## FEHLMANN
### PICOMAX 60-HSC

5-axes CNC High-speed machining center

<table>
<thead>
<tr>
<th>Manufacture</th>
<th>FEHLMANN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>PICOMAX 60-HSC</td>
</tr>
<tr>
<td>Year of manufacture</td>
<td>2007 / only ca. 14,542 working hours</td>
</tr>
<tr>
<td>Control</td>
<td>HEIDENHAIN iTNC 530</td>
</tr>
<tr>
<td>Machine number</td>
<td>14607253</td>
</tr>
<tr>
<td>Travels</td>
<td>X – 505 / Y – 355 mm / Z - 610 mm</td>
</tr>
<tr>
<td>Table</td>
<td>920 mm x 380 mm</td>
</tr>
<tr>
<td>Tool holder</td>
<td>HSK-E40</td>
</tr>
<tr>
<td>Speed range</td>
<td>50 – 42,000 rpm</td>
</tr>
<tr>
<td>Tool changer</td>
<td>24-fold</td>
</tr>
</tbody>
</table>
EQUIPMENT

4/5. axis (ATS 160 CNC)
Lasersystem BLUM Type P87.0634 - NT
Measuring probe RENISHAW Type OMP 40
Spindle cooler
Extraction system
Coolant connection
Electronic handwheel
User guide / Documentation
Machine parameters on storage medium
Vertical Machining Centre

PICOMAX® 60
Universal in all respects.

FEHLMANN
Productivity increased four-fold: Precise, fast, reliable and ergonomic.

**Precise**, as the machine is standard equipped with several high-accuracy “features”, as well as having a thermally stable design and construction.

**Fast**, as completely digital axis drives, HSC spindles (optionally high torque or high-power spindle) and a rigid design and construction guarantee maximum productivity.

**Reliable**, as the machines are produced in-house, assembled, commissioned and tested by FEHLMANN.

**Ergonomic**, not only as the operator is close to the part, but also due to the well-thought-out arrangement of operating elements and peripherals.

**PICOMAX 60-M**
**PICOMAX 60-HSC**

The machine is simple to operate and perfectly suited for the cost-effective and profitable production of small to medium-size parts, allowing optimum surfaces and tolerances.

Optionally available with pick-up changer for 24 tools (see pict. above) or with the larger tool changer for up to 48 tools (see pict. on the right). The tool changers allow for very easy and ergonomic access and are integrated into the machine in an efficient and space-saving way.
Even more productive thanks to automation - can be freely configured and retrofitted at any time.

Well-thought-out and tailored to customer’s needs.
The FEHLMANN automation solutions expand the machine’s application spectrum and can be integrated at any time without diminishing machine accessibility. The PICOMAX 60 can be easily adapted to a variety of automation concepts - tuned and tested for full performance from the very first day. Whether as a single-machine solution, automation for two machines or as a linear system.

Simple and intuitive control.
Depending on the number of pallets and parts, the system is controlled and monitored either by the flexible FEHLMANN Milling Centre Manager (MCM) or via an integrated pallet management file.
PICOMAX® 60-M / -HSC:
Machining centres not simply meeting, but beating the user’s expectations and requirements.

With its compact and easy accessible design the PICOMAX 60 is perfectly suited for each workshop. This machine concept combines the qualities of a precision milling machine with the dynamics of an HSC-milling machine. Available in different models and applicable for both, a universal milling machine (-M version) or high speed cutting milling machine (-HSC version).

The configurations of the machine depend entirely on the user’s expectations and requirements. All axes drives are driven via ball screw and digital AC drivers with AC motor. The axes are equipped with high-precision glass scales for direct path measurement. The high-speed spindle integrated into the vertical column is equipped with hybrid bearings and offers a speed range of 50-20,000 rpm (HSC up to 42,000 rpm) and disposables of Z/S interpolation for tapping without compensation chuck.

The quiet low-vibration machine operation even under high speeds permits machining tasks with even the smallest tool. Milling operations of top precision and excellent surface finish are reached.

Further features and characteristics:
- Practical accessibility (operator to machine and spindle to dividing attachment).
- Liquid-cooled spindle (ideal thermal stability).
- Short acceleration/deceleration times of spindle and axes.
- Feedback of the effective spindle speed.
- Heidenhain CNC control unit.
- Practical options, adapted to the actual applications.
- Fully digital drive technology.
**Most versatile applications.**

- In mould manufacturing for the production of copper and graphite electrodes, as well as for HSC milling operations in hardened tooling steel
- For the production of general maximum precision machine components
- For the machining of complicated and/or finest single parts
- For complete series production
- In 5-axis machining (in combination with the FEHLMANN dividing attachments)
- In tool, jigs & fixtures manufacturing
- Complex aluminium parts
- Prototype production
- In test workshops

The optimum rigidity and high precision guarantee jig boring quality.

**Precision parts**

![Precision parts image]

**Mould production**

![Mould production image]

**Tool, jigs & fixtures manufacturing**

![Tool, jigs & fixtures image]

**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. Energy consumption is taken into account early in the development process and the company’s production is characterized by its sparing use of resources and lowest possible CO₂-emissions.

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

With FEHLMANN you stay one step ahead of the competition!

*Your Precision Advantage.*
The structure of the PICOMAX® 60: Solid, rigid, precise.

Optimum results in HSC milling may only be obtained if the electronic system is perfectly tuned to the precise and robust mechanics.

The in-house production of all essential machine parts forms the solid basis for reliable operation - day after day.

The customer is our trusted partner. A responsibility which Feilmann takes on from A to Z. Our high level of production integration guarantees you quality on all levels.

Ultimate final quality check in every machine using laser interferometer and cross-grid measuring device.

Machine construction in vertical column design with integrated coordinate table and generously dimensioned profile guideways, as well as glass scales in all axes guarantee “rigid boring machine quality”. Complete digital drive technology in all axes for maximum dynamics.

Everything from a single source: Naturally, the complete dividing attachments are also developed and produced in-house.

Which means: No problems with accessibility and non-compatible machine elements.
Handiness and easy accessibility are further valuable benefits in daily use.

The platform for efficient and precise working offers a perfectly ergonomic workplace.

The angular arm with twin-gripper guarantees a precise, fast and simple loading of the tools. The disk magazine offers ample room and stations for the machining of demanding or sophisticated work pieces.

Work comfortably - all machine elements are within easy reach and effortlessly accessible.

The compact pick-up changer comfortably fits 24 tools.
Virtually unlimited versatility and flexibility for all types of applications …

The all-rounder, up to 20,000 rpm
With its 20,000 revolutions per minute, this spindle may be used for most applications. Thanks to the perfect combination of torque, speed and quiet low-vibration operation you efficiently get all tasks done – from roughing to fine finishing.

The high speeder up to 30,000 or 36,000 rpm
These speeds allow for the use of the smallest of tools or for high feedrates. These spindles are the perfect solution for those who frequently work at speeds of over 20,000 rpm, but still have high demands on stability and rigidity.

The fine solution, 42,000 rpm
This high-speed spindle with its 42,000 revolutions per minute was developed for small and medium-size machining applications.

Tapping
Naturally the 4 spindles are suitable for tapping without compensation chuck. The machine synchronizes the feed movement with the spindle rotation (Z-B Interpolation).
The selection of the correct spindle is essential. New technologies and tools continue to open up new paths. We would be happy to advise you.
... hand in hand with the appropriate spindles.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
<tr>
<td>Repeat accuracy (mm)</td>
<td>0.002</td>
</tr>
<tr>
<td>Speed range (rpm)</td>
<td>50-42000</td>
</tr>
<tr>
<td>Output at S1 (100% ED) (kW)</td>
<td>13</td>
</tr>
<tr>
<td>Output at S6 (40% ED) (kW)</td>
<td>17</td>
</tr>
<tr>
<td>Max. torque at S6 and rated speed (Nm)</td>
<td>5.4</td>
</tr>
<tr>
<td>Rated speed (rpm)</td>
<td>30000</td>
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</table>
Practical accessibility on two levels: operator-to-machine and spindle-to-dividing attachment.

The automatic dividing/sweiling attachment FEHLMANN ATS 160 set on top of the machine table. It can be mounted/dismounted quickly.

- Optimum accessibility of the work piece by the spindle, even in case of small parts with extremely short clamping area.
- 5-axis machining fixture: 5-face complete machining.
- With direct measuring system of the swivelling axis - maximum precision guaranteed.

Reduction of set-up times and fast set-up order change.

- Unhindered accessibility to the work piece.
- Comfortable operation of the tool magazine.
- Ergonomic arrangement of all operating elements.
Economic and profitable 4/5 axis machining with automatic dividing attachments.

Dividing attachment AT 100
Precise automatic dividing, circular and helical milling, etc., centre height 100 mm.

Dividing attachment AT 125
To be used horizontally with pneumatic-hydraulic spindle clamping.
Ultracompact, high-precision dividing attachment for automatic dividing, circular and helical milling, etc., centre height 125 mm.

5-axis machining
Automatic CNC dividing and swivelling attachments with pneumatic-hydraulic clamping of both axes, which can be controlled simultaneously or simply be used as positioning axes.
Very compact, solid and highly precise.
Swivelling axis is fitted with double clamping.
For fully automatic dividing, circular and helical milling processes, etc.
Fully digital drive technology.

Dividing/swivelling attachment ATS 160
Centre height 160 mm
Positioning measure via direct measuring system at swivelling axis.

Please ask for our separate brochure for dividing attachments!

Perfect accessibility - even small, fine parts may be machined using short standard tools.
The work pieces do not have to be “extended” to be clamped.

This use of a tail center grants the perfect stabilization of long parts or swivelling bridges.

Flexibility - you can easily use an additional vice next to dividing attachment on the spacious table.

So why not let us advise you.
Individual options. Used precisely where they are required for diverse machining tasks.

**Laser System**
Non-contact tool measurement and breakage detection directly on the machine. Precise length or diameter measurements in the μm-range of even the smallest part diameters, starting from 0.3, are possible - either stationary or rotating. The measured values are stored directly in the central tool file of the machine control unit. The tool is cleaned prior to each measurement.

**Additional HF spindle**
For speeds up to 40,000 or 100,000 rpm. Simple installation - laterally mounted to the machine head (preparation of the mounting face, including mounting holes).

**Measuring probe**
For measuring the tool length and tool radius (single-edge measurement). The measured values are automatically stored in the central tool memory via the TNC control unit. The measuring probe also allows for efficient tool breakage control.

For the machining of graphite parts, an efficient on-site disposal system can be integrated. Quick re-equipping for the machining of graphite is possible.

**3D probe system**
With infrared signal transmission to register the part zero point and for part measurement functions. Automatic eccentricity compensation thanks to 360° radiation.
Standard coolant system
Coolant tank, chips container and workpiece shower.

Enhanced power-save function
Automatic standby mode of machine drives after processing the NC-programs.
Re-start of the system automatically via electronic timer. This allows for unattended spindle and axes warm-up.

Bag filter to standard coolant system
(option)
With suction lifting pump for coolant filtering when working with fine chips.

Coolant system with auxiliary tank
To keep the coolant temperature low even with high production output, an additional tank with 600 litre capacity is used. Consistent coolant quality is ensured through automatically actuated circulation system after two hours of inactivity. A high pressure pump (60 or 60 bar) allows the use of internally cooled tools.

Minimal Lubrication System
Economical cooling and lubrication system. Perfect for milling or high-speed cutting of materials such as aluminium, copper and hardened steels. The device is equipped with 2 nozzles and is controlled via M-functions.

Swiveling board
For the storage of measuring tools, work pieces, etc., including holders for 12 tools.

Drawers (standard)
Generously dimensioned drawers integrated in the base allow orderliness, good overview and quick access.
### PICOMAX® 60-M / -HSC with 24 tool stations.

<table>
<thead>
<tr>
<th>Machine type</th>
<th>PICOMAX 60-M</th>
<th>PICOMAX 60-HSC</th>
<th>PICOMAX 60-HSC</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>20000</td>
<td>30000</td>
<td>42000</td>
</tr>
</tbody>
</table>

#### Travels
- **X travel**: mm 505 for all models
- **Y travel**: mm 355 for all models
- **Z travel**: mm 610 for all models

### Table / work area
- **Clamping surface (length x width)**: mm 920 x 500 for all models
- **T-slot (width / spacing / number)**: 12 / 50 / 7 for all models
- **Distance between table and spindle nose**: 84-934 mm 100-720 mm 114-724 mm
- **Horizontal load**: mm 405 for all models
- **Max. permissible table load**: kg 250 for all models

#### Spindle
- **Tool holder**: ISO 9683 HSK E50 HSK E40
- **Repeatability**: mm 0.002 for all models
- **Speed range**: rpm 50-20000 50-30000 50-40000
- **Output at 61 (100% ED)**: kW 5.6 11.5 19
- **Output at 95 (40% ED)**: kW 8.3 15.0 17
- **Max. torque at 85° and rated speed**: Nm 63.9 32.9 5.4
- **Nominal rated speed**: rpm 1240 4300 30000

#### Tool changer
- **Magazine pockets standard**: 24 20 24
- **Magazine pockets optional**: – – –
- **Max. tool diameter without free spaces**:
  - mm up to Ø 63 for all models
- **Max. tool diameter with free spaces**:
  - mm up to Ø 100 for all models
- **Max. tool length (from spindle nose)**:
  - mm 175 for all models
- **Tool change time**:
  - sec approx. 6 for all models
- **Mean chip-to-chip time**:
  - sec approx. 8 for all models

#### Feed rates
- **Digital AC drive with AC-motors**
- **X/Y/Z axis**
  - mm/min 1-20000 for all models

#### Position accuracies ISO 230, respectively VDI/DGG 3441
- **Position tolerance P**
  - mm 0.005 standard/0.003 increased for all models
- **Position variation range Ps**
  - mm 0.003 standard/0.002 increased for all models

#### Measuring system / Resolution
- **Direct measuring system with glass scales**
- **Resolution in X/Y/Z**
  - mm 0.001 for all models
- **Pressurization**
  - incl. for all models

#### Connecting data
- **Operating voltage and frequency**: V/Hz 3x400/50 for all models
- **Recommended pre-lubrication**: A 32 AT 40 AT 32 AT
- **Pneumatic operating pressure**: bar 6 for all models

#### Weight
- **Machine tool**
  - kg approx. 3350 for all models

(excl. cooling medium)

Subject to technical modifications.
MACHINE PICTURES
Thank you very much for your interest