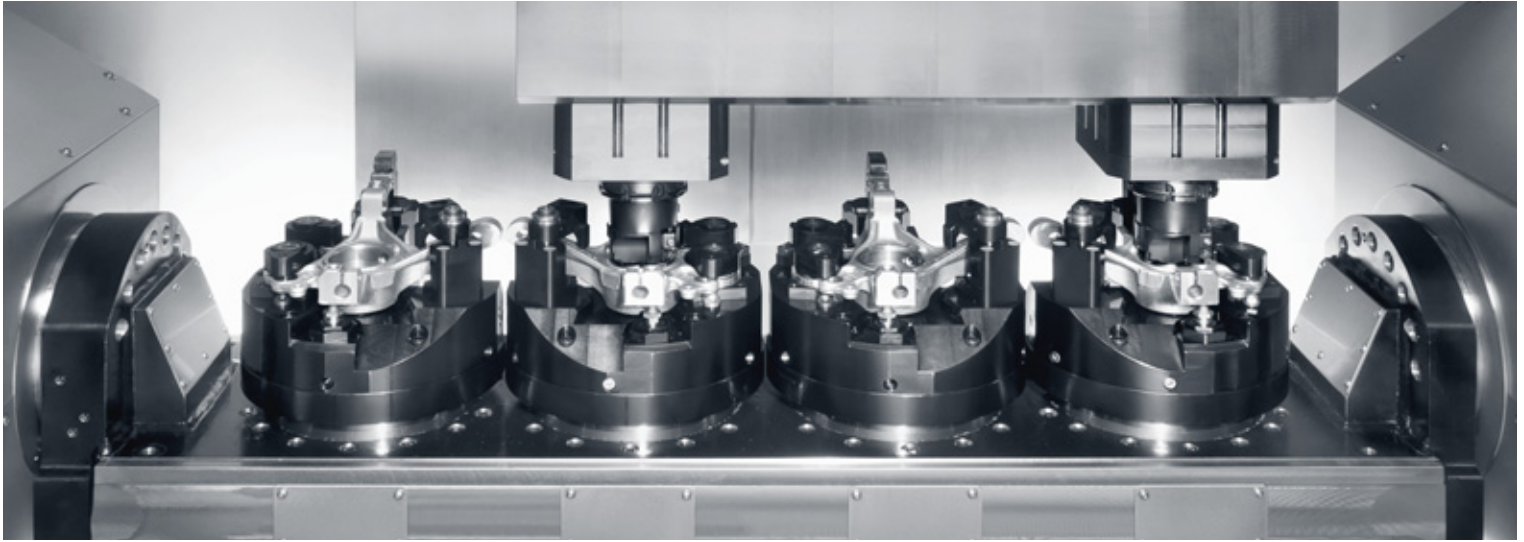


Excellence in Manufacturing



## Vertical Machining Centers

 **STAMA**

# Excellence in manufacturing

STAMA delivers machining centers and milling-turning centers worldwide to manufacturing in almost every branch. As a complete solution for manufacturing at the press of a button. The turnkey business comprises a good 80 percent of all machines delivered – STAMA is one of the top suppliers of individual manufacturing solutions.

Innovative technologies and high-tech machining centers from STAMA point the way ahead. Our best ideas for manufacturing and production.

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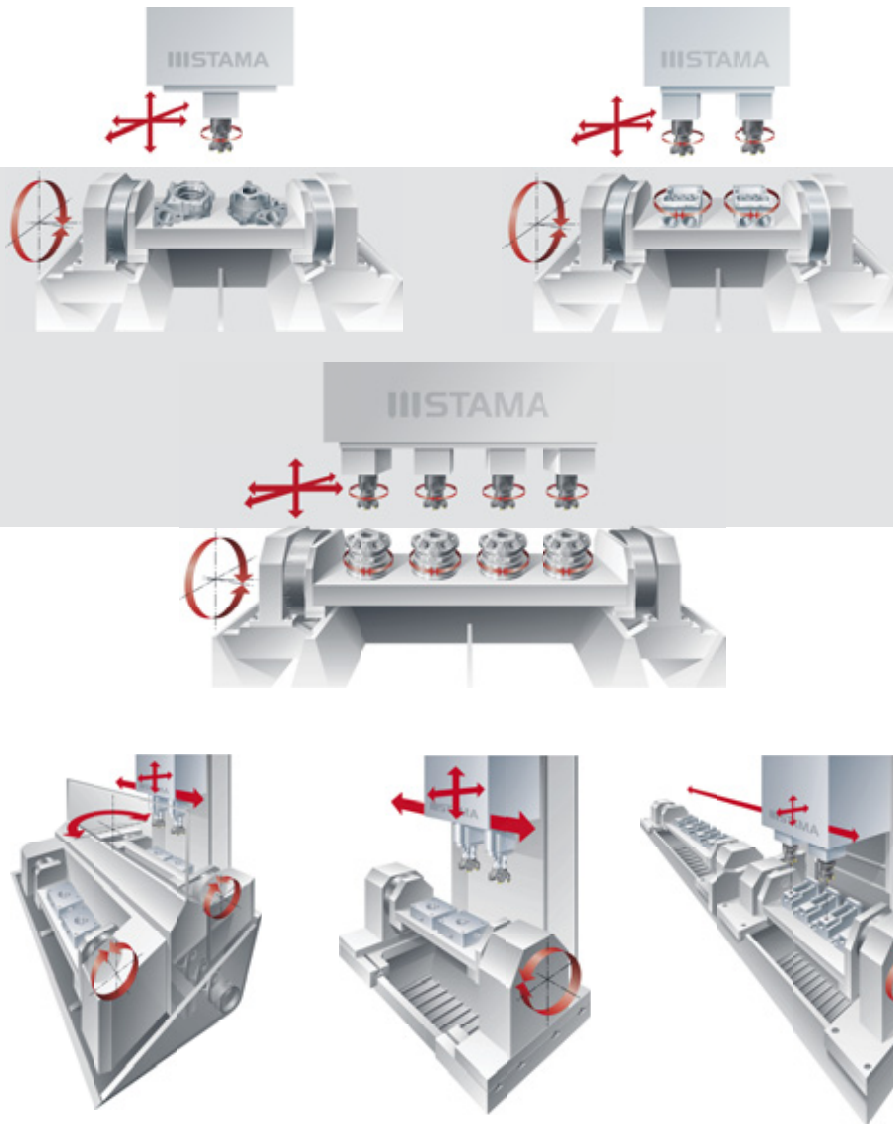


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# The solution counts double

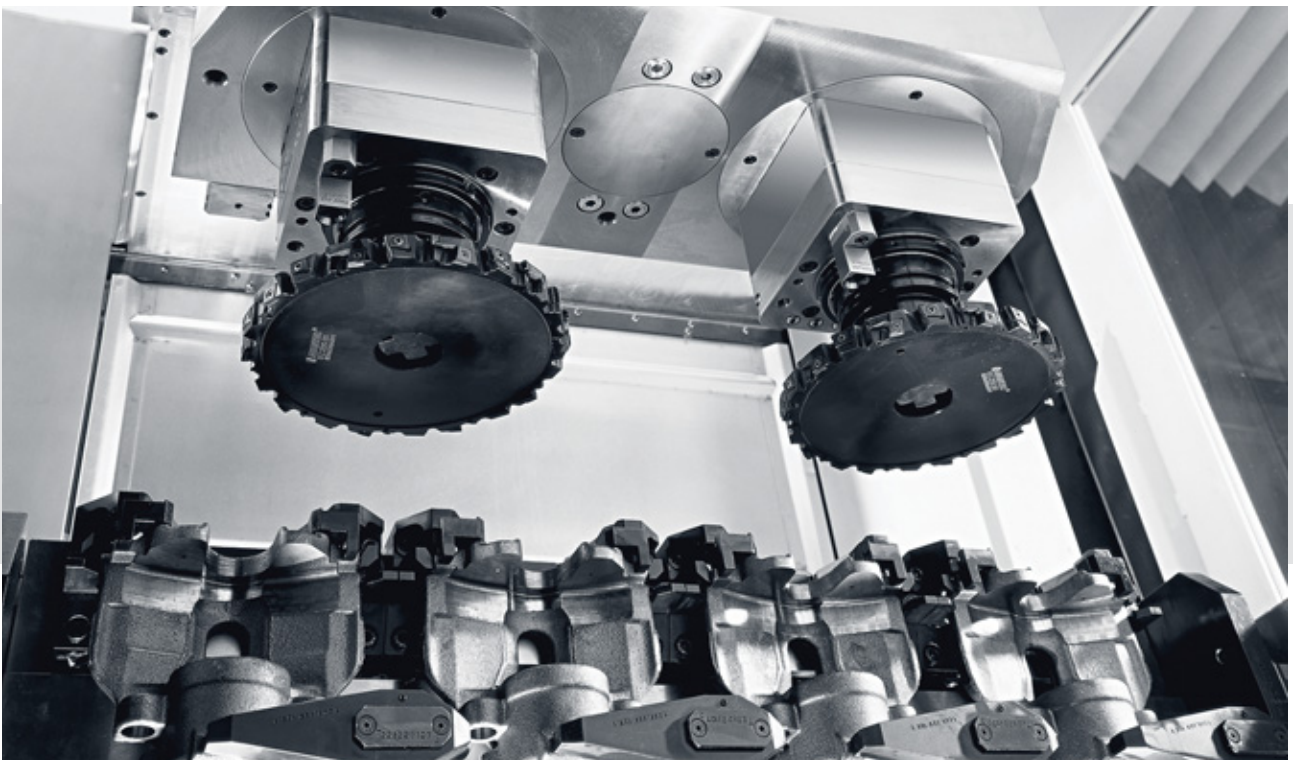
You can manufacture a workpiece in many different ways. But there is only one optimal solution. Our vertical machining centers are an excellent basis for implementing technically innovative and economically convincing solutions for process solutions.

1-, 2- and 4-spindle. As one place and two place machining centers.  
3-, 4- and 5-axis. MC from STAMA – for all branches, for any batch size.



# Flexible series manufacture – and always productive

Highly productive complete machining, fast changeover, flexible reaction to variations in quantities. TWIN technology from STAMA has been successfully in use since 1980. No other machine tool manufacturer worldwide has such branch-specific experience and know-how in double- and four-spindle series manufacturing.



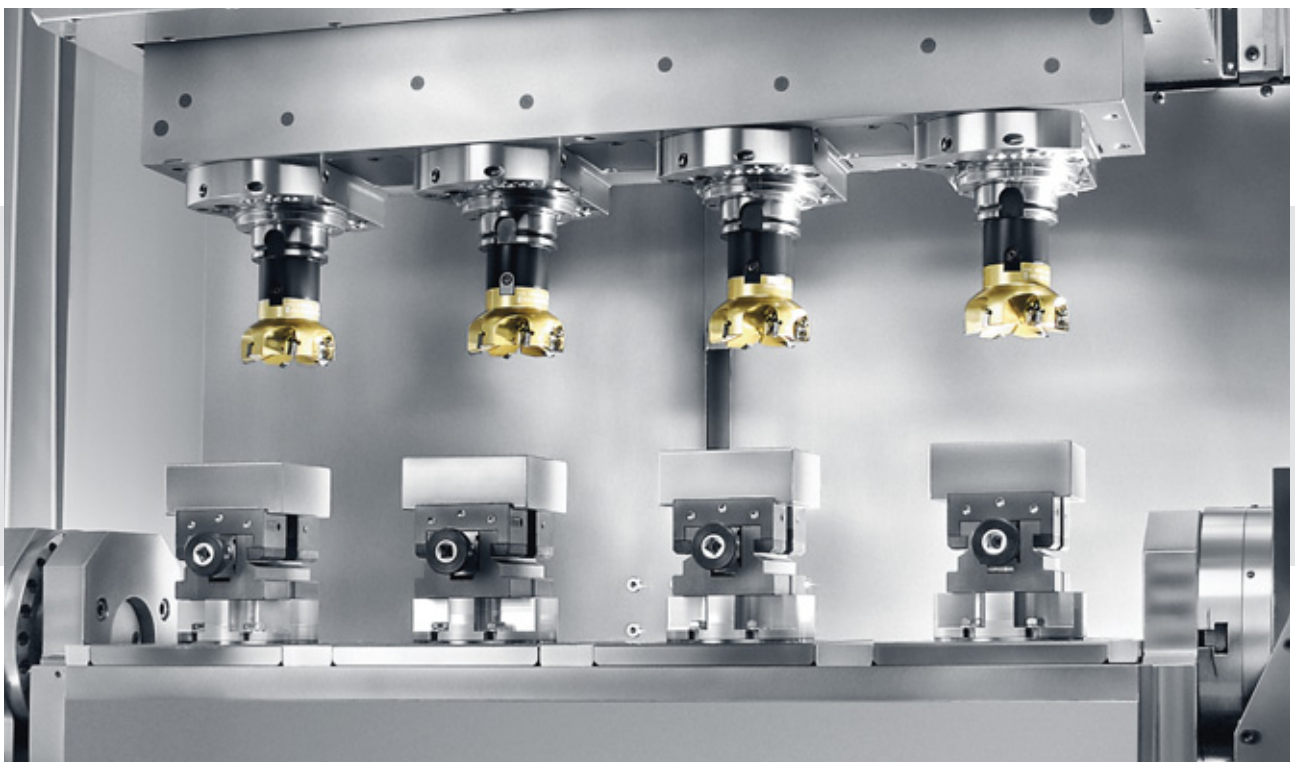
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The target application of multi-spindle machining defines the particular basic properties of the TWIN and TWIN<sup>2</sup> machining centers from STAMA: high thermal-mechanical stability and rigidity.

For many applications, a decisive criteria for meeting the high requirements for precision and workpiece quality. For light chip removal as well as heavy-duty chip removal with HSK-A100.

# TWIN and TWIN<sup>2</sup> technology

A branch-specific application analysis has shown that because of the increasing individualisation of the workpieces, the number of double- and four-spindle manufacturing solutions is rising. Cost-effectiveness and flexibility are the decisive arguments. Solutions with TWIN and TWIN<sup>2</sup> are almost without exception superior to special/transfer machines or single-spindle machining centers.



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Every tenth multi-spindle solution is implemented as a four-spindle TWIN<sup>2</sup> – tendency rising. Experienced TWIN users see as the biggest benefit the additional doubling of productivity per footprint with the same high flexibility.

Practically orientated new developments and application-specific product customisation are our strengths. STAMA is innovation.

# In all big industry branches

## **Automotive**

A process solution for the automobile industry has to satisfy complex requirements. Carry over parts strategy and model diversity, short product cycles, variable batch sizes, highest quality.



Chassis, gear box, motor or brake system components – implementing the optimal manufacturing solution for manufacturer and supplier motivates people and challenges the technology. Innovative, pioneering and unit cost orientated.

# STAMA is in action worldwide

## **Tool industry**

Small batch sizes, large series and single part manufacturing. Fast changeover, automated complete manufacture; tool production is a demanding and multifaceted manufacturing field.



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The process solutions for the diverse ranges of parts have to be flexible, precise and highly productive – for the best cost effectiveness, fast delivery times and technological advances through innovation.

# Comprehensive know-how and experience

## **Mechanical engineering**

The basis for the market and technology leadership of German mechanical engineering is its innovative strength. The machine itself and everything the machine produces – both are developing further rapidly and continually. More stable, more compact, more precise, more flexible, more energy efficient – there are always high demands on high-tech Made in Germany.



## **Precision engineering**

One thinks at once of watches and the proverbial Swiss precision. Precision is of course also found in other areas. Long-term precision and a high dynamic belong to the key criteria of a manufacturing solution for the range of precision engineering workpieces. That they are economic and flexible is a basic assumption.



# for innovative process solutions

## **Fluid technology**

Pumps, valves, cylinders, motors, units – anywhere air and liquids are controlled, fluid, hydraulic and pneumatic components are used. The range of parts is as diverse as the application areas: Valves, oil platforms, machine tools, building technology, wind turbines, automotive – in demand are innovative and individual process solutions for small and large workpieces, for small and large series.



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## **Medical technology**

Instruments, implants and equipment: Requirements known from precision and mechanical engineering are found regularly in medical technology. With this plus of know-how and experience, innovative manufacturing solutions are implemented – components like tank adaptors for anaesthetic equipment, rotors and beakers for laboratory centrifuges, and instrument handles of all types. Complete manufacture with long-term precision and high flexibility.

## MC 3 – with 180° swivel table

1-, 2- or 4-spindle chip removal. Highly productive manufacture. The integrated 180° swivel table offers two separate work spaces. In the first work space chip removal, in the second loading and unloading parallel to main time. And the other way round. Workpieces can be completely machined in two clampings.



All machining forces are dissipated directly into the base frame – an ideal property for powerful and stable chip removal with high long-term precision.

MC 3 machining centers are equipped with defined work piece loading positions and interfaces for pallet change, robot or gantry loader systems for automated manufacturing processes.

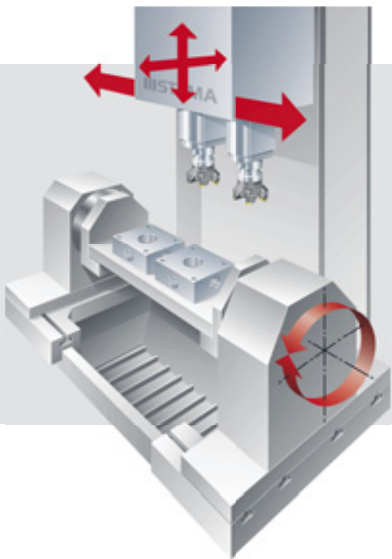
highly productive manufacture in a small space



# Single place MC 5 – compact power

The System 5 Machining Centers with modular construction allow total freedom in the individual design of manufacturing processes. Unit cost orientated and branch specific. The double- and 4-spindle machining centers stand for productive and flexible series manufacturing. In the 36 Class, optimised components ensure dynamic and precise heavy-duty chip removal with HSK-A100.

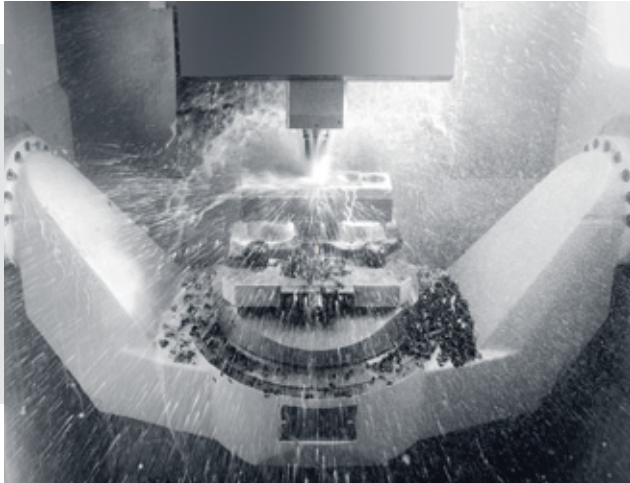
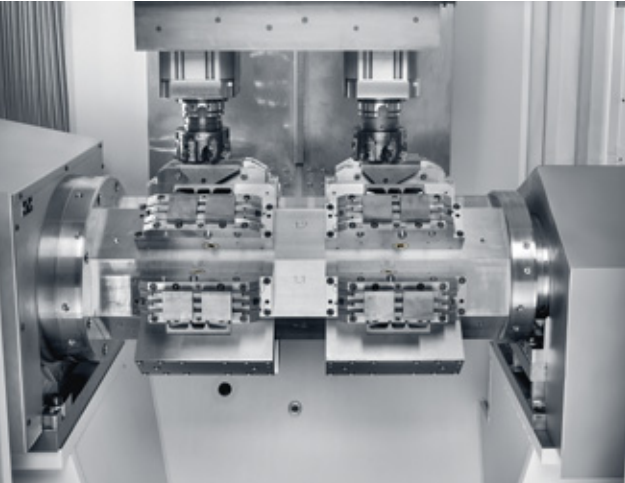
12



Rotary indexing tables and device bridges with torque technology enable stable and precise 4- and 5-axis machining of small and large workpieces in multiple fixtures. The alignment in the work space helps free chip fall.

Integrated operation and pre-defined interfaces allow simple automation with various loading and unloading systems for work pieces and tools.

# Versatile and flexible, always productive

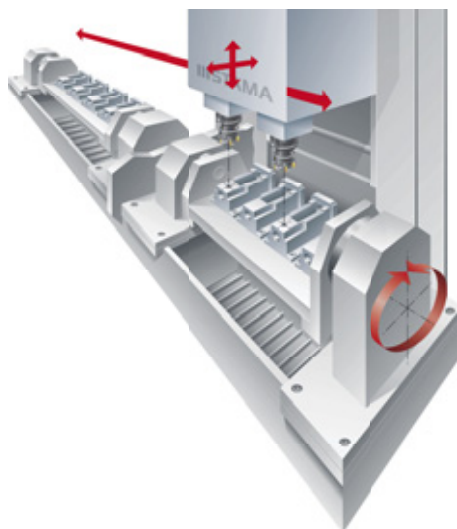


# Two place MC 5 – complete manufacture

Chip removal in the left-hand work space, loading and unloading parallel to main time in the right-hand work space. And the other way round. As double- and 4-spindle machining centers, the two place System 5 machining centers stand for the productive series manufacturing of small and large workpieces in multiple fixtures.



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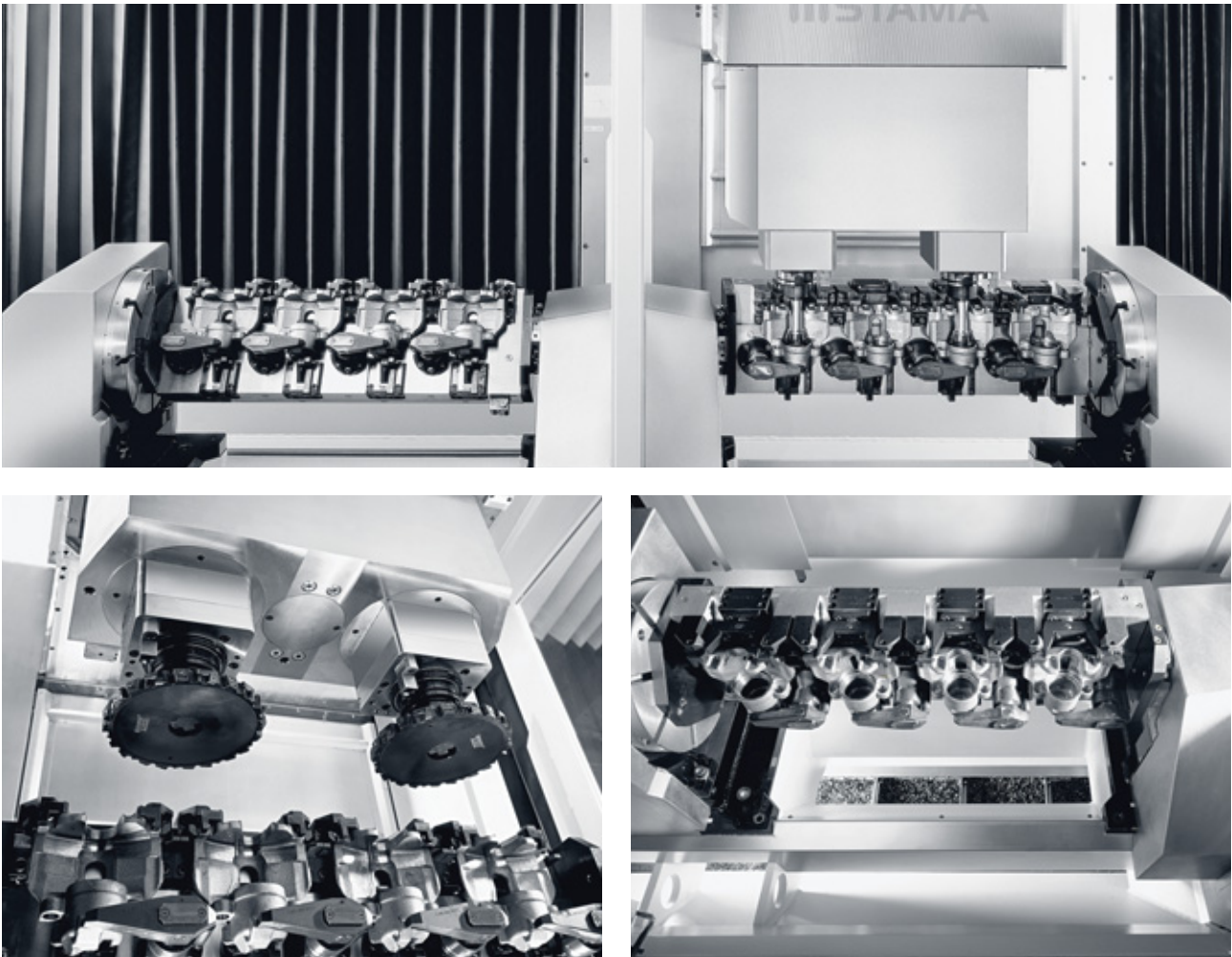


The machining centers with modular construction allow total freedom in the individual design of manufacturing processes.

In the 38 Class, application-optimised components ensure dynamic and precise heavy-duty chip removal with HSK-A100.

# Loading, unloading and set-up parallel to main time

Complete machining in two clamping positions on one center ensures more efficient quality assurance, lower logistics expenses and more personal responsibility for the operator.



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Large dimension rotary indexing tables and device bridges with torque technology enable stable and precise 4- and 5-axis machining. The alignment in the work space helps free chip fall.

# Teamwork – 100 percent reliability

Adapting quickly and safely to the new production conditions belongs to the decisive selection criteria of an automated process solution. Every component of the automated system has to be able to react flexibly to changes, in order not to compromise delivery times, unit price and quality.

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## MC 534 with external loading gantry

Automated workpiece handling over two machining centers and integrated monitoring station for manufacturing process reliability in 3-shift operation.



## Robot loading

One robot serves two MC 331 TWIN machining centers alternately. It loads and unloads the machining centers parallel to main time with 4 workpieces from the blank and finished part storage.



## for complex process solutions

The more complex the automation, the more demanding the controllability of the whole process. How well the machine and the individual automation components work together determines how reliable the process solution and how high the availability will be.



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If everything is single-sourced, components and processes are proven and extensively standardised. Interfaces and process configurations are coordinated as a whole and totally technically integrated.

The investment for the automation of one or more machining centers accounts for between 30 and 50% of the total for a manufacturing solution. Flexibility is also a question of cost.

# Flexible and space-saving automation

More output from a smaller space: The footprint is for many companies a criteria in the selection of a manufacturing solution. If loading gantries and available robots are out of the question for the work-piece handling automation – there is simply not enough space – integrated loading gantries are the solution.



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## **Integrated handling 1**

The loading gantry with two- or four-fold gripper is integrated in the machining center. Blanks and finished parts are fed and removed by means of a belt with coded pallets for manufacturing different models. This cost-effective automated solution is small and compact.

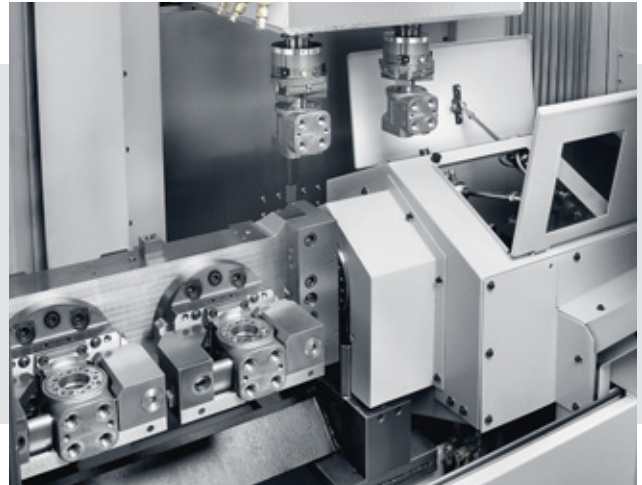
# with integrated solutions

Work space loading and unloading either directly into a fixture or together with the fixture by means of zero-point clamping systems. Automated workpiece handling by means of an integrated gantry or pick-up system saves production space. The simple interface from the MC to the workpiece handling feed and removal systems is a further benefit. Start-up is less complicated, and subsequent process changes can be quickly and flexibly implemented.



## Integrated handling 2

A 6-fold pallet pool holds the workpieces ready with zero-point clamping systems. The integrated loading gantry lifts up to 200 kg.



## Pick-up!

The spindle head takes over the loading and unloading of the blanks and finished parts. The grippers appropriate for the shape are stored in the tool magazine.



# PEPS®!

More output per footprint is the objective of the PEPS® concept. A „capacity investment“ calculation alone no longer provides realistic key figures for the productivity and unit costs of a process solution. The space requirement also has an effect on unit costs, as buildings do not add value but incur costs.

The image shows a chalkboard with the PEPS formula and several surrounding factors:

- INVESTMENT**: TOTAL COST OF OWNERSHIP, PART COST ANALYSIS
- ERGONOMICS**: SETUP TIMES, ACCESSIBILITY, AUTOMATION
- PRODUCTION/AUXILIARY/TIME**: CHIP-TO-CHIP, WORKPIECE HANDLING, TOOL LIFE, 5-AXES MACHINING
- NUMBER OF WORKPIECES**: PER CLAMPING POSITION, PER SPINDLE
- MAINTENANCE/SERVICE TIME**: AVAILABILITY, NUMBER OF COMPONENTS, MAINTENANCE RATES, STAFF REQUIRED
- FLOOR SPACE REQUIRED**: FOOTPRINT MACHINING CENTER, FOOTPRINT PERIPHERAL EQUIPMENT
- ENERGY REQUIRED**: PRODUCTION, MANUFACTURING, OPERATION
- NUMBER OF SPINDLES**: MILLING SPINDLE, TURNING SPINDLE

$$PEPS^{\circledR} = \frac{e \times n \times s}{I \times \sum(t_h + t_n) \times E \times A} \times (1 - t_m) \times (1 - t_s)$$

20

PEPS® – Performance Efficiency Per Square Meter

The PEPS® formula illustrates the factors that determine the performance efficiency per footprint. A TWIN center has a smaller footprint than two single-spindle machining centers, saves 40% of the energy costs and reduces the maintenance and operating costs. PEPS® means that multi-spindle machining brings measurable benefits in cost-effectiveness and sustainability.

# Award-winning!

Innovative engineering, convincing machine concepts and a reliable team of qualified employees are our basis for the optimal implementation of customer-specific process solutions.

Some projects and concepts have won major awards for their strengths and visions. A challenge and at the same time an incentive for the STAMA company.



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# Stand-by and wake-up. Cut costs intelligently

In unproductive machine phases, peripheral units and axis feeds are turned off one after the other with the **ECO menu**. The works settings can be simply adjusted at any time. Once in stand-by modus, the machine is reactivated without delay by pressing the start button.

In shut-off operation, up to 80 percent savings are achieved, which can amount to several thousand Euros per machining center and year.

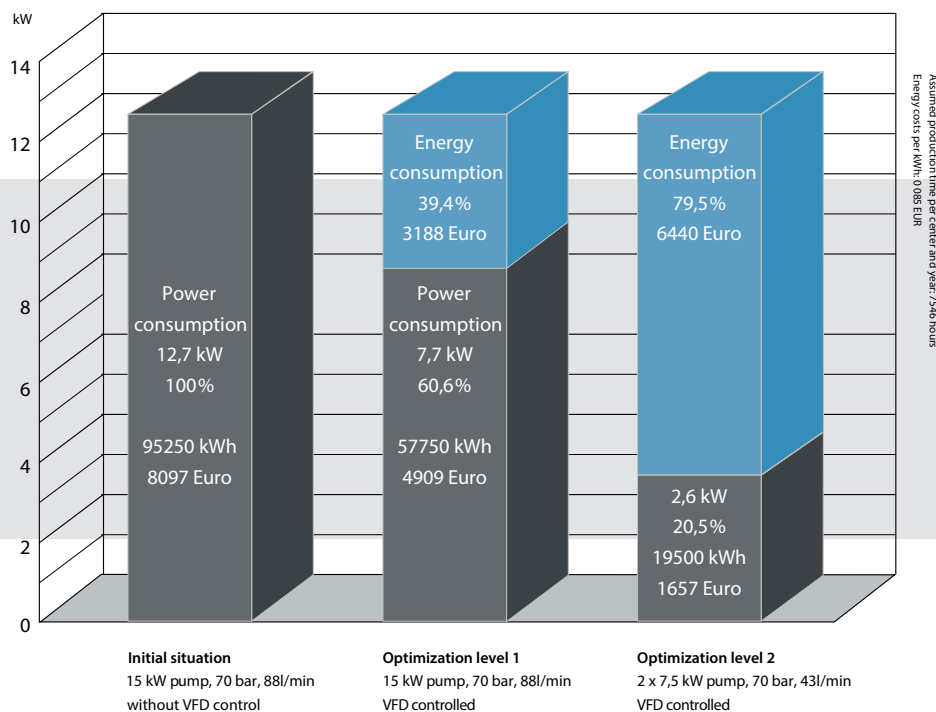


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To circulate cooling lubricant or allow a fast acceleration in a thermally stable phase, machines are often not turned off in production-free times like nights and weekends. With the **wake-up timer**, you can flexibly programme the on and off times of different functions. A defined NC programme runs at these times. This can be a warm-up programme for the start of the week or a rinse programme to circulate the cooling lubricant. After completion of the programme, the machine either stays active or is put back into sleep mode.

# Manufacture energy-efficiently, produce sustainably

Energy costs are rising, likewise their share of total production costs. This applies to many industries; machine tools are also heavy energy consumers. Requirements of the new EU product guidelines are also to be expected in this regard. A sustainable and efficient use of energy and resources will be a distinguishing feature for manufacturer and customer.



STAMA has implemented innovative ideas for more efficient energy use. One is the use of frequency-controlled cooling lubricant pumps. These cut energy costs by a good 80%.

To implement future-orientated and future-proof manufacturing solutions, the (further) development of energy and resource efficient products, technologies and processes is vital.

# In-house precision

Our own spindle engineering assembles per year around 900 milling spindles, turning spindles and torque axis for all STAMA machining centers. Every spindle has a unique number; the spindle's history can be followed over its entire lifetime. Directly driven rotary axis with crash-resistant torque technology guarantees high positioning accuracy and dynamics for the 4th and 5th axis.



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The 4th axis for the round axle of the trunnion table.



The 5th axis for mounting in the trunnion table.

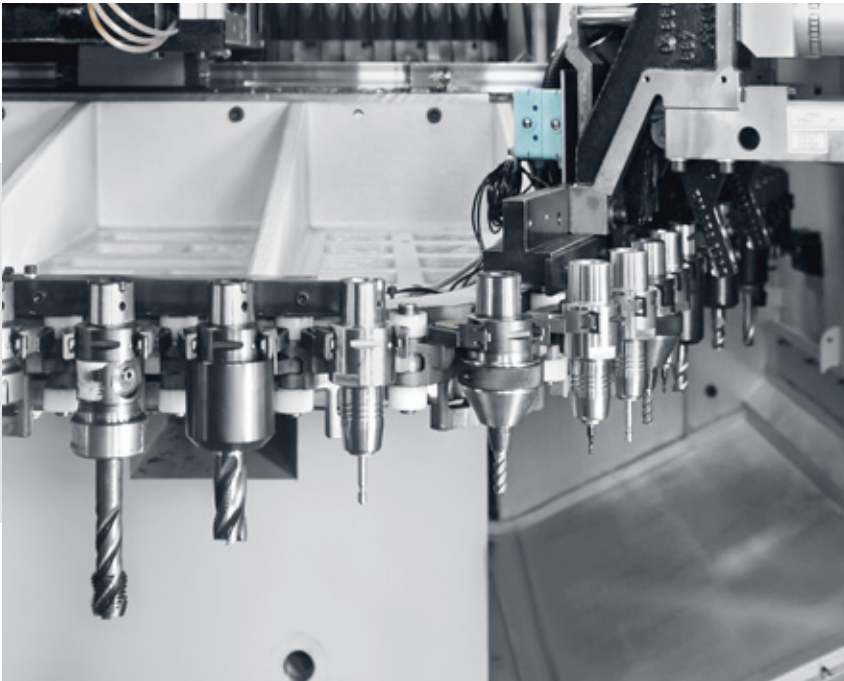




# STAMA tool management<sup>Pat.</sup>

The standard tool magazines are outside the chip and coolant area. The tool change itself is carried out in a pick-up procedure with the headstock.

The constant, short chip-to-chip times with the patented tool changing management help to reduce main times.



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As significantly more users are machining with 5-axis, magazines with a large number of tools are included as standard.

For larger tool capacity there is a background magazine with 200 tool places. On a footprint of just 3.5 square metres. The management of complete tool sets parallel to machining time considerably reduces set-up times.

# Well looked after worldwide – STAMA service

With standard and turnkey solutions, unexpected problems and disruptions can occur even with planned inspection and maintenance by STAMA technicians and with correct operation of the machining centers by your employees.

To ensure that spare parts and our service technicians are quickly on the spot, we have a network of over 70 service stations.



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A good 80 percent of machine downtime can be rectified quickly and efficiently with the STAMA Online Service. Whether on-site or by remote diagnosis – together we always find a solution to get your production running again.

**You will find the contact information for our service stations worldwide and direct access to the STAMA Online Service SOS on the STAMA website.**



# Engineering is our key competence

We use our know-how and experience to develop individual turnkey solutions – every branch and every workpiece in special focus. A good 80 percent of all delivered projects are customer-specific process solutions. Of course – there are always different solutions for a manufacturing process. But only one is optimal.



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STAMA engineering leads and supports all customer projects with teams of experienced designers, engineers, selected partners and suppliers. From project start to customer acceptance, the project management is the central contact for implementing the process solution. All project dates and information flow together here, the project status is always available.

**You will find the contact information for our sales engineers and representatives worldwide on the STAMA website.**

www.stama.de



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 **STAMA**