

Outstanding flexibility,
Cost effective & high precision



Mikron Multistep XT-200

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Advantage through modularity

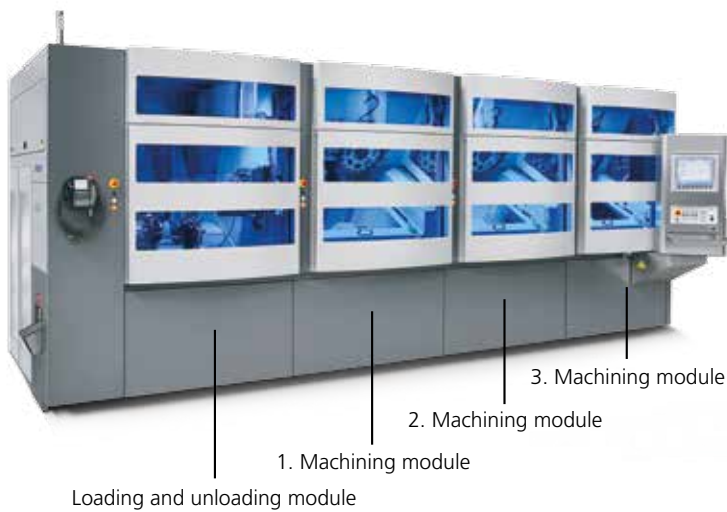
UNIQUE

The Mikron Multistep achieves top results in economy and precision. With its unbeatable modularity and flexibility, production requirements can be adjusted at any time, all with unparalleled precision.

With a single loading module you can add from 1 up to 4 machining module extensions providing a total of 36 to 144 tools.

The features that particularly distinguish this machine are:

- 5 1/2 side machining, simultaneously with 5 axis in a single clamping
- The loading module can perform parallel tasks such as, for example, fully automated repositioning of work-pieces for 6th-side machining, dimensional checking of blanks, deburring, cleaning and much more...
- Chip-to-chip in less than one second



When compared to conventional machining centers, the Mikron Multistep XT-200 guarantees savings in: Personnel / Space requirements / Machinery

For both small and large production runs, with Multistep XT-200 customisation, you can produce your precision parts economically. Allows to switch easily between demanding processing steps and short run orders effectively.

Maximum size workpieces up to 200 mm x 200 mm edge length (depending on setup situation and processing tasks).



Mikron Multistep XT-200 with 3 machining modules

Brilliant machine design

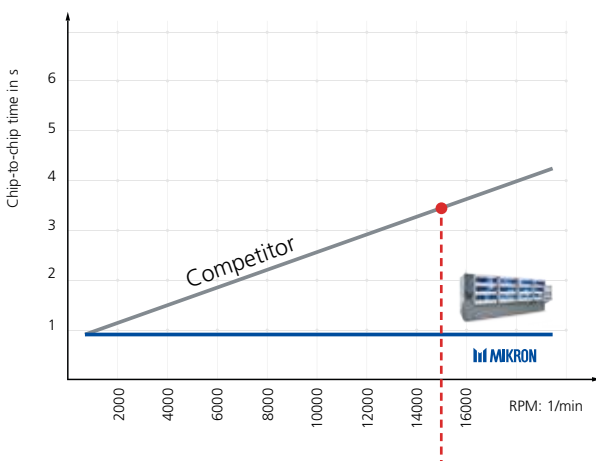
The Multistep XT-200 combines perfectly the productivity of a transfer machine with the retooling flexibility of a machining centre perfectly. The design of this high precision machining system is based on individual, two-spindle modules fitted to each other.

The integrated loading and unloading module feeds all of the machining modules. Any expansion with additional machining modules (up to 4) results in a direct increase in productivity, providing a demand-oriented investment. With up to 4 spindles operating independently, up to 144 tools afford excellent flexibility.

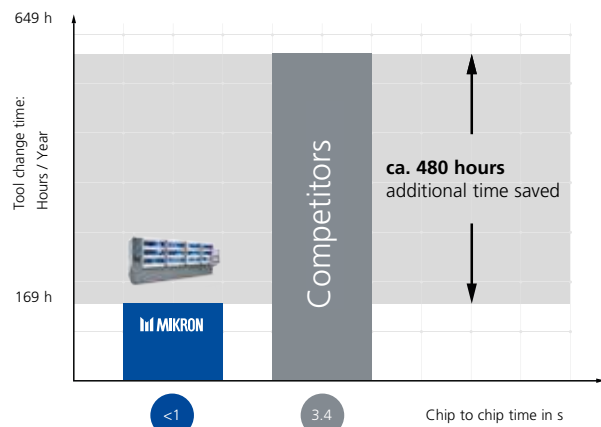
REVOLUTIONARY

- 100% system integrity
 - A single, integrated loading/unloading module feeds all of the machining modules, eliminating error-prone interfaces. Additional tasks can be performed in parallel in the main loading module with no downtime.
 - Only 1 chip conveyor and one coolant system, integrated for all machining modules.
 - Significant space saving, as well as a reduction in the number of operators required in comparison to traditional machining centres
- Ingenious workpiece flow through all machining modules – without repositioning and reclamping – thanks to the double grip (grripper arm) positioned by the EROWA-zero point system
- Two independent working spindles per module, allowing a very short chip-to-chip time of < 1 second (at maximum spindle speed)

Constant chip-to-chip time of < 1 second regardless of spindle speed



Considerable cost savings – from short idle times and rapid tool changes



Case Study

At **4 tool changes per minute**, in one year the Mikron Multistep XT-200 saved **480** machine hours when compared to its competitors (3.4 s / tool changes).

Two –shift operation (16h) x 0.8, 220 days/year. Spindle speed: 15 000 1/min

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Loading and Unloading Module – One for All !

Material flow of blank and finished work-pieces can be managed optimally. Either by manual loading, or an integrated robot! Thanks to systems integration, fault prone interfaces, as is so often the case with conventional machining centres, are omitted. Additional tasks can be processed in parallel, without any downtime.

Loading system during machining with

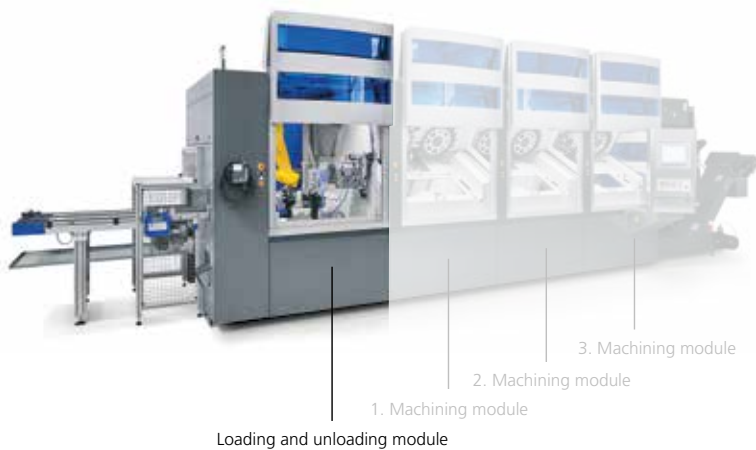
- 3-axis handling
- Robot
- Manual

Variable part loading and unloading

- Paternoster pallets
- Pallet stacking magazine
- Vibratory feeder belt-conveyor
- Stop/Go conveyor belt

Anytime parallel processing

- Blank part testing & blank part measurement, with direct out of tolerance discharge from the system. Measurement results sent to control for automatic coordinated clearing
- Deburring, cleaning, engraving
- Turning and measurement
- Positioning
- Cleaning
- ... and much more



For fully automated, 6-side machining, turning of workpieces – processed in parallel to operations in the loading module.



Loading module: real time loading by a robot

Super-efficient machining module

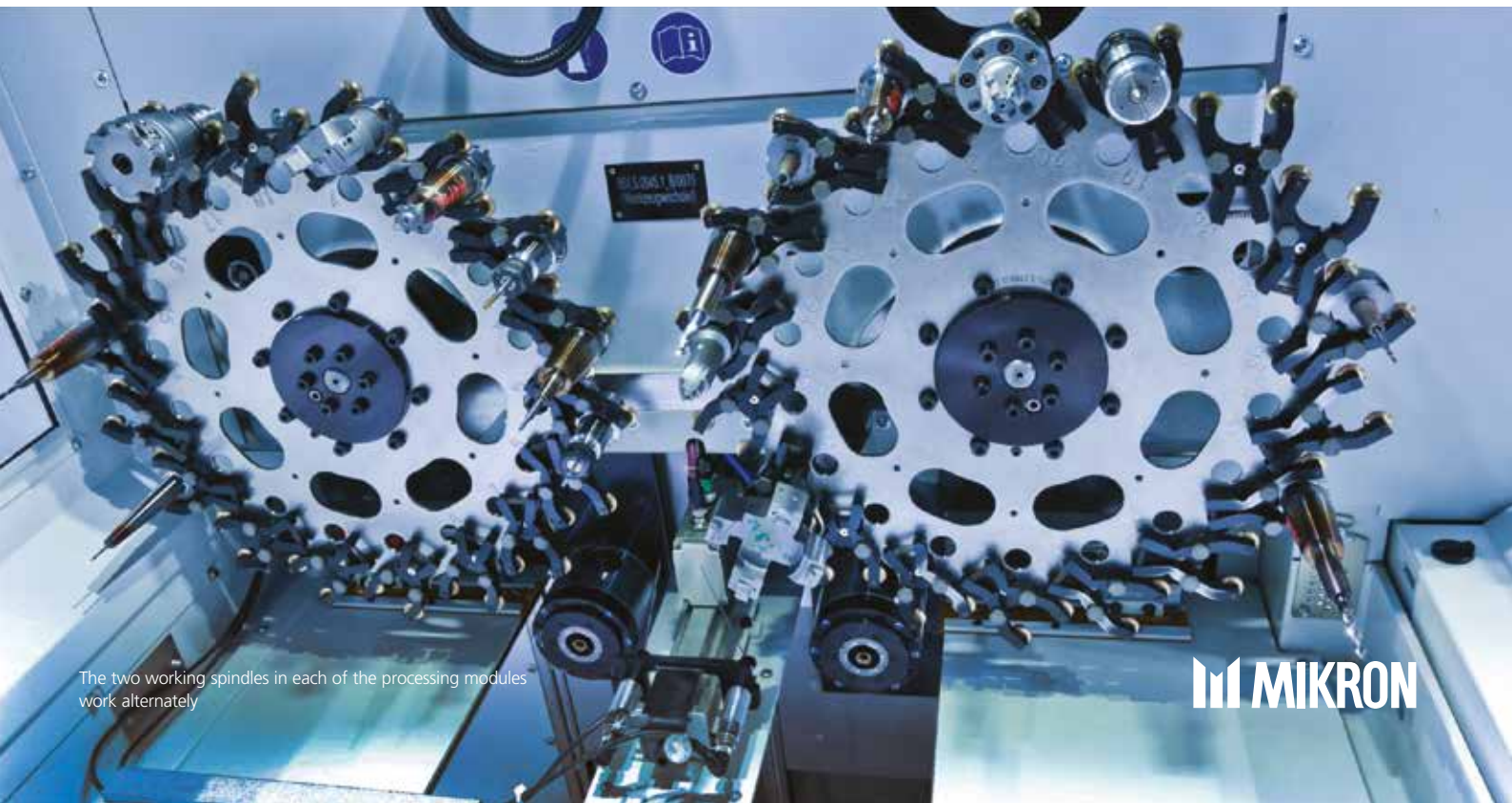
Each machining module is equipped with two working spindles which are used alternately. While one spindle is machining, the other is changing the cutting tool. The ingenious work-piece flow through the directly connected machining modules allows complete machining of the work-pieces – with no downtime!

Overview of a working module

- 2x tool magazine discs with 18 tool slots, up to 36 tools per module.
- When stacked to the maximum level (4 modules), the Multistep XT-200 can accommodate 144 tools
- 2x alternately operating spindles, chip-to-chip time under 1 second at full spindle speed
- 1x B/C- axis: The extremely stable table guarantees stable machining even with heavy load operations
- Twin gripper transfer arm for transporting work-pieces (clamped in the fixture) between the machining modules
- Slanted machine bed for optimal chip removal
- Options: electronic tool wear detector – tool breakage detection with mechanical sensor – tool coding with chip and reader



Individual machining of 5½ sides in a single clamping with 5 interpolated axes achieving a chip-to-chip time of under 1 second.



The two working spindles in each of the processing modules work alternately

Mikron Multistep XT-200

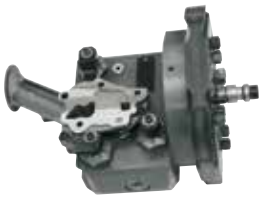
Clamping approaches.... There is always a good solution!

For years our engineers have encountered a wide range of materials, shapes and geometries of workpieces. You benefit from vast knowledge and skills regardless of whether you are using standard clamping devices or special clamping chucks.

Multiple clamping possible: more than 70 dedicated clamping solutions are developed every year!

Gripping moments

An EROWA interface ensures perfect clamping repetition precision. Air pressure barrier ensures a clean interface when re-clamping. The clamping force of 18 kN guarantees stability while machining. You can stay calm even during the most gripping moments.



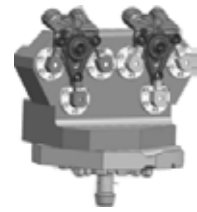
Hydraulic clamping



Two-jaws clamping



Quad clamping



Double clamping

Clamping concepts: mechanical / hydraulic / pneumatic or combined - single or multiple.



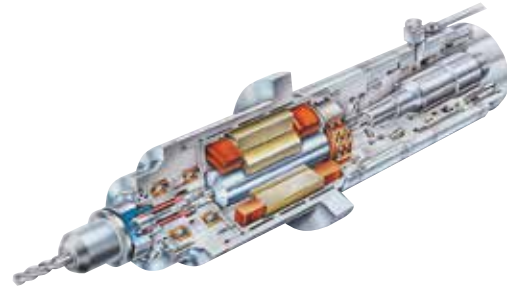
Spindle types & Control

The Multistep XT-200 is available with two spindle options. The spindle MS 140 is part of the standard equipment. A high frequency spindle is available as an option for high speed machining. Both types have standard internal coolant feed pressure of 120 bar respectively 150 bar.

The tool holder with HSK A-40 interface holds the tools. Tool change occurs outside of the machining area. Interface cleaning and air pressure barriers prevent dirt and chips from entering. A very tidy solution!



Belt spindle



Motor spindle

Working spindle	Standard	High speed
Tool holder	HSK A - 40	HSK A - 40
Outside diameter	140 mm	140 mm
RPM	15'000 1/min	40'000 1/min
Torque (S6 45% ED)	36 Nm	9 Nm
Power (S6 45% ED)	18 kW	13.5 kW
Internal coolant feed	150 bar	120 bar
Spindle distance	290 mm	290 mm



Advantages of IndraMotion MTX

Multistep XT-200 is equipped with the "IndraMotion MTX" control from Bosch Rexroth. The control makes system management effortless and easy-to-follow in programming, diagnostics, production data management and 3D simulation.

- Extremely quick and super precise
- Simple and easy-to-follow screen display
- Large NC programming memory
- 1000 "Look Ahead" records
- Open architecture compatible with NC programming systems
- Multilingual menus
- Not clear control cycle of 0.25 ms for assured precision
- 3D simulation for secure programming

Mikron Multistep XT-200

Measurement – runtime parallel & in-process

Measuring without wasting time

Optionally with a button already in the loading module runtime parallel measurement of the blank parts. Out of tolerance blank parts are ejected directly from the system directly. Measurement results are automatically sent to the Control for automatic coordinated clearing.

For impeccable precision

Perfect μ -precision with the "In-Process Measurement" option. The measuring sensor, like any other working tool, can be loaded in just 1 second.

- For detecting reference areas, drill holes, contours, etc.
- For automatic correction of the workpiece zero points or to confirm the proper state of the machine.

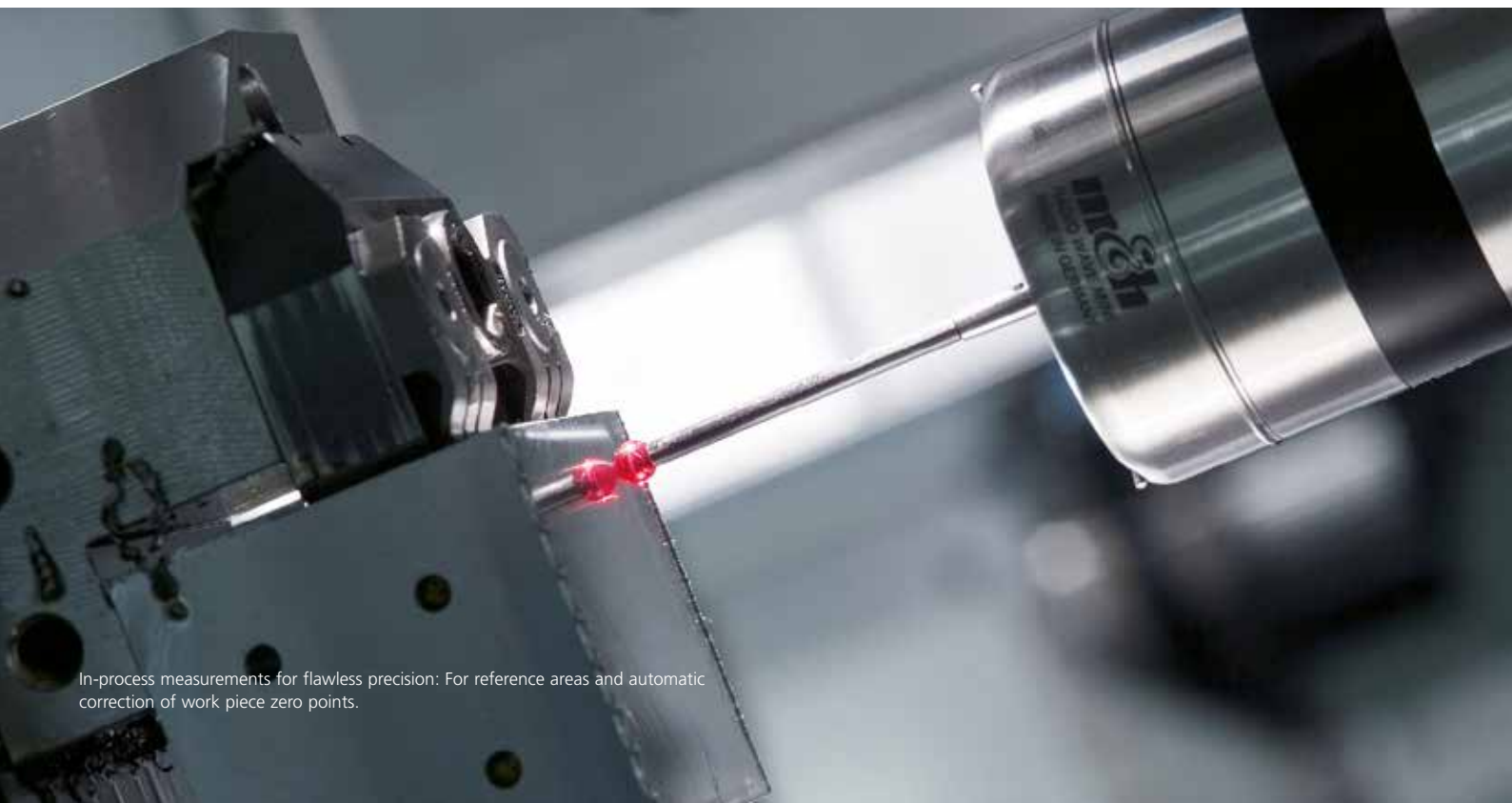
By using efficient measurement cycles, the spatial orientation and position of the workpieces can be determined accurately.

The management of multiple voltages, as well as several clamping devices is therefore massively simplified. Differences in the dimensions of individual clamping nests can be balanced with ultra-high precision without compromise.

For you, this means: enormous savings in clamps and fittings!



The measuring sensor can be loaded in just 1 second like any other work tool.



In-process measurements for flawless precision: For reference areas and automatic correction of work piece zero points.

Precision

Multistep XT-200 owes its high manufacturing quality to the perfect interaction of its various elements:

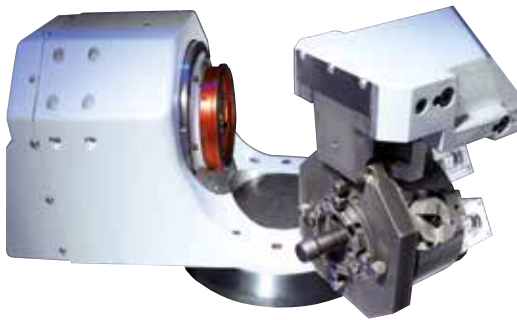
- Runtime parallel measurements in the loading/unloading module. Automatic ejection of blank parts outside of the tolerance range.
- In-process measurement in the machining modules
- High positioning accuracy of the clamping device thanks to the EROWA interface
- Rigid machine construction
- Extremely stable B/C Axis

Gripping moments

An EROWA interface ensures perfect clamping repetition precision. Air pressure barrier ensures a clean interface when re-clamping.

B/C Axis a strategic element

The B/C axis of the Multistep XT-200 can handle feeds up to 2500 N. The extremely stable table guarantees stable machining even with heavy duty chip removal.



Precision in re-clamping: Workpiece clamping system with the EROWA interface



Transfer of work pieces from module to module is achieved using a gripper arm

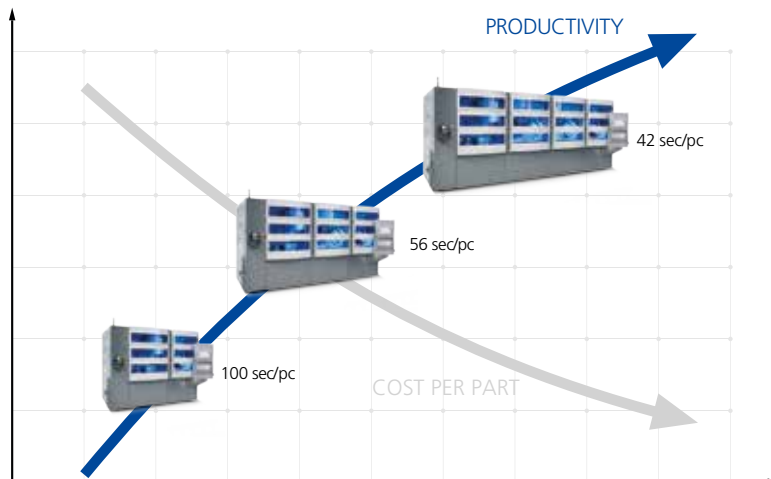
Mikron Multistep XT-200

Productivity & Flexibility

EXPANDABLE WHEN NEEDED

The Multistep machining system is a true productivity center! Its modularity and flexibility are unique and unequalled. It can be expanded to meet future production increases at any time with incomparable precision!

There is one integrated loading/unloading module which can work with all the machining modules (up to 4). Therefore production can be increased by adding machining modules but no additional loading/unloading module has to be added. The investment in increased production can be tailored as needed.



The Multistep XT-200 combines ideally the productivity of a transfer machine with the changeover flexibility of a machining center. With 4 machining modules, 4 spindles are simultaneously in operation.

QUICK SYSTEM UPGRADES

Quick retooling for different work-pieces is possible at any time. On the Multistep XT-200 even small lots can be machined very cost effective.

In less than 30 minutes the machine is changed over and ready for the production of a new workpiece.

And here's how:

Clamping fixture changes

The EROWA interface makes it possible: Changing the clamping chuck in only 30 seconds with a positioning accuracy of $\pm 2\mu\text{m}$.

Tool changes

Quickly remove the tool from the tool holder disk and replace it with a different tool right in the machine. The standard two-spindle module can have a maximum of 36 tools (2x18).

Program changes

Quick and easy. Just choose a program on the machine control platform and go.



User-friendly maintenance and servicing design

Do you want a production machine with minimal downtime?

With Multistep XT-200 the technical availability can be used optimally because the service and maintenance times are reduced to a minimum. Maintenance is easy and convenient. Benefit from the numerous advantages!

The advantages at a glance

- Easy and rapid access to central structural elements
- Servicing corridor between the modules and the electrical cabinets
- Visual maintenance inspection of all valves during production processes
- Self-diagnostics of the entire system
- Maintenance status displayed via HMI
- Central power unit for the control system, centralised lubrication, hydraulics and pneumatics



A tidy finis



Mikron Multistep XT-200

Typical workpieces

Multistep XT-200 is practically limitless. The machining range of the Multistep XT-200 transfer system is very broad: It extends from simple drilling processes to complex milling operations.

- Machining on 5 ½ sides with five CNC axes and interpolation
- The loading module can perform parallel tasks such as fully automated repositioning of work-pieces – for 6th-side machining, dimensional checking of blanks, deburring, cleaning and much more.
- Chip-to-chip in less than one second

AUTOMOTIVE INDUSTRY



PNEUMATICS & HYDRAULICS



PHARMA / MEDICAL EQUIPMENT



MISCELLANEOUS



Case History: Compressor Housing

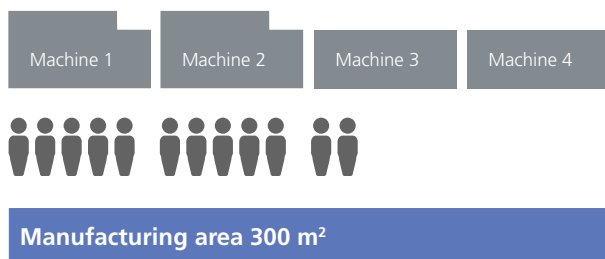
The challenge

- 5 different housings made from cast AlMgSiCu-alloys
- Turning, milling, drilling on 6 sides of the workpieces.
Depending on the part, 30 to 40 processes. Variable batch sizes from 500 to 10,000 parts.
- Tolerance: $\pm 25\mu\text{m}$ PFU1.67. (Acceptance sampling 10%)
- Annual requirement approx. 500'000 pieces (in a 3-shift operation)



The traditional solution

- Machines required: 4
- Production area: 300 m²
- Processing work in 2 setups:
 - Milling on a multi spindle-processing centre, followed by
 - Turning on automatic lathes
- Manual loading/unloading
- Preparation time: 80 mins
- 12 employees



The innovative solution

- Equipment required: 2 Mikron Multistep XT-200
- Manufacturing area: 165 m²
- All machining processes completed on one processing system
- Intelligent, integrated, automated loading/unloading module
- Preparation time: 20 min
- 6 employees



Cost-per-part
less 35%



Turbocharger in action

Mikron Multistep XT-200

The benefits at a glance

PRODUCTIVITY

- Chip-to-chip in 1 second at full spindle speed: Whilst a tool is being changed on one spindle, the workpiece is being processed on the second spindle in a machining module. As a result, unproductive time is significantly reduced.
- Multiple voltages possible.
- 1 integrated loading/unloading system feeds 1 to 4 machining modules. Additional tasks can be processed in parallel with no downtime: inspecting the workpieces, testing and measuring blank parts, deburring, cleaning and much more...
- Significant space requirement savings, as well as a reduction in the number of operators required when compared to traditional machining centres.
- Up to 4 independent spindles which can be used simultaneously.

VERSATILITY

- 5-axis interpolation on 5 1/2 working sides in one clamping.
- For fully automated 6-side processing operations, automated tilting of the workpieces - runtime parallel for processing in the loading module.
- Up to 144 tools in 4 modules.
- Cutting and free form milling, drilling, deep hole drilling, plunge cutting, threading, deburring, reaming, chamfering, engraving, countersinking, knurling, turning or honing, grooving with U-axis.
- Integration of assembly tasks (parallel runtime) in the loading module.

PRECISION

- Compact and rigid machine design with an extremely stable B/C-axis.
- Direct distance measurement system for achieving the highest positioning accuracy.
- Perfect clamping accuracy with the EROWA interface.
- Automatic measuring of reference position and offset through wireless communication with machine control computer (blank part in loading module and during processing in the machining modules).

FLEXIBILITY

- Increase of the production volume through an addition of more machining modules is possible at any time.
- Short set-up times, ideal for the production of different workpieces (ideal when changing batch sizes).
- Quick change-over of tools and tool carrier palettes.



Mikron Multistep XT-200 with 3 machining modules

Mikron Service Solutions

Flexible and modular

We ensure quick, competent and uncomplicated service and support for our customers. We work together with you to design a service solution profile tailored to your individual needs.

Mikron's service palette:



REACTIVE

Technical Support – repair your machine

- » Helpdesk
- » Remote Diagnostics
- » Augmented Connection
- » Service Assignment



PREVENTIVE

Service & Maintenance – prevent machine stops

- » Technical Evaluation
- » Preventive Maintenance
- » Spindles & Groups Overhaul
- » Extended Warranty
- » Software Backups



PREDICTIVE

miS4.0 – predict your machine maintenance

- » Production Monitoring
- » Condition Monitoring
- » Failure Analysis
- » Mikron cloud and IoT platform
- » Mikron miTool – The next level of monitoring



PROACTIVE

Business Support – keep & improve machine productivity

- » Process Monitoring (OEE Improvement)
- » Training
- » Energy Consumption
- » New Applications & Simulations
- » Engineering
- » Interactive Troubleshooting
- » Startup & Production Support
- » Service Level Agreements



SPARE PARTS

Spare Parts – reliable supply of original Mikron spare parts

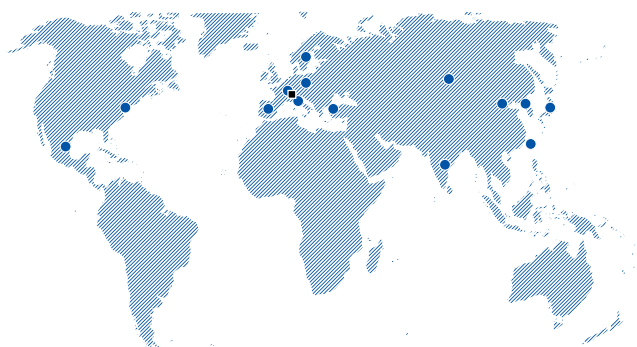
- » Original Mikron spare parts
- » Xchange Modules



SECOND LIFE

2nd life – guarantee continuous use of your investment

- » Machine Overhaul
- » Retooling
- » Safety & Environments
- » Updates & Upgrades
- » Retrofitting



Contact your Service Center today, we gladly be of assistance.

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Switzerland
Service Center
Tel. +41 91 610 61 61
service.mag@mikron.com
OH: 08.00 - 17.30

Germany
Service Center
Tel. +49 741 5380 200
service.mro@mikron.com
OH: 08.00 - 17.30

USA/Canada
Service Center
Tel. +1 203 261 31 00
service.mmo@mikron.com
OH: 7.30 am - 5.00 pm EST

China
Service Center
Tel. +86 1592 1577 050
services.mm.msh@mikron.com
OH: 08.00 - 17.30

Mikron Machining

Mikron Switzerland AG, Agno

Division Machining

Headquarter
Via Ginnasio 17
6982 Agno
Switzerland
Tel. +41 91 610 61 11
Fax +41 91 610 66 80
mag@mikron.com

Mikron Germany GmbH

Berner Feld 71
D-78628 Rottweil
Tel. +49 741 5380 0
Fax +49 741 5380 580
mro@mikron.com

Mikron Corp. Monroe

200 Main Street
P.O. Box 268
Monroe, CT 06468 / USA
Tel. +1 203 261 31 00
Fax +1 203 268 47 52
mmo@mikron.com



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