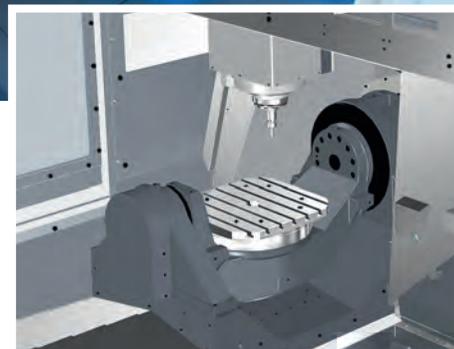
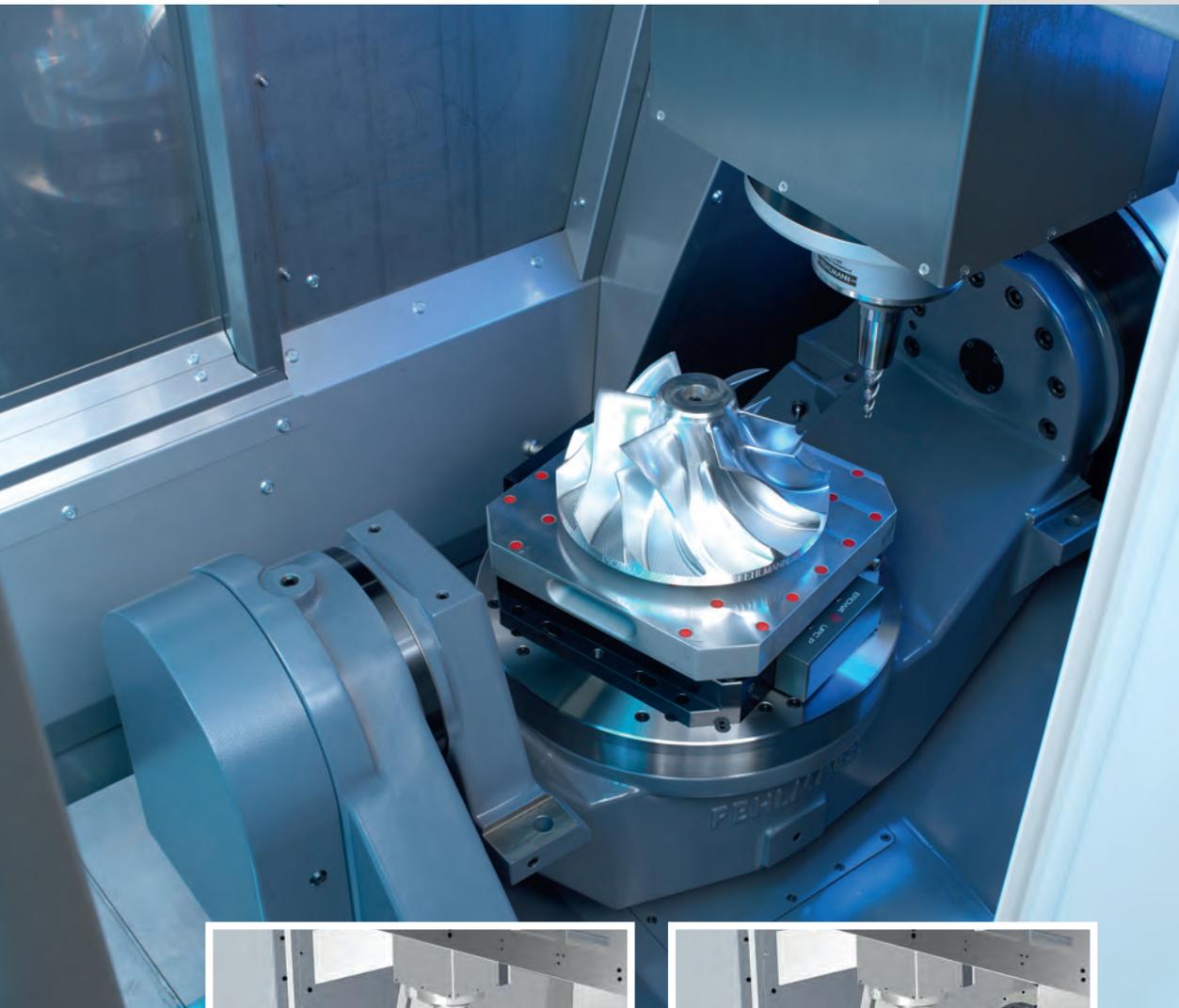


VERSA® 823 / 825

Dynamism and performance
at the highest level



FEHLMANN: The Brand



Precision "Made in Switzerland" since 1930

Whether design, manufacturing, training, delivery, commissioning, or service and maintenance: FEHLMANN customers receive everything from a single source.

Each FEHLMANN product reflects the high quality standards applied to the entire production process.



As a partner of the Blue Competence sustainability initiative and an ISO 9001/14001 certified company, FEHLMANN strives to integrate sustainability into all aspects of the company. Our focus in this regard is on the entire life cycle of our machines.

FEHLMANN already ensures minimal CO₂ emissions during the production process, as energy consumption is already considered during product development. FEHLMANN also participates in the renowned Switzerland-wide EnAW (Energy Agency for Industry) model for energy optimization.

FEHLMANN is renowned in the industry for its superior precision, good ergonomics, ease of handling and reliability. FEHLMANN's understanding of quality also means developing machines that satisfy current and future workshop requirements.

With FEHLMANN you stay one step ahead of the competition!
Your Precision Advantage.®

VERSA® 823 / 825

Precise, reliable and compact

Highest precision with strong performance and compact dimensions — these are the qualities that make the FEHLMANN VERSA 823/825 stand out. These machines are equipped with all the functions and features that are necessary for precision machining. As is typical for FEHLMANN machines, the VERSA 823/825 can be tailored to your needs — for example, by retrofitting the machine with an automation system (possible at any time), or customer-specific set-up requirements.

The VERSA 825 machines complex workpieces in 5 axes, allows for dynamic HSC milling and is ideal for processing difficult-to-machine materials.

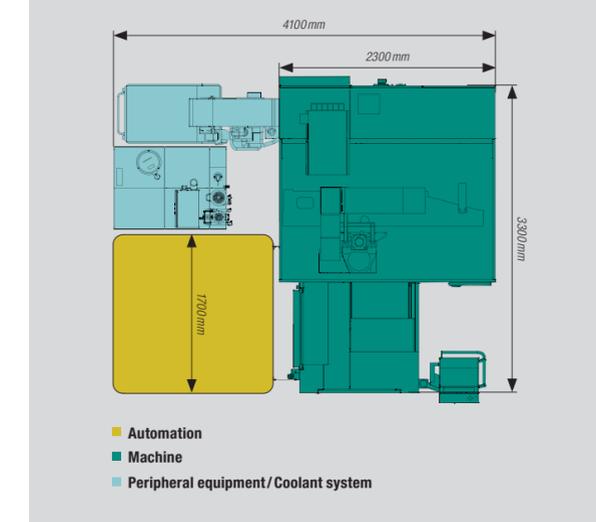
The VERSA 823 is for precise and dynamic high performance 3-axis machining of large workpieces weighing up to 1000 kg.

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- 15 Floor plan
Technical data



The concept at a glance

- 5- respectively 3-axis precision machining — with excellent accessibility from three sides
- Flexible automation without limiting machine operation
- Compact design with small footprint



VERSA 825 and 823 — complex high-performance machining combined with optimum precision

The VERSA machines in portal design by FEHLMANN are the perfect choice when complex applications and high cutting performance are desired. Complex parts of titanium and aluminium, e.g. for the aerospace industry, form part of the application range, as do hardened tool steels in mould and die making. Stainless steels in medical technology and demanding workpieces in general mechanical engineering and vehicle construction are further fields of application.

The VERSA concept — ergonomic and perfectly accessible

An outstanding feature of the VERSA 825 and 823 is their ergonomic design. The workpiece is situated at the optimum working height and can be easily loaded by hand or by crane through the open overhead door. The machine operator has all important areas of the machine within easy reach from the work space. This allows all work steps to be executed safely and efficiently. In order to monitor the machining process from the front and for loading the automation, you may easily rotate the control unit by 90° (see figure).

The machine is easily accessible from three sides. The spindle and swivelling bridge can be continuously monitored from the front. The table and tool changer are accessible from the right side. The operator is also in close proximity to the milling process, as well as to the optional laser for tool measurement. The left side can be equipped with an automatic door and is available for automation. The machine is accessible without restrictions, even with automation mounted on the side.



Access from the right: Free access to table and tool changer, the operator remains close to milling process and laser (option) for automatic tool measurement.

Access from the front: Even when swivelling the swivel bridge away from the operator, nothing obstructs visibility of spindle and bridge — nothing escapes the operator.

Access from the left: This side may be equipped with an automatic door and is reserved for the possibility of retrofitting an automation system.

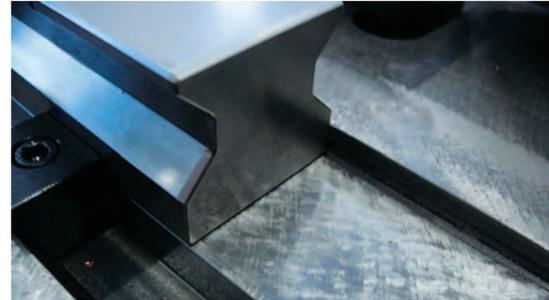
Maximum precision and immaculate surface finish thanks to hand-scraped geometries as well as perfect stability

Machine structure designed for optimized rigidity

The VERSA machines are designed for uncompromising stability and dynamics. The machine structure in portal design with 3-point support is made from grey cast iron. This ensures optimum damping, homogeneous thermal conductivity and excellent dimensional stability. The stable swivel bridge with counterbearing also contributes to the high rigidity (VERSA 825).

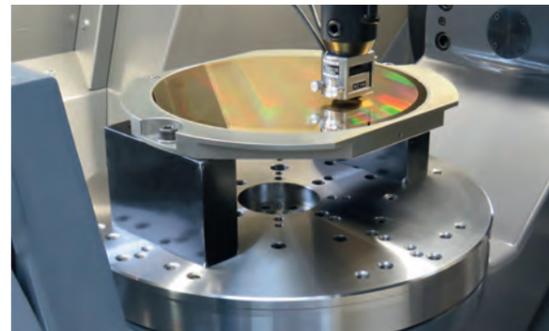
Guide carriages with widely-spaced supports, as well as ball screws with cooled drives, guarantee fast axis feeds and acceleration for highly accurate high performance machining.

The fact that only two axes are used for cutting results in high rigidity and precision in the tool axis and, thus, in an immaculate surface finish. The tilting rotary table is integrated into the machine concept longitudinally, thereby guaranteeing a swivelling area unaffected by the linear axes (no kinetic coupling effect). It also has direct drives with cooled torque motors and high-precision angle measurement systems, which grant maximum dynamic precision even in case of simultaneous multi-axis machining.



Precise machine geometry

Machine geometry is optimized on the fully assembled machine frame by hand-scraping all guideways and machine geometries.



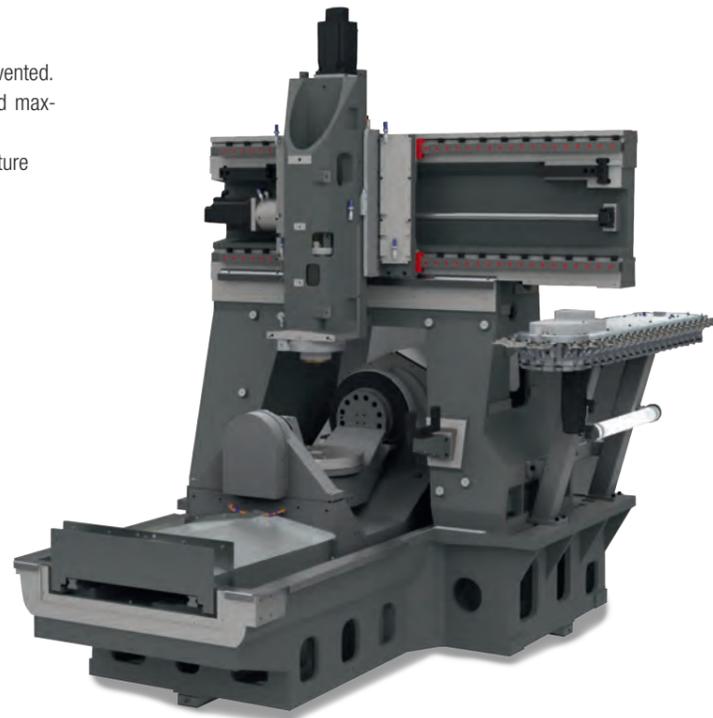
KGM grid encoders measurement

All machines are measured and optimized before delivery using KGM grid encoders and other state-of-the-art methods.

Thermal stability

Negative impact due to thermal growth is consistently prevented. The following features guarantee constant 24h accuracy and maximum geometrical precision:

- Homogenous thermal conductivity thanks to machine structure made of heavily ribbed grey cast iron
- Operating temperature is reached quickly
- Active cooling and gapless insulation of all elements which can transmit heat into the machine structure
- Thermal decoupling through inner lining of carriage parts and machine structure
- Thermal compensation
- Precision linear guideways with direct distance measurement in all axes
- Position correction of the main spindle via direct measuring system (optional)



In-house motor spindle manufacturing

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



Cutting edge spindle technology for the most demanding applications



Spindles for optimal results

The desired and required quality is achieved with spindles that are perfectly attuned to the machine.

Both larger and smaller tools can be used for hard-to-machine materials.

- Best surfaces and longest tool life due to minimal vibrations and precise concentricity
- High flexibility and low programming effort — the mechanical design and torque of the spindles also allow machining with conventional tools and cutting data
- All spindles are actively and energy efficiently cooled and are equipped with temperature compensation

The right spindle for each application

Depending on requirements and customer needs, the machines are available with a variety of FEHLMANN motor spindles — HSK-A63 with 14 000/18 000 or 24 000 rpm or HSK-E50 with 30,000 rpm. For short power-up times, all spindles are equipped with high spindle acceleration. Position correction of the main spindle via a direct measurement system is available as an option.





+115°

0°

-115°

VERSA® 825 — Dynamic and highly precise 5-axis milling

Dynamic and robust

Drives are designed for rapid simultaneous 5-axis machining. They are also well-suited for high-precision 5-axis milling with positioning.

Stiff swivelling bridge with excellent vibration damping

The swivelling bridge is supported along the entire length of the machine bed with large roller guides. A total of six guide carriages allow for optimal rigidity and vibration damping. The swivelling bridge is equipped with a counterbearing, which prevents the table from sinking to the front.



Well-designed concept for highest precision

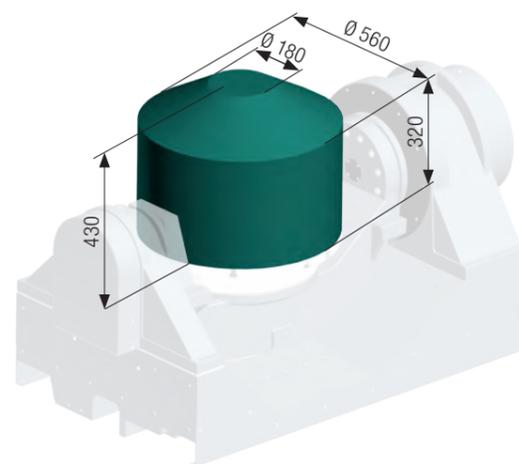
The rotary swivelling table is driven by cooled torque drives and has a large, symmetric swivelling area of $\pm 115^\circ$ (optionally $\pm 115^\circ / -135^\circ$). It is integrated into the machine lengthwise, so that the swivelling axis recedes into the large portal area when milling. This systematically prevents rise when milling simultaneously.



Various clamping systems available

The rotary swivelling table can be equipped with various clamping systems, depending on the customer's requirements (illustrated here with UPC 320 clamping chuck).

See additional examples on facing page. Please contact us to discuss further available options. Four fixing points on the swivelling bridge allow easy and quick mounting of an optional upper clamping plate (see below right). This creates a generously sized table of 650×580 mm, allowing plates or multiple clamps to be used. These features allow for additional fields of application, as well as time savings and shortened down times.



Maximum swing circle VERSA 825

By limiting the rotating and swivelling range, larger workpieces may also be machined. The maximum workpiece dimensions depend on the milling strategy and the fixtures and may thus deviate from the maximum swing circle.



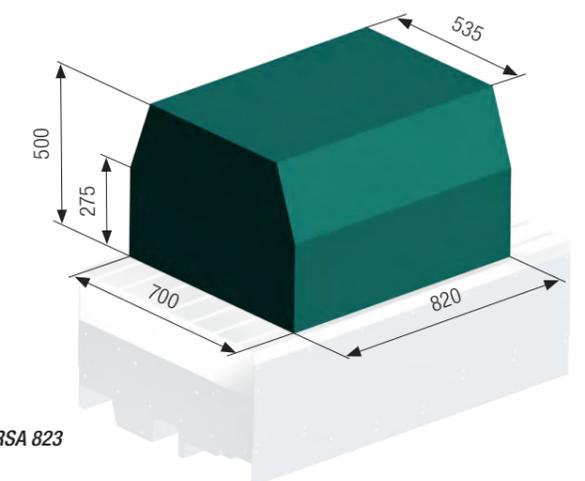
VERSA® 823 — 3-axis version for workpieces up to 1000 kg

The 3-axis version **VERSA 823** is perfectly suited for the machining of high-precision machine components and mould bases up to 1000 kg. Large workpieces can thus be machined precisely, dynamically and with high performance. The table recedes into the portal during the machining process. This concept allows for complex and highly precise 3-axis machining with perfect surface finish



Ample space

The table offers a large surface of 1200×750 mm, which also allows for machining applications with multi-part clamping.



Maximum swing circle VERSA 823

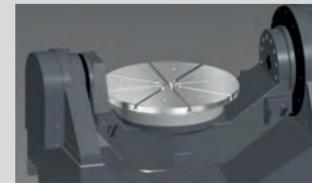


Table plate round
 $\varnothing = 560$ mm



Table plate square
 460×460 mm



Integrated Adaption Kit
UPC/PCP: $\varnothing = 148$ mm



PC 210: $\varnothing = 210$ mm



UPC: 320×320 mm
MTS: 400×400 mm



Clamping plate 650×580 mm



Controls and software: Simply versatile — from HSC/HDC to workshop programs

The fully digital Heidenhain control unit meets all workshop requirements.

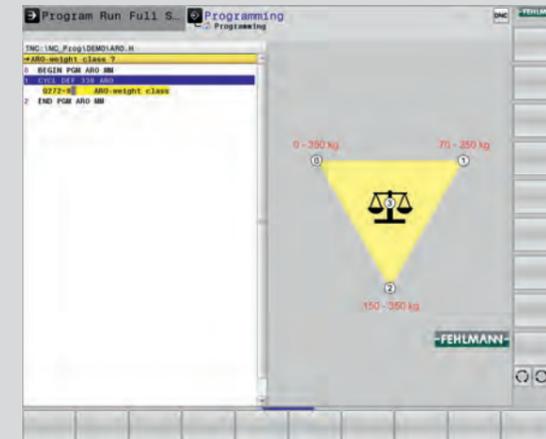
Its suitability ranges from processing simple mechanical parts that are programmed directly on the machine, up to complex 3 and 5-axis CAD/CAM program applications. Thanks to various built-in machining cycles developed by FEHLMANN, the control unit is perfectly attuned to VERSA 823/825.



3D probe system

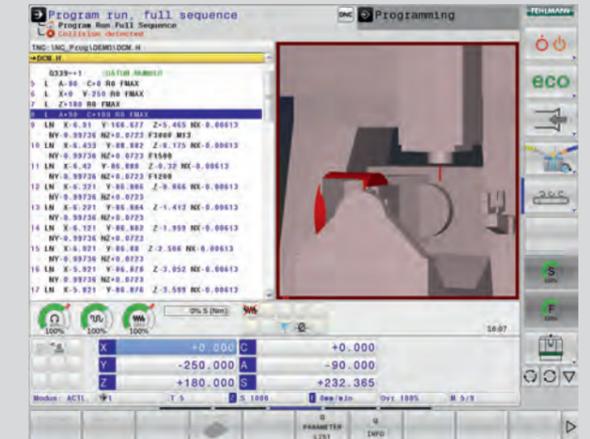
With infrared signal transmission to determine the workpiece zero point and for workpiece measurements. Automatic mis-alignment compensation thanks to 360° coverage.

- Heidenhain Klartext and DIN/ISO programming
- FEHLMANN specific functions such as HSC-SETUP and TOOL-WARM-UP contribute to highest precision
- Free contour programming for contours that are not clearly defined
- DXF-Converter for conversion of DXF contours and dot patterns
- Comfortable FEHLMANN tool management
- Special control strategies and optimized path control with continuous movements ensure flawless surfaces and increased service life of tools
- Time-savings through short block processing times
- Electronic handwheel for direct operation
- Graphic support with contextual images and simulations enables faster and reliable programming
- PDF documents and images can be easily viewed on the 19" control screen display



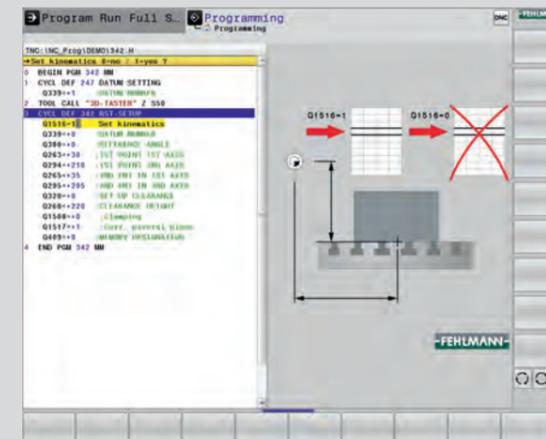
Weight optimized simultaneous milling

FEHLMANN cycle ARO™ — Automatic Rotary Axis Optimization (included in FEHLMANN 5-axis cycles package). For dynamic optimization of rotary swiveling axes based on weight of workpiece. The cycle includes various weight classes and influences the control of the rotary swiveling axes accordingly.



Minimize the risk of collision

Active collision detection (optional) helps operators avoid collisions due to manipulation and programming interventions. If the control unit detects a possible collision, the feed is slowed down or even stopped.



Easy and quick calculation of centers of rotation

FEHLMANN cycle KINEMATICS-SET™ — (included in FEHLMANN 5-axis cycles package). Easily and quickly determines machine's centers of rotation together with 3D probe (to be ordered separately) — degree of precision within a thousandth of a millimeter. Also applicable to compensation of thermal growth.



Advanced power saving function

The machine drives are automatically switched to hibernation mode after the processing of NC programs. With this option, the system can be automatically restarted at a programmed time, enabling unattended warm-up of spindles and axes.



VERSA 825 with pallet handling system ERE on the left and with rack magazine for up to 250 tools on the right (optional equipment).

Short set-up times with tool rack magazines for up to 346 tools

The tool rack magazine can be comfortably accessed from the front

Tools can be checked or inserted while machining. The desired tool can be called up with the controls in only a few steps and is then positioned in front of the loading door by the chain. An optimal overview is guaranteed.

Fast, efficient and accurate tool measurement

For non-contact tool measurement and breakage control right at the machine. Length and diameter of stationary or rotary tools from D0.6 to D150 mm can be measured with an accuracy of a thousandth of a millimetre. The determined measurements are stored directly in the central tool memory of the TNC; before each measurement, the tool is cleaned using the integrated nozzles. A mechanical probe is also available, instead of the laser system.



Tool changing system with chain magazine for 44 tools — optional up to 80 tools

In the standard version the machine picks up the tools from the chain. The operator always has free access to the machine table and tool changer. This grants a perfect overview at all times.



Tool laser measurement

The laser system (optional) is positioned in close vicinity to the tool changer and the operator.

Tool magazines for 44, 80, 186, 218, 250 and up to 346 tool pockets

The basic version with chain magazine contains 44 tool pockets. Optionally, 80 tool pockets are available by extending the chain out the back of the machine.

Rack magazine is an option and offers up to 346 tools depending on tool length. The operator has a good overview of the tools at all times. The rack magazine is loaded by an external loading system.

For the rack magazine, fully automatic cleaning of tools with compressed air and brushes is available as an option.

Tool	Name	Doc	L	D	Pr	Ref. Inv.	TL	PT	POCKET	DL	DB	L
21	VHM 825-825		100	100	0				100	0		
22	VHM 825-825		100	100	0				100	0		
23	VHM 825-825		100	100	0				100	0		
24	VHM 825-825		100	100	0				100	0		
25	VHM 825-825		100	100	0				100	0		
26	VHM 825-825		100	100	0				100	0		
27	VHM 825-825		100	100	0				100	0		
28	VHM 825-825		100	100	0				100	0		
29	VHM 825-825		100	100	0				100	0		
30	VHM 825-825		100	100	0				100	0		
31	VHM 825-825		100	100	0				100	0		
32	VHM 825-825		100	100	0				100	0		
33	VHM 825-825		100	100	0				100	0		
34	VHM 825-825		100	100	0				100	0		
35	VHM 825-825		100	100	0				100	0		
36	VHM 825-825		100	100	0				100	0		
37	VHM 825-825		100	100	0				100	0		
38	VHM 825-825		100	100	0				100	0		
39	VHM 825-825		100	100	0				100	0		
40	VHM 825-825		100	100	0				100	0		
41	VHM 825-825		100	100	0				100	0		
42	VHM 825-825		100	100	0				100	0		
43	VHM 825-825		100	100	0				100	0		
44	VHM 825-825		100	100	0				100	0		
45	VHM 825-825		100	100	0				100	0		
46	VHM 825-825		100	100	0				100	0		
47	VHM 825-825		100	100	0				100	0		
48	VHM 825-825		100	100	0				100	0		
49	VHM 825-825		100	100	0				100	0		
50	VHM 825-825		100	100	0				100	0		
51	VHM 825-825		100	100	0				100	0		
52	VHM 825-825		100	100	0				100	0		
53	VHM 825-825		100	100	0				100	0		
54	VHM 825-825		100	100	0				100	0		
55	VHM 825-825		100	100	0				100	0		
56	VHM 825-825		100	100	0				100	0		
57	VHM 825-825		100	100	0				100	0		
58	VHM 825-825		100	100	0				100	0		
59	VHM 825-825		100	100	0				100	0		
60	VHM 825-825		100	100	0				100	0		
61	VHM 825-825		100	100	0				100	0		
62	VHM 825-825		100	100	0				100	0		
63	VHM 825-825		100	100	0				100	0		
64	VHM 825-825		100	100	0				100	0		
65	VHM 825-825		100	100	0				100	0		
66	VHM 825-825		100	100	0				100	0		
67	VHM 825-825		100	100	0				100	0		
68	VHM 825-825		100	100	0				100	0		
69	VHM 825-825		100	100	0				100	0		
70	VHM 825-825		100	100	0				100	0		
71	VHM 825-825		100	100	0				100	0		
72	VHM 825-825		100	100	0				100	0		
73	VHM 825-825		100	100	0				100	0		
74	VHM 825-825		100	100	0				100	0		
75	VHM 825-825		100	100	0				100	0		
76	VHM 825-825		100	100	0				100	0		
77	VHM 825-825		100	100	0				100	0		
78	VHM 825-825		100	100	0				100	0		
79	VHM 825-825		100	100	0				100	0		
80	VHM 825-825		100	100	0				100	0		

Flexible and efficient tool management

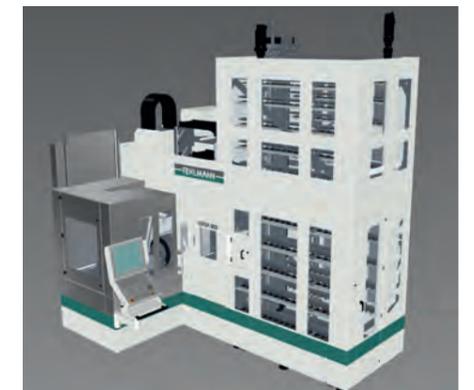
The expanded FEHLMANN tool management system allows quick and easy tool changing at the push of a button.



Basic version with chain magazine for 44 tools



Optional with 80 tools



Optional rack magazine scalable up to 346 places

Highly productive due to automation — retrofitting possible at any time

Workpiece feeding with pallet handling is well-suited for medium lot sizes and single pieces. Various clamping devices can be mounted on the pallets, so that a robot does not have to be programmed.



Machine, software and automation — a perfectly coordinated system.

Ready for “Industry 4.0”

FEHLMANN machines provide the basis for “Industry 4.0”, thanks to an innovative data BUS system. Cost-effective production of a wide variety of parts — as single pieces or small series: FEHLMANN solutions offer full flexibility — beginning with a batch size of one.

Custom-tailored automation solutions

Whether as a single-machine solution, automation for two machines or as a linear system — FEHLMANN machines can be easily adapted to a variety of automation concepts — easily and without operator restrictions. Depending on customer needs, number of pallets and variety of parts, the system is controlled and monitored either via a pallet management file, integrated into the controls, or with the flexible FEHLMANN Milling Center Manager (MCM™).

Automation with 6-axis articulated robot

and a combination of blank and pallet handling. In order to produce large series, the robot directly loads the parts into an automated clamping system. After having machined the first series, the parts are re-clamped automatically and machined on the back side. In order to produce single parts, the robot unloads the automatic chuck and continues working with the pallet handling.



FEHLMANN MCM™ Milling Center Manager — simple and intuitive controls

The FEHLMANN host computer system Milling Center Manager (MCM™), developed in-house and continuously improved, enables unattended operation of machines and loading robots. Due to high operator comfort of the machine and MCM™, the FEHLMANN solutions are not only perfectly suited for series production, but also for small lot manufacturing starting from just a few parts. The modern software solution is based on open industry standards and can run on a separate screen as well as directly on the TNC control console.



From left to right: VERSA 645 linear with rack magazine for up to 225 tools — Robot Compact 80 — VERSA 825 with rack magazine for up to 250 tools.



Minimal Lubrication System

Economical cooling and lubricating system. Perfect for milling or high-speed cutting of materials such as aluminium, copper and hardened steels.

Chip flow, cooling and vacuum system — tailored to your requirements



Customer-optimized layout

The intelligent machine design allows the customer to either install a chip conveyor and coolant system on the right or left side of the machine, depending on the shop floor conditions and the selected configuration. Chip container 300 l to be ordered separately.



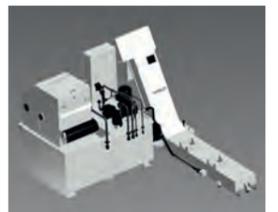
Standard coolant equipment
Capacity 700 l. Consisting of chip conveyor, bag filter, clean coolant tank, pumps for bed flooding and external coolant, controlled by PLC. Consistent coolant quality is ensured through automatically actuated circulation system after two hours of inactivity.



Coolant equipment with chip conveyor, bag filter and high pressure pump
Capacity 700 l. A high pressure pump (80 bar) allows the use of internally cooled tools and is adjustable via M-function. Exclusively suitable for emulsion, also available for cutting oil.



Coolant equipment with chip conveyor, additional tank and compact filter
To keep the coolant temperature low, even with high production output, an additional tank with 1400 litre capacity is used. Use of closed band filter (compact filter) enables longer periods of machine operation without stops to clean the filter. A high pressure pump (80 bar) allows the use of internally cooled tools and is adjustable via M-function. Exclusively suitable for emulsion.



Coolant equipment with chip conveyor, additional tank and compact filter — suitable for cutting oil
Tank capacity 2250 litre. Use of closed band filter (compact filter) enables longer periods of machine operation without stops to clean the filter. The high pressure pump with 80 bar for use of internally cooled tools is included in delivery and is adjustable via M-function.

High quality thanks to our in-house manufacturing and qualified customer service



In our climate-controlled production halls we manufacture high-precision components that comply with the quality standard ISO 9001.

Modern machine-tools have a key function in the manufacturing process. Thus, it is vital that our customers can rely 100% on their availability. Even more important are fast and cost-effective solutions in case of technical malfunctions.

Development, production, assembly, training and service: At FEHLMANN, you will receive everything from a single source

Complete in-house manufacturing ensures not only high quality, but also long-term availability of spare parts. On-going investments in the latest production and environmental technologies together with lean and efficient processes, long-standing expertise and, last but not least, our committed and competent employees stand for quality, reliability and safety. These are the features that distinguish FEHLMANN high-precision milling machines.

Short response times

Highly-qualified hotline employees actively offer support to our customers during troubleshooting. A malfunction can be efficiently

narrowed down through telephone assistance and, in some cases, directly solved on the phone with advice from an expert. Furthermore, modern means of communication allow remote diagnosis of your machine, if required. This considerably reduces not only down times, but also costs.

Immediate spare parts supply

Due to our high level of in-house production, we have the required spare parts in stock and are able to deliver them to our customers at short notice, even with express delivery, if required. Moreover, our efficient ticketing solution through our free hotline minimizes problem-solving time.

Comprehensive solutions for maintenance, service and spare parts delivery

The delivery of pre-parameterized electronic modules, such as CNC control units, drives, etc. whenever possible, considerably reduces the repair time on site. EU customers can return defective spare parts to our office in Mönshelm (Germany) at their convenience, without customs formalities. Our in-house repair service can supply you with as-good-as-new reconditioned replacement units or rental equipment for the duration of the inspection work, which also keeps costs low.

Personal and competent

We provide our customers with personal and highly qualified advice. Please contact our customer service at:

Fehlmann AG Maschinenfabrik

5703 Seon/Switzerland

Phone +41 62 769 1280

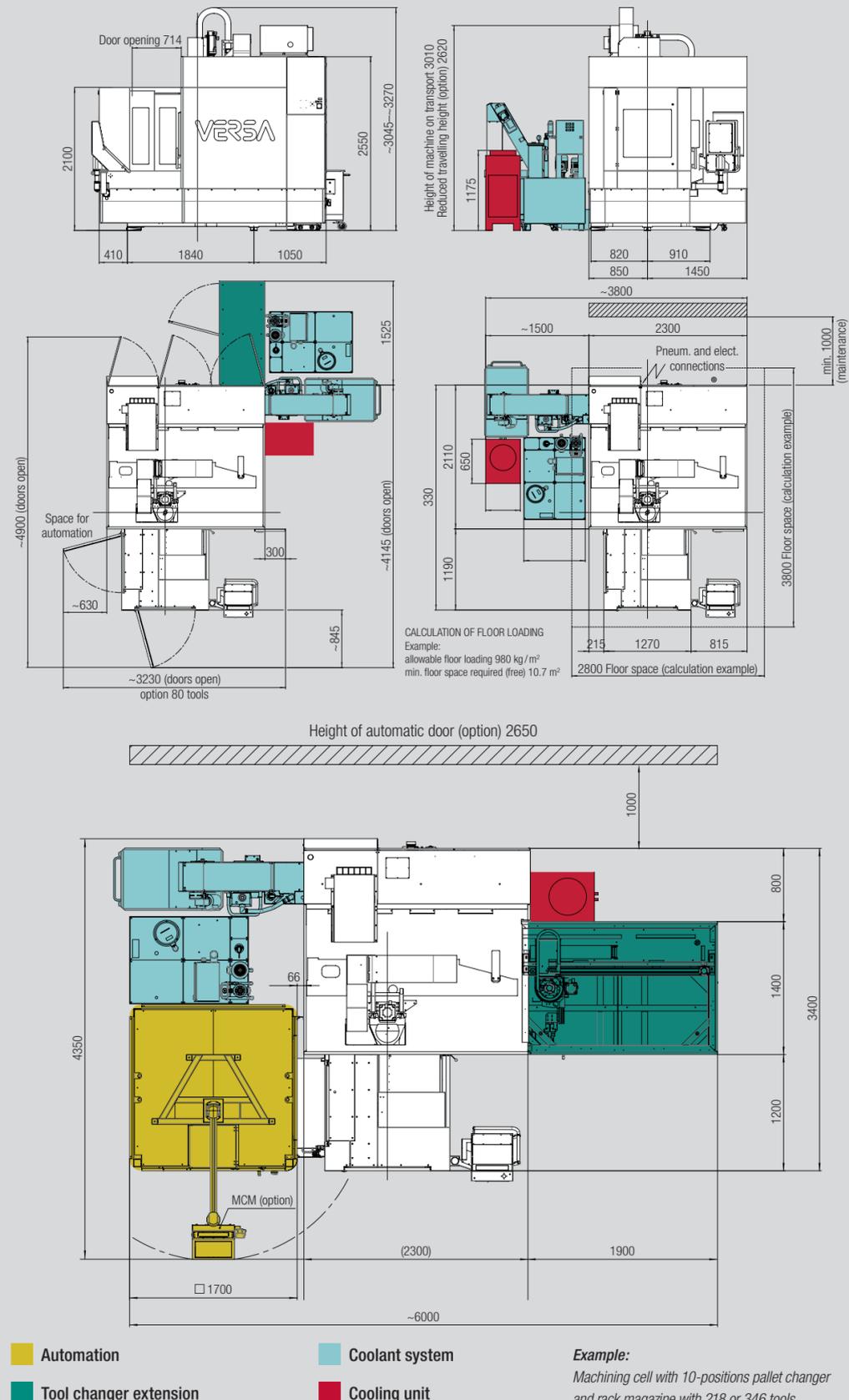
Fax +41 62 769 1193

E-mail service@fehlmann.com

or on www.fehlmann.com



Fehlmann AG center of excellence in Seon: development, planning, production and administration under one roof.



Example:
Machining cell with 10-positions pallet changer and rack magazine with 218 or 346 tools.

Technical Data

	VERSA® 825	VERSA® 823
Travel		
X travel	mm 875	820
Y travel	mm 700 (1270)	700 (1270)
Z travel	mm 450	450
Swivel axis A	degrees 230° (+/-115°)	
Option extended swivel range A-axis	degrees 250° (+115/-135°)	
Dividing axis C	degrees 0-360° (endlessly rotating)	

Table/work area		
Clamping surface (L x W)	mm 460 x 460 Table plate square	1200x750
T-slots (width/distance/number)	12-H8/63/7	14-H8/100/7
Distance between table and spindle nose	mm 120-570	150-600
Max. permissible table load	kg 350	1000

Tool Changer		
Magazine pockets standard	44	44
Magazine pockets optional	80/186/218/250/346	80/186/218/250/346

Maximum tool diameter without free spaces	mm Ø 80	Ø 80
Maximum tool diameter with free spaces	mm Ø 130	Ø 130
Max. tool length (from spindle nose)	mm 350	350
Tool change time	s approx. 3	approx. 3
Chip-to-chip time ISO10791-9	s approx. 11	approx. 11
Max. tool weight	kg 5	5

Feed rates		
Axis X/Y/Z	mm/min 1-30000	1-30000
optional	mm/min 1-48000	1-48000
Swivel axis A	rpm 0-30	
Dividing axis C	rpm 0-60	

Position accuracies according to ISO 230-2 resp. VDI/DGQ 3441		
Position tolerance A (X/Y/Z)	mm 0.005 (increased 0.003)	0.005 (increased 0.003)
Position variation range R (X/Y/Z)	mm 0.003 (increased 0.002)	0.003 (increased 0.002)
Position tolerance A (A/C)	degrees 0.003 (increased 0.002)	
Position variation range R (A/C)	degrees 0.002 (increased 0.001)	

Measurement systems
Direct measuring system in all axes, pressurization inclusive

Connection data		
Operation voltage and frequency	V/Hz 3 x 400/50	3 x 400/50
Recommended pre-fusing	A 63 AT	63 AT
Pneumatics operating pressure	bar 6	6

Weight		
Machine-tool (excl. cooling medium)	kg	~ 10500 kg/44 tools ~ 11000 kg/80 tools ~ 11500 kg/218 tools ~ 11500 kg/250 tools ~ 12500 kg/346 tools

Subject to technical modifications

Spindles

Speed range	rpm	50–14 000
Tool holder		HSK-A63
Output at S1 (100% ED)	kW	18.5
Output at S6 (40% ED)	kW	24.0
Max. torque at S6 and rated speed	Nm	120
Nominal rated speed	rpm	1920

Speed range	rpm	50–18 000
Tool holder		HSK-A63
Output at S1 (100% ED)	kW	19.0
Output at S6 (40% ED)	kW	25.4
Max. torque at S6 and rated speed	Nm	120
Nominal rated speed	rpm	2030

Speed range	rpm	50–24 000
Tool holder		HSK-A63
Output at S1 (100% ED)	kW	20.0
Output at S6 (40% ED)	kW	25.5
Max. torque at S6 and rated speed	Nm	74
Nominal rated speed	rpm	3320

Speed range	rpm	50–30 000
Tool holder		HSK-E50
Output at S1 (100% ED)	kW	9.5
Output at S6 (40% ED)	kW	13.7
Max. torque at S6 and rated speed	Nm	31
Nominal rated speed	rpm	4350

Subject to technical modifications

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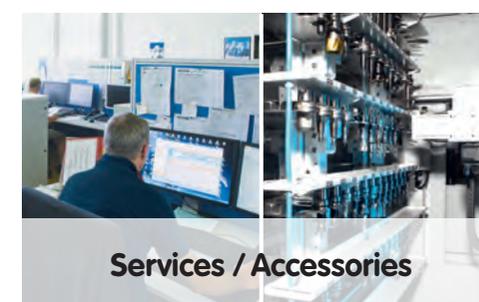
**Machining centres
in portal design**



Machining centres



Milling / Drilling machines



Services / Accessories



Automation

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