y3, Z3
Max. machining Ø	*mm*	38 (opt. 42)
Max headstock stroke (sliding/fixed)	*mm*	320/95
Max. drive power	*kW*	7,5 / 11,0
Max. speed	*min⁻¹*	7000
Tools gang tool post		
Turning tools	*pc. (mm)*	3 (□16) - 1 (□20)
Cross working tools B axis	*pc.*	4 (ER20) front 4 (ER16) back
Max. speed cross working	*min⁻¹*	5000
Drive power	*kW*	2,2 / 3,0
Tools turret		
Number of tools		10 (all driven)
Max. speed	*min⁻¹*	5700
Drive power	*kW*	2,7 / 4,0
Back side		
Number of axes	*axis*	4
Vertical backworking	*min⁻¹*	Y2
Sub spindle		C2, X2, Z2
Max. gripping Ø	*mm*	38
Drive power	*kW*	7,5 / 11,0
Max. speed sub spindle	*min⁻¹*	7000
Drive unit (standard) / Tool stations	*Pcs*	8 (all driven)
Max. drive power	*kW*	1,2 / 2,2
Max. backworking speed	*min⁻¹*	5000
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CNC Swiss type automatic lathes COMPLEX

ST SERIES

ST-20 is designed for the production of complex components requiring many tools. With three revolvers at 8 tool stations each (firmly or powered) various holders can be installed modularly. The lower revolver also allows simultaneous machining of the main and counter spindles, witch significantliy reduces the cycle time

ST-38 for the production of complex components and has a bar passage of 38mm. With three revolvers at 10 tool stations each (fixed or driven), diverse modular holders can be installed. The lower revolver also allows simultaneous processing of the main and counter spindles, which reduces the cycle time significantly.

Technical data		ST 20	ST 38
Number of axes		12	
Front side			
Main spindle	*axis*	C1 / Z1	
Turret 1	*axis*	X1 / Y1	
Turret 3	*axis*	X3 / Y3 / Z3	
Max. machining Ø	*mm*	20 (opt. 23)	38 (opt. 42)
Max. headstock stroke	*mm*	350	
Drive power	*kW*	3,7 / 5,5	7,5 / 11,0
Max. speed	*min⁻¹*	10000	7000
Tool sleeve holder			
Number of tools	*pc.*	max 3 per station	max 3 per station
Max. drilling capacity	*mm*	14	23
Max. tapping capacity		M12 x P1.75	M16 x P2.0
Driven tools			
Number of tools	*pc.*	max 2 per station	max 2 per station
Max. drilling capacity	*mm*	10	10
Max. tapping capacity		M8 x P1.25	M8 x P1.25
Max. speed	*min⁻¹*	5750	5700
Back side			
Sub spindle	*axis*	C2 / YA2 / Z2	
Turret 2	*axis*	X2 / Y2	
Max. machining Ø	*mm*	20 (opt. 23)	38 (40)
Drive power	*kW*	3,7 / 5,5	7,5
Max. speed	*min⁻¹*	10000	7000
Backworking tools			
Number of tools	*pc.*	max 3 per station	max 3 per station
Max. drilling capacity	*mm*	14	23
Max. tapping capacity		M12 x P1.75	M12 x P1.75
Driven tools			
Number of tools	*pc.*	max 2 per station	max 2 per station
Max. drilling capacity	*mm*	10	10
Max. tapping capacity		M8 x P1.25	M8 x P1.25
Max. speed	*min⁻¹*	5750	5 750

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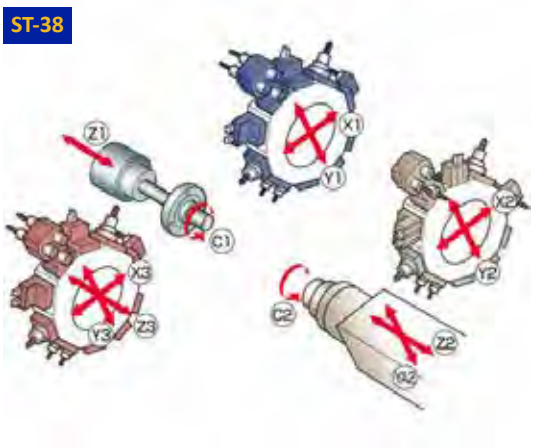
General Data		ST - 20	SW - 20
CNC		Fanuc 31i-B5	Fanuc 31i-B5
Rapid feed rate	*m/min*	30 *X1-2-3, Z1-2-3*	30 *X1-2-3, Z1-2-3*
Dimensions (W x D x H)	*mm*	2988 1720 1845	3477 1859 1865
Weight	*kg*	4850	6250

ST-20

ST-38



Conventional precision engine lathes

PRIMUS

COMMODOR

PRAKTIKANT

CONDOR

Technical Data		PRIMUS	PRAKTIKANT			CONDOR	COMMODOR		
		VC^{D}	GS^{D}	VC^{D}	VC^{Plus}	VC^{Plus}	180GS^{D}	180VC^{D}	230VC^{D}
Operating range									
Distance between centres	mm	500	650	650	650	800	1000	1000	1000
Centre height	mm	140	160	160	160	180	180	180	230
Swing over bed / cross slide	mm	280 / 150	320 / 190	320 / 190	320 / 190	360 / 190	380 / 215	380 / 215	475 / 270
Main spindle									
Spindle nose (acc. to DIN 55027)	size	5	5	5	5	6	6	6	6
Spindle diameter (front bearing)	mm	70	70	70	70	90	90	90	90
Spindle bore	mm	43	43	43	43	57	56	56	56
Internal taper (acc. to DIN 228)	MK	meters 50	meters 50	meters 50	meters 50	6	6	6	6
Main drive									
Drive power	kW	4	2,6 / 3,1	7,5	8	10,5	4	5,5	12,5
Speed range	min^{-1}	30-4 000 (5000)	48-2500	30-4000 (5000)	25-5000	25-4000	25-2000	25-2000	25-2000
Number of speeds		Stepless	16	Stepless	Stepless	Stepless	18	Stepless**	Stepless**
Feeds									
Number of feeds		24	24	24	Stepless	Stepless	200	200	320
longitudinal	mm/rev	0,02-0,63	0,02-0,63	0,02-0,63	0,01-6	0,01-6	0,026-0,9	0,026-0,9	0,026-7,4
level	mm/rev	0,006-0,2	0,006-0,2	0,006-0,2	0,003-2	0,003-2	0,013-0,45	0,013-0,45	0,013-3,7
Thread Cutting Range									
Metric threads	mm	0,25-8*	0,25-8*	0,25-8*	0,1-20	0,1-20	0,3-10	0,3-10	0,3-80
Inch threadS	TPI	80-2*	80-2*	80-2*	80-2	80-2	80-2,75	80-2,75	80-0,75
Tailstock									
Quill travel /diameter	mm	85 / 40	85 / 40	85 / 40	85 / 40	110 / 50	150 / 60	150 / 60	150 / 70
Inside taper of quill DIN 228	MK	3	3	3	3	3	4	4	4
Weight	kg	1050	1050	1150	1100	1500	1750	1800	2000

*Inch threads and metric thread pitches 0.45; 0.75; 4.5 and 5.5 are only possible with additional change gears

**4 gear stages

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Engine lathes and servo engine lathes

DA series

C series

DA range of universal lathes, solid and robust quality, highest precision and high power performance in various applications.

WEILER Software C4

Developed by Weiler on the basis of the latest Siemens Sinumerik one.

Technical Data		DA210	DA210AC	DA260	DA260AC
Operating range					
Distance between centres	*mm*	1000, 1500		1000, 1500, 2000	
Centre height	*mm*	210		260	
Swing over bed / in bed recess	*mm*	435 / 470		535 / 560	
Swing over cross slide	*mm*	245		345	
Bed width	*mm*	330		330	
Travel of cross- / top slide	*mm*	330 / 130		330 / 130	
Tool cross section (HxW)	*mm*	25x25			
Main drive					
Drive power 100% ED	*kW*	5,5		7,5	5,5
Main spindle					
Spindle nose (acc. to DIN 55027)	*size*	6			
Spindle diam. (front bearing)	*mm*	83		100	
Spindle bore	*mm*	52		71	
Inner taper of main spindle	*mm*	metr. 57		metr. 76	
Speed range	*min⁻¹*	44-2000	20-2500	33-1500	20-2500
Speed levels		12	stepless	12	stepless
Feed range					
Number of feeds		66	55	66	55
Longitudinal feeds	*mm/rev.*	0,072-4	0,072-2	0,072-4	0,072-2
Transverse feeds	*mm/rev.*	0,036-2	0,036-1	0,036-2	0,036-1
Tailstock					
Quill diameter / travel	*mm*	65 / 120			
Quill taper (acc. toDIN 228)	*MK*	4		4	
Thread cutting range					
Metric threads	*mm*	0,5-28	0,5-14	0,5-28	0,5-14
Inch	*TPI*	56-1	56-2	56-1	56-2
Permissible workpiece weight					
Overhung	*kg*	150		200	
With tailstock / steady	*kg*	500 / 700		800 / 1000	
Weight	*kg*	1300 1550	1450 1700	1510 1760 2050	1650 1900 2200

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Technical Data		C35HD	C50HD
Operating range			
Distance between centres	*mm*	800	1000 / 2000
Swing over bed	*mm*	360	570
Swing over cross slide	*mm*	180	340
Bed width	*mm*	260	350
Travel of cross slide	*mm*	200	340
Turning tool cross section (WxH)	*mm*	25x25	32x25
Main spindle			
Spindle nose (acc. to DIN 55027)	*size*	6	8
Spindle diam. (front bearing)	*mm*	90	120
Spindle bore	*mm*	57	83
Internal taper of main spindle		MK5	Metr. 90
Main drive			
Number of speeds		stepless	
Drive power at 60% / 100%ED	*kW*	9/7	15/12
Overall speed range	*min⁻¹*	1-4500	1-2500
Feed range			
Number of feeds		stepless	
Feed force longitudial	*N*	7000	12000
Feed force transverse	*N*	3000	8000
Feed range longitudinal and transverse	*mm/rev*	0,001-10	0,001-10
Max feed range longitudinal/transverse	*m/min*	8/4	8/4
Thread cutting range			
Metric threads	*mm*	0,1-400	0,1-400
Inch threads	*TPI*	56-1/4	56-1/4
Modular threads	*mm*	0,125-28	0,125-28
DP threads	*DP*	224-1	224-1
Max. number of thread starts		99	99
Tailstock			
Quill diameter / travel	*mm*	50 / 110	80 / 200
Inside taper of quill	*MK*	3	5
Weight	*kg*	2200	3500 4000

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Cycle-Controlled Precision Lathes

E series

WEILER SL2

V series

Typical E-Series: up to 3 x more efficient!

Under the bottom line, each E-series machine can replace up to three conventional machines. There is also maximum efficiency in the power consumption – through effective use of the latest energy-saving drives

The advantages of cycle-controlled precision lathes:

- Rapid implementation from the drawing to the finished workpiece
- Extremely short setup times
- Generously sized machining areas with minimum footprint
- Toolmakers accuracy in accordance with DIN 8605

The WEILER 4-way precision lathe with automated cycles

The WEILER 4-way precision lathe with automated cycles represents the implementation of the WEILER cycle controller – well-known and proven from over a thousand E-Series installations – into a 4-way bed lathe.

Advantages:

- Simple workpieces can be machined in the same way as with a conventional machine – only more efficiently
- Elaborate workpieces can be machined in the same way as with a conventional machine – only faster
- Complex workpieces can be machined in the same way as with a CNC machine – only more simply

Technical Data		E series (2-way bed)												V series (4-way bed)	
		E30	E40	E50HD	E60	E70	E80	E90	E110	E120	E150	E175	E200	V90	V110
Distance between centres	mm	750	1000	1000-2000	1000-2000	1000-6000	1000-6000	2000-12000	2000-12000	2000-12000	2000-12000	2000-12000	2000-15000	3000-12000	3000-12000
Swing over bed	mm	330	435	570	650	720	800	900	1100	1200	1500	1750	2000	940	1160
Swing over cross slide	mm	160	200	340	400	430	510	530	730	830	1030	1280	1530	590	810
Travel of cross slide	mm	180	260	340	380	410	410	590	590	590	790	790	790	580	580
Bed width	mm	240	330	350	380	480	480	600	600	600	830	830	830	900	900
Drive power 60/100% ED	kW	11/9	20/17	20/17	25/20	37/30	37/30	45/37	45/37	45/37	65/51	65/51	65/51	45/37	45/37
Max. torque at the spindle	Nm	165	450	1300	1700	3150	3150	6000	6000	8000	10700	10700	12000	8000	8000
Spindle nose DIN 55027	size	5	6	8	8	11	11	11	11	15	15	15	20	15(20)	15(20)
Spindle bore	mm	43	66	83*	83	128**	128**	128***	128***	165****	165*****	165*****	262******	165****	165****
Spindle diameter in front bearing	mm	70	110	120	120	150	150	178	178	235	235	235	330	235	235
Speed range	min-1	1 - 4500	1 - 3500	1 - 2500	1 - 2500	1 - 1800	1 - 1800	1 - 1120	1 - 1120	1 - 900	1 - 900	1 - 900	1 - 700	1 - 900	1 - 900
Force feed longitudinal	N	6000	10000	12000	12000	20000	20000	20000	20000	20000	30000	30000	30000	20000	20000
Feed range	mm/rev.	0,001-50												0,001-50	
Thread cutting range	mm	0,1-2 000												0,1-2 000	
Tailstock quill diameter	mm	50	65	80	100	115	115	140	140(180)	140(180)	180	180	180	140	140(180)
Inside taper of tailstock quill	Mk	3	4	5	5	6	6	6	6	6	metr. 100	metr. 100	metr. 100	6	6 / Metr. 100
Acceptance accuracy	DIN	8605	8605	8605	8605	8605	8605	8606	8606	8606	8607	8607	8607	8606/ 8607	8606/ 8607

*Spindle bore on request: *128, 165 mm **165, 216 mm ***165, 262, 362 mm ****262, 362 mm ****262, 362, 450, 580 mm*

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CNC precision lathes

DZ series

DZ45 CNC precision lathe for high productivity applications in production, tool making and research institutes as well as in apprenticeships and vocational training.

The advantages of WEILER CNC precision lathes:

- Robust, rigid substructure
- High quality, heavily ribbed grey cast iron bed
- Exceptional ergonomics
- Broad range of possible applications thanks to a wide variety of accessories
- Siemens 840Dsl controller
- Short setup times
- High productivity

Technical Data		DZ45 CNC		
		AR	ARY	AGY
Operating range				
Max. turning diameter	mm	240		
Travel X	mm	207,5	220	207,5
Travel Z	mm	530	525	525
Main spindle		Spindle motor		
Spindle nose (DIN 55026)	size	5		
Chuck size	mm	160		
Spindle bore	mm	53		
Bar capacity in draw/thrust tube	mm	42		
Max. speed	min^{-1}	6000		
Torque at 60% ED	Nm	128		
Drive performance at 60% ED	kW	17 / 21,5		
Feed drive				
Feed force X/Z/Q	daN	530		
Rapid traverse X/Z/Q	m/min	30/30/30		
Tailstock				
Centre fixture	M	4		
Supporting force	daN	530		
Subspindle - Spindle motor		Spindle motor		
Spindle nose DIN 55026	size	-		5
Chuck size	mm	-		160
Bar capacity in draw/thrust tube	mm	-		42
Speed range	min^{-1}	-		6000
Drive power 60% ED	Nm	-		80
Torque 60% duty cycle	kW	-		17
Tools turret				
Not AGW / AGW		12/12	16/16	
Tool shank cross section	mm	20x20	16x16	
Shank diameter DIN 69880	mm	30	25	
Drive power 100% duty cicle	kW	4,5	5,2	
Tool turret with Y axis				
Y travel	mm	-	+45 / -35	
Control system		Sinumerik 840D sl		
Weight	kg	5500		

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