

# HPM 1000U/HPM 1100 Machining in another dimension!

Overwhelming enthusiasm – Feedback from EMO 2005 in Hanover, Germany clearly shows that the new Mikron HPM series is the standard in high-speed machining

**No other manufacture of state-of-the-art machining centers in the HSM and HPM field has developed such extremely successful concepts for cost-effective milling so consistently in the first five years of the 21st century. After rolling out the HPM 1000U and HPM 1100, experts agree: Mikron has done it again!**

#### Urs Hänni

Single minded, persistent, long sighted and finally, thanks to a focus on the important, successful; these are some of the main characteristics you expect from companies. Of course, these same companies also expect similar characteristics from the manufacturers of state-of-the-art machining centers and in a related sense from the products, too.

#### Focusing on the important

Mikron introduces the new HPM series developed and tested over a period of two years and tested under production conditions, spot on. The five-axis HPM 1000U and three-axis HPM 1100 adeptly meet the requirements of today's companies thanks to imaginative conceptual considerations. The most important characteristics of these machining centers are unrestricted accessibility of the machine at any time, the individual components perfectly coordinated to the performance requirements in the HPM area, the unique robot system through the center of the machine and the design of all components of the entire production center on the three-shift operation.

#### HPM – High-performance milling

Following HSM (High-Speed

Milling), Mikron has also now coined the term HPM (High-Performance Milling). HPM strategies, i.e. milling with the goal of achieving the required performance over the chip volume, not only place specific requirements on the machine as a whole, but on each individual element of the system.

The HPM 1000U and HPM 1100 can clearly show that these demands can be met. Two spindles are available. On the one hand, the 20,000 rpm spindle and 198 Nm is suited for powerful machining of tough materials. On the other hand, the 28,000 rpm and 40 kW spindle has all the properties to also cost-effectively machine parts with smaller tools. The fully-simultaneous circular swiveling table is available as a version for pallets or with a T-slots table top. In regards to power and dynamics, the linear



drive in the axes (two motors in the A axis, one motor in the C axis) offers complete security. The A axis can be locked in the settings operation. This improves the quality of the work piece on the one hand and also prevents unnecessary heat build-up on the table on the other. The temperature of all power components mentioned

above including the switch cabinet are controlled by a regulated water cooling circuit.

#### 3 shifts, 365 days a year

To achieve the high rate of metal removal the entire year, the new machines must be equipped with production-specific and reliable options, e.g. the cooling of the



The HPM 1100 machining center can handle a table load of up to 2000 kg



The steep incline of the side panels ensures perfect chip discharge



| HPM 1100 und HPM 1000U              |                     |                 |                 |
|-------------------------------------|---------------------|-----------------|-----------------|
| Work area                           |                     | HPM 1100        | HPM 1000U       |
| Longitudinal                        | X mm                | 1100            | 1000            |
| Cross                               | Y mm                | 800             | 800             |
| Vertical                            | Z mm                | 600             | 600             |
| <b>Feed rate</b>                    |                     |                 |                 |
| Rapid traverse rate X, Y, Z         | m/min               | 60              | 60              |
| Feed rate X, Y, Z                   | mm/min              | 0 - 20'000      | 0 - 20'000      |
| <b>Working spindle</b>              |                     |                 |                 |
| High-frequency spindle              | min <sup>-1</sup>   | 20,000 - HSK 63 | 20,000 / HSK 63 |
| Spindle power/Spindle torque        | 40% ED              | 66 kW / 198 Nm  | 66 kW / 198 Nm  |
| High-frequency spindle              | min <sup>-1</sup>   | 28,000 - HSK 63 | 28,000 / HSK 63 |
| Spindle power/Spindle torque        | 40% ED              | 40 kW / 107 Nm  | 40 kW / 107 Nm  |
| <b>Work table</b>                   |                     |                 |                 |
| Clamping surface                    | mm                  | 1200 x 900      | -               |
| Max. table load                     | kg                  | 2000            | -               |
| <b>Rotary tilting table</b>         |                     |                 |                 |
| Tilt range                          | °                   | -               | +30/-110        |
| Rapid traverse rate                 | C min <sup>-1</sup> | -               | 60              |
| Rapid traverse rate                 | A min <sup>-1</sup> | -               | 30              |
| Clamping surface, autom. DIN-Pallet | mm                  | -               | 500x630         |
| Max. table load (central)           | kg                  | -               | 800             |
| Clamping surface, manual            | ∅ mm                | -               | 800             |
| <b>Tool changer</b>                 |                     |                 |                 |
| Central tool changer                | Tools               | 40              | 40              |
| Tool changer (tower)                | -                   | -               | 115/165/215     |
| <b>Pallet changer</b>               |                     |                 |                 |
| Pallets                             | -                   | -               | 5               |
| Dimension                           | mm                  | -               | 500 x 630       |

machining process: Internal and external supply of coolant (IKZ/AKZ) is possible with cooling water, air or oil mist. The pressure of the cooling water with IKZ (20 to 80 bar, 1200 l) can be variably regulated from the operator console. If additional cooling is needed while machining, an optional coolant system keeps the medium at a constant temperature. In addition, steam extraction for coolant steam and oil mist is available for the series. It was designed for high

efficiency and a long service life. A fully-automatic bellows seals the workspace. The barrier can be automatically unlocked when the swiveling table is manually loaded with a crane and relocked once the loading is complete.

Of course, all smart machine modules, e.g. ITC, APS or RNS can be used to achieve a cost-effective milling process.

**Pioneering robot system**

The real innovation with the

HPM 1,000U is the solution for automatic loading. Work pieces of up to 800 kg are automatically changed from the palette magazine to the circular swiveling table. A hydraulic lift/rotation unit (pallet changer) sets the preselected pallets on the clamping devices of the circular swiveling table. The pallet changer first executes a linear movement through a paddle sealed from the working space. At the same time, the pallet is placed in the pallet magazine together with the work piece to be machined, a process that takes less than 30 seconds.

The optional swiveling setup station on the pallet magazine makes loading the magazine with the work pieces secured on the DIN pallets easier. The setup station and circular swiveling table have reliable fluid couplings. Of course, the compact tool changer that can keep up to 215 tools on barely more than 1 m<sup>2</sup> is part of the extremely compact design of the machine. This entirely new solution for automating heavy components offers unparalleled ergonomic conditions at the workstation. Access to the working area and pallet magazine is convenient and safe.

**Your access – "Your access to the machine"**

The robot system by the center is part of the new "your access" concept from Mikron. Regardless of which machine configuration you want, access to all relevant components of the machining center is always optimal. The "your access" concept shows its full effect with the HPM 1000U. Whether as a version with a 40-unit tool changer or as a version with a double pallet changer in the center and a tool changer, access to the machine is always optimal.

Even connecting the pallet magazine or a flexible manufacturing system does not affect access. (see box) Past are the times when a pallet changer or pallet magazine stood in the way of the user in front of the working area.

The five-axes HPM 1000U and the three-axes HPM 1000 meet the requirements placed on state-of-the-art machines. The most important characteristics are unrestricted accessibility of the machine at any time, the individual elements perfectly coordinated to the performance requirements in the HPM area, the unique robot system by the center of the machine and the design of all components of the entire production center for extended shift operation.



The large tool changer with up to 215 tools is near the operator console



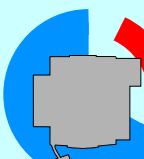
The pallet changer is handled through the portal directly, making access to the machine effortless



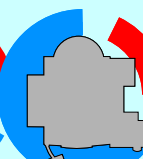
The fully-simultaneous circular swiveling table is available as a version for pallets (above) or with a T-slots table top

**your access**

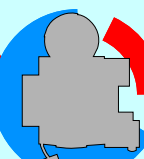
Mikron machining centers are well known for their ergonomic design. The new HPM 1100 und HPM 1000U are unique when it comes to the access of the machine, no matter which machine configuration the customer needs to produce its work pieces.



Basic machine with central 40-unit tool changer

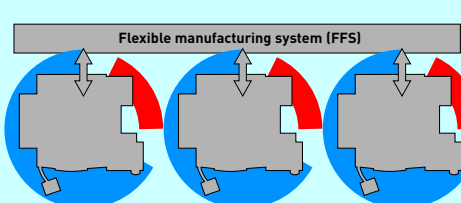


Basic machine with double pallet changer and tool changer



Basic machine with pallet changer, 5-unit pallet magazine and tool changer

**Flexible manufacturing system (FFS)**



Combination of 3 basic machines, pallet changer and tool changer with a flexible manufacturing system