

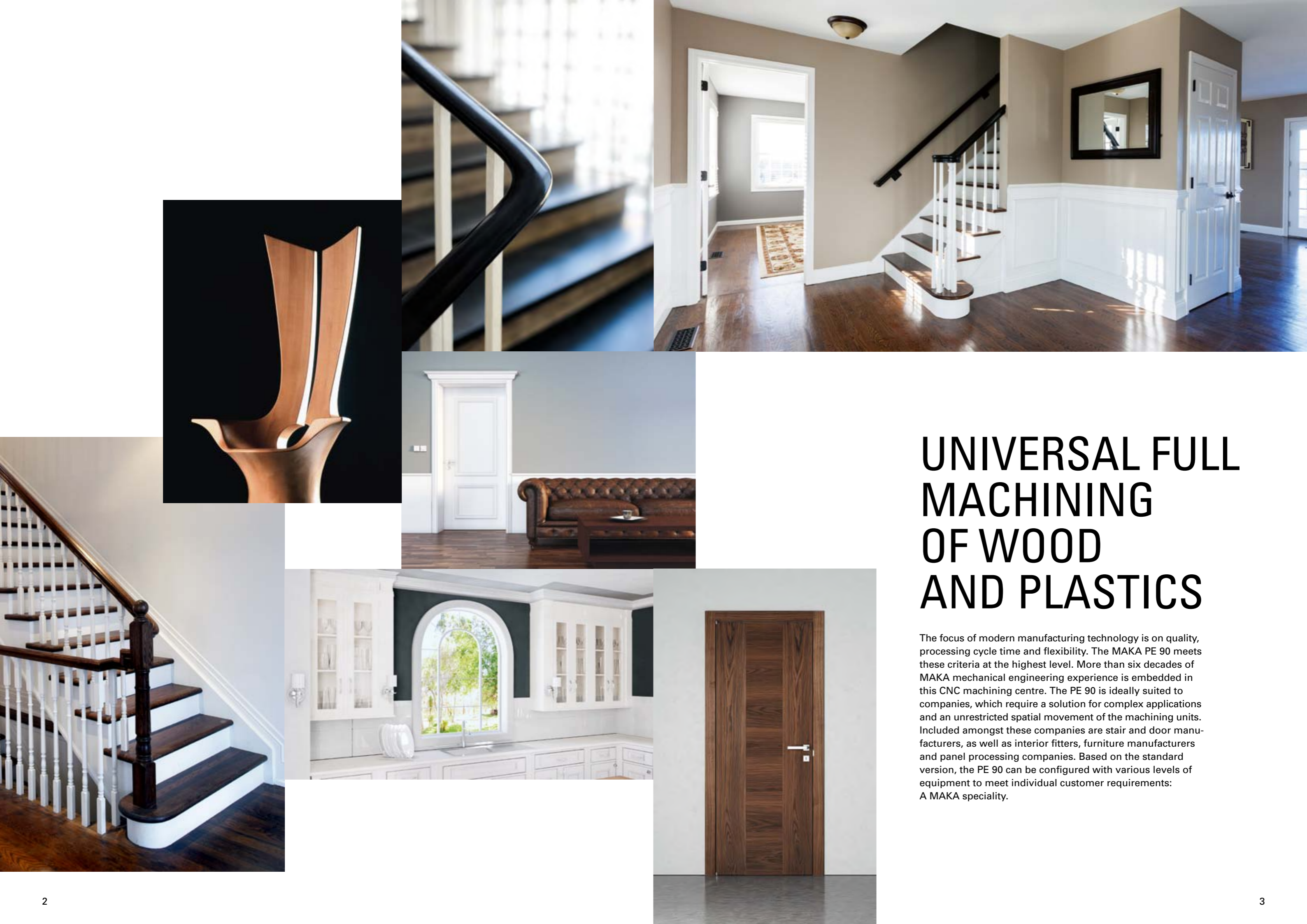
MAKA

PE 90

CNC Machining Centre
for Machining Wood
and Plastics



CNC Spezialmaschinen



UNIVERSAL FULL MACHINING OF WOOD AND PLASTICS

The focus of modern manufacturing technology is on quality, processing cycle time and flexibility. The MAKА PE 90 meets these criteria at the highest level. More than six decades of MAKА mechanical engineering experience is embedded in this CNC machining centre. The PE 90 is ideally suited to companies, which require a solution for complex applications and an unrestricted spatial movement of the machining units. Included amongst these companies are stair and door manufacturers, as well as interior fitters, furniture manufacturers and panel processing companies. Based on the standard version, the PE 90 can be configured with various levels of equipment to meet individual customer requirements: A MAKА speciality.

Outstanding Quality

The majority of our customers run tough 2 or 3 shift operations. Under such conditions, the rigid design of the PE 90 provides the ideal base for maximum precision. The PE 90 has other winning features, such as the high-performance MAKА spindle, produced in-house, and the tried and tested MAKА clamping devices for fixing of the work pieces with absolute precision. MAKА product quality is well known for ensuring high availability and durable value-added of the machine.

Efficient, Automated Production

MAKA expertise is found wherever high quality solutions are demanded. It was important to us in developing the PE 90 to gain every second in machining time that could be saved. Even with highly complex applications, the CNC machining centre enables full machining with just a single clamping operation. The shortest possible production times are ensured both through minimum down time for the loading and removal of work pieces as well as powerful axis drives with excellent acceleration times. Integration of individual MAKА automation systems into the plant architecture allows profitability to be maximised even with a batch size of one.

Great Flexibility

The PE 90 can machine work pieces with lengths up to 8,000 mm and widths up to 2,000 mm. Even with complicated milling and drilling work, it can cope with the most challenging tasks. The tried and tested standard table set-ups can be equipped to specific customer requirements. To compliment this, a range of shuttle table feeders and flexible tool changing systems with high tool capacities are also available. There is a choice of either Siemens or BWO systems for CNC control. In addition, it is possible to integrate a variety of CAD/CAM systems.

High Operating Comfort

Large table dimensions place high demands on handling of work pieces. Operating can, therefore, be made easier with the PE 90, by loading and placement aids, for large and heavy work pieces, and by flexible clamping systems, or even a completely automatic self-loading machine table. Alternatively, a wide table can also be loaded from both sides. The mobile control panel allows machine operation from any position. For established customers, MAKА specifically offers the familiar BWO control, with which the machine can still be equipped. The PE 90 scores highly when it comes to safety, in particular with the option of visually monitoring of the production process. An effective and optimised extractor on the milling spindle and a chip conveyor in the table area ensure that the chips and residual material are disposed of in an optimum manner.

Individual Add-ons and Equipment

MAKA is recognised for engineering tailored specifically to the customer. There is also a choice of different equipment versions for the PE 90 that can be carefully adapted to the customer requirements. Variable table dimensions are amongst these versions - including with automatic loading. Table versions include cross bar tables, grid tables and suction tables and provide ideal conditions for all types of processing including nesting. The tool magazines come in a range of sizes offering from 20 to 51 tool places. And as many as 150 or more places are possible with a stationary tool magazine. A KUKA robot can also be easily integrated into production, as an automation device, via the Siemens CNC control, using the "run my Robot" option.



MAKA is the choice for high availability and durable quality.

Equipment Options

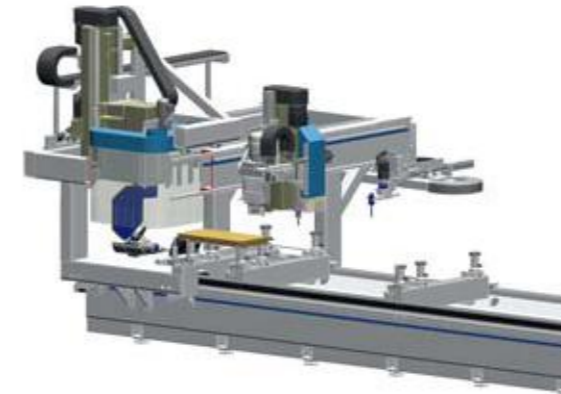
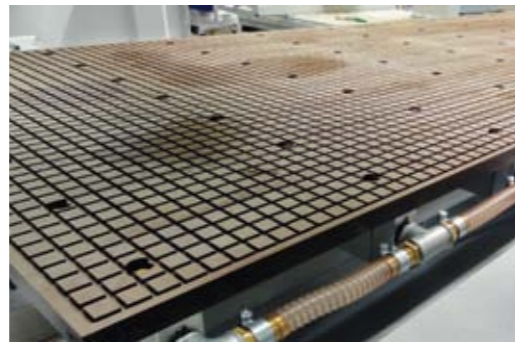


Table Designs

Each table version, whether cross bar table, grid table or suction table, can be produced to specific customer requirements. All machine table versions can be switched over as a single or shuttle table.

Loading and production can be carried out simultaneously with MAKА split tables. Especially with longer machine versions, alternating loading is an option for higher production capacity. The cross bar table is available both in manual or fully automated loading versions. The surface table version can be finished with a planar surface, with or without grid holes, or alternatively as a grid table with a milled grid for inserting sealing cords. As a further option, the suction table with powerful suction is especially for nesting of components.

All sizes and shapes of work pieces can be clamped to MAKА machines. A range of MAKА clamping devices and vacuum clamps are available for this purpose. Specific customer templates and fixtures can also be easily clamped to the table and connected to the table vacuum.

Cross bar table:

- Manual or fully automatic loading
- Very short set-up times
- Can be individually and very closely adapted to the most varied work piece shapes

Surface tables:

- Very flexible and secure
- Precise clamping even with large planar work pieces
- Aluminium surface table version: more wear resistant and stable, for even higher precision clamping tasks

Clamping Elements:

All table versions can be combined with MAKА clamping systems, for example, vacuum supports, vacuum clamps, pneumatic clamps and customary clamping systems, such as step separation devices or window clamping elements.

Unit Versions

Highest processing quality is a core promise of MAKА. That is why we produce our own milling spindle in-house. The high performance MAKА spindle version can be used on the PE 90 instead of the standard HSD milling spindle. Even with large tools at low cutting speeds, it still offers greater power and higher torque. Both milling spindle versions are designed with the same HSK F 63 tool interface, which ensures fast and very precise tool changes.

Every milling spindle, especially the MAKА milling spindle, must pass through a strict test procedure in order to ensure safe function and durable operation. The MAKА milling spindle comes with an extended warranty.

Our advanced CNC control systems, with multi-channel technology, enable the use of dual and multi-unit technology and represent maximum efficiency. Integrated air nozzles support the extraction system and prevent chips from clogging the tool chip space. Safe disposal of dust and chips is ensured by an NC height controlled, chip collecting and extraction system.

The MAKА HSD standard milling spindle

Output range 12/15 kW from 12,000 up to a maximum of 24,000 rpm

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

The MAKА milling spindle

Output range 20/26 kW from 6,000 up to a maximum of 24,000 rpm

- HSK F 63 tool interface can be used, as well as HSK E 63 and A 63
- Steel construction that is robust and durable for long life span
- Dust protection design and reliable sensor technology
- Regulated spindle drive (higher power reserves and thread cutting)
- 30 to 40% higher service life against benchmark
- Faster spindle service using in-house production and repair

Equipment Options



Tool changer

Nowadays single piece part and small batches determine day-to-day production. Against this background, short periods of down time are an important factor in ensuring high productivity. A significant influence on this is the capacity of the tool magazines and the performance capability of the tool changers. The standard version of the PE 90 has more than 20 tool places. The drum-type magazine can be extended with a horizontal chain-type magazine to 33 or 51 places; sufficient to meet all requirements in the area of application of the machine.

Tool magazine
with 20 places

Chain-type tool magazine
with 33 or 51 places

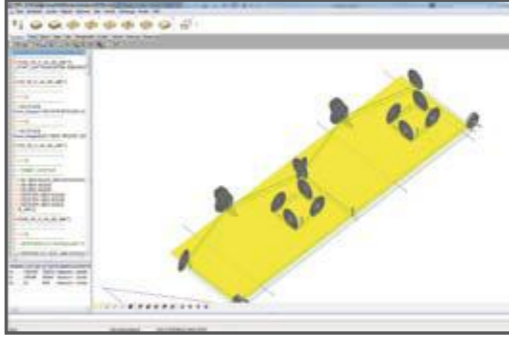
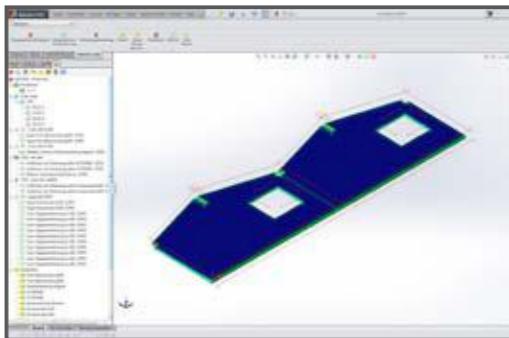
Stationary tool magazine
with 150 places and more



Control systems

The PE 90 is equipped with the latest generation of Siemens Sinumerik 840D sl control systems, which are noted for their open and modular system characteristics. Alternatively, a BWO control system is available for long established MAKAs users. As a manufacturer, whose particular strength lies in the design of systems specific to the customer, we adapt the control to the user requirements, right down to the last detail. This includes, for example, the creation of individual screen masks. In particular with complex applications, this can considerably simplify functions

Software



01 Example of DPS software: Initial analysis carried out on the component based on 3D contours ...
02 ... then the NC programme is created for the machine

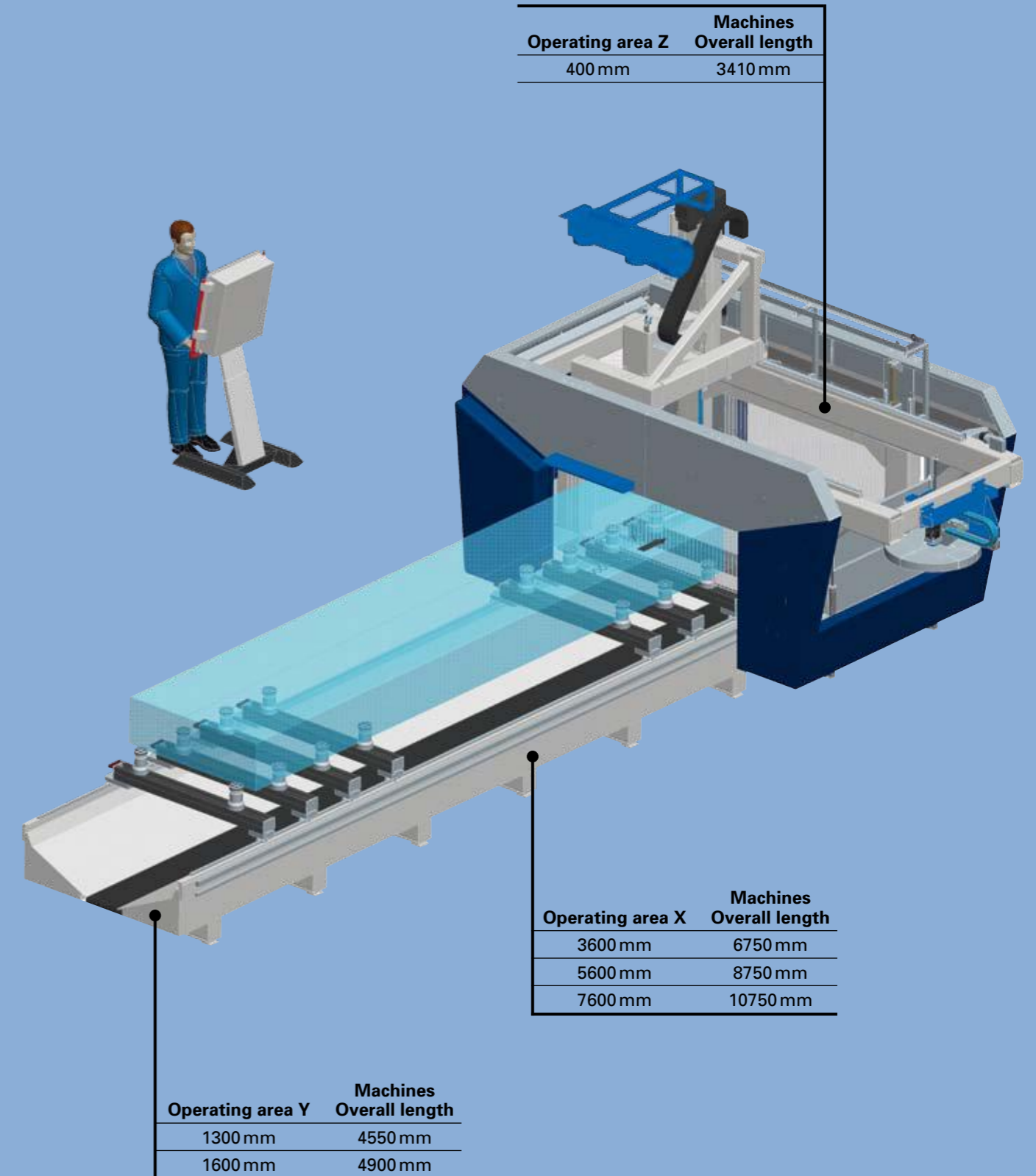
Configuration of systems specific to the customer create many challenges. In the field of software this requires efficient implementation, ranging from sophisticated special solutions right up to batch sizes of one, while at the same time retaining the existing IT infrastructure and associated process sequences as far as possible. An important prerequisite for this is the close cooperation with the customer. MAKAs engineers are familiar with all common industry software. Long-standing collaboration on systems with the appropriate software producers helps to ensure the optimum solution is always found from the perspective of the customer. We are adept at realising very specific customised interfaces, with connection to the machine and production data acquisition and ERP systems that are already in use. Machine connection to CAD/CAM systems via post processors is already a standard feature. With the appropriate software, the machine can even be programmed in the office. Data is then made available to the machine via the network.

Technical Data Standard Machine

Control system	Siemens SINUMERIK 840D SL/NCU 710
Milling spindle	HSD spindle with HSK F63 holder, rating: S1= 12 kW/S2=15 kW
Unit	50° 5 axis unit
Extraction hood	(Optional: NC vertically adjustable extraction hood)
Axis drives	X/Y axis: Rack and pinion drive Z axis: Ball screw A/C axis: Quill drive
Machine table	Cross bar table
Clamping station	Manual support bars with vacuum supports
Safety devices	Travelling guard cabin with safety bumpers
Machine versions	X dimension: 4000/6000/8000 mm Y dimension: 1300/1600/2000 mm Z dimension: 400 mm
Machining area 5 axis operation	X dimension: 3600/5600/7600 mm Y dimension: 1300/1600/2000 mm Z dimension: 400 mm
Drive 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 place drum-type magazine
Installation requirements	1,500 kg/m ² floor loading with 200 mm deep floor slab
Compressed air consumption	Approx. 800 l/h
Extraction	Air consumption: approx. 7700 m ³ /h Vacuum: approx. 1000 pascal Connection fittings: Ø 300 mm

Pre-configured Equipment Pack

Type	Basic	Advanced	High End
Working area in mm	X: 3600 mm Y: 1300 mm Z: 400 mm	X: 5600 mm Y: 1600 mm Z: 400 mm	X: 7600 mm Y: 1600 mm Z: 400 mm
Unit	50° 12/15 kW	90° 12/15 kW	50° MAK A 12/16 kW
Tool magazine	20 place drum-type magazine	33 place chain-type magazine	51 place chain-type magazine
Speed X, Y, Z axis Speed C / A axis	60/60/45 m/min 10,000°/min	60/60/45 m/min 10,000°/min	60/60/45 m/min 10,000°/min
Table configuration	Cross bar table Manual table cross bars	Cross bar table Manual table cross bars	Cross bar table Autom. table cross bars
Machine and operating guard	Travelling guard cabin with safety bumpers	Travelling guard cabin with safety bumpers	Travelling guard cabin with safety bumpers and roof



The overall machine width and total length includes all the required safety equipment for the machine to comply with CE requirements. The machine has a CE mark. With the delivery, the extensive machine documentation is also accompanied by a CE certificate of conformity.

What is the alternative to a MAKA? A MAKA!

In addition to the PE 90, the wide product portfolio of MAKA also includes other machines with a similar requirements profile. As an industry solution in the board and furniture segment, the CR 27 and SM 20 table machines should also be considered. For requirements where particularly large widths have to be machined, the PM 270 moving gantry machine is an ideal choice. Your MAKA distributor will be pleased to advise you.



MAKA CR 27



MAKA PM 270

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MAKA SM 20



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