ALFLETH ENGINEERING

Your partner for the companies

ACCURATE
Partnering Quality

AFFOLTER

BalTec

BENZINGER
PRÄZISIONSMASCHINEN

FEHLMANN

RETTIFICATRICI GHIRINGHELLI

HEMBRUG
MACHINE TOOLS

Henninger
PRÄZISIONSTECHNIK

HURON
CRÉATEUR DE MACHINES - OUTILS

IMSA

JYOTI

klein

KELLENBERGER

PRECI TRAME

rihs

ROBBI

SCHNEEBERGER

star

STÄHLI
FEELING FOR FINISHING

WEILER

ALFLETH ENGINEERING

Machine Catalogue

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.

We are a Swiss engineering and trading company with our own subsidiaries in several countries and represent the following associated companies:

Company	Place	Products	Exclusive	Project	Page
ACCURATE Partnering Quality	Accurate Sales and Services Pvt Ltd IN - Pune	Manufacturer of 3D coordinate measuring machines	-	AT, AM, AZ, BG, BA, BY, CZ, EE, GE, RU, HR, HU, LT, LV, MD, MK, ME, PL, RO, RS, SI, SK, UA	4 - 7
AFFOLTER	Affolter Technologies SA CH - Malleray	Manufacturer of gear hobbing and micro machining centres	AT, AM, AZ, BG, BA, BY, CZ, EE, GE, RU, HR, HU, LT, LV, MD, MK, ME, PL, RO, RS, SI, SK, UA	-	8 - 9
BalTec	Baltec AG CH - Pfäffikon	Manufacturer of radial riveting machines and servo presses	AM, AZ, BG, BY, GE, RU, HU, RO, UA	-	10 - 11
BENZINGER PRÄZISIONSMASCHINEN	Carl Benzinger GmbH D - Pforzheim-Büchenbronn	Manufacturer of high-precision turning machines	AT, AM, AZ, BG, BA, BY, CZ, EE, GE, RU, HR, HU, LT, LV, MD, MK, ME, PL, RO, RS, SI, SK, UA	-	12 - 17
FEHLMANN	Fehlmann AG CH - Seon	Manufacturer of milling / drilling machining centres and high-speed milling machines	AM, AZ, BG, BA, BY, CZ, EE, GE, RU, HR, HU, LT, LV, MD, MK, ME, PL, RO, RS, SI, SK, UA	-	18 - 21
RETTIFICATRICI GHIRINGHELLI	Ghiringhelli S.p.A. I - Luino	Manufacturer of centreless circular grinding machines	AM, AZ, BG, BA, BY, CZ, EE, GE, RU, HR, HU, LT, LV, MD, MK, ME, PL, RO, RS, SI, SK, UA	AT	22 - 23
KELLENBERGER HAUSER	L.Kellenberger & Co.AG CH-2500 Biel-Bienne 8	Manufacturer of high precision coordinate grinding machines	BY, RU, PL, UA	AM, AZ, BG, BA, GE, HR, MD, MK, ME, RO, RS, SI	24 - 25
HEMBRUG MACHINE TOOLS	Hembrug Machine Tools NL- Haarlem	Manufacturer of hard turning machines	AM, AZ, BG, BA, BY, CZ, EE, GE, RU, HR, HU, LT, LV, MD, MK, ME, PL, RO, RS, SI, SK, UA	-	26 - 29
Henninger PRÄZISIONSTECHNIK	Henninger GmbH & Co KG D - Straubenhardt	Manufacturer of centre grinding machines and high-speed spindles	AT, AM, AZ, BG, BA, BY, CZ, EE, GE, RU, HR, HU, LT, LV, MD, MK, ME, PL, RO, RS, SI, SK, UA	-	30
HURON CRÉATEUR DE MACHINES - OUTILS	Huron Graffenstaden S.A. F - Illkirch Cedex	Manufacturer of vertical and gantry milling machines with high rigidity and maximum precision for high-speed machining	AT, AM, AZ, BG, BA, BY, CZ, EE, GE, RU, HR, HU, LT, LV, MD, MK, ME, PL, RO, RS, SI, SK, UA	-	32 - 37
I.M.S.A.	I.M.S.A. s.r.l. I - Barzago	Manufacturer of deep drilling machines	AT, AM, AZ, BG, BA, BY, CZ, EE, GE, RU, HR, HU, LT, LV, MD, MK, ME, PL, RO, RS, SI, SK, UA	-	38 - 41
JYOTI	JYOTI CNC Automation PVT. LTD. IN - Rajkot	Manufacturer of vertical and horizontal machining centres as well as CNC and vertical turning machines	AT, AM, AZ, BG, BA, BY, CZ, EE, GE, RU, HR, HU, LT, LV, MD, MK, ME, PL, RO, RS, SI, SK, UA	-	42 - 43
KELLENBERGER	L.Kellenberger & Co.AG CH - St. Gallen	Manufacturer of precision grinding machines and systems	BY, RU, PL, UA	AM, AZ, BG, BA, HR, MD, MK, ME, RO, RS, SI	44 - 45
klein	Klein Maschinenbau GmbH & Co KG D - Straubenhardt	Manufacturer of centre hole grinding machines for plunge grinding and linear grinding	AT, AM, AZ, BG, BA, BY, CZ, EE, GE, RU, HR, HU, LT, LV, MD, MK, ME, PL, RO, RS, SI, SK, UA	-	31
PRECITRAME	PRECITRAME MACHINES SA CH - Tramelan	Manufacturer of rotary transfer machines and finishing machines	AT, AM, AZ, BG, BA, BY, CZ, EE, GE, RU, HR, HU, LT, LV, MD, MK, ME, PL, RO, RS, SI, SK, UA	-	46 - 47
rihs	Rihs Maschinenbau AG CH - Pieterlen	Manufacturer of 3 axes controlled universal grinding machines	AT, AM, AZ, BG, BA, BY, CZ, EE, GE, RU, HR, HU, LT, LV, MD, MK, ME, PL, RO, RS, SI, SK, UA	-	48 - 49
ROBBI	Robbi s.a.s. I - Veronella (Verona)	Manufacturer of external and internal universal grinders in manual, teach in and CNC versions	AT, AM, AZ, BG, BA, BY, CZ, EE, GE, RU, HR, HU, LT, LV, MD, MK, ME, PL, RO, RS, SI, SK, UA	-	50 - 51
SCHNEEBERGER	J. Schneeberger Maschinen AG CH - Roggwil	Manufacturer of tool and cutter grinding machines for production and regrinding from 2 - 5 axes	AM, AZ, BG, BA, BY, CZ, EE, GE, RU, HR, HU, LT, LV, MD, MK, ME, PL, RO, RS, SI, SK, UA	AT	52 - 57
STÄHLI FEELING FOR FINISHING	STÄHLI Lapp Technik AG CH - Pieterlen/Biel	Manufacturer of machines for flat honing, lapping and polishing	AM, AZ, BG, BA, BY, EE, GE, RU, HR, HU, LT, LV, MK, ME, PL, RO, RS, SI, SK, UA	SK	58 - 59
star	Star Micronics AG CH - Otelfingen	Manufacturer of CNC-Swiss type machines	AM, AZ, BG, BA, BY, CZ, RU, HR, MK, ME, RO, RS, SI, SK, UA	-	60 - 63
KELLENBERGER TSCHUDIN	L.Kellenberger & Co.AG CH - St. Gallen	Manufacturer of grinding machines	BY, RU, PL, UA	-	64 - 65
KELLENBERGER VOUMARD	L.Kellenberger & Co.AG CH - St. Gallen	Manufacturer of universal internal and external cylindrical grinding machines for ultimate productivity and flexibility	BY, RU, PL, UA	-	66 - 67
WEILER	WEILER Werkzeugmaschinen D - Emskirchen	Cycle-controlled and CNC precision lathes and automation engineering systems	AM, AZ, BG, BA, BY, CZ, EE, GE, RU, HR, HU, LT, LV, MD, MK, ME, PL, RO, RS, SI, SK, UA	-	68 - 71

ACCURATE
Partnering Quality

Accurate Engg. Co. Pvt. Ltd
67 Gauge House
IN-411 013 Hadapsar

Complete 3D Measuring Solutions

CMM - Bridge type

I tis innovative series with power packed features for 3D measurement of small parts as well as for training purpose. Designed for ease of operation and safety ensuring optimum performance.

Features

- Elevated Bridge construction for enhancing dynamic strength
- All granite guide ways ensuring uniform thermal stability
- increased protection for guide ways and measuring scales
- Choice for various probing system
- Machine ready for plug & play

Features

- Proven design with all granite construction for stable performance. Wrap around air bearing construction for high acceleration and stability
- Zero hysteresis belt drive for smooth repeatable movement
- X & Z axis guide ways made hollow reducing mass to achieve high acceleration
- In built Y axis for better homogenity of material
- High resolution reader head for better accuracy

Model			TUTOR	SPECTRA
Measuring range	X axis	mm	500	500 - 800
	Y axis	mm	500	600 - 1500
	Z axis	mm	400	400 - 600
Mode of operation			CNC	
Max. Workpiece weight		kg	250	
Accuracy MPEE (as per ISO 10360 - 2 with TP200)		µm	3.5 +L /250	2.2 +L /350
				1.9 +L /350*
Resolution		µm	0.5	0.5 / 0.1 /
Guidance			Air bearings on all axes	
Linear Velocity		mm/s	300	400
Volumetric Velocity (3D)		mm/s	520	700
Measuring table (Material)			Granite	
Probing option			TP 20,TP200, SP 25M	
Probe heads			TP8, MH20, MH20i	

**Custom Built Range / *Enhanced accuracies in Spectra Models*

TUTOR

SPECTRA

Large measuring range bridge type CMM. Using special techniques for machining and grinding of granite guides, we are able to achieve accelerations similar to lighter construction machines with further benefit of naturally stabilised material.

Features

- All granite guide ways ensuring uniform thermal stability
- Pre-loaded air bearings to ensure proper griping
- In built Y axis for better homogenity of material
- Toothed belt drive inducing zero hysteresis
- High resolution read head for better accuracy

CORDIMEASUR

Model			CORDIMEASUR	MEGA	MEGA Plus
Measuring range	X axis	mm	1000	1200	1500
	Y axis	mm	1500 - 2000	1500 - 2000	2000 - 2500
	Z axis	mm	800	1000	1200
Mode of operation			Motorised / CNC		
Clearance under bridge			750	950	1600
Max. weight		kg	800	1000	4000
Accuracy MPEE (as per ISO 10360 - 2 with TP200)		µm	2.5 +L /350	2.9 +L /350	4 +L /350
		µm	2.5 +L /350*	2.9 +L /350*	
Resolution		µm	0.5 / 0.1		
Guidance			Air bearings on all axes		
Linear Velocity		mm/s	400	350	300
Volumetric Velocity (3D)		mm/s	692	600	520
Measuring table (Material)			Granite		
Probing option			TP 20,TP200, SP 25M, Revo		
Probe heads			MH8, MIH, PH10, PH20, SP80		

**Custom Built Range / *Enhanced accuracies in Spectra Models*

MEGA

Designed for inline measuring application on modern shop floor. All aluminium construction with active temperature compensation. Unique design for easy movement of parts from automated conveyors.

Features

- Elevated moving bridge gives open access for inline applications
- Full protection for guide ways and measuring scales
- High acceleration and speed
- Free floating scales suitable foe shop floor application
- Efficient foot print
- FEA for structure and CAA for enhanced performance

ARIA

Model			ARIA
Measuring range	X axis	mm	600
	Y axis	mm	500
	Z axis	mm	500
Mode of operation			CNC
Max. Workpiece weight		kg	200
Accuracy MPEE		µm	3 + L /250
Resolution		µm	0.1
Guidance			Air bearings on all axes
Linear Velocity		mm/s	300
Volumetric Velocity (3D)		mm/s	520
Measuring table (Material)			Granite
Probing option			TP 20,TP200
Probe heads			TP8, MH20, MH20i, RTP20, MH8, MIH, PH10, PH20, SP80

ACCURATE
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Complete 3D Measuring Solutions

CMM - Gantry type

Precision inspection of large components.
A machine is designed and developed with advanced patented technology. Stable mechanical structure offered with wide range of probing options including 5-axis probing technology.

ACCORD

Model			ACCORD
Measuring range	X axis	mm	2000 - 2500
	Y axis	mm	2000 - 6000
	Z axis	mm	1500 - 2000
Mode of operation			CNC
Max. Workpiece weight		kg	250
Accuracy MPEE (as per ISO 10360 - 2)		µm	5 +L / 200
Resolution		µm	0.1
Guidance			Air bearings
Linear Velocity		mm/s	250
Volumetric Velocity (3D)		mm/s	430

**Custom Built Range*
**Enhanced accuracies with high accuracy probing options*

Features

- For inspection of large components with high accuracy performance
- Open access structure enable easy inspection of large scale parts
- High precision air bearings in all axes
- Zero hysteresis drive in all axes
- Can be interfaced with rail system for loading and unloading of large components

CMM - Horizontal arm type

ARMMAX

Model			ACCORD
Measuring range	X axis	mm	600 - 1200
	Y axis	mm	400
	Z axis	mm	500
Mode of operation			CNC
Accuracy MPEE (as per ISO 10360 - 2)		µm	5 +L / 200 < 9
Resolution		µm	0.5
Guidance			Linear Guide ways
Compatible with Renishaw probing systems			

Precision measuring machine for measurement in shop floor. A machine is designed for inline inspection of components. Machine is compatible for both contact and non- contact measurement. Easy access on three sides for facilitating automation for loading and unloading components.

Features

- Robust mechanical design
- Precision LM guides for all axis
- Measuring GD & T in shop floor
- Rigid stable structure
- Maintenance free
- Optimized foot print
- Plug & Play operation
- Laser head adaptation for reverse engineering

SEAGULL

Features

- Fit to operate in shop floor environment
- Available in single or double machine configuration
- High precision linear guide ways in all axis
- New generation composite material in Y axis reducing drop of arm
- Advance spring balance system for Z axis counter balancing

Model			SEAGULL
Measuring range	X axis	mm	2000 - 10000
	Y axis	mm	1200 - 1600
	Z axis	mm	1600 - 2500
Mode of operation			Motorised/CNC
Accuracy MPEE* (as per ISO 10360 - 2)	Single Arm	µm	25 L + / 50 < 75
	Dual Arm		40 L+ / 50 < 100
Resolution		µm	0.5
Guidance			Linear Guide ways
3D Velocity		mm/s	700
3D Acceleration		mm/s^2	1200

**Custom Built Range*
**Enhanced accuracies with high accuracy probing options*

CMM - Portable type

ACCUFLEX

Features

- Six axis completely balanced equipment used with single hand
- Preset for interchangeable probes
- Certification as per ISO 10360-2
- Laser probe compatibility
- CAD based software
- Accuracy at 2 sigma

Model		ACCUFLEX Plus 2500 CNC			ACCUFLEX		
Measuring range	mm	2500	3200	4000	2500	3200	4000
Volumetric accuracy	mm	0.032	0.045	0.058	0.048	0.060	0.080

Large arm available up to 9000 mm

Accurate Engg. Co. Pvt. Ltd
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Complete 3D Measuring Solutions

Probing system

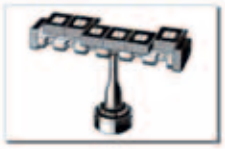
Our CMMs support full range of advanced Renishaw probe Systems

PROBE HEADS

CNC Indexable | Semi automated | Manual Indexable

PH 10 T	PH 10M	PH 20	RTP 20	MH 20i	MH 8	MIH
						
Touch trigger Extension upto 300 mm	Multiwire Scanning Laser + Optical	5 Axis Touch Trigger with integral TP 20	Automated indexing using motion of CMM 15 degree indexing	Integral TP20 15 degree indexing.	15 degree indexing. Probe extension upto 50 mm.	7.5 degree indexing. Extension upto 300 mm.

STYLUS CHANGE RACKS

MCR 20 for TP 20	SCR 200 for TP 200	FCR 25 for SP 25M
		

PROBES

Touch Trigger TP 20 / TP 200	Indexable Scanning SP 25 M	Ultra high accuracy Scanning SP 80	5 Axis Scanning REVO	Laser Scanning Accu Laser	Low force Appolo
					
Compact and rugged machanical TP 20. High accuracy and repeatable electronic stain gauge TP 200.	Scanning and touch trigger modules in one probe. Maximum reach up to 400 mm.	Styli range upto 800 mm. Data collection rate 1000 point per sec.	Measuring speed up to 500 mm/s. Data collection rate 6000 points per sec. Maximum reach up to 500 mm.	Flexible scanner for Reverse Engineering. Blue laser line for hot glowing metals, (semi -) transparent and organic materials.	Special probe for measurement of small, fragile and flexible parts. Low touch trigger force, less than 10 mg.

Full range of stylii is available from 0.3 mm rubyball upto 18 mm ceramic hemisphere

Accurate Engg. Co. Pvt. Ltd
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Complete 3D Measuring Solutions

Applications

- Power train
- Sheet metal & BIW
- Engineering
- Rail Bogies
- Aerospace
- Dies & Moulds
- Gears

Advantage Accurate CMM

Accurate CMMs are powered with features like,

- In-house infrastructure for CMM Design, Manufacturing, Software Development and Application Support to provide homogeneous solutions.
- Integrated design features like thermally stable materials, Vibration dampers and online temperature compensation to overcome the variation in temperature, dust level, vibrations, light intensity, etc. in shop floor environment.
- The special granite construction ensures same coefficients of expansion for different machine parts.
- Reduced thermal sensitivity by fixing the gold plated metallic scales from Renishaw on the granite itself.
- CNC controllers with I++ protocol to enable customers to tailor the machine with different software applications.
- Provides complete library of probing options from global leaders to include Touch Trigger, Non contact and Continous scanning probes along with Laser scanners and probe with very low measuring force (< 10 gm)

Team Accurate

Accurate has strong team of Application support Engineers, Service Engineers and Training experts in customer support department, providing prompt and economical solutions to every customer. Our team of 45 qualified Engineers assists their customers whenever there is need for any change in measuring application. We have network of service centers spread across in major metros to ensure prompt response by our engineers to attend customer calls on short notice. The team is experienced and has multifunctional knowledge to provide timely solutions.

CMM Software

CMM Software

Software for reliable measurement in three dimensions. The software is simple to use and can be easily upgraded. The software packages are available best for your environment. The software options for Geometrical Measurement, CAD Comparison and Reverse Engineering Applications.

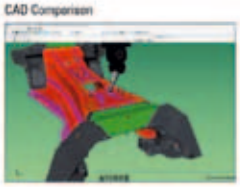
An advanced measuring system is completely integrated with a powerful CAD engine.

- Import of native CAD formats. Group management.
- Alignment on free forms.
- Measuring surface edges in real time.
- Measuring and creating profiles.
- Graphical outputs
- Implementation of the native DMIS language
- Total solution for both prismatic and free form measurement
- Powerful solution for single and dual arm CMM
- Off line graphical programming tools with simulation on the program
- Complete GD & T, geometric dimension and tolerances, as per ASME Y14.5 M 1994
- Extracting geometrical elements from CAD.
- Optimisation of an existing reference.
- Graphical outputs
- Geometrical engine supporting neutral IGES format or native CAD interfaces.
- Export and import of CAD files in UNIGRAPHICS, VDA, CATIA, STEP etc.
- Integrated with articulated arms
- CNC controller and measuring instruments
- I`` compliant & PTB Certified algorithm
- Complete compensation of the CMM errors, Textual, graphical and statistical output representation.

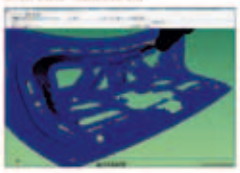
Prismatic Part Measurement

Air Foil Measurement

CAD Comparison



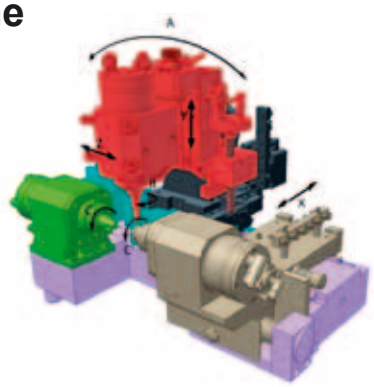
Sheet Metal Measurement



AFFOLTER TECHNOLOGIES SA
Grand-Rue 76
CH-2735 Malleray

Gear hobbing and micro machining centres

GEAR AF90 - Gear hobbing machine



CNC gear hobbing machine with highest productivity and precision thanks to unique combination of Affolter Leste CNC control and Affolter motor spindle

Technical data		AF90
Workpiece data		
Max. workpiece diameter	mm	30
Max. machining length	mm	40
Max. rpm of headstock and tailstock	min^{-1}	5 000
Smallest possible module	mm	0.02
Maximum module (dependent upon material and number of cuts)	mm	0.5 - 0.8
Tool data		
Max. diameter of hob cutter	mm	24
Max. width of hob cutter	mm	20
Angle of inclination of cutter (manual)		+/- 10°
Max. spindle rpm	min^{-1}	16 000

GEAR AF100plus Gear hobbing center

The AF100plus combines quality, productivity and flexibility:
CNC hobbing for wheels and shafts; straight, helical and crowned cuts as well as hobbing of bevel gear wheels.

Technical data		AF100plus
Workpiece data		
Max. workpiece diameter	mm	36
Max. machining length	mm	50
Max. rpm of headstock and tailstock	min^{-1}	5 000
Smallest possible module	mm	0.02
Maximum module (dependent upon material and number of cuts)	mm	0.5 - 1.0
Tool data		
Max. diameter of hob cutter for gear hobbing	mm	24
Max. width of hob cutter	mm	20
Angle of inclination of cutter (B axis NC controlled)		+30° /-30°
Max. spindle rpm	min^{-1}	16 000

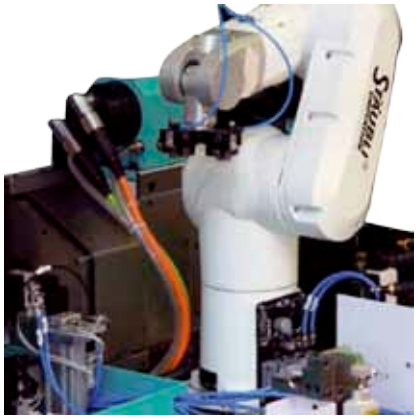
AFFOLTER TECHNOLOGIES SA
Grand-Rue 76
CH-2735 Malleray

Gear hobbing and micro machining centres

GEAR AF101 - automated gear hobbing center







Gear hobbing center with robot automation and various feed systems
such as palletizing system, feeder bowl, conveyor belt and image recognition etc.

Technical data		AF101
Workpiece data		
Max. workpiece diameter	mm	36
Max. machining length	mm	50
Max. rpm of headstock and tailstock	min^{-1}	5 000
Smallest possible module	mm	0.02
Maximum module (dependent upon material and number of cuts)	mm	0.5 - 0.8
Tool data		
Max. diameter of hob cutter for gear hobbing	mm	24
Max. width of hob cutter	mm	20
Angle of inclination of cutter (B axis NC controlled)		+30° / -30°
Max. spindle rpm	min^{-1}	16 000

GEAR AF110 - powerful gear hobbing center







High precision gear hobbing center with high stability and high spindle performance
with or without automation

Technical data		AF110
Workpiece data		
Max. workpiece diameter	mm	60
Max. machining length	mm	90
Max. rpm of headstock and tailstock	min^{-1}	2 000
Smallest possible module	mm	0.02
Maximum module (dependent upon material and number of cuts)	mm	0.5 - 1.25
Tool data		
Max. diameter of hob cutter	mm	38
Max. width of hob cutter	mm	50 (2 x 25)
Angle of inclination of cutter (automatic)		+30° / -45°
Max. spindle rpm	min^{-1}	12 000

BalTec Maschinenbau AG
Obermattstrasse 65
CH-8330 Pfäffikon

Radial riveting and cold forming for joining

BalTec radial riveting and forming technology is considered to be the most modern riveting and forming principle worldwide. Where high-quality joints are in demand there is currently no comparable process. Even joints which hitherto could only be accomplished with non-rivet technologies are now possible using BalTec radial riveting and forming technology.

A selection of applications:

Home

Window hinges

Moving hinges

Kitchen furniture hardware

Electric connectors

Automobile industry

Steering forks

Hinge for luggage

Seatbelt buckle

Seat adjuster

Radial riveting machines:

An autonomous workstation

Riveting machine
RN 281 with HPP-25

All riveting units can be fitted to special machines, rotary indexing tables or transfer installations and in any required position.

Riveting units - **various sizes**
Riveting shank max. Ø 4 mm to 30 mm
Max. riveting force 1.5 kN to 100 kN

The most important tool profiles

Flat | Conical | Flat-cambered | Flanged | Clinched | Expanded | Cylindrical | High-cambered | Crimped | Drawn-in

BalTec Maschinenbau AG
Obermattstrasse 65
CH-8330 Pfäffikon

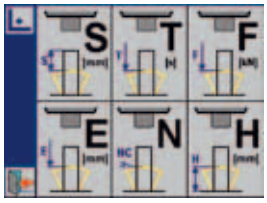
Radial riveting and cold forming for joining

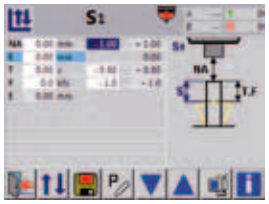
Control systems with/without process monitoring

YOUR decisive competitive edge:
HPP25 Process control with integrated process monitoring

Proof of quality through continuous analysis and documentation of the riveting process.

- 6 different control parameters
- Windows diagnostic software
- USB and Ethernet interfaces





Control systems

HPP25

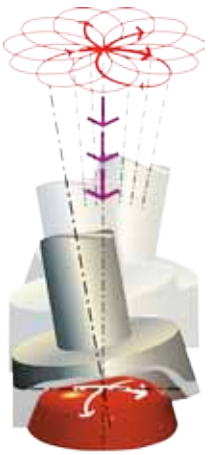
RC30

HPP25 - with process monitoring
control variable selectable: Time, force, rivet head height, spindle distance, forming distance and external signal

RC30 - without process monitoring
variable: Time

More riveting machine models

CNC coordinate riveting machine with round indexing table as a complete and autonomous workstation



CNC coordinate riveting machine with transfer system for integrating into a transfer line

RNS pedestal model RNL long stroke

RND double riveting

RNE with side motor

Carl Benzinger GmbH
Robert-Bosch-Str.28
D-75180 Pforzheim-Büchenbronn

High-precision - lathes

GOFuture

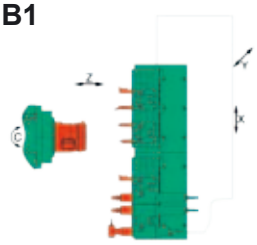
Technical data		GOFuture	B1	B2	B3	B4	B6	BX
X-axis	mm	370 (180 / B2, B3, B4, B6)	●	○(●)	(●)	(●)	(●)	●
X2-axis	mm	195	-	-	-	-	●	-
Z1-axis	mm	260 (294.5 BX)	●	●	●	●	●	(●)
Z2-axis	mm	290	-	-	●	●	●	-
Y-axis	mm	80(-42.5/48 BX)	○	○	○	○	○	(●)
Main spindle	Water-cooled motor spindle			●	●	●	●	●
Bar capacity	mm	26 / 32 / 42	●/○/○	●/○/○	●/○/○	●/○/○	●/○/○	●/○/○
Spindle speed	rpm	6000 / 8000	●/○	●/○	●/○	●/○	●/○	●/○
Driving power (S1)	kW	12 / 15.5	●/○	●/○	●/○	●/○	●/○	●/○
Chuck size	mm	to 160	●	●	●	●	●	●
C-axis resolution	°	0.01 / 0.001	○/○	○/○	○/○	○/○	○/○	○/○
Opposed spindle	Water-cooled motor spindle			-	●	-	●	-
Spindle bore	mm	26	-	-	●	-	●	-
Spindle speed	rpm	to 8000	-	-	●	-	●	-
Driving power (S1)	kW	12	-	-	●	-	●	-
Chuck size	mm	to 130	-	-	●	-	●	-
C-axis resolution	°	0.01 / 0.001	-	-	○	-	○	-
Tool carrier	Linear system BENZINGER		●	○	-	-	●	○
Turret	Star turret VDI 25 DIN 69880		-	●	●	●	●●	-
Number of tool places		12 / 16	-	●/○	●/○	●/○	(●●)/((○))	-
Single motor drive	rpm	6 000	-	○	●	●	●●	-
Max. driving power	kW / Nm	6 / 12.5	-	○	●	●	●●	-
Tailstock								
Quill stroke/travel	mm	110 / 270	-	-	-	●	-	-
Control	Siemens 840D sl / Fanuc 31i-B		●/●	●/●	●/●	●/●	●/●	●/●

● Standard ○ Option

Precision lathe for complete machining, 1 or 2 spindle

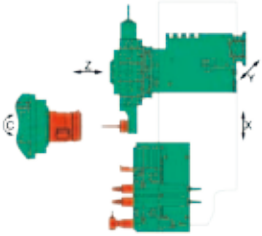
The ***GOFuture*** combines maximum precision with a compact footprint. The modular design plus numerous additional options such as rotary tables, milling, drilling and grinding units as well as automatic loading and unloading systems mean that customer-specific adaptations can be made even better and more efficiently than previously.

B1



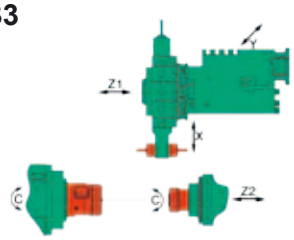
*Variant **B1** with linear tool setup for or the shortest cycle times, optionally with Y-axis*

B2



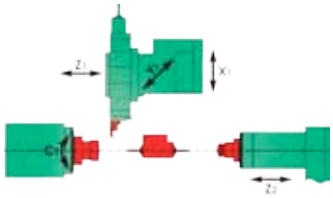
*Variant **B2** with VDI 25 turret with 12 or optionally 16 stations, constructed on the X-axis slide, optionally with single place drive, optionally with Y-axis*

B3



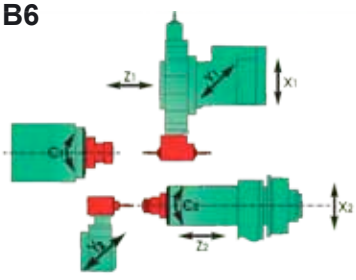
*Variant **B3** with opposed spindle (traversable in Z-direction) for complete machining in sequence, star turret VDI 25 on compound rest with 12 or optionally 16 tool places and single place drive, optionally with Y-axis*

B4



*Variant **B4** with manual tailstock, optionally on NC-axis*

B6



2 work spindles with C-axis, 2 VDI 25 turrets with 12 or 16 tool places, each with a single place drive, Y-axis for both spindles, turret 1 and opposing spindle on separate compound rest, stationary turret 2, simultaneous complete machining

GOFuture BX

Carl Benzinger GmbH
Robert-Bosch-Str.28
D-75180 Pforzheim-Büchenbronn

High-precision - lathes

CNC-precision turning-milling centre with 3 expansion stages

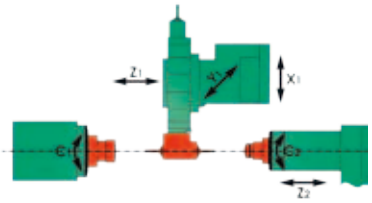
For simultaneous complete machining from bar up to maximum Ø 42 mm or for chuck components, optionally with Y-axis

TNI

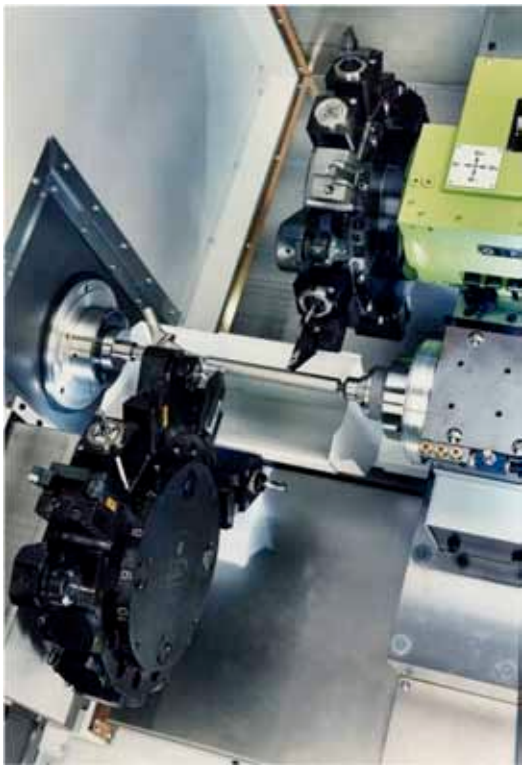
Technical data		*TNI*	B2	B6	B10
X1-axis	mm	180	●	●	●
X2-axis	mm	195	-	●	●
X3-axis	mm	170	-	-	●
Z1-axis	mm	340	●	●	●
Z2-axis	mm	440	●	●	●
Z3-axis	mm	180	-	-	●
Y1-axis	mm	+40 / -40	○	○	○
Y2-axis	mm	+40 / -25	-	-	○
Main spindle					
Capacity	mm	32 / 42	●/○	●/○	●/○
Spindle speed	rpm	6 000 / 8 000	●/○	●/○	●/○
Driving power (S1)	kW	15.5	●/○	●/○	●/○
Chuck size	mm	to 160	●	●	●
C-axis	°	0.01 / 0.001	●/○	●/○	●/○
Tool systems					
Star turret		VDI 25 DIN 69880	●	●	●
Number of tool places		12 / 16	●/○	●/○	●/○
Speed, single drive	rpm	6 000	●	●	●
Opposed spindle					
Bar capacity	mm	26	●	●	●
Spindle speed	rpm	6,000 / 8,000	●/○	●/○	●/○
Driving power (S1)	kW	12	●	●	●
Chuck size	mm	to 130	●	●	●
C-axis resolution	°	0.01 / 0.001	●/○	●/○	●/○
Control		Siemens 840Dsl, Fanuc 31 i-B			

● Standard ○ Option

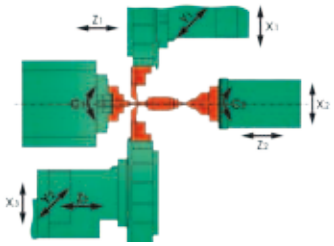
TNI-B2



2 work spindles with C-axis, 1 turret VDI 25 on compound rest with 12 or 16 tool places, each with single place drive, Y-axis for both spindles, complete machining in sequence

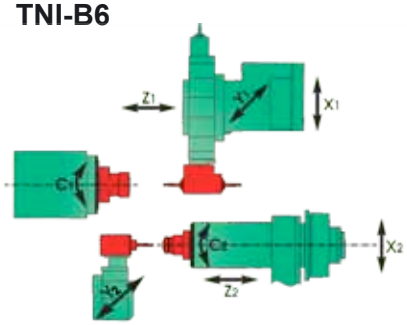


TNI-B10



2 work spindles with C-axis, 2 VDI 25 turrets each with 16 tool places, each with a single place drive, Y-axis for both spindles, turret 1 and turret 2 on separate compound rest, Opposed spindle/tailstock with separate Z-axis, simultaneous machining with turret 1 and turret 2 on main spindle or opposed spindle

TNI-B6



2 work spindles with C-axis, 2 VDI 25 turrets with 12 or 16 tool places, each with a single place drive, Y-axis for both spindles, turret 1 and opposing spindle on separate compound rest, stationary turret 2, simultaneous complete machining

Carl Benzinger GmbH
Robert-Bosch-Str.28
D-75180 Pforzheim-Büchenbronn

High-precision - lathes

5-axis precision turning and milling centre

With 2 machining spindles for 5-axis and simultaneous 3-axis milling or turning - for complete machining of complex workpieces with the lowest possible set-up times

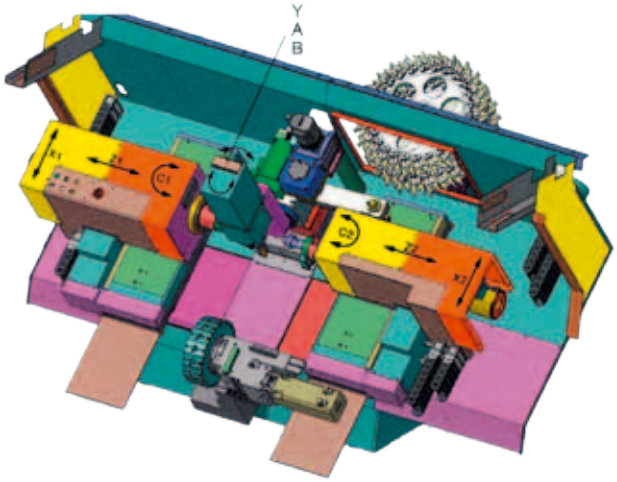
Take5

Technical data		*Take5*	
Travel X-axis	mm	370	●
Travel Z-axis	mm	190	●
Travel Y1-axis	mm	-40 / +85	●
Travel Y2-axis	mm	-25 / +25	●
Main spindle		Water-cooled motor spindle, indexable for milling operation	●
Bar capacity	mm	26, 32, 42	○/●/○
Spindle speed	rpm	6 000 / 8 000	●/○
Driving power (S1)	kW	15.5	●
Chuck size	mm	to 130	●
C-axis resolution	°	0.01 / 0.001	●/○
Opposed spindle		Water-cooled motor spindle, indexable for milling operation	●
Bar capacity	mm	26, 32, 42	●/○/○
Spindle speed	rpm	6 000 / 8 000	●/○
Driving power (S1)	kW	12	●
Chuck size	mm	to 130	●
C-axis resolution	°	0.01 / 0.001	●
Turning turret		VDI 25 DIN 69880	●
Number of tool places		16	●
Single drive 16x	rpm	6 000	●
Max. driving power	kW/Nm	6 / 12.5	●
Milling spindle		Water-cooled milling spindle, indexable for turning	●
Maximum spindle-speed	rpm	30 000	●
Driving power (S1)	kW	10	●
Tool holder		HSK-T40	●
Tool changer			
Magazine places / expansion		52 internal /	●/○
Tool measurement		Laser	○
Control		Siemens 840Dsl	●

● Standard ○ Option

Star turret VDI25 with 16 tool places, each with a single place drive

The respective working spaces of the main spindle and opposed spindle are spatially serially separated from each other in the X-direction so that a collision during machining is not possible.



BENZINGER
PRÄZISIONSMASCHINEN

Carl Benzinger GmbH
Robert-Bosch-Str.28
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High-precision - lathes

Technical data		*mµFuture*	B1	B5
X-axis	mm	470	●	-
X1/X2-axis	mm	Each 200 (independent	-	●
X1/X2-axis	mm	Each 320 (coupled movement)	-	●
Z1-axis	mm	210	●	●
Z2-axis	mm	210	-	●
Main spindle	Water-cooled motor spindle			
Bar capacity	mm	26, 32, 42	●/○/○	●/○/○
Spindle speed	rpm	6 000 / 8 000	●/○	●/○
Driving power (S1)	kW	12	●/○	●/○
Chuck size	mm	to 160	●	●
C-axis resolution	°	0.01 / 0.001	●/○	●/○
Tool carrier	Linear system BENZINGER		○	○
	Third-party machinery		○	○
Turret	Disc-type turret VDI 25 DIN 69880		●	●
Number of tool places		12 / 12 powered	●/○	●/○
Single motor drive	rpm	6 000	○	○
Max. driving power	kW/Nm	6 / 12.5	○	○
Control	Siemens 840D			●

● Standard ○ Option

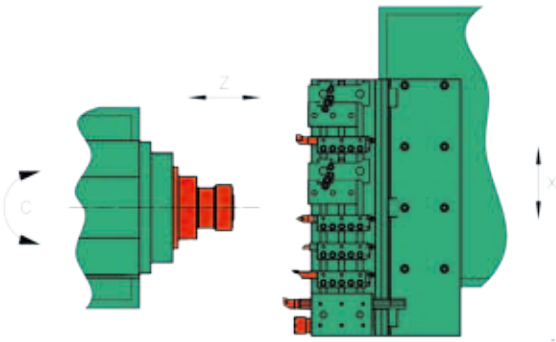
mµFuture

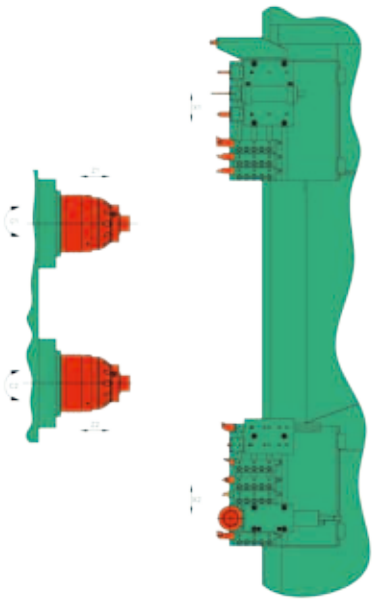
High-precision machine, 1 or 2 spindle
in conjunction with various automation
techniques!

Maximum precision when turning by separation
of X-axis and Z-axis - paired
with minimum cycle times!

Expansion stage B1:
Optionally with NC-swivel loader for shortest possible workpiece changeover times, linear tool setup, optionally with grinding spindle

*Expansion stage **B5**:*
2 spindle with swivel loader for shortest possible workpiece changeover times,
Linear tool setup





New machining options by
combination of hard turning and grinding
Plus outstanding surface quality
by polish turning!

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High-precision - lathes

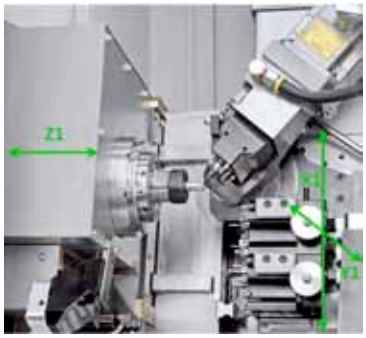
DOLittle

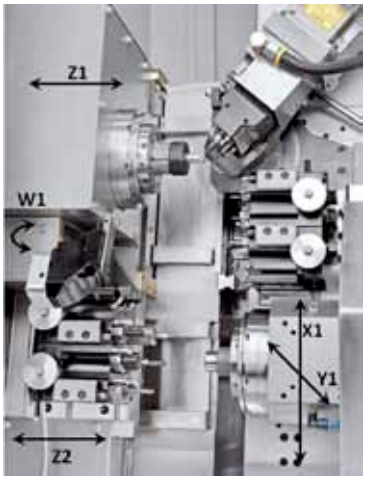
Technical data		*DOLittle*	B1	B2	B3	B5
X-axis	mm	320	●	●	●	-
X1/X2-axis	mm	140	-	-	-	●
Z1-axis	mm	145 (opt.185) (185 / B5)	●	●	●	(●)
Z2-axis	mm	90 (185 / B5)	-	-	●	(●)
Y-axis	mm	80	●	●	●	○
Main spindle	Water-cooled motor spindle		●	●	●	●●
Bar capacity	mm	16 / 26	●/●	●/●	●/-	●●/○○
Spindle speed	rpm	15 000 / 6 000 (8 000)	●/●/(○)	●/●/(○)	●/-	●●/○○(○○)
Driving power (S1)	kW	13 / 12	●/●	●/●	●/-	●●/○○
Chuck size	mm	to 65	●	●	●	●●
C-axis resolution	°	0.001	○	○	○	○○
Opposed spindle	Water-cooled motor spindle		-	-	●	-
Bar capacity	mm	16	-	-	●	-
Spindle speed	rpm	15 000	-	-	●	-
Driving power (S1)	kW	13	-	-	●	-
Chuck size	mm	to 65	-	-	●	-
C-axis resolution	°	0.001	-	-	○	-
Tool carrier	Linear system BENZINGER		●	○	●	●
Turret	Disc-type turret VDI20/VDI16		-	(●)/(○)	-	-
Manufacturer		Sauter Company	-	●	-	-
Tool places / powered		(12/ 6) / (12/ 6)	-	(●)/(○)/(●)/(○)	-	-
Milling installation						
Number of tools		max. 6	○	-	○	-
Spindle speed	rpm	2x6 000 / 4x18 000	○	-	○	-
	Swivelling up to fixed stop		○	-	○	-
	Swivelling via NC axis		○	-	○	-
Control	Siemens 828D / 840 Dsl		●/○	●/○	-/●	-/●

● Standard ○ Option

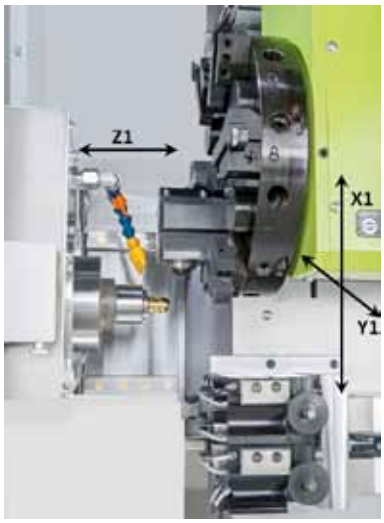
Maximum precision for small turned parts in space-saving and compact format; optionally with opposed spindle, Y-axis as standard

DOLittle ***B1***





DOLittle ***B3***



DOLittle ***B2***

DOLittle ***B5***

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Automation

Automation solutions

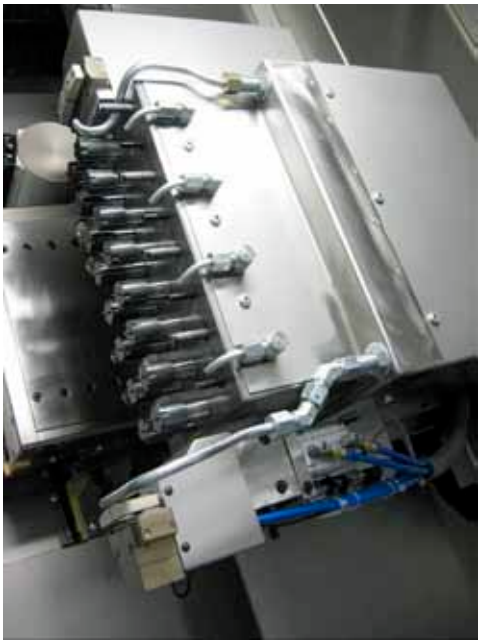
- Benzinger has a lot of experience with additional automation solutions for different systems so that our customers can configure their production technology even more efficiently and effectively.

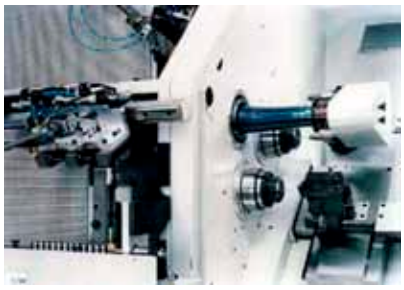
Gantry solution

- Compact design integrated into the machine enclosure
- Complete system controlled via a control (Sinumerik 840D), no external interfaces used
- Gantry space flexibly positionable in 3D
- High positioning accuracy
- Other operations, e.g. washing, cleaning, measuring and fitting can be performed without affecting the production time
- Proven automation concept already used multiple times

Integrated loading

- Shortest possible workpiece changeover times from about 3 seconds
- Individual design to match customer parts
- Lots of standard solutions already available
- Perfect integration into the machine concept





Swivel loader special solution

- Quick automation for single and double spindle machines
- CNC controlled

Robotic solution

- Fully automated production solution
- Also suitable for a wide range of workpieces and special workpiece types
- Shortest possible workpiece changeover times and short non-productive times
- Complete production processes possible including part handling, clean-up, measuring and packaging of parts
- High precision and repeatability results in optimum parts quality
- Enables 24h production resulting directly in increased production and ensuring deadlines are always met

FEHLMANN AG
Birren 1
CH-5703 Seon

High precision machine tools / machining centres

Precision coordinate milling and drilling machines

PICOMAX 21-

Technical data		PICOMAX 20-D	PICOMAX 21-M
Travel		**KS 323 D**	**KS 323 M**
Travel X	mm	450	450
Travel Y	mm	260	260
Travel Z	mm	110	110
Max. head movement W	mm	450	450
Working area			
Clamping area L x W	mm	770x320	770 x 320
Clearance table - spindle nose	mm	77 - 527	77 - 527
Permissible table load	kg	200	200
Work spindle			
Drive power	kW	2.9	2.9
Torque	Nm	40	40
Speed infinitely variable	min^{-1}	50 - 6 300	50 - 6 300
Toolholder		SF 32	SF 32
Feed drive			
Feed rate X	mm/min	-	1 - 2 000
Feed rate Y	mm/min	-	1 - 2 000
Feed rate Z	mm/min	manual	manual
Tool magazine			
Number of magazine compartments		8 /12	12
Digital display/control		**ND780**	**POSITIP 8013**
Weight			
Incl. base/control box	kg	850	930

Precision milling machines of vertical design

PICOMAX 56 *TOP*

Technical data		PICOMAX 56 TOP	PICOMAX 56L TOP
Travel			
Travel X	mm	500	800
Travel Y	mm	400	400
Travel Z	mm	400	400
Working area			
Clamping area L x W	mm	908 x 480	1 400 x 480
Clearance table - spindle nose	mm	120 - 520	120 - 520
Permissible table load	kg	250	350
Work spindle			
Drive power	kW	9.5	9.5
Torque	Nm	60	60
Speed infinitely variable	min^{-1}	50 - 12 000	50 - 12 000
Toolholder		SK 30	SK 30
Feed drive			
Feed rate X	mm/min	1 - 20 000	1 - 30 000
Feed rate Y, Z	mm/min	1 - 20 000	1 - 20 000
Positioning accuracy (ISO 230-2)			
Position tolerance A	mm	0.006	0.006
Position scatter band R	mm	0.004	0.004
Tool changer			
Number of magazine compartments		- (20 / 30)	- (20 / 30)
Digital display/control		TNC 620	TNC 620
Connectable axis (optional)		A	A
Weight			
Incl. base/control box	kg	3 250	4 000

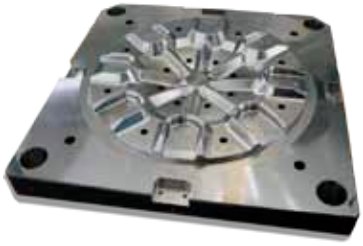
FEHLMANN AG
Birren 1
CH-5703 Seon

High precision machine tools / machining centres

HSC vertical machining centres from 3 to 5 axes

PICOMAX 75

Technical data		PICOMAX 75		PICOMAX 95	
Travel					
Travel X	mm	600		800	
Travel Y	mm	400		500	
Travel Z	mm	610		610	
Working area					
Clamping area L x W	mm	1 160 x 475		1 600 x 550	
Clearance 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	kW	10.5	12 (17,8)	24	25.5
Torque	Nm	74	30 (14,6)	120	74
Speed infinitely variable	min^{-1}	50 - 14 (20 000)	50 - 30 (36 000)	50 - 14 (20 000)	50 - 24 000
Feed drive					
Feed rate X, Y, Z	mm/min	1 - 30 000		1 - 30 000	
Positioning accuracy (ISO 230-2)					
Position tolerance A (X/Y/Z)	mm	0.005 (0,003)		0.005 (0,003)	
Position scatter band R (X/Y/Z)	mm	0.003 (0,002)		0.003 (0,002)	
Tool changer					
Number of magazine compartments		50 (80)		48 (80)	
Digital display / control		**TNC 640**		**TNC 640**	
Connectable axis (optional)		B / C		B / C	
Weight					
with standard coolant system	kg	5 300		9 400	



Automatic CNC dividing/ swivelling unit ATS 200 DD

PICOMAX 95

Technical data		ATS 200
Centre 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	7 600
Feed rate C	Degrees/min	10 000
Clamping		
Clamping torque B	Nm	1 000
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		
Incl. base/control box	kg	150

HSC vertical machining centres in portal design

VERSA 645 linear

Technical data		VERSA 640 linear	
Travel		VERSA 643	VERSA 645
Travel X	mm	350	
Travel Y	mm	500	
Travel Z	mm	300	
Travel A	Degrees	-	+ / - 120
Travel C	Degrees	-	360
Working area			
Clamping area L x W	mm	620 x 500	320 x 320
Clearance table - spindle nose	mm	100 - 400	
Permissible table load	kg	400	150
Work spindle		**HSK-E50**	**HSK-E40**
Drive power	kW	12	17
Torque	Nm	30	6.3
Speed infinitely variable	min^{-1}	50 - 30 000	50 - 42 000
Feed drive			
Feed rate X, Y, Z	mm/min	1 - 50 000	
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 scatter band R (X/Y/Z)	mm	0.003 (0.002)	
Position tolerance A (A/C)	Degrees	-	0.003 (0.002)
Position scatter band R (A/C)	Degrees	-	0.002 (0.0015)
Tool changer (Number of magazine		50 (86,200, 225)	
Digital display / control		**TNC 640**	
Weight with standard coolant system	kg	7 500	

VERSA 825

Technical data		VERSA 820	
Travel		VERSA 823	VERSA 825
Travel X	mm	875	
Travel Y	mm	700	
Travel Z	mm	450	
Travel A	Degrees	-	+ / - 115
Travel C	Degrees	-	360
Working area			
Clamping area L x W	mm	1 200 x 750	460 x 460
Clearance table - spindle nose	mm	150 - 600	120 - 570
Permissible table load	kg	1 000	350
Work spindle		**HSK-A63**	**HSK-E50**
Drive power	kW	24 (25.5)	12
Torque	Nm	120 (74)	30
Speed infinitely variable	min^{-1}	50 - 20 (24 000)	50 - 30 000
Feed drive			
Feed rate X, Y, Z	mm/min	1 - 30 (48 000)	
Feed rate A	rpm	-	30
Feed rate C	rpm	-	60
Positioning accuracy (ISO 230-2)			
Position tolerance A (X/Y/Z)	mm	0.005 (0.003)	
Position scatter band R (X/Y/Z)	mm	0.003 (0.002)	
Position tolerance A (A/C)	Degrees	-	0.003 (0.002)
Position scatter band R (A/C)	Degrees	-	0.002 (0.0015)
Tool changer (Number of magazine		44 (80,186, 218, 346)	
Digital display / control		**TNC 640**	
Weight with standard coolant system	kg	10 400	

FEHLMANN AG
Birren 1
CH-5703 Seon

Standard solutions for automated production

VERSA 825 with Robot Easy

	Pallets	Transfer weight	Pos. / level
Robot Easy	ITS 50 / holder 72	20 kg	60
	ITS 115 / ITS 148	40 kg	24
	PC210	130 kg	12
	UPC	130 kg	10
	MTS400	250 kg	6
Auto gripper changeover	not possible	Number of magazine levels	1
Loading station	not possible	with max component height	400 mm
2 machine solution	not possible	Suitable for	VERSA 820/640

VERSA 645 with Robot Compact 80

Automation	Pallets	Transfer weight	Pos. / level
Robot Compact 80	ITS 50	20 kg	11
	PM85	30 kg	9
	ITS148	40 kg	5
	PC210	80 kg	3
	UPC	80 kg	2
Auto gripper changeover	possible	Number of magazine levels	2 x 6
Loading station	possible	with max component height	130 mm
2 machine solution	possible	Suitable for	VERSA 820/640 PICOMAX 75 / 95

2 x PICOMAX 75 with Robot Multi

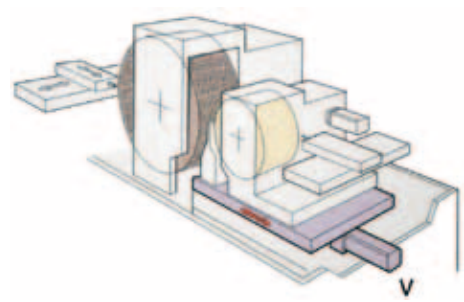
Automation	Pallets	Transfer weight	Pos. / level
Robot Multi	ITS 50	20 kg	30
	PM85	30 kg	30
	ITS148	40 kg	15
	PC210	80 kg	10
	UPC	80 kg	5
Auto gripper changeover	possible	Number of magazine levels	8
Loading station	possible	with max component height	100 mm
2 machine solution	possible	Suitable for	VERSA 820/640 PICOMAX 75 / 95

GHIRINGHELLI S.P.A.
Via Asmara, 19
I-21016 Luino

Centreless cylindrical grinding machines

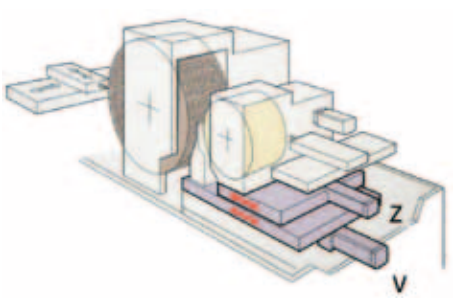
1 axis

Possibility of controlling the upper or lower regulator wheel slide



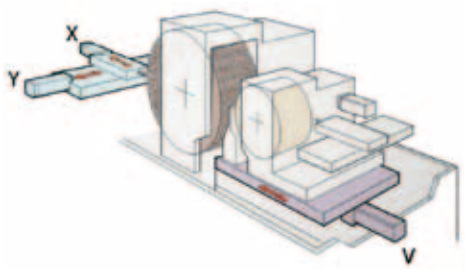
2 axes

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



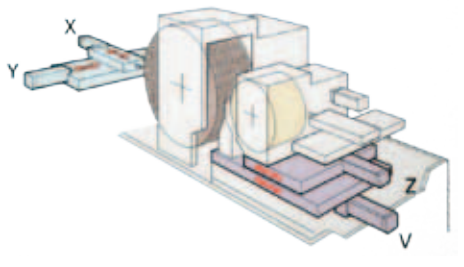
3 axes

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



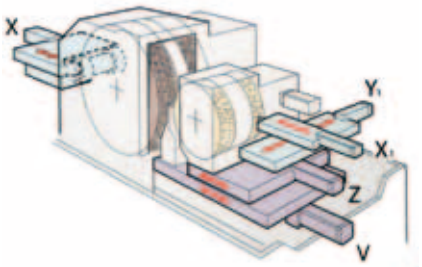
4 axes

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



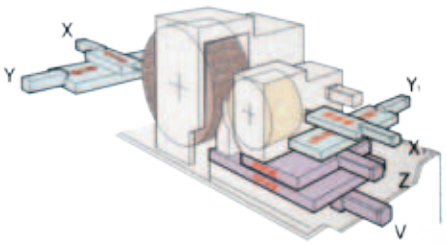
5 axes

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



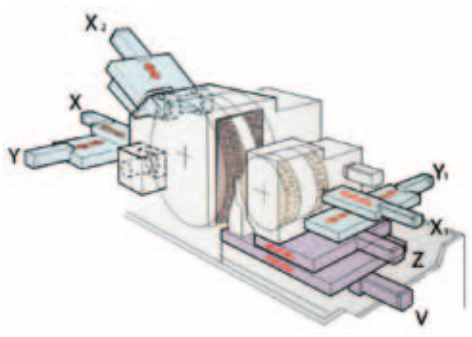
6 axes

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



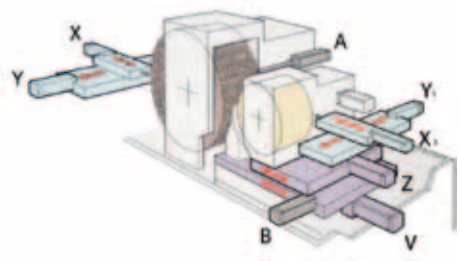
7 axes

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



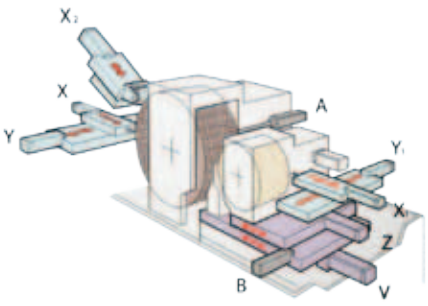
8 axes

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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Centreless cylindrical grinding machines

APG-S

TECHNICAL DATA		APG-S		
Operating range				
Min. grinding diameter	mm	1.5		
Max. grinding diameter	mm	70		
Max. grinding length	mm	150	200	250
Grinding wheel				
Max. width of grinding wheel	mm	154	205	254
Grinding wheel diameter	mm	610/508		
Grinding wheel bore	mm	304.8		
Regulator wheel				
Max. width of regulator	mm	154	205	254
Regulator wheel diameter	mm	305		
Regulator wheel bore	mm	152.4		
Weight	kg	8 100	8 650	8 800

TECHNICAL DATA	M100	
Operating range		
Min. grinding diameter	mm	1.5
Max. grinding diameter	mm	20
Max. grinding length	mm	100
Grinding wheel		
Max. width of grinding wheel	mm	120
Grinding wheel diameter	mm	406
Grinding wheel bore	mm	203.2
Drive power	kW	7.5 (10)
Regulator wheel		
Max. width of regulator wheel	mm	120
Regulator wheel diameter	mm	205
Regulator wheel bore	mm	127
Weight	kg	2 800

M100

APG-M

TECHNICAL DATA	APG-M	
Operating range		
Min. grinding diameter	mm	2
Max. grinding diameter	mm	70
Max. grinding length	mm	300
Grinding wheel		
Max. width of grinding wheel	mm	305
Grinding wheel diameter	mm	610
Grinding wheel bore	mm	304.8
Regulator wheel		
Max. width of regulator wheel	mm	305
Regulator wheel diameter	mm	355
Regulator wheel bore	mm	203.4
Weight	kg	9 050

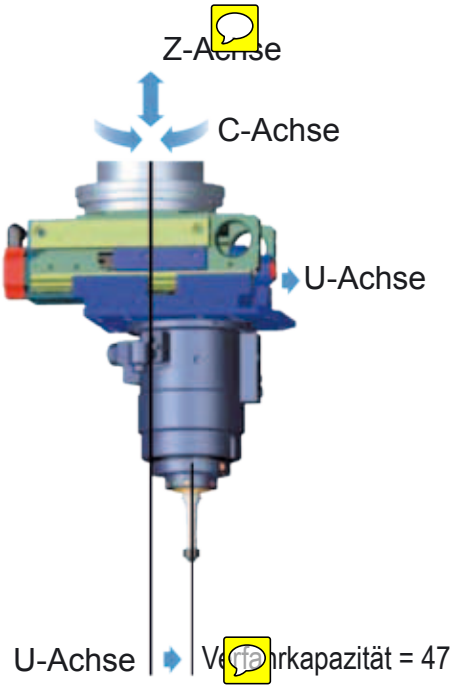
TECHNICAL DATA	CF-400	
Operating range		
Min. grinding diameter	mm	3
Max. grinding diameter	mm	80
Max. grinding length	mm	400
Grinding wheel		
Max. width of grinding wheel	mm	406
Grinding wheel diameter	mm	610
Grinding wheel bore	mm	304.8
Regulator wheel		
Max. width of regulator wheel	mm	406
Regulator wheel diameter	mm	350
Regulator wheel bore	mm	203.4
Weight	kg	9 500

CF-400

L.Kellenberger & Co.AG
Längfeldweg 107
CH-2500 Biel-Bienne 8

High-precision jig grinding machines

HAUSER H35



Technical data		H35
Operating range		
Adjustment range X, Y	mm	500 x 300
Vertical adjustment of the grinding head (W)	mm	450
Clearance between table surface and carrier plate for U axis grinding motor	mm	700
Distance between spindle axis and upright columns	mm	365
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
• Grinding motor 70S with extension plates, semi-automatic mode	mm	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
• Grinding motor 40S with extension plates, semi-automatic mode	mm	max. 360
Taper grinding, included angle (divergent or convergent)	Degrees	max. 120
Table		
Usable surface	mm	600 x 380
6/7 T-slots, width	mm	10
Permissible load	kg	max. 300
Feeds		
Table saddle and vertical slide X, Y, W		
• Machining speed	mm/min	0 - 2,000
• Traversing speed	mm/min	2,000
Grinding spindle Z, C, U		
Diameter of the spindle sleeve	mm	125
Basic machine is prepared for use of the following grinding spindle speeds:		
• Electric grinding motor 40S, infinitely adjustable & programmable	min^{-1}	4,000 - 40,000
• Electric grinding motor 22S, infinitely adjustable & programmable	min^{-1}	4,500 - 22,500
• Electric grinding motor 45S, infinitely adjustable & programmable	min^{-1}	9,000 - 45,000
• Electric grinding motor 70S, infinitely adjustable & programmable	min^{-1}	9,000 - 70,000
• System to allow use of grinding turbine T13	min^{-1}	up to 130,000
C-axis planetary speed:		
• Planetary speed, infinitely adjustable and programmable	min^{-1}	5 - 350
• Follow-up mode, AC servo drive	min^{-1}	up to 10
Z-axis as alternating stroke:		
• Z stroke movement, infinitely adjustable from	mm/min	V min. 0.500
• Z stroke movement, infinitely adjustable up to	mm/min	V max. 22,000
• Z-stroke frequency	Hz	max. 8
• Z-stroke length, infinitely adjustable	mm	0.1 mm to 170
U axis radial travel capacity in CNC-mode	mm	from -3 mm to +47
Accuracies		
Position uncertainty of axes X, Y and W, according to VDI/DGQ 3441	mm	0.0020

Grinding motor

Dressing

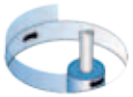
L.Kellenberger & Co.AG
Längfeldweg 107
CH-2500 Biel-Bienne 8

High-precision jig grinding machines

Drive part

Precision part

HAUSER H45 - 400



Grinding mandrel

Multi-sensor system

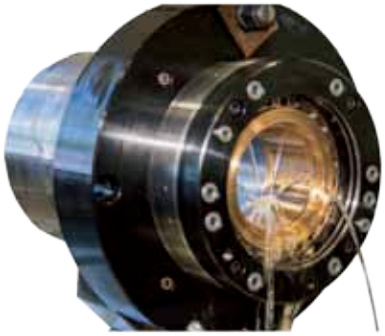
Technical data		H45	H55
Operating range			
Adjustment range X, Y	mm	700 x 500	1 300 x 800
Vertical adjustment of the grinding head (W)	mm	500	635
Clearance between table surface and carrier plate for U axis grinding motor	mm	max. 785	max. 905
Distance between spindle axis and upright columns	mm	750	970
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 or convergent)	°	max. 120	max. 120
Table			
Usable surface	mm	770 x 630	1 440 x 860
6/7 T-slots, width	mm	14	14
Permissible load	kg	max. 500	max. 800 (1500)
Feeds			
Table, saddle and vertical slides X, Y, W			
• Machining speed	mm/min	0 - 2 000	0 - 2 000
• Traversing speed	mm/min	4 000	4 000
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:			
• Electric grinding motor 40S, infinitely adjustable & programmable	min^{-1}	4 000 - 40 000	4 000 - 40 000
• Electric grinding motor 22S, infinitely adjustable & programmable	min^{-1}	4 500 - 22 500	4 500 - 22 500
• Electric grinding motor 45S, infinitely adjustable & programmable	min^{-1}	9 000 - 45 000	9 000 - 45 000
• Electric grinding motor 70S, infinitely adjustable & programmable	min^{-1}	9 000 - 70 000	9 000 - 70 000
• System to allow use of grinding turbine T13	min^{-1}	Up to 130 000	Up to 130 000
C-axis planetary speed:			
• Planetary speed, infinitely adjustable and programmable	min^{-1}	5 - 350	5 - 350
• Follow-up mode, AC servo drive	min^{-1}	up to 10	up to 10
Z-axis as alternating stroke:			
• Z stroke movement, infinitely adjustable from	mm/min	V min. 0.500	V min. 0.500
• Z stroke movement, infinitely adjustable up to	mm/min	V max. 22 000	V max. 22 000
• Z-stroke frequency	Hz	max. 8	max. 8
• Z-stroke length, infinitely adjustable	mm	0.1 to 170	0.1 to 170
U axis radial travel capacity in CNC-mode	mm	from -3 to +47	from -3 to +47
Accuracies			
Position uncertainty of axes X, Y and W, according to VDI/DGQ 3441	mm	0.0025	0.0025

Hembrug Machine Tools
H.Figeeweg 1a+b
NL-2031HA Haarlem

Hard turning machines

Hembrug Hard turning

Hard turning is concerned with the process of single point cutting of hardened workpieces within the 2 micron range with hardnesses between 58 and 70 HRC.



All Mikroturn® hard turning machines have a hydrostatic main spindle and guideways

High demands on the accuracy of precision components can only be fulfilled with suitable machine concepts. Requirements are an excellent static and dynamic stiffness, a true running accuracy of the main spindle in the sub-micrometre range and high thermal stability. The hydrostatic components in the Mikroturn® machine series are superior to all other conventional bearing systems and provide immense advantages.

- A new continuous oil film over the total lengt h of the guideways and bearing elements are a guarantee for excellent damping characteristics and a high static and dynamic stiffness.
- The avoidance of metal contact and resultant wear guarantees a long and reliable service life of the machine and low operating costs.
- The temperature regulated oil flow ensures thermal stability.
- Due to the absence of any stick-slip effect the smallest increments of movement of 0.01 µm are possible.

Cost saving

With hard finish-turning hardened workpieces can be repeatedly machined on one hard finish-turning machine in one and the same chucking operation. By this means conventional multi-stage grinding in two or three operations can be dispensed with.

More flexibility

Using standard CBN indexable inserts and a single chucking operation a huge variety of workpieces with differing contours and sizes can be machined. This ensures greater flexibility in production and reduces changeover times.

Tight tolerances

Hard finish turning enables complex machining of even complex workpieces in one chucking operation. As a result extremely high accuracies of concentricity, angularity and roundness can be achieved.

High productivity

Hard finish turning guarantees greater material removal per operation in comparison to grinding. As a result hard turning is 3 to 4 times faster than cylindrical grinding.

HEMBRUG
MACHINE TOOLS

Hembrug Machine Tools
H.Figeeweg 1a+b
NL-2031HA Haarlem

Hard turning machines

Mikroturn® Horizontal Series

Mikroturn® 100

Tools, forms

Mikroturn® 200 L

Spindle nuts

Automotive

Bearing roller

Mikroturn® 500 XL

Hydraulic components

Mikroturn®Twin Spindle

Technical data		Base Line	100	200 L	500 XL	Twin
Max. turning diameter	mm	380	380	380	500	100
Max. turning length	mm	350	350	700	500	50
Max. weight of workpiece incl. clamping	kg	50	50	50	300	1
Max. spindle speed	rpm	4 000	2 000 / 4 000 / 8 000	4 000	2 000 / 1 200	8 000 / 10 000
Nominal torque	Nm	50 / 100	50 / 100	50 / 100	249 / 300	50
True running accuracy of main spindle	µm	0.15	0.1	0.1	0.1	0.1
Z axes travel	mm	350	350	750	750	350
X axes travel	mm	240	240	210	400	260
Max. travel speed	m/min	10	10	30	30	30
Max. feed rate	m/min	0 - 10	0 - 10	0 - 30	0 - 30	0 - 30
Positioning accuracy	µm	1	1	1	1	1
Reproducibility of the slideways +/-	µm	0.1	0.1	0.1	0.1	0.1
Resolution of control system	µm	0.1	0.01	0.01	0.01	0.01

Hembrug Machine Tools
H.Figeeweg 1a+b
NL-2031HA Haarlem

Hard finish turning machines

Mikroturn® Vertical series

Mikroturn® 650

Mikroturn® 800 V

Mikroturn® 1000 V

Mikroturn® 1500 V4

Mikroturn® 1000 V4

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

Hembrug Machine Tools
H.Figeeweg 1a+b
NL-2031HA Haarlem

Hembrug combi process

Mikropolisch® / Mikrogrind® / Mikrofinisch®

As far as the development of industrial processing machinery is concerned we are increasingly witnessing the development of multifunctional and all-in-one processing machines because demands on productivity and precision are increasingly more stringent. Mikroturn® machines can be equipped with grinding, so that for every part of the surface to be machined the most suitable technology can be applied. This leads to shorter machining times, superior quality of workpieces and lower costs per workpiece.

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 < 0.1 µm**	**Ra 0.02 – 0.05 µm**

Henninger GmbH u. Co. KG
Humboldstrasse 20
D-75334 Straubenhardt

Centre - Grinding machines

Centre - grinding machines ZS 102 / 202 / 1000

ZS 102/202 CNC

ZS 102/202

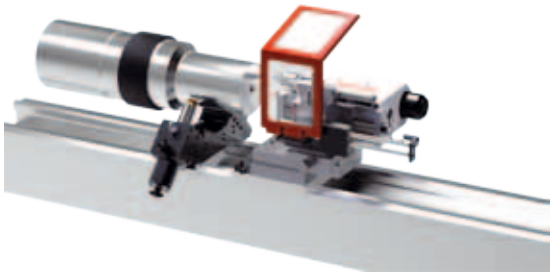
ZS 1000

Technical data		ZS 102	ZS 202		ZS 1000		
		1 200	1 200	1 500	1 000	2 000	3 000
Max. workpiece length	mm	1 100	1 150	1 500	1 000	2 000	3 000
Centre	mm	Ø 1 - 58	Ø 2 - 90		Ø 2 - 120		
Clamping range - Ø	mm	5 - 100	5 - 105 (95 - 160)		30 - 275		
Special clamping range - Ø	mm	-	140 - 225		-		
Max. workpiece weight	kg	100	500		1 000		
Grinding spindle speed	rpm	16 000 - 40 000	9 600 - 24 000		30 000 - 60 000		

Double-sided horizontal centre - grinding machine ZS 2000

Technical data		ZS 2000	
		800	1200
Max. workpiece length	mm	800	1 200
Max. workpiece weight	kg	20	50
Max. workpiece diameter	mm	5 - 100	5 - 150
Workpiece clamping		Two centrally clamping, electrically driven vices	
Number of grinding heads	Piece	2	
Grinding area of the centre holes	mm	2 - 60	
Grinding spindle speed	rpm	10 000 - 30 000	

Horizontal centre grinding unit ZS251 installable for example on a lathe



Technical data		ZS 251
Travel path of the eccentric	mm	20
Eccentric speed	rpm	approx. 30
Grindable centre		
- With stationary workpiece	mm	80
- With rotating workpiece	mm	150
Grinding spindle speed	rpm	10 000 - 30 000

Klein Maschinenbau GmbH u. Co KG
Humboldstrasse 20
D-75334 Straubenhardt

Centre - Grinding machines

ZSS I - II

Immersion grinding of centre holes

Immersion grinding

Linear grinding

ZSU S, L, SL, SF

For linear and immersion grinding of centre holes

Technical data		ZSS I	ZSS II	ZSU S	ZSU L	ZSU SL	ZSU SF
Max. workpiece length type I	mm	1 000	1 000	1 000	1 000	1 000	1 000
Max. workpiece length type II	mm	-	-	1 500	1 500	1 500	1 500
Max. workpiece length type III	mm	-	-	2 000	2 000	2 000	2 000
Centre height	mm	165	165	160	160	160	160
Largest workpiece Ø	mm	325	325	320	320	320	320
Lapping area centring Ø	mm	1 - 120	1 - 120	-	-	-	-
Centring Ø	mm	-	-	1 - 150	1 - 120	1 - 150	1 - 150
Cone angle	Degrees	60 - 90	60 - 90	60 - 90	60 - 90	60 - 90	60 - 90
Infinitely adjustable grinding spindle							
Speed I	rpm	30 - 440	30 - 440	60 000	30 - 440	60 000	60 000
Speed II	rpm	430 - 3450	430 - 3450	-	430 - 3450	430 - 3450	-
Power	kW	0.75	0.75	0.45	0.45	0.45	0.45
Stroke	mm	60	60	60	60	60	60
Clamping Ø grinding spindle	mm	2 - 10	2 - 10	2 - 10	2 - 10	2 - 10	2 - 10
Tailstock							
Morse taper	MK	2	2	4	4	4	4
Load capacity	kg	50	50	160	160	160	160
Dressing spindle							
Dressing wheel Ø	mm	120	120	120	120	120	120

HURON
CRÉATEUR DE MACHINES - OUTILS

HURON GRAFFENSTADEN SAS
Route de Lyon 156
F- 67400 Illkirch Strasbourg

CNC - precision machining centres

VX 6 to 18

CNC vertical machining centres of 3 to 5 axes design

Technical data		VX 6	VX 8	VX 10	VX 12	VX 15	VX 18
Travel distances X/Y/Z	mm	600 / 400 / 460	820 / 510 / 510	1020 / 510 / 510	1220 / 600 / 610	1 510 / 810 / 810	1 810 / 810 / 810
Usable table surface	mm	800 x 500	1 000 x 530	1 200 x 530	1 400 x 630	1 700 x 810	2 000 x 810
Permissible table load	kg	400	500	800	1 200	2 000	2 500
Toolholder		**SK 40** - HSK 63A		**SK 40** - SK50 - HSK 63A			
Spindle performance S1/S6	kW	**10.5 / 14.5**					
Spindle torque S1/S6	Nm	**50 / 69**					
Spindle speed	min^{-1}	**10 000** (8 000 - 15 000 - 18 000)		**10 000** (6 000 - 8 000 - 15 000 - 18 000)			
Clearance table - spindle nose	mm	150 - 610	150 - 660	150 - 660	150 - 760	150 - 960	150 - 960
Rapid traverse X,Y,Z	m/min	24					
Magazine capacity		**24** - 40 (SK40 - HSK63A)		**24** - 40 (SK40 - HSK 63A)	24 - SK50	40 (SK40 - HSK 63A - SK50)	

K2X 8 to 20

KX 30

CNC gantry machining centres of 3 to 5 axes design

Technical data		K2X 8				K2X 10			K2X 20		KX 30			
Travel distances X/Y/Z	mm	700 / 600 / 450				1000 / 800 / 500			1200 / 1000 / 500		1800 / 1000 / 550			
Usable table surface	mm	800 x 600				1150 x 800			1400 x 1000		2000 x 1000			
Permissible table load	kg	500				1000			2000		2500			
Toolholder		**HSK 63A**	HSK 63A	HSK 50E	HSK 40E	**HSK 63A**	HSK 63A	HSK 50E			**HSK 63A**	SK50	HSK 100A	HSK 63A
Spindle performance S1/S6	kW	**20 / 25**	22/36	24/32	10	**25 / 35**	30/40	24/32			**25 / 35**	40/50	40/50	30/40
Torque S1/S6	Nm	**32 / 40**	60/98	15.5/20.6	6.5	**86 / 120**	50/67	15.5/20.6			**86 / 120**	160/200	160/200	50/67
Spindle speed	min^{-1}	**24 000**	16 000	36 000	42 000	**18 000**	24 000	36 000			**18 000**	10 000	12 000	24 000
Rapid traverse X,Y,Z	m/min	40 / 40 / 40				60 / 60 / 60			50 / 60 / 60		30 / 30 / 18			
Positioning accuracy P	mm	0.004				0.004			0.005		X: 0.009 Y, Z: 0.007			
Repeat accuracy Ps	mm	0.002				0.002			0.003		0.005			
Magazine capacity		24 (30)				24 (30, 40, 60)					24 (30, 40, 60)			

CNC gantry machining centres of 3 axes design

K MILL 8 and 10

Technical data		K MILL 8	K MILL 10
Travel distances X/Y/Z	mm	700 / 600 / 500	1 000 / 700 / 600
Usable table surface	mm	800 x 600	1 250 x 700
Permissible table load	kg	500	1 500
Toolholder		SK40	
Spindle performance	kW	26.4	
Torque	Nm	84 - 110	
Spindle speed	min^{-1}	15 000	
Rapid traverse X,Y,Z	m/min	40, 40, 40	30, 30, 18
Positioning accuracy P	mm	X/Y/Z: 0.010	X/Y: 0.015 Z: 0.007
Repeat accuracy Ps	mm	X/Y/Z: 0.005	X/Y: 0.007 Z: 0.005
Magazine capacity		30	

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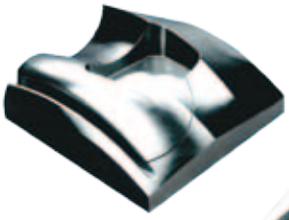
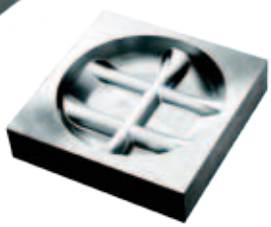
CNC - precision machining centres

CNC gantry machining centres of 3 axes design with greater travel distances





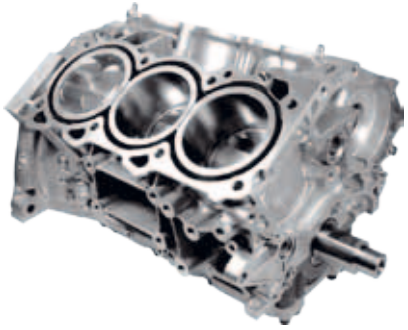
NX 40 to 70

Technical data		NX40	NX50	NX60	NX70
Travel distances X/Y/Z	mm	2200 / 1500 / 800(1000)	3200 / 1500 / 800(1000)	3200 / 2200 / 800 (1000)	4 200 / 2 200 / 800 (1 000)
Usable table surface	mm	2200 x 1250	3000 x 1250	3000 x 2000	3 500 x 2 000
Permissible table load	kg	6 000	8 000	10 000	
Toolholder (option)		ISO 50			
Spindle performance S1/S6	kW	21.5 / 32.3			
Spindle torque S1/S6	Nm	117 / 170			
Spindle speed	min^{-1}	6 000			
Rapid traverse X,Y,Z	m/min	20 / 20 / 15	15 / 20 / 15	15 / 15 / 15	
Magazine capacity		24			
Accuracy P/Ps	mm	0.02 / 0.008			

CNC horizontal machining centres with twin pallet systems

HSX 540 to 860

Technical data		HSX540	HSX650	HSX860
Travel distances X/Y/Z	mm	630 / 600 / 600	800 / 730 / 750	1 100 / 900 / 1 000
Pallet size	mm	400 x 500	500 x 630	630 x 800
Permissible load	kg	400	700	1 100
Toolholder		SK40	SK50	
Spindle power / spindle torque	kW / Nm	26 / 125	41 / 170	
Spindle speed	min^{-1}	12 000	10 000	
Rotary table - minimum indexing	°	1		
Rapid traverse X,Y,Z	m/min	50		40
Magazine capacity		40 (60, 120)		40
Accuracy P/Ps	mm	0.01 / 0.005		0.015 / 0.007



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CNC precision machining centres

CNC travelling column machining centres with integrated swivelling head of 4 to 5 axes design

Head P standard

EX 20 und 30

Technical data		EX 20	EX 30
Travel distances X/Y/Z	mm	1600 / 800 / 800	2400 / 800 / 800
Usable table surface	mm	2000 x 750	2800x750
Permissible table load	kg	3 500	4 500
Toolholder		HSK 63A	
Spindle power S1	kW	26.0	
Spindle rpm	min^{-1}	15 000	
Spindle torque S1	Nm	84 - 110	
Rapid traverse X,Y,Z	m/min	30	
Magazine capacity		36	
Accuracy P/Ps	mm	0.01 / 0.006	

5 axes high-performance machining centres

MU Tech 6

Technical data		MUTech 6
Linear axes		
Travel distances X/Y/Z	mm	/ 560 / 560
Rapid traverse	m/min	30
Acceleration per axis	m/s^2	5
Head/ B (rotational axis)		
Speed	rpm	35
Spindle axis/column	°	+30 / -120
Table / C (rotational axis)		
Type		Fixed table with integrated rotary table
Fixed table	mm	1 000 x 600
Rotary table	mm	Ø 600
Speed	rpm	40
Permissible table load	kg	500

Technical data		MUTech 6
Spindle		
Speed	rpm	15 000
Toolholder		SK 40
Power (S1)	kW	23.6
Torque(S1/S6)	Nm	84 / 110
Tool changer		
Pockets		24
Tool		
Length	mm	300
Diameter	mm	75
Weight	kg	7
Accuracy (VDI/DGQ 3441)		
Positioning accuracy P	mm	0.010
Repeat accuracy Ps	mm	0.005

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CNC precision machining centres

High-performance 5 axes gantry machining centre with great versatility

U mill 6

Technical data		U mill 6
Travel distances X/Y/Z	mm	700 / 740 / 550
Rapid traverse X,Y,Z	m/min	40
Table – A/C axes		
A-axis: Swivel	°	+20 / -110
A axis: Swivelling speed	min^{-1}	20
C axis / rotation	°	360
C axis / rotary speed	min^{-1}	35
Surface	mm	Ø630
Permissible table load	kg	600
Max. clearance spindle nose / table surface	mm	750
Spindle		
Spindle speed	min^{-1}	10 000
Toolholder		SK 40
Drive power	kW	12
Torque	Nm	115
Accuracy of linear axes (VDI DQG 3441)		
Position uncertainty P	µm	15
Position scatter band (Ps mean)	µm	5
Tool changer		
Pockets		30

HSC gantry machining centre of 5 axes design

K3X 8Five K2X 10Five

Technical data		K3X 8FIVE		K2X 10FIVE	
Travel distances X/Y/Z	mm	780 / 700 / 500		900 / 900 / 500	
A axis / speed	° / min^{-1}	-45 / +110 (on 55° plane) / 50		-45 / +180 (on 45° plane) / 40	
C axis / rpm	° / min^{-1}	360 / 50		360 / 90	
Table diameter	mm	Ø 500		Ø 630	
Workpiece size	mm	Ø 700		Ø 800	
Permissible table load	kg	250 (300)		500 (750)	
Spindle					
Spindle power S1/S6	kW	20 / 25	22 / 36	24 / 32	10 / 12
Torque	Nm	32 / 40	60 / 98	15 / 20	6.5 / 9
Spindle speed	min^{-1}	24 000	16 000	36 000	42 000
Toolholder		HSK 63A	HSK 63A	HSK 50E	HSK 40E
Rapid traverse X,Y,Z	m/min	50			
Magazine capacity		24 (30, 40, 60, 90) - for HSK 40E 28		30 (40, 60) - for HSK 40E 28 only	
Accuracy P/Ps		X, Y, Z: 0.004/0.002 mm		A, C: 7.2/3.6 arcsec	

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CNC precision machining centres

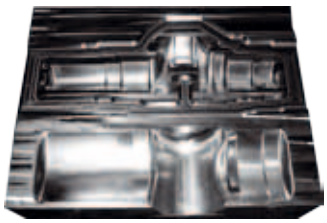
5 axes high-performance gantry machining centres with linear drive

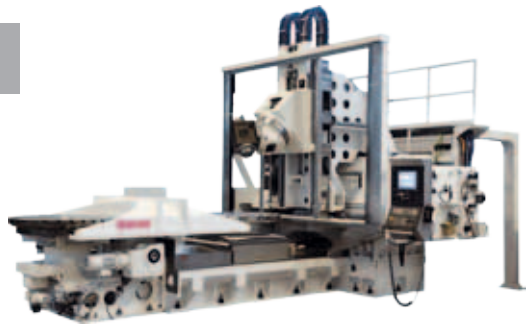
MX 4

Technical data		MX4
Travel distances X/Y/Z	mm	750/700/500
Rapid traverse X,Y,Z linear axes	m/min	60/120/120
A - C rotary axes on the palletized table		
A axis - table swivel angle on cross 45°	°	-45 / +180
C axis - table rotation	°	360
Working position (Spindle axis / table)	°	from horizontal plane = 0° to vertical plane = 90°
Speed	min^{-1}	100
Table surface	mm	400 x 400
Permissible table load	kg	250
Spindle		
Speed	min^{-1}	24 000 (HSK 63-A)
Drive power – torque S1/S6	kW/Nm	20 / 25 – 32 / 40
Positioning accuracy P		0.004 mm lin. / 7 arcsec rot.
Tool changer	Pockets.	36(42, 84)
Options		
Spindle		
Speed	min^{-1}	16 000 (HSK 63-A)
Drive power – torque S1/S6	kW/Nm	22 / 36 – 60 / 98

CNC gantry machining centres of 5 axes design with rotary functions and twin pallet systems

MX 8 to 20





Configuration MX12 with pallet

Technical data		MX8 M	MX8 MT	MX10 M	MX10 MT	MX12 M	MX12 MT	MX20 M
Travel distances X/Y/Z	mm	1160 / 1000 / 900		1200 / 1200 / 1000		1200 / 1600 / 1000		3000 / 3100 / 1600
Rapid traverse X,Y,Z linear axes	m/min	40 / 40 / 40						20
A axis - universal head	°	-45 / +180						45
Speed	min^{-1}	100						
C axis - rotary table	°	360						
Speed	min^{-1}	50	500	65	500	50	250	5
Table surface	mm	Ø 1000 x 800	Ø800	Ø 1250 x 900	Ø 1000	Ø 1600 x 1250	Ø 1400	Ø 2200
Permissible table load	kg	2 000		2 500		4 000		12 000
Spindle								
Speed	min^{-1}	18 000	10 000					
Toolholder		HSK 63-A	HSK 100-A					
Spindle power S1/S6	kW	20 / 30	32 / 50					
Torque S1/S6	Nm	160 / 240	180 / 280					
Positioning accuracy P		0.007 mm lin. 10 arcsec rot.						
Tool changer	Pocket	60(96, 120)	48(96)	48(60,96,120)	48 (96)	48(60,96,120)	48 (96)	40
Variants								
Rotary axis A - fork head								-
Positioning of B axis	°	-	-	-110 / +10	-	-110 / +10	-	-
C axis - rotary palletizing table								-
Speed	min^{-1}	50	500	65	500	50	250	-
Table surface	mm	Ø 800 x 630	Ø800	Ø 1000 x 800	Ø 1000	Ø 1400	Ø 1400	-
Permissible table load	kg	1 200		1 500		2 500		-
Spindles		12000-HSK 100-A	-	18 000-HSK 63-A (8 000-HSK 100-A)	-	18 000-HSK 63-A (8 000-HSK 100-A)	-	-
Spindle power S1/S6	kW	70/86	-	20 / 30 (70 / 86)	-	20 / 30 (70 / 86)	-	-
Torque S1/S6	Nm	190/235	-	160 / 240 (190 / 235)	-	160 / 240 (190 / 235)	-	-

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CNC precision machining centres

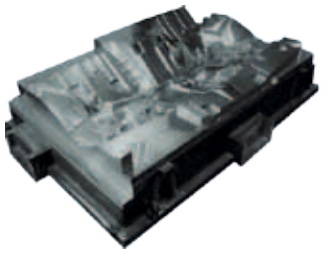
CNC high gantry machining centres with high performance and high precision of 5 axes design with fork head

Fork head

KX 50 to 300

Technical data		KX50 M	KX50 L	KX100	KX200	KX300
Travel distances X/Y/Z	mm	2 000 / 1 700 / 900	3 000 / 1 700 / 900	2 300 / 2 300 / 1 000	3 300 / 2 300 / 1 000	5 000 / 3 100 / 1 500
B axis	°	- 105 / +105				
C axis	°	-190 / +190				
Usable table surface	mm	2 200 x 1 250	3 300 x 1 250	2 500 x 1 250	3 500 x 1 250	5200 x 2000
Permissible table load	kg	4 000	6 000		9 000	20 000
Toolholder		HSK 63A		**HSK 63A**	HSK 100A	HSK 63A
Spindle power S1/S6	kW	**60 / 75** (56 / 70)		**20 / 30**	70 / 86	30 / 40
Torque S1/S6	Nm	**60 / 75 (56 / 70)**		**160 / 240**	190 / 235	50 / 67
Spindle speed	min^{-1}	**20 000** (15 000)		**18 000**	12 000	24 000
Rapid traverse X,Y,Z	m/min	40 / 40 / 40			25 / 40 / 40	20 / 20 / 20
Positioning accuracy P		0.007 mm linear axes, 0.010 arcsec rotary axes				0.02 mm (X), 0.007 mm (Y/Z) 0.010 arcsec rotary axes
Repeat accuracy Ps		0.004 mm linear axes, 0.005 arcsec rotary axes				0.005 mm (X), 0.004 mm (Y/Z) 0.005 arcsec rotary axes
Magazine capacity		30 (40, 60, 100)		40 (60, 100)		

KXG 45 to 90



Technical data		KXG45-14	KXG45-23	KXG60-23	KXG90-23
Travel distances X/Y/Z	mm	4 500 / 1 400 / 800	4 500 / 2 300 / 800	6 000 / 2 300 / 800	9 000 / 2 300 / 800
B axis	°	- 105 / + 105			
C axis	°	- 190 / + 190			
Table dimensions	mm	4 700 x 1 390	4 700 x 2 480	6 200 x 2 480	9 000 x 2 480
Max. table load	kg	18 000	25 000	30 000	52 000
Toolholder		HSK 63A			
Spindle speed (option)	min^{-1}	20 000 (15 000)			
Spindle power S1/S6	kW	60 / 75 (56 / 70)			
Torque S1/S6	Nm	60 / 75 (89 / 111)			
Rapid traverse X,Y,Z linear axes	m/min	60 / 60 / 45			
Speed B, C rotary axes	min^{-1}	100			
Positioning accuracy P		0.025 /0.010/ 0.010 mm linear axes	0.010 arcsec rotary axes	0.035 /0.010/ 0.010 mm linear axes	0.010 arcsec rotary axes
Magazine capacity		40 / 60 / 100			

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Deep drilling machines for moulds and component parts

MF 800, 1000 C

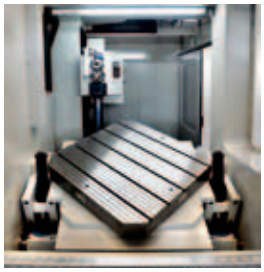
Technical data			MF 800 C	MF 1000 C
Max. drilling depth in one operation	axis V	mm	800	1000
Column horizontal travel	axis X	mm	800	1000
Vertical stroke	axis Y	mm	500	520
Approach travel of drill unit	axis Z	mm	300	300
Drilling spindle				
Optimal drilling diameter		mm	4 - 18	4 - 25
Drilling spindle speed		min^{-1}	5000	4200
Drilling spindle motor power		kW	7	7
Milling spindle				
Milling spindle			ER32	ISO40
Table (load)				
Standard fixed table	800x800 mm	kg	4000	-
(Option) CNC rotary table	600x600 mm	kg	2000	-
Standard fixed table	600x700 mm	kg	-	2500
(Option) CNC rotary table	800x900 mm	kg	-	4000
(Option).CNC rotary tilting table	800x800 mm / 25° -20° 800x900 mm	kg		2000

MF 1000AF

Technical data			MF 1000 AF
Max. drilling depth in one operation	axis V	mm	1000
Column horizontal travel	axis X	mm	900
Vertical stroke	axis Y	mm	400
Approach travel of drill unit	axis Z	mm	250
SK40 drilling and milling spindle			
Optimal drilling diameter (solid material)		mm	4 - 25
Spindle motor power S1		kW	7
Drilling spindle speed		min^{-1}	4200
Max. torque		Nm	108
Thread cutting in steel 2311/2312		"	3/4
Table			
Standard fixed table - dimensions/table load		mm/kg	800 x 1000 / 4000
(Option) CNC infinitely variable 360 000 pos. dimensions/table load		mm/kg	800 x 900 / 4000
(Option) CNC infinitely variable 360 000 pos. dimensions/table load		mm/kg	600 x 700 / 2000

MF 1000/2F

Technical data			MF 1000/2F Rotary table	MF 1000/2F Rotary tilting table	MF 1250/2F Rotary tilting table
Max. drilling depth in one operation	axis V	mm	1000		1 250
Column longitudinal movement	axis X	mm	1400		1 700
Vertical stroke (gun drilling and milling)	axis Y	mm	700		935
Approach travel of drilling/milling unit	axis Z	mm	500		600
Table rotation control infinitely variable		Pos/circum	360 000		
Drilling unit					
Drilling diameter min. max., in solid material		mm	4 - 25		
Drilling diameter max., with pilot drilling		mm	32		
Drilling spindle motor power (S1) / speed		kW/ min^{-1}	7 / 6000		9 / 6 000
ISO40 Milling spindle					
Milling spindle motor power (S1) / speed		mm/ min^{-1}	7 / 4000		9 / 4 000
Max. torque		Nm	108		-
Thread cutting in steel 2311/2312			M25		M24
Rotary table					
Standard rotary table dimensions / load-bearing		mm/kg	800 x 1000 / 4000	-	-
(Option) Rotary table dimensions / load-bearing		mm/kg	1000 x 1200 / 6500	-	-
Rotary tilting table					
Rotary tilting table dimensions / load-bearing		mm/kg	-	1000 x 1000 / 5000	1000 x 1000 / 6000
Tilt axis		°	-	+22.5 / -22.5	



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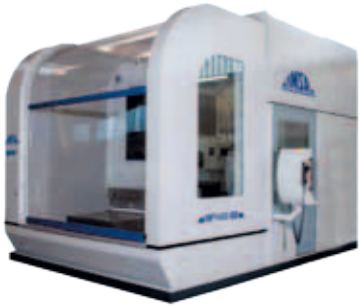
Gun-drilling machines for moulds and component parts

MF 1200 BB, BBL, BBLL

MF 1450 BB



Technical data			MF 1200 BB	MF 1200 BBL	MF 1200 BBLL	MF 1300 BB/4P	MF 1450 BB
Column longitudinal movement	axis X	mm	1 250	1 650	2 200	2 250	
Drilling slide vertical movement	axis Y	mm	1 000			1 500	1 300
Approach travel of drilling/milling unit	axis W	mm	500			650	600
Tilting of drilling/milling unit	axis A	°	± 20 resolution 0.001				
Drilling spindle							
Max. drilling depth in one operation	axis V	mm	1 200			1 300	1 450
Optimal drilling diameter without pilot drilling		mm	5 - 40				
Drilling spindle motor power (S1) / speed		kW/min^{-1}	9 / 4200			11 / 4200	
Milling spindle							
Milling axis independent travel	axis Z	mm	360			450	
Maximum travel	axes Z+W	mm	860			1 100	1 050
Drilling spindle motor power (S1) / speed		kW/min^{-1}	9 / 4 000			29 / 6 000	29 / 6 000
Maximum torque on milling spindle		Nm	226			130	130
CNC rotary table system IMSA							
Version			Rotary tilting table	Rotary table	Rotary table	Traversing/rotary table	Traversing/rotary table
Dimensions		mm	800 x 1 000	1 000 x 1 200	1 200 x 1 500	1 200 x 1 500	
Table load		kg	4 000	6 500	12 000	12 000	
Max. diameter of drilling part during table rotation		mm	1 700	2 100	2 600	1 700	
Angular resolution of rotary table	axis B	°	0.001				
Table traverse (approach to workpiece)	axis U	mm	-			500	
Table tilting		°	+20/-20	-			

MF 1500 BB, 2000 BB

MF 1500 BB-6P

Technical data				MF 1500 BB -6P	MF 1500 BB	MF 1600 S	MF 1750 BB	MF 2000 BB
Column longitudinal movement		axis X	mm	3 250		3 000	3 250	
Drilling slide vertical movement		axis Y	mm	1 500		1 600	1 500	
Approach travel of drilling/milling unit		axis W	mm	500		-	600	500
Drilling spindle								
Max. drilling depth in one operation	axis V		mm	1 500		1 600	1 750	2 000
Optimal drilling diameter without pilot drilling			mm	5 - 40	5 - 50	5 - 25	5 - 50	
Drilling spindle motor power (S1) / speed			kW / min^{-1}	15 / 4200	9 / 4 200	17 / 4 500	15 / 4 200	9 / 4 200
Tilting of drilling/milling unit	axis A		°	± 20		+30 / -15	± 20	
Milling spindle				ISO50				ISO50
Milling axis independent travel	axis Z		mm	500		1 500	500	500
Maximum travel	axes Z+W		mm	1 000		-	1 100	1 000
Milling spindle motor power (S1)/speed			kW / min^{-1}	37 / 4 500	17 / 2 500	17 / 4 500	45 / 4 500	17 / 2 500
Maximum torque on milling spindle			Nm	300	680	324	430	680
CNC rotary table system IMSA								
Table traverse (approach to workpiece)	axis U		mm	1 000		-	1 000	1 000
Table rotation		axis B	Pos/circumf	360 000				
Extensible rotary table - Standard		Table load 20 t	mm	-	1 600 x 1 800	1 600 x 1 800	-	1 600 x 1 800
Extensible rotary table - Option		Table load 30 t	mm	2 000 x 2 000	2 000 x 2 000	-	1600x1800 / 2000x2000 / 2000x2500	2 000 x 2 000
Extensible rotary table - Option		Table load 35 t	mm	-	2 200 x 2 200	-	2 200 x 2 200	2 200 x 2 200
Extensible rotary table - Option		Table load 40 t	mm	-	2 500 x 2 500	-	2 500 x 2 500	2 500 x 2 500
Tool changer								
ISO SK-50 - capacity			Pc	40	-	-		-
Max. tool diameter/length			mm	100 / 350	-	-		-

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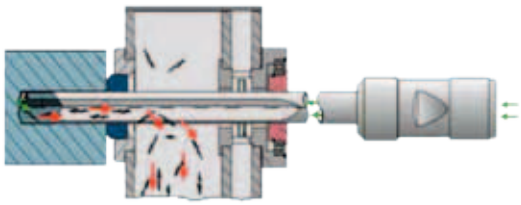
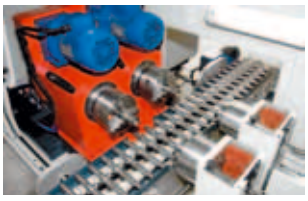
Deep drilling machines for cylindrical workpieces

Single lip

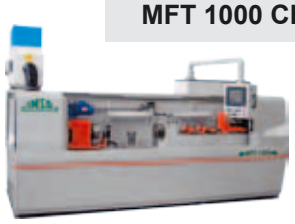


MFT 750 / 6 CR

MFT 250 / 2Ti CR



MFT 1000 CR



MFT 750 / 12 CR

MFT 500 CR

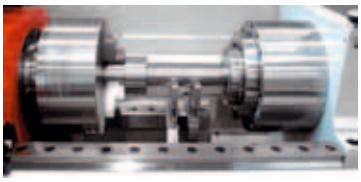
MFT 1500 CR

Technical data MFT		750 / 6 CR	750 / 12 CR	250 / 2Ti CR	500 CR	1000 CR	1500 CR
Drilling diameter min. - max.	mm	1.5 - 6.0	2.5 - 12.0	4.0 - 16.0	4.0 - 25.0	4.0 - 25.0	4.0 - 25.0
Drilling depth	mm	750	750	250	500	1000	1500
Number of drilling spindles		1		2	1		
Speed of counter headstock	min^{-1}	150					
Flange version		Pneu/ opt. CNC					
Speed of spindle	min^{-1}	11/16000	7500	6000			
Pressure max.	bar	210	180	90 / Opt.120			

MFT 500 / 2Ti CR

MFT 1500 / 2Ti CR

MFT 1000 / 42



MFT 1000 / 2Ti CR

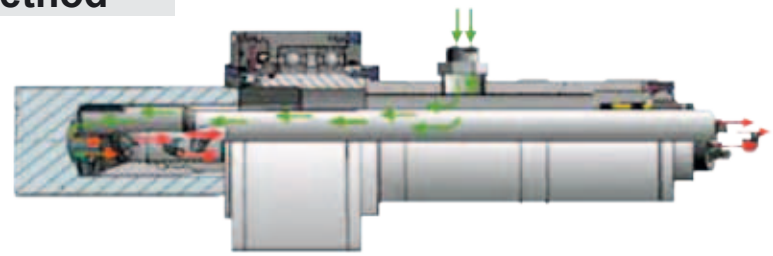
MFT 1000 / 32 CR

Technical data MFT		500 / 2Ti CR	1000 / 2Ti CR	1500 / 2Ti CR	1000 / 32 CR	1000 / 42
Drilling diameter min. - max.	mm	4.0 - 25.0			6.0 - 32.0	12.0 - 42.0
Drilling depth	mm	500	1000	1500	1000	
Number of drilling spindles		2			1	
Speed of counter headstock	min^{-1}	150				80
Flange version		Pneu/ opt. CNC			CNC	hydraulic
Speed of spindle	min^{-1}	6000			4000	3000
Pressure max.	bar	90				50

I.M.S.A. s.r.l.
Via Don G. Dell´Acqua, 2
I-23890 Barzago

Deep drilling machines for cylindrical workpieces

BTA / STS method



Special solutions with the MFT / MFTB series are standard for IMSA

MFT B 1500 / 2000 / 65 CR

MFT B 1000 / 51 CR

MFT B 1000 / 200 CR

MFT B 1000 / 2000 / 110

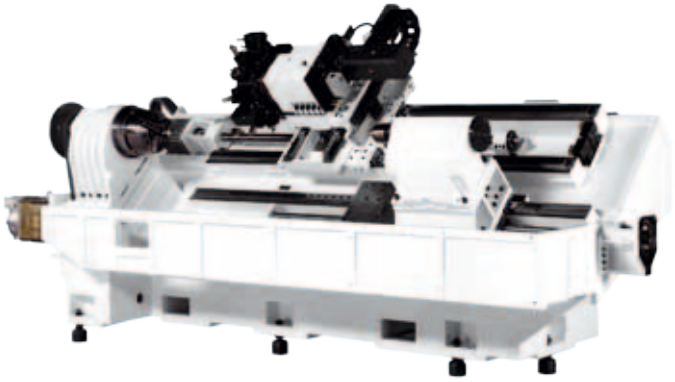
Technical data		MFT B 1000 / 51 CR	MFT B 1000 / 2000 / 76 CR	MFT B 1000 / 2000 / 110	MFT B 1000 / 2000 / 200
Drilling diameter min. - max.	mm	18 - 51	18 - 76	25 - 110	50 - 200
Drill out option	mm	65	80	135	-
Drilling depth	mm	1000	1000 / 2000	1000 / 2000	1000 / 2000
Number of drilling spindles		1	1	1	1
Counter headstock		Yes	Yes	No	No
Spindle speed	min^{-1}	2000	1500	1500	1500
Pressure max.	bar	50	35	30	25

JYOTI CNC Automation PVT. LTD.
G.I.D.C. Lodhika, Vill. Methoda
IN - 360 021 Rajkot

CNC turning centres with/without driven tools

DX 150to 350

TMC 250 and 350

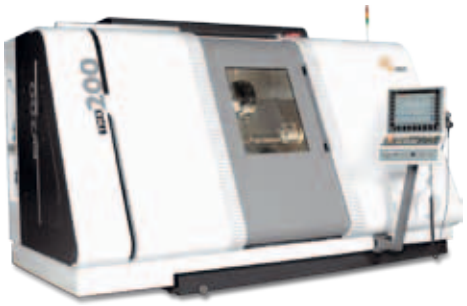


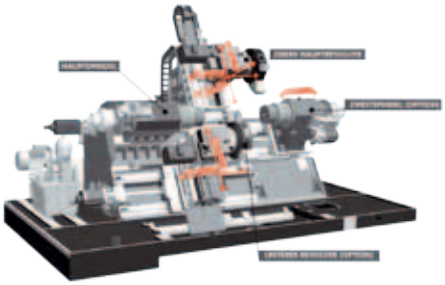
Technical data		DX 150	DX 200	DX 250		DX 350		TMC 250		TMC 350	
				700	1000	700	1000	700	1000	700	1000
Feeds											
Turning diameter over bed	mm	375	500	600		700		600		700	
Max. turning length	mm	350	500	700	1000	700	1000	700	1000	700	1000
Max. turning diameter	mm	250	350	470							
X axis	mm	150	200	250							
Z axis	mm	350	500	700	1000	700	1000	700	1000	700	1000
Rapid traverse	m/min	24									
Spindle											
Spindle nose	Size	$A_2$5	$A_2$6			$A_2$8		$A_2$6		$A_2$8	
Drive power S1/S6	kW	7 / 10.5	9 / 13.5	12 / 18		18.5 / 27.8		12 / 18		18.5 / 27.8	
Material feed through	mm	38	52			65		52		65	
Speed	min^{-1}	50 - 4500	50 - 4000	50 - 3500		50 - 2500		50 - 3500		50 – 2500	
Turret											
Number of tools/driven	Pcs	8 / -						12 / 12			
Toolholder	Size	-						VDI 30			
Speed	min^{-1}	-						5000			
Drive power	kW	-						4.1			
Tool size	mm	20 x 20	25 x 25			32 x 32		25 x 25			
Max. boring bar diameter	mm	32	40			50		40			
Tailstock											
Tailstock quill - diameter	mm	75	85			130		85			
Tailstock quill stroke	mm	100	120			150		120			
Control system		Siemens									

JYOTI CNC Automation PVT. LTD.
G.I.D.C. Lodhika, Vill. Methoda
IN - 360 021 Rajkot

CNC turning centres with/without driven tools

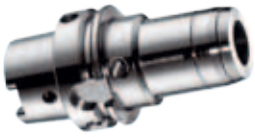
TMX 200





Technical data		TMX200	
Feeds			
Standard turning diameter	mm	250	
Max. turning length	mm	725	
Travel			
X1 / Y / Z1 axes	mm	300 / ±40 / 750	-
X2 / Z2 / Z3 axes	mm	-	180 / 750 / 770
Rapid traverse			
X1 / Y / Z1 axes	m/min	25 / 15 / 30	-
X2 / Z2 / Z3 axes	m/min	-	25 / 30 / 30
Spindle		Main	Opposed (opt.)
Speed	min^{-1}	50 - 4000	
Spindle bore	mm	65	
Power /torque	kW / Nm	21 / 200	
C axis (accuracy)	°	0.001	
Tailstock			
Z3 axis travel	mm	770	-
Tailstock quill diameter	mm	85	-
Turret		upper	lower (opt.)
Driven tools	Pcs	12	
Toolholder		VDI40	
Power /torque	kW / Nm	5.7 / 13.5	
Max. diameter boring bar	mm	40	
Control system		Siemens	

AX 200 to 300



Technical data		AX200	AX200M	AX200MY	AX200MSY	AX300	AX300M	AX300MY	AX300MSY
Feeds									
Turning diameter over bed	mm	550				650			
Max. turning diameter	mm	370	330			480	420		
Max. turning length*	mm	325 / 625*			625	600			
X axis	mm	200				250			
Y axis	mm	-	-	± 40		-	-	± 50	
Z axis	mm	325 / 625*			625	625			
Rapid traverse	m/min	24 / - / 35		24 / 24 / 35		24 / - / 30			24 / 24 / 30
Main spindle (motor spindle)									
Spindle nose	Size	$A_2$6				$A_2$8			
Drive power	kW	10				20			
Material feed through	mm	52				65			
Speed	min^{-1}	5000				4000			
Opposed spindle (motor									
Spindle nose	Size	-	-	-	$A_2$5	-	-	-	$A_2$6
Drive power	kW	-	-	-	7	-	-	-	10
Spindle travel	mm	-	-	-	630	-	-	-	620
Speed	min^{-1}	-	-	-	5000	-	-	-	5000
Turret									
Number of tools/driven	Pcs	12 / -	12 / 12			12 / -	12 / 12		
Toolholder	Size	-	VDI30/BMT45			-	VDI40/BMT55		
Speed	min^{-1}	-	4500			-	4000		
Drive power (Siemens/Fanuc)	kW	-	4.8			-	4.8		
Tool size	mm	25 x 25							
Max. Ø boring bar	mm	40				50			
Tailstock (type)		CNC	CNC	CNC	-	CNC	CNC	CNC	-
Tailstock quill stroke	mm	330 / 630			-	620 / 1220	620		-
Diameter	mm	85			-	130			-
Control		Siemens							

Precision grinding machines and systems

KEL-VERA

The innovative grinding system

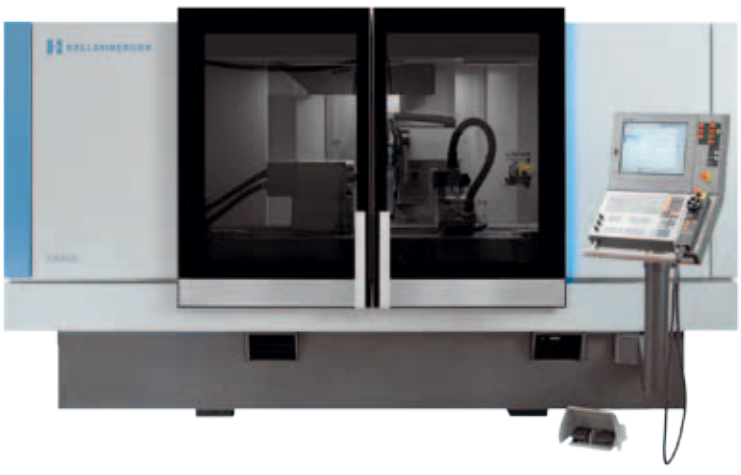
Technical data		KEL-VERA		
		Universal	URF	Production
Specifications				
Control system		GRINDplusIT / GE FANUC 3 I Ols		
Distance between centres	mm	400		
Centre height with TDC	mm	175		
Centre height without TDC	mm		250	175
Input voltage		3x400V 50Hz / 3x460V 60Hz		
Power requirement dependent on equipment	A		35 - 80	
Space requirement	mm	2700 x 2100		
Workpiece weights				
Between centres	kg	150	150	150
Chucking work	Nm	160	320	160
Longitudinal cuts Z axis				
Travel	mm	600		
Rapid traverse	m/min	30		
Resolution	µm	0.1		
Upper table				
Table swivelling	°	9		
Cross slide X axis				
Travel	mm		350	
Rapid traverse	m/min		15	
Resolution	mm		0.1	
Turned parts				
Swivelling range	°	240	240	0 / 30
Resolution B axis	sec	0.1	0.1	
Grinding head				
Versions		Universal/diagonal/tandem		Production
Power	kW	10		15/20
Peripheral speed	m/s	45		< 80
Grinding wheels	mm	Ø 400 / 500		Ø 500 / 600
Workpiece headstock				
Speed range	min^{-1}	1 - 1000		
Drive torque	Nm	60		
Mounting shank		MK 5 / ASA 5		
Lower parts		Fixed / rough adjustment / precision adjustment lower parts		
Tailstock				
Mounting shank		MK 4		
Stroke	mm	50		
Lower parts		Fixed / precision adjustment		
Clamping surface upper table				
Table mountings	mm	195 x 1100		
Clamping surface lower table				
Table mountings	mm		195 x 1300	
BDC front	mm		90 x 1300	
Clamping surface carriage				
Carriage plate	mm	430 x 710		

VARIA – evolution not revolution

Systematically optimized proven elements, e.g. the hydrostatic guide concept, combined with newly developed components such as the automatic cylinder correction system and synchronous tailstock provide a contemporary platform for flexibly satisfying all the varied requirements of our customers.

VARIA

Technical data		VARIA
Specifications		
Distance between centres	mm	1000 / 1600
Z axis		
Stroke	mm	1170 / 1670
Rapid traverse	m/min	20
X axis		
Stroke	mm	365
Rapid traverse	m/min	10
B axis		
Swivelling range	°	240
Rapid traverse	1/sec	0.5
Power external grinding	kW	10
Power internal grinding	kW	15
Centre height	mm	200 / 250 / 300
Workpiece weight between centres	kg	150 / 300
Load on chucked work	Nm	160 / 320 / 750
Space requirement / length x width	mm	3700 x 2200 / 4700 x 2200



VARIA – for complex grinding applications

L.Kellenberger & Co.AG
Heiligkreuzstrasse 28
CH-9009 St. Gallen

Precision grinding machines and systems

KEL-VITA

The perfect CNC universal grinder

VISTA

The competitive CNC universal grinder

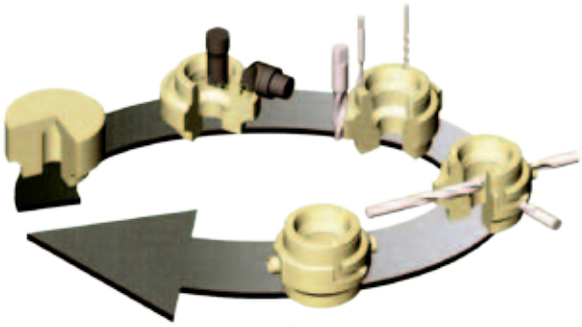
Technical data		KEL-VITA	VISTA	
Overall length		**1000**	**1000**	
Specifications				
Distance between centres	mm	1000	1000	
Grinding length RS//URS	mm	800		
Grinding length R//UR	mm	1000	1000	
Centre height	mm	175	175	
Workpiece weight between centres	kg	100	100	
Load - chucked work	Nm	100	100	
Mains voltage requirement		3x400V 50Hz / 3x460V 60Hz	3x400V 50Hz / 3x460V 60Hz	
Power consumption dependent on equipment	A	35 - 80	32	
Space requirement / length x width	mm	3000 x 2000	2400 x 1700	3000 x 1700
Table / slide: Z axis				
Travel	mm	1150	750	1150
Rapid traverse	m/min	20	12	
Resolution	µm	0.1	0.1	
Swivelling range upper table		9	6	
Cross slide: X axis				
Travel	mm	350	350	
Rapid traverse	m/min	10	6	
Resolution	mm	0.1	0.1	
Swivel devices				
B axis				
Resolution	°	0.00002		
Automatic indexing / 1° Hirth coupling		1	yes	
Automatic indexing / 2.5° Hirth coupling		2.5		
Swivelling range	°	240	220	
Grinding head general				
Drive motor water-cooled	kW	10	7.5	
Peripheral speed	m/s	35 / 45	45	
Grinding head R / UR				
Grinding wheel dimensions left-hand side	mm		450 x 63 x 127	
Option	mm		450 x 80 x 203	
Grinding wheel dimensions right-hand side opt.	mm		300 x 40 x 127	
Grinding wheel dimensions left-hand side	mm	400 // 500	400 x 50 x 127 option	
with different options	mm	other dimensions on request		
Grinding wheel Dimensions right-hand side	mm	300 // 400		
with different options	mm	other dimensions on request		
Grinding head RS				
Grinding wheel Dimensions right-hand side	mm		450 x 80 x 203	
Grinding head RS // URS				
Grinding wheel Dimensions right-hand side	mm	400 // 500		
with different options	mm	other dimensions on request		
Grinding wheel dimensions left-hand side	mm	400		
with different options	mm	other dimensions on request		
Internal grinding attachment only for UR // URS				
Locating bore	mm	80 / 120	120	
Rotational spindle motor infinitely variable	min^{-1}	6000 - 28000	4 - 40000	
Drive power Motor	kW	3	2.5	
HF spindle options	kW	5.2 / 8	6.5 standard	
Workpiece headstock				
Speed range	min^{-1}	1 - 1000	1 - 1000	
Drive torque spindle	Nm	24	15	
Mounting shank		MK 5 / ISO 702-1	MK 5 / ISO 702-1	
Swivelling range Option	°	110	110	
Tailstock				
Mounting shank		MK 4	MK 5 / ISO 702-1	
Stroke	mm	48	48	
Fine adjustment Option	µm	+/- 60	+/- 60	
CNC control system				
GE Fanuc		310is-A	2li	
Measuring systems				
GAP Control		KEL-TOUCH	KEL-TOUCH	
Active longitudinal positioning		Movomatic / Marposs	Movomatic	
Passive longitudinal positioning		Movomatic / Marposs	Movomatic	
Diameter measurement control system		Movomatic / Marposs	Movomatic	
Balancing		KEL-BALANCE		

Precitrame Machines SA
Grand-Rue 5
CH-2720 Tramelan

Innovative, high-precision machining solutions

CNC - Rotary transfer machines

MTR200	3 axis machining above and below
MTR300	3 axis machining from above
MTR400	Machining on 5 faces with C axis
MTR400HR	Machining on 5 faces with C axis and horizontal spindles



PRECISION

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

FLEXIBILITY

- Full latest generation CNC control system
- 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

MODULARITY

- Sophisticated modular machine design with 4 to 20 stations
- Modular stations for milling and turning
- Compatible with all Precitrame machining units
- Easy configuration changing and high upgrade flexibility

ECONOMY

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

Precitrame Machines SA
Grand-Rue 5
CH-2720 Tramelan

Innovative, high-precision machining solutions

Precitrame 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 axis	120 mm	120 mm	120 mm	200 mm
Y axis	160 mm	160 mm	160 mm	200 mm
Z axis	130 mm	130 mm	130 mm	120 mm
A axis	-	0 - 30°	-	-
Rapid traverse	20 m/min	20 m/min	20 m/min	15 m/min
Max. number of spindles	4	2	1 bis 2 horizontal 1 bis 4 vertical	1 bis 3 horizontal 1 bis 6 vertical
Precision	0,001 mm	0,001 mm	0,001 mm	0,001 mm

Precitrame offers a complete range of spindles equipped with pneumatic quick change system

AUTOMATED TRANSFER FINISHING

900T series

900T SERIES	920T / 940T
Type	Belt grinding, lapping, polishing, felting and precision machining
Stations	2 / 4
Number of tools per station	1 to 2
Type of tool	Abrasive belt, abrasive wheel, felt disc, polishing disc, lapping disc
Loading	Manual or automatic
Fields of application	Watchmaking, electronics, medical engineering, aerospace engineering and power industry
Max. part dimensions	Ø 160 mm ball
Max. part weight	4 kg
Robot	Stäubli TX90
Software	CyberMotion 5
Power supply	3x400V PE+N, 50/60 Hz, 32A
Supply pressure	6-8 bar
Sound level	< 75dB
Cell dimensions with 4 stations	3 100 x 2 900 x 2 600 mm / 4 000 x 4 550 x 2 700 mm
Weight	2 500 kg / 4 000 kg
Safety	The machine incorporates cutting edge safety technologies for safe and at the same time user-friendly operation
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

RIHS MASCHINENBAU AG
Bielstrasse 29
CH-2542 Pieterlen

Universal tool grinding machine

USM3

Grinding operations	
Roughing cutters, end mills, shell end mills, dis mills with staggered teeth, Centre cutter end mills	Face: Clearance or cutting angle circumference: Chamfer or radius
Reamers	Cut, clearance angle (three-dimensional)
Twist drill, High-performance HM drills	Surface cut, reduction of cutting edge in one chucking and special finishing
Step drills	Round grind step, Relief grind step, Relief grind step to 180°, release of cylindrical section
Countersinks	Rake grinding, relief grinding
Taps	Peel grinding, grinding relief grinding
Threading die	Internal peel grinding relief grinding
Turning tools and shaping tools	Clearance and rake , radii and profile grinding

Technical data			USM3 Type 14
Operating range		mm	430 x 400 x 400
Coarse adjustment range	X	mm	300
	Y	mm	360
	Z	mm	200
Fine adjustment range	Y_f	mm	40
	Z_f	mm	125
Stroke length	l_{Hx}	mm	150
Swivel range	A		+/- 90°
	B		+/- 90°
	C		+/- 180°
Spindle speed (infinitely variable)		min^{-1}	1 000 - 12 000
Max. grinding disc diameter		mm	80
Spindle head holder			MK4, ISO40
Max. tool diameter		mm	0.5 - 250
Max. tool length		mm	400
Drive power		kW	0.45
Machine dimensions		mm	680 x 850 x 1 700
Machine weight		kg	175

Typical of applications

RIHS MASCHINENBAU AG
Bielstrasse 29
CH-2542 Pieterlen

Universal tool grinding machine

Equipment package	Light	Standard	Convenience	Luxury
Cylinder shaft	up to ø 20 mm	up to ø 20 mm	up to ø 26 mm, MK1-4	up to ø 34 mm, MK1-4

End mills and bevelled cutters
up to ø 6 mm: face only
up to ø 6 mm: plus spirals incl. relief grinding

Roughing cutter
Face hobbing and grinding acute spiral grooves:
possible with experience

End mills, step drills, cylindrical cutters, disc mills
Radius / edge rounding R0.5 up to R5

Ball-nose cutters
from ø 6 mm radius and spiral with radius grinding unit

Angular mill
complete

Grooving cutter
complete

Twist drills
Cutter (surface cut) incl. reduction of cutting edge
also drills with taper MK1, MK2, MK3 and MK4

Step drills
Cutting edge on the drill bit, relief grind step, can be made from standard drill (round grinding pins), measurement of steps and angles.

Taps
relief grinding on cut and peel grinding
with 3, 4, 5, and 6 cutting edges

Reamers
First grind also between centres (distance between centres 400mm)

Counterbores
complete

Countersinks
Relief grinding of groove and circumference

Form cutters
Grooves, and radius with radius grinding unit

Engraving cutters
from ø 2

Cylindrical cutters
Face hobbing and grinding
Spiral grinding incl. relief grind 2

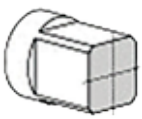
Crossed tooth hobbing cutters and disc cutters
complete incl. chip space

Prism milling cutters and angular cutters
complete incl. chip space

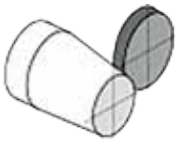
Module milling cutters and form cutters
cutting face only

Thread-cutting dies
internal peel grinding
relief grinding

Turning tools
Workpieces of all types up to a clamping width of 50 mm



First facing cuts
First cut on polyhedrons



External round grinding

Internal round grinding

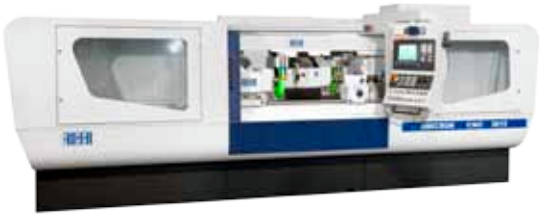
Robbi Group Srl
Via dell´Industria, 7
I-37040 Veronella

Universal external and internal cylindrical grinding machines

OMICRON 1000 R

OMICRON 600 E T6

OMICRON CNC 3615



OMICRON 2000 P T6

OMICRON 600 E

OMICRON M T6

OMICRON		R		E				P				M			
		600 R 600 R T6 CNC 3206	1000 R 1000 R T6 CNC 3210	600 E 600 E T6 CNC 3606	1000 E 1000 E T6 CNC 3610	1500 E 1500 E T6 CNC 3615	2000 E T6 CNC 3620	1000 P T6 CNC 6010	1500 P T6 CNC 6015	2000 P T6 CNC 6020	3000 E T6 CNC 6030	3000 M T6 CNC 8030	4000 M T6 CNC 8040	5000 M T6 CNC 8050	6000 M T6 CNC 8060
Max. distance between centres	mm	600	1 000	630	1 030	1 530	2 030	1 350	1 750	2 250	3 150	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	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	3 200	4 200	5 200	6 200
Table speed	m/min	0 - 5		0 - 5				0 - 4				0 - 4			
Swivel table	°	+ 9 /- 5	+ 8 /- 4	+ 9 /- 5	+ 8 /- 4	+ 7 /- 3	+ 6 /- 2	+8/-3	+7/-2	+6/-2	+5/-1	+5/-1	+4/-1	+3/-1	+2/-1
Headstock															
Headstock speed range	rpm	30 - 800		0 - 300				0 - 300				0 - 150			
Max. spindle bore	mm	26		31				44				70			
Internal cone	MK	4		5				6				80			
Headstock, swivelling	°	90		90				90				90			
Tailstock															
Stroke	mm	25		35 - 70**				70				100			
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				760 x 305			
Grinding wheel width	mm	20 - 50		20 - 80				50 - 120				50 - 120			
Grinding spindle head, swivelling	°	+ 45 /- 45		+ 45 /- 45				+45 / -45				90			
Internal grinding		Option													

*Upon request ** for hydraulic tailstock

Robbi Group Srl
Via dell´Industria, 7
I-37040 Veronella

Universal internal cylindrical grinding machine IGR-250

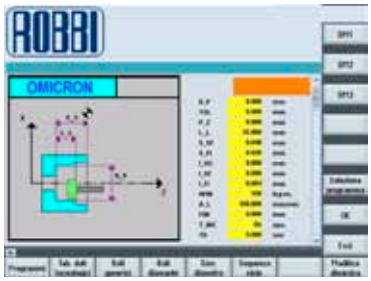
OMICRON IGR-250, 450 – (PLC, CNC)

Max. grinding diameter	mm	250	450
Centre height	mm	180 / 230*	
Max. distance headstock - grinding spindle	mm	1 000	
Internal grinding spindle - diameter	mm	100	
Table speed	mm/min	0 - 6000	
Swivel table	°	8	
Headstock speed range	rpm	0 - 600	
Chuck diameter	mm	160	
Grinding spindle - motor	kW	3	
Headstock - motor	kW	0.75	
Front side - grinding apparatus			
Max. grinding diameter	mm	355	
Grinding wheel diameter	mm	125	
Inclination	°	10	
Grinding spindle - motor	kW	1.1	

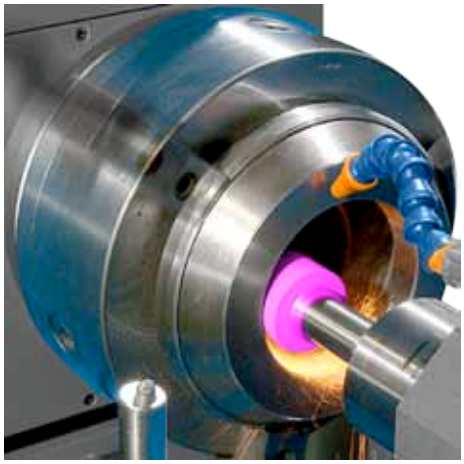
*Upon request

PLC

CNC



OMICRON IGR 250



Face grinding

Internal grinding

J. SCHNEEBERGER Maschinen AG
Geissbergstrasse 2
CH - 4914 Roggwil

Precision CNC grinding machines

Super flexible 5-axis machine for finish-grinding and production Complete machining contour and face up to 250 mm cutting length, diameter up to 250 mm



aries NGP

aries NGP		
Axes		
X - longitudinal slide	mm	420 (CNC)
Y - cross slide	mm	360 (CNC)
Z - vertical column	mm	260 (CNC)
A - workpiece carrier	°	Free (CNC)
C - rotation of the grinding head	°	320 (CNC)
Workpiece carrier		
Centre height	mm	151
Interface		HSK 80
Max. speed	rpm	96
Grinding head		
Grinding motor (100%)	kW	5
Double grinding spindle, direct drive		HSK 50 - (2 + 2 grinding wheels)
Max. grinding spindle speed	rpm	12 000
Grinding wheel diameter	mm	50 - 200
Handling* - integrated parts loader		
Workpiece loader		1 pallet 200 x 200 mm, 25 - 100 workpieces
Weight	kg	1 700

*Option

The ideal grinding machine for finish-grinding on flutes, contour and tooth face

aries ENP2, ENP4


aries		ENP2	ENP4
Axes			
X - longitudinal slide	mm	400 (CNC)	400 (CNC)
Y - cross slide	mm	260 manual	260 (CNC)
Z - vertical column	mm	300 manual	300 (CNC)
A - workpiece carrier	°	Free (CNC)	Free (CNC)
C - rotation of the grinding head	°	±180 manual	±180 manual
Workpiece carrier			
Centre height	mm	210	
Steep cone		ISO50	
Grinding head			
Grinding motor (100%)	kW	2.2 / 7.5*	
Double grinding spindle		HSK 50 - (2 + 2 grinding wheels)	
Max. grinding spindle	rpm	9 000	
Grinding wheel diameter	mm	50 - 200	
Weight	kg	2500	

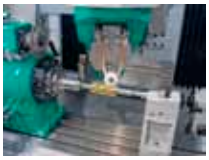
*Option

J. SCHNEEBERGER Maschinen AG
Geissbergstrasse 2
CH – 4914 Roggwil

Precision CNC grinding machines

Super flexible 5-axis machine for production and finish-grinding Complete machining, contour and face up to 300 mm cutting length, diameter up to 400 mm, maximum clampable workpiece length 500/800 mm

norma NGC, NGC750

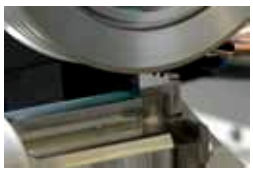


norma		NGC	NGC750
Axes			
X - longitudinal slide	mm	470	750
Y - cross slide	mm	390	
Z - vertical column	mm	325	
A - workpiece carrier	°	Free	
C - rotation of the grinding head	°	365	
Workpiece carrier			
Centre height	mm	210	
Interface		ISO50	
Max. speed for cylindrical	rpm	800	
Grinding head			
Grinding motor (100%)	kW	10	
Double grinding spindle, direct drive		HSK 50 (3 + 3 grinding wheels)	
Max. grinding spindle speed	rpm	12 000	
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	5 000	

*Option

Precision 6-axis CNC grinding machine for the production of highly precise cutting inserts, micro-tools and workpieces

sirius NGS



sirius NGS		
Axes		
X - longitudinal slide	mm	400
Y - vertical column	mm	350
Z - cross slide	mm	280
A - workpiece carrier	°	Free
B - swivel axis	°	270
C - rotation of the grinding head	°	270
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	12 000
Grinding wheel diameter	mm	50 - 300
Handling* - robots		
Pallets	Pc	2, 10*
Pallet dimensions	mm	300 x 300 49 - 400 places
Loader for grinding wheel packages and coolant tubes*		
Wheel package	Pc	7
Max. number of grinding wheels	Pc	21
Weight	kg	4 000

*Option

J. SCHNEEBERGER Maschinen AG
Geissbergstrasse 2
CH - 4914 Roggwil

Production 5-axis CNC grinding machine for production grinding and tool grinding.

gemini NGM

gemini NGM			
Axes		**NGM**	**GHP**
X - longitudinal slide	mm	500	
Y - cross slide	mm	400	
Z - vertical column	mm	380	
W - oscillating axis	mm	-	20
A - workpiece carrier	°	Free	
C - rotation of the grinding head	°	365	
Workpiece carrier			
Centre height	mm	210	
Interface		ISO50	
Cylindrical grinding*	rpm	800	
Grinding head			
Grinding motor (100%)	kW	10, 24*	10
Double grinding spindle, direct drive		HSK 50, HSK 80* 3 + 3 grinding wheels	Replaceable head
Max. grinding spindle	rpm	12 000	40 000
Grinding wheel diameter	mm	50 - 250	25 - 120
Loader for grinding wheel packages and coolant tubes*			
Wheel package	Pc	8, 14, 24	
Max. number of grinding	Pc	24, 42, 72	
Handling* - robots			
Pallets	Pc	2, 4, 10	
Pallet dimensions	mm	300 x 300 49 - 400 places	
Weight	kg	7 000	

*Option

The revolutionary production machine for the manufacture of threaded tools in a single clamping

gemini TAP

gemini TAP		
Axes		
X - longitudinal slide	mm	400
Y - cross slide	mm	360
Z - vertical column	mm	200
A - workpiece carrier	°	Free
W - oscillating axis (stroke)	mm	5
C - rotation of the grinding head	°	290
Workpiece carrier		
Interface		HSK 80
Grinding head - thread grinding		
Grinding motor (100%)	kW	24
Grinding spindle		HSK 190
Max. grinding spindle speed	rpm	6 000
Grinding wheel diameter	mm	300 - 400
Grinding head - flute grinding		
Grinding motor	kW	24
Double grinding spindle		HSK 50
Max. grinding spindle speed	rpm	10 000
Grinding wheel diameter	mm	100 - 225
Handling* - robots		
Pallets	Pc	2, 4, 10
Pallet dimensions	mm	300 x 300 49 to 400 places
Weight	kg	7 000

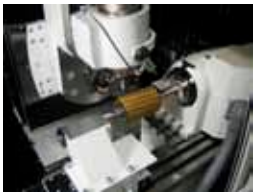
J. SCHNEEBERGER Maschinen AG
Geissbergstrasse 2
CH - 4914 Roggwil

Precision CNC grinding machines

Precision 5 (6)-axis CNC grinding machines

for broaching tools, tooth cutters, toothed racks

corvus BBA



corvus GDS

corvus GDS, BBA, BPP, C360, C500						
Axes						
X - longitudinal slide	*gds*	mm	650	1100	1700	3000
	bba, bpp, c360, c500	mm	-	1100	1700	3000
Y - vertical column	*gds*	mm	300	300		
	bba, bpp, c360, c500	mm	-	300		
Z - cross slide	*gds*	mm	280	280		
	bba, bpp, c360, c500	mm	-	300		
W -vertical - oscillating axis	*gds, bba, c360, c500*	mm	-	-	-	-
	bpp,	mm	-	100		
A - workpiece carrier	*gds, bba, bpp, c360,*	°	Free	Free		
C - rotation of the grinding head	*gds, bpp, c360, c500*	°	240	240		
	bba		-	325		
B - swing of the grinding head	*bba*	°	-	220		
Workpiece carrier						
Steep cone	*gds, bba, bpp, c360, c500*		ISO 50			
Grinding head						
Grinding motor (100%)	*gds*	kW	15, 20, 26*			
	bba, bpp	kW	-	14		
	c360	kW	-	26		
	c500	kW	-	40		
Double grinding spindle	*gds*		HSK 50.80	HSK 50.80		
	bba, bpp		-	HSK 50		
	c360		-	HSK 80		
Grinding spindle	*c500*		-	HSK 190		
Max. grinding spindle speed	*gds, bpp, c360*	rpm	10 000	10 000		
	bba	rpm	-	18 000		
	c500	rpm	-	6 000		
Grinding wheel diameter	*gds, bba*	mm	50-250	50 - 250		
	bpp	mm	-	50 - 200		
	c360	mm	-	to 360		
	c500	mm	-	to 500		
Weight	*gds*	kg	11000	12500	14500	19000
	bba	kg	-	14000	18500	22000
	bpp	kg	-	12500	14500	19000
	c360, c500	kg	-	12500	14500	19000

*Option

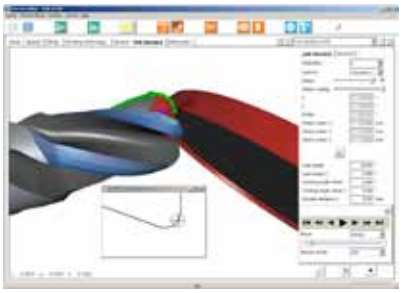
corvus BPP

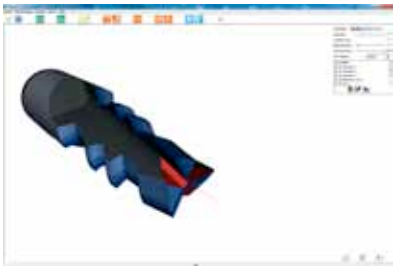
corvus C500

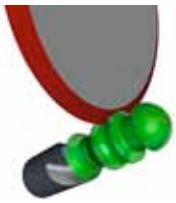
J. SCHNEEBERGER Maschinen AG
Geissbergstrasse 2
CH – 4914 Roggwil

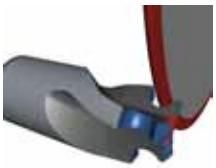
Precision CNC grinding machines

The ideal solution for every tool is “Qg1”









Years of experience and innovation in the field of tool grinding and production grinding have been integrated in the Qg1 software and represent the strongest argument for purchasing a grinding machine from J. Schneeberger Maschinen AG

GALILEO

X - axis	vertical column	300 mm
Y - axis	longitudinal slide	250 mm
A - axis	rotation	free ISO 50
Weight	600 kg	

3-axis measuring machine with two cameras and optional 3D probe for measuring shaft tools and cutting inserts and presetting of grinding wheels

Automation

Loader *aries* NGP

Loader *norma* NGC

Robot *gemini* NGM
2 pallets

Robot *gemini* NGM Stack

Robot *gemini* NGM
4 pallet

Robot *sirius* NGS

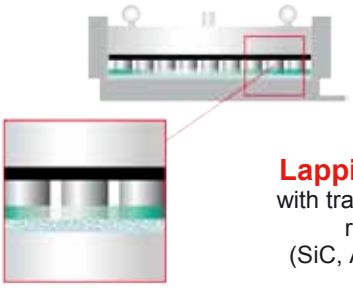
Robot *sirius* NGS Stack

Loader *corvus* max Robot

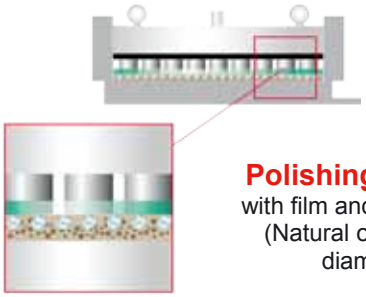
Loader *corvus* Arbor Arena Robot

STÄHLI Läpp Technik AG
Sägestrasse 10
CH-2542 Pieterlen/Biel

Flat honing, lapping, polishing



Lapping process
with transfer liquid and rolling grit
(SiC, Al2 O3 , B4 C)



Polishing process
with film and upright grit.
(Natural or synthetic diamond)

Flat lapping machines

FLM 500 - 550

Technical data		FLM 500	FLM 550
Outside Ø of lapping plate	mm	500	550
Inside Ø of the 3 conditioning rings	mm	190	220
Speed of the lapping plate infinitely variable	min^{-1}	0 - 75	0 - 75
Timer		digital	digital
Motor main drive	kW	2.2	2.2
Weight	kg	480	480
Compressed air supply	bar	6	6
Cooling system, capacity of coolant reservoir	L	150	150

FLM 750 - 1000 - 1250 - 1500

Technical data		FLM 750	FLM 1000	FLM 1250	FLM 1500
Outside Ø of lapping plate	mm	750	1000	1250	1500
Inside Ø of the 3 conditioning rings	mm	300	400	500	600
Speed of lapping wheels infinitely variable	min^{-1}	0 - 70	0 - 60	0 - 50	0 - 35
Timer		digital	digital	digital	digital
Motor main drive	kW	4	7.5	15	22
Weight	kg	1 500	2 500	3 950	5 850
Compressed air supply	bar	6	6	6	6
Cooling system, capacity of coolant reservoir	L	150	150	150	150

FLM 500-R

Cylindrical lapping and polishing machines

Technical data		FLM 500-R
Outside Ø of the working wheel	mm	500
Pneumatic lift 6 bar	daN	0 - 110
Timer		Touchscreen
Speed of the lapping plate, infinitely variable	min^{-1}	0 - 75
Motor main drive	kW	2.2
Dimensions L x W x H	cm	85 x 100 x 200
Weight	kg	approx. 350
Workpiece dimensions	mm	Ø 0.7 - 30 length 5 - 200

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 LxWxH	cm	100 x 60 x 110	100 x 60 x 110
Weight	kg	480	550

CLM 150 - 500

STÄHLI Läpp Technik AG
Sägestrasse 10
CH-2542 Pieterlen/Biel

Flat honing, lapping, polishing

Flat honing process
with bonded grit
using diamond or CBN
working wheels

1 - sided flat honing machine

FH 602-H

Technical data		FH 602-H
Working wheels Ø	mm	550 - 600 / 190
Workpiece cage Ø	mm	180
Achievable switch-off accuracy	µ	1
Drive power	kW	4
Speeds of working wheels	min^{-1}	0 - 140
Rotational direction of all drives		freely selectable
Working power		pneumatic
Working power/ ramps		programmable
Workpiece height	mm	0.1 - 50
Spray liquid		monitored
Operating voltage		24 V DC
Weight	kg	approx. 1100

2 - sided flat honing machine

DLM 705 - 805 - 1005 - 1205 - 1405

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	min^{-1}	0 - 250, 300, 400, 600	0 - 210, 300
Centre drive	min^{-1}	0 - 125, 220	0 - 100, 150
Rotational direction of all drives		freely programmable	
Weight	kg	8000	from 13000

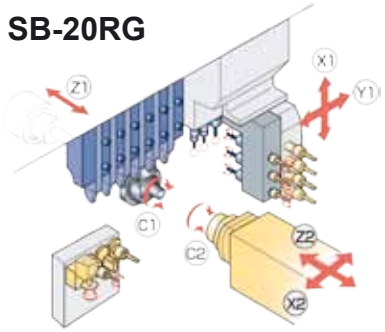
STAR MICRONICS AG
Lauetstrasse 3
CH - 8112 Otelfingen

CNC Swiss type automatic lathe

SB-12/20RG

Technical data		SB-12RG	SB-20RG
Number of axes		7	
MAIN SIDE			
Main spindle (headstock)		Z1 / C1 axis	
Linear slides		X1 / Y1	
Max. turning diameter	mm	12	20 (23)
Max. headstock stroke long / short turning	mm	205 / 30	205 / 50
Max. drive power	kW	3.7	
Max. speed	min^{-1}	15 000	10 000
Tools linear slides			
Turning tools	Pc	6 (□ 12 mm)	
Drilling tools (4 spindle drilling apparatus)	Pcs	4 x ER16	
Cross working tools	Pcs	5 (7)	
Speed	min^{-1}	8 000	
REAR SIDE			
Counter spindle		X2 / Z2 / C2 axis	
Max. gripping diameter	mm	12	20 (23)
Drive power	kW	1.2	
Max. speed counter spindle	min^{-1}	12 000	9 000
Tools rear side machining			
Drilling tools (4 fold tool holder)	Pcs	4 (holder Ø 22)	
Drive (standard)	Pcs	4 x ER16	
Max. speed rear side machining	min^{-1}	8 000	
GENERAL DATA			
Rapid traverse	m/min	up to 35	
Dimensions (W x D x H)	mm	2 070 x 1 177 x 1 760	
Weight	kg	1 750	

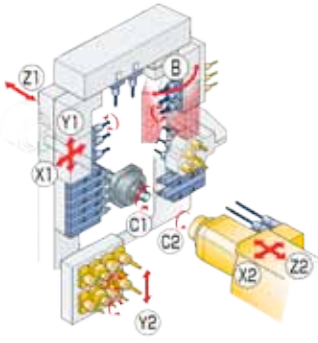
SB-20RG

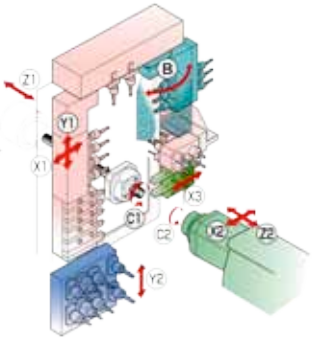


SR-20R IV A,B SR-38 A,B

Technical data		SR-20R IV	SR-38 A, B
Number of axes		8 / 9	9 / 10
MAIN SIDE			
Main spindle (headstock)		Z1 / C1 axis	Z1 / C1 axis
Linear slides		X1 / Y1 / B axis	X1 / X3 / Y1/ B axis
Max. turning diameter	mm	20 (23)	38 (42)
Max. headstock stroke long / short		205 / 50	320 / 95
Max. drive power	kW	3.7	11.0
Max. speed	min^{-1}	10 000	7 000
Tools linear slides			
Turning tools head 1	Pcs	7 (□ 12 mm)	5 (□ 16 mm)
Turning tools head 3	Pcs	-	2 (□ 16 mm)
Drilling tools	Pcs	4 x ER16	3 x ER16, 2 x ER20
Cross working tools	Pcs	5 x ER16	6 x ER20
B axis	Pcs	3 x ER16 main side	3 x ER16 main side
(e.g. for angled holes)	Pcs	3 x ER11 rear side	3 x ER16 rear side
Speed	min^{-1}	8 000	6 000
Tools gun drilling unit			
Number of tools	Pcs	2	-
Holder	mm	Ø 22	-
Max. drilling depth	mm	100	-
REAR SIDE			
Gripping spindle		X2 / Z2 / C2 axis	X2 / Z2 / C2 axis
Max. gripping diameter	mm	20 (23)	38 (42)
Drive power	kW	3.7	5.5
Max. speed counter spindle	min^{-1}	10 000	7 000
Tools rear side machining			
Height axis		Y2	Y2
Number of tools	Pcs	8 (fixed or driven)	8 (fixed or driven)
Max. speed	min^{-1}	8 000	6 000
GENERAL DATA			
Rapid traverse	m/min	up to 35	up to 36
Dimensions (W x D x H)	mm	2 334 x 1 200 x 1 695	2 740 x 1 315 x 2 120
Weight	kg	2 600	4 300

SR- 38 B





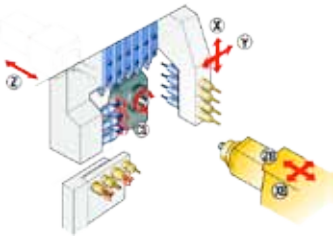
SR- 20R IV

STAR MICRONICS AG
Lauetstrasse 3
CH - 8112 Otelfingen

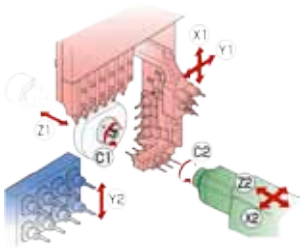
CNC Swiss type automatic lathe

SR-10J SR-32J II B

Technical data			SR-10J	SR-32J II- A,B
Number of axes			7	8
MAIN SIDE				
Main spindle (headstock)			Z1 / C1 axis	Z1 / C1 axis
Linear slides			X1 / Y1	X1 / Y1
Max. turning diameter		mm	10	32 (35)
Max. headstock stroke long / short turning:		mm	105 / -	320 / 80
Max. drive power		kW	3.7	11.0
Max. speed		min^{-1}	15 000	8 000
Turning tools		Pc	6	6
Drilling tools (front-/rear)		Pc	4	5
Driven tools	Linear holder	Pcs	3	5
	for rear side machining	mm	2	8
	Max. speed	min^{-1}	10 000	6 000
	Drive motor	kW	0.5	1.2
Rear side machining				
Counter spindle			Z2 /X2 / C2 axis	Z2 /X2 / C2 axis
Height axis rear side machining			-	Y2
Max. gripping diameter		mm	10	32 (35)
Gripping spindle motor		kW	1.1	5.5
Max. gripping spindle speed		min^{-1}	10 000	8 000
Tools (driven)	Number	Pcs	2 fixed + 2 driven	8
	Max. speed	min^{-1}	8 000	6 000
GENERAL DATA				
Rapid traverse		m/min	35	35
Dimensions (W x D x H)		mm	1 865 x 775 x 1 695	2 690 x 1 345 x 1 780
Weight		kg	1 400	3 900



SR-32J II B

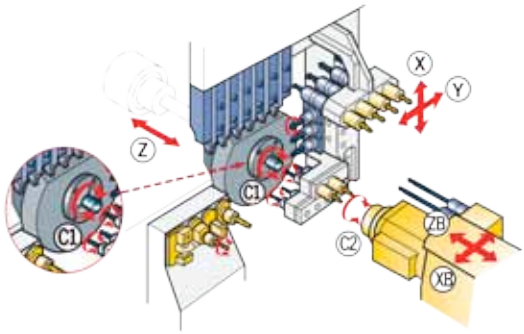


SR-10J

SR-20J / JN

Technical data		SR-20J / JN
Number of axes		7
MAIN SIDE		
Main spindle (headstock)		Z1 / C1 axis
Linear slides		X / Y
Max. turning diameter	mm	20 (23)
Max. headstock stroke long / short turning	mm	205 / 55
Max. drive power	kW	3.7
Max. speed	min^{-1}	10 000
Tools linear slides		
Turning tools	Pcs	6
Drilling tools (4 spindle drilling apparatus)	Pcs	4
Cross working tools	Pcs	5
Speed	min^{-1}	8 000
REAR SIDE		
Counter spindle		X2 / Z2 / C2 axis
Max. gripping diameter		20 (23)
Drive power		2.2
Max. speed counter spindle		8 000
Tools rear side machining		
Drilling tools (4 fold tool holder)	Pcs	4
Drive (standard)	Pcs	4
Max. speed rear side machining	min^{-1}	8 000
GENERAL DATA		
Rapid traverse		35
Dimensions (W x D x H)	mm	2 200 x 1 200 x 1 700
Weight	kg	2 200

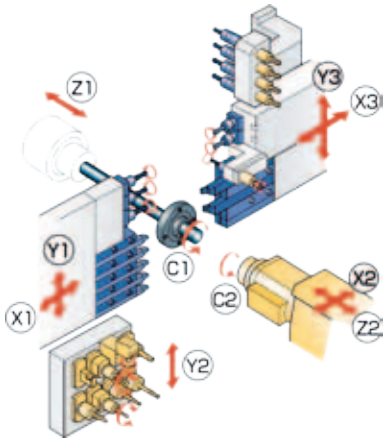
SR-20J/JN



STAR MICRONICS AG
Lauetstrasse 3
CH - 8112 Otelfingen

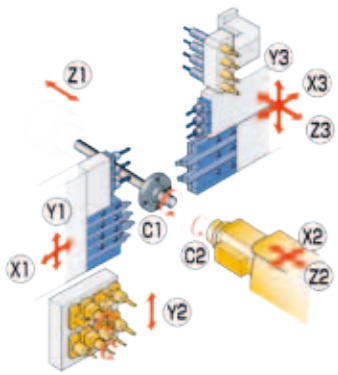
CNC Swiss type automatic lathe

SW-12R II



Technical data		SW-12R II
Number of axes		10
MAIN SIDE		
Main spindle (headstock)		Z1 / C1 axis
Linear slides		X1 / Y1 /X3 / Y3 axis
Max. turning diameter	mm	13
Max. headstock stroke long / short turning		135 / 30
Max. drive power	kW	3.7
Max. speed	min^{-1}	15 000
Tools linear slides		
Turning tools	Pcs	5+2 (□ 10 mm)
Drilling tools (4 spindle drilling apparatus)	Pcs	4 x ER11
Cross working tools	Pcs	6 x ER11
Speed	min^{-1}	12 000
REAR SIDE		
Counter spindle		X2 / Y2 / Z2 / C2 axis
Max. gripping diameter	mm	12
Drive power	kW	3.7
Max. speed counter spindle	min^{-1}	15 000
Tools rear side machining		
Drilling tools (4 fold tool holder)	Pcs	4 (holder Ø 22)
Drive (standard)	Pcs	8
Max. speed rear side machining	min^{-1}	12 000
GENERAL DATA		
Rapid traverse	m/min	up to 35
Dimensions (W x D x H)	mm	1 995 x 920 x 1 700
Weight	kg	2 100

SW-20



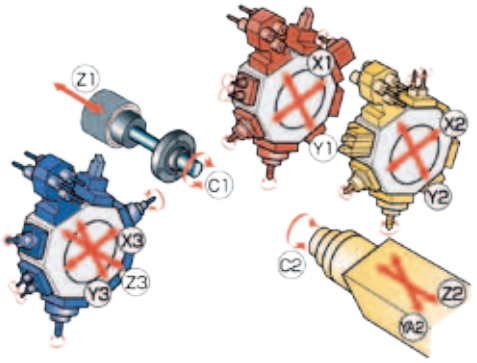
Technical data		SW-20
Number of axes		11
MAIN SIDE		
Main spindle (headstock)		Z1 / C1 axis
Linear slides		X1 / Y1 /X3 / Y3 / Z3 axis
Max. turning diameter	mm	20 (23)
Max. headstock stroke		205
Max. drive power	kW	3.7
Max. speed	min^{-1}	10 000
Tools linear slides		
Turning tools	Pcs	6 (□ 12 mm / □ 16 mm)
Drilling tools (4 spindle drilling apparatus)	Pcs	4 x ER16
Cross working tools	Pcs	6 x ER16
Speed	min^{-1}	8 000
REAR SIDE		
Gripping spindle		X2 / Y2 / Z2 / C2 axis
Max. gripping diameter	mm	20 (23)
Drive power	kW	3.7
Max. speed counter spindle	min^{-1}	10 000
Tools rear side machining		
Drilling tools (4 fold tool holder)	Pcs	4 (holder Ø 22)
Drive (standard)	Pcs	6 driven + 2 fixed
Max. speed rear side machining	min^{-1}	8 000
GENERAL DATA		
Rapid traverse on all linear axes	m/min	35
Dimensions (W x D x H)	mm	2 558 x 1 150 x 1 765
Weight	kg	3 400

STAR MICRONICS AG
Lauetstrasse 3
CH - 8112 Otelfingen

CNC Swiss type automatic lathe

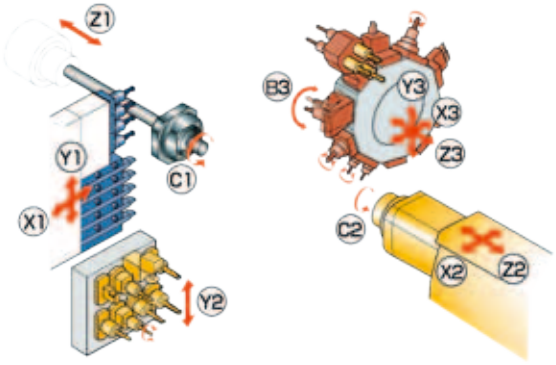
ST-20, ST-38

Technical data		ST-20	ST-38
Number of axes		12	
Number of stations turrets 1, 2, 3		8	10
MAIN SIDE			
Main spindle (headstock)		Z1 / C1 axis	
Turret 1		X1 / Y1 axis	
Turret 3		X3 / Y3 / Z3 axis	
Max. turning diameter	mm	20 (23)	38 (40)
Max. headstock stroke	mm	350	
Max. drive power	kW	5.5	11
Max. speed	min^{-1}	10 000	7 000
Drive power turrets 1 and 3	kW	2.5	4
Speed turrets 1 and 3	min^{-1}	5 750	5 700
REAR SIDE			
Gripping spindle		Z2 / C2 / Y4 axis	
Turret 2		X2 / Y2 axis	
Max. gripping diameter	mm	20 (23)	38 (40)
Drive power	kW	5.5	7.5
Max. speed counter spindle	min^{-1}	10 000	7 000
Drive power turret 2	kW	2.5	4
Speed turret 2	min^{-1}	5 750	5 700
GENERAL DATA			
Rapid traverse	m/min	up to 30	
Dimensions (W x D x H)	mm	2 988 x 1 720 x 1 845	3 477 x 1 859 x 1 865
Weight	kg	4 850	6 250



SV-20R SV-38R

Technical data		SV-20R	SV-38R
Number of axes		12	12
MAIN SIDE			
Main spindle (headstock)		Z1 / C1 axis	
Linear slides		X1 / Y1	
Turret		B3 / X3 / Y3 / Z3 axis	
B axis on the turret		freely programmable	
Max. turning diameter	mm	20 (23)	38 (42)
Max. headstock stroke long / short		205 / 50	350 / 95
Max. drive power	kW	5.5	11.0
Max. speed	min^{-1}	10 000	7 000
Tools linear slides			
Turning tools	Pc	7 (□ 12 mm)	4 (□ 16 mm) / 1 (□ 20
Cross working tools	Pc	4 x ER20	
Max. speed	min^{-1}	8 000	5 000
Drive power	kW	2.2	2.2
Tools turret			
Number of tool stations		8 (all driven)	10 (all driven)
B axis e.g. for angled holes)		4 stations	5 stations
Max. speed	min^{-1}	5 700	
Drive power	kW	2.7	4
REAR SIDE			
Counter spindle		X2 /Z2 / C2 axis	
Max. gripping diameter	mm	20 (23)	38 (40)
Drive power counter spindle	kW	3.7	7.5
Max. speed counter spindle	min^{-1}	10 000	7 000
Tools rear side machining			
Height axis		Y2	Y2
Tool stations	Pcs	8 (6 driven 2 fixed)	
Max. speed	min^{-1}	8 000	5 000
GENERAL DATA			
Rapid traverse	m/min	up to 30	
Dimensions (W x D x H)	mm	2 730 x 1 350 x 1 865	3 420 x 1 440 x 1 865
Weight	kg	4 150	4 300



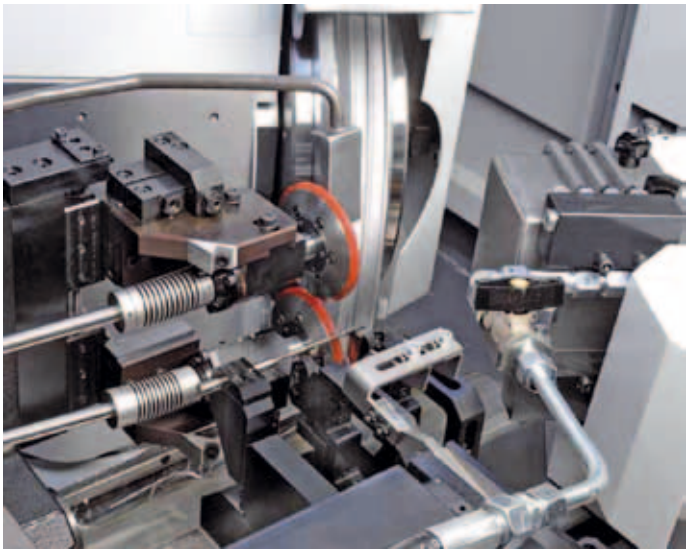
TSCHUDIN

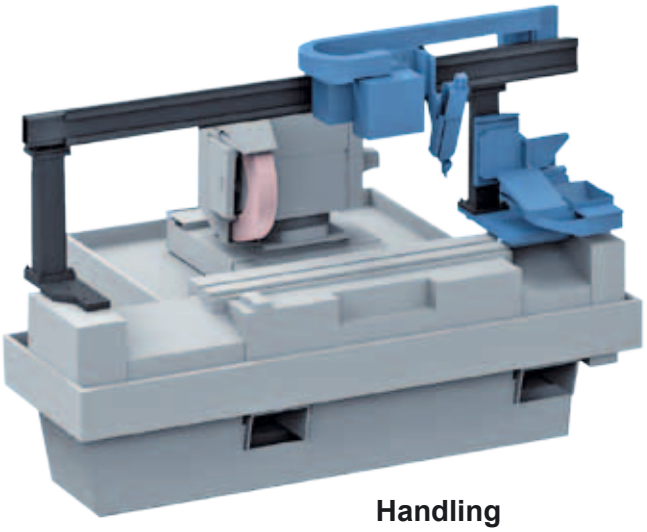
T25

RS/R grinding head

Technical data		T25
Operating range		
Distance between centres	mm	400 / 600
Z axis travel	mm	500 / 750
Rapid traverse	m/min	20
Resolution	µ	0.1
X axis travel	mm	365
Rapid traverse	m/min	10
Resolution	µ	0.1
Grinding wheel	mm	550 x 80 (100)
Peripheral speed with ant-friction bearing	m/s	45 (63)
Power	kW	10
Control system		Fanuc 31i

CNC control system Fanuc 31i





Handling

TSCHUDIN

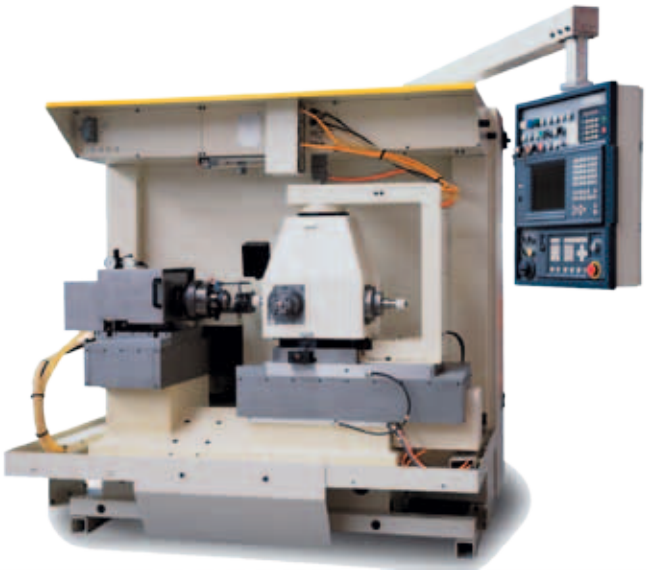
T35

Technical data		T35
Specifications		
Distance between centres	mm	400
Grinding length	mm	400
Centre height	mm	125 / 175
Max. workpiece diameter	mm	249
Workpiece weight		
between centres	kg	150
Traversing axes		
Z axis	mm	600
Rapid traverse	m/min	15
Resolution	µm	0.1
Upper table		
Table swivelling	Degrees	+/- 6
Cross slide:		
X axis	mm	350
Rapid traverse	m/min	7.5
Resolution	µm	0.1
Grinding head		
Grinding wheel (special apps)	mm	400 – 500 x 80 x 203.2
Diameter	mm	up to 600
Width	mm	up to 120
Peripheral speed with anti-friction bearing	m/s	0 - 120
Peripheral speed hydrodynamic	m/s	45 / 60
Speed	min^{-1}	V const (opt.)
Power	kW	10 (opt. up to 20)
Workpiece headstock		
Speed	min^{-1}	5 – 1500 (opt. 3000)
Power	kW	2.1
Mounting shank		MK5 / Ø 70 mm // MK6 / Ø 90 mm
Spindle bore	mm	34
Drive torque	Nm	20
Tailstock		
Stroke	mm	80
Mounting shank		MK3
Control system		Bosch / Siemens

L. KELLENBERGER & Co. AG
Heiligkreuzstrasse 28
9008 St.Gallen

Universal internal / external circular grinding machines

VOUMARD VM 110



Technical data		VOUMARD 110
Internal diameter to be ground	mm	up to 150
Maximum dimensions of workpieces		
Manual chucking	mm	160 x 80
Automatic chucking	mm	120 x 80
In centreless	mm	160 x 50
Chucking equipment		
Max. outside diameter of chuck	mm	250
Max. weight of workpiece and cutting tool	daN / 100 mm	50
Programmable speeds	min^{-1}	0 - 1 500
Axial clamping force	daN	600
Axes X and Z		
Available stroke X	mm	220
Available stroke Z	mm	300
Resolution	µm	0.1
Max. speed	m/min	20
Centre height		
Over workpiece table	mm	130
Over grinding table	mm	245
Machine dimensions L x W x H	mm	2 000 x 1 560 x 2 100
Weight approx.	kg	2 800

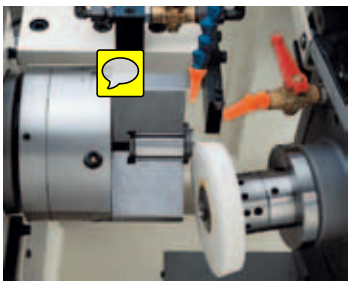
4 spindle turret

Die VOUMARD VM 110 is a universally deployable internal and external circular grinding machine which is equally suited for one-off machining or series production of workpieces with small and intermediate dimensions

Typical areas of application include the machining of one-off components for the manufacture of

- Hydraulic components
- Ball bearings
- Fuel injection systems

External grinding



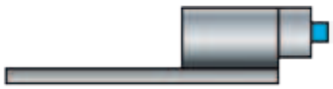
L. KELLENBERGER & Co. AG
Heiligkreuzstrasse 28
9008 St.Gallen

Universal internal / external circular grinding machines

VOUMARD VM 150

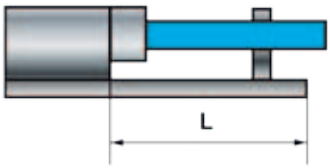
		VOUMARD VM 150	VOUMARD VM 300
Grinding range			
Internal diameters up to	mm	200 + Ø grinding wheel	500
External diameters max.	mm	260 - Ø grinding wheel	640
Recommended grinding depth	mm	250	300
Maximum dimensions of workpiece or chuck (swing diameter)			
Under protective hood	mm	380	
Over workpiece table	mm	350	550
Over gap	mm	500	830
Chuck equipment dependent on model			
Programmable speeds	min^{-1}	0 - 850 or 560	dependent on model
Max. weight of chuck and workpiece	daN / 100mm	200 or 250	500
Axial clamping force	daN	750 or 1 200	
X and Z axis			
Gap stroke X	mm	230	300
Available stroke Z	mm	500	600 / 1000
Resolution	µm	0.1	0.1
Max. speed	m/min	X=10 / Z=20	20
Centre height			
Over workpiece table	mm	200	200 / 300
Dimensions of the machine L x W x H			
Model L7	mm	3 500 x 2 000 x 2 150	5518 x 3965 x 2179
Model L13	mm	4 450 x 2 000 x 2 150	6474 x 4115 x 2179
Model L15	mm	4 450 x 2 000 x 2 150	-
Weight dependent on model	kg	5 000 to 6 000	6 000 to 8 000

Grinding of short workpieces on all versions



Machine model	VM 150		VM 300	
	Length L	Swivelling range B axis	Length L	Swivelling range B axis
L7	700	max. 15°	750	max. 20°
L13	1 300	max. 10°	1300	max. 15°
L15	1 500	max. 10°	-	-

Grinding of long workpieces with steady rest



The VOUMARD VM 150 and VM300 are universally deployable internal and external circular grinding machines which are equally suited for one-off machining or series production of workpieces with medium to large dimensions

Typical areas of application include the machining of one-off components for the manufacture of

- Hydraulic components
- Machine tool spindles
- Ball bearings
- Transmissions

WEILER Werkzeugmaschinen GmbH
Friedrich K. Eisler Strasse 1
D-91448 Emskirchen

Conventional precision engine lathes

PRIMUS VC^{D}

PRAKTIKANT GS^{D}
PRAKTIKANT VC^{D}
PRAKTIKANT VC^{Plus}

COMMODOR 180 GS^{D}
COMMODOR 180 VC^{D}
COMMODOR 180 VC^{D}

CONDOR VC^{Plus}

TECHNICAL DATA		PRIMUS VC^{D}	PRAKTIKANT			CONDOR	COMMODOR		
			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	1 000	1 000	1 000
Centre height	mm	140	160	160	160	180	180	180	230
Swing diameter over bed	mm	280	320	320	320	360	380	380	475
Swing diameter over cross slide	mm	150	190	190	190	190	215	215	270
Main spindle									
Spindle head according to DIN 55027	Size	5	5	5	5	6	6	6	6
Spindle diameter in the front bearing	mm	70	70	70	70	90	90	90	90
Spindle bore	mm	43	43	43	43	57	56	56	56
Internal taper according 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 (30-5 000)	48-2 500	30-4 000 (30-5 000)	25-5 000	25-4 000	25-2 000	25-2 000	25-2 000
Number of gear speeds		1	8	1	1	1	9	4	4
Speed levels		infinitely variable	16	infinitely variable	infinitely variable	infinitely variable	18	infinitely variable	infinitely variable
Feed range									
Number of feeds		24	24	24	infinitely variable	infinitely variable	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 pitches									
Metric threads		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 thread		80-2	80-2	80-2	80-2	80-2	80-2.75	80-2.75	80-0.75
Tailstock									
Tailstock quill stroke	mm	85	85	85	85	110	150	150	150
Tailstock quill diameter	mm	40	40	40	40	50	60	60	70
Location taper DIN 228	MK	3	3	3	3	3	4	4	4
Weight	kg	850	1 050	1 050	1 100	1 500	1 800	1 900	2 000

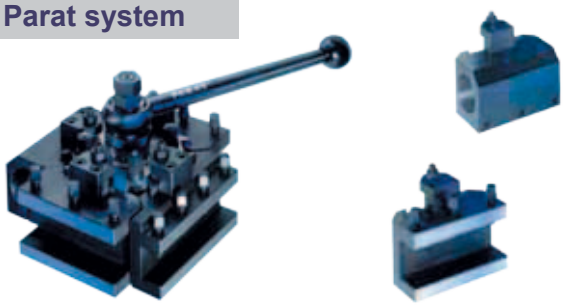
WEILER Werkzeugmaschinen GmbH
Friedrich K. Eisler Strasse 1
D-91448 Emskirchen

Engine lathes and servo engine lathes

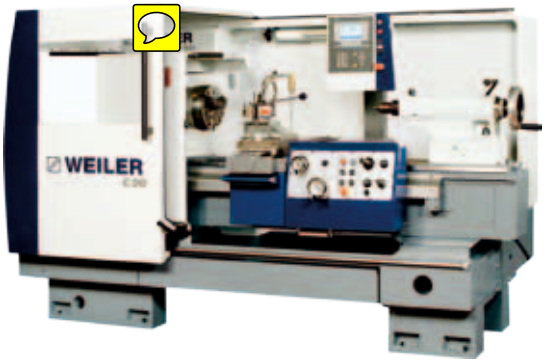
DA 210 DA 260

TECHNICAL DATA	DA	210	210AC	260	260AC
Operating range					
Distance between centres	mm	1 000, 1 500		1 000, 1 500, 2 000	
Centre height	mm	210		260	
Swing diameter over bed	mm	435		535	
Swing diameter in the bed recess	mm	470		560	
Swing diameter over cross slide	mm	245		345	
Bed width	mm	330		330	
Travel of cross slide	mm	330		330	
Travel of upper support	mm	130		130	
Turning tool cross section	mm	25x25			
Main drive					
Drive power 100% ED	kW	5.5		7.5	5.5
Main spindle					
Spindle head according to DIN 55027	Size	6			
Spindle diameter in the front bearing	mm	83		100	
Spindle bore	mm	52		71	
Internal taper of main spindle	mm	Metr. 57		Metr. 71	
Speed range	min^{-1}	44-2 000	20-2 500	33-1 500 (44-2 000)	20-2 500
Speed levels		12	2	12	2
Feeds					
Longitudinal feed	mm/r	0.072-4	0.072-2	0.072-4	0.072-2
Cross feed	mm/r	0.036-2	0.036-1	0.036-2	0.036-1
Tailstock					
Tailstock quill diameter	mm	65			
Tailstock quill stroke	mm	120			
Internal taper of tailstock quill	MK	4		5	
Thread cutting range					
Metric threads	m	0.5-28	0.5-14	0.5-28	0.5-14
Inch threads	G	56-1	56-2	56-1	56-2
Permissible workpiece					
Overhung	kg	150		200	
With tailstock	kg	500		800	
With steady	kg	700		1 000	
Weight	kg	1 300 1 550	1 450 1 700	1 510 1 760 2 050	1 650 1 900 2 200

Parat system



C30 C50



TECHNICAL DATA		C30	C50
Operating range			
Distance between centres	mm	750	1 000 2 000
Swing diameter over bed	mm	330	570
Swing diameter over cross slide rest	mm	160	340
Bed width	mm	240	350
Travel of cross slide	mm	180	340
Turning tool cross section (WxH)	mm	20x20	32x25
Main spindle			
Spindle head according to DIN 55027	Size	5	8
Spindle diameter in the front bearing	mm	70	120
Spindle bore	mm	40.5	83
Internal taper of main spindle	MK	5	Metr. 90
Main drive			
AC drive			2 speed
Drive power at 60%/100%ED	kW	9/7	15/12
Overall speed range	min^{-1}	1-4 500	1-2 500
Feed range			
Three-phase servo drives			
Longitudinal feed force	N	6 000	10 000
Cross feed force	N	3 000	7 000
Longitudinal and cross feed range	mm/rev.	0.001-10	0.001-10
Max rapid traverse speed longitudinal/cross	mm/rev.	6/3	6/3
Thread cutting range			
Metric threads	m	0.1-400	0.1-400
Inch threads	G	56-1/4	56-1/4
Thread module	mm	0.125-28	0.125-28
DP threads	DP	224-1	224-1
Number of turns of the thread	max.	99	99
Tailstock			
Tailstock quill diameter	mm	50	80
Tailstock quill stroke	mm	130	200
Internal taper of tailstock quill	MK	3	5
Weight	kg	1 300	3 200 3 700

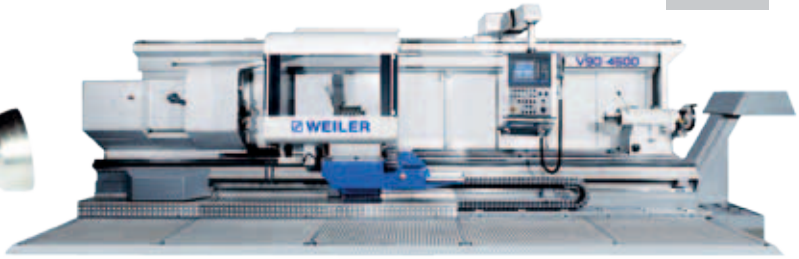
Multi Suisse system

WEILER Werkzeugmaschinen GmbH
Friedrich K. Eisler Strasse 1
D-91448 Emskirchen

Precision engine lathes with cycle control

E30

V90



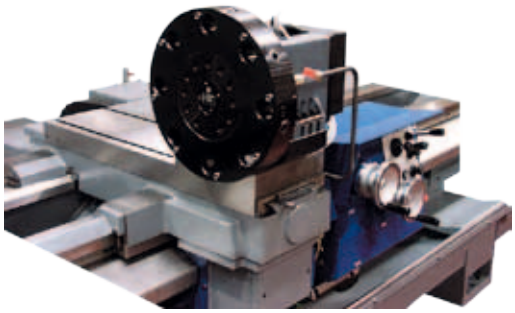
E175

E50HD

TECHNICAL DATA		E series (2-way bed)												V series (4-way	
		E30	E40	E50HD	E60	E70	E80	E90	E110	E120	E150	E175	E200	V90	V110
Distance between centres	mm	750	1 000	1 000 2 000	1 000 2 000	1 000- 6 000	1 000- 6 000	2 000- 12 000	2 000- 12 000	2 000- 12 000	2 000- 12 000	2 000- 12 000	2 000- 15 000	3 000- 12 000	3 000- 12 000
Swing diameter over bed	mm	330	435	570	650	720	800	900	1 100	1 200	1 500	1 750	2 000	940	1 160
Swing diameter over cross slide	mm	160	200	340	400	430	510	530	730	830	1 030	1 280	1 530	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 on the spindle	Nm	165	450	1 300	1 700	3 150	3 150	6 000	6 000	8 000	10 700	10 700	12 000	8 000	8 000
Spindle head according to DIN 55027	Size	5	6	8	8	11	11	11	11	15	15	15	20	15(20)	15(20)
Spindle bore	mm	40.5	66	83*	83	128**	128**	128***	128***	165****	165*****	165*****	262******	165****	165****
Spindle diameter in the front bearing	mm	70	110	120	120	150	150	178	178	235	235	235	330	235	235
Speed range	min^{-1}	1 - 4 500	1 - 3 500	1 - 2 500	1 - 2 500	1 - 1 800	1 - 1 800	1 - 1 120	1 - 1 120	1 - 900	1 - 900	1 - 900	1 - 500/30 0	1 - 900	1 - 900
Longitudinal feed force	N	6 000	10 000	12 000	12 000	20 000	20 000	20 000	20 000	20 000	30 000	30 000	30 000	20 000	20 000
Feed range	mm/rev.	0.001-50													
Thread pitch range	mm	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)
Internal taper of tailstock quill	Mk	3	4	5	5	6	6	6	6	6	Metr.100	Metr.100	Metr.100	6	6/Metr.100
Machine weight approx.	kg	1 600	3 400	3 800 4 300	5 200 6 400	4 500 9 000	5 000 9 500	8 500 14 500	9 500 15 500	10 500 16 500	16 000 32 000	18 000 34 000	20 000 34 000	15 000 27 000	16 000 28 000
Acceptance accuracy	DIN	8605	8605	8605	8605	8605	8605	8606	8606	8606	8607	8607	8607	8606/8607	8606/8607

* Spindle bores 128, 165 mm on request
** Spindle bores 165, 216 mm on request
*** Spindle bores 165, 262, 362 mm on request
**** Spindle bores 262, 362 mm on request
***** Spindle bores 262, 362, 450 mm on request
****** Spindle bores 362, 450 mm on request

8 tool disc-type turret



4 tool head-type turret

Turning, drilling and milling unit

WEILER Werkzeugmaschinen GmbH
Friedrich K. Eisler Strasse 1
D-91448 Emskirchen

CNC precision lathes

DZ45 CNC
DZ65 CNC

TECHNICAL DATA		DZ45 CNC				DZ65 CNC			
		AR	ARY	AG	AGY	AR	ARY	AG	AGY
Operating range									
Max. turning diameter	mm	240				240			
Travel X	mm	207.5	205			207.5	205		
Travel Z	mm	530				530			
Main spindle -spindle motor									
Spindle head according to DIN 55026	Size	5				6			
Max. chuck size	mm	160				200			
Spindle bore	mm	53				77			
Feed-through in draw/thrust tube	mm	42				66			
Max. speed	min^{-1}	6 000				5 000			
Torque at 60% ED	Nm	128				260			
Drive performance at 60% ED	kW	21.5				27			
Feed drive									
Feed force X/Z/Q	daN	530				530			
Rapid traverse speed X/Z/Q	m/min	30/30/30				30/30/30			
Tailstock									
Clamping of live centre	MK	4		-		4		-	
Thrust force max.	daN	530		-		530		-	
Counter spindle-spindle motor									
Spindle head according to DIN 55026	Size	-		5		-		5	
Max. chuck size	mm	-		160		-		160	
Feed-through in draw/thrust tube	mm	-		42		-		42	
Max. speed	min^{-1}	-		6 000		-		6 000	
Torque at 60% ED	Nm	-		85		-		85	
Drive performance at 60% ED	kW	-		17		-		17	
Tools turret									
Not AGW / AGW		12/12	16/16			12/12	16/16		
Toolholder shaft cross section	mm	20x20	16x16			20x20	16x16		
Shaft diameter according to DIN 69880	mm	30	25			30	25		
Drive performance at 60% ED	kW	4.5				4.5			
Speed of tool drive max.	min^{-1}	4 000				4 000			
Tool turret with Y axis									
Y travel	mm	-	+ 45/- 35	-	+ 45/- 35	-	+ 45/- 35	-	+ 45/- 35
Control system									
		Sinumerik 840D sl							
Weight	kg	6 100		6 500		6 300		6 700	

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