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MASCHINENBAU

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www.matec.de **News** Ed. 2/2013

Solutions for all sectors...


Power engineering


Automotive Industry


Tool and mould making


Aerospace Industry


Machining of gear rims for wind turbine generators


Machining of axles on matec-40 HV


matec-50 P machining of voluminous parts


matec-30 HVU with universal milling head


Machining of aluminium


Machining of truck axle

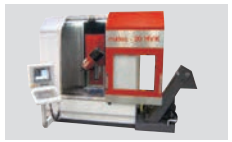

matec-50 P with traveling operator panel


Universal milling head


Free-surface milling


Machining of oil pumps


Mould making


Manufacturing of blades

Editorial

Erich Unger, General Manager
matec Maschinenbau GmbH

... and manufacturing tasks

... on more than 1400 matec machining centers all over the world

Companies from sectors such as aerospace, medical technology or tool and mould making put their trust in matec machining centers. So do manufacturers of packaging machinery, plastic processing industry, suppliers for automotive industry, mechanical engineering sector and many more. The world market leader in the production of road milling machines manufactures the core components of his machines on a matec machining center. Read more on this subject in the applications report in this issue.

The machining of very large parts, used in aerospace industry, electric and electronics industry, in the tool and mould making sector, mechanical engineering and in steel construction, is a growing industry. Our gantry machines with their long traverse paths in all axes are in strong demand. We have therefore expanded this machine series with two floor-running versions, one of which has even an augmented flexibility due to a universal milling head.

Furthermore we have corresponded to the demands of our customers and have standardized some of our HV machines. Please find more information on the **HV basic line** on the following pages.

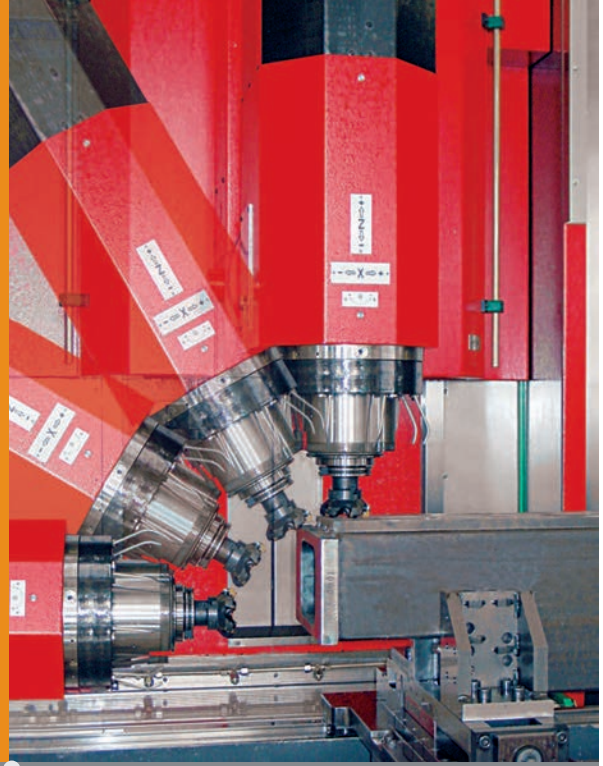
We will present the basic line at the EMO in Hanover. Come and see for yourself what matec can do for your production!

Cordially
Erich Unger

We show these machines at the EMO in Hanover

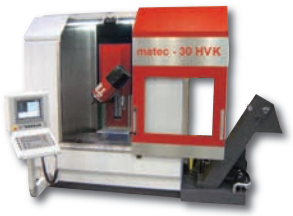
Highlights

- **Swivel head continuously variable ± 105° as CNC axis for horizontal and vertical machining, indexing precision ± 5 sec.**
- **Taper SK 40/HSK-A 63**
- **Integrated rotary table Ø 630 mm**
- **Long Z-axis 1,100 mm**



Short delivery time and excellent value for money

HV series basic line



The HV series has been designed 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. A swivel head for 5-side horizontal and vertical machining as well as for 3D machining of any kind of work-piece distinguishes the HV series.

The success of the HV series is based on the unsurpassed flexibility of the machine concept which allows a great number of different configurations. To meet our customers' demands we now offer some machines such as **matec-30 HV**, **matec-30 HVC**, **matec-30 HVK** and **matec HV 2000** in standardized versions: the **HV series basic line**.

Benefits of the HV series basic line: short delivery time and best value for money

Specifications basic line

matec-30 HV basic

Working area X	2,000/3,000/4,000 mm
Working area Y	630/800/1,000/1,200 mm
Working area Z	800/1,100 mm
Spindle	SK 40 (HSK-A 63)
Speed	9,000/12,000/15,000 rpm
Power 40% DC	16 (30) kW
Torque, max. 40% DC	100 (191) Nm
Rapid feed	30 m/min
Tool magazine	36 pcs
Swivel head	Hirth 1°
Integrated rotary table	630 mm

Subject to technical changes

matec-30 HVC basic

Working area X	1,500 mm
Working area Y	800 mm
Working area Z	800/1,100 mm
Spindle	SK 40 (HSK-A 63)
Speed	9,000/12,000/15,000 rpm
Power 40% DC	16 (30) kW
Torque, max. 40% DC	100 (191) Nm
Rapid feed	30 m/min
Tool magazine	36 pcs
Swivel head	NC continuous ± 105°
Integrated rotary table	800 mm

Subject to technical changes

matec-30 HVK basic

Working area X	1,300 mm
Working area Y	600 mm
Working area Z	800 mm
Spindle	SK 40 (HSK-A 63)
Speed	9,000/12,000/15,000 rpm
Power 40% DC	16 (30) kW
Torque, max. 40% DC	100 (191) Nm
Rapid feed	30 m/min
Tool magazine	36 pcs
Swivel head	NC continuous ± 105°
Integrated rotary table	630 mm

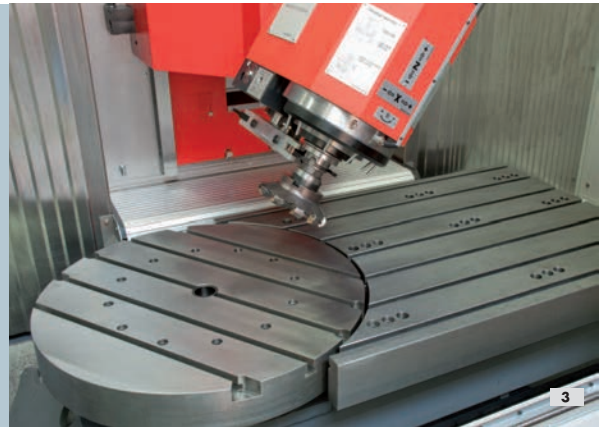
Subject to technical changes

matec HV 2000 basic*

Working area X	2,000/3,000/4,000 mm
Working area Y	600 mm
Working area Z	800 mm
Spindle	SK 40 (HSK-A 63)
Speed	10,000/14,000 rpm
Power 40% DC	16 kW
Torque, max. 40% DC	100 Nm
Rapid feed	30 m/min
Tool magazine	36 pcs
Swivel head	Hirth1°

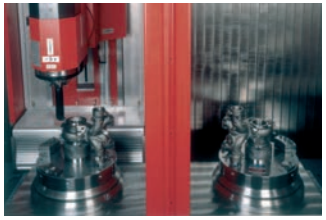
Subject to technical changes

*Also available in the basic series:
matec L 2000 basic
3-axis machining center with fixed spindle, for specifications see HV 2000 Basic

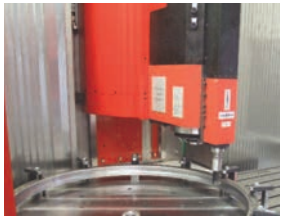


For more information on th HV series see www.matec.de

matec-30 HV with rotary table



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



Rotary tables + lathe spindles with direct drive

matec-30 HVT with rotary table

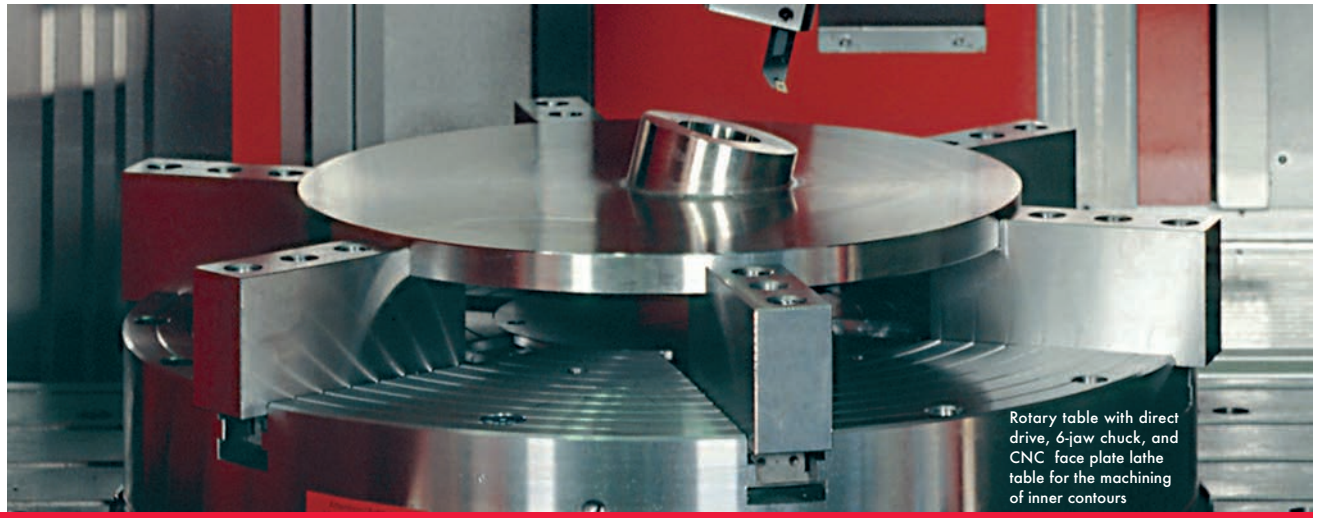
Fast milling and turning

Almost all the machining centers of the HV series can be additionally equipped with a lathe spindle or high-speed rotary table with direct drive. The integrated high-speed rotary table is available in different diameters up to 2,200 mm and tapers.

This makes the HV machines a perfect solution for complex machining tasks in three dimensional domain and 5-side machining, and at the same time allows turning in all angles.

The separation of the axes B and C brings stable chipping conditions for exact contours and optimal surface quality of the workpiece.

In connection with a CNC swivel head we have developed a universal mill/turn center especially for supplier companies in single-part and small-part production.



Rotary table with direct drive, 6-jaw chuck, and CNC face plate lathe table for the machining of inner contours

matec-30 HVTH with bar loader

HV series

Milling and turning in one machine

matec-30 HV with lathe spindles

Complex parts can be machined economically on such machines in one or two clampings in demanded tolerance and surface quality. Designed correspondingly, our machines even allow controlled boring of inner contours in slant borings.

The advantage is evident: two machining processes united in one machine – the work part machined either on the face or on the perimeter and in every angular position – that saves time and costs.

Drumming mill in clamping position ready for machining: The 5-axis machining center matec-50 HV is equipped with a vertical rotary table with zero-point clamping system

Product know-how meets flexible mechanical engineering: Dieter Schneider, Erich Unger, Bernd Hoffmeister, Norbert Tiede, Ralph Nagel, Günter Kloos and Thomas Gattung in front of the matec-50 HV. The new machining solution for the production process was successfully implemented by both parties

Every traffic participant knows the road milling machines: market leader Wirtgen offers the most comprehensive range of cold milling machines in the industry. Milling widths between 14 mm and 4,40 m are available. Depending on pavement structure and task milling depths of up to 800 mm are possible.

Machining task: Milling drum

The milling drum is a heavy-duty tool, performing the removal of the asphalt during road works with a road milling machine. It consist of a cylindrical rolar tube, with a forged chisel-holder welded onto it. This toolholder holds a number of interchangeable cutting tools. The machining of the milling drum includes different shafting and drilling processes at the external circumference of the tube.

These processes are quite challenging for the machining center: on the one hand a safe clamping of the slightly asymmetric tube for 3+2-axis heavy milling must be ensured in order to avoid vibrations in consequence of the oscillation, which occurs during machining. Furthermore a reliable continuous milling operation in 2 to 3 shifts has to be guaranteed, including short down times - and of course ergonomics are an important factor as well.

Applications

Wirtgen: In-house manufacturing including prototyping

The original version of this article was published in Werkstatt + Betrieb 1/2013 · Author: Helmut Damm

"Bright moments" are worth gold, when a reorganization of production processes is strived for. Wirtgen, the world market leader for road milling machines, has revolutionized the manufacturing of a core component using matec technical know-how.

The main plant in Windhagen is also worldwide center of excellence for development and production of the mobile heavy machinery. Starting with prototyping all components are manufactured in-house. Only in times of capacity constraints assemblies are allocated to suppliers. Even the chassis is an in-house development, as well as the required devices, which are put on stock for further orders. Wirtgen only manufactures its own product line, so the manufacturing department houses mostly custom-tailored machining centers. Project Manager Ralph Nagel is responsible for the technical specifications preceeding any investments in machinery: "We hardly have any standard machines in the mechanical department. Before we decide on investments we really pay great attention to finding a solution which meets our requirements and is at the same time economical. Using our product expertise we are looking for manufacturers, who are flexible and competent enough to transform our know-how into optimal machine concepts. Now and again an inspirational spark from both parties is needed, to create the breakthrough. Prime example for such a special inspiration is the reorganization of the manufacturing process for the core component milling drum with the aid of our partner matec."

Flexible machining center for 3+5-axis machining

A robust and flexible state-of-the-art machine concept was sought-after, with the idea of transferring the manufacturing process from an outdated horizontal machining center with pallet changer. Taper SK-50 was demanded, in order to adapt the great number of tools in stock. Günter Kloos, who manages the mechanical production department in shifts with Dieter Schneider, describes the technical specifications for the new machining center: "We wanted to reduce the great variety of in-house designed devices, which were kept in stock for the various types of drumming mills. The downtime, based on the pallet solution, shouldn't be longer. And although we wanted a 5-axis solution, especially suited for the workpiece drumming mill, we were also looking for a certain degree of universality, because a flexible machine is quite useful in daily business."

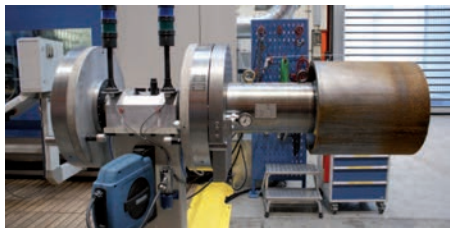
Creative ideas for clamping and chipping

Transferring the machining of the milling drums from horizontal 3+2 axes to vertical 5-axis machining on the matec machine required a couple of conceptional manoeuvers. matec owner Erich Unger: "From a constructive point of view we certainly build one of the most stable, if not THE most stable, traveling column machines on the market and probably the most precise across the total length of the traverse paths. The three well-dimensioned guides on the Y-axis and the traveling column - no extending RAM, which brings a certain instability - provide for a continuous rigidity. So we do have the perfect basis for robust machining. An intelligent clamping solution was required in this case, which we could provide based on our mechanical engineering experience."

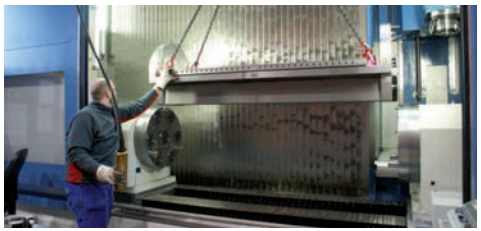
One good idea was the vertical positioning of two rotary tables with zero-point clamping system for a fast change of parts with a high repetitive accuracy. The left rotary table is fixed, the right is moving and can - equipped with a centered tailstock - be used as a counterbearing for the machining of longer drums. The second idea was the clamping of the drums by use of hydraulic internal clamping, to even out existing asymmetrics and to avoid vibrations in consequence of the oscillation which could augment during machining. Finally a workpiece changing station was placed ideally in front of the machine, which is equipped with a setting of two vertical rotary tables with zero-point clamping system identical to the ones in the machine. The manual change of parts with a crane thus equals the time of the pallet change performed by the former horizontal machining center. Ralph Nagel: "We not only held down times low, but have a safer clamping situation, so that we can use the milling potential of the machine to its fullest and achieve a shorter processing time in machining the drums."

The matec-50 HV has traveling paths of 3,000/1,000/1,300 mm in X/Y/Z and a Siemens 840 D Powerline control. Software engineer Bernd Hoffmeister, who is also in charge of the construction of devices, praises: "On one side we have found an intelligent clamping solution for the machining of our core component milling drum, while at the same time the zero point clamping system on the tilting bridge enables us to still use our long-standing clamping devices, which we had designed for diverse parts and components for 5-axis machining. Furthermore the programming of the machine for these machining tasks is conveniently easy."

Easy change of parts: the clamping plate is equipped with a bolt for quick fixture to the zero-point rotary table. The drum is clamped hydraulically from the inside.



A workpiece changing station is equipped with a rotary table with zero-point clamping system for the quick change of raw and finished parts.



Prepared for universal 5-axis milling tasks: A tilting table with zero-point clamping bridge can easily be transported by crane and fixed between the rotary tables in the matec-50 HV. In that case the rotary tables are turning simultaneously.

Universal milling head and rotary table with direct drive

Highlights

- Variable traveling paths
- Universal milling head, continuously and simultaneously swiveling in both axes by ± 180°
- Option: hydraulic disconnection of axes via M-mode
- Rotary table with direct drive Ø 2,200 mm, speed max. 200 rpm
- Additional rotary table Ø 320 mm with tail-stock for machining of shafts
- Pick-up station for tools with a length of up to 1,000 mm
- CNC control MTX Indra-Motion

With universal milling head for the machining of long parts on up to 6 sides

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.

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 (1,070/1,200/1,400 mm). Circular parts with diameters of up to 5,000 mm can be machined. A rotary table with direct drive turns the HVU machines into mill/turn centers.

The matec-50 HVU shown here was designed for the manufacturing of thin-walled containers made from high-alloyed stainless steel. These containers are in use in food industry, chemical plant engineering, offshore constructions, and in aerospace industry.

The machining task:

The parts have a diameter of up to 2,200 mm and a height of approx. 1,200 mm. The machining includes milling and turning in one clamping. For the machining of inner surfaces lathe tools with a length of more than 1,000 mm are necessary. In order to avoid vibrations in consequence of the oscillation of the thin-walled workparts, only massive lathe tools are in use.

HVU series

Specifications	matec-50 HVU
Working area X	4,000 mm
Working area Y	1,400 mm
Working area Z	1,800 mm
Spindle	HSK-A 100
Speed	8,000 rpm
Power	45 kW - 40% DC
Torque, max.	520 Nm - 40 % DC
Rapid feed	X- / Y- and Z-axis 30 m/min
Tool magazine	40 pcs

NEW: Gantry machines

with universal milling head

Highlights

- Universal milling head continuously and simultaneously swiveling in both axes ± 180°
- Option: hydraulic disconnection of axes via M-mode

This machine is equipped with a 2-axis universal milling head, which turns the motor spindle from vertical to horizontal in a 45° diagonal position.

This universal milling head increases the working area in Z by 250 mm and allows a 360° all-over machining of parts.

Specifications	matec-40 PBU
Working area X	11,000 mm
Working area Y	4,800 mm
Working area Z	1,800 mm
Gantry clearance height	1,950 mm
Gantry clearance width	3,900 mm
Machine table width	1,500 (2,000/2,500/3,000) mm
Spindle	HSK-A 100
Speed	8,000 rpm
Power 25% DC	50 kW
Rapid feed 25% DC	530 Nm
Rapid feed	30 m/min
Tool magazine	2 x 60 pcs

Subject to technical changes

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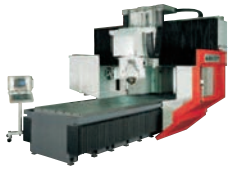
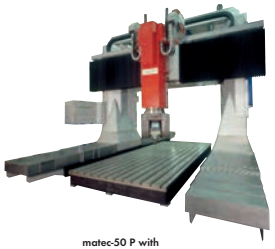


matec-30 P with
2-axis swivel head

matec-40 P with
2-axis swivel head



matec-50 P with
2-axis swivel head

NEW GANTRY MACHINE!

matec-40 PB
In-ground gantry machine with 2-axis swivel head and traveling operator panel

matec-30 P with
traveling operator panel

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 (1,350/1,950) 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

For voluminous and heavy parts

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 (± 90°) 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 2,500-5,000 mm
Z-axis 800-2,300 mm

For more information on the gantry series see www.matec.de

Gantry machines

Productivity doubled

matec-30 LD:
right-hand working
area with device

matec-30 L duo with 2 traveling columns

Specifications	matec-30 L duo
Working area X	from 3,550 mm
Working area Y	600 mm
Working area Z	700 mm
2 spindles, spindle distance	800 mm
Machine table size	3,500 x 635 mm
Spindle	SK40 (HSK-A 63)
Speed	9,000 (12,000/15,000/18,000/24,000/42,000) rpm
Power	16 (30) kW - 40% DC
Torque, max.	100 (191) Nm - 40 % DC
Rapid feed	30 (48/100 with linear drive) m/min
Tool magazine	2 x 24 (36/48) pcs

Subject to technical changes

Rechter Arbeitsraum mit Schwenkbrücke und Vorrichtung

matec-30 LD pendulum machining
tilting tables in both working areas

LD Highlights

- **2 motor spindles, spindle distance 400 (550) mm. Right spindle adjustable ± 5 mm in Z-axis (opt.)**
- **Double production with only 30% additional costs**

matec-30 LD is a double spindle machining center designed as a long-bed machine for twin table machining. It has been designed 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 the most difficult chipping tasks.

matec-30 LD with double spindle

Specifications	matec-30 LD
Working area X	from 2,600 mm
Working area Y	600 mm
Working area Z	600 mm
2 spindles, spindle distance	400 (550) mm
Machine table size	3,500 x 635 mm
Spindle	SK40 (HSK-A 63)
Speed	9,000 (12,000/15,000/18,000/24,000/42,000) rpm
Power	16 (30) kW - 40% DC
Torque, max.	100 (191) Nm - 40 % DC
Rapid feed	30 (48/100 with linear drive) m/min
Tool magazine	2 x 24 (36/48) pcs

Subject to technical changes

L duo Highlights

- **Two separate traveling columns for the adjustment of tool length, tool radius and clamping**

The machining center 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 L duo:
left-hand working
area with device

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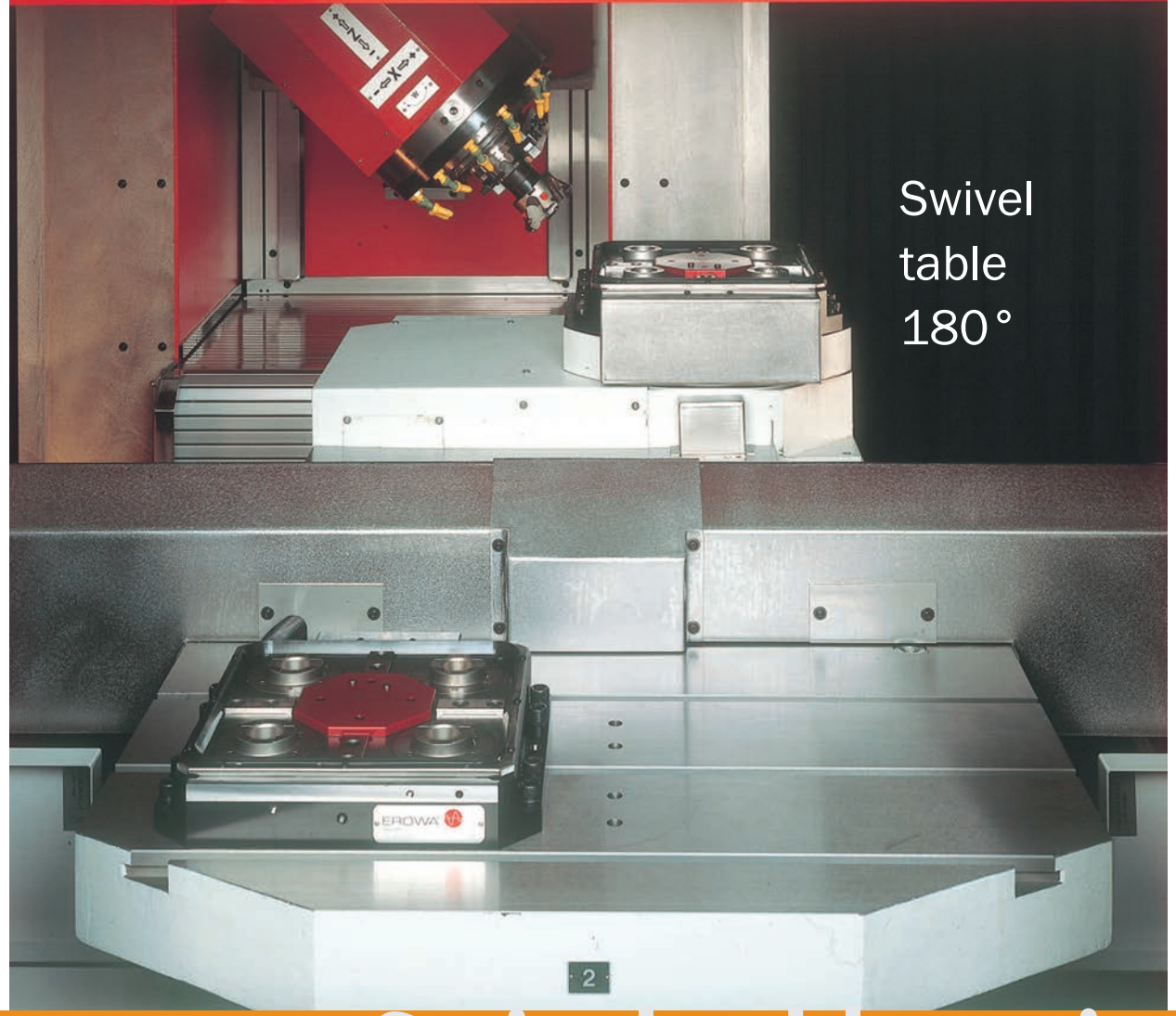
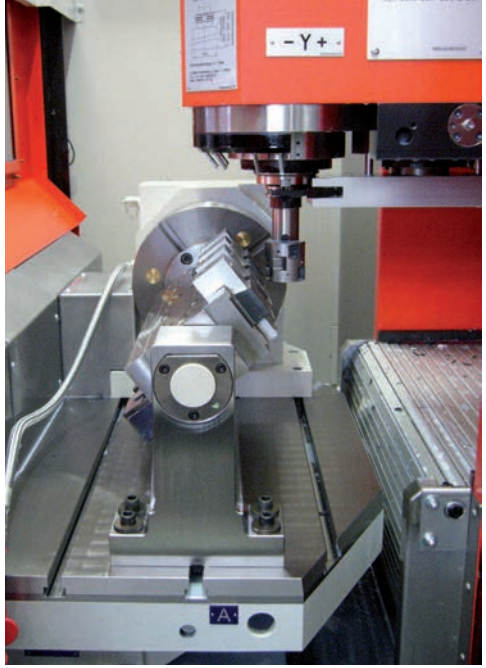
L series Double spindle





matec-30 SG working area with perfect chip flow

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.

For mass production

Swivel table series

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EMO
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The world of metal-working focuses on Europe. We invite you to our stand at the EMO: Hall 12 A60

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
- Metal-working industry
- Aerospace industry
- Automobile manufacture

Range of Products

Traveling Column Series

Highly flexible machines for
single and series production

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

Swivel Tabel Series

Highly productive machines
for series production

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

Gantry Series

The specialists for the machining
of voluminous and heavy parts

matec-30 P with 2-axis swivel head
matec-30 PB 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

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