GF Machining Solutions

Mikron

VCE Pro

Swiss design and quality

Contents

GF Machining Solutions
Machining centers belonging to the Mikron VCE Pro series: More robust, more reliable, better performance, better ergonomics.

Applications

A wide range of parts...

Fixture

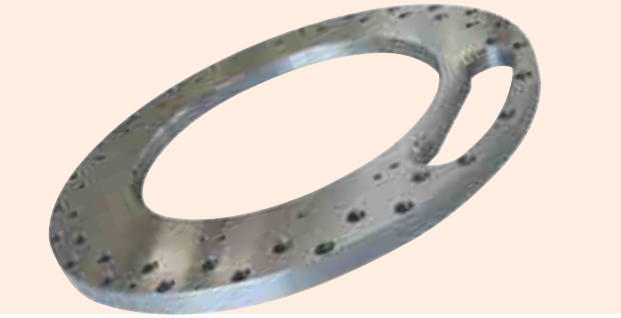
Ck45
Mechanical engineering

+ High cutting performance
+ Precision round-pocket milling
+ Preset pocket milling cycles make programming on the machine quick and easy

Baseplate

AlCu4Mg1.5
High-strength aluminum alloy
Electronics/mechatronics

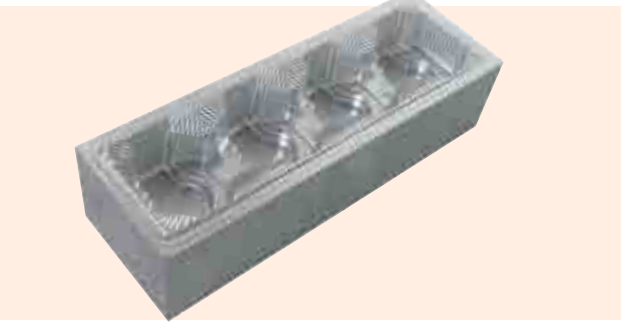
+ High cutting speeds and small tool diameters require high spindle speeds
+ High-quality surface
+ Longer tool service life because tool is cooled



Motor flange

X38CrMoV 5 1
High-alloy hot-working steel
Mechanical engineering

+ Thread cutting without compensating chuck
+ The touch probe was used to automatically align machining on the back
+ Tools measured using the tool touch measuring system



Mold for biscuit packaging

Al 99.5 aluminum
Mold construction

+ Machined using HSC technology
+ Minimum quantity lubrication
+ The machine is highly dynamic, which reduces machining time considerably
+ Machining time including rough machining approx. 7 h
+ The tools are measured by laser

Four-axis cutting drum

34CrAlMo5 nitrided steel
Paper industry

+ Cutting drum contours absolutely precise
+ Programmed using the cylinder mantel milling function
+ With a 0.5 ms block processing time, even complex contours can be executed quickly

There are no limits to how the Mikron VCE Pro machines can be used. This one is being used in die and mold construction for smoothing using a round-head cutter. Because the Mikron VCE Pro spindle can rotate at 16,000 rpm, the necessary cutting speeds can even be achieved using small tools.

Highlights

The Mikron VCE Pro can be used for any commissioned work

Other features

+ Compact construction
+ Optional linear scales
+ Almost any optional extra can be retrofitted
+ Ethernet and USB ports included
+ Mobile handwheel

yourAccess

Mikron machining centers are distinguished by their exceptional ergonomics. The Mikron VCE Pro boasts unrivaled accessibility, regardless of how the machine is configured.

Tool changer with double-arm gripper for even shorter downtimes
A side-mounted tool changer with integrated double-arm gripper makes it even easier to change tools. Because the tool changer faces away from the working space, the tools are all well protected. This design, which is free of interfering edges, enables high parts and applications to be machined on an indexer.

Belt-driven spindle 6,000 rpm, 10,000 rpm, 14,000 rpm
Inline spindle 16,000 rpm
Strong spindles always offer sufficient performance for any conventional machining processes, even up to 350 Nm in the ISO 50 version of the Mikron VCE 1600 Pro. When drilling, which requires the highest performance, the capabilities of modern tools can be utilized to the fullest.
The spindles for universal machining are designed for 10,000 rpm (standard) or, optionally, 14,000 rpm. These also offer high torque levels of 94 to more than 209 Nm.
Only hybrid ball bearings are used for the sake of longevity. No compensating chuck is needed for thread cutting.

Feed rate up to 40 m/min (X + Y)
The Mikron VCE Pro achieves the level of dynamism required to machine free-form services on account of feed motors that allow it to work at a feed rate of up to 40 m/min. This pays off when moving to new milling positions and changing tools.

Optional linear scales
Linear scales ensure a constant level of precision for machining, even when temperatures fluctuate. Compressed air is connected up to protect them as effectively as possible against dirt.

Clean enclosure thanks to perfect chip management
A spiral conveyor removes chips automatically. Its load level is monitored and, in the case of overload, an unblocking cycle is automatically initiated. Solid telescopic covers made of sheet steel protect the three linear axes all around against chips and dirt. The design of the enclosure prevents chips from mounting up.

Table

There is still enough room for the clamping elements, even when travel ranges are used to the fullest.

Chips effectively flushed away
A side-mounted flushing system rinses the chips lying on the enclosure wall outlet directly into the chip conveyor. Spray and compressed-air pistols provide a flexible means of cleaning.

Extended usage possibilities thanks to fourth axis
A fourth axis connection is included in the Mikron VCE Pro's electrical cabinet as standard. This means it is easy to fit an indexer at any later stage. Activation is done using parameters at the controller. Many accessories are available. The precision indexers belonging to the Mikron VCE Pro series are the right solution for machining medium to large workpieces. A small range of dependable products supplements the vertical machining center with a crucial fourth axis.

+ Pneumohydraulic axis clamp with integrated pressure intensifier
+ Center heights of 150 mm, 180 mm, 250 mm
+ Workpiece weights up to 1,000 kg

Compressed-air connection on every table
Each table is fitted with an air connector for pneumatically activated zero-point clamping systems.

Mikron VCE 800 Pro: a large working space makes it easy to work on voluminous workpieces.

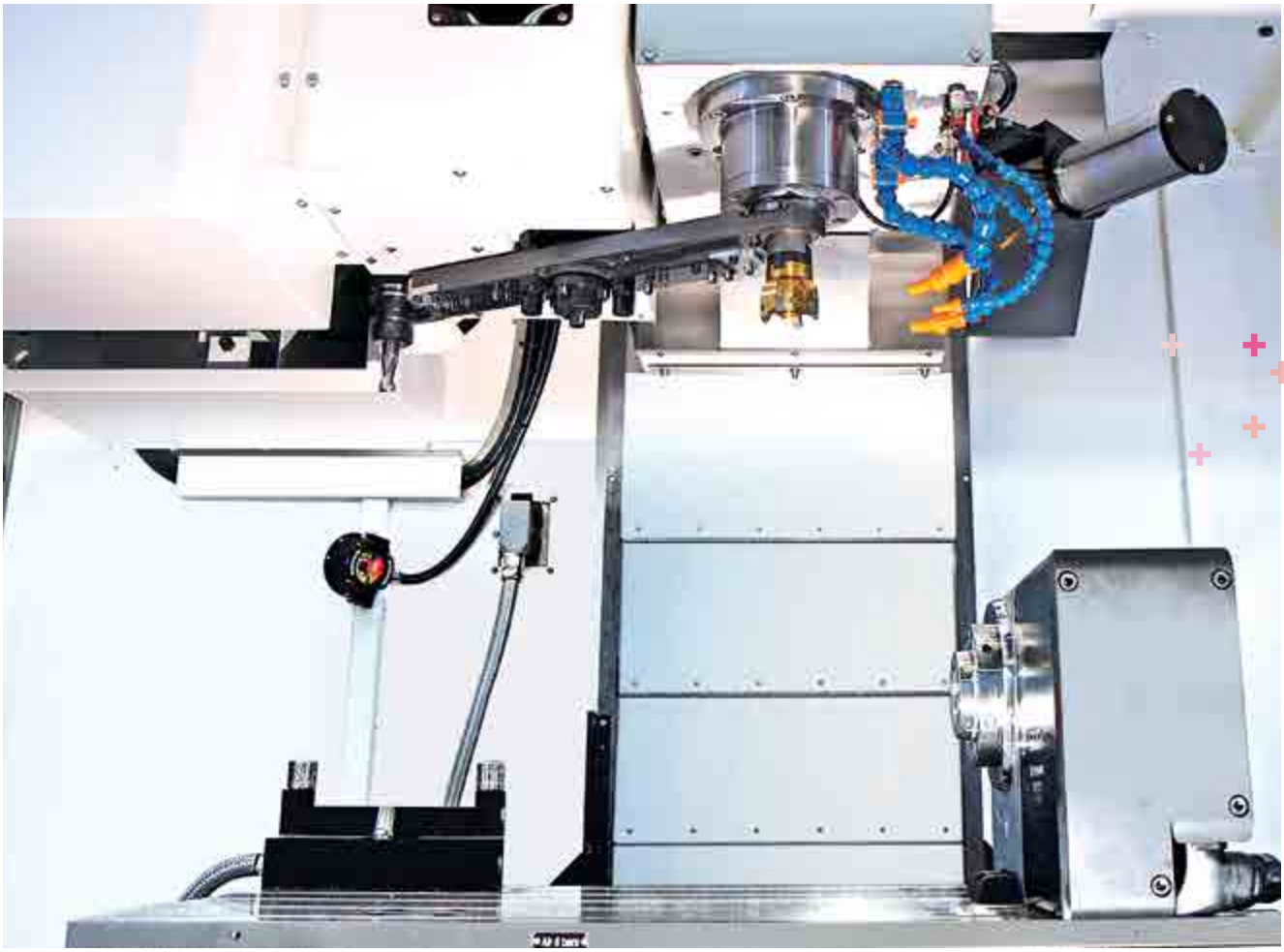
Tool Magazines

No restrictions on working space accessibility

More productivity with larger tool magazines
The machining autonomy of the popular VCE Pro line has been greatly increased.

Along with the 24-compartment and 30-compartment changers, chain changers with 40 and 60 compartments are now also available.

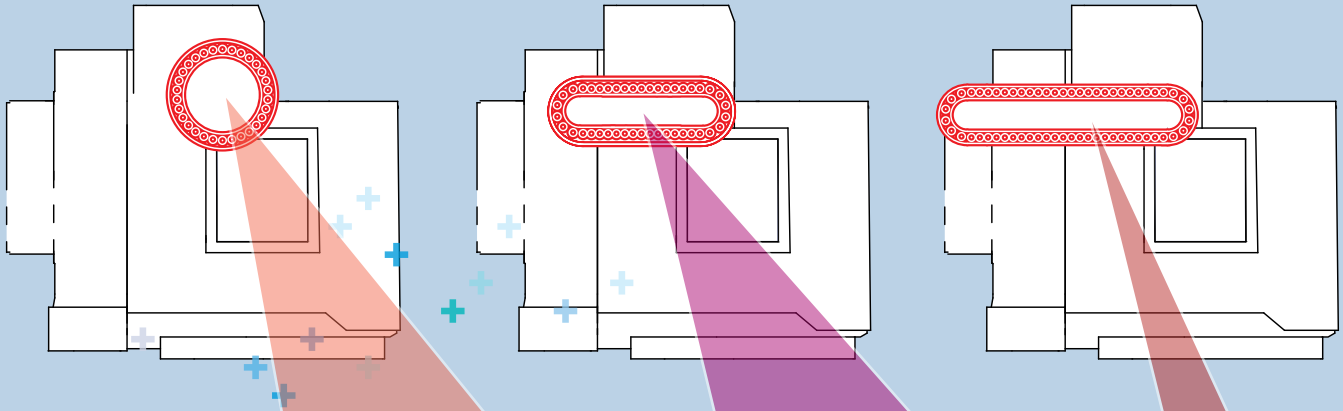
The 40- and 60-compartment chain changers are equipped with a simultaneous tool-fitting feature.



24 / 30
tool ports

40
tool ports

60
tool ports



Tool Magazines	DT 24 (ISO 40)	DT 30 (ISO 40)	DT 24 (ISO 50)	CT 40 (HSK-A63)	CT 40 (ISO 40)	CT 40 (ISO 50)	CT 60 (ISO 40)
Machine types	VCE 600 Pro, VCE 800 Pro VCE 800W Pro, VCE 1000 Pro VCE 1200 Pro, VCE 1400 Pro	VCE 1600 Pro	VCE 1600 Pro	VCE 600 Pro, VCE 800 Pro VCE 800W Pro, VCE 1000 Pro	VCE 600 Pro, VCE 800 Pro VCE 800W Pro, VCE 1000 Pro VCE 1200 Pro, VCE 1400 Pro VCE 1600 Pro	VCE 1600 Pro	VCE 800W Pro, VCE 1000 Pro VCE 1200 Pro, VCE 1400 Pro
Tool magazine (type)	Double-arm, side-mounted	Double-arm, side-mounted	Double-arm, side-mounted	Double-arm, side-mounted	Double-arm, side-mounted	Double-arm, side-mounted	Double-arm, side-mounted
Number of tool ports	24	30	24	40	40	40	60
Tool selection	Bidirectional	Bidirectional	Bidirectional	Bidirectional	Bidirectional	Bidirectional	Bidirectional
Maximum tool diameter (mm)	77	85	125	75	75	125	75
With permanent space coding and with free neighboring spaces (mm)	115	150	240	125	125	240	125
Maximum tool length (mm)	305	305	350	305	305	350	305
Maximum tool weight (kg)	6	6	15	7	7	15	7
Tool-changing time “Chip to chip” (sec.)*	8	8	11	8	8	11	8

***) As per VDI Guideline 2852, Sheet 1**

Outstanding workpiece quality thanks to exceptional machine concept

Lasting quality

This machine concept produces a strength and rigidity that permeates the machining center. A generously proportioned cast structure exhibits outstanding damping properties, combined with high stability and rigidity even under full load and in continuous operation. This enables a stable milling process, guaranteeing sustained quality and narrow tolerances on the workpiece.

Strong spindle head

A broadly supported and strongly designed spindle head facilitates a milling/drilling process involving strong forces along the Z-axis. A closed coolant circuit stabilizes and regulates the temperature of the spindle head. Active spindle cooling also has positive effect on the ball bearings, the life span, and the elongation of the spindle (optional 6,000/10,000 rpm, standard 14,000/16,000 rpm).

Robust belt-driven spindle

A generously proportioned spindle motor enables uninterrupted production, whether at low speeds with high torque or at high speeds with a high output. The machining center is equipped with a 14,000 rpm spindle for the processing of aluminum nonferrous metal and for finely detailed work (optional).

Precise, dynamic, safe: ball screw, linear guide, automatic central lubrication

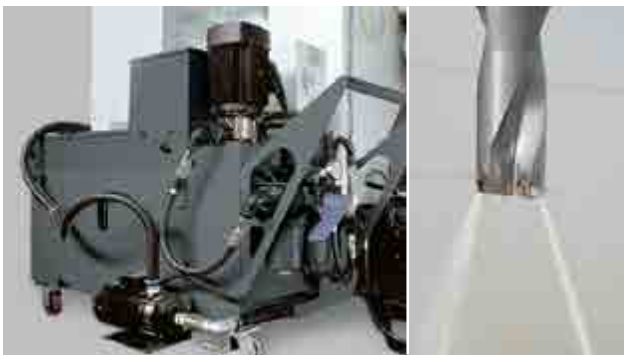
A pre-tensioned and doubly anchored ball screw guarantee high levels of running precision which is an important precondition for high-level workpiece precision. Linear guides made from hardened steel, with ball rollers, offer the best dynamic properties while requiring minimal force. During operation, the linear guides and ball screws belonging to the machining center are automatically supplied with the right amount of lubricant by the central lubrication system.

Cooling

Spectacular performance in conventional and high-speed milling

Programmed precision
Gone are the days of time-consuming and imprecise manual adjustments on the coolant inlet. A programmable coolant nozzle directs the jet automatically to precisely where the action is after each tool change (optional).

All-around cooling with spray ring
Cooling is always guaranteed with the optional spray ring (optional).



Cooling through the spindle, 18 or 42 bar
Coolant is fed directly to the cutting edges under high pressure and through the working spindle. The benefits of this are high cutting speeds, easy deep drilling, blind hole milling, and longer tool service life (optional). The supply unit consists of a large, mobile coolant tank and can be added to with an optionally available belt filter. This system has two switchable filter cartridges to enable uninterrupted use in production.

+ Cooled spindle head
+ Large coolant tank that can be pulled out on wheels, making cleaning easier
+ Spray gun and air gun
+ Coolant nozzles and blow-off nozzles on the spindle head

Ideal for any production job in the workshop

This control console does everything

Its clearly structured monitoring desk is genuinely user friendly. Fourteen function keys give you direct access to menu functions on, beneath and next to the 15-inch color TFT display. The console pivots and can be adjusted in height, and its screen tilts so you can avoid reflections.

Digital drive technology

A digital control circuit for the drive motors offers exceptionally dynamic control. This enables precision contour reproduction and excellent service quality.

Automatic calculation of cutting data

The control software offers a facility for automatically calculating cutting data. To do this, you enter tool-specific data into a table, from which the controller calculates suggested spindle speeds and feed rates, which technicians can of course then change and adjust to the levels they have found most effective.

- Programming using Heidenhain plain text dialogue or DIN/ISO
- Keyboard with alpha keys, track function keys, operating mode keys, and separate spindle and feed override potentiometers
- Graphical support for the programming of cycles and contours, graphics for testing programs and for checking on current workpiece machining
- Cutting data automatically calculated
- Heat exchanger on electrical cabinet cools power components and keeps outside dust away from the cabinet by means of two separate circuits
- Touch measuring system cycles
- Short block processing time (1.5 ms)

All about the Workpiece

Efficient working preparation for shorter downtimes

The unusual design of this protective enclosure helps operators to make the important preparations for their work. They can also rely on our popular workpiece and tool measurement options. The Mikron VCE Pro helps you perform basic handling with ease so that you can focus on what is most important.

Outstanding view of the workpiece from three sides
An excellent window construction on both sliding doors at the front, along with big windows on either side, provides you with an unrestricted view of the setup and machining processes in a completely closed protective enclosure. Another benefit is that the working space is accessible from the side, with operating buttons for the tool magazine (optional).

Setting up is easy with the OMP 40-2 workpiece probe
An infrared probe inserted into the spindle enables the workpiece to be set up, detected, and measured rationally (optional).

This reduces setup times considerably.

Produce safely with the TS 27 tool probe
Precision tool setup, reliable tool breakage monitoring: the length and diameter of tools can be measured precisely using a probe mounted on the worktable (optional).

Tool measurement using laser
Tools with small diameters are measured by laser. Contours, such as those of round-head cutters, can also be monitored. The unit has a built-in blow-off nozzle in order to blow dirt off the tool before measuring (optional).

Options

Custom fittings

Tool touch measuring system TS 27

Laser tool measuring device

Preparing setup probe OMP 40-2

Setup probe OMP 40-2

Basic supply unit for IKZ (internal coolant supply), 18 bar

Supply unit for IKZ, 18 or 42 bar

Belt filter unit on cooling water tank

Integrated belt filter for sizes 600–1000

Spray ring

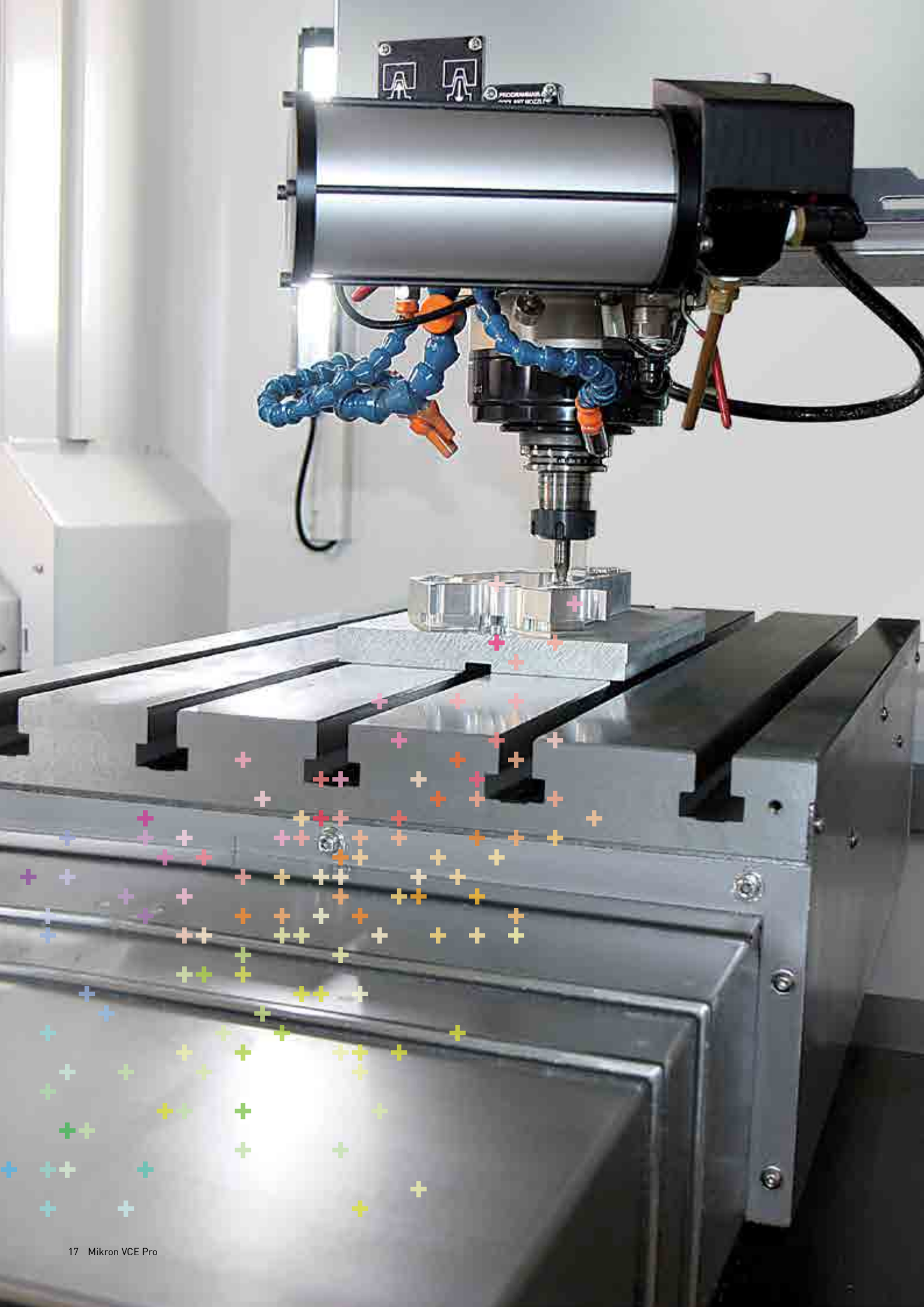
Programmable coolant nozzle

Minimum quantity lubrication

Spray mist extraction

Mechanical oil/coolant separator

Indexer



Technical Specifications

Mikron VCE 600 Pro

Mikron VCE 800 Pro

Mikron VCE 800W Pro

Mikron VCE 1000 Pro

			Mikron VCE 600 Pro	Mikron VCE 800 Pro	Mikron VCE 800W Pro
Travel ranges					
Longitudinal	X	mm	600	800	860
Transverse	Y	mm	500	500	560
Vertical	Z	mm	540	540	600
Max. distance between spindle tip and worktable		mm	690	690	735
Tool spindle					
Drive type			Drive belt	Drive belt	Drive belt
Maximum speed up to		rpm	10'000	10'000	10'000
Tool 40% duty cycle/S6		kW @ rpm	18,5 @ 1188	18,5 @ 1188	18,5 @ 1188
Spindle torque 40% duty cycle/S6		Nm	149	149	149
Tool mount			ISO-B40	ISO-B40	ISO-B40
Optional working spindle		rpm	14'000 ISO-B40 16'000 ISO-B40/HSK-A63	14'000 ISO-B40 16'000 ISO-B40/HSK-A63	14'000 ISO-B40 16'000 ISO-B40/HSK-A63
Travel speed					
Rapid traverse	X, Y	m/min.	40	40	40
Rapid traverse	Z	m/min	40	40	40
Tool magazine					
Magazine spaces		quantity	24/40 ISO-B40 40 HSK-A63	24/40 ISO-B40 40 HSK-A63	24/40/60 ISO-B40 40 HSK-A63
Tool magazine			Side-mounted	Side-mounted	Side-mounted
Max. tool length		mm	305	305	305
Max. tool diameter		mm	77/115	77/115	77/115
Worktable					
Table area		mm	700 x 500	910 x 500	1000 x 560
Maximum table load		kg	800	1100	1350
Number of T-grooves			5	5	5
T-groove spacing		mm	100	100	100
T-groove dimensions		mm	18 $^{+0.006/+0.024}$	18 $^{+0.006/+0.024}$	18 $^{+0.006/+0.024}$
Cooling					
Coolant tank capacity		l	300	300	300
Controller					
		Type	Heidenhain TNC 620	Heidenhain TNC 620	Heidenhain TNC 620
Machine weight					
		kg	4'800	5'000	6'500

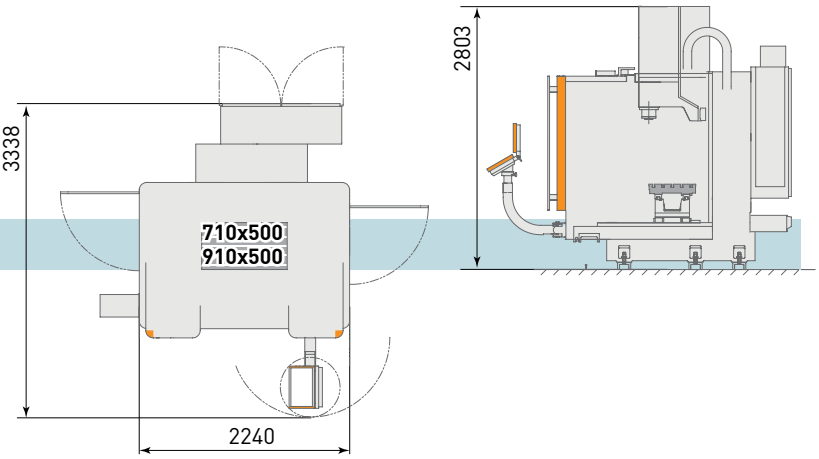
Mikron VCE 1200 Pro

Mikron VCE 1400 Pro

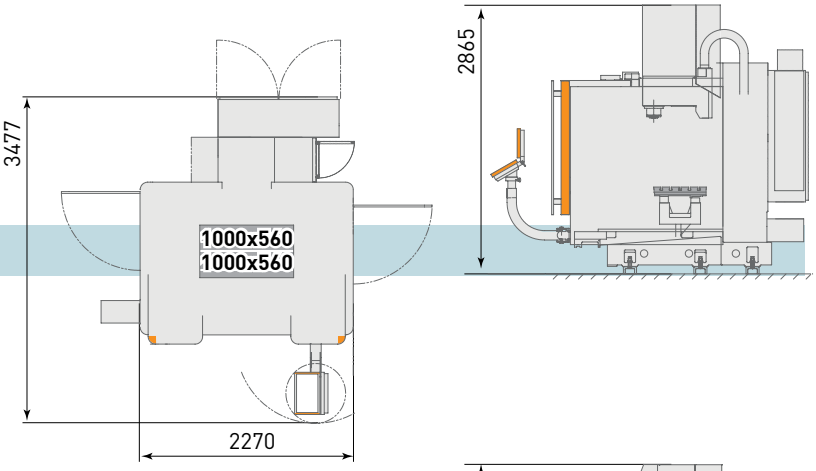
Mikron VCE 1600 Pro

Mikron VCE 1000 Pro	Mikron VCE 1200 Pro	Mikron VCE 1400 Pro	Mikron VCE 1600 Pro
1020	1200	1400	1600
560	600	650	900
600	675	675	800
735	775	775	900
Drive belt	Drive belt	Drive belt	Drive belt
10'000	10'000	10'000	10'000
18,5 @ 1188	18 @ 823	18 @ 823	18 @ 823
149	209	209	209
ISO-B40	ISO-B40	ISO-B40	ISO-B40 / ISO-B50
14'000 ISO-B40 16'000 ISO-B40/HSK-A63	14'000 ISO-B40 -	14'000 ISO-B40 -	14'000 ISO-B40 (6'000, ISO 50, 350 Nm)
40	32	32	24
40	24	24	20
24/40/60 ISO-B40 40 HSK-A63	24/40/60 ISO-B40 -	24/40/60 ISO-B40 -	30/40/60 ISO-B40 24/40 ISO-B50
Side-mounted	Side-mounted	Side-mounted	Side-mounted
305	305	305	305 (350, ISO-B50)
77/115	77/115	77/115	85/150 (125/240, ISO-B50)
1000 x 560	1220 x 620	1400 x 620	1700 x 850
1350	1700	1700	2000
5	5	5	7
100	100	100	100
18 $^{+0.006/+0.024}$	18 $^{+0.006/+0.024}$	18 $^{+0.006/+0.024}$	18 $^{+0.006/+0.024}$
300	380	380	540
Heidenhain TNC 620	Heidenhain TNC 620	Heidenhain TNC 620	Heidenhain TNC 620
6'500	8'000	8'700	18'600

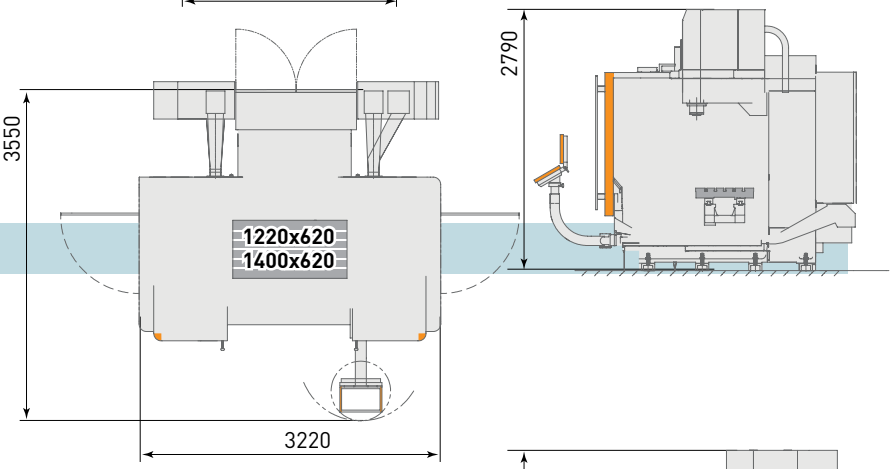
	X	Y	Z
Mikron VCE 600 Pro	600	500	540
Mikron VCE 800 Pro	800	500	540



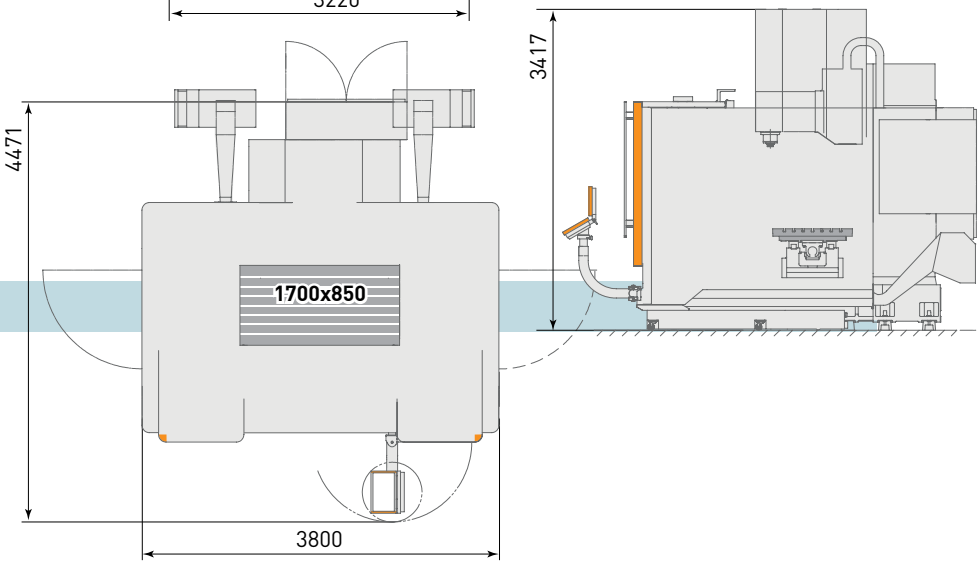
	X	Y	Z
Mikron VCE 800W Pro	860	560	600
Mikron VCE 1000 Pro	1020	560	600



	X	Y	Z
Mikron VCE 1200 Pro	1200	600	675
Mikron VCE 1400 Pro	1400	650	675



	X	Y	Z
Mikron VCE 1600 Pro	1600	900	800



Standard equipment for all Mikron VCE 600 Pro to 1600 Pro vertical machining centers

+ Protective enclosure
+ Two side windows, large front doors
+ Powerful fluorescent lights in the working space
+ Telescopic covers on X-, Y-, and Z-axis
+ Spiral chip conveyor with mechanical double filter
+ Automatic central lubrication
+ Side-mounted tool changer
+ Spray gun
+ Compressed-air gun
+ Operating status display
+ Working spindle 10,000 rpm
+ Spindle head cooled using cooling water
+ Regulated cooling for main spindle (14,000/16,000 rpm)
+ Side-mounted flushing system (Mikron VCE 600 Pro to Mikron VCE 1400 Pro)
+ Coolant nozzles and air nozzles on spindle head
+ Roll out coolant tank
+ Thread cutting without compensating chuck
+ Heidenhain TNC 620 track controller
+ USB 3.0 port
+ Compatible with optional extras
+ Ethernet port
+ Mobile handwheel
+ Additional protective screen

Accessories for all vertical machining centers Mikron VCE 600 Pro to 1600 Pro

+ Cooling through spindle (IKZ), 18 or 42 bar
+ Belt filter unit to IKZ
+ Regulated cooling for main spindle (6,000/10,000 rpm)
+ Compatible with fourth axis
+ NC indexer as fourth axis
+ Spray ring to spindle
+ Controllable coolant nozzle
+ Spray mist extraction
+ Infrared measurement and setup probe, type OMP 40-2
+ Tool touch measuring system type TS27
+ Integrated belt filter
+ BT tool version
+ Mechanical oil/coolant separator
+ Chip trolley
+ Minimum quantity lubrication
+ Compatible with angled head
+ Additional protective screen

Cutting data for CK 45 1.1191 (approx. 800 N/mm²)

		Mikron VCE 600 Pro to VCE 1000 Pro	Mikron VCE 1200 Pro to VCE 1600 Pro	Mikron VCE 600 Pro to VCE 1600 Pro
Milling:				
HM blade head / five blades		10'000 rpm	10'000 rpm	14'000 rpm
HM tool		Flat-face mill 45°	Flat-face mill 45°	Angled-face mill 90°
Tool diameter	mm	63	63	50
Cutting speed	m/min.	160	160	250
Speed	rpm	809	809	1592
Feed rate	mm/min.	809	809	1990
Plunging depth	mm	5,5	6	4
Plunging width	mm	63	63	40
Chip volume	cm^3/min.	281	305	319
Spindle load	%	120	120	85
Drilling:				
Insert drill / two blades/ Ø 38 mm		10'000 rpm	10'000 rpm	14'000 rpm
Cutting speed	m/min.	220	220	220
Speed	rpm	1843	1843	1843
Feed rate	mm/min.	221	221	221
Spindle load	%	80	65	90
Thread cutting:				
HSS tap / M24		10'000 rpm	10'000 rpm	14'000 rpm
Cutting speed	m/min.	10	10	10
Speed	rpm	133	133	133
Feed rate	mm/min.	398	398	398
Plunge depth	mm	36	36	36
Spindle load	%	45	40	60

GF Machining Solutions

Milling

High-Speed and High-Performance Milling Centers. In terms of cutting speed, HSM centers are 10 times faster than conventional milling machines. Greater accuracy and a better surface finish are also achieved. This means that even tempered materials can be machined to a condition where they are largely ready to use. One essential advantage of HSM is that with systematic integration, the process chain can be significantly shortened. HSM has developed alongside EDM into one of the key technologies in mold and tool making.

EDM

Electric Discharge Machines. EDM can be used to machine conductive materials of any hardness (for example steel or titanium) to an accuracy of up to one-thousandth of a millimeter with no mechanical action. By virtue of these properties, EDM is one of the key technologies in mold and tool making. There are two distinct processes — wire-cutting EDM and die-sinking EDM.

Laser

Laser texturing. Laser texturing supplements and extends the technologies offered by GF Machining Solutions. With our laser technology we enable you to produce texturizing, engraving, microstructuring, marking and labeling of 2D geometries right through to complex 3D geometries. Laser texturing, compared to conventional surface treatment using manual etching processes, offers economic, ecological and design advantages.

Automation

Tooling, Automation, Software. Tooling for fixing workpieces and tools; automation systems and system software for configuring machine tools and recording and exchanging data with the various system components and design advantages.

Customer Services

Operations, Machine and Business Support. Customer Services provides with three levels of support all kind of services for GF Machining Solutions machines. Operations Support offers the complete range of original wear parts and certified consumables including wires, filters, electrodes, resin and many other materials. Machine Support contains all services connected with spare parts, technical support and preventive services. Business Support offers business solutions tailored to the customer's specific needs.

GF Machining Solutions

259.805.892

At a glance

We enable our customers to run their businesses efficiently and effectively by offering innovative Milling, EDM, Laser and Automation solutions. A comprehensive package of Customer Services completes our proposition.

www.gfms.com