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The experience in practical operation.

# REPORT

FEHLMANN

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Frank Fehlmann  
General Manager FEHLMANN AG

Dear Reader,

As you will certainly remember ... the last years were bustling and fast-paced with the production running at full capacity in all industrial sectors. The stock exchange was booming, the felt presence of purchasing power - in certain countries triggered by ever higher real estate prices - hand in hand with an increasing consumerism was virtually unshakeable. However, this peak time was followed by heavy economical turbulences which will go down in the annals of international economy. How will it go on?

Lamenting is of no use! The present decline of all economical activities gives us the opportunity to analyze and utilize quality and efficiency potentials regarding the design and creation of products and services. Processes may be reassessed and redundancies may be eliminated. In this connection, the knowledge of today's state-of-the-art production methods is indispensable.

We believe in Switzerland as our production site and have continuously been investing in the FEHLMANN production plants in Seon. With the «Northern plant extension», we have integrated yet another assembly and production hall covering around 2600 sqm in our enterprise. The opportunities arising from this will be reflected in the still higher quality and availability of our products.

We at FEHLMANN fully utilize our innovation power on the basis of our long-standing and praxis-oriented experience and focus on your everyday customer benefit - namely precision, productivity and handiness.

As an actual example for these high aims, we would like to introduce you to the PICOMAX 823/825 VERSA starting from page 6 in this REPORT.

You are most welcome to make yourself acquainted with our machines and find the perfect solution for your customer-specific requirements and benefit.

I would like to sincerely thank you for your confidence and wish you informative and interesting reading.

Frank Fehlmann

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Please, allow us to quickly look back on a number of events, trade fairs and other occasions.

At this point, we would like to sincerely thank all those who pay us a visit on these trade shows and exhibitions, continue to have confidence in us and «last but not least» provide for a highly interesting exchange of ideas.

## Occasions

Over the last years, several seminars on various topics have been held. Especially the FEHLMANN 'mold-making days' in Seon enjoyed great popularity and large attendance.

**Precision in prototype production helps avoid pain.**

**PICOMAX 823/825 VERSA, the latest family members.**

**Optimum production under optimum conditions.**

**Actively shaping the future.**

**News 4U. Interesting news for our customers.**



## The Fehlmann Small Band

On the musician's own initiative, the FEHLMANN SMALL BAND was founded. It is composed of employees from various departments. They play at diverse events just for the fun of it - practicing in their free time.



## Trade Fairs

As a global company, we again presented our machines and agencies on numerous trade fairs and agencies around the world right on the ground last year.

The Premiere:  
Market introduction of our new PICOMAX 825 VERSA at the AMB Stuttgart (Germany) and at the PRODEX Basel (Switzerland).



# Precision in prototype production helps avoid pain.

Author: Ing. Robert Fraunberger / x-technik

**The W&H Group with their headquarters in Bürmoos close to Salzburg counts among the leading manufacturers of rotary dental instruments in the world. The success of this company is based on extensive research and development designing and producing fine mechanical miracles at the limits of physics. Vigor and precision in prototype production could still be increased thanks to the purchase of a 5-axis machining centre PICOMAX 60-HSC despite restricted installation conditions.**



«Cozy chairs do not all days let anybody's spirits raise. Resting on nettles won't compare well to that famous polished chair: its comfort – easy to ignore it, when the dentist stands before it». This is how Eugen Roth - a German poet - lets start his poem «To the dentist» - a poem which picks out one of the most widely spread fears as e.g. in the line «The dentist checks the fine needle with which he soon will prove that you are full of pain inside».

It was written at a time when slow drills and brute methods were still usage in the dental practices and before the Dentalwerk W&H of Bürmoos in Salzburg/Austria - founded 1890 in Berlin/Germany - started to revolutionize the treatment methods. True to the company motto «People have Priority», the fine mechanical miracles are designed both for precise, non-fatigue work for the dentist and for an optimum treatment of the patient with as little pain as possible.

#### Export orientation with high R&D share

With around 980 employees all over the world, W&H exports its products in more than 90 countries. Approximately 30% of the turnover can be allotted to products not older than three years. To obtain such results, more than 60 employees - male and female - work in Research & Development in Bürmoos alone.



Thanks to the purchase of a 5-axis machining centre FEHLMANN PICOMAX 60-HSC, effectiveness and precision could be further increased in prototype production at W&H Dentalwerk Bürmoos.

«The generously dimensioned space inside the machine combined with a small footprint and observance of our weight limitations make this system the perfect complete package.»

**Andreas Kuta**  
**Prototype Production**  
**Precision Mechanics at W&H**



This sector also includes a well established and developed prototype construction where the feasibility of innovative and pragmatic solutions is proven. Here, the most varied materials are processed, from fiber-glass reinforced plastics via aluminum alloys up to titanium, as well as complex micro parts. In prototype production, one recurring problem caused W&H a headache: The ever rising precision requirements could no longer be fulfilled with the existing machine pool. Furthermore, the used profile cutter had to be replaced time and again due to the constructive changes as they frequently occur in prototype production causing high costs not to mention the annoying nonproductive times.

#### 5-axis machining centre to solve the problem

Slowly but steadily, the logical decision matured to purchase a 5-axis machining centre allowing for simultaneous milling in 5 axes which among other enabled them to dispense with expansive special tools. At an early stage, however, the fairly limited space conditions proved to be an obstacle: «Many manufacturers go for polymer concrete as carrying foundation. We, however, have to operate the machine on a hollow ceiling and are thus extremely limited as far as the weight is concerned», reports Andreas Kuta, Sample and Prototype Production / Precision Mechanics at W&H. It was in the PICOMAX 60-HSC that the prototype



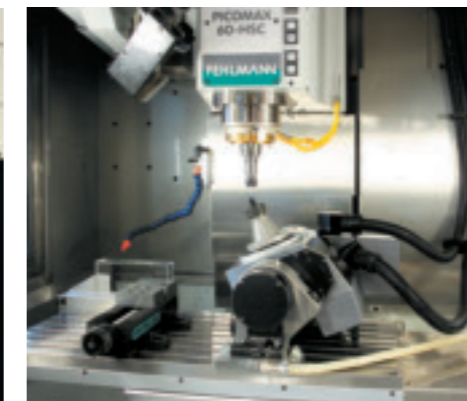
builders from the Flachgau district found their perfect alternative. With its literal Swiss precision, the PICOMAX 60-HSC is perfectly equipped to machine complex cubic micro parts and electrodes in 5 axes, thus hitting the demand right on. Even before visiting the machine in the Swiss plant, the option to install a vice and a dividing & swiveling unit as 4th and 5th axis was judged as advantageous. It increases the precision and reduces set-up times. Nevertheless, also other makes were of course being discussed at that time. What finally tipped the scales for good was a test with two complex work pieces, one electrode and one impeller, which were machined from a provided parasolid-file, i.e. immediately from the geometry data.

#### Compelling precision

«We were not only convinced by the surface quality and geometrical accuracy which was examined by an independent authority, but also by the explanations concerning machine programming and tool selection», continues Andreas Kuta.

«The generously dimensioned space inside the machine combined with small external dimensions and the observance of the weight restrictions made the PICOMAX 60 the most suitable and perfect complete package.»

The high accuracy of the machine despite its being operated in a non air-conditioned environment was a further criterion for



Important feature of the FEHLMANN PICOMAX 60-HSC is the good accessibility to the machining area and the fact that a vice and a dividing & swiveling nit as 4th and 5th axis can simultaneously be installed on.

W&H speaking in favor of FEHLMANN. «The solid rigid cast machine bed with its massive vertical column is hand scraped right from the beginning in a way to make it suitable for 5-axis machining. In addition, we appreciated the compact design with its small footprint».

What also impressed the engineers was the philosophy of the FEHLMANN AG to produce almost everything in-house. Moreover, a giant spare parts warehouse meets the demands of long-standing users. Also other services are available - in an uncomplicated way and on short notice - according to existing customers.

Training is praised too: «The instructor perfectly succeeded in responding to the different levels of knowledge concerning the Heidenhain control used», explains Andreas Kuta.

#### Résumé

After a couple of months of operation, a first summary can be drawn up - and the result is pretty impressive. The time saving from the construction right through to the manufacturing process is enormous. This is accompanied by further extras like stainless steel design or an additional tool box integrated in the machine. The use of a Blum laser tool measuring system is just one other module among many on the way to still higher efficiency and the speedy conversion of new production ideas.

#### About the company:

The W&H Dentalwerk Bürmoos GmbH takes a leading part in the production of instruments and devices for the five most important fields of application in dentistry: from the manual handpiece and contra-angle handpiece for the dentist via laboratory equipment for dental technicians up to drives for implantology or oral surgery.

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# PICOMAX® 823/825VERSA.

## The latest family members.

As supplement to the proven FEHLMANN machine series, the PICOMAX 825 VERSA has been completely developed from the ground up for the 5-axis machining of larger work pieces. Among the outstanding features of the PICOMAX 825 VERSA count the extremely rigid portal design, the dividing, swiveling table integrated in the X-axis as well as the advantageous ergonomics of the machine.



The specifications for our engineers were a big challenge. With the PICOMAX 825 VERSA, we intended to develop a machine for larger work pieces to be machined in 5 axes. Here, dynamics, stability and rigidity, ergonomics and compact design were the major objectives to be achieved. Furthermore, it should be possible to retrofit the machine for automation at any time without constraining the operator in any way. For this purpose, numerous machine designs and materials were analyzed and calculated. The result is positive throughout; first presented on the AMB in Stuttgart in fall 2008. Already, several of these machines prove their worth at our customers every day.

The machine perfectly blends in our FEHLMANN family - to the full extent: precision, compactness, reliability.

### Application / field of use:

The new machining centre in portal design is used in high-accuracy

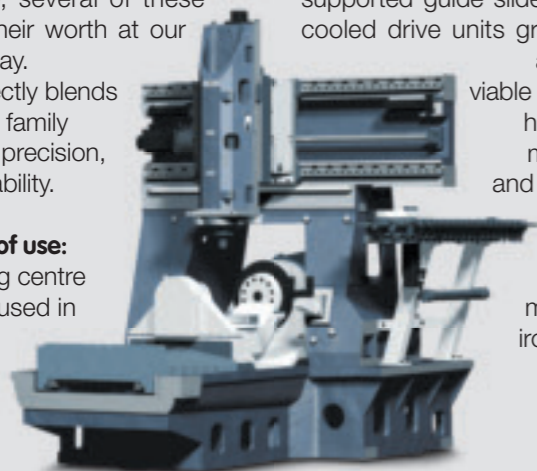
5-face / 5-axis machining in mold & die production as in the production of precision parts for machine building, automotive as well as aerospace industry, medical applications etc.

### Machine concept and configuration for maximum accuracy

The machine structure in portal design including guidance and drive systems are designed for today's state-of-the-art high-speed machining processes. Precision linear guideways with direct distance measurement in all axes, widely supported guide slides, ball screws with cooled drive units grant fast axis feeds

and acceleration for viable and highly accurate heavy-duty and HSC machining. The FEM and topology-optimized machine structure with 3-point support system is made from grey cast iron. Guide ways and

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### Technical highlights: PICOMAX 825 VERSA

Travel distances X 820 mm, Y 700 mm, Z 450 mm, C 0-360°, A 230° (+/- 115°)

Distance between table and spindle nose 120-570 mm

Feed rates 1-30,000 mm/min, optionally up to 48,000 mm/min

Tool magazine with 44, 80 and 218 pockets, scalable

Max. spindle speeds 14,000 rpm / 20,000 rpm / 30,000 rpm / 36,000 rpm

machine geometry are hand-scraped; in this way, the geometry may be optimized at the machine frame without any electronic compensation. Among further advantages of the selected materials count optimum dampening characteristics and homogenous heat conductance which in turn grant fast warm-up to operating temperature, constant 24-hour-precision, maximum geometric accuracy and rigidity.

### 5-axis machining

The PICOMAX 825 VERSA has been designed as machine for 5-axis machining for the highest demands from scratch. The dividing, swiveling table is integrated into the machine concept in longitudinal direction and thus grants a swiveling drive completely unaffected by the linear axes (no kinetic coupling).

It disposes of dynamic torque drives in both axes, mechanical clamping and a direct measurement system. Outstanding features for simultaneous 5-axis machining processes are the high dynamics and the large swiveling range of 230° (+/- 115°). The max. permissible load of the highly rigid dividing, swiveling table - equipped with 3 carriages per guide rail - amounts up to 350 kg, the pallet size is 400x400mm, the part diameter 560mm. The installation of zero point clamping systems by various manufacturers (EROWA, 3R, Schunk and more) is provided for.

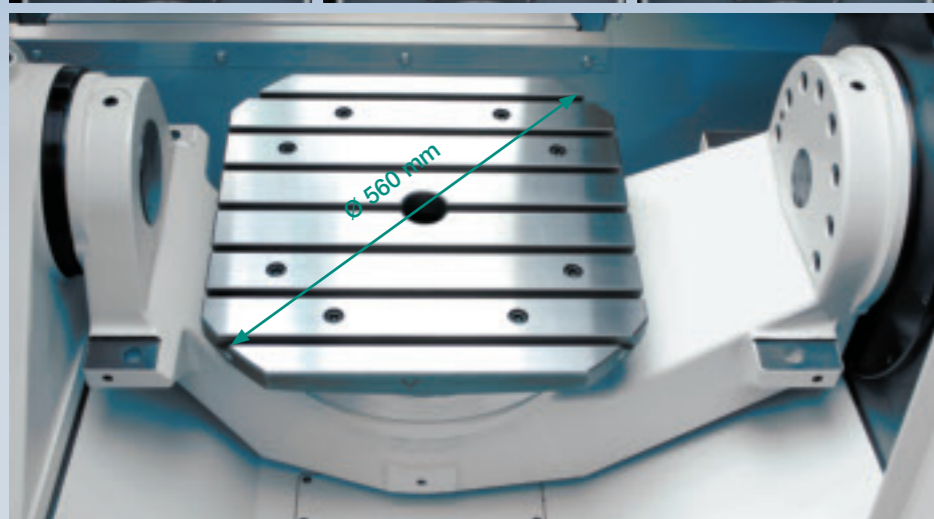
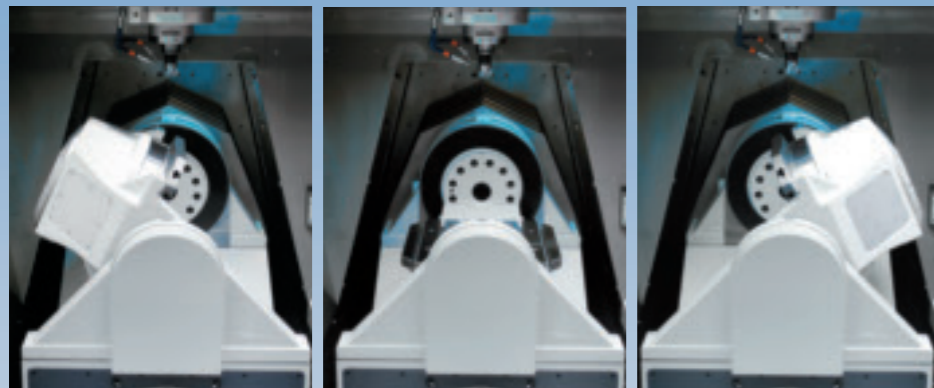


### Operating concept and automation

Very important focus of attention was put on ergonomics so that also the «new one» would offer good accessibility whether loaded manually or automatically by robot (patent pending). For instance sliding doors to the work area, CNC operating panel with Heidenhain iTNC 530 and also tool change loading station are arranged in close vicinity to the operator.

For easy and efficient cleaning and long-term maintenance of value, the casing of the work area is made from stainless steel.

# PICOMAX® 823/825VERSA .



## Technology and precision

Various HSC motor spindles are available according to the customer's specific requirements. 14,000 or 20,000 rpm with HSK-A63 and powerful 120 Nm or 30,000 rpm as well as 36,000 rpm with HSK-E50 and a torque of 33 or 15 Nm. The tool changer with chain magazine offers room for 44 tools in the basic version.

An expansion magazine for up to 218 tool pockets is available as an option.

Chip removal is provided for both dry (minimal lubrication system) and wet machining (cooling lubricant / oil). The removal of chips or coolant is realized via two conveying twist on the left and right side of the machine table.

The thermo-symmetrical machine structure plus further selective measures to further increase the accuracy, like thermo compensation and position compensation of the main spindle via direct measurement system, were implemented without compromise. All elements prone to introduce heat to the machine are actively cooled and the internal covering (also made from stainless steel) prevent the direct transfer of the chip and cooling water heat to the machine structure.

## PICOMAX 823 VERSA, the 3-axis version

Instead of the integrated dividing, swiveling table, the 3-axis version has a large table clamping area of 1,200 x 750 mm.

This allows precision machine components and dies weighing up to 1,000 kg to be machined. High-accuracy guide holes, as they are required in toolmaking, may be produced in drilling milling cycles. Larger 3D dies are milled with outstanding precision even from hardened tool steels. Crane loading is done by simply opening the operator door. A pallet changer can easily be fitted or retrofitted at a later date.



# The «Northern plant extension»: For optimum production under optimum conditions.

Willy jun., Willy sen.  
and Frank Fehlmann  
at ground-breaking



## Even when it comes to production premises, the focus lies on the quality of our products.

In order to guarantee a continuous quality and process optimization, we have been investing in the production plant Seon/Switzerland for years. The new building was officially opened in summer 2009 and offers a surface of 2,600 sqm.

The temperature-stable assembly hall with its generously dimensioned space, the 16-ton indoor crane and the light-flooded premises offer the perfect pre-conditions for the assembly of the larger FEHLMANN machines (PICOMAX 90, 95 and 823/825).

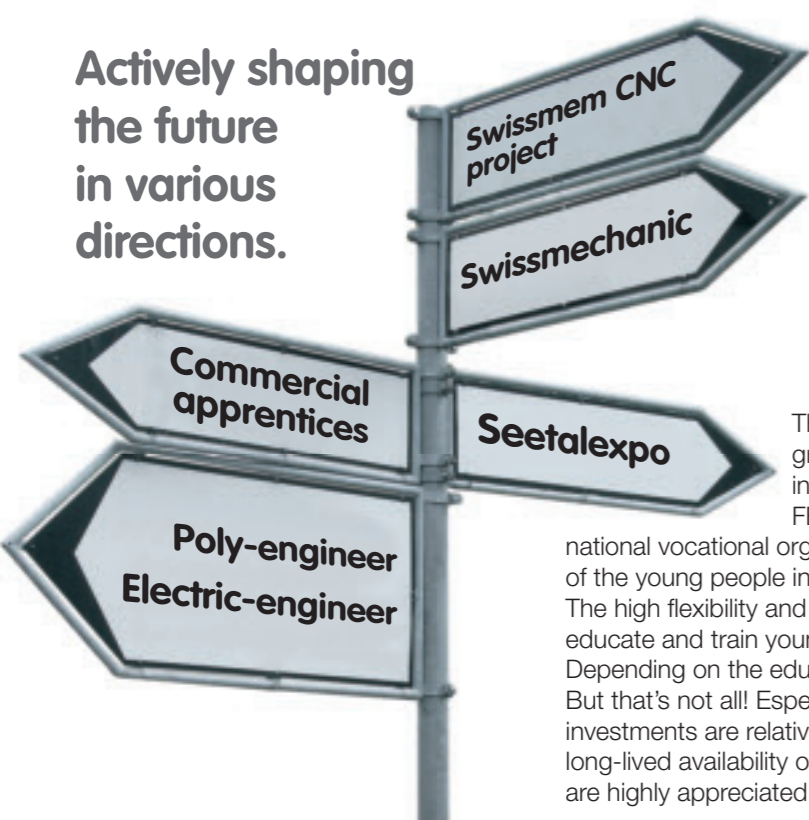
An air conditioned measuring room, the freight forwarder in immediate vicinity as well as an assembly intermediate storage for large components were designed in a way that the material flow could drastically be improved.

Through a double gate system, the machines can be loaded onto the transport vehicles directly inside the building independently of the weather at any time without sudden temperature changes interfering with the assembly process. The already existing assembly hall has been adapted to today's requirements concerning air conditioning and energy technology and definitely been made the production hall for large components.

This further expansion is an important step towards a future-oriented efficient- and quality-oriented production and assembly.



Actively shaping the future in various directions.



# Short survey of further news

The high quality of the FEHLMANN machines may only be granted by our highly qualified, highly committed employees in the long term. Next to our own apprentice departments, FEHLMANN also works closely together with the most important national vocational organizations and participates in projects which ensure the future of the young people in the metalworking industry. The high flexibility and ergonomics of the FEHLMANN machines are perfectly suited to educate and train young specialists. Depending on the educational progress, different machine concepts are available. But that's not all! Especially in apprentice training, where the intervals between new investments are relatively large, the longevity of the FEHLMANN machines and the long-lived availability of the FEHLMANN spare parts as well as the qualified support are highly appreciated.



Swissmechanic



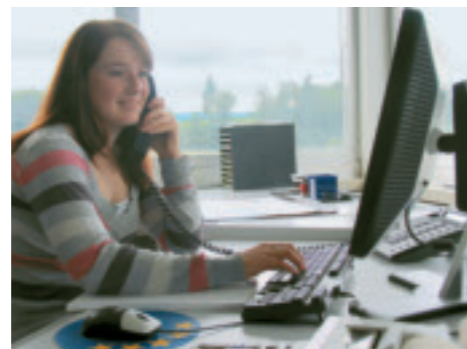
Heidenhain-Swissmem-Fehlmann CNC project, CNC Competence Centre



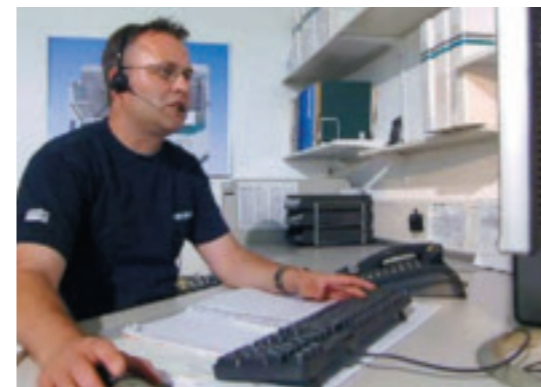
Poly-engineer



Seetal trade exposition



Commercial apprentices



### FEHLMANN Remote Support FRS

For the fast and reliable elimination of problems or in case of questions, you may now share your monitor with our customer service. And this is easier than you think: The FRS is installed on a separate PC which is connected to the Internet and the machine. If a problem arises, you call us as usual; should the error message then require further analysis - e.g. parameter settings and/or status messages - you briefly start the FRS, enter the code of our customer service and clear the way into your control for us. *Very important: You and you alone decide whether and when we log on to your control.*



### FEHLMANN ARO cycle

This standard cycle for the PICOMAX 825 VERSA serves for optimizing the simultaneous 5-axis machining. Using this cycle, swiveling and rotary movements may specifically be adapted to the part at hand; perfect dynamics and surfaces are thus guaranteed.



### FEHLMANN spindle with 30,000 rpm

True to the motto «Everything from a single source», we do not rest on our laurels when it comes to developing our own motor spindles. The new HSK-E50 motor spindle is now also available with 30,000 rpm. This HSC spindle comes equipped with an oil-air lubrication and is quite universally applicable despite its power of 15 kW and high torque of 33 Nm.



### Heidenhain training partner certificate

The Heidenhain training partner certificate qualified the FEHLMANN AG as official Heidenhain training partner. The customer can thus be sure that the FEHLMANN instructors are continuously further trained at Heidenhain and are thus always kept on the latest state of knowledge.

