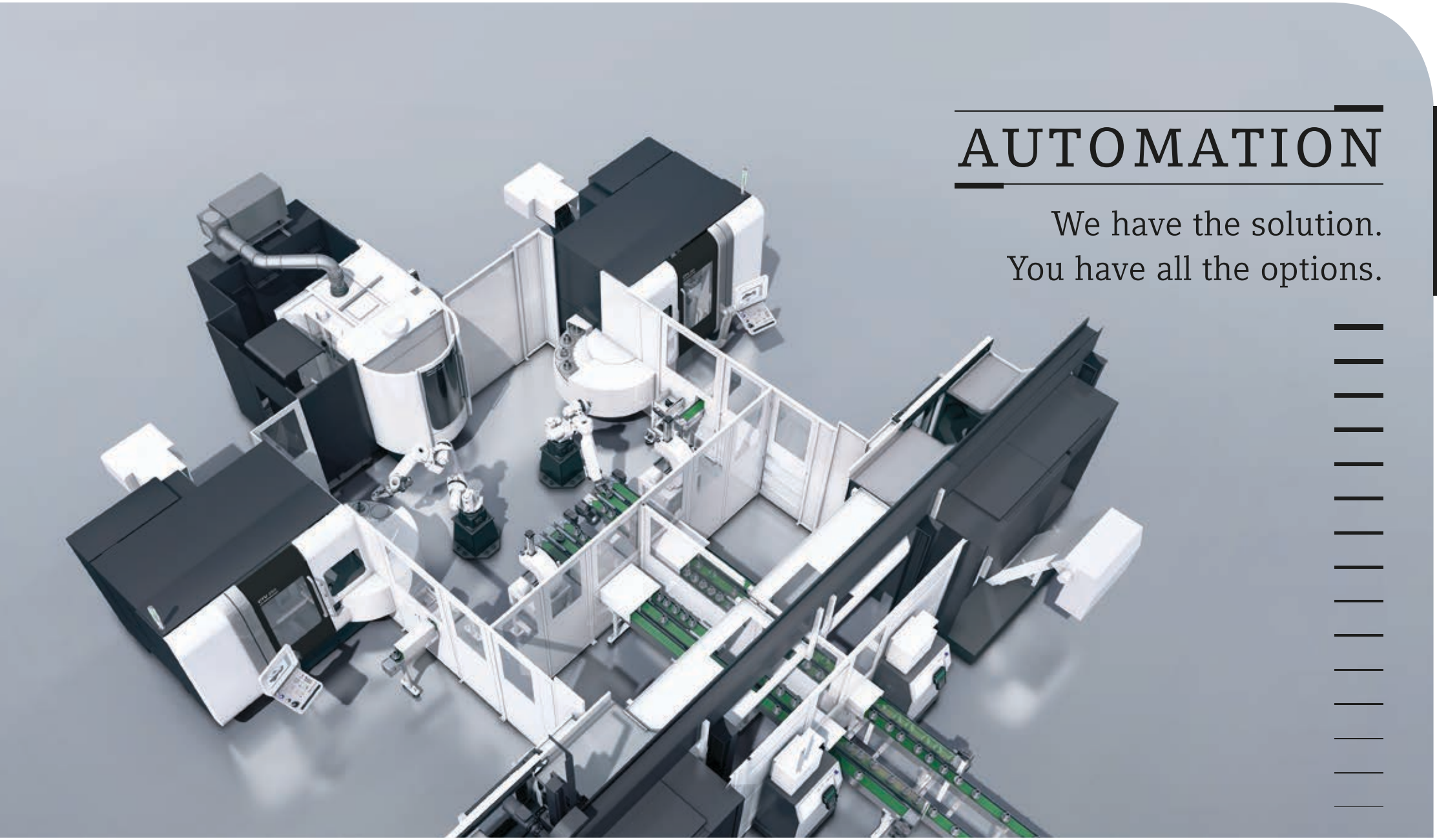
www.dmgmori.com

DMG MORI



AUTOMATION

We have the solution.
You have all the options.

Automation from DMG MORI

Efficiently improve productivity and process reliability.

Automated processes now offer the highest productivity increase potentials. At the same time, consistent production quality is achieved. This leads to economic success and the growing pressure of rising costs is countered efficiently.

Many companies see additional value in automated processes: Highly qualified employees are free to carry out other work thanks to automated processes, which means less of a shortage of specialists and savings for the company. DMG MORI Systems supports you with many years of experience and a broad knowledge base in all fields of automation.

Uwe Kling
Managing Director

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Tel.: +49 (0) 771 / 60 00 - 0
E-mail: automation@dmgmori.com

Potentials for your performance

+ Increased competitiveness and profit / returns
+ Increased productive time (e. g. bridging breaks or reducing non-productive time)
+ Reduced labour costs and staff requirements
+ Advantages of mass production, even from small batch sizes
+ Manual operation is still possible
+ Optimal utilisation of production capacities
+ Consistent high quality
+ Standardisation of operations
+ Efficient space utilisation
+ Increased flexibility

Assembly hall of
DMG MORI Systems
in Hüfingen

DMG MORI Systems

Experience and expertise – more than 3,000 successful projects.

Multiply your performance – with automation solutions from DMG MORI Systems. We guarantee perfect work flows and maximum efficiency for your production. DMG MORI offers you the know-how and the technology for the lowest workpiece costs with the highest quality. Our experience spans from simple machine integrated automation to the planning and implementation of complex manufacturing cells or production lines.

DMG MORI Systems

Our 360° solution skills – analysis, consultation, implementation.

DMG MORI Systems opens all the doors for you to achieve top performance. For this purpose we combine our core business, machine tools, with cutting edge engineering and expertise in automation. Our customers benefit from precisely tailored solutions. Whether you just want to automate one machine or an entire production line or manufacturing cell with multiple machining steps: DMG MORI Systems will develop and implement the perfect solution for you.

Production planning

+ Process analysis
+ Technology planning
+ Machine design
+ Cycle calculation
+ Simulation

Production logistics

+ Automation planning
+ Material flow analysis
+ Layout planning

Start-up support

+ Training
+ Process visualisation
+ Back up strategy
+ Remote diagnostics


1


2


3

1: Planning, engineering
2: Simulation
3: Implementation

DMG MORI Systems – expertise in four segments

SEGMENT 1 // PAGES 06 – 13

Machine integrated automation

Rotary and linear storage

As an optional accessory for the machine, the DMG MORI factories offer a range of automation solutions that can be integrated into the machine.

Possible number of automated machines: 1

SEGMENT 2 // PAGES 14 – 29

Standard automation

Workpiece or pallet handling

Efficient robot and portal solutions with additional modules (cleaning, measuring, brushing, etc.); available as plug and play solutions or in custom configurations.

Possible number of automated machines: 1–2

SEGMENT 3 // PAGES 30 – 43

Flexible manufacturing cells

Linking of multiple process sequences

Portal solutions, fixed or mobile robots and additional modules for loading multiple machines with integrated additional operations.

Possible number of automated machines: 3–10

SEGMENT 4 // PAGES 44 – 55

Production lines

Overall solutions in series production

Planning and implementation of pallet, portal and robot handling as a production line.

Possible number of automated machines: > 10

Segment 1

Machine integrated automation – Package solutions from the DMG MORI factories.

DMC 60 H ***linear*** with RS 12

NMV3000 with AWC 34

Segment 1

Machine integrated automation – DMC 65 monoBLOCK® with RS 3.

Workpiece: Individual parts and series from the field of mechanical engineering

Scope of delivery

+ DMC 65 monoBLOCK® with RS 3

Process description

+ Production of series and individual parts
+ Production of components for tool magazines
+ Machining of aluminium and steel components with a 200 Nm motor spindle
+ High degree of machine capacity utilisation thanks to pre-setting on a total of 3 pallets

Customer value

+ Reduced non-productive time thanks to set up during main time

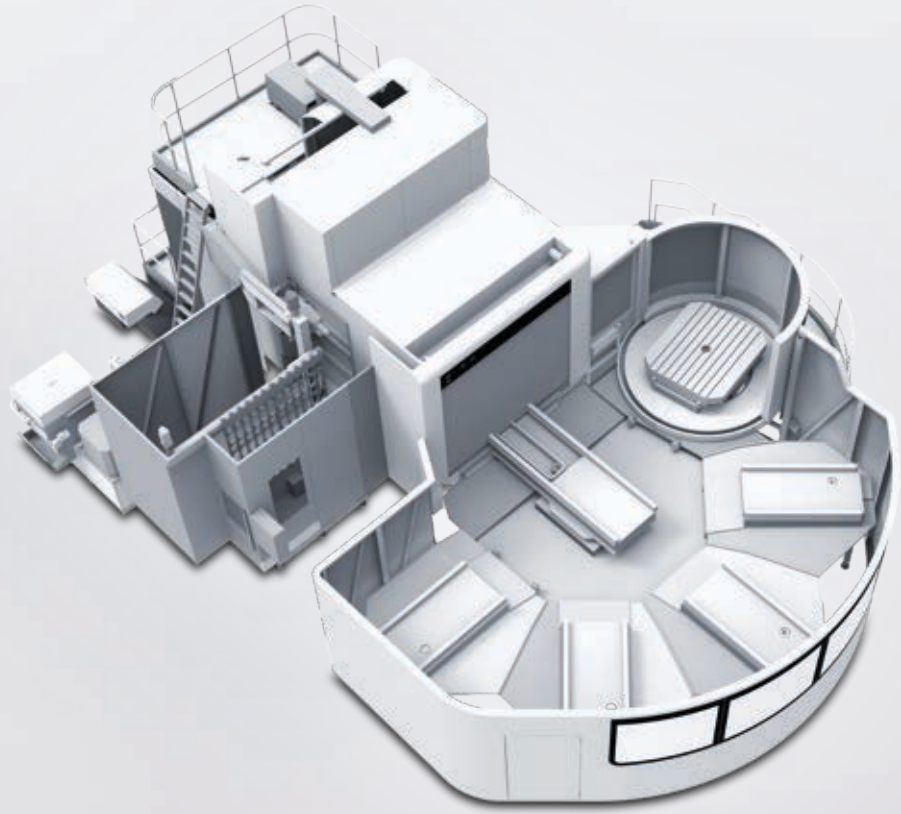
Deciding factors for DMG MORI Systems

+ High flexibility

KBA MÖDLING AG
Ein Unternehmen der Gruppe Koenig & Bauer AG

Segment 1

Machine integrated automation – DMC 210 U with RS 3.



Workpiece: Recurring individual parts from plant construction

Scope of delivery

+ DMC 210 U with RS 3

Process description

+ Diverse, highly varied components
+ Set up of individual parts during main time
+ Use of twin tools due to high strength steels
+ 5-axis simultaneous machining of complex components

Customer value

+ Universal machine for complex machine components

Deciding factors for DMG MORI Systems

+ Rotary pallet storage for portal machines

Segment 1

Machine integrated automation – DMC 160 U duoBLOCK® with RS 4.

Workpiece: Diverse individual parts for mechanical engineering

Scope of delivery

+ DMC 160 U duoBLOCK® with RS 4

Process description

+ Use of the machine as a universal milling machine
+ High variation of mechanical engineering components
+ The challenge: minimize tooling times for individual parts
+ Process monitoring by means of MPC
+ Maximum machining precision, even with large components

Customer value

+ Maximum flexibility thanks to 5-axis machining of large components measuring up to ø 1,500 mm and weighing up to 4,000 kg
+ Unmanned shifts when machining recurring components thanks to the rotary storage with 6 pallets in the system
+ Reduced non-productive time thanks to set up during main time

Deciding factors for DMG MORI Systems

+ Good experience with the existing identical machine

MWM
Energy. Efficiency. Environment.

REDUCED NON-PRODUCTIVE TIME THANKS TO SET UP DURING MAIN TIME

Segment 1

Machine integrated automation – DMC 80 U duoBLOCK® with RS 5.

Workpiece: Gas engine connecting rods

Scope of delivery

+ 2 × DMC 80 U duoBLOCK® with RS 5
+ Turnkey project including tools, devices and program

Process description

+ Two identical sister machines
+ Four clamping operations on hydraulic devices
+ Gear grinding on an external grinding machine
+ Connecting rod eye measurement with BLUM test bar
+ Key feature measurement with a measuring sensor
+ Readjustment of the tools on the basis of the bar measurement and automatic reworking

Customer value

+ Process reliability through collection and analysis of measurement data

Deciding factors for DMG MORI Systems

+ Large product range for future investments
+ Extensive experience in turnkey projects

Segment 1

Machine integrated automation – DMC 60 H *linear* with RS 12.

Workpiece: Production of individual clamping elements

Scope of delivery

+ DMC 60 H *linear* with RS 12

Process description

+ Production of individual parts
+ Process monitoring with MPC (Machine Protection Control)

Customer value

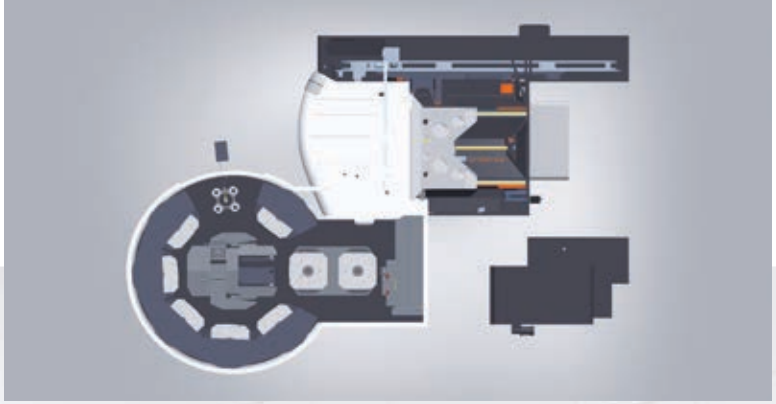
+ Maximum productivity with 12 pallets in the system
+ Linear drives on the X, Y and Z axes with a 60-month warranty
+ High dynamics with 100 m/min rapid traverse and 1 g acceleration
+ Intelligent tool magazine with 303 tools for set up during main and non-productive time
+ Chip to chip time of 2.5 seconds

Deciding factors for DMG MORI Systems

+ Maximum productivity and flexibility

welser profile

MINIMAL SET UP AREA OF JUST **26.8 M²**



Segment 1

Machine integrated automation – DMC 65 monoBLOCK® with RS 20.

Workpiece: Various small batch components, primarily special punching and machine tools

Scope of delivery

+ DMC 65 monoBLOCK® with RS 20

Process description

+ Machining / post processing of special tools
+ Few or no operators during weekend shifts when machining recurring parts
+ Reduced tooling times thanks to tooled devices on the machine pallet
+ Minimized errors thanks to program assignment to the pallet

Customer value

+ Reduced non-productive time, especially with short machining times, thanks to the rotary storage with 20 pallets in the system
+ The high number of pallets allows for the operation of multiple machines

Deciding factors for DMG MORI Systems

+ High number of pallets on a minimal set up area of just 26.8 m²
+ Rapid tool change system with 120 magazine slots

Segment 1

Machine integrated automation – CTX beta 800 4A with integrated workpiece handling.

Workpiece: Chuck components of up to ø 300 × 150 mm and 15 kg

Scope of delivery

+ 1 × CTX beta 800 4A with integrated workpiece handling and pallet conveyor
+ NC-controlled loading and unloading with double gripper

Process description

+ Programming of automation using the machine control system
+ Manual pallet loading
+ Workpiece feed through the pallet conveyor and double gripper
+ Workpiece machining on the CTX beta 800 4A

Customer value

+ Reduced non-productive time thanks to unloading during main time
+ 50 % shorter loading time than with external loading portals
+ Space saving design

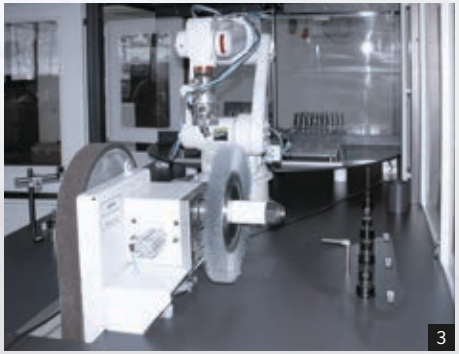
Deciding factors for DMG MORI Systems

+ Full integration into the machine control system
+ A complete solution from one supplier also means only one contact partner

Examples of additional operations
1: Deburring
2: Engraving with needle embosser
3: Combined grinding and brushing station
4: Measuring with tactile measuring equipment


1


2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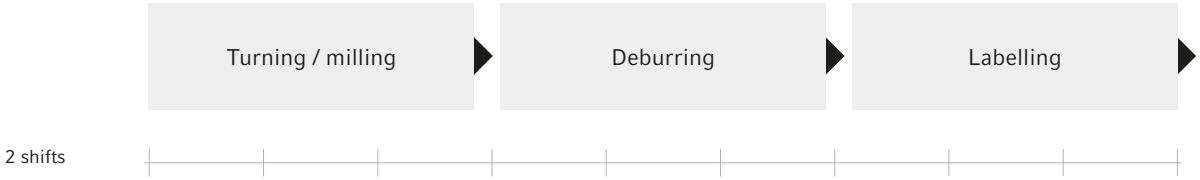
4

Segment 2

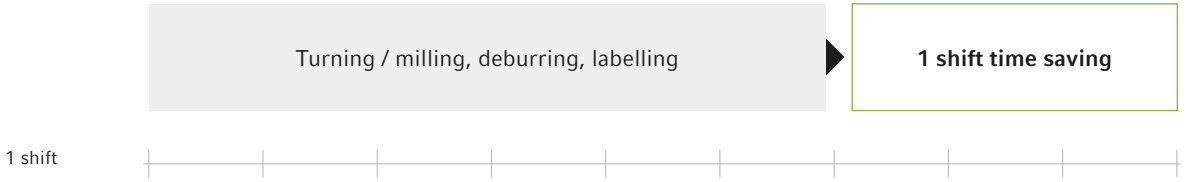
Standard automation – improve added value and productivity with additional operations.

All automation solutions from DMG MORI Systems with 6-axis industrial robots or a portal can be equipped with additional operations which the automation system carries out during main time. By reducing manual activities and improving value creation at the same time, cost effectiveness in production can be significantly increased.

Old value added chain



New value added chain with automation from DMG MORI Systems



Segment 2

Standard automation – WH 3 as an assembly cell.

WH 3 from € 71,900.–

Workpiece: Sensor housing in varying sizes

Scope of delivery

+ Workpiece handling up to 3 kg, assembly cell for sensor housing
+ Full production process with hydraulic press

Process description

+ Component handling by a 6-axis industrial robot
+ Hydraulic press with quality monitor
+ Components are fed in via vibrating helical conveyors
+ Workpiece discharge through the paternoster system
+ Visualisation and system operation on a 21" monitor
+ Process monitoring by SPC drawer is possible

Customer value

+ Components can be quickly retooled
+ Process reliability thanks to in process measurements
+ Fewer worker hours required

Deciding factors for DMG MORI Systems

+ A contact partner for service queries
+ Proximity to the factory

HIGH FLEXIBILITY AND LOW SPACE REQUIREMENTS

Segment 2

Standard automation – WH 10 top on CTX beta 800.

WH 10 top from **€ 118,900.–**

Workpiece: Shafts for electric motors

Scope of delivery

+ WH 10 top on CTX beta 800

Process description

+ Workpiece feed and removal with the rotary magazine
+ Maximum handling weight of over 20 kg, YASKAWA MOTOMAN robot
+ External turning on the CTX beta 800
+ Quick gripper jaw change system for various workpiece geometries
+ The gripper jaws are safely indexed with binary coding
+ Temporary workpiece storage on the machine roof for quick loading and unloading

Customer value

+ Machining of 20 different shaft types ranging from ø 16 mm to ø 65 mm, lengths from 100 mm to 800 mm
+ High flexibility thanks to changeable insertion prisms and gripper jaws
+ Low space requirements
+ Fewer worker hours required

Deciding factors for DMG MORI Systems

+ A complete turnkey solution from a single source

Segment 2

Standard automation – Portal system with NLX2500/700.

Workpiece: Cylinder (ø 40 mm × L 390 mm, 3 kg)

Scope of delivery

+ NLX2500/700
+ Portal (LG05)
+ Stacking cell

Process description

+ Automatic workpiece provision with the stacking cell
+ Loading and unloading through the portal system

Customer value

+ Maximum workpiece quantity: 224

Deciding factors for DMG MORI Systems

+ Stacking cell with space for up to 28 blisters

OVER **80 SYSTEMS** OF WH 3 INSTALLED!

Segment 2

Standard automation – WH 3 on MILLTAP 700.

from € 53,550.–

Workpiece: Various ranges

Scope of delivery

+ 1 × MILLTAP 700 with WH 3, workpiece handling up to 3 kg
+ Compact automation solution for short machining times

Process description

+ Tool changing with the 6-axis industrial robot
+ Feeding by the MOTOMAN robot
+ Workpiece machining on the MILLTAP 700
+ Workpiece storage with the paternoster system
+ High autonomy thanks to the high workpiece storage capacity
+ Double gripper system for rapid workpiece changing

Customer value

+ The workpiece can be changed quickly
+ High autonomy with no intervention by the operator
+ Additional stations can be added at a later date
+ Fewer worker hours required

Deciding factors for DMG MORI Systems

+ A complete solution from one supplier
+ Low space requirements
+ Quick start up

SPETH
ZERSPANUNGSTECHNIK
www.speth-zerspanung.de

Segment 2

Standard automation – WH 10 on DMU 70.

Workpiece: Variable

Scope of delivery

+ DMU 70, WH 10 standard workpiece handling, workpiece handling up to 10 kg
+ Continuous workpiece supply and discharge

Process description

+ Tool handling with the 6-axis industrial robot
+ Feeding with the MOTOMAN robot
+ Workpiece machining on the DMU 70
+ Ranked job management
+ Workpiece storage in 4 drawers, each with 2 pallets
+ Double gripper system for changing components within the machine
+ Turning station integrated in the cell for full machining
+ SPC and measuring unit discharge

Deciding factors for DMG MORI Systems

+ A complete solution from a single source
+ Standard components flexibly adapted for customer value
+ Rapid delivery time

Segment 2

Standard automation – VL-553MCII & VL-553II workpiece handling.

Workpiece: Brake disc

Scope of delivery

+ VL-553MCII
+ VL-553II
+ Robot
+ Transport belt for loading and unloading
+ Multi stage milling station
+ Turning station
+ Blowing unit

Process description

+ Automatic workpiece transportation with the conveyor
+ Automatic loading and unloading with robot
+ Multi stage milling with image sensor
+ Turning station
+ Blowing unit

Customer value

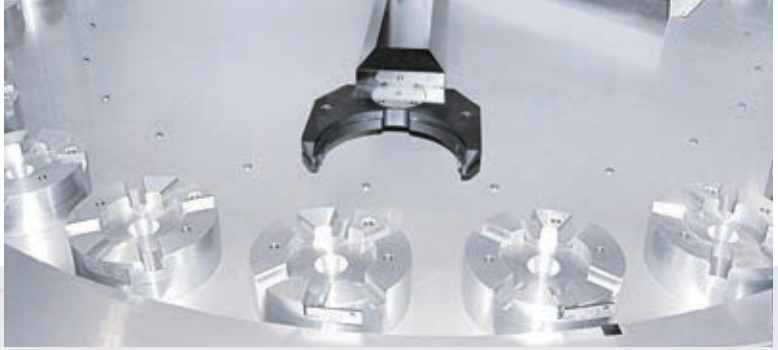
+ Precise multi stage milling with the image sensor and robot

Deciding factors for DMG MORI Systems

+ Set up of the entire system (turning machine and automation)

ATLANTIC ZEISER

OVER **90 UNITS** OF PH 150|8 ALREADY SOLD!



Segment 2

Standard automation – PH 150|8 on DMU 40 eVo.

from **€ 49,900.–**

Workpiece: Pallets with various workpieces

Scope of delivery

+ 1 × DMU 40 eVo with PH 150|8, pallet handling with 24 pallets

Process description

+ Pallet change via rotating table
+ Feed over the linear axis
+ Workpiece machining on the DMU 40 eVo
+ Number of available pallet slots: 24
+ Can machine workpieces measuring up to 150 mm in diameter
+ Integrated job management system for individually prioritising jobs

Customer value

+ Batch sizes of 1 can be produced
+ High autonomy with no intervention by the operator
+ The priority list can be flexibly changed during production
+ Highly flexible pallet handling for processing jobs with a minimum batch size of 1

Deciding factors for DMG MORI Systems

+ A complete solution from one supplier also means only one contact partner
+ Price, customer satisfaction and compatibility
+ Compatibility with existing DMG MORI products

Segment 2

Standard automation – NT4250 with portal loader.

Workpiece: Automotive workpieces

Scope of delivery

+ NT4250DCG/1500SZ
+ Portal
+ Workpiece buffer

Process description

+ Automatic loading and unloading with portal
+ Workpiece transfer between spindles 1 and 2

Customer value

+ Gantry robot with a high load (up to 20 kg)
+ Full machining on one machine thanks to transfer of the workpiece between the spindles
+ Save time thanks to full machining and automatic loading and unloading

Deciding factors for DMG MORI Systems

+ Customized turnkey solution

Segment 2

Standard automation – Pallet handling on DMU 60 eVo.

Workpiece: Variable

Scope of delivery

+ 1 × DMU 60 eVo, pallet handling up to 500 × 500 mm, max.100 kg
+ Job management system

Process description

1 Pallet changing with the 6-axis industrial robot
2 Feeding by the FANUC robot
3 Workpiece machining on the DMU 60 eVo
4 Ranked job management
5 Visualisation and system operation on a 21" monitor
6 Can be expanded with additional machines and pallet storage systems

Customer value

+ Compatible with jobs with a batch size of 1
+ Higher flexibility thanks to random processing or based on a priority list
+ Varied expansion options
+ Fewer worker hours required
+ Integration of various machining processes

Deciding factors for DMG MORI Systems

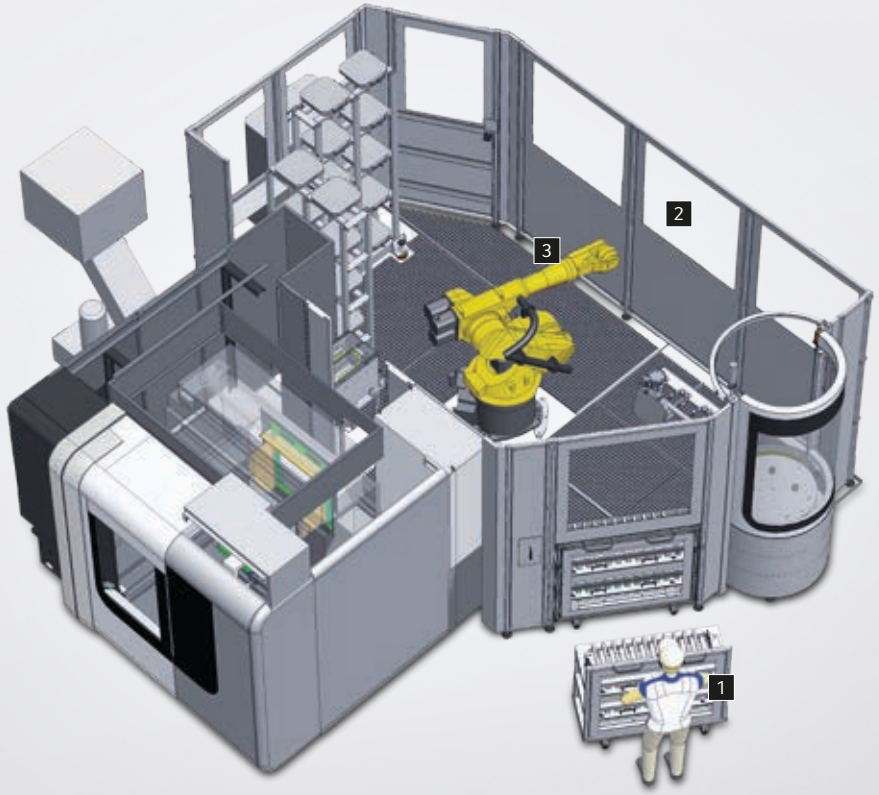
+ A complete solution from a single source, flexible system design
+ Quick delivery times
+ Attractive prices
+ Expandability

stryker®

VARIABLE EXPANSION OPTIONS

Segment 2

Standard automation – Combination of workpiece and pallet handling on HSC 55.



Workpiece: Variable

Scope of delivery

+ 1 × HSC 55, pallet handling up to 320 × 320 mm, max. 30 kg
+ Job management system

Process description

1 Job related workpiece and equipment management by a ranked cell control system
2 Preparation for the integration of a second machine
3 Maximum handling weight of 60 kg thanks to the KUKA KR60 6-axis industrial robot

Customer value

+ Jobs with a batch size of 1 can be processed
+ Higher flexibility thanks to random processing or based on a priority list
+ Varied expansion options
+ Fewer worker hours required
+ Integration of various machining processes

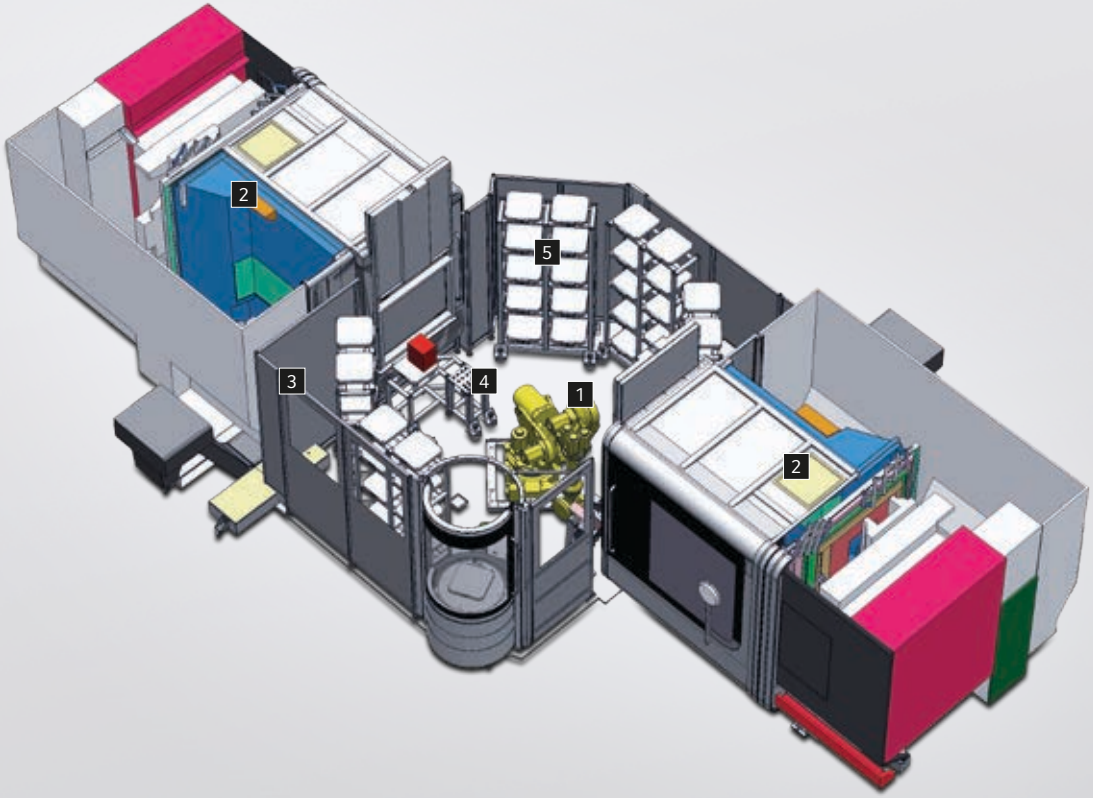
Deciding factors for DMG MORI Systems

+ Flexible system design
+ Enhanced interface between automation and the machine

PALLET AND WORKPIECE HANDLING **COMBINED**

Segment 2

Standard automation – Pallet handling on DMU 80 P duoBLOCK®.



Workpiece: Variable

Scope of delivery

+ 2 × DMU 80 P duoBLOCK®, combined workpiece and pallet handling up to 400 × 400mm, max.180 kg
+ Job management system

Process description

1 Pallet changing with the 6-axis industrial robot
2 Workpiece machining on 2 × DMU 80 P duoBLOCK®
3 Ranked job management
4 Automatic gripper change from pallets to workpiece handling
5 Pallet storage system

Customer value

+ Jobs with a batch size of 1 can be processed
+ High flexibility thanks to random processing or based on the individual machine priority list
+ Less worker supervision required
+ Unmanned shifts are made possible

Deciding factors for DMG MORI Systems

+ A complete solution from a single source, flexible system design
+ The ability to handle pallets and workpieces

LOW SPACE REQUIRE-MENTS

Segment 2

Standard automation – Portal system with NZX-S1500/500.

Workpiece: Drive shaft

Scope of delivery

+ 2 × NZX-S1500/500
+ Portal loader (LG05)
+ Centring machine
+ Turning unit
+ Pallet changer

Process description

+ Automatic workpiece transportation with the pallet changer
+ Automatic loading and unloading with portal
+ Turning unit
+ Centring machine

Customer value

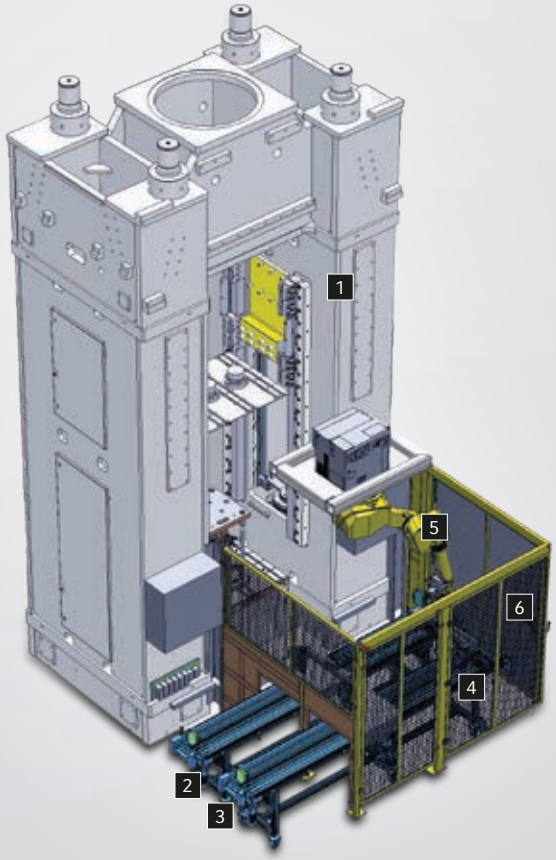
+ Saves 153 minutes of the operator's time
+ Capacity for 108 workpieces in the buffer

Deciding factors for DMG MORI Systems

+ Set up of the entire system (turning machine and automation)

Segment 2

Standard automation – Handling for the hydraulic press.



Workpiece: Slugs / housings

Scope of delivery

+ Handling for a hydraulic press

Process description

1 Loading and unloading of the 1250-tonne press
2 Blanks (slugs) are fed in on synthetic fibre ribbons
3 Finished parts (housings) are discharged on a stainless steel chain link belt with separating strips
4 The sensors can detect blanks amongst the various workpieces
5 Press loading and unloading with the FANUC M710iC-70 6-axis industrial robot (ceiling suspension)
6 Fully automatic gripper change system for raw and finished parts

Customer value

+ Continuous workpiece processing
+ Process reliability thanks to variant and position detection
+ The feeding systems to be integrated can be set up flexibly due to the flexible design of the safety fence system
+ Fewer worker hours required

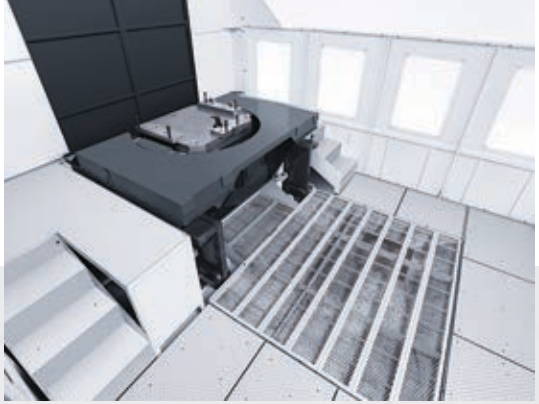
Deciding factors for DMG MORI Systems

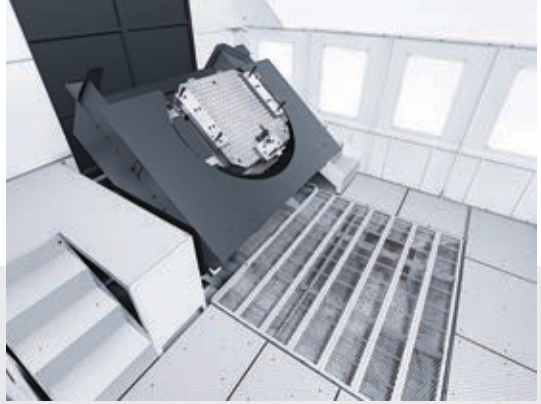
+ Creative and innovative solutions
+ Years of reliable cooperation
+ Simultaneous engineering

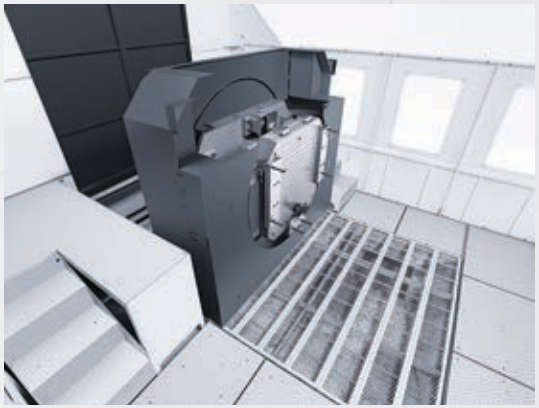
DMG MORI

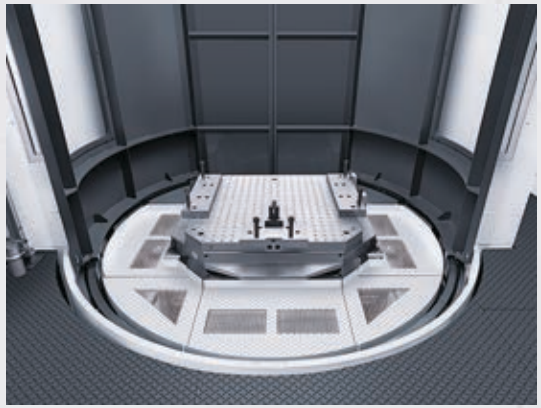
Segment 2

Standard automation – CPP system with NHX10000.









Workpiece: Machine table, table grooves

Scope of delivery

+ NHX10000
+ Swivelling set up station
+ Fixed set up station
+ 5 pallet spaces
+ 1 × CPP

Customer value

+ The set up station with swivel unit facilitates loading and unloading
+ The huge variety of workpieces can be managed in the system

Process description

+ Carrier pallet pool system
+ Set up station with ID system
+ Set up station with swivel unit

Deciding factors for DMG MORI Systems

+ The integrated pallet ID system facilitates the handling of equipment and workpieces (MCC-LPSIII software)

Segment 3

From the blank to the finished piece – complete machining according to your requirements.

In this segment we project the entire material flow for your workpiece. Together we will establish the linking of different machine tools. Of course we will incorporate the necessary additional tasks, for instance deburring, cleaning or assembling, into the optimal workflow. As a result you get an automation cell with maximum productivity.

Your benefits

+ Tailored to individual requirements
  _ Requirements analysis
  _ Value added chain projection
  _ Communication with ERP systems
  _ Modular solution
+ Most efficient space utilisation
+ Large workpiece weights possible
+ Unmanned production
+ Just-in-time production
+ Turnkey projects
+ Medium and large batch sizes
  _ Optimised machining steps in the machine
  _ Optimised loading and unloading of the machines
  _ Automation of subsequent steps
+ Large number of workpiece variants
  _ Automated changing of various workpiece types
  _ Machining of a mixture of various workpieces

VERY SHORT
CYCLE TIME

Segment 3

Flexible manufacturing cells – fully automatic restacking cell.

Workpiece: Gear shaft

Scope of delivery

+ Restacking cell; transfer from transport baskets into temper baskets

Process description

1 Restacking of hardening grate in a wire basket
2 2 × KUKA robots
3 Intercepting station
4 Stack transportation
5 Central computer software with re-tooling strategy
6 2 × portal

Customer value

+ Saves workers
+ Space saving concept
+ Avoidance of errors
+ Visualisation of the robot and portal in one control system
+ Cycle time: 6 seconds per workpiece

Deciding factors for DMG MORI Systems

+ Expertise in robot and portal technology
+ Very short cycle time

SCHMIEDETECHNIK PLETTENBERG

35% HIGHER PRODUCTIVITY

Segment 3

Flexible manufacturing cells – Full machining of gear shafts.

Workpiece: Gear shaft

Scope of delivery

+ 2 × NZX2500 (OP10), 2 × CTV 250 (OP30), 1 × Profiroll (OP20)
+ Linked full machining
+ Integration of a range of additional operations

Process description

1 Workpiece feed and discharge on conveyor belts
2 Feeding with the FANUC robot
3 External turning on the NZX2500
4 Gear cutting on the Profiroll
5 Internal turning, CTV 250
6 Cleaning station
7 Embossing station
8 Optional measuring equipment

Customer value

+ Seamless component tracking
+ High flexibility thanks to 2 parallel production lines
+ Low space requirements
+ Fewer worker hours required

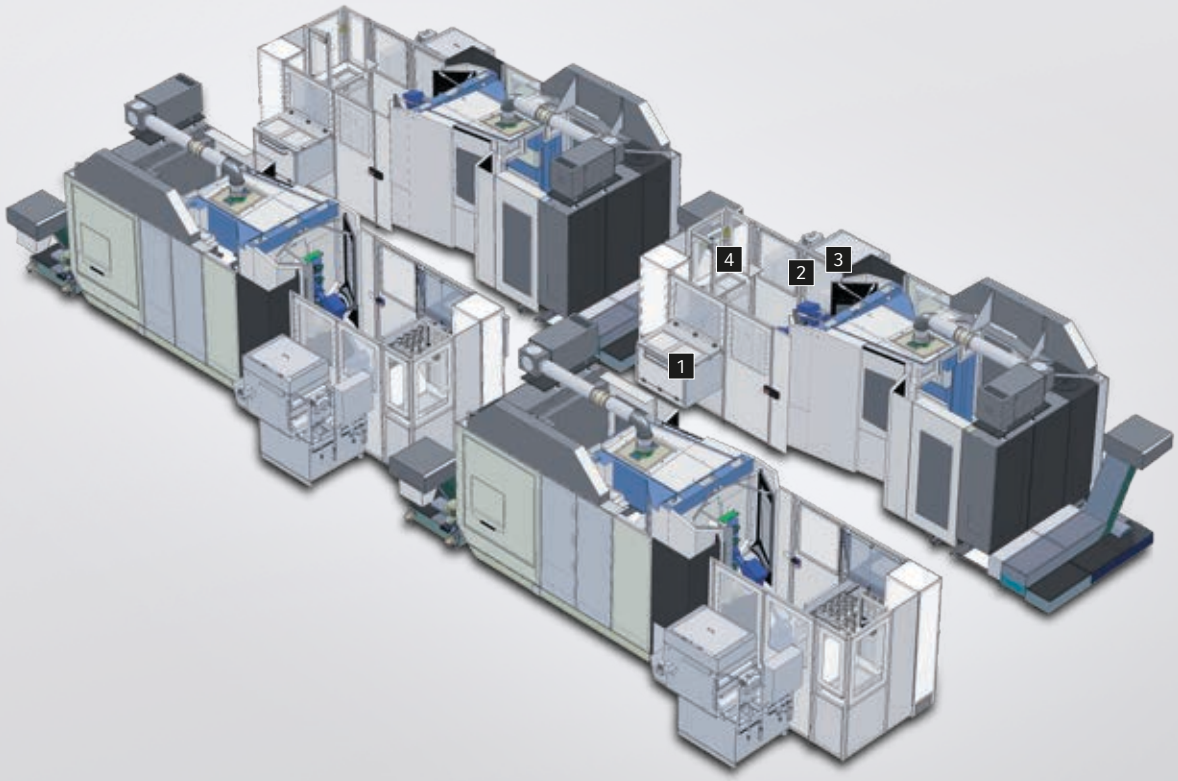
Deciding factors for DMG MORI Systems

+ A complete turnkey solution from a single source
+ Continuous workpiece tracking

SPACE-SAVING SOLUTION

Segment 3

Flexible manufacturing cells – Production of bearing housings.



Workpiece: Bearing housing for commercial vehicles

Scope of delivery

+ 4 × DMC 60 H *linear*
+ Robot loading

Process description

1 The worker loads the components into loading drawers for the robot
2 The robot loads the fastening device of the BAZ with 4 blank parts
3 After the machining process, the robot removes the individual components whilst simultaneously loading the next blank
4 The machined components are deburred in a deburring station in the robot cell during main time

Customer value

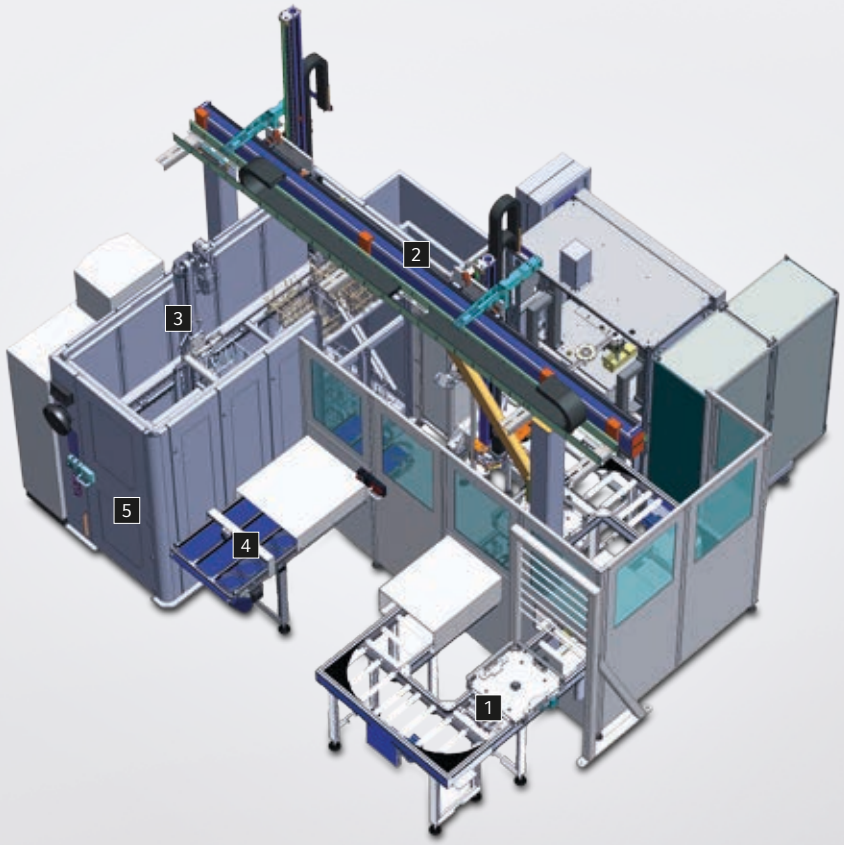
+ Partial autonomy for approx. 30 minutes; components cannot be placed wrongly as special position matrices are in use
+ The operator can monitor several machines at once

Deciding factors for DMG MORI Systems

+ Thanks to the large Y axis of the DMC 60 H *linear*, four components can be mounted on one set up tower – only three could be mounted in the past
+ Highly compact set up area
+ Integrated component deburring

Segment 3

Flexible manufacturing cells – Loading and unloading of measuring machines.



Workpiece: Centre gear

Scope of delivery

+ Linkage of 4 measuring machines
+ Re-stacking cell; transfer from transport baskets into annealing baskets

Process description

1 Workpiece supply in stack of hardening grates
2 Transfer unit (portal) between stations
3 Integrated measuring station
4 Conveyor feed for individual parts
5 Workpiece discharge in a stack of wire baskets

Customer value

+ Avoidance of errors
+ Pays for itself in under one year
+ Process optimisation with the customer
+ Fewer worker hours required
+ Cycle time: 12 seconds per workpiece

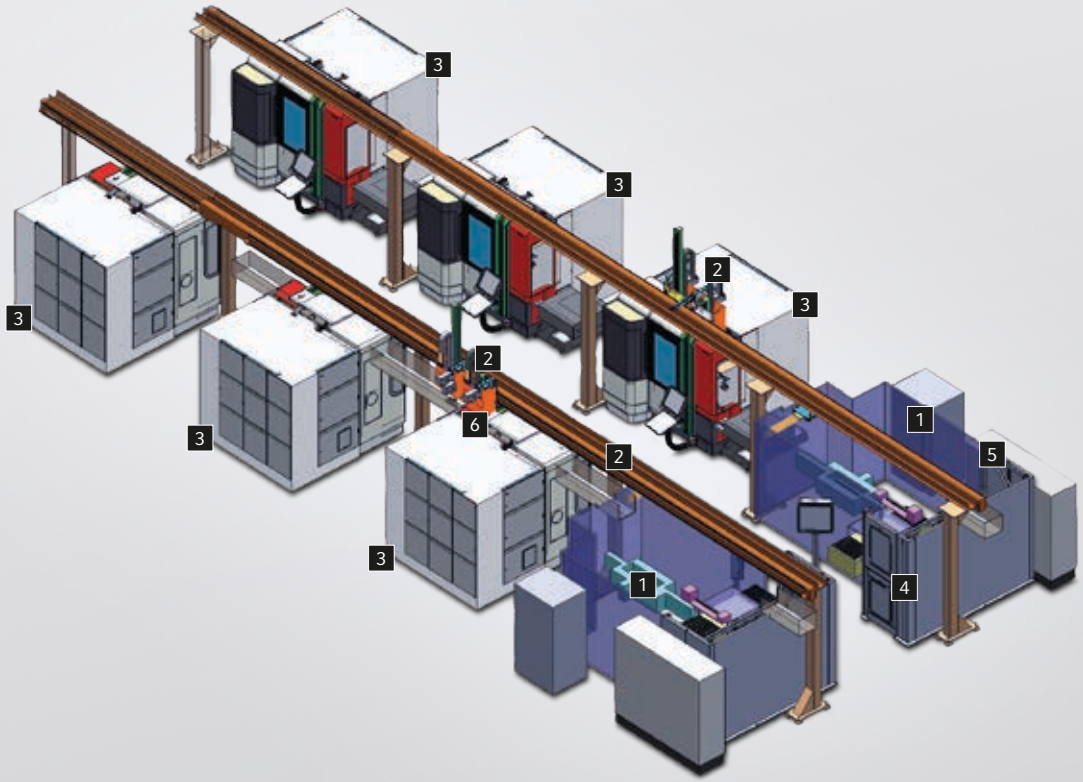
Deciding factors for DMG MORI Systems

+ Experience with complex systems
+ Good project management

SEAMLESS COMPONENT TRACKING

Segment 3

Flexible manufacturing cells – Linked to a grinding machine.



Workpiece: Camshaft

Scope of delivery

+ Linking of 6 × grinding machines
+ Stacking cell; workpieces in mesh baskets, transportation through the portal

Process description

1 Workpiece feed and discharge with the pallet storage
2 Portal unit with H loader
3 NZX2000SY grinding machines
4 Orientation station with DMC reader
5 TRT dry cleaning
6 Bucket function on the gripper

Customer value

+ Connection to central computer
+ High flexibility thanks to 2 parallel production lines
+ Low space requirements
+ Fewer worker hours required

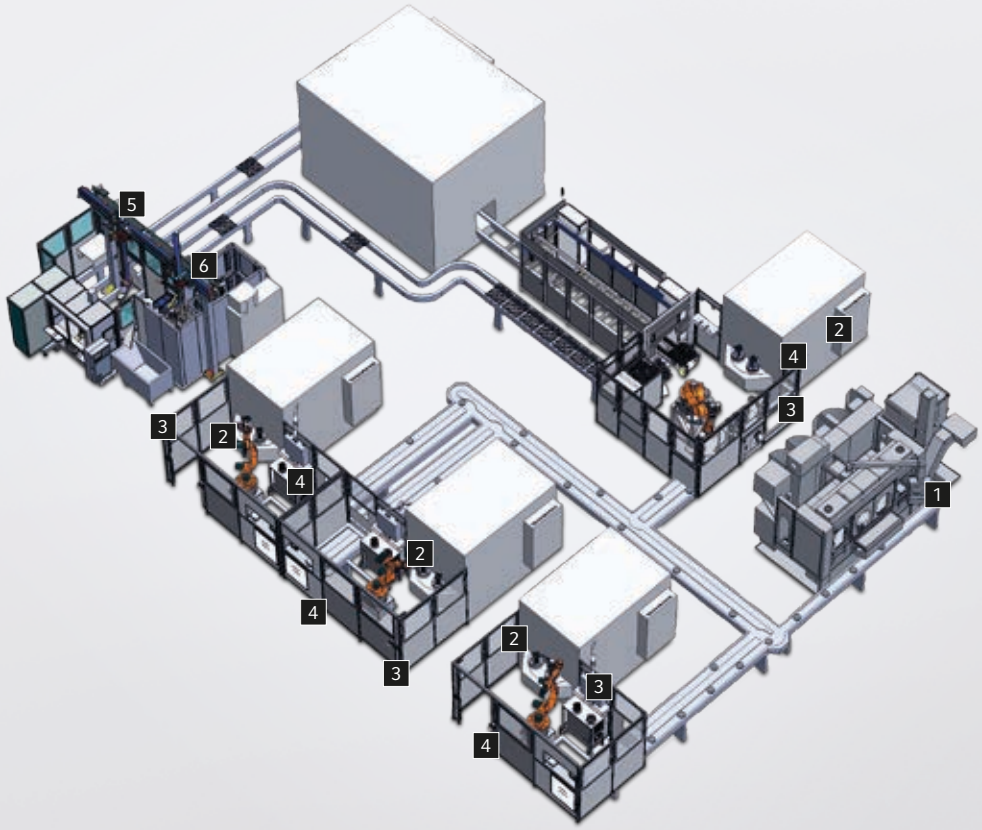
Deciding factors for DMG MORI Systems

+ A complete turnkey solution from a single source with third party machines
+ Quick delivery times

INTUITIVE HALL PLANNING BY DMG MORI SYSTEMS

Segment 3

Flexible manufacturing cells – Automation of TEM systems.



Workpiece: Centre gear

Scope of delivery

+ Linking of 4 × Bosch, 1 × Kennametal, 1 × Klingelnberg
+ Linked hard machining

Process description

1 Workpiece feeding and discharge on the pallet conveyor
2 Workpiece stack at pallet unloading point and restacking
3 Assembly of the hold-down clamp on the TEM device
4 Integrated measuring parts drawer
5 Loading of a measuring machine
6 Stacking of hardening grates in wire baskets

Customer value

+ Seamless component tracking
+ High flexibility thanks to 3 parallel production lines
+ Fewer worker hours required
+ Integration of various machining processes

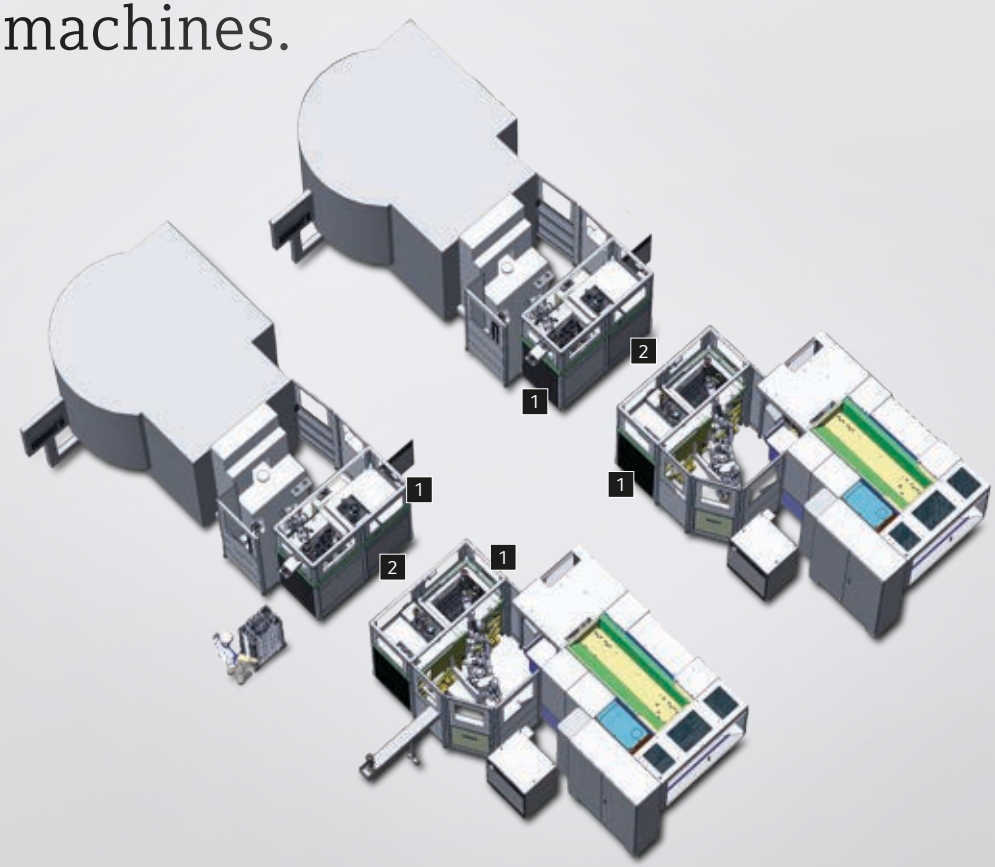
Deciding factors for DMG MORI Systems

+ Complete hall planning by DMG MORI Systems
+ Project management by DMG MORI Systems

OVER
60 SYSTEMS
SUCCESSFULLY
INSTALLED

Segment 3

Flexible manufacturing cells – Workpiece handling for generative grinding machines.



Workpiece: Variable

Scope of delivery

+ Workpiece handling on Reishauer RZ150, RZ160, EMAG VL5, EMAG VSC250

Process description

1 Loading machines with workpieces
2 Integration of subsequent processes, e. g. cleaning, measuring, testing, aligning, deburring

Customer value

+ Tried and tested automation solution
+ Minimal space requirements

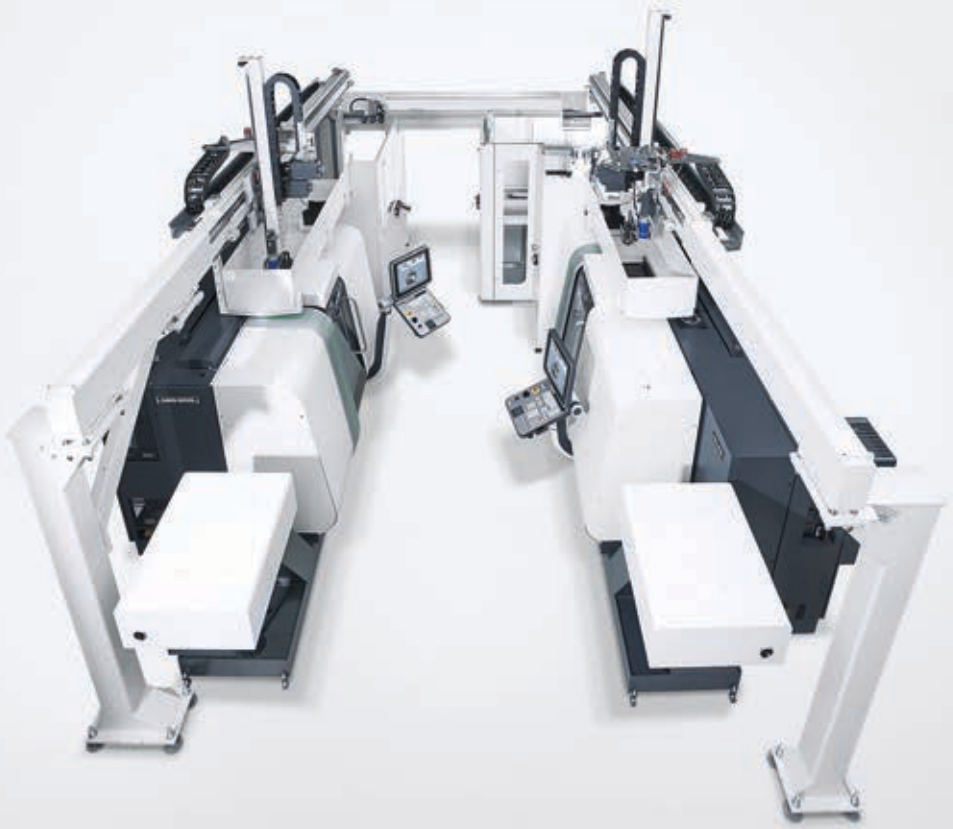
Deciding factors for DMG MORI Systems

+ A complete solution from a single source
+ Flexible system design
+ Cooperation backed up by over 60 systems so far
+ Quick delivery times

LOW STAFF
PRODUCTION

Segment 3

Flexible manufacturing cells – Production of turning parts.



Workpiece:
Screw / pan head screw

Scope of delivery

+ Linking of 1 × CTX alpha 300 and 1 × CTX alpha 500
+ Linked full machining
+ Integration of various machining processes

Process description

+ Workpiece feed and discharge with the stacking cell
+ 2 × portals with l loader
+ Turning on the CTX alpha 300 / 500
+ Blowing station
+ Needle embossing including test function
+ Measuring device drawer

Customer value

+ Low space requirements / short operator sequences
+ Clear processes
+ Less worker supervision required

Deciding factors for DMG MORI Systems

+ A complete turnkey solution from a single source
+ Development of a rolling and pressing unit

INTEGRATION OF ALL PROCESSES

Segment 3

Flexible manufacturing cells – Portal system with NLX2500/700 & NLX2500MC/700.

Workpiece: Tube

Scope of delivery

+ NLX2500/700 + 2 × NLX2500MC/700 + 2 × GX05 portals + loading of blanks with the automatic centring unit + turning unit + automatic measuring unit + temporary storage + cleaning station + bush feed + finished parts storage

Process description

+ Loading of blanks including automatic centring unit
+ OP1: Loading and unloading the NLX2500/700 with the GX05 portal system
+ Work storage (storage of blanks)
+ Automatic loading of the machine by the portal
+ Turning station integrated in the measuring station
+ Temporary storage integrated in a transfer unit
+ Cleaning station

Customer value

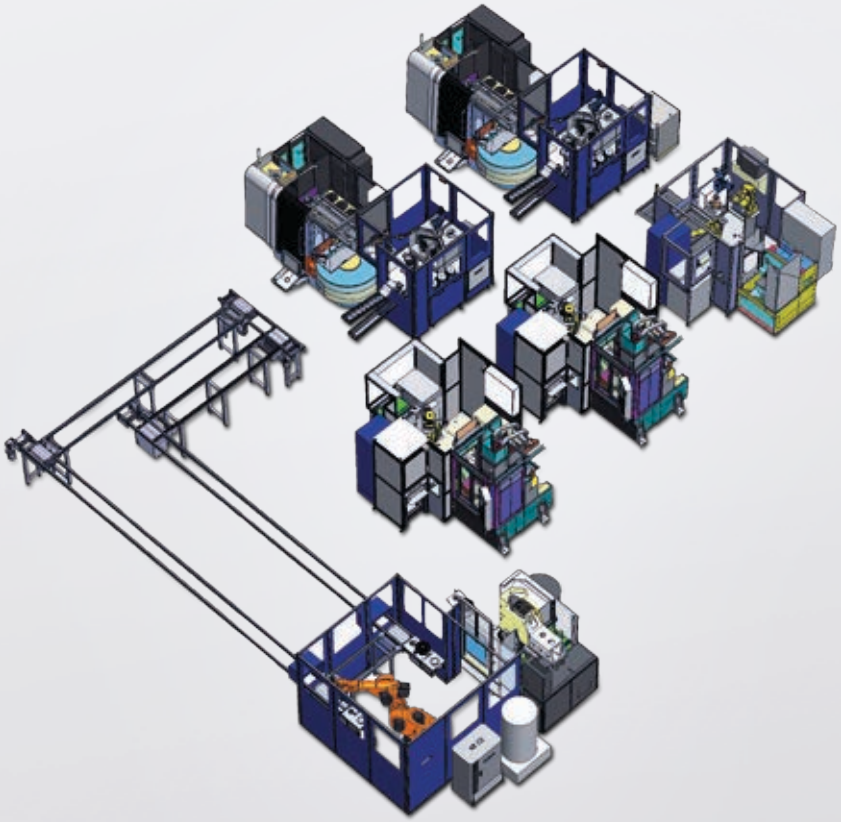
+ Integration of all processes, from the blank to the finished part

Deciding factors for DMG MORI Systems

+ Integration of the automatic measuring unit as quality control

Segment 3

Flexible manufacturing cells – Independent manufacturing cells.



Workpiece: Various sizes

Scope of delivery

+ 2 × CTV 160, 1 × DMU 50 *ecoline*, workpiece handling up to 3 kg
+ Full production process in various manufacturing cells

Process description

+ Tool changing with the 6-axis industrial robot
+ Feeding with the MOTOMAN robot
+ Workpiece machining on 2 × CTV 160 and a DMU 50 *ecoline*
+ Additional operations: Integrated cleaning / weight analysis / measurement / marking
+ Custom workpiece feeding via the drawer system, roller belt and paternoster system

Customer value

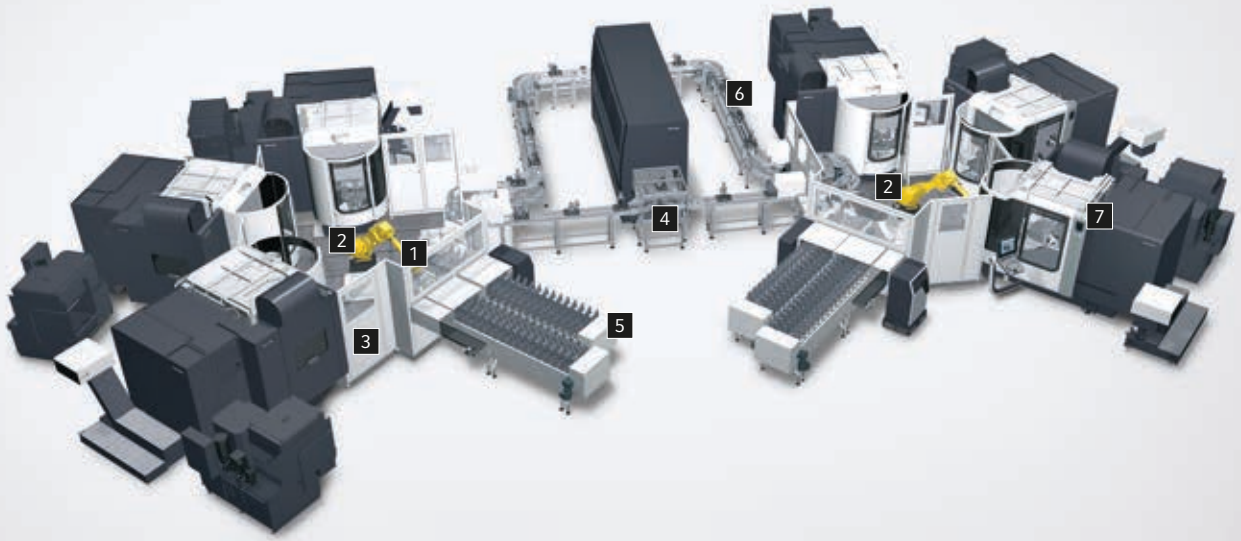
+ Various batch sizes made possible
+ High flexibility thanks to independent manufacturing cells
+ Each can be expanded with additional manufacturing cells

Deciding factors for DMG MORI Systems

+ A skilled contact partner for service queries and process analyses

Segment 3

Flexible manufacturing cells – Workpiece handling for maximum machine capacity utilisation.



Workpiece: Parallel machining of three predefined workpieces

Scope of delivery

+ 6 × DMC 55 H duoBLOCK®, workpiece handling up to 40 kg

Process description

1 Workpiece handling with the 6-axis industrial robot
2 Feeding with the FANUC robot
3 Workpiece machining on 6 × DMC 55 H duoBLOCK®
4 Connection of an additional feed belt to a cleaning machine
5 Feed and unloading belt with a custom conveyor belt
6 The system is designed to be modular, it can be flexibly expanded
7 Another system was delivered in the meantime, and it now runs with 2 × 3 machines

Customer value

+ High batch sizes made possible
+ High degree of machine capacity utilisation through machine prioritisation
+ Varied expansion options
+ Frees up workers from three machines
+ Prioritised processing by the next available machine
+ Simultaneous machining of 3 different components

Deciding factors for DMG MORI Systems

+ Custom concept development
+ A complete solution from a single source

Segment 3

Flexible manufacturing cells – Linking of turning and milling.

Workpiece: Bearing flange

Scope of delivery

+ Linkage of DMC 635 V + CTV 160

Process description

+ Workpiece feeding by the rotary stack magazine
+ Place the part in the CTV 160
+ Component at the orientation station
+ Place the part in the DMC 635 V
+ Storage of finished parts in the mesh box

Customer value

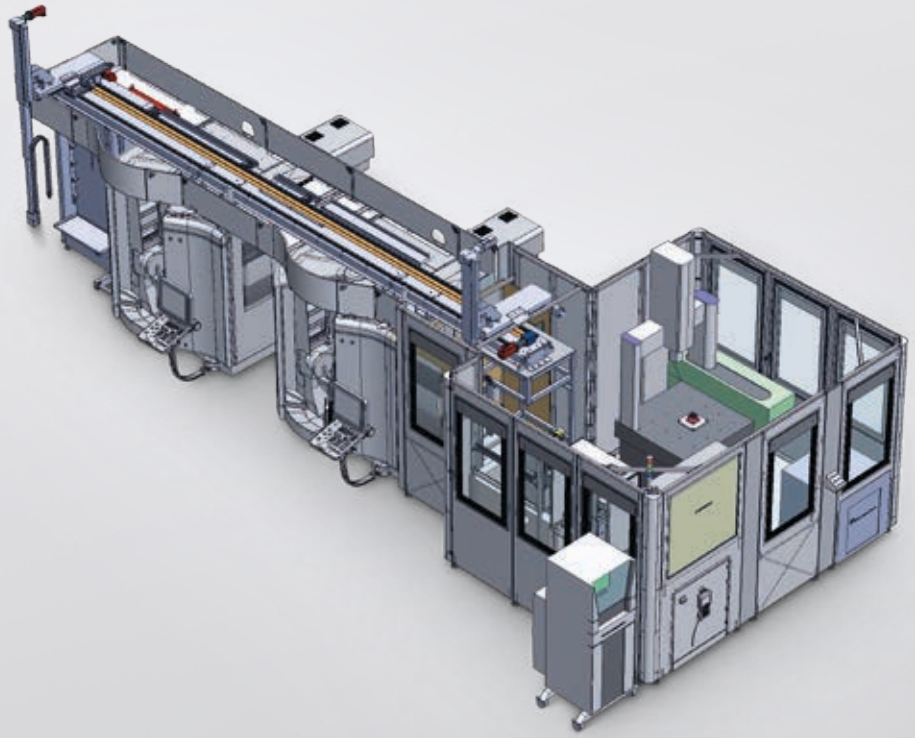
+ Can be quickly changed
+ Independent cell control

Deciding factors for DMG MORI Systems

+ Everything from one source from DMG MORI Systems

Segment 3

Flexible manufacturing cells – Linkage of a pallet handling portal and robot cell.



Workpiece: Stamped parts

Scope of delivery

+ Linking of 2 × HSC 20 with PH 10|100 portal + robot cell

Process description

+ Pallet handling by robot (pallets measuring ø 100 mm)
+ Combined: SAUER portal with 6-axis robot
+ Pallets in the cleaning and drying station
+ Pallets on the ZEISS 3D measuring machine
+ Component engraving by laser
+ Transfer to PH 10|100 in storage

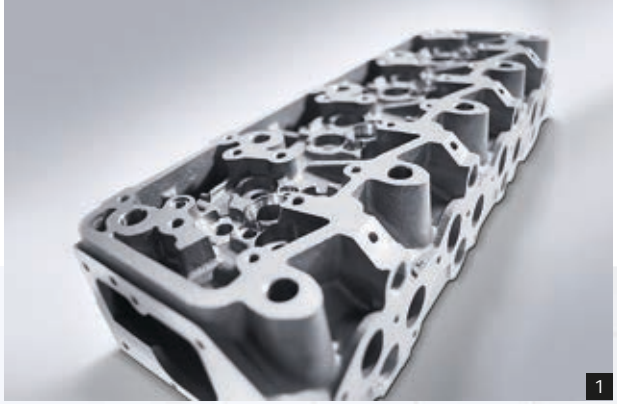
Customer value

+ Independent cell control
+ Integrated 3D measuring system

Deciding factors for DMG MORI Systems

+ Best price to performance ratio

1: Cylinder head
2: Universal joint assembly


1


2

Segment 4

The future today – material flow in fully automatic production.

Large production systems, complex process chains or exceptionally specialised production: DMG MORI Systems offers you highly efficient solutions for every application designed to maximise output. Make use of our competence in the fields of engineering and technology – for fully automated production with the highest degree of economic efficiency. Welcome to the future – at DMG MORI Systems.

Your benefits

+ System solution for series production (3–10 or more machines)
  _ Optimised machining steps in the machine
  _ Optimised loading and unloading of machines
  _ Automation of subsequent machining steps (e. g. cleaning)
+ Integration of multiple machining centres
+ Fully automatic set up points (robots or portal loading)
+ Automated functions: Loading and unloading, transport, measuring / testing

Segment 4

Production lines – Conveyor system with NHX5000 & NVX7000.

Workpiece: Gearbox

Scope of delivery

+ NHX5000 + NVX7000 + clamping device bearing + conveyor + clamping device conveyor + clamping device lift + clamping device transfer unit

Process description

+ Clamping device bearing (for various workpieces)
+ Automatic transfer unit
+ Manual conveyor
+ Automatic clamping device conveyor
+ Automatic loading and unloading with the auto coupler

Customer value

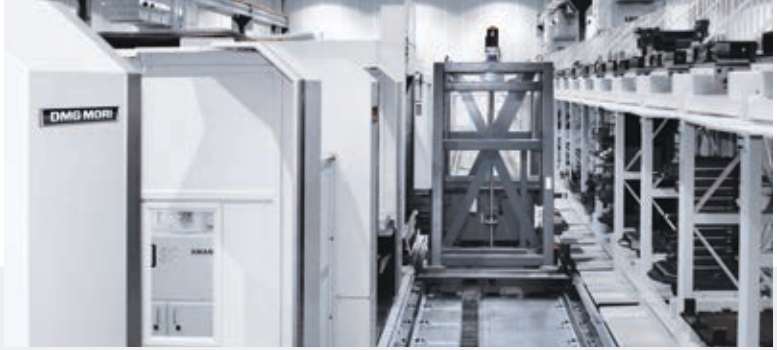
+ Simple workpiece changing
+ The manual conveyor facilitates the transportation of heavy workpieces

Deciding factors for DMG MORI Systems

+ The machining process can be visually monitored in case a workpiece needs to be machined differently

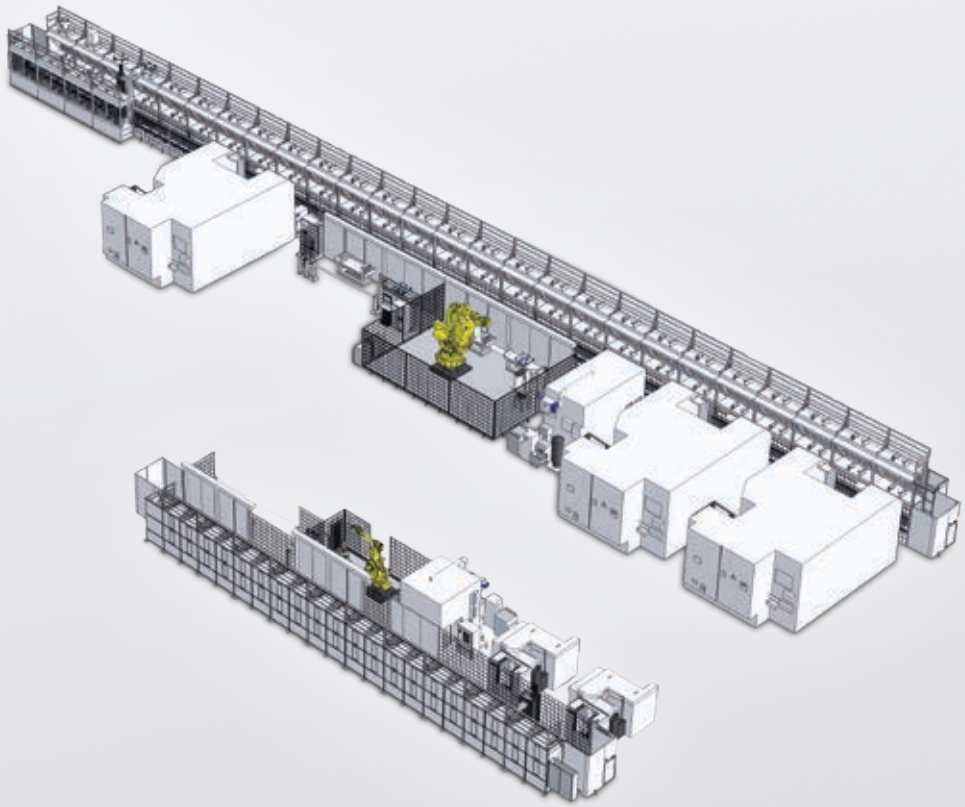
DMG MORI

UNMANNED 24-HOUR OPERATION MADE POSSIBLE



Segment 4

Production lines – LPP system with NHX10000 & NH6300 DCGII.



Workpiece:
Machine table, table grooves

Scope of delivery

+ NHX10000 + cleaning station + 6-axis robot + set up station + 60 pallet storage spaces
+ NH6300 DCGII + cleaning station + 6-axis robot + set up station + 40 pallet storage spaces

Process description

+ Linear pallet pool system
+ Automatic loading and unloading by the robot
+ Automatic selection of blanks and finished parts by the image sensor
+ Set up station (frees up workers)
+ Automatic cleaning station with a robot

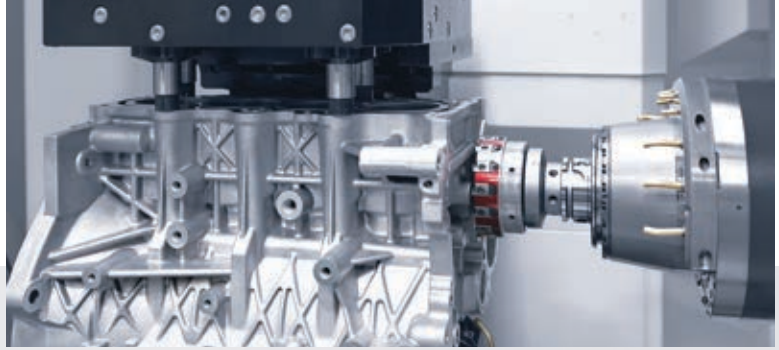
Customer value

+ High storage capacity for different workpieces

Deciding factors for DMG MORI Systems

+ Blanks can be stored in no particular order and processed by priority
+ The robot detects the workpiece condition and acts accordingly, resulting in complete automation
+ Full process automation from a single source

Great Wall



Segment 4

Production lines – Cylinder block line with 18 linked DMC H duoBLOCK®.

Workpiece: 4 cylinders with 1,5l & 1,4l, 3 cylinders with 1,3l

Scope of delivery

+ 14 × DMC 55 H duoBLOCK®
+ 4 × DMC 75 H duoBLOCK®
+ Technology (tools, equipment, process and loading / unloading)

Process description

+ In process measurement and correction of the cylinder bore
+ Adjustment of the cutting edge by the internal coolant supply
+ Balluff workpiece identification
+ Camshaft boring
+ Feed and discharge belts
+ Workpiece turning station
+ A and B machines per operation
+ Semi automatic loading

Customer value

+ A cost-effective semi automatic solution
+ Reduced post processing work thanks to in process measurement and corrections

Deciding factors for DMG MORI Systems

+ Quick delivery times
+ Overall concept – a solution based on the customer's specifications

Great Wall

Segment 4

Production lines – Cylinder block line with 25 linked DMC monoBLOCK® / DMC H duoBLOCK®.

Workpiece: 2 types of cylinder block, 1 mounted lengthwise, 1 mounted diagonally

Scope of delivery

+ 9 × DMC 65 monoBLOCK®, 13 × DMC 55 H duoBLOCK®, 3 × DMC 75 H duoBLOCK®
+ Tools, equipment, process and loading / unloading

Process description

+ 3 production lines: Pre-machining of the baseplate, pre-machining of the engine block, fine machining of the engine block and mounted baseplate
+ In process measurement and correction of the cylinder bore
+ Adjustment of the cutting edge by the internal coolant supply
+ Camshaft boring and machining
+ Semi automatic loading
+ Feed and discharge belts
+ Workpiece turning station

Customer value

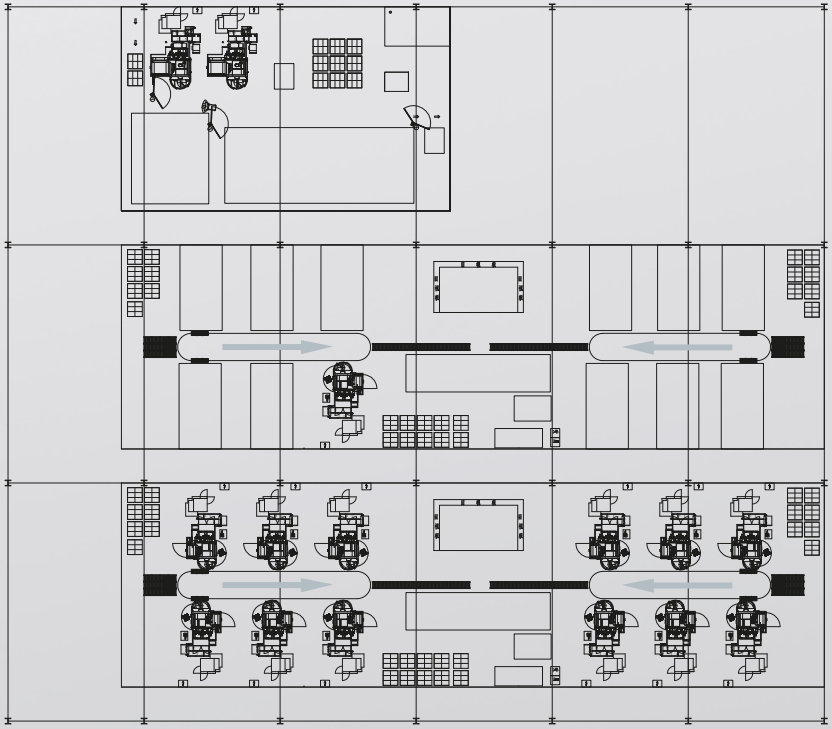
+ Subsequent job with identical machines
+ Universal product ranges

Deciding factors for DMG MORI Systems

+ Quick delivery times
+ Expansion project / follow up job

Segment 4

Production lines – Production line with 15 linked DMC H duoBLOCK®.



Workpiece:
3 different types of gearbox

Scope of delivery

+ 13 × DMC 55 H duoBLOCK®
+ 2 × DMC 65 H duoBLOCK®
+ Technology (tools, equipment, tool pre-setting device)

Process description

+ System project with stand alone machine
+ Machining of 10 different gearboxes
+ Up to 50,000 gearboxes per year
+ Full component machining

Customer value

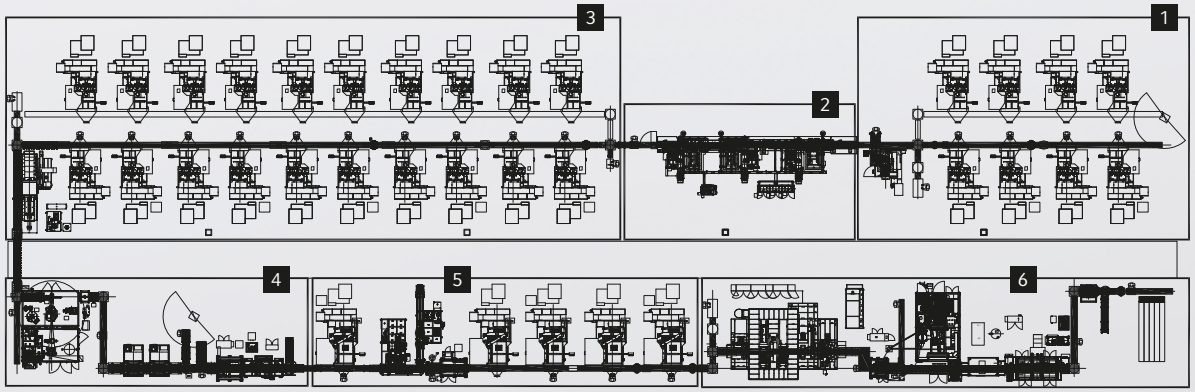
+ High productivity thanks to duplicate machines
+ Universal machine concept featuring different sizes of machine

Deciding factors for DMG MORI Systems

+ Experience in turnkey projects
+ Universal machine concepts
+ Price concept for horizontal machining centres

Segment 4

Production lines – Production line with 18 DMC H duoBLOCK®.



1: Blank machining / roughing **2:** Cleaning **3:** Pre-machining **4:** Assembly
5: Cylinder head assembly and finish machining **6:** Cleaning, honing, assembly

Workpiece: 1.8 litre car engine

Scope of delivery

+ 14 × DMC 55 H duoBLOCK®
+ 4 × DMC 75 H duoBLOCK®
+ Tools, tool pre-setting device, loading station, roller belts, process, equipment

Process description

+ Machining a cylinder block
+ Linkage to external machines
+ Component orientation with the turning station

Customer value

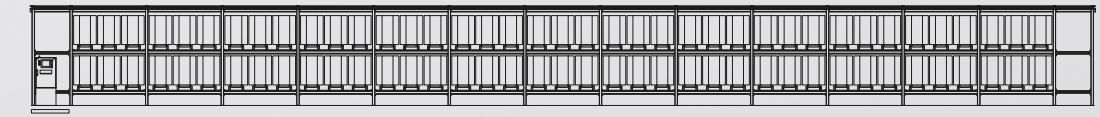
+ Flexible manufacturing cells thanks to hand loading
+ Short tooling times
+ High productivity thanks to linked machines
+ A cost effective automation solution
+ Subsequent job with identical machines

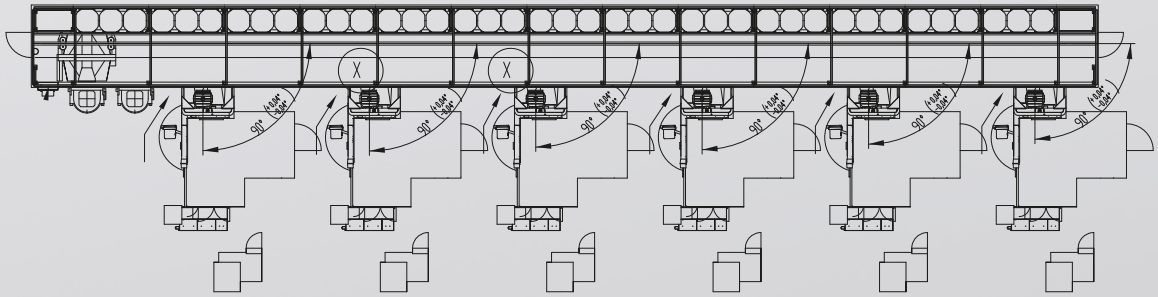
Deciding factors for DMG MORI Systems

+ Price
+ Quick delivery times
+ Experience in turnkey projects
+ Universal machine concepts

Segment 4

Production lines – System with 12 linked DMC H duoBLOCK®.





Workpiece: Valve block

Scope of delivery

+ 12 × DMC 80 H duoBLOCK®
+ 2 × Fastems FPM-1100 (78 storage slots / 2 levels / 2 loading stations)
+ DMG Virtual Machine, tool pre-setting device

Process description

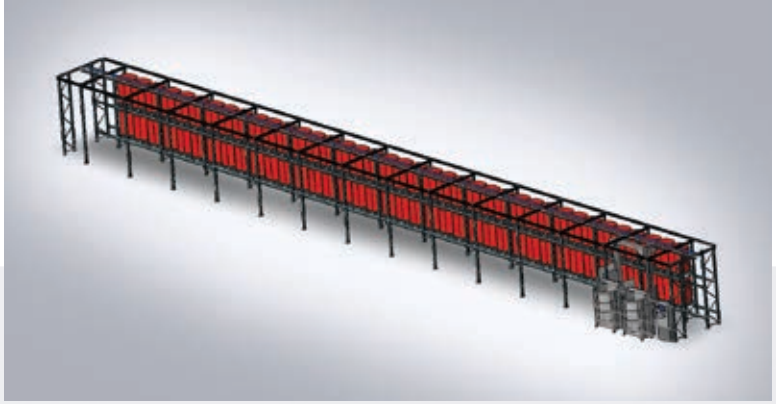
+ Flexible production of various valve blocks on 2 × 6 DMC 80 H duoBLOCK®
+ High number of pallets in the system
+ Manual component set up, placed on the storage shelf

Customer value

+ Low staff machine operation thanks to two set up stations and 78 pallet storage slots
+ High autonomy and production related parts production
+ High flexibility for the future

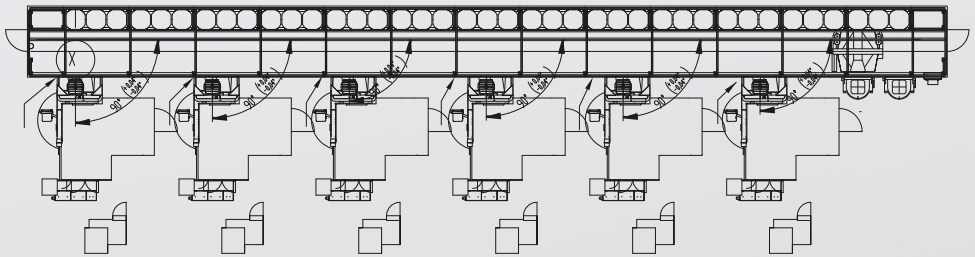
Deciding factors for DMG MORI Systems

+ Machine precision and stiffness
+ DECKEL MAHO – Fastems partner concept
+ Services in China (DMG MORI and Fastems)



Segment 4

Production lines – System with 10 linked DMC H duoBLOCK®.



Workpiece: Valve blocks, CK45

Scope of delivery

+ 10 × DMC 65 H duoBLOCK®
+ 2 × Fastems FPM-750 (72 storage slots / 2 levels / 2 loading stations)
+ DMG Virtual Machine, tool pre-setting device

Process description

+ 37 different components
+ Manual clamping device
+ 250,000 valve blocks per year
+ Flexible production of various valve blocks on 2 × 5 DMC 65 H duoBLOCK®, manual component clamping

Customer value

+ Low staff machine operation thanks to two set up stations and 72 pallet storage slots
+ High parts autonomy and production related parts production
+ Automation with Fastems FPM 750

Deciding factors for DMG MORI Systems

+ Service in China (DMG MORI and Fastems)

Weber

Segment 4

Production lines – Car cylinder heads.

Workpiece: Car cylinder head

Scope of delivery

+ 10 × NHX 5000
+ FANUC Track Motion with 3 robots
+ Interface for adapter plates
+ Integrated assembly

Process description

+ Flexible production of cylinder heads
+ Workpiece clamping and transport via adapter plates
+ Automatic loading and unloading process
+ High chip discharge rate via the powerful central system

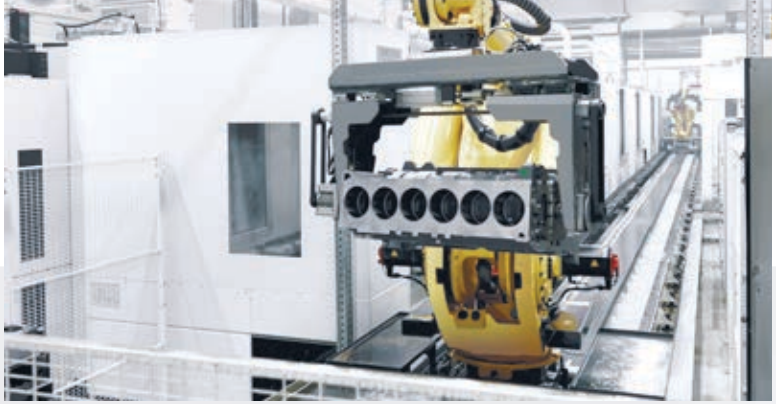
Customer value

+ High flexibility for the future and component changes
+ High process precision
+ Low personnel requirements
+ Low maintenance costs

Deciding factors for DMG MORI Systems

+ Maximum availability of delivered systems
+ Quick delivery times
+ Machine price:performance ratio

Weber



Segment 4

Production lines – Engines for construction machines.

Workpiece: Cylinder block & head

Scope of delivery

+ 21 × NH8000 DCG
+ FANUC Track Motion with 6 FANUC M900iA robots
+ Cleaning machine, assembly, seal testing

Process description

+ Production of the cylinder head and block in two lines
+ Unsupported workpiece transportation
+ Integrated processes: Measurement, cleaning, assembly

Customer value

+ 21 identical standard machines
+ Maximum machine availability
+ Maximum component precision with numerous control points
+ High flexibility for the future and component changes

Deciding factors for DMG MORI Systems

+ Machine precision and stiffness
+ Quick delivery times

Segment 4

Production lines – NL2000 + CL2000 with portal loading.

Workpiece: Automotive workpieces

Scope of delivery

+ 4 × NL2000/500
+ 3 × CL2000B

Process description

+ Automatic loading and unloading with the gantry robot
+ Linkage of the entire system
+ Buffer capacity for a total of 26 pallets

Customer value

+ Shorter cycle time thanks to several loaders for 7 machines in simultaneous operation

Deciding factors for DMG MORI Systems

+ Set up of the entire system (turning machine and automation)

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