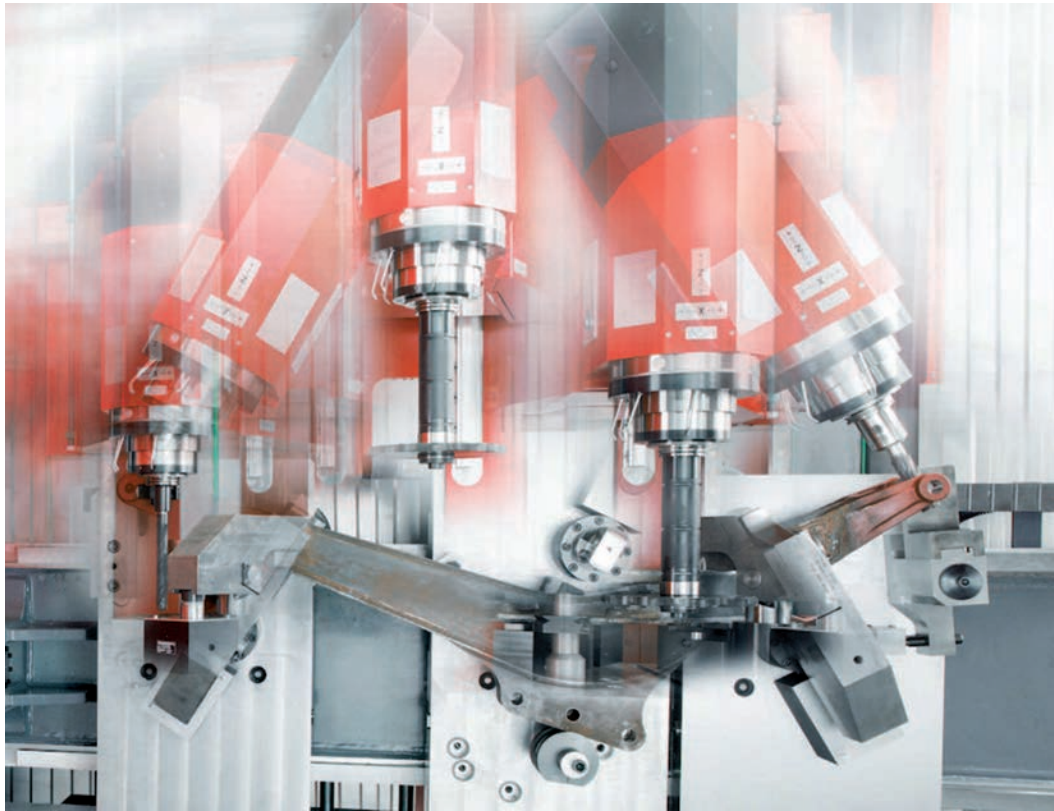


The Power of Innovation...



Editorial



Erich Unger, Managing Director
matec Maschinenbau GmbH

**New gantry machine
matec-40 PB**
Get all information
in this issue

... plus technical know-how and creativity

that is what matec has been known for over the last 20 years. Our customer-oriented approach, which is responsible for our reputation, is based on the creativity of our engineers and the technological options of our matec modular component system, which we again and again transform into highly productive machine concepts - some of them in the standard range, the majority custom-tailored to create highly individual manufacturing solutions. It is amazing to see how our customers rise to enormous manufacturing challenges. Especially the aerospace sector uses a variety of new materials, that are difficult to machine, so the performance of the machines are tremendously challenged. Read more about the manufacturing of parts for carrier rockets and satellites on a matec-30 P in this issue.

Perfect machining solutions for voluminous and heavy work parts are more and more in demand. A new in-ground gantry machine concept - matec-30 PB - is our answer to this trend. Increased loading capacity - for augmented parts weight - and easier loading make this new machine perfect suited for the tool and mould making sector. Find the details and specifications of the matec-30 PB on the following pages.

And if You are looking for YOUR perfect manufacturing solution, get inspired by matec!

Cordially
Erich Unger



matec-40 PB

with 2-axis CNC motor spindle milling head

Highlights 40 PB

- 2-axis CNC swivel head for 5-axis simultaneous machining
- C-axis (rotary axis) $\pm 200^\circ$ /
B-axis (swivel axis) $\pm 120^\circ$
- Long Z-axis up to 1,500 mm
- Gantry bridge adjustment for optimal chipping process

Surpassing
chipping performance

In-ground design for increased stability and heavy-duty milling



In-ground gantry machine machining of aluminium



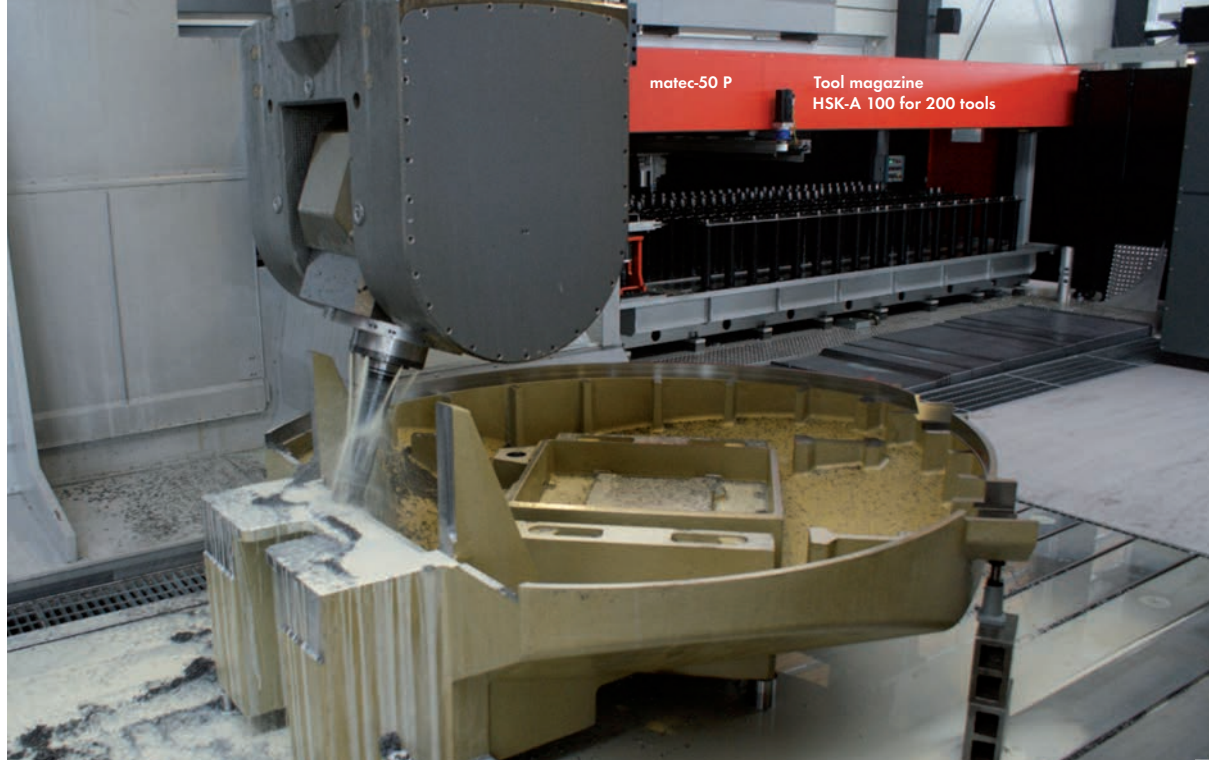
In-ground gantry machines allow the machining of very voluminous parts and high-speed milling



In-ground gantry machine with traveling operator platform

Specifications	matec-40 PB
Working area X	3,000/12,000 mm
Working area Y	2,500 (3,000/3,500/4,000) mm
Working area Z	1,300 (1,500/1,800) mm
Gantry clearance height	1,150 (1,350/1,550) mm
Gantry clearance width	1,900 (2,400/2,900/3,400) mm
Machine table width	1,600 (2,100/2,600/3,100) mm
Spindle	SK 50 (HSK-A 100)
Speed	8,000 rpm
Power	45 kW - 40% DC
Torque, max.	480 Nm - 40% DC
Rapid feed	30 m/min
Tool magazine	40 (80 up to 200) pcs
Subject to technical changes	





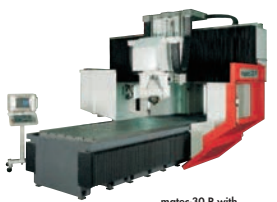
Highlights 50 P

- 2-axis CNC swivel head for 5-axis simultaneous machining
- C-axis (rotary axis) $\pm 200^\circ$ /
W-axis (swivel axis) $\pm 120^\circ$
- Long Z-axis up to 1,500 mm
- Gantry bridge adjustment for optimal chipping process

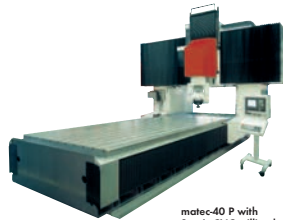


For voluminous and heavy workparts

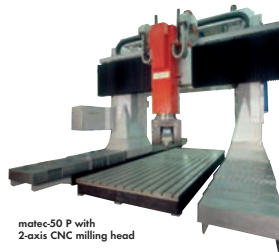
The Gantry Series



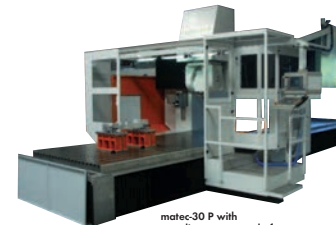
matec-30 P with
2-axis CNC milling head



matec-40 P with
2-axis CNC milling head



matec-50 P with
2-axis CNC milling head



matec-30 P with
traveling operator platform

The gantry machines matec-30 P (Taper SK 40/HSK-A 63), matec-40 P, matec-40 PB and matec-50 P (Taper SK 50/HSK-A 100), were designed for single-part and series production of large and heavy work parts for tool and mould making, mechanical engineering, and structural steel engineering. Main range of application is the machining of 3D-shapes in steel and aluminium, plates, welding, and steel construction.

The gantry construction guarantees good accessibility from all sides if space is limited. The application of either a swivel head ($\pm 90^\circ$) or a 2-axis CNC motor spindle milling head permits multilateral machining. A rich variety of spindle speed and spindle power options for all materials is available.

Traveling paths: X-axis 3,000-15,000 mm · Y-axis 1,600-5,000 mm · Z-axis 800-2,300 mm

Specifications

matec-30 P

Working area X	3,000-12,000 mm
Working area Y	2,500-4,000 mm
Working area Z	1,100-1,800 mm
Gantry clearance height	1,150-1,350 mm
Gantry clearance width	2,800-3,800 mm
Machine table width	1,600-2,600 mm
Spindle	SK 40 (HSK-A 63)
Speed	9,000-42,000 rpm
Power	16 (30) kW - 40% DC
Torque, max.	100 (191) Nm - 40% DC
Rapid feed	30 m/min
Tool magazine	36 (48/72/96) pcs
Subject to technical changes	

matec-40 P

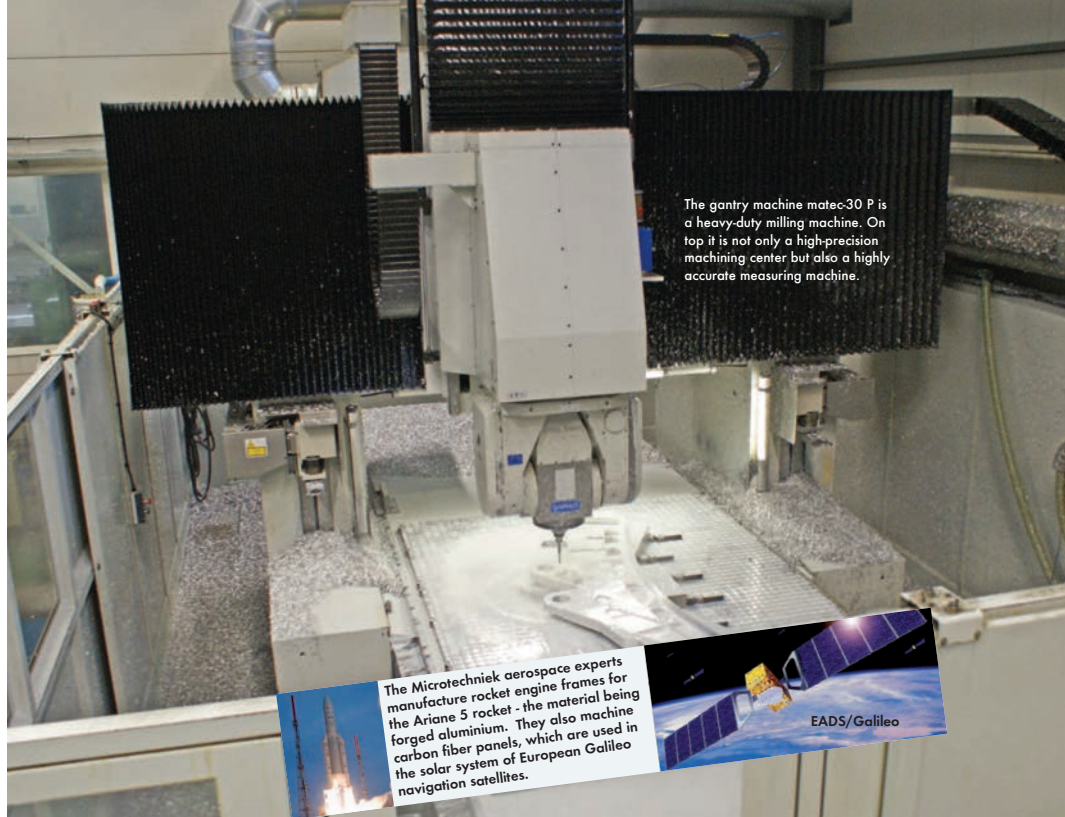
Working area X	3,000-12,000 mm
Working area Y	2,500 (3,000/3,500/4,000) mm
Working area Z	1,300 (1,500/1,800) mm
Gantry clearance height	1,150 (1,350/1,950) mm
Gantry clearance width	1,900 (2,400/2,900/3,400) mm
Machine table width	1,600 (2,100/2,600/3,100) mm
Spindle	SK 50 (HSK-A 100)
Speed	8,000 rpm
Power	45 kW - 40% DC
Torque, max.	480 Nm - 40% DC
Rapid feed	30 m/min
Tool magazine	40 (80 up to 200) pcs
Subject to technical changes	

matec-50 P

Working area X	4,000-50,000 mm
Working area Y	5,000 mm
Working area Z	1,100 (1,500/1,800) mm
Gantry clearance height	2,270 (3,070) mm
Gantry clearance width	4,000 mm
Machine table width	3,000 mm
Spindle	SK 50 (HSK-A 100)
Speed	9,000 rpm
Power	60 kW - 40% DC
Torque, max.	575 Nm - 40% DC
Rapid feed	30 m/min
Tool magazine	18 (up to 200) pcs
Subject to technical changes	

The gantry series - stability and surpassing chipping performance





The gantry machine matec-30 P is a heavy-duty milling machine. On top it is not only a high-precision machining center but also a highly accurate measuring machine.

The Mikrotechnik aerospace experts manufacture rocket engine frames for the Ariane 5 rocket - the material being forged aluminium. They also machine carbon fiber panels, which are used in the solar system of European Galileo navigation satellites.



Six months of work for a service performance of 5 minutes

A matec-30 P "off-the-shelf" achieves a positioning accuracy of 3,5 μm on a traverse path of 4 m. For aerospace expert Mikrotechnik, situated in Beverwijk near Amsterdam, this guarantees an exceptional position in the aerospace sector.

In some cases a special application shows quite plainly the surpassing performance of a machine, much to the surprise of the machine tool builder. The machine's specifications are considerably exceeded in those cases. Of course these specifications usually describe (for warranty reasons) the minimum values of important performance features. But a 5-axis gantry milling machine matec-30 P, achieving a positioning accuracy of 3,5 μm on the total length of a traverse path of 4 m, is not a common benchmark, even for matec.

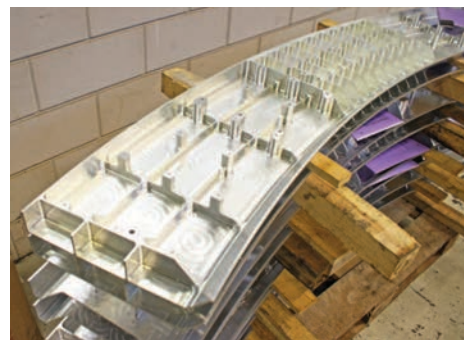
Mikrotechnik Managing Director Clement Kieftenbeld strongly believes, that such quality rates are essential, if you want to play a role in the high-end-market aerospace: "On our matec we manufacture engine frames for the rocket stages of the European carrier rocket Ariane 5, as well as for the smaller rocket version called Vega. In addition we manufacture fixtures for the fuel-booster casings of the Ariane rocket. Plus we machine parts for the solar panels of Galileo satellites, which consist of an ultra-light, but difficult-to-machine special-compound fiber board. The panels have to be delivered with an extremely high surface precision."

Calibration once a year

In order to manufacture the voluminous and complex parts in the called-for precision, appropriate measures were taken. Before setting up the machine, a solid base-plate was built, and the production halls were climated to maintain a constant temperature. Once a year the machine is calibrated with a laser measurement system, the exact matches are then recorded in the CNC control. In order to achieve a reproducible positioning accuracy of 3,5 μm on the total length of 4 m in traveling path X, it is absolutely essential that the mechanical components of the machine have the least backlash possible.

Competitors had no solution for the machining

The matec-30 P has a fixed machine table and a traveling gantry with traverse paths of 4000/3000/1100 mm in X/Y/Z, used to full capacity. The motor spindle is integrated in the 2-axis CNC milling head, so multilateral machining can be performed simultaneously in up to 5 axes. The vacuum clamping table is quite suitable for everyday use. All parts are clamped tightly and securely.



750 kg raw material result in a finished part with a weight of 50 kg: in the high-precision machining of the engine frame for Ariane 5, the gantry machine matec-30 P reliably meets the highest demands.

Microtechnik: Machining of frames for rocket engines on matec-30 P

Machining task: high-end precision

Each satellite has ten solar panels measuring 2.5 x 1.2 m, providing an energetic life-cycle of approximately seven years. The panels consist of carbon fiber reinforced plastics, which are alveolarly laminated. Across the surface hundreds of drilling holes with diameter 1.5 up to 60 mm have to be inserted, the required accuracy lies within a tolerance of $\pm 0,025$ mm. Finally the contours are fly-cut. Here again accuracy is an absolute must.

100 percent of the measuring of the parts is carried out on the machine - partly because due to the size of the parts a second clamping is not easy to perform, but even more so because concerning preciseness the 30 P all but equates a measuring machine. This preciseness has been certified by Mikrotechnik's customer. In machining the solar panel boards the Dutch company has proven its problem-solving quality. No competitor could so far offer a comparable solution for the machining of these parts in matters of quality and price. "In the Netherlands, all milling tasks for voluminous parts, needed in the joint aerospace project Galileo and Ariane, are performed here on our matec-30 P", Clement Kieftenbeld reports.



Chips in abundance: gantry machine matec-30 P with 2-axis CNC motor spindle milling head has a very high milling performance, producing a truckload of compressed chips every day.

Applications

95 % milling rate

No less demanding is the manufacturing of the rocket's engine frames. A propulsive force of up to 450 tons is exerted upon these frames, each of the eight segments being machined from high-strength forged aluminium. This material is quite rare, so the required quantity for five years has already been ordered well in advance.

The last of the rocket stages does its job in less than 20 seconds, before it burns up and disappears in space, thereby accelerating the rocket to 28000 km/h. Next project on schedule is Galileo, the European navigation system. 27 satellites have to be brought into the geostationary orbit. Starting 2015/16 this route guidance system will maneuver us through the traffic with an accuracy of 1 cm. It takes 6-8 weeks to manufacture a complete engine frame for Ariane 5. 4.5 minutes after the start, the satellite is set-up and all that is left of the rocket are two recyclable fuel-boosters.

Mikrotechnik has been commissioned for 9 engine frames per year. "No down time allowed in this order" the Managing Director emphasizes. "But despite the rather extreme chipping rate - 95 % of the raw material is chipped off - we have absolutely no reason to doubt the reliability of the machine."

Part of the success is attributed to matec sales representative for Benelux, LIMAS CNC-Machinery. They not only supplied a trouble-free after-sales service, but also custom-tailored the machine to meet Mikrotechnik's requirements. LIMAS General Manager Hans Blomen: "From the matec modular component system we selected the very robust gantry machine and equipped it with a 2-axis CNC motor spindle milling head. We chose a high-capacity spindle configuration with a performance of 30 kW, a speed of 15,000 rpm, taper HSK 63-A and inner coolant supply with a pressure of 20 bar. A tool magazine with 96 tools has proven to be adequate. It makes me proud to see the performance and the accuracy of the machine we configured for Mikrotechnik. I am quite happy to see, that we have contributed to the sustainable success of our customer."

The functional dimensions of the engine frame's segments have an accuracy tolerance of just a few micrometers. The calibrated matec-30 P has a high process-reliability and can additionally be used as a measuring machine



The purchase of the matec-30 P helped Mikrotechnik pervade the Dutch aerospace market. Hans Blomen, matec sales representative for Benelux, machine operator Heydar Andishmand, Managing Director Clement Kieftenbeld and machine operator Jahan Dashtgoli rejoice in the successful venture

The original version of this article was published in Werkstatt + Betrieb. 3/2012 - Author: Helmut Damm

Stability and speed

matec-30 PP

with pallet changer



matec-30 PP with pallet changer

Highlights:

- 2-axis CNC swivel head for 5-axis simultaneous machining
- C-axis (rotary axis) $\pm 180^\circ$ / B-axis (swivel axis) $\pm 95^\circ$
- Tool magazine with 250 tool pockets
- Long Z-axis up to 1,500 mm
- Stable gantry bridge
- Pallet changer

A robot provides for a safe change of tools from the newly developed tool magazine

Specifications matec-30 PP/40 PP

Working area X	3,000 mm
Working area Y	3,200 mm
Working area Z	1,300 [1,500] mm
Gantry clearance height	30 PP 1,350 / 40 PP 1,500 mm
Gantry clearance width	2,260 mm
Pallet size	2,000 x 2,000 mm
Spindle	SK 40 [HSK-A 63] / SK 50 [HSK-A 100]
Speed	9,000-42,000 / 8,000 rpm
Power	30 PP 16 [30] / 40 PP 26 kW - 40% DC
Torque, max.	30 PP 100 [191] / 40 PP 340 Nm - 40% DC
Rapid feed	30 m/min
Tool magazine	up to 200 pcs
Subject to technical changes	

For parts up to
2,000 x 2,000 mm

matec
MASCHINENBAU

The head makes the difference



Universal milling head and variable traveling paths

HVU Highlights

- Variable traveling paths
- Universal milling head continuously and simultaneously swiveling in both axes $\pm 180^\circ$
- Option: hydraulic disconnection of axes via M-mode

The significant characteristic of the HVU series is a 2-axis universal milling head with 45° swivel range. The tools can be utilized in horizontal machining position in the Y-axis. This allows for new designs in the working area, along with more innovative machine concepts, and therefore more economical manufacturing solutions for the user.

The universal milling head allows the machining of long workpieces on four sides - in connection with an integrated rotary table even on five sides. In that case 6 axes are at disposal for demanding machining tasks on a workpiece.

A CNC rotary table with horizontal plan disk, adapted to the size of the workparts, allows for the machining of comparatively big workparts in combination with a short Y-axis. Circular parts with diameters of up to 5,000 mm can be machined.

Specifications	matec-30 HVU/50 HVU
Working area X-axis	2,000 - 20,000 mm
Working area Y-axis	1,070/1,400 mm
Working area Z-axis	1,100/1,300/1,500/1,500/1,800 mm
Spindle	SK 40/HSK-A 63 / SK 50/HSK-A 100
Speed	9,000 up to 24,000 / 8,000 rpm
Power	16 [30] / 45 kW
Torque	100 [191] / 480 Nm

A rotary table with direct drive turns the HVU machines into mill/turn centers.

HVU Series



Gantrymachine



Variable traverse paths

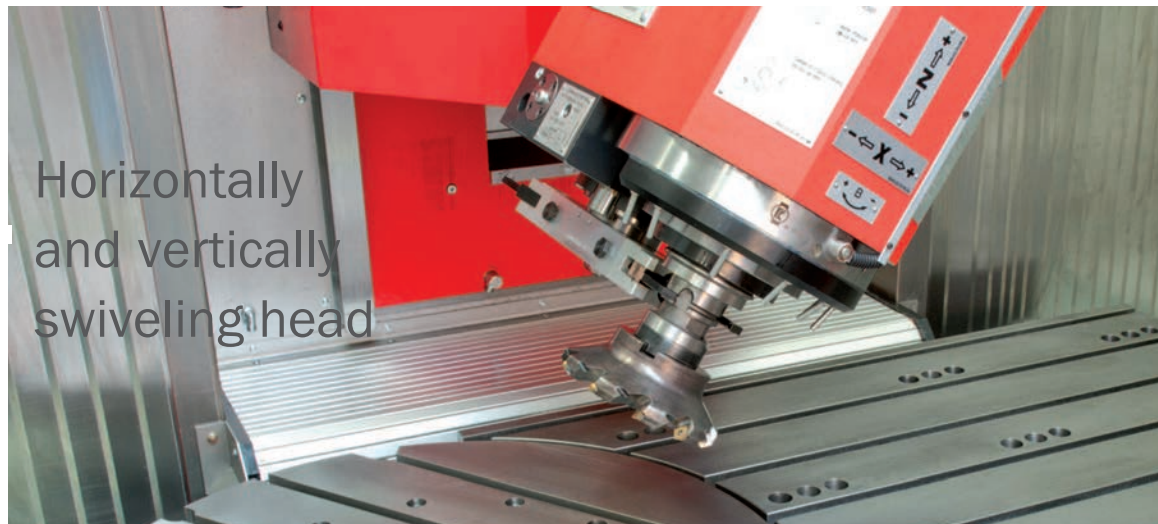


Machine table with integrated rotary table for long parts



Machining of truck axles on matec-40 HV

Horizontally
and vertically
swiveling head



Highly flexible for a multitude of machining tasks

HV-Series

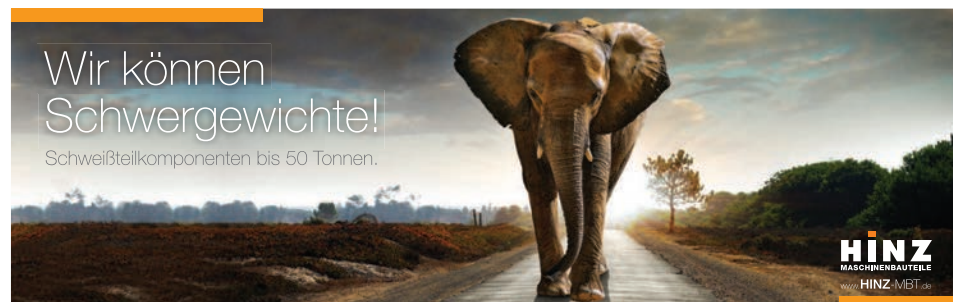


matec-30 HVT:
2 working areas - mounted rotary tables with direct drive



The HV-series has been developed for single-part and series production. Whether used for twin-table machining with rotary table or tail stock, multiple clamping or single-part manufacturing of voluminous parts, this machine group covers nearly all fields of application. The possibilities of the HV machines for the machining of 5 sides or 3D machining of any kind of work parts are almost unlimited. The long X-axis and a swivel head tilting 105° continuously to both sides, with SK or HSK tapers, in combination with a variety of CNC rotary tables make these machines infinitely flexible. Outstanding features are long traverse paths, easy mounting of clamping units as well as automatic loading by means of external loading systems.

Each HV machine can be turned into a milling/turning center for series production. If parts are best manufactured by complete machining this can be done in max. two clampings. The swivel head provides for 5-side machining during drilling and milling processes and during the turning process it allows the application of multifunctional lathe tools in all angles.



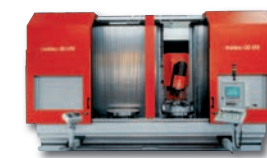
Milling and turning in one machine



matec-30 HV with rotary table



matec-30 HV with lathe spindles



matec-30 HV with rotary table

The customer-specific variant of matec-30 L shown here was designed for the machining of gear rims for wind turbine generators.

It has a twin-table working area, which allows parallel loading and unloading in the main time. The mounting of the new work part during machining time saves 40-50 minutes of setting-up time.

2 CNC rotary tables with face plate, Ø 2,200 mm, safely hold the heavy and voluminous work parts.

Perfect for long work parts

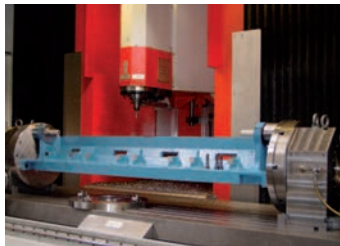
The long-bed machine series has been conceived for single-part and series production. The machines are available in various configurations e.g. with one motor spindle (matec-30 L), double motor spindle (matec-30 LD) or with 2 traveling columns (matec-30 L duo). Also available as matec-40 L and matec-50 L with taper SK 50/HSK-A 100.

Whether used for twin table machining with rotary table or tail stock, multiple clamping or single-part manufacturing of voluminous parts, this machine group covers nearly all fields of application. Stability, precision and high speed are characteristics of these machines. On the basis of a great variety of traverse paths in X up to 12,000 mm, Y up to 1,200 mm and Z up to 1,100 mm we provide an optimal manufacturing solution for every customer.

The long machine bed allows multiple clamping of long, bulky parts or twin-table machining. Outstanding features of the L-machines are long traverse paths, easy mounting of clamping units as well as automatic loading by means of external loading systems.

For long parts and twin-table machining

Long-bed Machines



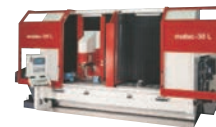
matec-30 L with rotary table and counter spindle



matec-30 L with double swiveling bridge - separately or simultaneously swiveling



matec-30 L duo with 2 traveling columns



matec-30 L



matec-30 L duo



matec-30 LD



matec-50 L

matec-30 L is the basic machine in the long-bed series. The machines in this series have long traveling paths in all axes: X up to 12,000 mm, Y up to 1,200 mm and Z up to 1,100 mm. The matec-30 L is available with taper SK 40/HSK-A 63.

matec-40 L is based on matec-30 L principle and features the same characteristics in the range of speed, precision and flexibility. The robust basic construction, the tooling system SK 50/HSK-A 100 and power capacity up to 68 kW convert this machine into a power package for heavy machining.

matec-50 L is the largest and the most powerful machine of the L-series. A tool changer constructed especially for matec-50 L provides for quick and secure change of heavy tools.

matec-30 L duo is a long-bed machine with two traveling columns. This concept allows various machining strategies: for one thing, the double spindle machining of identical parts with tooling correction in 2 x 3 axes; for another thing, the independent simultaneous machining of one work part by means of both spindles. Integrated turning spindles, vertical or horizontal, transform matec-30 L duo into a double spindle milling/turning center.

matec-30 LD is a double spindle machining center, designed as a long-bed machine for twin table machining. It has been developed for the manufacturing of voluminous and challenging work parts and demanding materials. Its strength lies in the robust basic construction that possesses necessary power reserves to solve most difficult chipping tasks.



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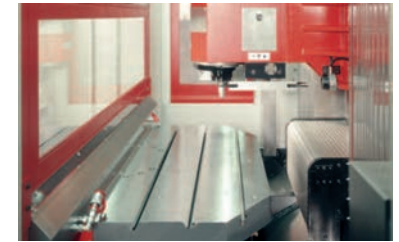
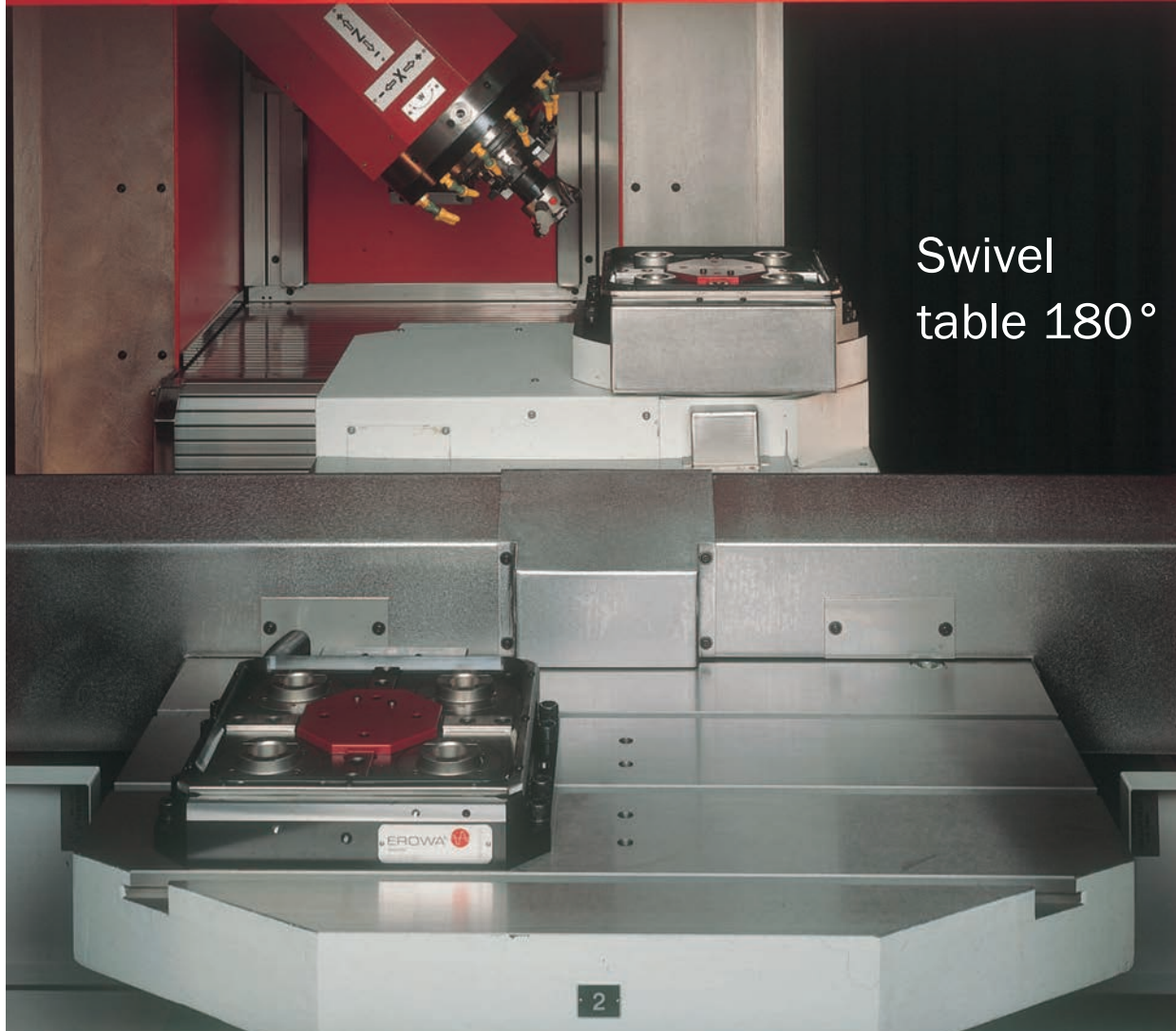
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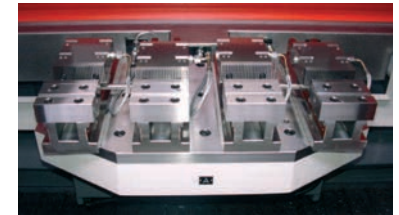
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matec-30 SG Working area with perfect chip flow



Swivel table with device

The matec swivel table series has been developed for series production if high stock-removing capacity is required. Stability, precision and high speed are characteristics of these machines. A 180° swivel table is a part of every basic machine.

This swivel table allows parallel loading and unloading in the main time and thus ensures high productivity. It facilitates a quick tool change and renders high productivity.

The basic machine matec-30 S is available in two sizes covering the whole spectrum of parts' dimensions for series production. The SH type is an especially compact and flexible machine with little place requirement and the SD machine with double spindle is particularly suitable for machining of most challenging and voluminous work parts. The SHV design with angle head fits best for horizontal and vertical machining of 5 sides and three-dimensional machining also in large-scale production.

Handling systems, devices and automation solutions adapt the swivel table series flexibly for every application.

Production machines with swivel table 180°

Swivel table Series

»Wenn deutsche Qualität auf
Schweizer Präzision trifft«

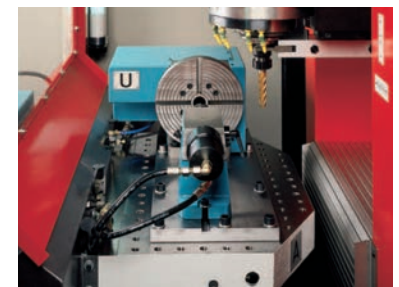
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Working area with mounted CNC rotary table and tail stock

Sectors

- General suppliers
- Automobile suppliers
- Tool and mould industries
- Tanks and containers industry
- Aluminium machining/Foundry
- Machine and plant engineering
- Packing machines
- Electric and electronics industries
- Plastic processing industry
- Medical technology Gerätebau
- Metal-working industry
- Aerospace industry
- Automobile manufacture



Swivel table series working area matec-30 SG

Range of Products

Traveling Column Series

Highly flexible machines for single and series production

matec-30 L	matec-30 HVC
matec-30 L duo	matec-30 HVT
matec-30 LD	matec-30 HVTH
matec-40 L	matec-30 HV duo
matec-50 L	matec-40 HV
matec-30 HV	matec-50 HV
matec-30 HVE	matec-30 HVU
matec-30 HVK	matec-50 HVU

Swivel Table Series

Highly productive machines for series production

matec-30 SH	matec-30 SD
matec-30 S	matec-30 SHV
matec-30 SG	

Gantry Series

The specialists for the machining of voluminous and heavy parts

matec-30 P with 1-axis swivel head
matec-30 P with 2-axis swivel head
matec-40 P with 2-axis swivel head
matec-40 PB with 2-axis swivel head
matec-50 P with 2-axis swivel head
matec-30 PP with pallet changer
matec-40 PP with pallet changer