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PICOMAX 60-M.
Das kompakte Hochgeschwindigkeits-Fräs- und Bohrzentrum mit den grossen Möglichkeiten.

PICOMAX 54 *Top*
Fräs- und Bohrmaschine mit CNC-Strecken- oder Bahnsteuerung und manuellen Handrädern.

PICOMAX 51 DC
PICOMAX 51 TNC
Perceuses-fraiseuses à coordonnées de précision.

PICOMAX 20
Handliche Präzisions-Koordinaten-Bohr- und Fräsmaschine.

Souplesse et maniabilité parfaites pour la réalisation de pièces unitaires et de petites séries.

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REPORT

FEHLMANN



2nd edition

May 1998

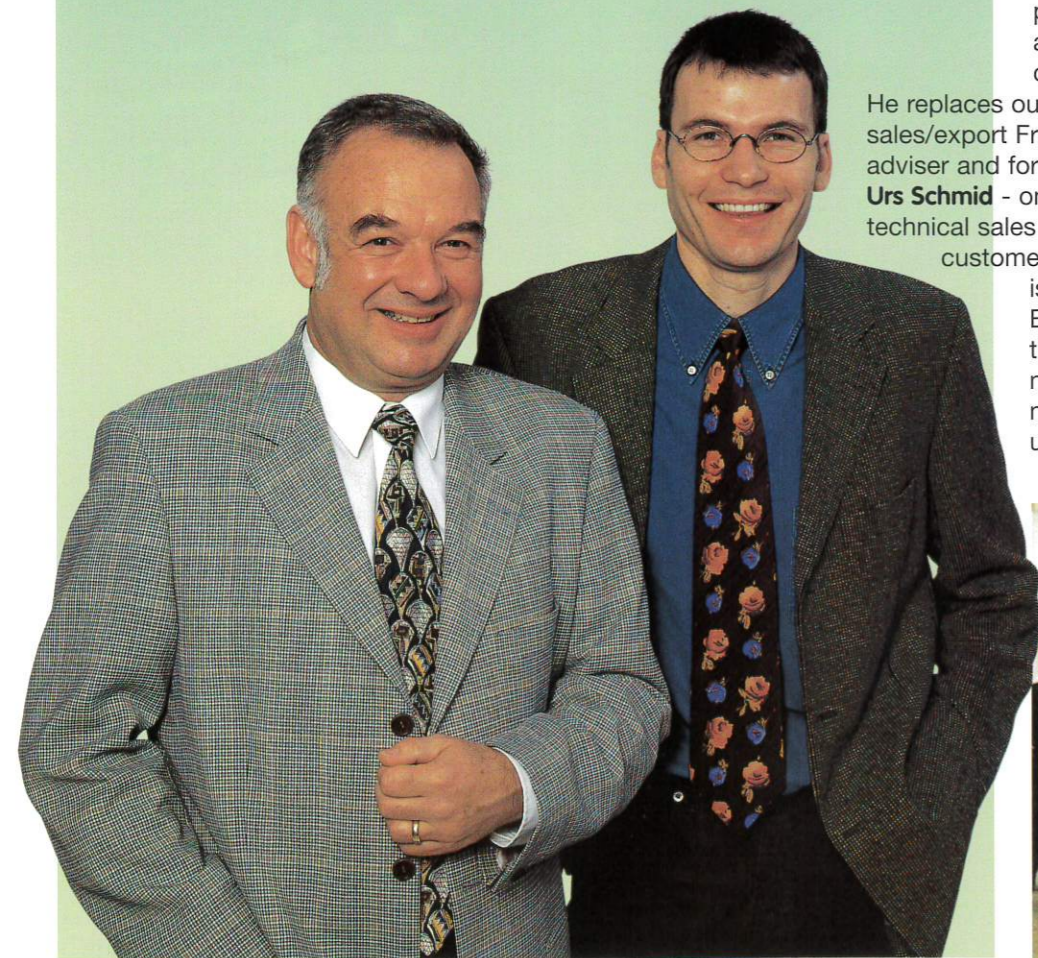


Editorial This time Roland Sandmeier
Technical adviser/sales expert

Dear reader,

Originally, *QUALITY* was the general synonym for top capacity and top products. Slowly but surely, this word lost its original meaning and one could no longer rely on this rating. Fortunately, the tendency goes back to the roots. For some time, great efforts are made to define the term *QUALITY*.

As producers of technical and high quality articles (in the original sense), we never had any problems at Fehlmann. True quality was always the supreme precept. Although this guarantee for quality was always „included“, we also have a real *QUALITY MANAGEMENT*. However, for us, this means much more than the usual final inspection. On the pages 8+9, you will find what exactly we mean. Of course for you it should only be important to still have the guarantee that our products prove themselves during daily use.



He replaces our Freddy Hasler (retirement) in the fields sales/export France and Italy, as internal technical adviser and for advertising.

Urs Schmid - on the right - until today member of the technical sales department (manager demonstrations, customer training, time calculations, tests, etc.) is now responsible for the area Zurich - East Switzerland as technical adviser of the sales department. He is a trained mechanic and worked as tool maker in mould making for five years and joined us almost ten years ago.

PICOMAX 60-M,
the new milling and
drilling centre

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Graphite machining
without dust

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FEHLMANN:
We are obliged to
quality

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Picomax 54 Top:
Proved itself top

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The linkage element
tool

12

New accessories
and the most impor-
tant data 1998 / 99

14

In order to further improve our customer service, we reinforced our adviser team:

Wolfgang Greim - on the left - is the new colleague. However, he is not new in the branch. Originally, he was a tool maker, later he was a production manager responsible for demonstrations, training and sales, having profound experience concerning plastics injection moulding.

REVIEW

EMO Hanover

Also at the latest edition of this world exhibition (10th to 17th September 1997) everyone who has standing or reputation was represented.

For us, this fair medium which takes place at Milan-Hanover-Paris-Hanover in turn has always been a must.

On the last exhibition in last autumn, not only the latest high-speed machine model PICOMAX 60-M met great interest, but also the PICOMAX 20 and the PICOMAX 82 with the work piece changing robot EROWA which were presented in the last REPORT.

However, we are most pleased that we can increasingly draw our customer's attention on us in the field of milling machines“

In general, an end of the recession has been recognised among exhibitors and visitors. Finally! is all we can say about this.

IBW St.Gallen

The best 533 junior professionals from the whole world met at St. Gallen from 4th to 7th July 1997 for the 34th professional Olympic games.

31 nations were represented and competitions took place in 38 professional branches. Switzerland took the fifth place and won 19 medals (see newspaper cutting).



Swiss big success Outstanding young people at the professional Olympic games

St. Gallen. - On the occasion of the 34th professional Olympic games at St. Gallen, Switzerland collected 19 medals; eight off each in gold and silver as well as three off in bronze. In the official nation evaluation, it took the fifth place. 533 candidates from 31 countries participated in this event which lasts several days and is held every two years.

This was the largest attendance ever registered on this event. Altogether, competitions in 38 professions were on the program and the Swiss delegation was able to be successful in the service branch as well as the commercial and technical services. (AP)

FEHLMANN Internal exhibition

22nd to 25th October 1997

Our small „private“ autumn exhibitions have become a popular tradition in the meantime. In a casual atmosphere, we can take the time to show our customers new and well-tried products. On this occasion, the guided tours through our company always meet great interest. And, concerning interest: We were very pleased about the visitors from Germany, France, Austria and the Benelux countries.



W. FEHLMANN Ltd, Machine tool works, CH-5703 SEON
Phone ++41 (0) 62 775 25 51, Fax ++41 (0) 62 775 22 59
E-MAIL: mail@fehlmann.com INTERNET: http://www.fehlmann.com

PICO-

SPACE REQUIREMENT

MAX CAPACITY



PICOMAX 60-M:
The compact high-milling and drilling centre with great possibilities.

The New PICOMAX 60-M has especially been designed for tool and mould making. It is perfectly suited for making graphite and copper electrodes, machining high-alloy steel moulds and even for hard machining of hardened steel.

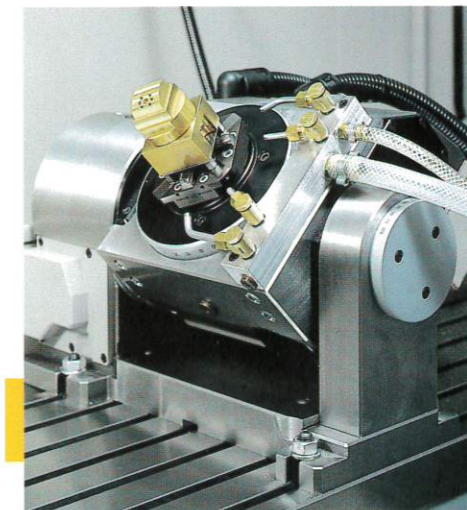
However, the PICOMAX 60-M with its large capacity is also ideal for mechanic single parts as well as small to medium lots of aluminium, plastics or steel.

The precise high-speed milling and drilling centre with vertical column and integrated coordinate table and automatic tool changer for 24 tools. All axis drives are effected via ball screws and digital three-phase drives with A.C. motors. The high speed spindle which is integrated into the vertical column is equipped with hybrid bearings and a speed range of 50 - 18.000 rpm and offers Z/S interpolation.

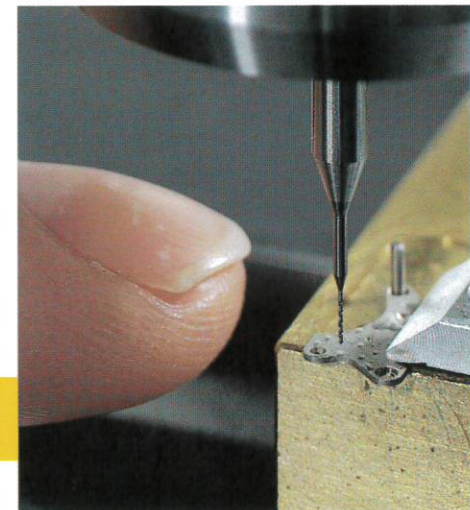
The smooth and low-vibration machine operation allows to work with smallest tools even at highest speeds and the milled parts achieve extremely high accuracies and surface finishes.

The optimum stability and precision guarantee jig boring machine quality.

Further excellent features are: Short accelerating and decelerating times, feedback of the effective speed and the fluid-cooled spindle (ideal thermal stability).



4- / 5-axis machining with automatic indexing and swivelling unit
FEHLMANN ATS 160 CNC



Fine boring in stainless steel
ø 0,15 mm

GRAPHITE

Everybody knows the problem: Graphite dust is extremely fine and soils every machine tool in the twinkling of an eye, it deposits on all surfaces, enters the smallest gaps and even in the production workshop the black dust is distributed over several meters. The most unpleasant thing about this is that it is very laborious to „catch“ the dust since it is permanently swirled up during cleaning.

In mould making, graphite is increasingly used. The material's advantage is that it does not get hot as e. g. copper. The disadvantages: See above.

By means of the SE dust separation system, FEHLMANN grabs the roots of the problem by clean suction of smallest particles immediately after they are released into the air. This cannot only be put down to the strong suction force, but also to the fact that a vacuum is built up in the machine

room. Thus, the complete interior space remains dust-free. But most important of all, the spindle, the guides and the tool tapers are prevented from being „powdered“.

Another pleasant side effect of an optimum suction is the test result that the life of milling tools is doubled.

The entire SE system is made as a module system. According to your requirements, you can select one or

two suctions - on the table or the dividing unit - or the additional manual suction which works better than every industrial vacuum cleaner (stronger suction force and finer filters)!

Besides the PICOMAX 60 which can as standard feature be equipped with the system (optional), the system can also be added to the PICOMAX 82. Special customer-specific models are also possible.

The SE dust separation system does not only prove itself concerning graphite. For all other types of material machining which produce floating particles - e. g. ceramics, plastics and composite materials - a reliable suction is also advantageous.

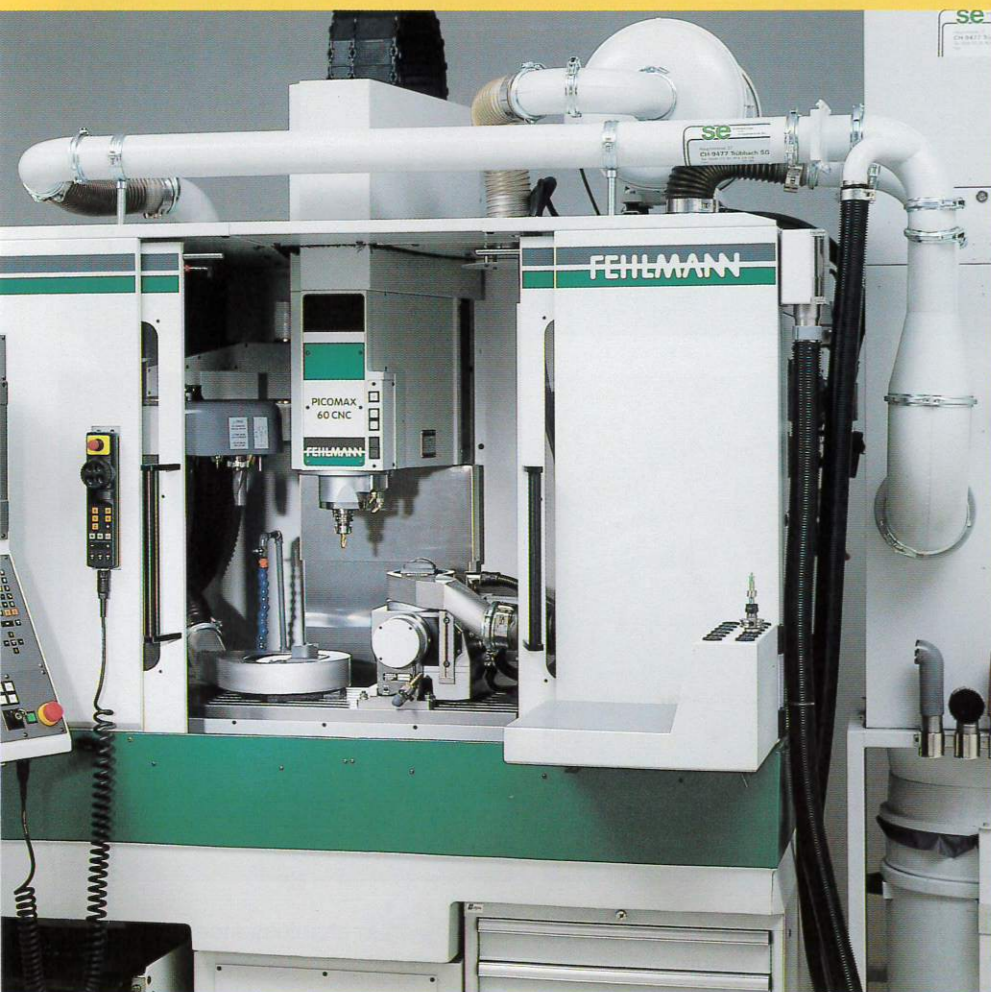
In case of a precious metal machining, it may be used for the recovery of valuable materials.

Left figure: The SE dust separation system on the new high-speed machine PICOMAX 60-M.

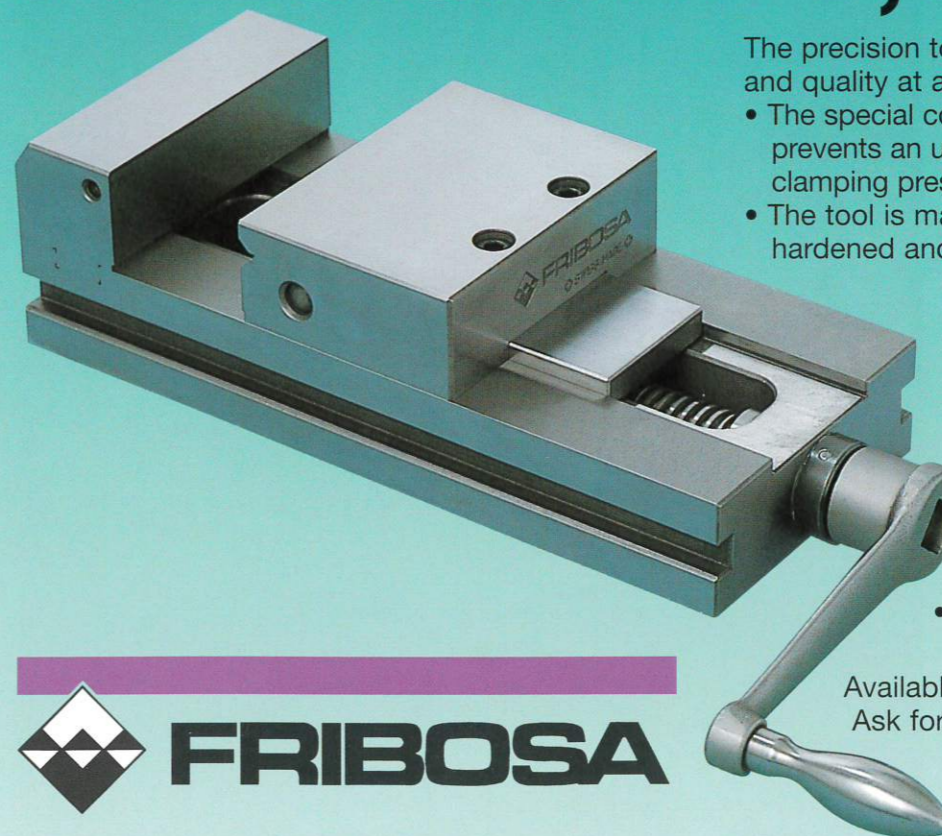
Upper right figure: ▶ The fine graphite dust is directly sucked off the machined part.

Upper right figure: ▶▶ The generously dimensioned pipes significantly reduce the resistance. Please observe the manual suction with the 4 m hose and the four suction nozzles. The filters are washable and the collecting receptacle is emptied without releasing any dust.

If you are interested, we will show you the SE dust separation system without any obligation.



PRECISION: 0,005 mm!



The precision toolmaker's vice offers technology and quality at a reasonable price.

- The special construction of the toolmaker's vice prevents an uplift of the work-pieces under high clamping pressure.
- The tool is made out of high-grade tool-steel, hardened and true to gauge size.
- The accuracy of the system is 0.005 mm.

Possible applications of the precision toolmaker's vice are

- milling
- boring / jig-boring
- surface-grinding
- profile grinding
- jig-grinding
- intermediate and final control

Available in five sizes
Ask for our special leaflet or just call us!

 **FRIBOSA**

Quality management

Or in other words - why you can always rely on us.

The machine manufacturer FEHLMANN always felt obliged to quality. Since Dieter Syfrig joined us, we took another important step in this direction. He introduced a consistent quality management at Fehlmann.

What is quality management?

Simply speaking: The most important target of the quality management is to produce faultless products using optimum procedures and high process stability, if possible. A demanding target, because consistent quality management concerns the entire company. The most important items are:

- Every employee is responsible and thus the most important goal is to do only 100 percent work.
- Principally, a fault may only occur once and must be eliminated immediately.
- Processes are permanently and department-comprehensively analysed and improved in order to achieve a high process stability.
- A quality control of the mechanic parts is absolutely necessary. All key and main parts are checked and a protocol is written down.

➤ As quintessence, the quality management should also result in quality improvement, thus offering a benefit for the company as well as the customer.

Since development continues to go on, everything remains moving. A continuous improvement of all mentioned items must be striven for.



The measuring device „Straightline“ provides for angle and evenness measurement with maximum measuring accuracy.

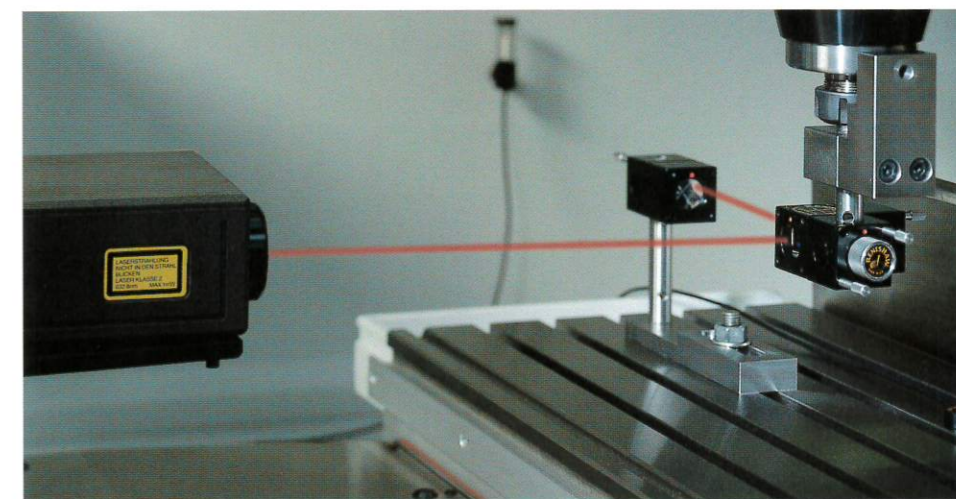
Dieter Syfrig (on the right) the main responsible for our quality management and René Widmer checking a protocol at the CNC measuring machine.

Different measuring methods which contribute to the quality management.

By means of the two-dimensional crossed-grid measuring device (KGM), the dynamic behaviour of a machine tool can be monitored and adjusted in two axes. It allows to set up machine tools specifically for the applications intended by the customer.

At FEHLMANN, the positioning accuracy as well as the dynamic behaviour of the machine tool is checked and taken down in a protocol as standard feature in one linear axis by means of laser measurement.

7,1 tons is the weight of the CNC measuring machine which is mounted in air bearings and used for checking single parts of up to 2 tons! The working area is 2000 x 1200 mm and 900 mm high. Measurements can be carried out from five sides. At the same time, a protocol of the measurement is taken down.



Touch or programme.

The Picomax 54: Proved itself Top

10 The targets were clearly defined:

The construction of a compact milling and drilling machine, which combines manual and automatic CNC operation.

It should allow to carry out conventional as well as two-axes CNC operation with automatic drilling feed.

With some pride, we may say that we did not only achieve our goals but even surpassed them. And the customers who decided to purchase a 54 Top in the last year were enthusiastic without exception. (We really have the practice under control!)

The fields of application are also „top“.

The machine is perfectly suited for the manufacture of single parts and small lots as well as tool and mould making, for test and prototype manufacture of laboratories. It is especially suitable for the use in the apprentice department.

Milling, drilling, boring and threading are executed with minimum programming and set-up work. In many cases, our customers modernise their conventional workshops or replace tool milling machines or even small jig boring machines by our Picomax 54.

The „application-specific“ machine construction.

The machine head is equipped with an extensible spindle quill. The coordinate table is moved by means of ball screws; this motion can be executed conventionally with mechanical handwheels as well as automatically with the control.

Because of the extremely large distance between spindle nose and table, bulky workpieces can also be machined.

A machine head „having brain“.

The machine head is adjusted in height by means of a motor and can be moved both manually and programmed as CNC axis (W). The spindle is equipped with the proven quick tool changer Fehlmann SF 32. With this device, tools can be changed in a few seconds. The quill can be extended manually by means of a drilling lever as well as with automatic feed. The spindle speeds can be pre-set as required or can be programmed via the control. For series-production jobs, the drum stop with 8 adjustable cams can be used for different and precise machining depths. A self-locking fine feed of the Z axis is provided for milling.



Heidenhain TNC. No compromises concerning the control unit, too.

The PICOMAX 54 Top is equipped with a Heidenhain straight-cut control or optionally with a path control, which enables easy and interactive programming.

Practice oriented machining cycles for machining pockets, hole circles and hole rows. Thus, it is much easier to program a machine.

Optimum stability and high precision on guarantee jig boring machine quality.

If you have further questions concerning the PICOMAX54 TOP, please order the special brochure (fax order form on page 15) or simply call our customer service.

Easy manual operation.



Manufacture of simple parts or execution of single operations positioning by means of handwheels or axis directional keys in digital display mode. No CNC knowledge required.

The excellent stability of the machine as well as the stepless speed and feed variation enable the execution of most demanding milling jobs with optimum cutting conditions.

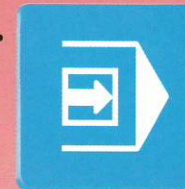
Precise manual input.



Quick and precise manufacture of single parts. Hole circles and hole rows with graphical support. Precise manual input.

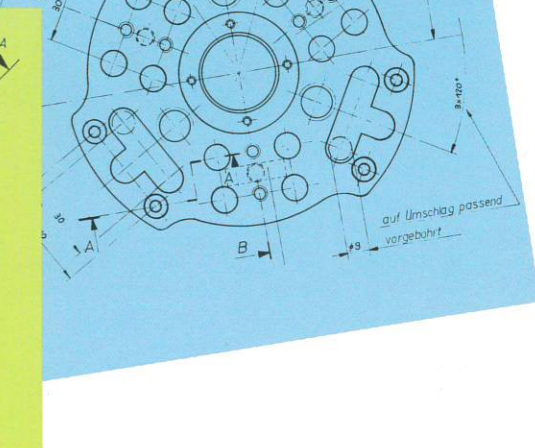
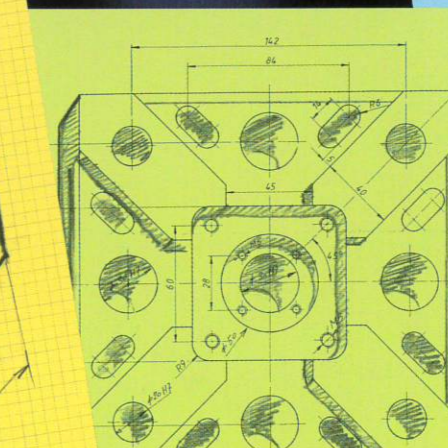
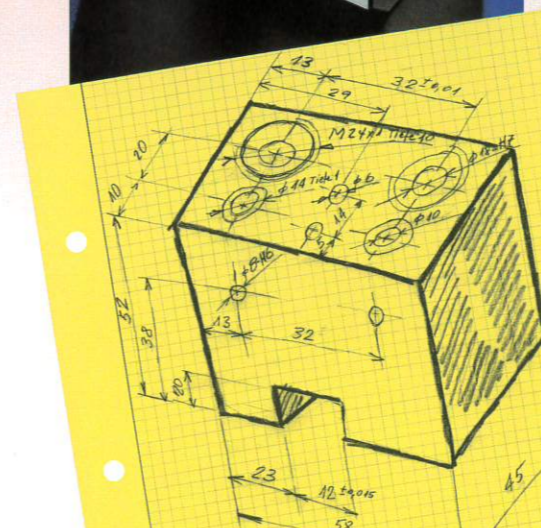
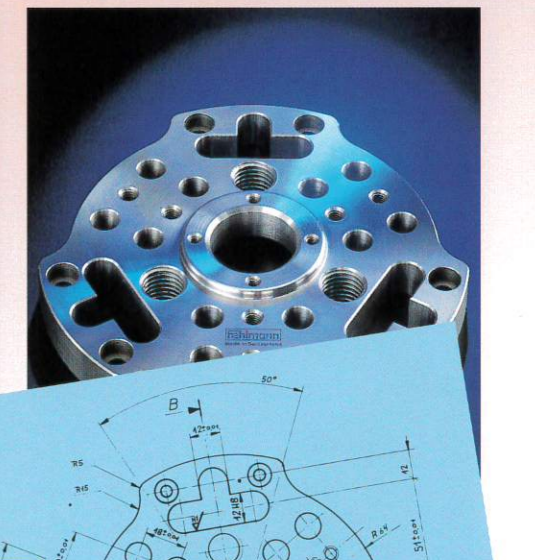
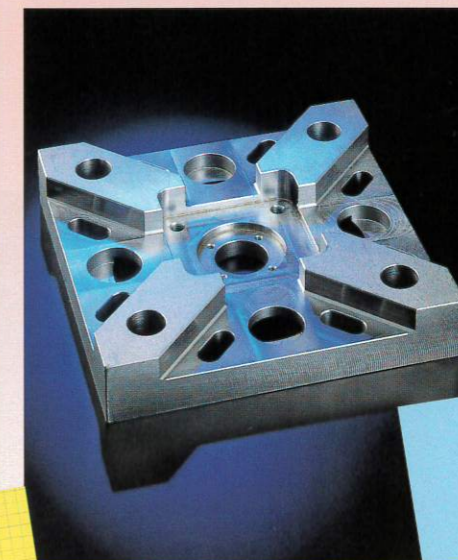
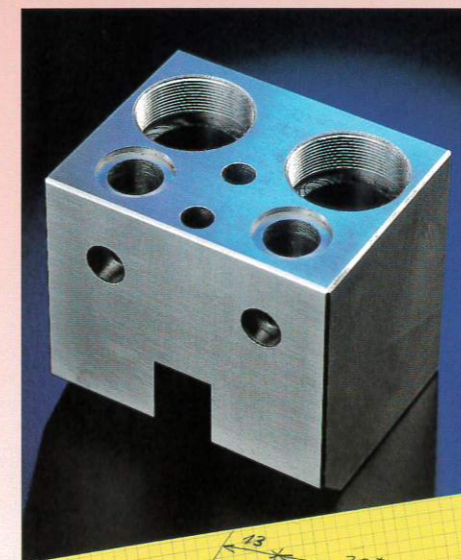
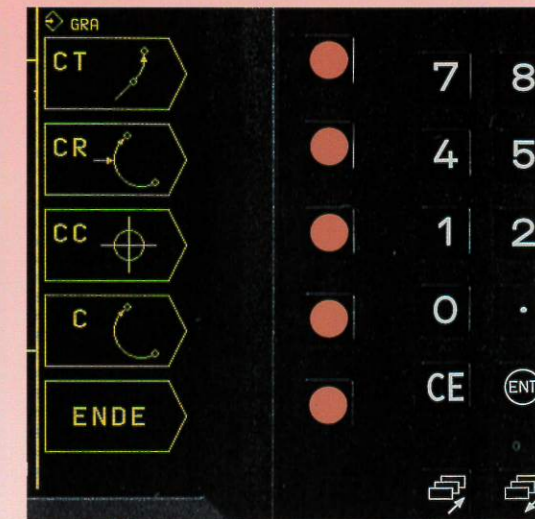
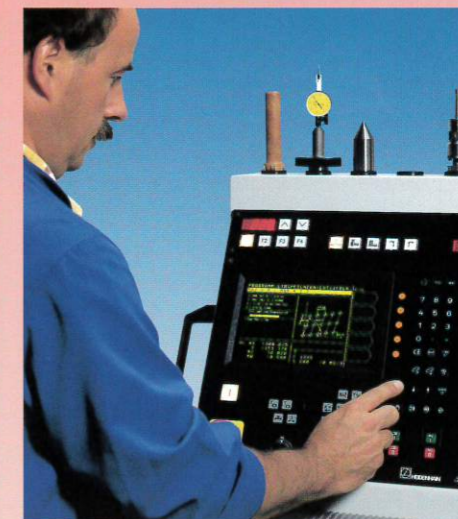
The Heidenhain straight-cut or path control is perfect for the work shop: It enables an easy and direct interactive programming on the machine.

Comfortable CNC automation.



Small batch production and shape programming. Two-axes CNC operation (X/Y) with drilling feed (Z) which can be triggered automatically. Interactive programming cycle support.

The TNC is programmed by means of soft keys, and the target positions are entered via the numerical keyboard. The control considers the tool radius and the tool length via the W axis.



fraisa

The Tool as a Connecting Link

12 The framework conditions for enterprises in the metal cutting trade are changing rapidly. Variable purchasing behaviour, profit centres, open markets, etc. - the companies that want to be successful in this field either have to meet extraordinary requirements in product quality or deadline, or have to offer a cost

of this competition can be seen in the metal working industries more than in almost any other branch of industry. Never before have machine tools and tools experienced a similarly pleasing development surge than during the past five years.

The connecting link between machine and workpiece has to be tools adapted to the material, geometry, and tolerance of the workpiece. At the same time, the possibilities of the machine have to be utilised in an ideal way from a technical and economical point of view.

Necessarily, this consideration leads to the fact that modified machines also require modified tools. For this reason, development and innovation means for us the creation of tools which permit a cost-optimised utilisation of new machines.

The following examples will demonstrate how this idea can be put into practice.

A tap that gets the work done

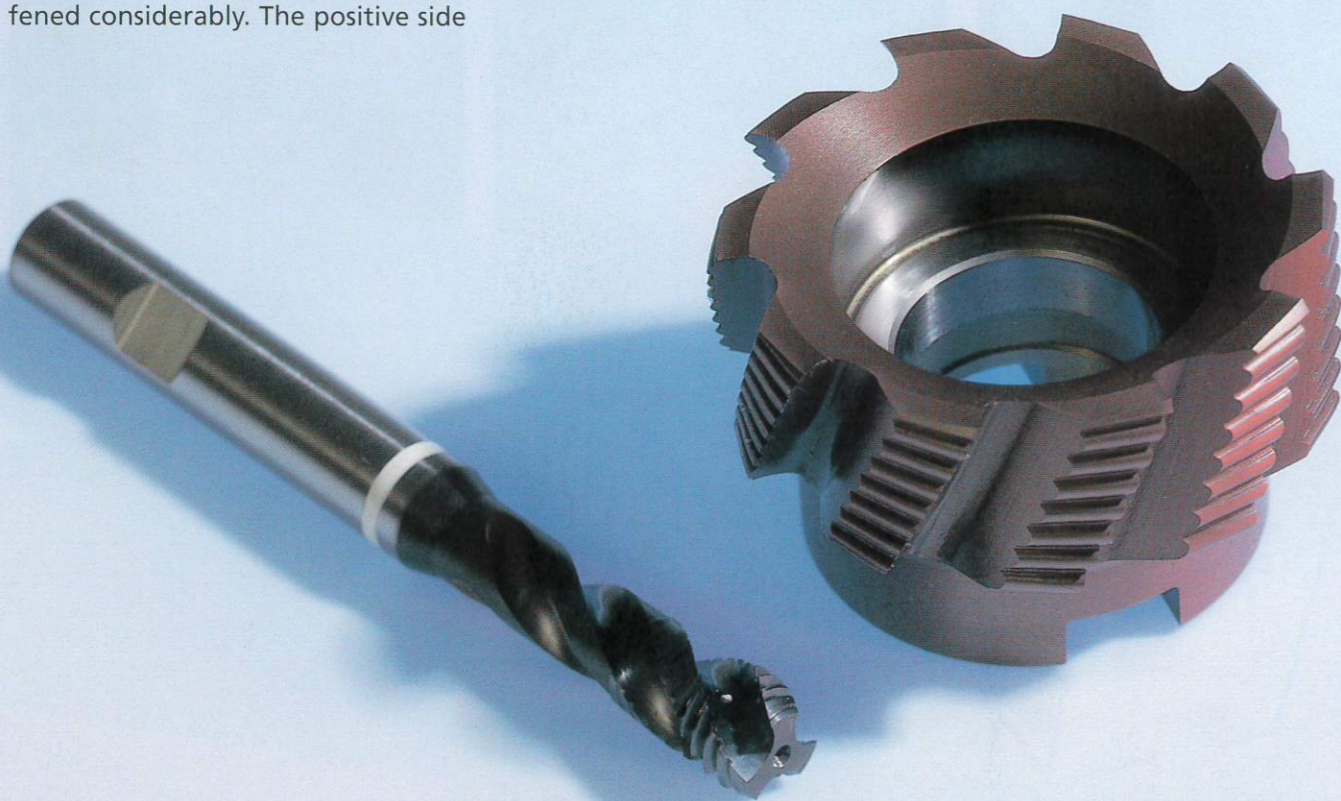
Taps combine the functions of cutting (chip removing) and guiding (adherence to the thread pitch), which is a balancing act because a large clearance angle is required for the function of cutting and a small clearance angle is necessary for the function of guiding. The result is an endless versatility of geometry types which are adapted to the individual materials. However, all modern CNC machines have the possibility of synchronise turning and axial movements to the spindle (rigid tapping).

In the Polytap-R tap we have consistently delegated the function of guiding to the machine for this reason. Uncompromisingly, the tap has been designed for the function of cutting, thus producing a tap for all types of material from aluminium and steel to cast iron. In addition, we

Josef Maushart, Chairman of the Management of Fraisa SA, Bellach, Switzerland



advantage at the international level. Protection of inefficient production in the own company or in the own country is a matter of the past in Europe. In the face of stagnating or decreasing volumes in Central Europe and simultaneously opening markets, the competition has stiffened considerably. The positive side



have fitted our Polytap-R with shanks in compliance with German standard DIN 1835 B (straight shank with side clamping surface). By consistent utilisation of modern CNC standards, the versatility of taps can be reduced to one type per type of thread, thus completely removing the necessity of special chucks for taps. These facts save time, costs, and tool space, and simplify stock-keeping and tool selection.

Shell end milling cutter - the gentle force

The question as to whether shell end milling cutters or inserted tooth milling cutters are the more economical alternative depends on many factors, two of the main aspects being drive capacity and stability as well as spindle bearing of the machine. Especially in machines with a driving power of below 10 kW, the maximum material removing rate is not limited by the tool, but by the machine power. Thus, it is decisive for productivity how many cubic centimetres per minute and kW can be removed with a tool. In standard shell end milling cutters, this value is about twice as high already as with inserted tooth milling cutters. Regardless of productivity, simple tooling and

low costs per cutting edge were features for indexable insert tools. Against this background, we have subjected our shell end milling cutters to a relentless value analysis, and have created a new product in Millcut. Today, 75 per cent of all shell end milling cutters use only the first third, and 90 per cent use only half of their height (this fact applies for shell end milling cutters with a roughing profile including regrinding). As, however, the high costs for the production of the roughing profile increase linear with the length of the tooth, we have shortened the tool to two thirds. The unused section of the edges are left away simply. In addition, in opposition to the standard, we have replaced the longitudinal slot which is very expensive to produce and hardly used any more by the cross slot. The number of teeth of the tool is increased depending on the diameter, which increases the productivity and service life of the tool at the same time. Thus, Millcut constitutes a new generation of shell end milling cutters, which, in an ideal way, converts the available machine power into material removal, i.e. productivity and which is distinctly cheaper than standard shell end milling cutters as revealed by the value analysis in the production costs. For machines with a limited driving power, a considerable reduction of the machining costs is achieved.



Tungsten carbide and high-speed cutting

13 Irrespective of whether complex surfaces in mould making or thin webs for aircraft are to be produced, the HSC technique shows the way in these cases. As soon as the axial and radial depth of cut gets very small in steel machining (typical situation in mould making), the cutting speed can be increased dramatically. In the end, this permits a high feed rate and thus a faster or finer finish. This technology is characterised by extreme cutting speeds at small cutting thickness. It is obvious that new tool shapes were created for this application as well. For clearing in die and mould making ball end mills with a helix angle of 0° and a rake angle of 0° are used for material hardnesses between 50 and 60 HRC. Moreover, end mills with shorter cutting edges and corner radii in the 3-D range are being used increasingly. For the machining of aluminium integral components a new de-facto standard has been created with Aluspeed. Feed rates of 15 m/min. at cutting speeds of over 1,000 m/min. are thus controllable.

Conclusion

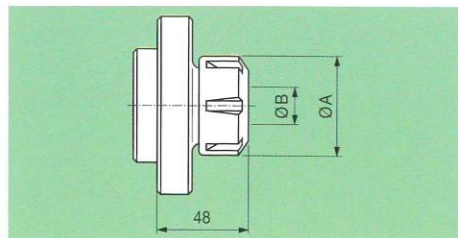
The considerable further development of the machine tools can be converted into high quality and low costs of chip removing through the connecting link of the tool. This fact requires from the tool manufacturer a wide range of offers, the use of value analytical methods on existing tools, and the continuous implementation of new knowledge in the fields of material and coating engineering. The individual modules for far-reaching cost optimisation in chip removing are on hand today. The possibility of co-operative exchange of ideas, however, instead of a rigid purchasing-and-selling system, is used too little.

Fraisa SA, CH-4512 Bellach / SO
Telefon ++41 (0) 32 617 42 42
Fax ++41 (0) 32 617 42 43
E-Mail: info@fraisa.ch

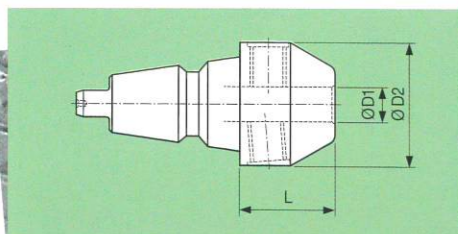


NEW ACCESSORIES

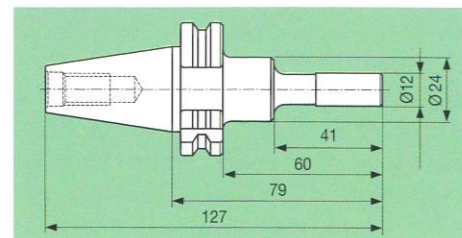
14 Collet attachments for ESX collets
 Ø A 49,5 mm / Ø B 3 – 20 mm
 order no: 4820-032
 For dividing unit 4820-000 and 4851-000



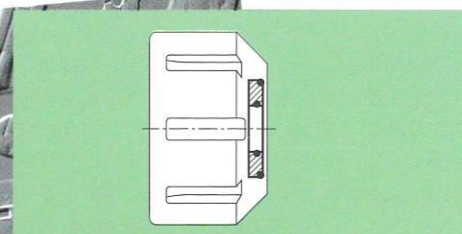
Milling chuck
 For milling cutters with straight shank and clamping flat.
 Combination: form B and E.
 New order no:
 7232-006 / 7232-020



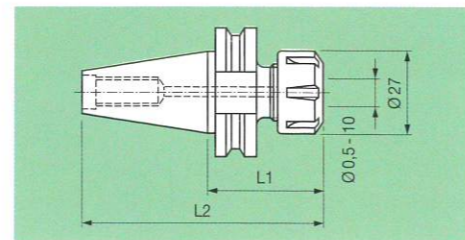
Zero tool taper
 For rapid and accurate measure of a reference surface.
 standard (8079-000) and fine balanced (8079-001)



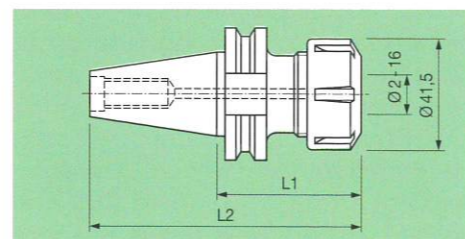
Set of seal washers
 For tight collet chuck, ESX 16, ESX 25, ESX 32, steps of 0,5 mm
 (Order number see machine accessories catalogue Page 44).



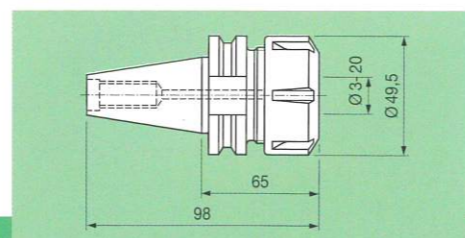
Collet chuck ESX 16 with locking nut
 With through hole for internal cooling
 Clamping range 0,5 – 10 mm, available:
 – standard <math><10000^{-1}</math>,
 – fine balanced,
 – fine balanced and tight*
 (Order number see machine accessories catalogue Page 43)
 L1 45 / L2 93 L1 80 / L2 128



Collet chuck ESX 25 with locking nut
 With through hole for internal cooling
 Clamping range 2 – 16 mm, available:
 – standard <math><10000^{-1}</math>,
 – fine balanced,
 – fine balanced and tight
 (Order number see machine accessories catalogue Page 43)
 L1 55 / L2 98 L1 90 / L2 138



Collet chuck ESX 25 with locking nut
 With through hole for internal cooling
 Clamping range 3 – 20 mm, available:
 – standard <math><10000^{-1}</math>,
 – standard and tight*
 (Order number see machine accessories catalogue Page 43)



The new accessories catalogue

Completely revised, many of the existing accessories with new item numbers.
 Please refer to our fax order form on page 15.

Please send us following documentation:

- Please send us the leaflet "FEHLMANN-manufacturing program 97/98"
- Please send us the *new* FEHLMANN accessories catalogue including price list
- Please send us the leaflet
 - Piercing press
 - Precision coordinate tables
 - Automatic CNC dividing units
- Please send us a detailed offer for
 - the new PICOMAX 60-M
 - the PICOMAX 20
 - the allround-machine PICOMAX 54 TOP
 - the PICOMAX.....
- We are especially interested in your graphite machining possibilities.
- Please call us! RE2 0498

Company.....

Person responsible.....

Address.....

Post code / Place.....

Country.....

Phone.....

Fax.....

Date..... Signature.....

30. March - 3. April 1998
Machine-Outil 98
 Paris, F

12. - 16. May 1998
Euro-Tech
 Brussels, B

26. - 30. May 1998
SIAMS 98
 CH-2740 Moutier

15. - 19. June 1998
Internationale Messe Poznan
 Poznan, PL

16. - 20. June 1998
METAV 98
 Düsseldorf, D

14. - 19. September 1998
Maschinenbaumesse BRNO
 Brno, CZ

15. - 19. September 1998
AMB 98
 Stuttgart, D

1. - 6. October 1998
BI-MU
 Milano, I

24. - 28. November 1998
FAWEM
 Basel, CH

5. - 12. May 1999
EMO
 Paris, F

Maschinen-zubehör
 Accessoires de machines
 Machine accessories

FEHLMANN