

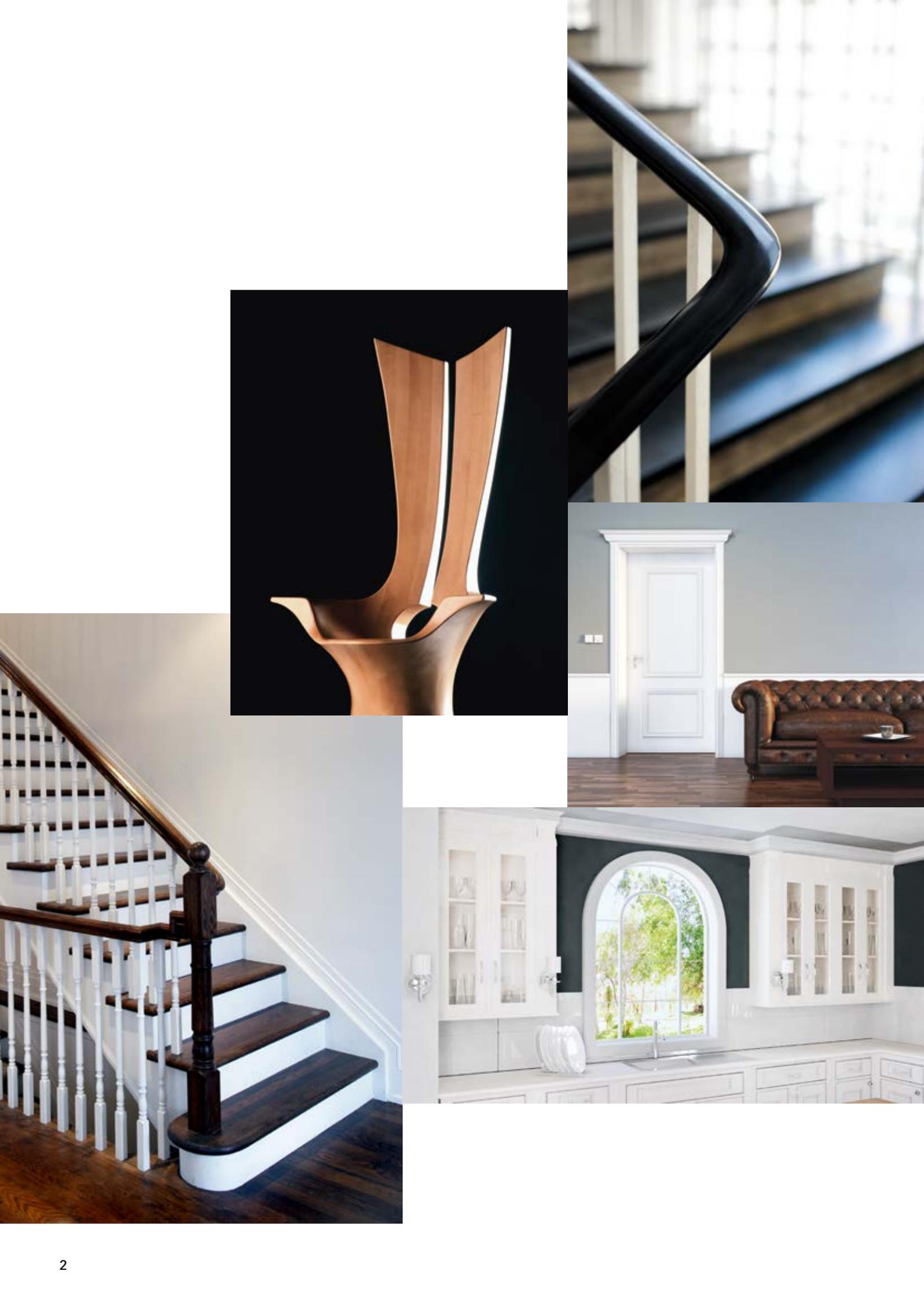
MAKA

PM Modular

Modular CNC centre
for the machining of
wood and plastic



Special CNC machines





HIGH-PERFORMANCE MODULAR SOLUTION FOR THE ALL-ROUNDER



Flexible gantry machines in the sophisticated standard range have a long tradition at MAKAL. We are continuing the success story of earlier product series with the PM Modular. The new basic solution brings together various concepts for the different requirements for a common platform for all-round medium-sized companies and interior fitters. The machining quality and performance correspond to the highest evolutionary stage of the predecessor models. The more rigid design of the construction enables the new PM Modular to meet even higher demands.

We have given the new solution a modular design with the aim of offering you an impressive price-performance ratio. The machine is based on a modular system with clearly defined equipment variants. In addition, the new findings relating to assembly and electronics were incorporated into the development and have a favourable effect on investment and maintenance. The PM Modular provides excellent flexibility despite its modular design. From ambitious beginners to CNC professionals looking for a variable system with extension prospects, the high-quality PM Modular is ideal for getting started at the next level of industrial production.

Outstanding quality

Most of our customers work in hard 2 or 3-shift operations. This is the ideal environment for the new PM Modular. The machine offers the usual high level of system rigidity offered by MAKA, thus providing the perfect basis for high productivity and optimum machining results. The PM Modular has more trump cards with the high-performance MAKA spindle from our in-house production and a wide variety of table variants. The well-known MAKA product quality ensures high availability and the long-term value of the machine.

Efficient automated production

MAKA expertise can be found wherever high-quality solutions are in demand. We focused on every second of machining time that could be saved when developing the PM Modular. The CNC centre allows the complete machining to be performed in one setting even with extremely complex applications. Minimal downtimes for loading and unloading the workpieces and strong drives with excellent acceleration values ensure the shortest cycle times. The PM Modular sets standards with the transmission of data. Data can be transferred from the machine to the ERP system via an IO link.

Great flexibility

Complex machining processes require a wide range of tools. The PM Modular satisfies every possible requirement from milling to drilling and sawing. In addition, extra flexibility is provided by variable tables that can be divided and used separately. The tool changers have a high capacity and are fully enclosed as standard to protect against contamination. A variety of lengths up to 8,000 mm can be machined on the PM Modular. The use of Siemens or BWO control systems simplifies the networking with other process steps, such as CAM.

Great ease of use

MAKA provides an adequate solution especially for broad system variants with the option of loading from two sides. The latest generation of Siemens control systems simplifies the work steps and contributes to process safety. The PM Modular scores points when it comes to safety, especially with the visual monitoring of the production process. Newly designed hoods with large window surfaces make an essential contribution to this. The automatic chip conveyor ensures the efficient disposal of residual material.

Individually extendible

The design of the PM Modular is based on three equipment variants that are carefully tailored to the requirements. In addition, you can choose from a range of options. These range from the integration of a vector axis in the basic equipment to multi-spindle drilling units fitted at the customer's request. Several different table versions are available including the matrix vacuum table that offers ideal conditions for nesting-panel processing. The PM Modular covers the most common target group applications with its three standard cube sizes. In terms of fast set-up, MAKA has equipped the machine with its own tool changer for every unit. A range of 20 to 33 tool slots are available. An infeed magazine can be mounted on the front for heavy tools. The PM Modular can be easily integrated into MAKA components or third-party components due to the excellent system capability.





Tried and tested rigid, steel-welded
MAKA structural components

Variable
unit equipment

A wide range of
table solutions



Increased user-friendliness
due to large access openings

Fully enclosed
tool changers



A MAKA is a decision for high
availability and long-term quality

Equipment options

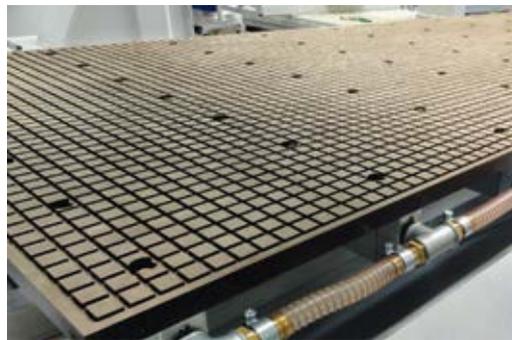


Table versions

Clearly structured and yet variable. The range of tables for the PM Modular follows the modular principle but provides plenty of scope for different requirements. The PM 150, PM 170 and PM 270 Modular are offered as standard versions. The operational range in the X-axis extends from 4,000 mm to a comfortable 8,000 mm. You can choose between a cross bar table, aluminium table with T-slot and thread, matrix vacuum table or a vacuum flow through table. All variants can be set as either a single table or shuttle table. You can produce and set up at the same time with the MAKА dividable tables. Alternate loading is an option for higher production capacity especially in the case of longer machine designs.

The cross bar table is available as a table version for manual or fully automatic set-up. The aluminium table with T-slot and thread variant can be supplied with a flat surface, with or without grid holes, or alternatively as a matrix vacuum table with raster milling for inserting sealing cords. Another option is the vacuum flow through table with a high vacuum performance especially for the nesting of components. Workpieces of any shape and size can be clamped on the MAKА ma-

chine tables. A wide variety of MAKА clamping devices and vacuum plates are available to do this. Customer-specific templates and jigs can also be easily clamped on the table and connected to the table vacuum.

Cross bar table:

- Manual or fully automatic set-up
- Very short set-up times
- Can be individually adapted very easily to a wide range of workpiece shapes

Aluminium tables with T-slot and thread:

- Very flexible and safe
- Precise clamping even with large workpieces
- Aluminium table with T-slot and thread version:
Wear-resistant and more stable for even more precise clamping tasks

Clamping elements:

All table variants can be combined with the MAKА clamping systems, such as vacuum supports, vacuum plates, pneumatic clamps and industry-standard clamping systems, such as stage separation devices or window clamping elements.



Unit variants

The highest machine quality is a key MAKА promise that is also a top priority in the basic PM Modular machine. Even the standard HSD milling spindle meets high demands. The high-performance MAKА spindle from our in-house production can also be used as a variant. It offers an even better performance and even higher torque for large tools even at low speeds. You receive an extended warranty on MAKА milling spindles. Both milling spindle variants are designed with the same HSK F 63 tool interface for fast and extremely accurate tool changes. The PM Modular is available in a 3-axis and 5-axis version and as a combined solution with two units. An additional vector axis can be integrated into machines with 3-axis technology in the interest of enhanced flexibility. The multi-channel technology of our modern CNC control systems facilitates dual and multi-unit technology and stands for maximum efficiency. Integrated air nozzles support the extraction system and prevent chips becoming clogged in the tool clamping area. An NC height-adjustable chip collection and extraction system ensures the safe disposal of dust and chips.

Standard HSD milling spindle

Power range of 12/15 kW
from 12,000 up to max. 24,000 rpm

- HSK F 63 tool interface
- Aluminium design
- Suitable for all machining with normal wood cutting

MAKA milling spindle

Power range of 20/26 kW
from 6,000 up to max. 24,000 rpm

- HSK F 63 tool interface possible, also HSK E 63 and A 63
- Steel design for robustness and a long service life
- Dustproof design and reliable sensors
- Controlled spindle drive (higher power reserves and thread cutting)
- 30 to 40 % longer service life as a benchmark
- Faster spindle service due to in-house production and repairs

Equipment options



Tool changers

Small series down to individual items in a batch determine the day-to-day production environment these days. Short downtimes are an important factor in this respect in order to ensure high productivity. The capacity of the tool magazines and the performance of the tool changers play a major part in this. The PM Modular has 20 tool slots as standard. The drum magazine can be extended to 33 slots with a horizontal chain magazine. Enough to meet all the requirements that arise in the machine's area of application. All tool changers are already fully enclosed as standard and offer maximum occupational safety.

Tool magazine
with 20 slots

Chain tool magazine
with 33 slots



Control systems

The PM Modular is equipped with Siemens's latest generation of Sinumerik 840D sl control systems that are characterised by an open and modular system design. Alternatively, a BWO control system is available for faithful long-term MAKAs users. As a manufacturer whose strength lies in the development of customer-specific systems, we adapt the control system to the user's wishes, down to the last detail. For example, this includes creating individual display screens. This can significantly simplify functions especially in the case of complex applications.



Networking

Modern bus systems today ensure uniform standards in data communication. The result is greater efficiency and profitability in production. MAKAs use an IO link in the PM Modular. This means fewer cables and supports the modular functionality of the machine with all its advantages. These include a favourable price and lower installation and maintenance costs. You are also at the technical forefront with

an IO link: the system automatically performs a plausibility check when changing the sensors and avoids faulty switching. It also remembers the previous parametrisation. However, its ability to capture smart data is truly pioneering. You benefit from a targeted selection instead of an unnecessary flood of information. Machine monitoring and production data analysis are easier than ever before.



MAKA is also a competent partner when it comes to the integration of your existing infrastructure into the new system. The MAKAs specialists are familiar with all common industry software and maintain long-standing partnerships with the relevant software manufacturers. The PM Modular can even be programmed from the office with the appropriate software. The data is then made available to the machine over the network.

Technical data

Control system	Siemens SINUMERIK 840D SL/NCU 710
Milling spindle	HSK F63 holder; Power: S1= 12 kW/S2=15 kW or S1= 20 kW/S2=26 kW
Unit	50° 5-axis unit
Extraction hood	(Optional: NC height-adjustable extraction hood)
Axis drives	X/Y-axis: Rack and pinion drive Z-axis: Ball screw A/C-axis: Hollow shaft drive
Machine table	Cross bar table
Clamping station	Manual support cross bars with vacuum supports
Protective device	Mobile protective cabin with safety bumpers
Cube dimensions	X-dimension: 4,000/6,000/8,000 mm Y-dimension: 1,300/1,600/2,000 mm Z-dimension: 400 mm
Travel speed	X/Y-axis: 60 m/min Z-axis: 45 m/min A/C-axis: 10,000°/min
Acceleration	3 m/sec ²
Tool changer	20 slot drum magazine
Installation conditions	1,500 kg/m ² floor load with 200 mm thick foundations
Compressed air consumption	Approx. 800 l/h

Basic variants

Type	PM 150 Modular	PM 170 Modular	PM 270 Modular
Features	1x3-axis unit (Vector axis optionally available)	1x5-axis unit	2x units (1x5-axis, 1x3-axis)
Tool changer	Optionally a 20 slot drum or 33 slot chain changer	Optionally a 20 slot drum or 33 slot chain changer	Separate changer for each unit (20 slot drum or 33 slot chain changer)
Equipment features	The equipment features described above and others are possible regardless of the basic type		
Target group	Entry-level variant Panel and nesting processing	Complete 5-axis system for all applications	Extension stage for short cycle times in an industrial environment



Operational range Z	Total machine height
400 mm	3410 mm



Operational range Y	Total machine depth
1300 mm	4650 mm
1600 mm	4950 mm
2000 mm	5350 mm

Operational range X	Total machine length
4000 mm	8300 mm
6000 mm	10300 mm
8000 mm	12300 mm

The total machine width and length includes all the necessary protective devices so that the machine meets the CE requirements. The machine bears the CE mark. A CE certificate of conformity is included with the comprehensive machine documentation at the time of delivery.

The alternative to a MAKA? A MAKA!

The extensive product portfolio includes other machines with a similar requirements profile in addition to the PM Modular. The CR 27 and SM 20 table machines are worth considering as an industry solution in the panel/ furniture segment. The PM 270 moving gantry machine is suitable for machining particularly large widths. Your respective MAKA sales partner will be happy to advise you.



MAKA CR 27



MAKA PM 270

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Our sales partners
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MAKA SM 20



Special CNC machines

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