



TTL TECHNOLOGY

Your partner in swiss and european precision machining products

TL TECHNOLOGY AG, a Swiss based engineering and trading company is your partner in first class high precision Swiss and European machine tool solutions.

We supply customer-oriented solutions in the field of quality Swiss and European metal working equipment, e.g. high precision machine tools, multifunctional centres, measuring equipment, tools and accessories as well as complete solutions with high end technology.



For our customers we provide consulting and project management services, installation and training with competent local service engineers as well as local service and maintenance for installed equipment.

TL TECHNOLOGY AG represents official and exclusive more than 20 Swiss and some European leading manufacturers of hi-tech products which are used in various production segments of the metal working industry:

- **High Precision Machines for Turned Components** in various materials from bar or coil in small series up to big quantities from **ESCO MACHINES - SCHAUBLIN MACHINES - MCM Madar - FELSOMAT - CMZ**
- **High Precision Vertical Machining Centres** from 3 to 5 CNC simultaneous axes in various machine types and sizes from **SCHAUBLIN MACHINES – KUNZMANN - C.B. FERRARI**
- **Turbine Blades, Blisks & Impellers** with powerful solutions for unique profile milling technology for multi-axes machining with g-acceleration in tough to machine materials. From **C.B. FERRARI**.

- **Micro EDM Technology and Solutions for Micro EDM Drilling** of very high precision holes and 3D cavities from **SARIX - POSALUX**
- **Cutting Tools Manufacturing and Regrinding Machines** for round & non-round cutting tools and carbide inserts from **ROLLOMATIC - STRAUSAK - AGATHON - SMS**
- **Industrial Cleaning Solutions** from **AMSONIC**.
- **Turn-key PVD Coating Systems** including all necessary peripheral equipment and technology **PLATIT**.
- **Gear-, Cylindrical-, Internal-, Thread-, Centerless- & Surface- Grinding Solutions** from the companies **REISHAUER - LIZZINI - SMS - TSCHUDIN - GIORIA - GST**
- **Honing Solutions** of internal diameters manual or automatic mode from **DELAPENA - MU-TOOLS**
- **CNC Gear Hobbing, Shaping and Worm Milling machines** from **MONNIER ZAHNER - LAMBERT WAHLI - FELSOMAT**
- **Drilling, milling, cross-drilling, turning, tapping, rolling and chasing** of big quantities of high precision parts with rotary transfer machines from **VARIOUS COMPANIES**
- **Complete solutions and equipment** for heat treatment, induction hardening, induction brazing and induction precious alloy melting from **TECHNO INDUZIONE**
- **Laser Technology solutions and Spark Assisted Chemical Engraving** for mass production by the companies **POSALUX - C.B. FERRARI**
- **Spring making and working machines** from **OMD**
- **Tooling Solutions & Accessories** from **DIAMETAL - SCHAUBLIN - MU-TOOLS - SWISS-TOOLS**

Gear-, Tool-, Internal-, External-, Thread-, Centreless-, Surface-, Profile- and Universal- Grinding Solutions



Gear grinding machines, diamond & CBN grinding tools, dressing wheels and fixtures. Fully automatic solutions with integrated handling system for measuring and automatic loading / unloading.



Combined CNC turning and grinding machines for hard turning up to 65HRC with grinding possibility.



External & internal grinding machines, non-circular internal grinding machines. Fully automatic solutions with integrated handling system for measuring and automatic loading / unloading.



Individual cylindrical grinders, deployment of complete processing solutions and innovative machine concepts for the production of transmission shafts, crankshafts and camshafts



Worm & thread grinding machines. Honing & polishing machines for medical heads and inserts (implants) as well for hydraulic, pneumatic and optical industries. Special grinding machines for tooth drills.



CNC 5-axes tool grinding machine for re-sharpening and the production of small series.



Cylindrical wheel- and table moving external and internal grinding machines for small, complex as well as very big work pieces up to 12'000mm part length!



High precision tool grinding machines for rotating tools from Ø 0.01mm up to 32mm, individual insert design, ultra-long drills, cylindrical grinding, flute & relief grinders. Dressing machines. Laser machining with simultaneous 5-axis interpolation for ultra-hard materials such as PCD, CVD, MD and natural diamond.



CNC worm, thread and gear hob grinding machines and technology. In addition to the core business of thread grinding machines, the product range includes relief measurement machines, profiling machines as well as relieving lathes.



High tech CNC grinding and laser machining centres for indexable tungsten carbide tools and insert.



Reliable, customer focused and technically and commercially intelligent CNC Centerless Grinding Machines for the production of high precision mechanical components.



Precision grinding machines that are set-up friendly, integrated compact systems with highly dynamic automation options as 'turnkey solutions' for high-volume serial manufacturing of high-precision components.

Horizontal-, Vertical- & Swiss Type Turning



Conventional high precision and CNC production lathes with exceptional characteristics.



Metal cutting technologies and high performance machine tools for vertical turning, gear milling & hobbing and laser welding.



Automatic, cam and CNC driven, coil and bar fed turning centres for small parts up to Ø 8mm.



Latest generation high performance and multi turret CNC lathes. Designed for maximum reliability and productivity.



CNC horizontal turning centres as well as conventional and CNC heavy duty precision lathe.

SWISS TURN LATHES

- Single-spindle numerical controlled sliding headstock machines
- Multispindle numerical controlled turning machines with 6 or 8 spindles
- Multispindle cam-controlled machines with programmable automated controller



Conventional and CNC driven horizontal precision lathes.

Gear-, Turbine Blade-, Impeller-, Blisk-, Universal- Milling Machines & Vertical- and Horizontal Machining Centers



Vertical high precision milling machines & centres.



Metal cutting technologies and high performance machine tools for vertical turning, gear milling & hobbing and laser welding.



Gear hobbing and worm milling and whirling machines.



Manual & CNC operated milling machines and machining centres.



5-axes CNC machining centres for high precision flow profiles like turbine blades, impellers, blisks and universal machining.

- Machines for high precision milling, machining centres, bar milling machines.

Material Handling and Testing Systems, Measuring-, Process- & Quality Control Equipment



Bar feeding solutions, chip and coolant management systems.



Industrial cleaning equipment and systems.



System solutions for parts clamping, measuring, robotics and process controlling.



Parts handling technology, deburring and finishing systems.

Tooling Solutions & Accessories



Precision clamping systems und clamping tool solutions.



Manufacturer of high quality hole machining and innovative tooling systems for multi-task and lathes. Swisstools offers solutions that are optimally matched to the respective machine and guarantee sustainable profitability.



Custom-made and standard high-precision and high-performance technology, abrasives and cutting tools.



Manufacturer of micrometrical expandable diamond honing tools and the production of manual honing apparatus and automatic honing machines.

Special Machining, Laser Processing, Deburring, Super- & Micro- Finishing, Coating



Spring making and working machines.



Micro machining solutions with dedicated milling processes, laser ultra-short pulse FEMTO technology, water jet guided laser solutions and spark assisted chemical engraving for mass production.



Machines for precise deburring, edge rounding and polishing. Gerber AG is one of the world's leading specialists in the field of micro-preparation of the cutting edges of machining and stamping tools.



Turnkey Coating Systems.



Complete solutions and equipment for heat treatment, induction hardening, induction brazing and induction precious alloy melting.



Precision controlled semi-auto and production honing with wide capability for low to high volumes.

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INSERT GRINDING MACHINES



AGATHON

High-tech 4- and 5- axis grinding centres for 24/7 industrial production of indexable inserts with complex geometries made of hard and super-hard materials. Grinding on the periphery and two chamfers with re-clamping or in a single clamping.

- ⇒ **Leo Peri** Maximum productivity in a very small space.
- ⇒ **Dom Plus** High flexibility and production autonomy
- ⇒ **Evo Combi** Unmatched productivity and flexibility – all in a single clamping
- ⇒ **Evo Penta** Unmatched productivity and flexibility for complex geometries

	Leo Peri	Dom Plus	Evo Combi	Evo Penta
Min. IC (inner Ø)	3.96 mm	3.96 mm	3.96 mm	3.96 mm
Max. OD (outer Ø)	35 mm	60 mm	120 mm	50 mm
Workpiece clamping distance	23.5 mm	23.5 mm	28.5 mm	29 mm
Grinding cup Ø	250 mm	350 mm	400 mm	400 mm
Number of axes	4	4	4	5
Clamping system	B1	B1	B1	B1 and B3
C-axis swiveling range	-45° to +36°	-90° to +45°	-140° to +140°	-140° to +140°
Y-axis distance	-17 to +69 mm	-100 to +53 mm	-266 to +352 mm	-266 to +352 mm
X-axis distance	-23 to +36 mm	-45 to +100 mm	-63 to +223 mm	-63 to +223 mm
B-axis speed	300 °/s	300 °/s	720 °/s	300 °/s
Clamping force range	500 - 8800 N	500 - 8500 N	500 - 8500 N	500 - 8500 N
Control system	OEM	OEM	OEM	OEM
Bosch Rexroth drives and motors	✓	✓	✓	✓



AMSONIC



Amsonic 400R-Series

The **Amsonic 400R Series** is a compact and powerful all-purpose single chamber cleaning unit used for the application of non-chlorinated solvents. Multistage cleaning with the following work steps: immerse cleaning, rinsing, vapour degreasing, vacuum drying.

- ⇒ **400R** Cleaning unit for metals, ceramics and plastics with 30kg weight per charge
- ⇒ **410R** Cleaning unit for metals, ceramics and plastics with 50kg weight per charge
- ⇒ **415R** Cleaning unit for metals, ceramics and plastics with 80kg weight per charge)
- ⇒ **420R** Cleaning unit for metals, ceramics and plastics with 1050kg weight per charge

Parts cleaning systems working with class A3 hydrocarbons or modified alcohol

	400R	410R	415R	420R
Basket dimension	37 x 22 x 20 cm	53 x 32 x 20 cm	60 x 40 x 30 cm	67 x 48 x 30 cm
Max. weight per charge	30 kg	50 kg	80 kg	100 kg
Throughput	6 - 12 h	6 - 10 h	6 - 10 h	6 - 10 h
Solvent Capacity	ca. 160 L	ca. 340 L	ca. 500 L	ca. 700 L
Cleaning temperature	60 - 80 °C			
Steam temperature	95 - 110 °C			
Electricity	ca. 14 kW	ca. 17 kW	ca. 20 kW	ca. 24 kW
Ext. Dimensions	2.1 x 1.2 x 2.0m	2.7 x 1.6 x 2.4m	3.0 x 1.8 x 2.4m	3.9 x 2.0 x 2.5m
Weight	1300 kg	2000 kg	2500 kg	3200 kg
Control system	Siemens PLC	Siemens PLC	Siemens PLC	Siemens PLC



PRECISION GRINDING MACHINES



BAHMÜLLER ULTRA, FLEX, QUBE

Precision grinding machines that are retrofit-friendly, integrated compact systems with highly dynamic automation options as 'turnkey solutions' for high-volume serial manufacturing of high-precision components subject to the highest of standards.

- ⇒ **ULTRA Line** Modular, super-precise multi station int./ext.-grinding solution for complex parts.
- ⇒ **FLEX** Versatile concept for internal-, combined- and external grinding.
- ⇒ **QUBE** Uncompromising quality and economic grinding for small components.

	ULTRA Line	FLEX	QUBE
Internal Grinding max. Ø x L	40 x 60 mm	40 x 60 mm	40 x 60 mm
External Grinding max. Ø x L	20 x 200 mm	20 x 200 mm	40 x 40 mm
External grinding spindle power	12.6 kW	12.6 kW	8 kW
Peripheral speed	125 m/s	125 m/s	125 m/s
Max. grinding wheel dimensions [mm]	610x203.2x100	610x203.2x100	406x127x60
Internal grinding spindle power	0.7 - 18 kW	0.7 - 18 kW	0.7 - 18 kW
Rotation speed [min ⁻¹]	21000 - 200000	21000 - 200000	21000 - 200000
Max. number of spindles	4	4	2
Compound slide path X / Z [mm]	620 / 250	620 / 250	200 / 200
Max. axis speed	30 m/min.	30 m/min.	15 m/min.
Max. Headstock drive power	6.77 kW	6.77 kW	6.77 kW
Rotation speed [min ⁻¹]	0 - 6000	0 - 6000	0 - 6000
Max load between centres	50 kg	50 kg	50 kg
Tailstock expanding cone	MK 4	MK 4	n/a
Mandrel path	30 mm	30 mm	n/a
Control system SIEMENS	840 D	840 D	840 D

C.B.Ferrari

MILLING MACHINES & CENTERS



C.B. FERRARI A Series

Vertical high-speed mobile column machining centres particularly suitable for precision machining of turbine blades and very complex parts for the aerospace and precision components industries.

The mobile column structure lends the machine a reduced floor space need as well as an optimal accessibility with an excellent chips evacuation ensured by the vertical table

- ⇒ **A 152** The A series machines are flexible machines with adjustable centre distance and a 6th
- ⇒ **A 156** axis configuration as well as direct-drive dividing heads with dynamic performance for
- ⇒ **A 176** max. machining efficiency. Machine accuracy, stability and longevity and perfect
- ⇒ **A 196** machining due to significant shorter length of tool holders and tools.

	A 152	A 156	A176	A 196
Working range X axis (longitudinal)	850 mm	850 mm	1050 mm	1620 mm
Working range Y axis (cross)	420 mm	520 mm	520 mm	520 mm
Working range Z axis (vertical)	420 mm	420 mm	420 mm	420 mm
Available main spindle power	up to 31/42 kW			
Available spindle torques (S1/S6)	up to 130/175 Nm			
Available spindle speed range	up to 40000 min ⁻¹			
Tool holder	ISO / HSK	ISO / HSK	ISO / HSK	ISO / HSK
Feed rates X, Y, Z axes	40 / 40 / 30 m/min			
Vertical table size (L x W)	1720 x 525 mm	1720 x 525 mm	1920 x 525 mm	2500 x 525 mm
C axis +/- 91°	✓	✓	✓	✓
Dividing head , A 360°/ B +45°/-135°	✓	✓	✓	✓
Tool changer positions	24 - 36	24 - 36	24 - 36	24 - 36
Max. tool weight	1 - 6 kg			
Changing time chips/chips	6"	6"	6"	6"
Control system Heidenhain	TNC 530/640	iTNC 530	TNC 530/640	TNC 530/640
SIEMENS (option)	840D SL	840D sl	840D SL	840D SL

C.B.Ferrari

MILLING MACHINES & CENTERS



C.B. FERRARI B Series

Vertical high-speed mobile column machining centres particularly suitable for precision machining of electrodes, precision components and moulds.

The mobile column structure lends the machine a reduced floor space need as well as an optimal accessibility with high loading capabilities due to the horizontal table.

- ⇒ **B 130** The B series includes a full range of vertical high-speed machining centres. As well as
- ⇒ **B 166** direct-drive dividing heads with dynamic performance for max. machining efficiency.
- ⇒ **B 176** Perfect machining due to significant shorter length of tool holders and tools and
- ⇒ **B 186** high precision due to compact axis travel and absolute linear scales.

	B 130	B 166	B 176	B 186
Working range X axis (longitudinal)	650 mm	850 mm	1050 mm	1450 mm
Working range Y axis (cross)	320 mm	520 mm	520 mm	520 mm
Working range Z axis (vertical)	420 mm	420 mm	420 mm	420 mm
Available main spindle power	up to 25.5/32.5 kW	up to 31/42 kW	up to 31/42 kW	up to 31/42 kW
Available spindle torques (S1/S6)	up to 18/23 Nm	up to 105/140 Nm	up to 130/175 Nm	up to 130/175 Nm
Available spindle speed range	up to 40000 min ⁻¹			
Tool holder	HSK	ISO / HSK	ISO / HSK	ISO / HSK
Feed rates X, Y, Z axes	40 / 30 / 30 m/min	40 / 30 / 30 m/min	40 / 40 / 30 m/min	40 / 40 / 30 m/min
Horizontal table size (L x W)	1200 x 400 mm	1500 x 500 mm	1920 x 450 mm	2320 x 450 mm
C axis +/- 91°	-	-	✓	✓
Rotary table , A 360°	-	✓	✓	✓
Tilting axis B 0°/-115°	-	✓	-	-
Tool changer positions	24 - 36	24 - 36	24 - 36	24 - 36
Max. tool weight	1 - 6 kg			
Changing time chips/chips	6"	6"	6"	6"
Control system Heidenhain	TNC 530/640	TNC 530/640	TNC 530/640	TNC 530/640
SIEMENS (option)	840D SL	840D SL	840D SL	840D SL

C.B.Ferrari

MILLING MACHINES & CENTERS



C.B. FERRARI D Series

The D Series includes a full range of vertical high-speed portal machining centres suitable for precision machining of medium sized components. The range includes 5 models, D230, D420/22, D430/32, whose main difference is the extension of the working area. Thanks to high axes dynamics it is able

- ⇒ **D 230** All the D Series machines can be equipped with a tilting head and a rotary table achieving
- ⇒ **D420/22** the 4 or 5 axis configurations respectively. With the high power and torque of the electro-
- ⇒ **D430/32** spindles on D-Series machines, it is possible to perform finishing and roughing processes achieving maximum efficiency.

	D 230	D 420/22	D430/32
Working range X axis (longitudinal)	1600 mm	2000 mm	3000 mm
Working range Y axis (cross)	1600 mm	1600 / 2200 mm	1600 / 2200 mm
Working range Z axis (vertical)	820 mm	820 mm	820 mm
Available main spindle power	up to 53 / 64 kW	up to 53/64 kW	up to 53 / 64 kW
Available spindle torques (S1/S6)	up to 265/340 Nm	up to 265/340 Nm	up to 265/340 Nm
Available spindle speed range	up to 20000 min ⁻¹	up to 20000 min ⁻¹	up to 20000 min ⁻¹
Tool holder	ISO / HSK	ISO / HSK	ISO / HSK
Feed rates X, Y, Z axes	40 m/min	40 m/min	40 m/min
Rotary table size (L x W)	750 x 1650 mm	1000 x 2200 mm	1000 x 3200 mm
Face plate Ø , A 360°	1000 mm	1000 mm	1000 mm
C axis +/- 91°	✓	✓	✓
Bi-rotary head, A +/- 100°, C +/- 270°	n/a	D 422	D 432
Tool changer positions	up to 60	up to 60	up to 60
Max. tool weight	5 kg	5 kg	5 kg
Changing time chips/chips	10"	12"	12"
Control system Heidenhain	TNC 530/640	TNC 530/640	TNC 530/640
SIEMENS (option)	840D SL	840D SL	840D SL

C.B.Ferrari

MILLING MACHINES & CENTERS



C.B. FERRARI GM / M Series

Vertical high speed semi-portal machining centres with two linear axes moving the tool and one moving the table, suitable for the precision machining of complex small sized components
The semi-portal structure lends the machine a reduced floor space need as well as an optimal access.

- ⇒ **M 110** Standard 3-axes machining centre
- ⇒ **GM 85** Standard 3-axes machine equipped with a two-axes rotary-tilting table with direct-drive torque motors

	GM 85	M110
Working range X axis (longitudinal)	850 mm	1100 mm
Working range Y axis (cross)	600 mm	600 mm
Working range Z axis (vertical)	520 mm	520 mm
Available main spindle power	up to 31/42 kW	up to 31/42 kW
Available spindle torques (S1/S6)	up to 130/175 Nm	up to 130/175 Nm
Available spindle speed range	up to 40000 min ⁻¹	up to 40000 min ⁻¹
Tool holder	ISO / HSK	ISO / HSK
Feed drives	Direct Drive	Direct Drive
Feed rates X, Y, Z axes	40 m/min	40 m/min
Linear acceleration X, Y, Z axes	5 m/s ²	5 m/s ²
Table size (L x W)	-	120 x 600 mm
2 axis swiveling rotary table	Ø 550 mm	-
Max. table load	300 kg	450 kg
Tool changer positions	48	48
Max. tool weight	5 kg	5 kg
Changing time chips/chips	6"	6"
Control system Heidenhain	TNC 530 / 640	TNC 530 / 640
SIEMENS (option)	840D SL	840D SL

C.B.Ferrari

MILLING MACHINES & CENTERS



C.B. FERRARI GT Series

The GT-Series includes a range of vertical high-speed mobile column machining centres particularly suitable for the molds industry and all the applications involving high surface finishing grades.

The wide machine travels of the GT series allow vertical as well as horizontal tool axis machining, allowing the process of 5 sides in one placement.

- ⇒ **GT 1200** New and modern design, strong compact, versatile and powerful with a huge working
- ⇒ **GT 1600** area. The machines can be configured with 3, 4 and 5 continuous axes. The 5 axes
- ⇒ **GT 2000** version is equipped with a rotary table integrated in a half-shaped table with the size of 700 x 700 / 1500 x 1000 mm

	GT 1200	GT 1600	GT 2000
Working range X axis (longitudinal)	1200 mm	1600 mm	2000 mm
Working range Y axis (cross)	620 mm	820 mm	820 mm
Working range Z axis (vertical)	620 mm	850 mm	850 mm
Available main spindle power	up to 33 kW	up to 33 kW	up to 33 kW
Available spindle torques (S1/S6)	up to 105/140 Nm	up to 105/140 Nm	up to 130/175 Nm
Available spindle speed range	up to 20000 min ⁻¹	up to 20000 min ⁻¹	up to 20000 min ⁻¹
Tool holder	ISO / HSK	ISO / HSK	ISO / HSK
Feed rates X, Y, Z axes	30 m/min	30 m/min	30 m/min
Fix horizontal table size (L x W)	1400 x 700 mm	2500 x 820 mm	2500 x 820 mm
C axis +/- 91°	✓	✓	✓
Rotating table , A 360°	✓	✓	✓
Rotating table dimension	Ø 630 mm	Ø 750/840 mm	Ø 750/840 mm
Tool changer positions	24	30	30
Max. tool weight	5 kg	5 kg	5 kg
Changing time chips/chips	6"	6"	6"
Control system Heidenhain	TNC 640	TNC 640	TNC 640
SIEMENS (option)	840D SL	840D SL	840D SL

C.B.Ferrari

MACHINES WITH LASER SOURCE



C.B. FERRARI LASER

Class 1 laser system for marking, engraving, cutting and drilling of metal components, controlled by latest generation Bosch-Rexroth CNC. Extremely compact solution available with laser sources depending on the application and the workpiece size.

The machine, based on three-axis base configuration, is expandable up to six mechanical axes.

- ⇒ **513** The ergonomic design makes the machine easily configurable, both for axes and installed accessories, and can be integrated with automatic loading /unloading systems
- ⇒ **813**
- ⇒ **813 nano** For special applications a version with granite basement and column is foreseen to guarantee maximum stability of the system with temperature variations

	513	813	813 NANO
Working range X axis (longitudinal)	150 mm	320 mm	320 mm
Working range Y axis (cross)	140 mm	320 mm	320 mm
Working range Z axis (vertical)	250 mm	320 mm	320 mm
One or three axes version	✓	✓	✓
Laser source depending on Application	✓	✓	✓



- ⇒ **1100** The ergonomic design makes the machine easily configurable, both for axes and installed accessories, and can be integrated with automatic loading /unloading systems
- ⇒ **1300**
- ⇒ **1500** For special applications a version with granite basement and column is foreseen to guarantee maximum stability of the system with temperature variations

	1100	1300	1500
Working range X axis (longitudinal)	630 mm	650 mm	850 mm
Working range Y axis (cross)	250 mm	320 mm	420 mm
Working range Z axis (vertical)	320 mm	320 mm	420 mm
Three or five axes version	-	✓	✓
Laser source depending on Application	✓	✓	✓

C.B.Ferrari

MILLING MACHINES & CENTERS



C.B. FERRARI MC / ML Series

The new 5 axes horizontal or vertical linear motors milling centres are designed to provide high accuracy combined with short machining times.

The modern production cycles require high speed and acceleration, combined with max. positioning accuracies, longer service life and reduced maintenance time.

- ⇒ **ML 45** Dynamic and compact 5 axis linear machining centre
- ⇒ **MCL 85** Vertical high speed 5 axis linear machining centre
- ⇒ **MCO 85** Horizontal high speed 5 axis linear machining centre

	ML 45	MCL 85	MCO 85
Working range X axis (longitudinal)	420 mm	600 mm	800 mm
Working range Y axis (cross)	320 mm	850 mm	650 mm
Working range Z axis (vertical)	320 mm	520 mm	780 mm
Available main spindle power	≤ 25.5/32.5 kW	up to 31/42 kW	up to 42 kW
Available spindle torques	up to 18/23 Nm	up to 130/175 Nm	up to 130/175 Nm
Available spindle speed range	up to 40000 min ⁻¹	up to 40000 min ⁻¹	up to 40000 min ⁻¹
Tool holder	HSK	ISO / HSK	ISO / HSK
Feed drives	Direct Drive	Direct Drive	Direct Drive
Feed rates X, Y, Z axes	60 m/min	60 m/min	60 m/min
Linear acceleration X, Y, Z axes	10 m/s ²	10 m/s ²	10 m/s ²
2 axis swiveling rotary table	✓	✓	✓
Max. table load	20 kg	300 kg	300 kg
Tool changer positions	56	60	60
Max. tool weight	2 kg	5 kg	5 kg
Changing time chips/chips	5"	5"	5"
Control system Heidenhain	TNC 530 / 640	TNC 530 / 640	TNC 530 / 640
SIEMENS (option)	840D SL	840D SL	840D SL

C.B.Ferrari

MILLING MACHINES & CENTERS

C.B. FERRARI N Series



The N Series includes a full range of vertical high-speed 5-axes machining centers, specifically designed for precision machining of turbine blades for the aerospace and for the low-pressure steam turbine for the energy sector up to a maximum length of 90 inches.

- ⇒ **N 316** The special design, that combines high stiffness and reduced moving masses, allows the
- ⇒ **N 516** N-Series machines to achieve high dynamic performances during the 5-axes high speed
- ⇒ **N 530** precision machining of complex aerofoil profiles. The N530 machine is among the bigger machines in the World in its category.

	N 316	N 516	N 530
Working range X/U axis (longitudinal)	1400 / 490mm	2580 / 2580 mm	3000 / 3000 mm
Working range Y axis (cross)	620 mm	620 mm	820 mm
Working range Z axis (vertical)	820 mm	820 mm	820 mm
Available main spindle power	up to 53 / 64 kW	up to 53/64 kW	up to 53 / 64 kW
Available spindle torques (S1/S6)	up to 265/340 Nm	up to 265/340 Nm	up to 265/340 Nm
Available spindle speed range	up to 20000 min ⁻¹	up to 20000 min ⁻¹	up to 20000 min ⁻¹
Tool holder	ISO / HSK	ISO / HSK	ISO / HSK
Feed rates X, Y, Z axes	45 m/min	45 m/min	45 m/min
Centre distance	510 - 1000 mm	545 - 1460 mm	1100 - 3000 mm
Swing diameter	1016 mm	1016 mm	1016 mm
C axis +/- 100°	✓	✓	✓
Dividing & tilting head, A, a +/- 360°	✓	✓	✓
Tool changer positions	36	36	36
Max. tool weight	6 kg	6 kg	6 kg
Changing time chips/chips	12"	12"	12"
Control system Heidenhain	TNC 530/640	TNC 530/640	TNC 530/640
SIEMENS (option)	840D SL	840D SL	840D SL



HIGH PRECISION CNC LATHES



CMZ CNC LATHES TA SERIES

Strong, precise and reliable CNC lathes with a wide range of possibilities for the needs of machining. The machines have a high capacity for milling, prepared to maximize reliability and measurement stability.

- ⇒ **TA-XX** CNC Lathe with fixed tools on the turret and tailstock
- ⇒ **TA-XX-M** CNC Lathe with powered tools on the turret and tailstock
- ⇒ **TA-XX-Y** CNC Lathe with Y-axis, powered tools on the turret and tailstock
- ⇒ **TA-XX-S** CNC Lathe with fixed tools on the turret and counter spindle
- ⇒ **TA-XX-MS** CNC Lathe with powered tools on the turret and counter spindle
- ⇒ **TA-XX-YS** CNC Lathe with Y-axis, powered tools on the turret and counter spindle

		TA15						TA20						TA25						TA30					
		TA15	TA15M	TA15Y	TA15S	TA15MS	TA15YS	TA20	TA20M	TA20Y	TA20S	TA20MS	TA20YS	TA25	TA25M	TA25Y	TA25S	TA25MS	TA25YS	TA30	TA30M	TA30Y	TA30S	TA30MS	TA30YS
Max. swing \varnothing over bed [mm]		760						760						760						760					
Max. swing \varnothing over slides [mm]		600						600						600						600					
Max. turning \varnothing [mm]		460						460						460						460					
Distance between spindle and tailstock centre [mm]	-400	490	-	-	-	-	473	-	-	-	-	-	473	-	-	-	-	-	449	-	-	-	-	-	
	-640	730	-	-	-	-	713	-	-	-	-	-	713	-	-	-	-	-	689	-	-	-	-	-	
	-1100	1190	-	-	-	-	1173	-	-	-	-	-	1173	-	-	-	-	-	1149	-	-	-	-	-	
Distance between center of spindles [mm]	-640	-	-	666	-	-	-	-	649	-	-	-	-	-	649	-	-	-	-	-	-	-	625	-	
	-1100	-	-	1126	-	-	-	-	1109	-	-	-	-	-	1109	-	-	-	-	-	-	-	1085	-	
Y-axis travel +70 / -50 [mm]		-	-	✓	-	-	✓	-	-	✓	-	-	✓	-	-	✓	-	-	✓	-	-	✓	-	-	✓
Max. spindle speed [min^{-1}]		4500						4000						4000						3500					
Bar diameter [mm]		52						66						66						78					
Chuck diameter [mm]		175 / 210						210						210 / 250						250 / 315					
Cuck bore [mm]		56 / 52						66						66						77					
Spindle power [kW] (max./S6 40%)		14 / 8						22 / 15						35 / 19						42 / 27					
Turning torque [NM] (max./S6 40%)		292 / 153						366 / 286						900 / 363						1020 / 720					
Number of positions on turret		12																							
Number of driven tools		-	12	-	12	-	12	-	12	-	12	-	12	-	12	-	12	-	12	-	12	-	12	-	12
Turning speed [min^{-1}]		12000																							
Power [kW] (max. / S1)		11.3 / 8.1																							
Control system		Fanuc 32iTB																							



HIGH PRECISION CNC LATHES



CMZ CNC LATHES TD SERIES

Latest generation high performance CNC lathes. Strong prismatic guide lathes manufactured to obtain maximum performance in the machining process.

- ⇒ **TD-XX** CNC Lathe with fixed tools on the turret and tailstock
- ⇒ **TD-XX-M** CNC Lathe with powered tools on the turret and tailstock
- ⇒ **TD-XX-Y** CNC Lathe with Y-axis, powered tools on the turret and tailstock
- ⇒ **TD-XX-S** CNC Lathe with fixed tools on the turret and counter spindle
- ⇒ **TD-XX-MS** CNC Lathe with powered tools on the turret and counter spindle
- ⇒ **TD-XX-YS** CNC Lathe with Y-axis, powered tools on the turret and counter spindle

		TD15					TD20					TD25					TD30								
		TD15	TD15M	TD15Y	TD15S	TD15MS	TD15YS	TD20	TD20M	TD20Y	TD20S	TD20MS	TD20YS	TD25	TD25M	TD25Y	TD25S	TD25MS	TD25YS	TD30	TD30M	TD30Y	TD30S	TD30MS	TD30YS
Max. swing \varnothing over bed [mm]		950					950					950					950								
Max. swing \varnothing over slides [mm]		715					715					715					715								
Max. turning \varnothing [mm]		550					550					550					550								
Distance between spindle and tailstock centre [mm]	-800	915	-	-	-	898	-	-	898	-	-	898	-	-	874	-	-	-	874	-	-	-	-	-	
	-1350	1465	-	-	-	1448	-	-	1448	-	-	1448	-	-	1424	-	-	-	1424	-	-	-	-	-	
	-2200	2315	-	-	-	2298	-	-	2298	-	-	2298	-	-	2274	-	-	-	2274	-	-	-	-	-	
	-3200	3315	-	-	-	3298	-	-	3298	-	-	3298	-	-	3274	-	-	-	3274	-	-	-	-	-	
Dist. between spindle centres [mm]		-	-	-	826	-	-	-	792	-	-	792	-	-	792	-	-	-	792	-	-	-	-	768	
Y-axis travel +80 / -60 [mm]		-	-	✓	-	-	✓	-	-	✓	-	-	✓	-	-	✓	-	-	✓	-	-	✓	-	-	✓
Max. spindle speed [min^{-1}]		4500					4000					4000					3500								
Bar diameter [mm]		52					66					66					78								
Chuck diameter [mm]		175 / 210					210					210 / 250					250 / 315								
Cuck bore [mm]		56 / 52					66					66					77								
Spindle power [kW] (max./S6 40%)		14 / 8					22 / 15					35 / 19					40 / 25								
Turning torque [NM] (max./S6 40%)		292 / 153					366 / 286					900 / 363					1020 / 720								
Number of positions on turret		12																							
Number of driven tools		-	12	-	12	-	12	-	12	-	12	-	12	-	12	-	12	-	12	-	12	-	12	-	12
Turning speed [min^{-1}]		12000																							
Power [kW] (max. / S1)		11.3 / 8.1																							
Control system		Fanuc 32iTB																							



HIGH PRECISION CNC LATHES

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- ⇒ **TD-XX-MS** CNC Lathe with powered tools on the turret and counter spindle
- ⇒ **TD-XX-YS** CNC Lathe with Y-axis, powered tools on the turret and counter spindle

		TD35						TD45						TD55					
		TD35	TD35M	TD35Y	TD35S	TD35MS	TD35YS	TD45	TD45M	TD45Y	TD45S	TD45MS	TD45YS	TD55	TD55M	TD55Y	TD55S	TD55MS	TD55YS
Max. swing \varnothing over bed [mm]		950						950						950					
Max. swing \varnothing over slides [mm]		715						715						715					
Max. turning \varnothing [mm]		550						550						550					
Distance between spindle and tailstock centre [mm]	-800	850		-				850		-				848		-			
	-1350	1400		-				1400		-				1398		-			
	-2200	2250		-				2250		-				2248		-			
	-3200	3250		-				3250		-				3248		-			
Dist. between spindle centres [mm]		-		760				-		744				-		742			
Y-axis travel +80 / -60 [mm]		-	-	✓	-	-	✓	-	-	✓	-	-	✓	-	-	✓	-	-	✓
Max. spindle speed [min^{-1}]		3000						2200						1600					
Bar diameter [mm]		95						127						180					
Chuck diameter [mm]		315						315 / 400						500					
Chuck bore [mm]		95						118 / 122						180					
Spindle power [kW] (S3 25% / S1)		48 / 39						51 / 39						51 / 39					
Turning torque [NM] (max.)		1500						3600						3600					
Number of positions on turret		12																	
Number of driven tools		-	12	-	12	-	12	-	12	-	12	-	12	-	12	-	12	-	12
Turning speed [min^{-1}]		12000																	
Power [kW] (max. / S1)		11.3 / 8.1																	
Control system		Fanuc 32iTB																	



HIGH PRECISION CNC LATHES

CMZ CNC LATHES TX SERIES



The multi-turret prismatic guide lathes with 3 turrets for high-performance machining. This 3-turret lathe is easy to handle, besides, its productivity and flexibility, guarantees a high-performance machining process. A lathe designed by and for productivity.

- ⇒ **TX52 Y3** CNC Lathe with 3 turrets and counter spindle
- ⇒ **TX66 Y3** CNC Lathe with 3 turrets and counter spindle
- ⇒ **TX52 Y2 Quattro** CNC Lathe with 2 opposed turrets and counter spindle
- ⇒ **TX66 Y2 Quattro** CNC Lathe with 2 opposed turrets and counter spindle
- ⇒ **TX52 Y2 Twin** CNC Lathe with 2 aligned turrets and counter spindle
- ⇒ **TX66 Y2 Twin** CNC Lathe with 2 aligned turrets and counter spindle

		TX52			TX66		
		Y3	Y2 Quattro	Y2 Twin	Y3	Y2 Quattro	Y2 Twin
Max. turning Ø [mm]		255					
Max. swing over carriage [mm]		270					
Dist. between spindle centres [mm]		649			639		
Inside Ø left side spindle [mm]		52			66		
Inside Ø right side spindle [mm]		52					
Strokes upper L turret [mm]	XL	190	-	190	190	-	190
	ZL	300	-	300	300	-	300
	YL	±40	-	±40	±40	-	±40
Strokes upper R turret [mm]	XR	190	190	190	190	190	190
	ZR	635	500	635	635	500	635
	YR	±40	±40	±40	±40	±40	±40
Strokes lower D turret [mm]	XD	190	190	-	190	190	-
	ZD	500	500	-	500	500	-
	YD	±40	±40	-	±40	±40	-
Left spindle speed [min ⁻¹]		5000			4000		
Left spindle nose		ASA 6" A2			ASA 8" A2		
Spindle power [kW] (30 min./S1)		15 / 11					
Right spindle speed [min ⁻¹]		5000					
Right spindle nose		ASA 6" A2					
Spindle power [kW] (30 min./S1)		7.5 / 5.5					
No. of tool stations each turret		12					
Number of driven tools each turret		12					
Power [kW] (max.)		18					
Control system		Fanuc 32iTB					



HONING MACHINES

DELAPENA Production Honing

The Delapena Group offers a range of horizontal and vertical honing machines for single-unit and small to medium batch honing requirements.

The product range of the Delapena Group honing machines for the machining of bores with diameters ranging from 1mm and bore lengths of up to 4000 mm.

- ⇒ **EAS** precision controlled, semi-auto honing machine for one-off and batch production work
- ⇒ **E1000S** precise, efficient and reliable production honing
- ⇒ **E2000S** precise, efficient and reliable production honing
- ⇒ **E2000-XL** innovative long bore precision honing for straight and tapered bores

	EAS	E1000S	E2000S	E2000-XL
Diameter range	1.14 - 80 mm	1.14 - 25 mm	1.14 - 80 mm	5 - 50 mm
Max. stroke length	3 - 250 mm	3 - 320 mm	3 - 320 mm	3 - 1200 mm
Stroking motor speed	1 - 25 m/min.	1 - 25 m/min.	1 - 25 m/min.	1 - 25 m/min.
Stroking motor power	3 Nm	3 Nm	4 Nm	12 Nm
Stroking movement	Precision recirculating ball screw			
Programmable short stroking	n/a	length & frequency		
Spindle speed	250 - 2500 min ⁻¹	300 - 2500 min ⁻¹	300 - 2500 min ⁻¹	up to 40000 min ⁻¹ 300 - 2500 min ⁻¹
Spindle motor power	1.5 kW	1.5 kW	3.0 kW	3.0 kW
Braking	Dynamic braking resistor			
Feed type	Programmable electro-mechanical			
Feed rate	programmable & timer			
Incremental feed	1 µ/sec.	0.1 µ/sec.	0.1 µ/sec.	0.1 µ/sec.
Feed movement	on recirculating ball screw			
Stone pressure	up to 670 N	up to 670 N	up to 670 N	up to 670 N
Programmable wedge retraction	n/a	✓	✓	✓
Wedge retraction speed	n/a	✓	✓	✓
Control system SIEMENS	HMI	HMI	HMI	TOUCH



HONING MACHINES

DELAPENA Production Honing

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The product range of the Delapena Group honing machines for the machining of bores with diameters ranging from 1mm and bore lengths of up to 4000 mm.

- ⇒ **Power** precision honing of large and heavy components in small to medium batches
- ⇒ **E3000S** precision-controlled production honing with wide capability for low to high volumes
- ⇒ **4200** precision honing of large and heavy components in small to medium batches

	E3000S	Power	4200
Diameter range	1.14 - 80 mm	740 mm external	up to 1000 mm
Max. stroke length	2 - 500 mm	1000 mm	4000 mm
Stroking motor speed	1 - 25 m/min.	up to 20 m/min.	1 - 25 m/min.
Stroking motor power	3.8 kW	1.5 kW	3.0 kW
Stroking movement	ball screw		
Programmable short stroking	length/frequency		
Spindle speed	200 - 3000 min ⁻¹	0 - 250 min ⁻¹	0 - 250 min ⁻¹
Spindle motor power	3.75 kW	1.5 kW	4.0 kW
Braking	dynamic resistor		
Feed type	programmable	automatic friction feed system	
Feed rate	0.1 - 30 µ/sec.	-	-
Incremental feed	0.1 - 10 µ/sec.	-	-
Feed movement	ball screw	-	-
Stone pressure	up to 1000 N	up to 670 N	up to 670 N
Programmable wedge retraction	✓		
Wedge retraction speed	✓		
Control system SIEMENS	HMI	-	TOUCH

DIAMETAL

Group 

Custom-made and standard high-precision and high-performance technology, abrasives and cutting tools

The DIAMETAL group unifies **three main fields of expertise** and high-precision industrial know-how that has been constantly evolving since 1936. Different from **its history and its rich experience**, the group provides the **international market** with standard or high-precision solutions personalized in **three strong fields**. DIAMETAL **delivers its production secrets** (expertise, tools, methods, parameters) and even the first tools to its customers. It's **simple** and it really makes the **Difference**.

DIAMETAL

Abrasifs



High quality expertise and best materials



DIAMETAL

Swiss Cutting Tool



Excellent service in application and processes



DIAMETAL

Wear Parts



Machining of super hard material, a unique Know-how



DIAMETAL

Abrasifs



HIGH QUALITY EXPERTISE AND BEST MATERIALS

Diamond and cubic boron nitride (CBN) are considered to be the hardest known grinding materials and are therefore often referred to as “super-abrasives”. For this reason, they are suitable for machining materials which are difficult or even impossible to grind with conventional abrasives such as silicon carbide or corundum. Diamond and CBN have the same crystal structure, with diamond consisting of pure carbon, whilst CBN is made up of the elements boron and nitrogen.

While diamond is available as natural grain as well as synthetically produced, CBN originates exclusively from synthesis.

Bonded precision grinding tools in Diamond and CBN

- Resin bonded grinding tools have an excellent cutting capacity and a cool cut, designed for use in a wide variety of applications both with Diamond and in CBN.
- Metal bonded grinding tools have an excellent stability of shape due to their superb grit retention power.
- Metal-vitrified bonds differ from classic vitrified bonds only in their manufacturing process. Classic vitrified bonds are “pressure-free sintered”, i.e. stoved in the furnace without pressing.
- Vitrified bonds have an excellent dressing capacity, allowing these grinding tools to return to their original shape easily once they lose their grinding rim geometry.



Electroplated precision grinding tools in Diamond and CBN

- Electroplated tools differ from bonded tools (resin bond, metal/vitrified bond) in a number of essential aspects. As a rule, electroplated tools only have one grit layer.



Diamond and CBN grinding wheels for top & bottom grinding

- Top and bottom grinding, also known as face grinding with planetary kinematics or fine honing, is most economical when machining large series. The method achieves excellent workpiece geometry in terms of height tolerance, parallelism and planarity.



DIAMETAL

Swiss Cutting Tool

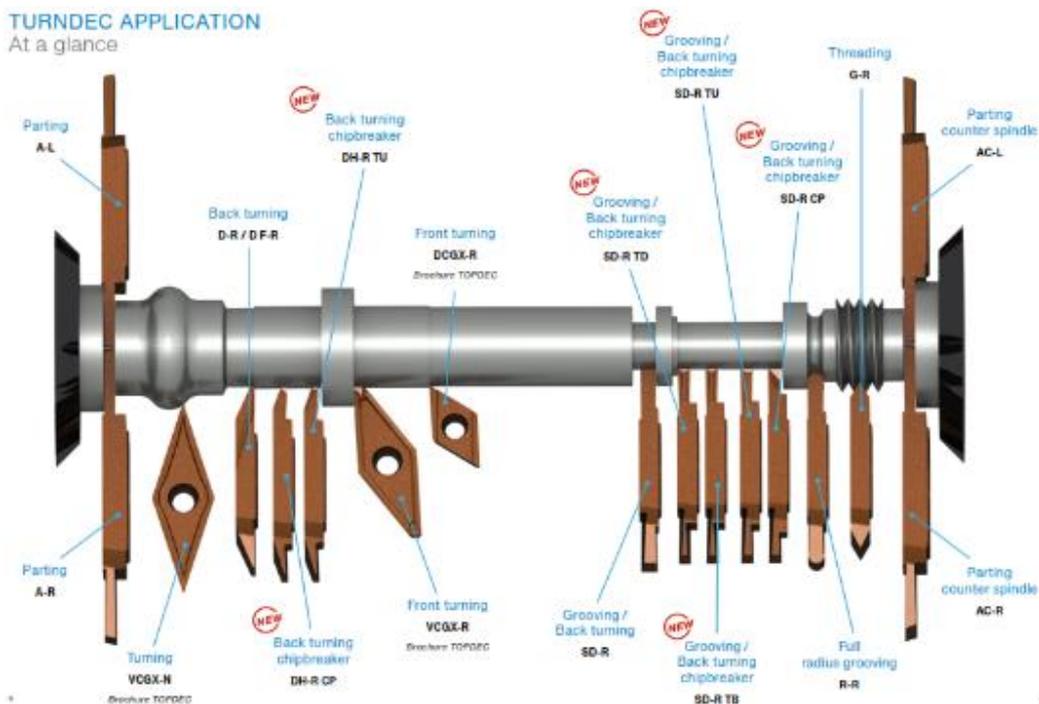


EXCELLENT SERVICE IN APPLICATION AND PROCESSES

DIAMETAL Swiss Cutting Tool offer complete machining competence in gear hobbing, turning, cutting and roller burnishing for more than 70 years. Not only are we able to provide optimal solutions for manufacturing high quality work pieces, we also never cease to innovate and satisfy our customers' needs with exceptional services.

Turning tools

- Turning tools and inserts are DIAMETAL Swiss Cutting Tool expertise for more than 75 years. Our precision turning tools are well known worldwide and our clients are extremely satisfied.



Precision gear cutting

- Carbide tools for high quality gear cutting in terms of precision and surface quality, e.g.:
 - Fine pitch hob cutter for epicyclic gears
 - Setting hub
 - Hub cutter for frontal gear cutting
 - Tooth profile cutter
 - Multi-position hob
 - Face gear



DIAMETAL

Wear Parts

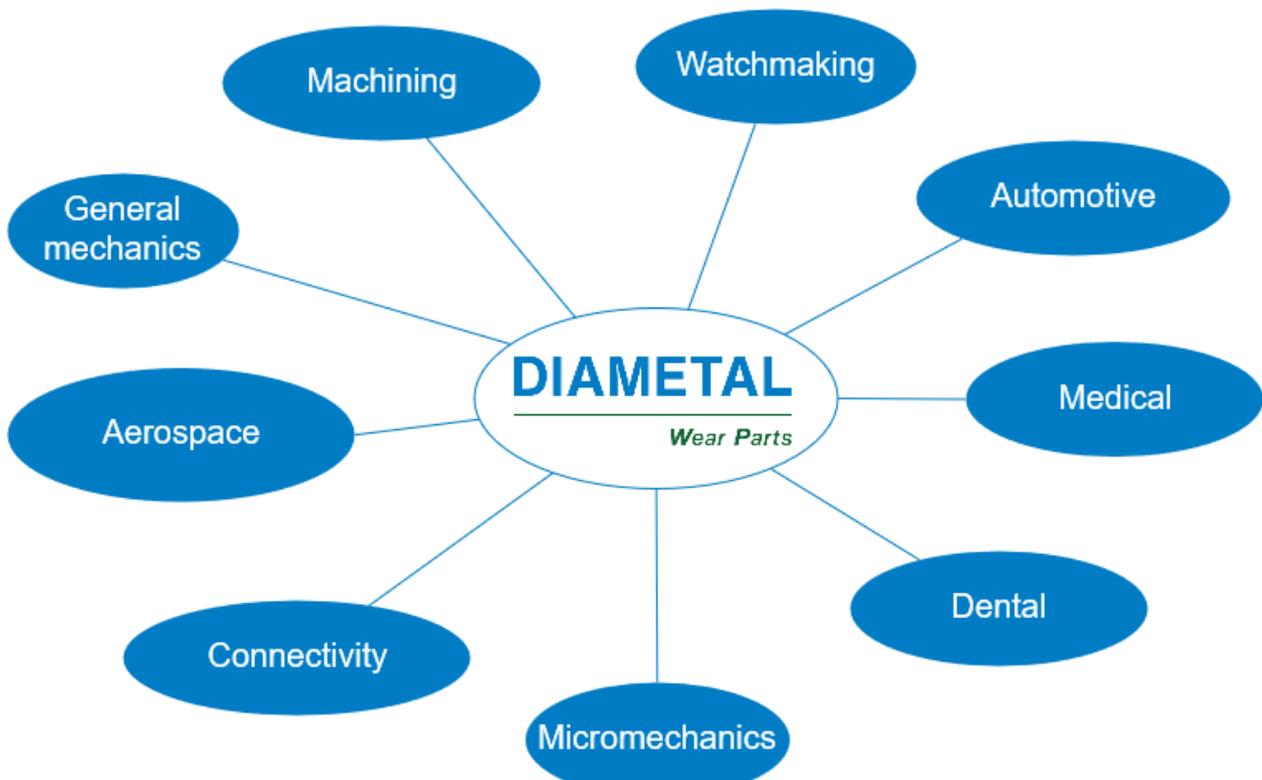


MACHINING OF SUPER HARD MATERIAL, A UNIUIQE KNOW-HOW

For years, the name DIAMETAL has stood for customer-specific production of wear parts made of carbide and ceramics. We offer contract work such as coordinate grinding, profile grinding, double side face grinding, honing, polishing. Our program includes a large variety of product such as stripping knives, circular knives, measuring instruments, injection moulding tool components, bushing and components for rotors.

Market applications

- DIAMETAL wear parts products are largely applied in the following fields:
 - Watchmaking
 - Medical
 - Aerospace
 - Dental
 - Connection technology
 - Micromechanics
 - Automotive (wire stripper equipment)
 - Machining
 - General mechanics





COIL FED SWISS TURN

Escomatic D2 / D5 CNC

escomatic lathes are based on a unique concept. The material, which is coil stock or bar, does not rotate. The cutting tools mounted onto the spinning tool head rotate around the material. This concept contributes to the extremely high performance and cost savings achieved with escomatic machines.

- ⇒ **D2 CNC** Fastest automatic lathe with the productivity of a cam and flexibility of a CNC machine
- ⇒ **D5 CNC** Identical to the D2 CNC but with front machining capabilities

	D2 CNC	D5 CNC
Max. turning diameter	4 mm	4 mm
Max. work piece length	80 mm	80 mm
Max. tool head speed	12000 min ⁻¹	12000 min ⁻¹
Material diameter	0.4 - 4 mm	0.4 - 4 mm
Tool head drive power	0.55 kW	0.55 kW
Number of cutting tools on tool head	2	2
Counter spindle with C-Axis (option)	n/a	n/a
Front machining unit (DUF)	n/a	✓
Max. number of tools on DUF	n/a	3
Max threading / tapping diameter	n/a	M3
Back machining unit (DUA)	n/a	option
Max. number of tools on DUA	n/a	1
Max. speed of powered tools	n/a	18000 min ⁻¹
Number of axes	3	5
Control system	ESCO oem	ESCO oem



COIL FED SWISS TURN

Escomatic D5 ULTRA / TWIN

escomatic lathes are based on a unique concept. The material, which is coil stock or bar, does not rotate. The cutting tools mounted onto the spinning tool head rotate around the material. This concept contributes to the extremely high performance and cost savings achieved with escomatic machines.

- ⇒ **D5 ULTRA** Speed combined with front, back and traverse machining
- ⇒ **D5 TWIN** Dual front pick-up for unmatched productivity

	D5 ULTRA	D5 TWIN
Max. turning diameter	4 mm	4 mm
Max. work piece length	80 mm	80 mm
Max. tool head speed	12000 min ⁻¹	12000 min ⁻¹
Material diameter	0.4 - 4 mm	0.4 - 4 mm
Tool head drive power	0.55 kW	0.55 kW
Number of cutting tools on tool head	2	2
Counter spindle with C-Axis (option)	1	2
Front machining unit (DUF)	✓	-
Max. number of tools on DUF	3	-
Max threading / tapping diameter	M3	-
Back machining unit (DUA)	✓	✓
Max. number of tools on DUA	3	2 x 3
Max threading / tapping diameter	M2	M2
Max. speed of powered tools	18000 min ⁻¹	18000 min ⁻¹
Number of axes	8	10
Control system	FANUC 0i-TD	ESCO oem



COIL FED SWISS TURN

Escomatic NM 6 Flexi / 8 Flexi

escomatic lathes are based on a unique concept. The material, which is coil stock or bar, does not rotate. The cutting tools mounted onto the spinning tool head rotate around the material. This concept contributes to the extremely high performance and cost savings achieved with escomatic machines.

- ⇒ **NM 6 Flexi** Flexible and powerful lathe with four turning tools and independent front and back machining units
- ⇒ **NM 8 Flexi** Versatile and highly flexible automatic turning centre for material up to 8 mm from coil or bar stock

	NM 6 Flexi	NM 8 Flexi
Max. turning diameter	6.5 mm	8 mm
Max. work piece length	150 mm	150 mm
Max. tool head speed	12000 min ⁻¹	8000 min ⁻¹
Material diameter	0.8 - 6.5 mm	2 - 8 mm
Tool head drive power (50% ED)	2.2 kW	2.2 kW
Number of cutting tools on tool head	4	4
Counter spindle with C-Axis	1	1
Max. speed of counter spindle	10000 min ⁻¹	10000 min ⁻¹
Front machining unit (DUF)	✓	✓
Max. number of driven tools on DUF	4	4
Max threading / tapping diameter	M4	M5
Back machining unit (DUA)	✓	✓
Max. number of tools on DUA	6	6
Max threading / tapping diameter	M4	M5
Max. speed of driven tools	15000 min ⁻¹	15000 min ⁻¹
Bar Feeder	optional	optional
Number of axes	7	7
Control system	FANUC Oi-TF	FANUC Oi-TF



FLEXIBLE HOBBING CENTRES



FELSOMAT FHC Series

Minimal idle times in the process.
Dynamic performance for top gear quality. A clever process combination that produces new potential where nobody expects: hobbing in parallel with chamfering and deburring without prolonging idle time. This unique 2 spindle combination provides a reliable process for changing the work piece on the second spindle while hobbing on the first spindle.

- ⇒ **FHC 80** competitive edge in high speed cutting processes for transmission manufacturing
- ⇒ **FHC 180** highest reliability and continuous accuracy in green and precision hard turning
- ⇒ **FHC 150 S** driven tools in the turret convert the turning machine into a turn, mill and drill centre
- ⇒ **FHC 280** universal dry machining, hard turning and grinding centre

	FHC 80	FHC 180	FHC 150 S	FHC 280
Max. work piece diameter	80 mm	50 - 180 mm	150 mm	50 - 280 mm
Max. modul	2 mm	4 mm	4 mm	4 mm
Max. Hob-spindle speed	11000 min ⁻¹	7000 min ⁻¹	5500 min ⁻¹	7000 min ⁻¹
Hob-spindle power rating (S6-60%)	9 kW	23 kW	23 kW	23 kW
Max. work piece spindle speed	700 min ⁻¹	620 min ⁻¹	620 min ⁻¹	620 min ⁻¹
Work piece spindle power rating	2 x 0.5 kW	2 x 15 kW	15 kW	2 x 15 kW
Axis travel X	80 mm	140 mm	110 mm	140 mm
Axis travel Z	200 mm	250 mm	1000 mm	250 mm
Axis distance	-	-	52 - 162 mm	-
Hob head swivel range (A axis)	+/- 35°	+/- 35°	+/- 35°	+/- 35°
Tangential travel (Y axis)	170 mm	200 mm	200 mm	200 mm
Travel tail stock - work piece	-	-	600 mm	-
Axial/radial/tangential rapid traverse	30, 30, 30 m/min	40, 40, 12 m/min	40, 40, 18 m/min	40, 40, 12 m/min
Max. hob cutter diameter	70 mm	60 - 100 mm	50 - 100 mm	60 - 100 mm
Hob cutter overall length	240 - 276 mm	200 - 310 mm	200 - 310 mm	200 - 310 mm
Max. hob cutter teathed length	190 mm	224 mm	224 mm	224 mm
Hob arbour cylinder shaft diameter	22 mm	32 mm	32 mm	32 mm
Counter support short taper ref. Ø	25 mm	25 mm	25 mm	25 mm
Control system SIEMENS	840 D	840 D	840 D	840 D



FLEXIBLE TURNING CENTRES

FELSOMAT FTC Series

High-precision turned parts equal to grinding quality. Lowest unit costs, highest reliability, permanent precision accuracy in the micron range – FTC sets new standards for profitability and quality in turning. The FTC series has been developed specifically for high-performance processes and eco-friendly dry machining of chuck components



- ⇒ **FTC 160** designed for high performance machining and environmental friendly dry cutting
- ⇒ **FTC 180** highest reliability and continuous accuracy in green and precision hard turning
- ⇒ **FTC 180F** driven tools in the turret convert the turning machine into a turn, mill and drill centre
- ⇒ **FTC 180HS** universal dry machining, hard turning and grinding centre

	FTC 160	FTC 180	FTC 180F	FTC 180HS
Swing diameter	320 mm	320 mm	320 mm	320 mm
Work piece diameter	160 mm	220 mm	220 mm	220 mm
Axis travel X	200 mm	450 mm	450 mm	450 mm
Axis travel Z	200 mm	300 mm	300 mm	300 mm
Max. work holding diameter	250 mm	315 mm	315 mm	315 mm
Spindle distance	-	750 mm	750 mm	-
Max. spindle speed	4500 min ⁻¹	4500 min ⁻¹	4500 min ⁻¹	4500 min ⁻¹
Spindle nose	DIN 55026-A6	DIN 55026-A6	DIN 55026-A6	DIN 55026-A6
Power rating 40%/100% ED	18.8/14.7 kW	26.8/20.9 kW	26.8/20.9 kW	26.8/20.9 kW
Torque rating 40%/100% ED	180/140 Nm	256/200 Nm	256/200 Nm	256/200 Nm
Feed rates X, Z axes	45 m/min	45 m/min	45 m/min	45 m/min
No's of tool pockets on the turret	8 (option 10)	8 (option 10)	8 (option 10)	8 (option 10)
Tool interface	VDI 40 / Capto C5			
Option 2 driven tools	HSK 40	-	-	-
Torque rating 25% ED	28 Nm	-	-	-
at tool speed	4500 min ⁻¹	-	-	-
Control system SIEMENS	840 D	840 D	840 D	840 D



GRINDING MACHINES



GIORIA R/150, R/152, R/154

CNC roll grinding machines with traveling wheel head.

- ⇒ **R/150 CNC** Universal grinding machines with convex / concave crown or taper grinding device
- ⇒ **R/152 CNC** Universal grinding machines with convex / concave crown or taper grinding device
- ⇒ **R/154 CNC** Universal grinding machines with convex / concave crown or taper grinding device

	R/150 CNC	R/152 CNC	R/154 CNC
Max. swing diameter	1800 mm	1800 mm	1800 mm
Distance between centres	3000 - 10000 mm	3000 - 10000 mm	3000 - 10000 mm
Max. work piece weight	15000 kg	25000 kg	40000 kg
Max. grinding wheel dimensions [mm]	1220x304.8x130	1220x304.8x130	1220x304.8x130
Wheel head power	40 kW	60 kW	80 kW
Max. peripheral wheel speed	60 m/s	60 m/s	60 m/s
Workhead spindle speed	0 - 80 min ⁻¹	15 - 60 min ⁻¹	0 - 60 min ⁻¹
Workhead head power	37 kW	60 kW	100 kW
Workhead swivelling range	Fixed	Fixed	Fixed
Workhead spindle taper / nose	Metric 100 / ASA11	Metric 100 / ASA11	Metric 100 / ASA11
Wheel slide X-axis travel	600 mm	600 mm	600 mm
Wheel slide X-axis speed	6000 mm/min	6000 mm/min	6000 mm/min
Z-axis travel	3300 - 10300 mm	3300 - 10300 mm	3300 - 10300 mm
Z-axis speed	6000 mm/min	6000 mm/min	6000 mm/min
Tailstock travel	165 mm	180 mm	250 mm
Control system SIEMANS (option)	840D	840D	840D



GRINDING MACHINES

GIORIA R/161, R/162, R/163

CNC roll grinding machines with traveling wheel head.



- ⇒ **R/161 CNC** Universal grinding machines for grinding operations with angular or straight wheel
- ⇒ **R/162 CNC** Universal grinding machines for grinding operations with angular or straight wheel
- ⇒ **R/163 CNC** Universal grinding machines for grinding operations with angular or straight wheel

	R/161 CNC	R/162 CNC	R/163 CNC
Height of centre	250 - 300 mm	300 - 400 mm	400 - 500 mm
Distance between centres	1000 - 7000 mm	1000 - 7000 mm	1000 - 7000 mm
Max. work piece weight	1000 kg	4000 kg	8000 kg
Max. grinding wheel dimensions [mm]	914x304.8x130	914x304.8x130	914x304.8x130
Wheel head power	22 kW	31 kW	37 kW
Max. peripheral wheel speed	60 m/s	60 m/s	60 m/s
Workhead spindle speed	0 - 400 min ⁻¹	0 - 200 min ⁻¹	0 - 150 min ⁻¹
Workhead head power	37 kW	60 kW	100 kW
Workhead swivelling range	90°	Fixed	Fixed
Workhead spindle taper / nose	Morse 4 / ASA 3	Morse 4 / ASA 3	Morse 4 / ASA 3
Wheel slide X-axis travel	400 mm	400 mm	400 mm
Wheel slide X-axis speed	6000 mm/min	6000 mm/min	6000 mm/min
Z-axis travel	1300 - 7300 mm	1300 - 7300 mm	1300 - 7300 mm
Z-axis speed	6000 mm/min	6000 mm/min	6000 mm/min
Tailstock travel	40 mm	90 mm	110 mm
Control system SIEMANS (option)	840D	840D	840D



GRINDING MACHINES



GIORIA RH/N, RU/PN, RU/S

Universal semiautomatic electro-oleo-dynamic or CNC controlled grinding machines.

- ⇒ **RH/N** Grinding machine with table longitudinal movement and work head infeed
- ⇒ **RU/PN** Grinding machine with double swivelling wheel head for plunge and angular grinding
- ⇒ **RU/S** Grinding machine with double swivelling wheel head for plunge and angular grinding

	RH/N	RU/PN	RU/S
Hight of center	165 - 200 mm	250 - 300 mm	300 - 450 mm
Distance between centres	600 - 2000 mm	1000 - 4000 mm	1000 - 7000 mm
Max. weight between centres	300 kg	1000 kg	2500 kg
Grinding wheel dimensions [mm]	406x127x60	508x203.2x60/80	762x304.8x80/130
Wheel head power	5.5 kW	11 kW	22 kW
Max. peripheral wheel speed	35 m/s	43 m/s	45 m/s
Wheel head swivelling range	± 45°	± 45°	± 45°
Workhead spindle speed	0 - 410 min ⁻¹	15 - 300 min ⁻¹	0 - 120 min ⁻¹
Workhead head power	3 kW	3.32 kW	11.5 kW
Workhead swivelling range	90°	90°	90°
Wheel slide X-axis travel	200 mm	260 mm	500 mm
Wheel slide X-axis speed	6000 mm/min	6000 mm/min	6000 mm/min
Z-axis travel	765 - 2165 mm	1225 - 4225 mm	1145 - 7145 mm
Z-axis speed	6000 mm/min	6000 mm/min	6000 mm/min
Tailstock travel	40 mm	40 mm	78 mm
Control system SIEMANS (option)	810D	810D	840D



CYLINDRICAL GRINDING SOLUTIONS

GST standard and special grinding machines for the most varied tasks



GST has developed a wide variety of highly productive standard and special grinding machines for various grinding operations, entirely flexible and focussed on customer requirements.

Leading manufacturers use GST grinding machines in continuous operations

- Complete machining in a single clamping set-up
- Full CNC control of all axes
- Automatic process measurement inclusive roundness compensation
- Solid GST grinding spindles with roller bearings
- Linear drive technology of the highest precision
- Workpiece spindle or centre drive for workpiece driving with speed control
- Compound-slide configuration (depending on requirements)
- Feed slides with recirculating roller guides or hydrostatic guideways
- Self-centring steady rests
- Additional compound slide with internal grinding spindle for simultaneous grinding of the needle bearing bore (optional)
- Coolant: emulsion or oil
- High energy efficiency due to compact design
- Short set-up times due to wheel changing devices, automatic set-up and automatic adjustment of table assemblies
- Stand-alone solution with GST loader and workpiece magazine, or integration into an interlinked system.

APPLICATION FIELDS:

⇒ Internal combustion engine

Grinding machines for:

- Crankshafts: main bearings, flange, journal, plane surfaces, encoder wheel seat, bores, flats, polygons
- Balance shafts: Diameter, plane surfaces
- Camshafts: Diameter, plane surfaces, cam shape



⇒ Transmission shaft and universal shaft production

Grinding of:

- Output shafts: diameters, plane surfaces, grooves, bores
- Input shafts: diameters, plane surfaces, grooves, bores
- Pinion shafts: diameters, plane surfaces, grooves, bores
- Splined shafts: diameters, plane surfaces, grooves, bores
- Countershafts: diameters, plane surfaces, grooves, bores

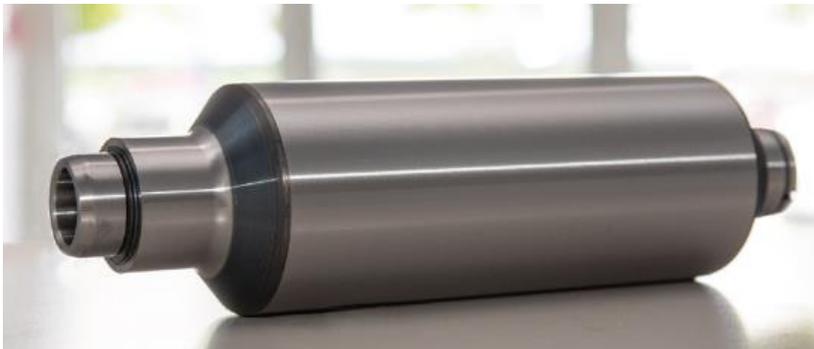
**⇒ CVT Transmission**

- Diameters, plane surfaces, centring bores, ball raceways

⇒ E-Mobility

Grinding machines for:

- Rotor shafts: plain surfaces, diameters, grooves

**⇒ Special grinding solutions**

Grinding machines for:

- Ring grinding: diameters, plane surfaces, radii
- Surface grinding: plane, profile
- Profile grinding: ball raceway
- Differential gear case: diameter, plane surfaces, radii – internal/external grinding.
- Belt grinding: double-sided cutting edge (endless belt)

KUNZMANN®
FRÄSMASCHINEN

MILLING MACHINES



KUNZMANN WF 400/410 Series

KUNZMANN milling machines are used by tool-makers, in mechanical engineering, research and development as well as in numerous vocational training centres and schools.

All KUNZMAN machines combine the highest precision, high-performance, easy handling and a long life cycle.

- ⇒ **WF 410 MA** Manual universal milling machine with Heidenhain digital read out
- ⇒ **WF 410 M** Conventional universal milling machine with Heidenhain TNC 128 control unit
- ⇒ **WF 410 MC** Conventional and CNC operated universal milling machine
- ⇒ **WF 400 CNC** Compact CNC controlled universal milling machine

	WF 410 MA	WF 410 M	WF 410 MC	WF 400 CNC
Working range X axis (longitudinal)	410 mm	410 mm	410 mm	400 mm
Working range Y axis (cross)	350 mm	350 mm	350 mm	350 mm
Working range Z axis (vertical)	450 mm	450 mm	450 mm	400 mm
Main spindle drive (100% / 40%)	10 / 14.0 kW	10 / 14.0 kW	7.0 / 11.0 kW	5.5 / 7.0 kW
Main spindle torque (100% / 40%)	307 / 435 Nm	307 / 435 Nm	243 / 384 Nm	350 / 500 Nm
Spindle speed range	1 - 4500 min ⁻¹	1 - 4500 min ⁻¹	1 - 5000 min ⁻¹	1 - 5000 min ⁻¹
Tool taper	ISO 40	ISO 40	ISO 40	ISO 40
Feed drives	AC single	AC single	AC single	Digital
Feed rate	0 - 2000 mm/min	0 - 2000 mm/min	0 - 2000 mm/min	0 - 10000 mm/min
Rapid feed rate X and Y axes	5000 mm/min	5000 mm/min	5000 mm/min	10000 mm/min
Rapid feed rate Z axis	4000 mm/min	4000 mm/min	4000 mm/min	7500 mm/min
Milling head swiveling range	+/- 90°	+/- 90°	+/- 90°	+/- 90°
Electronig hand wheel HR510	-	option	option	✓
Automatic central lubrication	✓	✓	✓	✓
Hydraulic tool clamping	✓	✓	✓	✓
Control system	n/a	TNC 128	TNC 620	TNC 640

KUNZMANN[®]
FRÄSMASCHINEN

MILLING MACHINES



KUNZMANN WF 600/610 Series

KUNZMANN milling machines are used by tool-makers, in mechanical engineering, research and development as well as in numerous vocational training centres and schools.

All KUNZMAN machines combine the highest precision, high-performance, easy handling and a long life cycle.

- ⇒ **WF 610 MA** Manual universal milling machine with Heidenhain digital read out
- ⇒ **WF 610 M** Conventional universal milling machine with Heidenhain TNC 128 control unit
- ⇒ **WF 610 MC** Conventional and CNC operated universal milling machine
- ⇒ **WF 600 CNC** Compact CNC controlled universal milling machine

	WF 610 MA	WF 610 M	WF 610 MC	WF 600 CNC
Working range X axis (longitudinal)	610 mm	610 mm	610 mm	600 mm
Working range Y axis (cross)	450 mm	450 mm	450 mm	400 mm
Working range Z axis (vertical)	450 mm	450 mm	450 mm	400 mm
Main spindle drive (100% / 40%)	10 / 14.0 kW	10 / 14.0 kW	7.0 / 11.0 kW	6.5 / 8.0 kW
Main spindle torque (100% / 40%)	307 / 435 Nm	307 / 435 Nm	243 / 384 Nm	350 / 500 Nm
Spindle speed range	1 - 4500 min ⁻¹	1 - 4500 min ⁻¹	1 - 5000 min ⁻¹	1 - 5000 min ⁻¹
Tool taper	ISO 40	ISO 40	ISO 40	ISO 40
Feed drives	AC single	AC single	AC single	Digital
Feed rate	0 - 2000 mm/min	0 - 2000 mm/min	0 - 2000 mm/min	0 - 10000 mm/min
Rapid feed rate X and Y axes	5000 mm/min	5000 mm/min	5000 mm/min	10000 mm/min
Rapid feed rate Z axis	4000 mm/min	4000 mm/min	4000 mm/min	7500 mm/min
Milling head swiveling range	+/- 90°	+/- 90°	+/- 90°	+/- 90°
Electronig hand wheel HR510	-	option	option	✓
Automatic central lubrication	✓	✓	✓	✓
Hydraulic tool clamping	✓	✓	✓	✓
Control system	n/a	TNC 128	TNC 620	TNC 640

KUNZMANN[®]
FRÄSMASCHINEN

MILLING MACHINES



KUNZMANN WF 650 Series

KUNZMANN cutting-edge, all-round high performance milling machines for modern production of precision single parts as well as variable series manufacturing.

All KUNZMAN machines combine the highest precision, high-performance, easy handling and a long life cycle.

- ⇒ **WF 650 FK** Manual swivelling milling head including an extending quill and a gear box
- ⇒ **WF 650 MS** Manual swivelling high performance motor spindle with B axis option
- ⇒ **WF 650-5AX** 5-axis simultaneous version is delivered with a controlled CNC tilting and rotary table, can be equipped with two different spindle versions.

	WF 650 FK	WF 650 MS	WF 650 5AX FK	WF 650 5AX MS
Working range X axis (longitudinal)	650 mm	650 mm	650 mm	650 mm
Working range Y axis (cross)	500 mm	500 mm	500 mm	500 mm
Working range Z axis (vertical)	450 mm	450 mm	450 mm	450 mm
Main spindle drive (100% / 40%)	9 / 13 kW	10 / 13 kW	9 / 13 kW	10 / 13 kW
Main spindle torque (100% / 40%)	192 / 300 Nm	99.5 / 118 Nm	192 / 300 Nm	99.5 / 118 Nm
Spindle speed range	1 - 6500 min ⁻¹	1 - 12000 min ⁻¹	1 - 6500 min ⁻¹	1 - 12000 min ⁻¹
Tool taper	ISO 40	ISO 40	ISO 40	ISO 40
Feed drives	AC digital	AC digital	AC digital	AC digital
Feed rate X and Y axes	25 m/min	25 m/min	25 m/min	25 m/min
Feed rate Z axis	20 m/min	20 m/min	20 m/min	20 m/min
Milling head swiveling range	-5° / + 95°	-5° / + 95°	-5° / + 95°	-5° / + 95°
CNC controlled B axis (option)	-	✓	-	-
Tilting / rotary table (A / C axis)	n/a	n/a	✓	✓
Tool changer positions	20 (option)	20 (option)	20	20
Tool changing time chips/chips	10"	10"	10"	10"
Control system Heidenhain	TNC 640	TNC 640	TNC 640	TNC 640
Control system SIEMENS (option)	840 D	840D	840D	840D

KUNZMANN[®]
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MILLING MACHINES



KUNZMANN BA 1100 L/H

Compact, high performance vertical machining centres with rapid tool changer intended for the versatile use in job-based series production.

The very good accessibility and a high level of Ergonomics also make it interesting for production of single parts.

- ⇒ **BA 1000** State-of-the-art vertical machining centre for universal use
- ⇒ **BA 1100 L/H** Modern vertical machining centre for universal use in the series production of small to medium-sized batches.

	BA 1100 L	BA 1100 L/H
Working range X axis (longitudinal)	1100 mm	1100 mm
Working range Y axis (cross)	620 mm	750 mm
Working range Z axis (vertical)	660 mm	900 mm
Main spindle drive (100% / 40%)	10 / 14 kW	10 / 14 kW
Main spindle torque (100% / 40%)	130 / 190 Nm	130 / 190 Nm
Main spindle speed range	1 - 8000 min ⁻¹	1 - 10000 min ⁻¹
Tool taper	ISO 40 / HSK 63	ISO 40 / HSK 63
Optional In-line spindle drive	12000/16000 min ⁻¹	14000/18000 min ⁻¹
Feed drives	AC digital	AC digital
Feed rate X / Y / Z axes	15 m/min	15 m/min
Rapid feed rate X / Y / Z axes	30 m/min	30 m/min
CNC dividing unit 4th / 5th axis	option	option
Table size (L x W)	1200 x 610 mm	1350 x 700 mm
Max. table load	850 kg	1500 kg
Tool changer positions	32	38/60
Tool changing time chips/chips	8"	8"
Control system Heidenhain	TNC 640	TNC 640
Control system SIEMENS (option)	840D	840D

KUNZMANN[®]
FRÄSMASCHINEN

VERTICAL MACHINING CENTRES



KUNZMANN BA 1300 / 1500

High performance vertical machining centre with rapid tool changer intended for the versatile use in job-based series production.

The very good accessibility and a high level of Ergonomics also make it interesting for production of single parts.

- ⇒ **BA 1300** State-of-the-art vertical machining centre for universal use
- ⇒ **BA 1500** State-of-the-art vertical machining centre for universal use with 750 mm Z axis

	BA 1300	BA 1500
Working range X axis (longitudinal)	1350 mm	1500 mm
Working range Y axis (cross)	750 mm	750 mm
Working range Z axis (vertical)	900 mm	900 mm
Main spindle drive (100% / 40%)	11 / 17.5 kW	10 / 14 kW
Main spindle torque (100% / 40%)	90 / 130 Nm	130 / 190 Nm
Main spindle speed range	1 - 10000 min ⁻¹	1 - 10000 min ⁻¹
Tool taper	ISO 40 / HSK 63	ISO 40 / HSK 63
Optional n-line spindle drive	14000/18000 min ⁻¹	14000/18000 min ⁻¹
Feed drives	AC digital	AC digital
Feed rate X / Y / Z axes	30 m/min	30 m/min
Rapid feed rate X / Y / Z axes	30 m/min	30 m/min
CNC dividing unit 4th / 5th axis	option	option
Table size (L x W)	1550 x 700 mm	1750 x 700 mm
Max. table load	1500 kg	1500 kg
Tool changer positions	38/60	38/60
Tool changing time chips/chips	8"	8"
Control system Heidenhain	TNC 640	TNC 640
Control system SIEMENS (option)	840D	840D



EX- & INTERNAL GRINDING



LIZZINI IG-FS, IG-FM, IG-FL

Innovative grinding machine for individual part manufacturing as well as small and large series production.

- ⇒ **IG-FS** CNC external / internal circular and non-circular grinding machine
- ⇒ **IG-FM** CNC external / internal circular and non-circular grinding machine
- ⇒ **IG-FL** CNC external / internal circular and non-circular grinding machine
- ⇒ **IG-FXL** CNC external / internal circular and non-circular grinding machine

	IG-FS	IG-FM	IG-FL	IG-FXL
Hight of center	200 mm	200 mm	200 mm	200/255 mm
Max. length of the workpiece	500 mm	800 mm	1000 mm	1500 mm
Max. weight between centres	60 kg	100 kg	1150 kg	200 kg
Max grinding length	500 mm	800 mm	1000 mm	1500 mm
Max. grinding wheel dimension	610x120x203.2	610x120x203.2	610x120x203.2	610x120x203.2
Max. grinding wheel peripheral speed	50 m/s	50 m/s	50 m/s	50 m/s
Grinding wheel head power	8 / 12 kW			
Work head speed	10 - 800 min ⁻¹			
Work head spindle taper (Morse - ASA)	4/6 - 5/6	4/6 - 5/6	4/6 - 5/6	4/6 - 5/6
Max. tailstock stroke	100 mm	100 mm	100 mm	100 mm
Tailstocke taper	Morse 4/6	Morse 4/6	Morse 4/6	Morse 4/6
Transversal stroke X-axis	300 mm	300 mm	300 mm	300 mm
Max. X-axis speed	10000 mm/min.	10000 mm/min.	10000 mm/min.	10000 mm/min.
Longitudinal stroke Z-axis	650 mm	960 mm	1200 mm	1760 mm
Max. Z-axis speed	20000 mm/min.	20000 mm/min.	20000 mm/min.	12000 mm/min.
Control system SIEMENS	840D	840D	840D	840D



INTERNAL GRINDING



LIZZINI IG-IS, IG-IM

Innovative grinding machine for individual part manufacturing as well as small and large series production.

- ⇒ **IG-IS** modular internal circular, non-circular and radius grinding machine
- ⇒ **IG-IM** modular internal circular, non-circular and radius grinding machine

	IG-IS	IG-IM
Max. workpiece diameter	250 mm	450 mm
Max. grinding bore diameter	200 mm	250 mm
Min. grinding bore diameter	5 / 10 mm	5 / 10 mm
Grinding length	170 mm	170 mm
Max. workpiece length	300 mm	300 mm
Max. workpiece weight on the headstock	60 kg	60 kg
Max. workpiece weight on-the-fly	100 kg	100 kg
HF grinding spindle speed	10000 - 19000 min ⁻¹	10000 - 19000 min ⁻¹
HF grinding spindlepower	3 - 25 kW	3 - 25 kW
Work head C-axis speed	10 - 800 min ⁻¹	10 - 800 min ⁻¹
Work head spindle taper	ASA 5/6	ASA 5/6
Transversal stroke X-axis	490 mm	490 mm
Max. X-axis speed	10000 mm/min.	10000 mm/min.
Longitudinal stroke Z-axis	300 mm	300 mm
Max. Z-axis speed	20000 mm/min.	20000 mm/min.
Control system SIEMENS	840D	840D



MONNIER + ZAHNER AG



M+Z AUTOMOTIVE

Innovative machine tools for the automotive, medical, dental and watchmaking industries. Construction of special purpose machines and solutions tailored exactly to the customer's requirements.

- ⇒ **2000D-Drive** High performance precision hobbing machine with 10 CNC axes
- ⇒ **M667** Robust worm milling machine for high speed milling.
- ⇒ **M312** 4 axes 120kN profile rolling machine, equipped with two servo hydraulic tool slides
- ⇒ **M305** Horizontal profile rolling/burnishing machine for plunge and through-feed process

	2000D-Drive	M667	M312	M305
Max. module	4	1.75	1.75	up to 2.5
Work piece Ø manual/automatic loading	160 / 100 mm	45 / 25 mm	48 / - mm	48 / - mm
Max. work piece length	350 mm	200 mm	90 mm	90 mm
Max hobbing length	350 mm	200 mm	-	-
Max. diameter of tools	80 mm	80 mm	178 mm	-
Max. setting angle milling head	± 45°	± 35°	± 8°	-
Max. distance work- / tool spindle	110 mm	-	-	-
Shift stroke	160 mm	-	-	-
Work piece spindle speed	7000 min ⁻¹	180 min ⁻¹	180 min ⁻¹	180 min ⁻¹
Spindle power	32 kW	2.2 kW	2 x 500 Nm	2 x 500 Nm
Max. rolling pressure	-	-	120 kN	50 kN
Max. milling spindle speed	10000 min ⁻¹	6000 min ⁻¹	-	-
X axis, plunging	110 mm	80 mm	-	-
Z axis, longitudinal movement	450 mm	200 mm	-	-
Y axis, shift axis	160 mm	-	-	-
U axis, deburring	350 mm	-	-	-
U1 axis, deburring	100 mm	-	-	-
W axis, tailstock	350 mm	200 mm	-	-
V axis, loading	✓	✓	-	-
C axis, work piece spindle	✓	✓	-	-
Control system	Bosch Rexroth	FANUC Oi	Bosch Rexroth	Bosch Rexroth



MONNIER + ZAHNER AG



M+Z MEDICAL & DENTAL

Innovative machine tools for the automotive, medical, dental and watchmaking industries. Construction of special purpose machines and solutions tailored exactly to the customer's requirements.

- ⇒ **M628** Special machine for milling self-cutting flutes on medical screws
- ⇒ **M668** Honing and polishing machine for heads and inserts as well as spine products
- ⇒ **M647** 6 axes grinding machine for grinding dental and industrial cutters (rotary cutters)
- ⇒ **M642 evolution** 7 axes grinding machine for grinding dental and industrial cutters (rotary cutters)

	M628	M668	M647	M642 evo
Work piece diameter	1.5 - 15 mm	up to 64 mm	0.5 - 6 mm	0.6 - 8 mm
Shank diameter	-	-	1.6 - 3.0 mm	1.6 - 3.0 mm
Work piece length	150 mm	-	-	-
Max. milling / grinding length	60 mm	-	20 mm	25 mm
Max. Ø of grinding wheel / milling cutter	2 - 32 mm		60 - 100 mm	70 - 125 mm
Grinding wheel/milling cutter travers angle	± 10°	0 - 75°	-45° to 105°	-110° to 30°
Workpiece traverse angle	-	-	-	-5° to 120°
Work piece spindle speed	-	1000 min ⁻¹	-	-
Milling Spindle power	1.0 kW		1.0 kW	0.5 kW
Milling Spindle speed	500 - 10000 min ⁻¹	10000 min ⁻¹	12000 min ⁻¹	9000 min ⁻¹
X axis, plunging	180 mm	-	-	-
Z axis, longitudinal movement	68 mm	-	-	-
Y axis, shift axis	38 mm	-	-	-
C axis, work piece spindle	90 min ⁻¹	-	-	-
Handling system magazine capacity	option	option	1000 pcs	240 pcs
Control system FANUC	Oi MB	32i A	Ind. PC Compax 1000SL	Ind. PC Compax 1000SL



MONNIER + ZAHNER AG



M+Z WATCHES & MICRO MECHANIC

Innovative machine tools for the automotive, medical, dental and watchmaking industries. Construction of special purpose machines and solutions tailored exactly to the customer's requirements.

- ⇒ **500D-Drive** High performance precision hobbing machine for automotive parts
- ⇒ **W1000 micro** High-performance precision hobbing machine with 8 CNC axes
- ⇒ **W90 CNC** CNC precision hobbing machine for watch & micro mechanic parts

	500D-Drive	W1000 micro	W90 CNC
Modul, depending on the material, max.	0.8 mm	1.0 mm	0.05 - 1.0 mm
Max. work piece diameter	0.3 - 30 mm	40 mm	40 mm
Max. work piece length	60 mm	65 mm	80
Max hobbing length	60 mm	65 mm	50 mm
Axis distance work piece - hob	30 mm		30 mm
Hob diameter	6 - 32 mm	32 mm	32 mm
Hob Length max.	35 mm		± 4°
Hob shift	30 mm		20 mm
Max. setting angle hob head	± 10°	± 35°	± 4°
Synchronized work piece spindles	✓	✓	✓
Work piece spindle speed up to	6000 min ⁻¹	12000 min ⁻¹	600 min ⁻¹
Spindle power	1.25 kW		
Spindle torque	2 x 2.4 Nm		
Synchronized hob spindles	✓	✓	
Hob spindle speed up to	12000 min ⁻¹	15000 min ⁻¹	6000 min ⁻¹
Hob spindle power	1.25 kW		
Hob spindle torque	2.4 Nm		
Control system	Bosch Rexroth IndraMotion MTX	Bosch Rexroth IndraMotion MTX	Beckhoff CX5000



HORIZONTAL LATHES



MCM Madar 5-STAR

CNC medium and big size precision horizontal lathes for special applications.

- ⇒ **5-STAR 45** Solid, reliable and technological 5 guideway CNC precision turning machine
- ⇒ **5-STAR 60** Solid, reliable and technological 5 guideway CNC precision turning machine
- ⇒ **5-STAR 80** Solid, reliable and technological 5 guideway CNC precision turning machine

	5-STAR 45	5-STAR 60	5-STAR 80
Hight of center	350 mm	450 mm	550 mm
Swing over bed	700 mm	900 mm	1100 mm
Swing over cross slide	450 mm	600 mm	800 mm
Distance between centres	2500 - 8000 mm	2500 - 8000 mm	3000 - 10000 mm
Sindle bore	100 mm	100 mm	130 mm
Spindle nose	CamLock 11"	CamLock 11"	CamLock 15"
Spindle speed	0 - 1400 min ⁻¹	0 - 1400 min ⁻¹	0 - 10000 min ⁻¹
Main motor power (S1 / S6)	30 / 45 kW	30 / 45 kW	37 / 56 kW
Travel of cross slide	410 mm	410 mm	650 mm
Rapid feed X / Z axis	10 m/min	10 m/min	9 m/min
Diameter of tailstok quill	200 mm	200 mm	200 mm
Travel of tailstok quill	200 mm	200 mm	250 mm
Taper of tailstok quill	Morse 6	Morse 6	Morse 6
Max. weight between centres	up to 6000 kg	up to 6000 kg	up to 10000 kg
Control system FANUC	0i-TD	0i-TD	0i-TD
Control system SIEMANS (option)	840D	840D	840D



HORIZONTAL LATHES



MCM Madar ATL HEAVY

CNC medium and big size precision horizontal lathes for special applications.

- ⇒ **ATL HEAVY**
- ⇒ **ATL HEAVY PLUS 755**
- ⇒ **ATL HEAVY PLUS 1100**

Monolithic, reliable and stable CNC precision turning machines
 Performant and powerful CNC precision turning machines
 Rapid, efficient and versatile CNC precision turning machines

	ATL HEAVY	PLUS 755	PLUS 1100
Hight of center	400 - 600 mm	500 - 800 mm	800 - 1200 mm
Swing over bed	800 - 1200 mm	1000 - 1600 mm	1600 - 2400 mm
Swing over cross slide	480 - 850 mm	650 - 1200 mm	1200 - 2000 mm
Distance between centres	1500 - 12000 mm	1500 - 16000 mm	2000 - 16000 mm
Sindle bore	100 mm	130 mm	130 mm
Spindle nose	ASA 11"	ASA 15"	ASA 15"
Spindle speed	0 - 1200 min ⁻¹	0 - 1000 min ⁻¹	0 - 400 min ⁻¹
Main motor power	30 kW	37 kW	55 kW
Travel of cross slide	620 mm	850 mm	1200 mm
Rapid feed X / Z axis	9 m/min	8 m/min	8 m/min
Diameter of tailstok quill	120 mm	160 mm	240 mm
Travel of tailstok quill	300 mm	300 mm	300 mm
Taper of tailstok quill	Morse 6	Morse 6	Morse 6
Max. weight between centres	up to 5000 kg	up to 10000 kg	up to 18000 kg
Control system FANUC	0i-TD	0i-TD	0i-TD
Control system SIEMANS (option)	840D	840D	840D



HORIZONTAL LATHES



MCM Madar ATL

CNC medium and big size precision horizontal lathes for special applications.

- ⇒ **ATL** Secure and simple CNC precision turning machines
- ⇒ **ATL GIOTTO** Rapid, efficient and versatile CNC precision turning machines
- ⇒ **ATL SPEEDY** Compact CNC precision turning machines

	ATL	ATL GIOTTO	ATL SPEEDY
Hight of center	320 - 500 mm	250 - 360 mm	180 / 225 / 285 mm
Swing over bed	640 - 1000 mm	500 - 720 mm	360 / 450 / 570 mm
Swing over cross slide	350 - 680 mm	310 - 530 mm	190 / 260 / 360 mm
Distance between centres	1500 - 6000 mm	1000 - 5000 mm	1000 - 2000 mm
Sindle bore	105 mm	80 / 102 mm	42 / 65 / 80 mm
Spindle nose	CamLock 11"	CamLock 8"	CamLock 5 / 6 / 8"
Spindle speed	0 - 1800 min ⁻¹	0 - 2000 min ⁻¹	0 - 3500 min ⁻¹
Main motor power	22 kW	15 kW	7.5 / 9 / 11 kW
Travel of cross slide	500 mm	360 mm	185 / 235 / 300 mm
Rapid feed X / Z axis	10 m/min	12 m/min	15 / 12 m/min
Diameter of tailstok quill	100 mm	80 mm	58 / 68 / 95 mm
Travel of tailstok quill	250 mm	230 mm	180 / 200 / 220 mm
Taper of tailstok quill	Morse 5	Morse 5	Morse 4 / 4 / 6
Max. weight between centres	up to 3000 kg	up to 1500 kg	-
Control system FANUC	0i-TD	0i-TD	0i-TD
Control system SIEMANS (option)	840D	840D	840D



HORIZONTAL LATHES

MCM Madar T, TC & HANDY

Conventional medium and big size precision horizontal lathes for special applications.



- ⇒ **HANDY** conventional lathe with double mechanical clutch and electromagnetic brake
- ⇒ **TC** conventional lathe with double mechanical clutch and electromagnetic brake
- ⇒ **T** conventional lathe with infinitely variable spindle speeds

	HANDY	TC	T
Hight of center	250 - 360 mm	225 - 350 mm	180 - 255 mm
Swing over bed	500 - 720 mm	450 - 700 mm	360 - 510 mm
Swing over cross slide	310 - 530 mm	230 - 480 mm	190 - 310 mm
Distance between centres	1500 - 2200 mm	1000 - 5000 mm	1000 - 1500 mm
Sindle bore	80 / 102 mm	82 / 105 mm	52 mm
Spindle nose	CamLock 8"	CamLock 8" / 11"	CamLock 6"
Spindle speed	11 - 1250 min ⁻¹	9 - 1600 min ⁻¹	60 - 2000 min ⁻¹
Main motor power	7.5 / 9.2 kW	5.5 / 7.5 / 9.2 kW	4 / 5.5 kW
Cross slide (L x W)	700 x 230 mm	650 x 230 mm	370 x 190 mm
Travel of cross slide	360 mm	320 / 350 mm	240 mm
Top slide (L x W)	365 x 145 mm	350 x 150 mm	275 x 115 mm
Travel of Top slide	155 mm	150 mm	120 mm
Diameter of tailstok quill	80mm	75 / 85 mm	60
Travel of tailstok quill	230 mm	150 / 200 mm	135 mm
Taper of tailstok quill	Morse 5	Morse 5	Morse 4
Control system	n/a	n/a	n/a



HORIZONTAL LATHES



MCM Madar TC HEAVY

Conventional medium and big size precision horizontal lathes for special applications.

- ⇒ **TC HEAVY** conventional lathe with monolithic bed
- ⇒ **TC HEAVY PLUS** conventional lathe with monolithic bed

			TC HEAVY	TC HEAVY PLUS
Hight of center			400 - 600 mm	500 - 1200 mm
Swing over bed			800 - 1200 mm	1000 - 2400 mm
Swing over cross slide			500 - 850 mm	650 - 2000 mm
Distance between centres			1500 - 12000 mm	1500 - 16000 mm
Sindle bore			100 mm	130 mm
Spindle nose			ASA 11"	ASA 15"
Spindle speed			6 - 800 min ⁻¹	2.5 - 315 min ⁻¹
Main motor power			18.5 kW	30 - 37 kW
Travel of cross slide			500 / 600 mm	520 - 1200 mm
Travel of Top slide			250 mm	300 / 400 mm
Diameter of tailstok quill			120 mm	160 / 200 mm
Travel of tailstok quill			240 mm	300 mm
Taper of tailstok quill			Morse 6	Morse 6
Max. weight between centres			up to 5000 kg	up to 15000 kg
Control system			n/a	n/a



TURN-KEY PVD COATING SYSTEMS



PLATIT π111, π411, PL1011, π1511

PLATIT offers complete turn-key PVD coating systems including all necessary peripheral equipment and technologies for surface pre-treatment:

- by polishing, brushing and/or micro blasting,
- single-chamber vacuum cleaning with "start-and-forget" operation,
- stripping of coatings from HSS and carbides.

- ⇒ **π111 PLUS** Compact hard coating unit, based on PLATIT LARC® technology
- ⇒ **π411 PLUS** Compact hard coating unit, based on LARC®, CERC® and SCiL® technology.
- ⇒ **PL1011** The “workhorse” high volume compact unit with 4 planar cathodes
- ⇒ **π1511** High volume coating unit based on rotating (LARC®) and planar ARC technology

	π111 PLUS	π411 PLUS	PL1011	π1511
Internal vacuum chamber size [mm]	450x320x615	650x670x675	1000x1000x1100	1000x1000x1100
Coatable volume (Ø x H)	355x460 mm	500x460 mm	700x650 mm	700x700 mm
Max. load	100 kg	200kg	400 kg	400 kg
Cathodes / Technology:				
LARC® (Lateral Rotating Cathodes)	✓	✓		✓
CERC® (CEntral Rotating Cathodes)		✓		
SCiL® (LARG-GD ind. Sputtered Coatings)		✓		
Planar ARC			✓	✓
Coatings				
Mono- & Multilayers	✓	✓	✓	✓
Nanogradients, Nanolayers	✓	✓	✓	✓
Nanocomposits	✓	✓		✓
Triple Coatings ^{3®}	selected	✓	selected	✓
QUAD Coatings ^{3®}		✓		✓
OXI (oxide and oxinitride coatings)		✓		✓
LACS® (Lateral ARC & Central Sputtering)		✓		
DLC (Diamond Like Coating)	✓	✓	selected	
SCiL® (Sputtered coatings by LARG-GD)		✓		
		OEM	OEM	OEM
Industrial PC and PLC System	OEM	OEM	OEM	OEM



FEMTO LASER / SACE



POSALUX Microfor LASER, SACE

Solutions for all high-end micro machining needs based on FEMTO-Laser technology and Spark Assisted Chemical Engraving SACE.

- ⇒ **FEMTO LASER** FEMTO-LASER drilling, cutting and engraving technology for mass production.
- ⇒ **SACE** Glass micro-machining with high flexibility, accuracy and efficiency

	SACE	FEMTO LASER
Technology	<ul style="list-style-type: none"> - High temperature etching - Dissolution of glass according: $SiO_2 + 2OH \rightarrow SiO_3^{2-} + H_2O$ - Local etching of glass around the tool by spark assisted chemical engraving (SACE) 	<ul style="list-style-type: none"> - Femto surge down to 200fs - Various harmonics available (wave length): nIR, green, UV - 5 axis precision galvohead - Vision system, beam attenuator, Shutter, beam analyser, power recorder
Number of heads	up to 4	1 or 2
Drilling / Hole diameter	down to 150 µm	down to 30 µm
Milling	✓	Combi machine with HD-milling
Engraving	✓	✓
Cutting	✓	✓
Optional processes	<ul style="list-style-type: none"> - Automatic loading/unloading - Washing process for wafer and other parts 	<ul style="list-style-type: none"> - Automatic loading/unloading - Camera for positioning - Focal length measurement - Dust extraction
Control system	TwinCAT 3 CNC Beckhoff	SIEMENS 840D



MICRO-EDM MACHINES

POSALUX Microfor HP4 & FP1 EDM

The last electro erosion developments, based on the integrated SARIX μ -EDM technology, allow machining with short cycle time, repeatability and stability on any conductive material.



- ⇒ **HP4 EDM** Custom micro-EDM solution designed for mass production.
- ⇒ **FP1 EDM** Custom micro-EDM solution designed for flexible small batch production.

	HP4 EDM	FP1 EDM
Hole diameter	50 μ m - 2 mm	50 μ m - 2 mm
Tapered hole with reverse taper	up to 150 μ m/mm	up to 150 μ m/mm
WII thicknes / \varnothing ratio	up to 12	up to 12
Smooth roughness	Ra < 0.2 μ m	Ra < 0.2 μ m
High productivity	✓	
Prototyping & small series		✓
High positioning accuracy	✓	✓
Processs Stability	✓	✓
Multi spindle machine	✓	
Single spindle machine		✓
Automatic loading / unloading	✓	✓
Compact Water deionization system	✓	✓
Control system SIEMENS	840D	840D

Electrode guiding system:

The integrated advanced electrode guiding system precisely feeds the smallest electrode available on the market, down to 30 μ m.



MICRO-MILLING/DRILLING MACHINE



POSALUX Microfor HP1 MILLING

The last electro erosion developments, based on the integrated SARIX μ -EDM technology, allow machining with short cycle time, repeatability and stability on any conductive material.

⇒ **HP1 Milling** High tech 5 axes micro-milling / drilling technology for mass production.

	HP1 Milling
Milling \varnothing	0.1 - 2 mm
Air bearing spindle speed up to	100000 min ⁻¹
Oil and grease free operation	✓
Single spindle machine	✓
Toll holder	HSK E25
Tool changer positions	12
X- / Y- axes travel	300 mm
Z-axis travel	70mm
B-axis	0 - 90°
C-Axis	0 - 360
Dry machining technology	✓
Milling hard materials up to	67 HRC
Automatic loading / unloading	✓
High productivity	✓
High positioning accuracy	✓
Control system SIEMENS	840D



UNIVERSAL GEAR GRINDERS



REISHAUER RZ 410, RZ 550, RZ 1000

The Reishauer continuous generating grinding process is based on a multi-axes high performance grinding machine equipped with dressable, vitrified bonded grinding worms also called threaded wheels. This union of machine and tooling ensures the resulting high-quality gears ground with very short cycle times.

- ⇒ **RZ 410** The Job Shop Machine
- ⇒ **RZ 550** Adding value to your gears.
- ⇒ **RZ 1000** The Job Shop Machine

	RZ 410	RZ 550	RZ 1000
Gear outside Ø	5 - 410 mm	5 - 560 mm	0 - 1000 mm
Module	0.5 - 10 mm	0.5 - 10 mm	0.5 - 10 mm
Grinding head swivel angle	± 45°	± 45°	± 45°
Max. grinding stroke	300 mm	300 mm	300 mm
Max. shaft length	700 mm	700 mm	700 mm
Max. work spindle speed	600 min ⁻¹	600 min ⁻¹	600 min ⁻¹
Max. work piece weight (incl. fixture)	600 kg	600 kg	1200 kg
Max. grinding speed	80 m/s	80 m/s	80 m/s
Max. grinding wheel outside Ø	300 mm	300 mm	300 mm
Max. face width of grinding wheel	145 / 160 mm	145 / 160 mm	145 / 160 mm
Control system SIEMENS	840D	840D	840D



AUTOMOTIVE GEAR GRINDERS



REISHAUER RZ60, RZ160, RZ 260

The Reishauer continuous generating grinding process is based on a multi-axes high performance grinding machine equipped with dressable, vitrified bonded grinding worms also called threaded wheels. This union of machine and tooling ensures the resulting high-quality gears ground with very short cycle times.

- ⇒ **RZ 60** The workhorse of planetary gear manufacture
- ⇒ **RZ 160** The Automotive Gear Grinding Machine.
- ⇒ **RZ 260** From automotive ring-gears to gears for medium-sized trucks

	RZ 60	RZ 160	RZ 260
Gear outside Ø	0 - 94 mm	0 - 162 mm	0 - 262 mm
Module	1 - 4 mm	0.5 - 4 mm	0.5 - 5 mm
Grinding head swivel angle	± 48°	± 48°	± 48°
Max. grinding stroke	180 mm	180 mm	180 mm
Max. shaft length	490 mm	490 mm	490 mm
Max. work spindle speed	3000 min ⁻¹	3000 min ⁻¹	1600 min ⁻¹
Max. work piece weight (incl. fixture)	30 kg	30 kg	50 kg
Max. grinding speed	100 m/s	100 m/s	100 m/s
Max. grinding wheel outside Ø	275 mm	275 mm	275 mm
Max. face width of grinding wheel	125 / 160 mm	125 / 160 mm	125 / 160 mm
Additional work spindle (C1- & C2-axis)	option	option	option
Pivoting dressing unit (C4-axis)	n/a	option	option
CNC tailstocks (W1- & W2-axis)	option	option	option
Control system SIEMENS	840D	840D	840D



TOOL GRINDING MACHINES



GRINDSMART

High precision CNC machines for production grinding of cutting tools and cylindrical grinding. Complete manufacturing solutions for the grinding of precision tools and parts, including wheel dressing and measuring finished parts.

- ⇒ **530XS** 5 axis precision tool grinder for standard and high performance cutting tools
- ⇒ **630XW** 6-axis super precision tool grinder for high performance and specialty cutting tools
- ⇒ **830XW** integrates the innovative combination of hydrostatic technology and linear motors to produce large and small series with 6 axes interpolated simultaneously
- ⇒ **Nano 5** Small rotary 5 axes bur grinding centre for dental, medical and metal-cutting burs

	530XS	630XW	830XW	Nano 5
Grinding Ø range	0.5 - 16.0 mm	0.1 - 20.0 mm	1.0 - 32.0 mm	0.3 - 6.35 mm
Grinding capacity burs Ø	up to 25.4 mm	-	-	-
Blank length max.	300 mm	300 mm	300 mm	100 mm
X axis, horizontal movement	300 mm	300 mm	320 mm	146 mm
Y axis, vertical movement	220 mm	220 mm	200 mm	99 mm
Z axis, motor spindle cross movement	180 mm	180 mm	400 mm	146 mm
A axis	-	-50° to 90°	-30° to 210°	-
B axis, tool attachment pivoting	-75° to 135°	-75° to 135°	-30° to 210°	200°
C axis, tool rotation speed	300 min ⁻¹	300 min ⁻¹	1000 min ⁻¹	1000 min ⁻¹
Grinding spindle power	7 / 11 kW	11 / 14 kW	11 / 14 kW	1.5 kW
Grinding spindle speed	500 - 10000 min ⁻¹	500 - 12000 min ⁻¹	500 - 12000 min ⁻¹	2000 - 10000 min ⁻¹
Max. grinding wheel diameter	200 mm	150 mm	150 mm	125 mm
Wheel packs / grinding wheels per pack	-	4 / 6	4 / 15	-
Grinding wheels	4	-	-	4
Grinding wheel interface	HSK 50E	HSK 50E	HSK 50E	PerfectArbor
Tool clamping	Schaublin / Nann	Schaublin / Nann	Schaublin / Nann	W12 / W5
Clamping Ø range	0.5 - 20.0 mm	0.5 - 20.0 mm	3.0 - 32.0 mm	1.0 - 6.35 mm
Control system FANUC	30i MB	30i MB	30i MB	30i MB



TOOL GRINDING MACHINES



SHAPESMART

High precision CNC machines for production grinding of cutting tools and cylindrical grinding. Complete manufacturing solutions for the grinding of precision tools and parts, including wheel dressing and measuring finished parts.

- ⇒ NP3+ 3 or 4 axes precision pinch and peel grinding machine for the preparation of cutting tool blanks
- ⇒ NP5 5 axes precision traverse, plunge or non-circular grinder for all kind of round blanks

	NP3+	NP5
Grinding Ø range	0.025 - 25.0 mm	0.025 - 25.0 mm
Grinding length	330 mm	330 mm
Y axis, vertical movement	350 mm	350 mm
Z axis, motor spindle cross movement	100 mm	100 mm
X axis, horizontal movement	29 mm	29 mm
V axis	option	29 mm
C axis, tool rotation speed	-	0 - 3000 min ⁻¹
Workhead / tool rotation speed	300 - 3000 min ⁻¹	-
3 CNC Axes Robot loading station	option	standard
Tool clamping	W20	W20
Motor spindle power roughing / finishing	8.5 / 1.4 kW	8.5 / 1.4 kW
Max. roughing spindle speed	7600 min ⁻¹	7600 min ⁻¹
V axis finishing grinding station	option	standard
Max. finishing spindle speed	10000 min ⁻¹	10000 min ⁻¹
Max. grinding wheel diameter (r/f)	250 / 150 mm	250 / 150 mm
Roughing grinding wheel orientation	10° or 90°	10° or 90°
Roughing & finishing spindle diameter	100 mm	100 mm
Grinding wheel interface	PerfectArbor	PerfectArbor
Control system FANUC	32i B	32i B

VERTICAL MACHINING CENTERS



SCHAUBLIN 48V / 48V-15K

Heavy cast construction for maximum rigidity. The stationary column and the "C" frame ensure optimum shock absorption. Thermal stability is increased by fixed and pre-tensioned ball screws on all axes. Stiff and thermally-stable spindle with lifetime-lubricated spindle bearings.

- ⇒ **48V** Compact vertical 3 axes machining centre with 4th axis option
- ⇒ **48V-15K** Compact vertical 3 axes machining centre with 4th axis option and increased speed range

	48V	48V-15K
Working range X axis (longitudinal)	480 mm	480 mm
Working range Y axis (cross)	400 mm	400 mm
Working range Z axis (vertical)	430 mm	430 mm
Main spindle drive (S1 / S3)	3.7 / 5.5 kW	2.2 / 3.7 kW
Max. spindle torque (continuous / intermittent)	24 / 35 Nm	7.0 / 11.8 Nm
Spindle speed	10000 min ⁻¹	15000 min ⁻¹
Tool holder	ISO 30	ISO 40
Feed drives	Direct Drive	Direct Drive
Feed rates X, Y, Z axes	12 m/min	15 m/min
Rapid feed rates X, Y, Z axes	36 m/min	48 m/min
4th axis	option	option
Table size (L x W)	600 x 400 mm	600 x 400 mm
Max. table load	300 kg	250 kg
Tool changer positions	20	20
Max. tool weight	6 kg	4 kg
Changing time chips/chips	4.5"	5"
Control system	FANUC 0i-MD	FANUC 0i-MD

VERTICAL MACHINING CENTERS



SCHAUBLIN 60 / 100 / 160 CNC

Heavy cast construction for maximum rigidity. The stationary column and the "C" frame ensure optimum shock absorption. Thermal stability is increased by fixed and pre-tensioned ball screws on all axes. Stiff and thermally-stable spindle with lifetime-lubricated spindle bearings.

- ⇒ **60 CNC** Vertical 3 axes machining centre with 4th axis option
- ⇒ **100 CNC** Vertical 3 axes machining centre with 4th and 5th axis option
- ⇒ **160 CNC** Vertical 3 axes machining centre with 4th and 5th axis option

	60 CNC	100 CNC	160 CNC
Working range X axis (longitudinal)	600 mm	1020 mm	1600 mm
Working range Y axis (cross)	540 mm	540 mm	700 mm
Working range Z axis (vertical)	540 mm	540 mm	635 mm
Main spindle power	13 kW	13 kW	26 kW
Spindle torque	82.7 Nm	82.7 Nm	149 Nm
Spindle speed	8000 min ⁻¹	8000 min ⁻¹	6000/10000 min ⁻¹
Tool holder	BT 40 / ISO 40	BT 40 / ISO 40	BT 40 / ISO 50
Feed drives	Direct Drive	Direct Drive	Direct Drive
Feed rates X, Y, Z axes	12 m/min	12 m/min	12 m/min
Rapid feed rates X, Y, Z axes	30 m/min	30 m/min	36 m/min
Table size (L x W)	750 x 540 mm	1120 x 540 mm	1170 x 700 mm
Max. table load	700 kg	700 kg	1500 kg
Tool changer positions	24	24	40
Max. tool weight	6 kg	6 kg	8 kg
Changing time chips/chips	2.5 - 4.5"	2.5 - 4.5"	2.5 - 5"
Control system	FANUC 0i-MD	FANUC 0i-MD	FANUC 0i-MD
SIEMENS (option)	SIEMENS 810 D	SIEMENS 810 D	SIEMENS 810 D

HIGH PRECISION LATHES



SCHAUBLIN 70

Conventional high precision turning machines available on bench.

- ⇒ **70 CF** CF drive for milling or grinding attachments
- ⇒ **70 Mi-CF** Spindle with AC motor drive and CF drive for milling or grinding attachments

	70-CF	70Mi-CF
Max. swing over bed	130 mm	130 mm
Centre hight over bed	70 mm	70 mm
Centre Hight over carriage	16 mm	16 mm
Distance between centres	275 mm	275 mm
Headstock	W12	W12
Power (continous)	1.1 kW	0.75 kW
Spindle for Schaublin collets	W12	W12
Max. throughbore	8.2 mm	14.5 / 19 mm
Spindle speed	100 - 5000 min ⁻¹	100 - 8000 min ⁻¹
C-Axis	n/a	n/a
X-Axis	65 mm	65 mm
Z-Axis	60 mm	60 mm
Tooling System	Multifix	Multifix
Tailstock	Morse 2	Morse 2
Control system	n/a	n/a

SCHAUBLIN⁺
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HIGH PRECISION LATHES

SCHAUBLIN 102

Conventional high precision turning machines
Available on bench or with cast iron base.

CNC driven lathe with C axis and exceptional characteristics.

- ⇒ **N-CF** CF drive for milling or grinding attachments
- ⇒ **Mi-CF** Spindle with AC motor drive and CF drive for milling or grinding attachments
- ⇒ **N-VM-CF** CF drive for milling or grinding attachments and lead screw
- ⇒ **TM-CNC** CNC driven lathe with three simultaneous axes.

	102N-CF	102Mi-CF	102N-VM-CF	102TM-CNC
Max. swing over bed	200 mm	200 mm	200 mm	200 mm
Hight of center over bed	102 mm	102 mm	102 mm	102 mm
Hight of centre over carriage	20 mm	20 mm	20 mm	40 mm
Max. turning length	-	-	-	100 mm
Distance between centres	470 mm	470 mm	450 mm	-
Headstock	W20 / W25	W20 / W25	W20 / W25	W20 / W25
Power (continous / intermittent)	4.2 kW / -	2 kW / -	4.2 kW / -	1.5 / 2.2 kW
Spindle for Schaublin collets	W20 / W25	W20 / W25	W20 / W25	W20 / W25
Max. throughbore	14.5 / 19 mm	14.5 / 19 mm	14.5 / 19 mm	14.5 / 19 mm
Spindle speed	100 - 5000 min ⁻¹	100 - 6000 min ⁻¹	100 - 3000 min ⁻¹	50 - 8000 min ⁻¹
C-Axis	n/a	n/a	n/a	✓
X-Axis	100 mm	100 mm	100 mm	120 mm
Z-Axis	90 mm	90 mm	90 mm	100 mm
Tooling System	Linear	Linear	Linear	Linear / Turret
Max. number of tools	5	5	5	5 / 6
Tailstock	MORSE 2	MORSE 2	MORSE 2	MORSE 2
Control system	n/a	n/a	n/a	FANUC 0i-TD

HIGH PRECISION LATHES



SCHAUBLIN 125-CCN

CCN-TURNING – as simple and flexible as conventional turning!
CCN (conventional control numerical) lathes combine the advantaged of a numerical control and the simplicity of a conventional lathe.

With the same base, the turning machine 125-CCN has three different versions:

- ⇒ **L-T** With linear tooling system
- ⇒ **R-T** Turret with fixed tools system
- ⇒ **R-TM** Revolver Turret with live tools system

	L-T	R-T	R-TM
Max. turning diameter	270 mm	270 mm	270 mm
Hight of center over carriage	60 mm	60 mm	60 mm
Max. swing over carriage	115 mm	115 mm	115 mm
Max. turning length (B32)	409 mm	265 mm	265 mm
Headstock	D1-3"	D1-3" / A2-4	A2-4
Power (continous / intermittent)	5.5 / 7.5 kW	5.5 / 7.5 kW	5.5 / 7.5 kW
Torque (continous / intermittent)	42 /58 Nm	42 /58 Nm	42 /58 Nm
Max. throughbore with collet	24	24 / 32	32
Spindle speed	30 - 5000 min ⁻¹	30 - 5000 min ⁻¹	30 - 5000 min ⁻¹
C-Axis	-	-	✓
X-Axis	200 mm	190 mm	190 mm
Z-Axis	415 mm	400 / 395 mm	389 mm
Tooling System	Linear	Turret	Turret
Max. number of tools (fix / rotating)	5 / -	8 / -	8 / 4
Tailstock	Morse 3	Morse 3	Morse 3
Control system	FANUC 0i-TF	FANUC 0i-TF	FANUC 0i-TF

HIGH PRECISION LATHES



SCHAUBLIN 180-CCN

CCN-TURNING – as simple and flexible as conventional turning!
CCN (conventional control numerical) lathes combine the advantaged of a numerical control and the simplicity of a conventional lathe.

With the same base, the turning machine 180-CCN is available with two main spindle sizes in two different versions:

- ⇒ **R-T / A2-5** Rotating Turret with fixed tools system
- ⇒ **R-T / A2-6** Rotating Turret with fixed tools system
- ⇒ **R-TM / A2-5** Rotating Turret with live tools system and C-axis
- ⇒ **R-TM / A2-6** Rotating Turret with live tools system and C-axis

	R-T / A2-5	R-T / A2-6	R-TM / A2-5	R-TM / A2-6
Max. turning diameter	250 mm	300 mm	250 mm	270 mm
Hight of center over carriage	83 mm	83 mm	83 mm	83 mm
Max. swing over carriage	160 mm	160 mm	160 mm	160 mm
Max. turning length (B32)	635 mm	635 mm	635 mm	635 mm
Headstock	A2-5	A2-6	A2-5	A2-6
Power (continous / intermittent)	15 / 18.5 kW			
Spindle for Schaublin collets	B32 / B45	B45	B32 / B45	B45
Max. throughbore with collet B45	36 mm	36 mm	36 mm	36 mm
Spindle speed	50 - 5000 min ⁻¹	50 - 4000 min ⁻¹	50 - 5000 min ⁻¹	50 - 4000 min ⁻¹
C-Axis	-	-	✓	✓
X-Axis	243 mm	243 mm	231 mm	231 mm
Z-Axis	721 mm	721 mm	721 mm	721 mm
Tooling System	Turret	Turret	Turret	Turret
Max. number of tools (fix / rotating)	8 / -	8 / -	6 / 6	6 / 6
Tailstock	Morse 5	Morse 5	-	-
Control system	FANUC 0i-TD	FANUC 0i-TD	FANUC 0i-TD	FANUC 0i-TD

HIGH PRECISION LATHES



SCHAUBLIN 302 / 842

High-precision machining for complex parts and applications as well as suitable for hard turning.

Versatile, compact and flexible state of the art production machines for economic small and large scale production runs.

- ⇒ **302** High precision production lathe with FANUC digital control
- ⇒ **842** High precision and production lathe with belt driven spindle
- ⇒ **842Mi** High precision and production lathe with integrated motor spindle
- ⇒ **842Mi-Y** High precision and production lathe with integrated motor spindle and Y-axis

	302	842	842Mi	842M-Y
Max. turning diameter	200 mm	300 mm	300 mm	300 mm
Max. turning length	200 mm	400 mm	400 mm	400 mm
Headstock	W20 / W25	A2-5	A2-5	A2-5
Power (S1 / S3)	7.5 / 9 kW	7.5 / 15 kW	24 / 30 kW	24 / 30 kW
Torque (S1 / S3)	11.9 / 14.3 Nm	47 / 126 Nm	72 / 90 Nm	72 / 90 Nm
Max. throughbore	19 mm	42 mm	42 mm	42 mm
Spindle speed	50 - 8000 min ⁻¹	0 - 6000 min ⁻¹	0 - 6000 min ⁻¹	0 - 6000 min ⁻¹
C-Axis	✓	option	✓	✓
Counter spindle option (C axis)	n/a	n/a	A2-4	A2-4
Spindle speed	n/a	n/a	0 - 5000 min ⁻¹	0 - 5000 min ⁻¹
X-Axis	150 mm	200 mm	200 mm	155 mm
Z-Axis	240 mm	400 mm	400 mm	400 mm
Y-Axis	n/a	n/a	n/a	± 40 mm
Tooling System	Turret / Linear	Turret	Turret	Turret
Number of tools on turret (fix / rotating)	6 / 6	- / 16	- / 12	- / 12
Tailstock option	Morse 2	Morse 3	Morse 3	Morse 3
Control system	FANUC 0i-TF	FANUC 0i-TD	FANUC 0i-TD	FANUC 0i-TD

SCHAUBLIN⁺
MACHINES SA
www.smsa.ch

HIGH PRECISION LATHES



SCHAUBLIN 225 CNC / 202 TG

CNC-TURNING – as simple and flexible as conventional turning!
CCN (conventional control numerical) lathes combine the advantaged of a numerical control and the simplicity of a conventional lathe.

With the same base, the turning machine 225 CNC is available in two versions with or without C axis:

- ⇒ **202 TG** High precision and production machine combining turning and grinding
- ⇒ **TM-CNC** Linear tools system and TurnMate
- ⇒ **TMi-CNC** Linear tools system and spindle with integrated motor and C-axis

	202TG	225TM-CNC	225TMi-CNC
Max. turning diameter	80 mm	270 mm	270 mm
Hight of center over carriage	60 mm	60 mm	60 mm
Max. swing over carriage	-	115 mm	115 mm
Max. turning length	150 mm	409 mm	270 mm
Headstock	W25	C1-3"	A2-4
Power (S1 / S3)	5 / 6 kW	3.7 / 5.5 kW	2.2 / 5.5 kW
Spindle for Schaublin collets	W25	B32	W20 - B45
Max. throughbore	19 mm	24 mm	36 mm
Spindle speed	50 - 7000 min ⁻¹	50 - 5000 min ⁻¹	50 - 8000 min ⁻¹
C-Axis	✓	-	✓
X-Axis	150 mm	136 mm	190 mm
Z-Axis	300 mm	410 mm	410 mm
Tooling System	Turret / Linear	Linear	Linear
Max. number of tools	6 / 6	5	5
Tailstock	MORSE 2	MORSE 2	MORSE 2
Control system	FANUC 0i-TD	FANUC 0i-TD	FANUC 0i-TD

HIGH SPEED MACHINING CENTERS



SCHAUBLIN HSM 330 - 510

HSM 330 and HSM 510 are compact CNC high speed high precision milling centres. Highly polyvalent and rigid, they can be used for a large application variety. Due to the exceptional technical capacities of the machine, all non-productive time are reduced to their minimum bringing highly productive equipment working for the high precision field.

- ⇒ **HSM 330** High speed 3 axes machining centre with 4th + 1 axes option
- ⇒ **HSM 510** High speed 3 axes machining centre with 4th + 1 axes option

	HSM 330	HSM 330	HSM 510	HSM 510
Working range X axis (longitudinal)	330 mm	330 mm	510 mm	510 mm
Working range Y axis (cross)	410 mm	410 mm	410 mm	410 mm
Working range Z axis (vertical)	330 mm	330 mm	330 mm	330 mm
Spindle power (S1 / S3)	5.5 / 7.5 kW	2.2 / 3.7 kW	5.5 / 7.5 kW	2.2 / 3.7 kW
Max. torque (S1 / S3)	17.5 / 23.8 Nm	3.5 / 5.9 Nm	17.5 / 23.8 Nm	3.5 / 5.9 Nm
Spindle speed	15000 min ⁻¹	24000 min ⁻¹	15000 min ⁻¹	24000 min ⁻¹
Tool holder	BT 30 / HSK A40	HSK E 40	BT 30 / HSK A40	HSK E 40
Direct feed drives	FANUC servo drive FANUC servo drive FANUC servo drive FANUC servo drive			
Feed rates X, Y, Z axes	40 m/min	40 m/min	40 m/min	40 m/min
Rapid feed rates X, Y, Z axes	60 m/min	60 m/min	60 m/min	60 m/min
4th or 4th + 1 axis	option	option	option	option
Table size (L x W)	650 x 410 mm	650 x 410 mm	650 x 410 mm	650 x 410 mm
Max. table load	250 kg	300 kg	250 kg	300 kg
Tool changer positions	20	20	20	20
Max. tool weight	3 kg	3 kg	3 kg	3 kg
Changing time chips/chips	1.6"	1.6"	1.6"	1.6"
Control system	FANUC 0i-MD	FANUC 0i-MD	FANUC 0i-MD	FANUC 0i-MD



THREAD GRINDING MACHINES



SMS SG 501, SG 1001, SG 2001

The SG machines are supported by a highly compact, rigid, vibration-reducing, and thermally stable basic structure (machine body made of polymer concrete).

- ⇒ **SG 501** Grinding of thread-, gear-, worm- and similar workpieces with any lead angle.
- ⇒ **SG 1001** Grinding of thread-, gear-, worm- and similar workpieces with any lead angle.
- ⇒ **SG 2001** Grinding of thread-, gear-, worm- and similar workpieces with any lead angle.

	SG 501	SG 1001	SG 2001
Work piece Ø-range	2 - 360 mm	2 - 360 mm	2 - 360 mm
Max. clamping length	850 mm	1250 mm	2250 mm
Max. Z-axis travel	900 mm	1300 mm	2300 mm
Module	0.5 - 12 (25)	0.5 - 12 (25)	0.5 - 12 (25)
Max. workpiece weight	250 kg	250 kg	250 kg
Max. helix angle	135°	135°	135°
Max. cutting speed	63 m/s	63 m/s	63 m/s
Grinding wheel Ø	290 - 400 mm	290 - 400 mm	290 - 400 mm
Grinding wheel width	8 - 40 mm	8 - 40 mm	8 - 40 mm
Grinding spindle power	15 kW	15 kW	15 kW
Max. work piece speed	200 min ⁻¹	200 min ⁻¹	200 min ⁻¹
Max. relief strokes	5 Hz	5 Hz	5 Hz
Optional motor spindles (H-version) for Hobs	✓	✓	✓
Grinding wheel Ø	10 - 120 mm	10 - 120 mm	10 - 120 mm
Grinding spindle power HSK C50 (30000 min ⁻¹)	7.5 kW	7.5 kW	7.5 kW
Grinding spindle power HSK C25 (60000 min ⁻¹)	6.3 kW	6.3 kW	6.3 kW
Control system SIEMENS	840D	840D	840D



PROFILE GRINDING MACHINE



HELIGRIND SH

The HELIGRIND SH series permits a wide range of grinding applications due to its modular design. The machine is - depending on the version and equipment – particularly suitable for the ultra-precise and highly productive grinding of all kinds of thread-type work pieces

- ⇒ **SH100-U** Travelling column construction is distinguished by its compact and low-vibration design.
- ⇒ **SH100-H** The machine has an optional vertical axis with hydraulic weight compensation. This
- ⇒ **SH100-SC** extends the application range of the basic version with an additional adjusting axis or
- ⇒ **SH100-R** in a further expansion phase – even a highly dynamic oscillation axis.

	SH100-U	SH100-H	SH100-SC	SH100-R
Max. work piece Ø-range	2 - 250 (400) mm	2 - 250 mm	2 - 250 (400) mm	2 - 250 mm
Max. clamping length	1000 (1400) mm	1000 (1400) mm	1000 (1400) mm	1000 (1400) mm
Max. grinding length	700 (1000) mm	700 (1000) mm	700 (1000) mm	700 (1000) mm
Module	-	(0.5 - 12)	-	-
Max. workpiece weight	400 kg	400 kg	400 kg	400 kg
Max. helix angle	125°	125°	125°	125°
Max. cutting speed	80 m/s	53 (80) m/s	53 (80) m/s	53 (80) m/s
Grinding wheel Ø	240 - 400 mm	240 - 400 mm	240 - 350 mm	240 - 400 mm
Grinding wheel width	8 - 63 mm	8 - 25 mm	8 - 63 mm	8 - 63 mm
Grinding spindle power	9 kW	9 kW	9 kW	30 kW
Max. work piece speed	1000 min ⁻¹	1000 min ⁻¹	200 min ⁻¹	200 min ⁻¹
Max. relief strokes	5 Hz	5 Hz	2.2 Hz	(5 Hz)
Internal thread option	✓	✓	✓	✓
Automatic loading system (robot)	✓	✓	✓	✓
Control system SIEMENS		840D	840D	840D



TOOL GRINDING MACHINES



STRAUSAK U-Grind

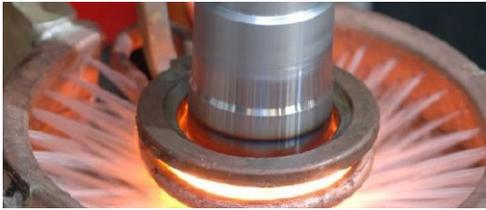
Cost effective re-sharpening due to our unique probing routines based on NUMROTOplus®. This user-friendly programming interface manages a wide variety of geometries and reduces the risk of collisions to zero. High grinding performance covering a wide range of cutting tool applications based on a powerful grinding spindle.

- ⇒ **U-Grind** Designed for special tools, re-sharpening and short batch grinding of cutting tools. 5 Axis CNC-Tool Grinding Machine with Integrated Wheel Changer.
- ⇒ **W-Dress** Grinding wheel dressing machine for single wheels or multi wheel packs

			U-Grind
X axis, tool attachment cross movement			420 mm
Y axis, motor spindle vertical movement			250 mm
Z axis, motor spindle horizontal movement			485 mm
B axis, motor spindle pivoting			340°
C-axis, tool rotation speed			1000 min ⁻¹
Motor spindle power			10 / 12 kW
Motor spindle torque			12.3 Nm
Motor spindle speed			500 - 12000 min ⁻¹
Grinding wheel diameter			150 mm
Grindinwheel interface			HSK 63F
Grinding capacity tool Ø production			32 mm
Grinding capacity tool Ø resharping			200 mm
Tool length max.			500 mm
Tool cutting length			300 mm
Automatic grinding wheel changer			6 positions
Control system NUM			Flexium
Software			NUMROTO plus

tecno induzione

INDUCTION HEATING TECHNOLOGIES

**INDUCTION-HEATING MACHINERIES**

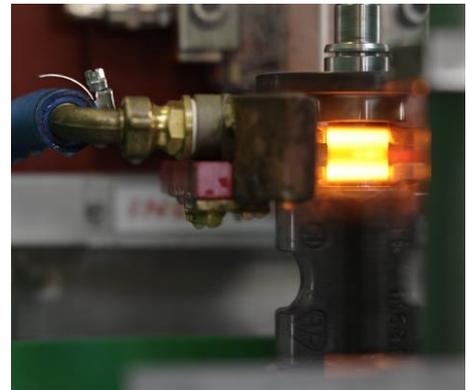
Complete solutions and equipment for heat treatment, induction hardening, induction brazing and induction precious alloy melting

Tecno Induzione was founded in 1999 by technicians having a 40-year experience in the design and manufacturing of MF/HF induction-heating machineries. The company takes care of the whole heat-treatment process to ensure customers the best support. Facing a constantly changing market, Tecno Induzione responds with new solutions and ideas developed as result of its ongoing strategy of research, innovation and investments.

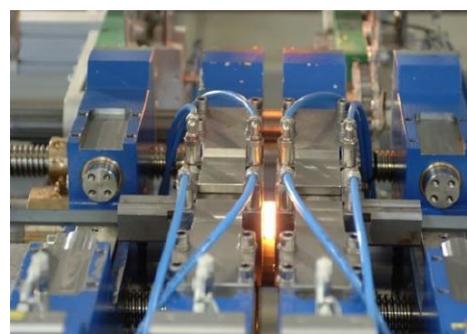
In addition to the supply of any standard equipment, Tecno Induzione rapidly evolved and specialized in codesign and manufacturing of customised turnkey machineries, equipped with multi-axis CNC-controlled units, in order to satisfy the most demanding customers in terms of quality and reliability. These machineries are suitable to be placed among customer's production lines by means of automatic feeding conveyor belts, NC loading manipulators, random loading systems from piece containers, automatic shaped part loaders and CN loading/unloading robots.

PRODUCTS:⇒ **Heat treatments**

- Induction "bright-hardening/tempering equipment
- Vertical hardening equipment with robotized loading
- Hardening equipment for pins and bushings
- Localized-hardening equipment
- High-production annealing induction equipment
- Flat or sloping machine-tool bed guides hardening equipment
- Modular/combined universal hardening equipment
- Vertical CN-axis hardening equipment
- Automatic induction hardening equipment for profiled linear guides, monorail-type and sliders
- 2-independent-station vertical hardening equipment
- On-line induction annealing equipment, under protective gas for copper, aluminium and stainless-steel finned tubes
- Combined universal hardening equipment with high production flexibility
- Universal induction hardening equipment

⇒ **Melting and upsetting**

- Induction precious-alloy melting equipment
- MF/HF wrought iron upsetting equipment



⇒ Brazing

- Robotized induction-brazing equipment under protective gas
- Automatic impact-system induction brazing equipment for pot-bottoms
- Automatic induction brazing equipment for pot-bottoms
- Induction brazing equipment for pot-bottoms
- Automatic induction brazing equipment for motorcycle fuel-tank bushings
- Automatic brazing machinery for vehicle pipe-braking system

**⇒ Work process controls**

- INDUCAM
 - constant control of delivered energy, quench-liquid flow, pressure and temperature
 - display panel showing the various parameters with graphics and allowance thresholds
- INDUVISION 4.0
 - artificial vision and thermovision
 - it avoids the machinery to repeat the heat-treatment on the same workpiece
 - it controls the correct workpiece position before treatment
 - it measures the temperature of the treated area

⇒ Generators

- frequency-converter specifications:
 - operating powers/frequencies: 30 to 1500 kW / 1 to 300 kHz
 - constant-power-heating generators operating both at room temperature and above the Curie point
 - adjustable power 1 to 100% from local or remote control
 - self-adapting frequencies
 - IGBT and MOSFET new Transistor technology
 - touch-screen operator's panel with direct display of all electric operating parameters (V, A, kHz, kW)
 - display of all-important load-adaptation values ("Q", "L")
 - display and descriptions of all machine alarms
 - display of cooling-fluid flows and temperature of hydraulic circuits
 - user's friendly design, easy access for inspection/maintenance
 - short-circuit control protection system
 - electrical cabinet cooled by air conditioner

T⁺SCHUDIN

CENTERLESS GRINDING MACHINES



TSCHUDIN ecoLine / proLine

The TSCHUDIN *ecoLine* and *proLine* machines feature a new arrangement of the axes using a simplified concept. The slide of the grinding wheel spindle (U-axis), the regulating wheel spindle (X-axis) and the work rest support (W-axis) are designed as independent CNC axis.

- ⇒ **Cube 350** worldwide smallest centreless system with digitized set-up and grinding processes
- ⇒ **ecoLine 300** high productivity for small diameters (>0.1 mm) and very frequent change overs
- ⇒ **ecoLine 410A** angle head grinding machine for simultaneous diameter and shoulder grinding
- ⇒ **ecoLine 400** 3-axes concept for maximized reliability and uptime
- ⇒ **proLine 400** with a Y-axis for consistent grinding geometry throughout the grinding process

	Cube 350	ecoLine 300	ecoLine 410A	eco/proLine 400
CNC axes	3	3	3	3/4
Grinding range plunge grinding	up to Ø 20 mm	up to Ø 50 mm	up to Ø 50 mm	up to Ø 180 mm
Max. grinding length	150 mm	100 mm	115 mm	280 mm
Plunge angle	straight	straight	30°	straight
Grinding range through feed	up to Ø 20 mm	up to Ø 25 mm	n/a	up to Ø 100 mm
Grinding wheel dimensions [mm]	Ø 350 x 150	Ø 300 x 100	Ø 400 x 100	Ø 410 x 280
Regulating wheel dimensions [mm]	Ø 250 x 150	Ø 225 x 100	Ø 225 x 100	Ø 254 x 280
Grinding wheel drive power	10 kW	4 (9.5) kW	4 (9.5) kW	15 (29) kW
Max. grinding wheel perival speed	63 m/s	63 m/s	63 m/s	50 m/s
Regulating wheel speed range	5 - 1000 min ⁻¹			
Control system FANUC	31i-B	0i MF	0i MF	0i MF
Front end PC option		✓	✓	✓



High Precision Collets & Toolholders since 1915

Workholding:

Pull-type collets



Dead length collets & Feedfingers



Toolholding:

Collets & Clamping nuts



Collet chucks & Toolholders:

SRS Schaublin Runout Adjustment System

SRS™ European and Other World Patents Pending



Collet chucks & Toolholders



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