The DMG MORI magazine for customers and interested readers.

DMG MORI Software Solutions: 24 exclusive technology cycles and 10 new CELOS® APPs.

DMG MORI manufacturer service: CUSTOMER FIRST – We've been listening to you! 5 service promises for the best service quality at fair prices.

CLX / CMX: Attractive entry-level machines are the evolution of our ECOLINE series with improved quality and technology. NEW HEIDENHAIN.

Holistic technology solutions for the automotive and aerospace industry.

DMG MORI

JOURNAL

Nº 2 – 2016

NEW

TECHNOLOGY INTEGRATION
MTG – Milling, turning and grinding in one set-up.

More on page 28

DMG MORI technology cycle MTG: Milling, turning and grinding.

Innovative technologies with unique software solutions.

24 exclusive DMG MORI technology cycles – up to 60 % faster conversational programming through easy input of parameters.

Find out more about this topic from page 4

Dr Ing. Masahiko Mori, President DMG MORI COMPANY LIMITED and Christian Thönes, CEO DMG MORI AKTIENGESELLSCHAFT.

Integration, innovation and quality.

Dear customers and interested parties,

"Global One" is aimed at the integration of DMG MORI COMPANY LIMITED and DMG MORI AKTIENGESELLSCHAFT to establish a global, integrated machine tool group. More than 12,000 employees in our worldwide production facilities and our 164 international Sales and Service sites now work with a holistic approach, to be the **world number 1 for our customers.**

We can promise **stability and continuity** in our partnership with you, our customers and suppliers. Together with you we would like to start new initiatives: "Global One" stands for future-oriented innovations for machines, DMG MORI Components, Software Solutions and LifeCycle Services for unrivalled quality from production to customer-oriented overall solutions. It heralds a new dimension in technologies and processes for automation and digitisation in the era of Industry 4.0.

We will promote the diversity of global skills and extend the regional strengths of our production sites. This applies, for instance, to Pfronten and Seebach as training factories, especially in fascinating 5-axis complete machining. Bielefeld and Iga will promote universal turning and turn-and-mill in close alliance. Bergamo will in future focus on production and automatic turning. In addition, we will rely on the strengths of our Excellence Centres in Nara for the automotive sector and in Pfronten for the aerospace industry.

As an integrated machine tool manufacturer we will in future also develop **innovations** for your benefit. Our focus is definitely on value for the customer. Above all, we want to do one thing: Listen to you and create solutions for your requirements. Besides machines and selected DMG MORI Components, we will focus on holistic technologies and process solutions.

For us, digitisation is one of the core issues of the future. We will expand our APP-based control and operating software CELOS® to become a digitisation platform. We have the technology and products for Industry 4.0 as well as the required process know-how. With **CELOS®** we already offer our customers the key element for networked intelligent production. A new and simple option is the integration of own CELOS® APPs for selected customers. The new technologies ULTRASONIC & LASERTEC already offer many opportunities for you to differentiate your production. Additive Manufacturing in particular will be expanded further, focusing on metallic working materials.

We will also continue our "First Quality Strategy" in the field of **quality.** A consistent orientation towards quality ranges across the worldwide integrated Group. The evolution of the ECOLINE for the new CLX and CMX series is a prime example for this. Conceptualised as attractive entry-level machines for the world market, they open up the complete range of technological performance as well as the full control system and automation know-how of DMG MORI to the user, with improved quality and productivity – now NEW with HEIDENHAIN for the CMX V. We will never lose sight of you, our foundation!

We have completely revised the Service and Spare Parts Pricing. With our **5 service promises** we want to meet your requirements for service quality – particularly at fair prices and with a best price warranty. You can take us at our word!

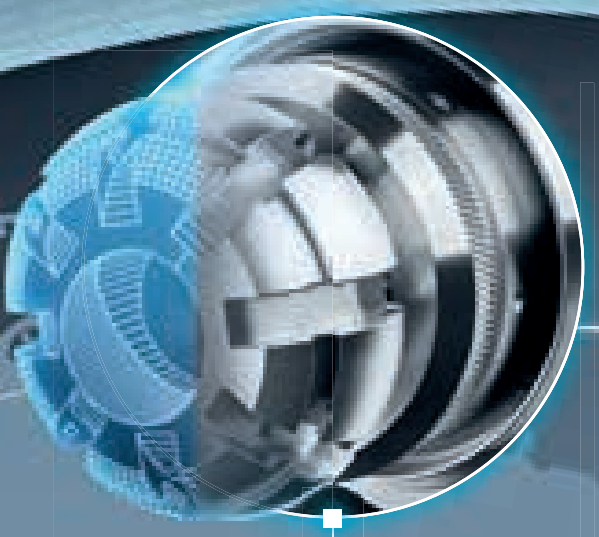
We are convinced that you, our customers, suppliers and business partners will benefit from the further integration to a "Global One" company. Thanks to you, we have become what we are today and we would like to shape the future jointly with you. Therefore we invite you: Talk to us! Your feedback is important to us!

Dr Ing. Masahiko Mori,
President
DMG MORI COMPANY LIMITED

Christian Thönes,
CEO
DMG MORI AKTIENGESELLSCHAFT

GLOBAL ONE

"Our goal: to be the world **number 1 for our customers."**



SOFTWARE SOLUTIONS

CELOS® – The APP-based control and operating system which serves as an entry point to digitisation and exclusive technology cycles. **Technology cycles:** 60 % faster conversational programming.

SERVICE & SPARE PARTS

CUSTOMER FIRST – We've been listening to you! 5 service promises for the best service quality at fair prices.

CLX / CMX

Evolution of the ECOLINE – More options, **technology and quality at fair prices.** NEW: now also with HEIDENHAIN.

AUTOMATION

New, innovative automation solutions such as the **Robo**2Go – With free access and no robotics expertise required.

TECHNOLOGY SOLUTIONS

Our technology centres – Holistic technological and industrial expertise including Additive Manufacturing.

Japan

2016
GLOBAL ONE – worldwide integrated manufacturer of machine tools

2013
Worldwide uniform branding

2011
First jointly developed projects

2009
Start of cooperation

1948 MORI SEIKI

Over 200 years of experience in the machine tool industry.

24 exclusive DMG MORI technology cycles

Your assistive systems for efficient programming and maximum machine safety.

Up to 60 % faster programming of complex machining cycles through automatic generation of the DIN program:

+ Easy windows-based conversational input of parameters
+ No need for a CAD/CAM system, e. g. in the manufacture of threads and gears

› Selected examples:

Interpolation turning – recess turning cycle

Easy manufacturing of sealing surfaces and recesses on milling and turning machines through circular interpolation of two linear axes.

"I can even perform eccentric turning operations although I do not own a turning machine."

Available for all turn-mill machines and milling machines with CELOS® and SIEMENS.

Multi-thread cycle 2.0

Production of multi-start threads with free definition of contours, pitches and angles.

"Without an expensive CAD / CAM system I can generate complex thread geometries, directly on the machine."

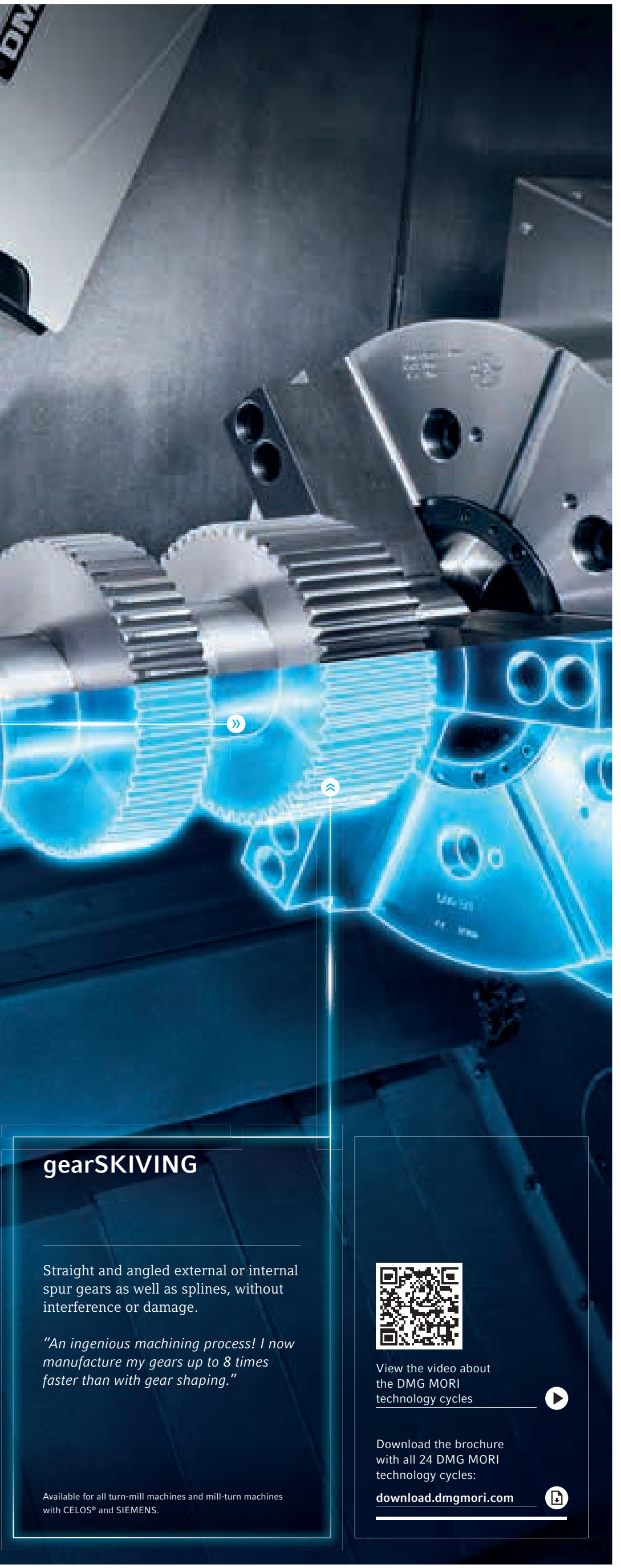
Available for all turning and turn-mill machines with CELOS® and SIEMENS.

Off-centre turning and milling

Creation of eccentric turning and milling contours by overlaying the turning movement with additional X- and Y-axis movements.

"Instead of using a complex CAD/CAM system, I only have to enter a few parameters."

Available for all turning machines with Y-axis and milling machines with CELOS® and SIEMENS.



gearSKIVING

Straight and angled external or internal spur gears as well as splines, without interference or damage.

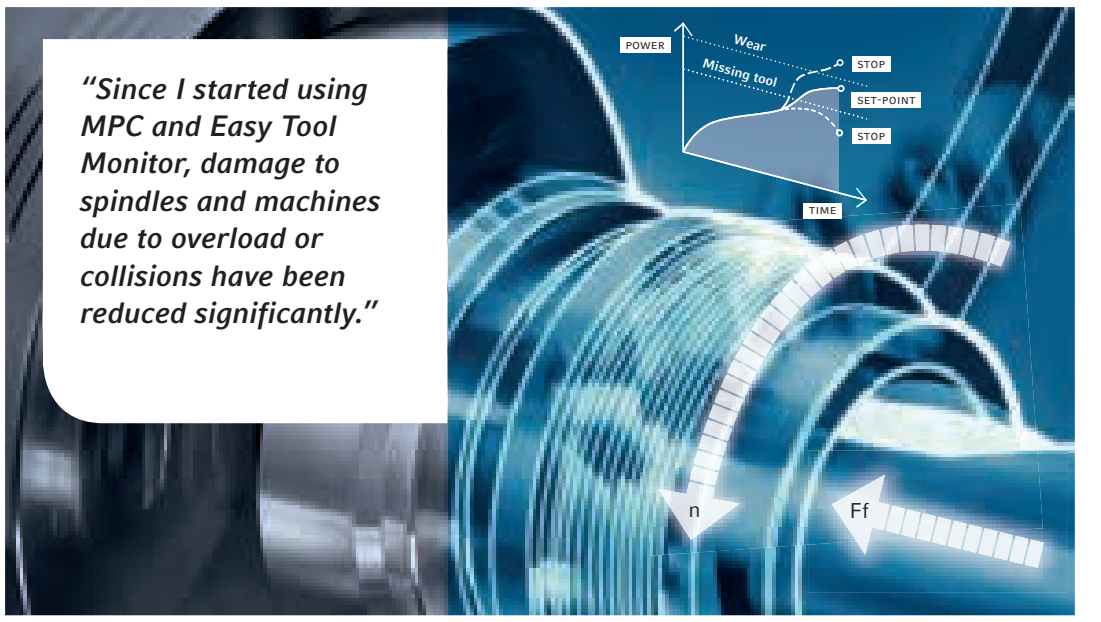
"An ingenious machining process! I now manufacture my gears up to 8 times faster than with gear shaping."

Available for all turn-mill machines and mill-turn machines with CELOS® and SIEMENS.

View the video about the DMG MORI technology cycles

Download the brochure with all 24 DMG MORI technology cycles:

download.dmgmori.com



"Since I started using MPC and Easy Tool Monitor, damage to spindles and machines due to overload or collisions have been reduced significantly."

Protection Package* including Easy Tool Monitor 2.0 and MPC

OPTIMISED MACHINE PROTECTION

+ Monitoring of vibrations and rapid stoppage of feed motion (MPC – Machine Protection Control)
+ Automatic learning of load limits through innovative evaluation algorithms (Easy Tool Monitor 2.0)

Available for all CTX TC machines with CELOS® and SIEMENS.

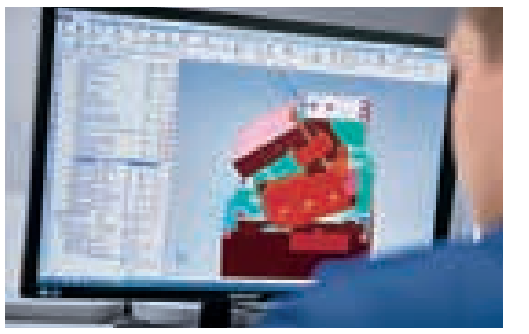
DMG MORI Process Chain

NEW: Module for adaptive measuring.

VOESTALPINE GIESSEREI LINZ GMBH

"We now have zero-error production thanks to automatic measuring of components and adaptation of the milling parameters."

Christian Farthofer, CAM Programming, and Herwig Riess, Head of NEM Production at voestalpine in Linz at the DMC 80 U duoBLOCK® control.



Programming of the measuring steps on NX CAM, so that the milling parameters can be corrected automatically during machining on the DMC 80 U duoBLOCK®.

voestalpine Gießerei Linz GmbH, founded in 1954, develops and produces cam slides for stamping and forming machines in the automotive industry. Increasing customer demands require a high degree of measuring accuracy of these cam slides. **"We are required to maintain these accuracies despite shorter delivery times",** says Herwig Riess, Head of NEM Production. Therefore the **DMG MORI Process Chain** was supplemented with a **module for adaptive measurement** together with DMG MORI, JANUS Engineering AG and Renishaw. The actual parameters resulting from in-process measurement during **5-axis machining** on a DMC 80 U duoBLOCK® are now read back into special cycles, **fully automatically** and in **real time. Accuracies of < 5 µm are achieved, irrespective of shape and positional tolerance fluctuations of the component.** Measurement of the cam slides is saved in the CAM program and is performed automatically between machining steps. Herwig Riess comments: **"The system detects and compensates for set-up errors or kinematic inaccuracies completely autonomously."** Manual measuring processes are no longer required, and tedious quality control is also obsolete. **"We achieve an overall reject rate of close to zero percent."**

VOESTALPINE GIESSEREI LINZ GMBH
voestalpine-Straße 3, A-4020 Linz
giesserei@voestalpine.com, www.voestalpine.com/giesserei

voestalpine
ONE STEP AHEAD.

CELOS® – your solution is a bespoke partner APP.

+ **Integration of your software solutions into a CELOS® partner APP,** including intuitive look & feel, tested and certified by DMG MORI
+ **Proven solutions perfectly integrated in CELOS®,** ensure smooth processes and functioning interfaces
+ **Easily create your own APP in 7 steps –**
  We will gladly assist you: Your contact person: patrick.beller@dmgmori.com

"With CELOS® DEVELOPER we offer our customers and business partners an easy option to develop their own CELOS® APPs."

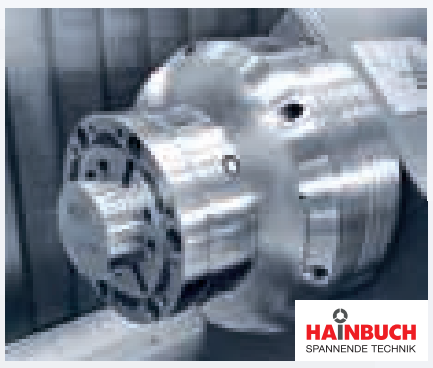
Dr Holger Rudzio
Managing Director DMG MORI Software Solutions

2 new partner APPs:

NEW

SURFACE ANALYSER

+ Machine-integrated measurement of surface finish
+ In-process quality control of the surface
+ Certified for medical and aerospace



NEW

CLAMP CHECK

+ Increasing machine safety through control of the clamping forces
+ Wireless measurement, even during turning

NEW

Now with 26 APPs – 10 new APPs in total and new functions.

View the video on CELOS®

Find out more about CELOS® at:
celos.dmgmori.com

Download the CELOS® brochure:
download.dmgmori.com

PERFORMANCE MONITOR

"KPI and OEE analysis at a glance"

SURFACE ANALYSER

CLAMP CHECK

CONDITION ANALYSER

3D PART ANALYSER

ROBO2GO

PALLET MANAGER

MESSENGER

CELOS® DEVELOPER

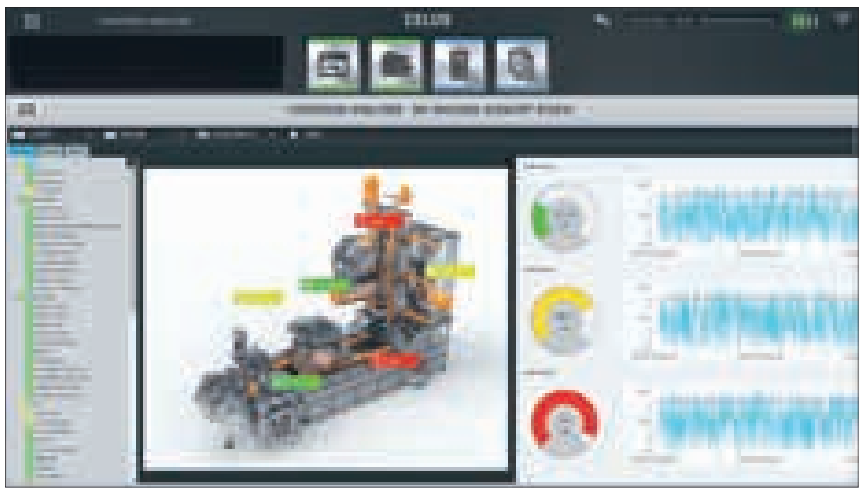
CELOS® UPDATER

SENSORS

NEW

DMG MORI Condition Analyser – 60 sensors in the machine monitor the machine status.

From **BIG DATA** to **SMART DATA –** record and analyse machine data with direct feedback to the customer for maximum machine productivity.
> Analysis of **individual machines, multiple machines at one site** or **across sites.**



> Measurement, visualisation and analysis of force, vibration, temperature and lubrication.

CONDITION ANALYSER

+ NC program optimisation
+ Early detection of machine faults
+ Analysis of damage causes
+ Saved data for long-term analysis

i4.0 sensor package

for improved **accuracy** and increased **process safety:**

TURNING*

+ **Advanced Sensor Control –** Analysis of power and compressed air consumption as well as coolant control
+ **Temperature Control –** Displacement compensation and precision alignment
+ **Machine Protection Control (MPC) –** Preventive protection with vibration sensors on the milling spindle
+ **Easy Tool Monitor 2.0 –** Tool breakage and wear monitoring

MILLING**

+ **Machine Protection Control (MPC) –** Preventive protection with vibration sensors on the milling spindle
+ **Spindle Growth Sensor (SGS) –** A sensor designed to determine and compensate for spindle growth
+ **IKZ flow monitor –** Internal coolant supply flow monitoring to determine the necessary coolant output

* for all CTX beta and gamma TC machines with the compactMASTER® turn-mill spindle.

** for all monoBLOCK®, duoBLOCK® and portal machines in conjunction with IKZ 600 / 980 / 2,500 l (40 / 80 bar); Not with gear-driven spindles.

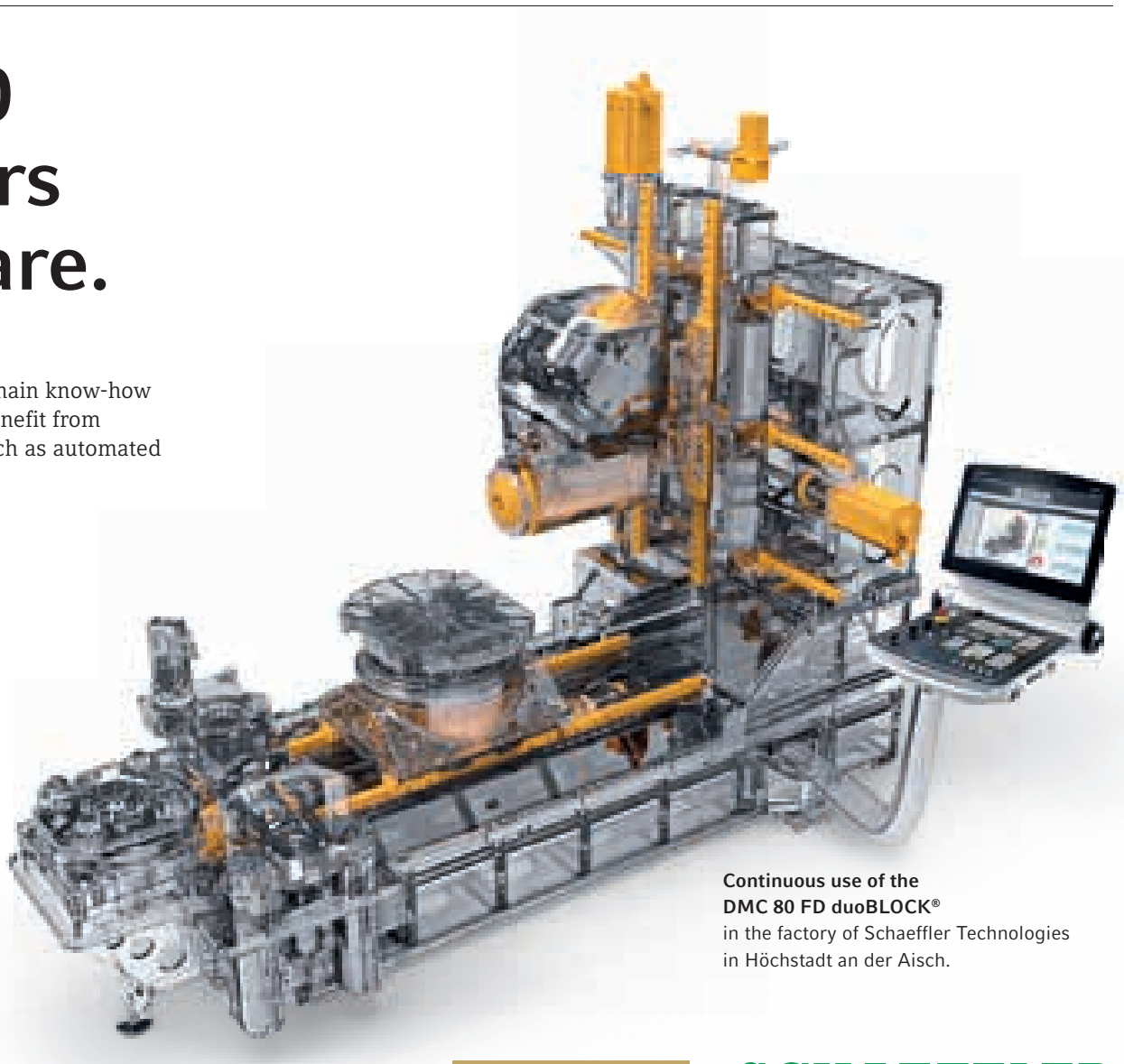
Ready for Industry 4.0 with intelligent sensors and networked software.

Passion 4.0 for Machine Tools: With mechatronic bearing systems and "domain know-how in rolling bearings" towards digitalised solutions in the Machine Tool 4.0. Benefit from the new possibilities in digitalisation with micro-services from Schaeffler, such as automated rolling bearing diagnosis and residual life calculation of rolling bearings.

Rotary table bearing YRTMA with integrated angular measuring system.

Linear recirculating roller bearing and guideway assembly RUE 4.0 with piezoelectric acceleration sensors.

> Predictive maintenance by means of monitoring **force, vibration, temperature** and **lubrication.**



Continuous use of the DMC 80 FD duoBLOCK® in the factory of Schaeffler Technologies in Höchstadt an der Aisch.

Dr Stefan Spindler
Director Industrial
Schaeffler AG

"Together with DMG MORI we will further develop our digitalised production solutions for our own production and for DMG MORI customers. The valuable practice experiences we have gained in our factory in Höchstadt with the digitalised DMC 80 FD duoBLOCK® and the positive resonance from the market form the basis for this approach."

DMG MORI PREMIUM PARTNER

SCHAEFFLER
LuK INA FAG

Schaeffler Technologies AG & Co.KG
www.schaeffler.com

CELOS® – Your entry into digitalisation.

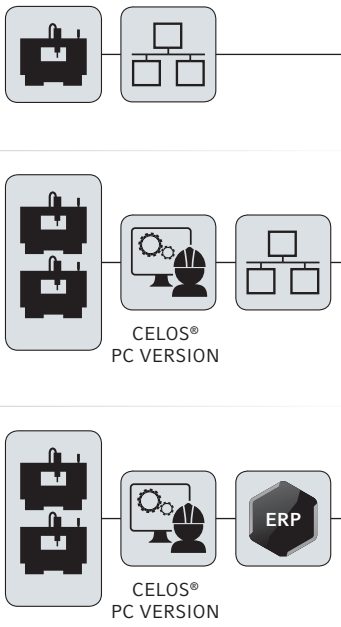
"We will show you solutions for digital transformation and the challenges posed to you and us by Industry 4.0. With its APP functionality, CELOS® already revolutionises the paperless interaction between man and machine."

3 CONFIGURATION LEVELS OF DIGITALISATION

1 **Easy connection of a machine to the company network**
Direct access to order data from the machine

2 **Networking multiple machines via the CELOS® PC version**
Direct transmission of all relevant order data to the respective machine by work preparation, including prioritisation of machine utilisation

3 **Linking to an existing ERP system (e. g. SAP) or a web application via CELOS® PC version**
Automatic control of production flow, directly from the existing manufacturing organisation



OUR SOFTWARE SOLUTIONS FOR ALL LEVELS OF DIGITALISATION

› ORDER

+ Customer-supplied CAD data or workpiece drawings
+ Creation of the order in Job Manager
> Process planning

ORDER MANAGEMENT


JOB MANAGER


CAD/CAM VIEWER

Andreas Böttcher (left), Senior Manager Production & Special Tools at Oerlikon Barmag, and specialist Bahtiyar Ayar, are equally impressed by CELOS®.

OERLIKON BARMAG

"CELOS® linked with the ERP intelligently and consistently."

Oerlikon Textile GmbH & Co. KG in Remscheid with their brand **Oerlikon Barmag** are part of the Swiss OC Oerlikon Group. The group of companies is, among others, **world market leader in the sector of filament spinning systems** for industrial threads, fibres and non-woven fabrics. The core competencies of the Remscheid company include the **manufacture of safety-related components.** The **high speed winders** for winding fibres at speeds of up to 8,000 m/min are an outstanding example. In total, high-tech manufacturing in Remscheid comprises **about 120 machine tools.** Among these are some **mill-turn and turn-mill machines from DMG MORI.** The latest investment, a **CTX beta 800 TC with CELOS®,** is of special significance.

Within the framework of a future-oriented pilot project, the turn-mill machine is **connected to the ERP system** in such a way that **orders, NC program and pricing data** can be transferred via special middleware **from the control interface to CELOS®, managed and reported back to the ERP** after machining. This pilot project forms **part of a holistic group initiative,** as explained by Andreas Böttcher, Senior Manager Production & Special Tools. The **consistency and transparency of data flow across the entire value-added chain** are pivotal, in order to be able to **optimise machining cycles and manufacturing processes holistically and sustainably.** The third important aspect mentioned by Böttcher is the seamless **traceability of components right up to the process documentation.** He points to **the marking station next to the CTX beta 800 TC,** which provides every single part with an **OCR code for unique identification**.

Oerlikon Barmag
Remscheid, Germany
www.barmag.oerlikontextile.com

Turn-and-mill complete machining

Experience Industry 4.0 LIVE: CELOS® Experience Centre covering a floor area of more than 2,000 m², at GILDEMEISTER Drehmaschinen in Bielefeld.

› PROCESS PLANNING / WORK PREPARATION

DMG MORI Software Solutions and CELOS® APPs for job preparation and process planning.

CAD-CAM / SIMULATION

+ DMG MORI Process Chain
+ Programmer 3D Turning
+ DMG MORI Virtual Machine

CELOS® PC VERSION

JOB MANAGER

JOB SCHEDULER

TECH CALCULATOR

DOCUMENTS

› MACHINING

CELOS® APPs for setting up and processing prepared jobs as well as live machine monitoring.

MASCHINES

JOB ASSISTANT

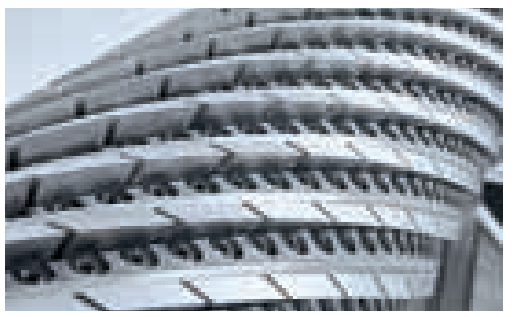
TOOL HANDLING

SERVICE AGENT

MESSENGER

Klaus Wehr, Manager Manufacturing for tool carriers at Ingersoll in Haiger.

5-axis simultaneous machining of blade inserts for milling cutters on the NTX 1000.



Milling cutter loaded with a few hundred blades.

INGERSOLL WERKZEUGE GMBH

"With in-process measurement and a reliable machining concept we manufacture high precision blade inserts on the NTX 1000, virtually unmanned."

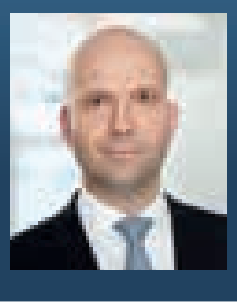
The product portfolio of **Ingersoll Werkzeuge GmbH** ranges from 0.1 mm **drilling bits for the dental industry** up to 5,500 mm **special tools for shipbuilding**. At the Head Office in Haiger, the company, in close cooperation with customers from all industries, produces **individual special tools for heavy duty machining,** accounting for 90 % of production. This includes highly complex roller slicers fitted with a few hundred HSS blades. **Highly demanding geometry and precision** are a matter of course. Machining of these blades has been implemented since 2014 on a **NTX 1000 from DMG MORI.**

"While we normally manufacture our tools as individual pieces, these blades have **batch sizes of up to 3,000 units**" explains Klaus Wehr, Manager Manufacturing of tool carriers at Ingersoll. With a bar loader, **automatic workpiece retrieval** and **in-processs measurement,** the **NTX 1000** is ideally equipped for this **series production** – to a large extent **unmanned.** The turn-mill centre also satisfies the **complexity** demands: "We position the workpiece using the C-axis for **5-axis simultaneous machining.** Thanks to the tailstock and the **stable machine concept,** we comply with **all specifications for geometry and accuracy."**

Ingersoll Werkzeuge GmbH
Kalteiche-Ring 21–25, D-35708 Haiger
www.ingersoll-imc.de

CUSTOMER FIRST – Our 5 service promises!

"We've been listening to you! Our 5 service promises help us to meet your high service quality expectations at fair prices. You can take us at our word!"



Dr Maurice Eschweiler
Director of Industrial Services,
DMG MORI AKTIENGESELLSCHAFT

1

BEST PRICE GUARANTEE FOR ORIGINAL SPARE PARTS

If a spare part, offered or supplied by us, is at least 20 % cheaper elsewhere, we'll immediately give you a full refund of the price difference. Guaranteed!*

IT'S THAT EASY

Just send an e-mail to the address below, listing our offer or order number and the cheaper alternative offer or alternative supplier's weblink:
bestprice@dmgmori.com

* Only applicable if delivery of our spare part was after 01/09/2016. The spare part in the alternative offer is completely identical – not a repair, copy or other version. It is a new part with an identical warranty period and contents. The scope of supply and quantity are identical. The alternative part has the same availability.

2

SPINDLE SERVICE AT BEST PRICES DIRECTLY FROM THE MANUFACTURER

World-class manufacturer's expertise at new attractive prices – DMG MORI spindle service!

SPINDLE REPAIRS

Expert repairs with full cost control.

+ Fixed price without additional charges
+ 6-month warranty
+ Includes replacement of rotary feed-through
+ Includes replacement of any faulty stator and rotor parts
+ Professional removal and installation of your spindle by experienced DMG MORI service engineers

SPINDLE REPLACEMENT SERVICE

The choice is yours: Fully refurbished replacement spindle or a new spindle ready-to-use.

+ Warranty up to 9 months or 18 months
+ Including replacement of rotary feed-through
+ Professional replacement of the damaged spindle by experienced DMG MORI service technicians

BEST PRICE
WARRANTY
TALK TO US!

SPARE PARTS

EXAMPLE MAINTENANCE KITS

MAINTENANCE KITS

Affordable original replacement parts, in a full package.

Safe DIY maintenance. Put together by our experts, perfectly customised for the individual machine types! Your advantage – everything in one package, at a reduced price.

HIGHLIGHTS

+ More than 200 different maintenance kits available, all perfectly customised for each machine type
+ Ensuring machine availability
+ All important wear parts in one kit
+ Protection from expensive subsequent damage
+ Save up to 25% with our attractive package rate

More information, descriptions and prices for our maintenance kits are available from your local service team: **www.dmgmori.com**

DMG MORI SPARE PARTS SERVICE

Maximum availability with a global presence.

+ Global logistics network for all non-domestic markets
+ More than 280,000 different items in stock
+ More than 1,000 spindles available immediately
+ Spare parts availability rate of > 95%
+ New and replacement parts available
+ Many spare parts also available for older series dating back to 1970
+ Order from anywhere in the world with the 24/7 service hotline

24/7 SERVICE HOTLINE
DMG MORI

SERVICE

3

MANUFACTURER SERVICE YOU CAN RELY ON

NEW

Local presence is our global strength. We are there for you around the clock in case of emergency. Any time, anywhere.

HIGHLIGHTS

+ More than 2,500 highly qualified service technicians worldwide
+ Unrivalled availability and operational capability with our extensive service network
+ Proximity to our customers, with more than 150 technology and service centres worldwide
+ 24/7 service hotline: Our experts can solve your problems over the phone in 60 % of cases
+ Minimising unplanned machine failures through preventive maintenance
+ More than 300 innovative service products to help optimise your processes
+ Comprehensive training portfolio

View the video on LifeCycle Services

4

WE SAFEGUARD YOUR PRODUCTIVITY

NEW

Reduced operating costs, maximum machine availability and precision throughout the entire life cycle of your machine – DMG MORI Service *Plus*!

MAINTENANCE *PLUS*

Manufacturer maintenance for maximum machine availability.

+ Replacement / installation of required wear parts at a fixed price
+ The maintenance level is adapted to meet machine running time requirements
+ 10 % special discount on any services and spare parts identified as necessary during maintenance
+ Term: 3 years (new machines) or 2 years (existing machines)

SERVICECOMPETENCE *PLUS*

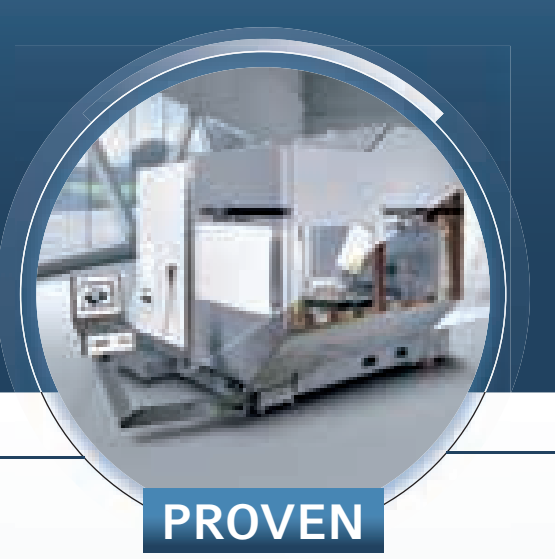
Professional maintenance – we show you how to do it yourself.

+ Replacement of key wear parts with maintenance kits tailored to each specific machine type
+ Extensive 2,000-hour maintenance training
+ Handover and iKey training (Inspection Key)

Find out more about our Service Plus products at: **serviceplus.dmgmori.com**

5

COMPLETE OVERHAULS – RESTORING MAXIMUM PERFORMANCE



PROVEN

Full functionality from proven DMG MORI technologies – Ensure well-established production processes with machine or component overhauls.

HIGHLIGHTS

+ A wide range of machine types at a fixed price
+ Maximum performance restored
+ Component reconditioning to manufacturer's quality standards
+ Additional software updates and selected retrofitting options
+ Top quality through extensive operational testing
+ Full service warranty
+ Overhaul options – on-site or at manufacturer's own location

REFERENCE PROJECTS

View the overhaul video MF Twin 65 now

View the overhaul video DMC 200 U now

Evolution of the ECOLINE for CLX / CMX.

C = COMPACT, COMPETITIVE, CUSTOMISED

FROM 1ST SEPTEMBER: NEW ENTRY-LEVEL MACHINES

+ CLX – Entry-level universal turning machines
+ CMX V – Entry-level vertical machining centres
+ CMX U – Entry-level universal milling machines

MOTIVATION FOR THE NEW APPROACH

⊕ **More technology and solutions!**

3D CONTROL SYSTEMS:
SIEMENS, HEIDENHAIN, FANUC, MITSUBISHI

SOFTWARE SOLUTIONS:
Technology cycles

CUSTOMER-SPECIFIC ADAPTATIONS:
Diverse options

⊕ **First quality!**

⊕ **Attractive prices!**

ADVANTAGES OF THE NEW APPROACH FOR OUR CUSTOMERS

+ Complete range of technology solutions from DMG MORI
+ Automation options

EFFECT ON OUR EXISTING CUSTOMERS

+ No disadvantages for our existing customers
+ Same service and spare parts availability for ECOLINE machines

19" DMG MORI SLIM*line*® multi-touch control system
with Operate on SIEMENS

CLX 450

DELIVERY 2016 – ECOLINE EXISTING MACHINES

Short delivery times starting at just two weeks with delivery and commissioning in 2016

***ecoTurn* 310**
***ecoTurn* 450**
***ecoTurn* 510**
***ecoTurn* 650**

***ecoMill* 600 V**
***ecoMill* 800 V**
***ecoMill* 1100 V**

***ecoMill* 50**
***ecoMill* 70**

Check availability!

YOUR CONTACT

Mr Florian Kock
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florian.kock@dmgmori.com

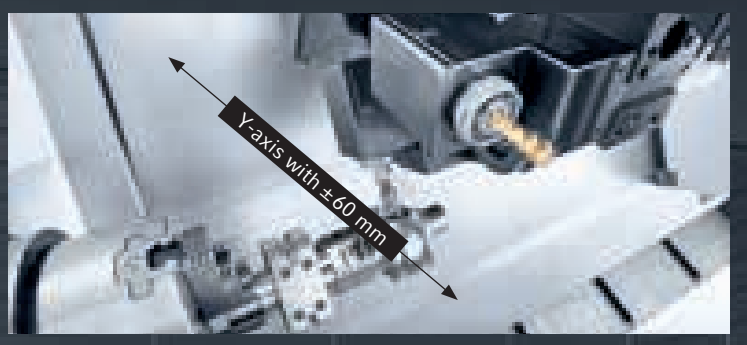
View all available offers:
cnc-scout.dmgmori.com

AMB

LIVE AT AMB IN STUTTGART
13–17/09/2016

CLX 450 // SIEMENS multi-touch
CMX 600 V // HEIDENHAIN
CMX 1100 V // SIEMENS multi-touch
CMX 70 U // SIEMENS multi-touch

The latest entry-level machines from DMG MORI with more technology.



OPTION // Y-axis with 60 mm traverse, milling on turning machines

OPTION // NC rotary table for efficient 4-sided machining

SOFTWARE SOLUTION // Exclusive DMG MORI technology cycles: 3D quickSET®

19" DMG MORI SLIM*line*® multi-touch control system
with Operate on SIEMENS

CMX 50 U

19" DMG MORI SLIM*line*® multi-touch control system
with Operate on SIEMENS

CMX 600 V

NEW CMX U – POWERFUL UNIVERSAL MILLING MACHINES FOR 5-SIDED MACHINING

+ **Maximum rigidity with C-frame cast iron construction** and patented NC swivelling rotary table
+ **Powerful 12,000 rpm milling spindle** for optimum performance
+ **Quick tool magazine with 30 positions as standard,** including double gripper for short exchange times
+ **Higher productivity and efficiency through dynamic drives –** up to 20 % shorter non-productive times and 30 m/min rapid traverse in all axes
+ **3D control system technology:**
  – 19" DMG MORI SLIM*line*® multi-touch control system with Operate on SIEMENS
  – 15" DMG MORI SLIM*line*® with HEIDENHAIN TNC 620

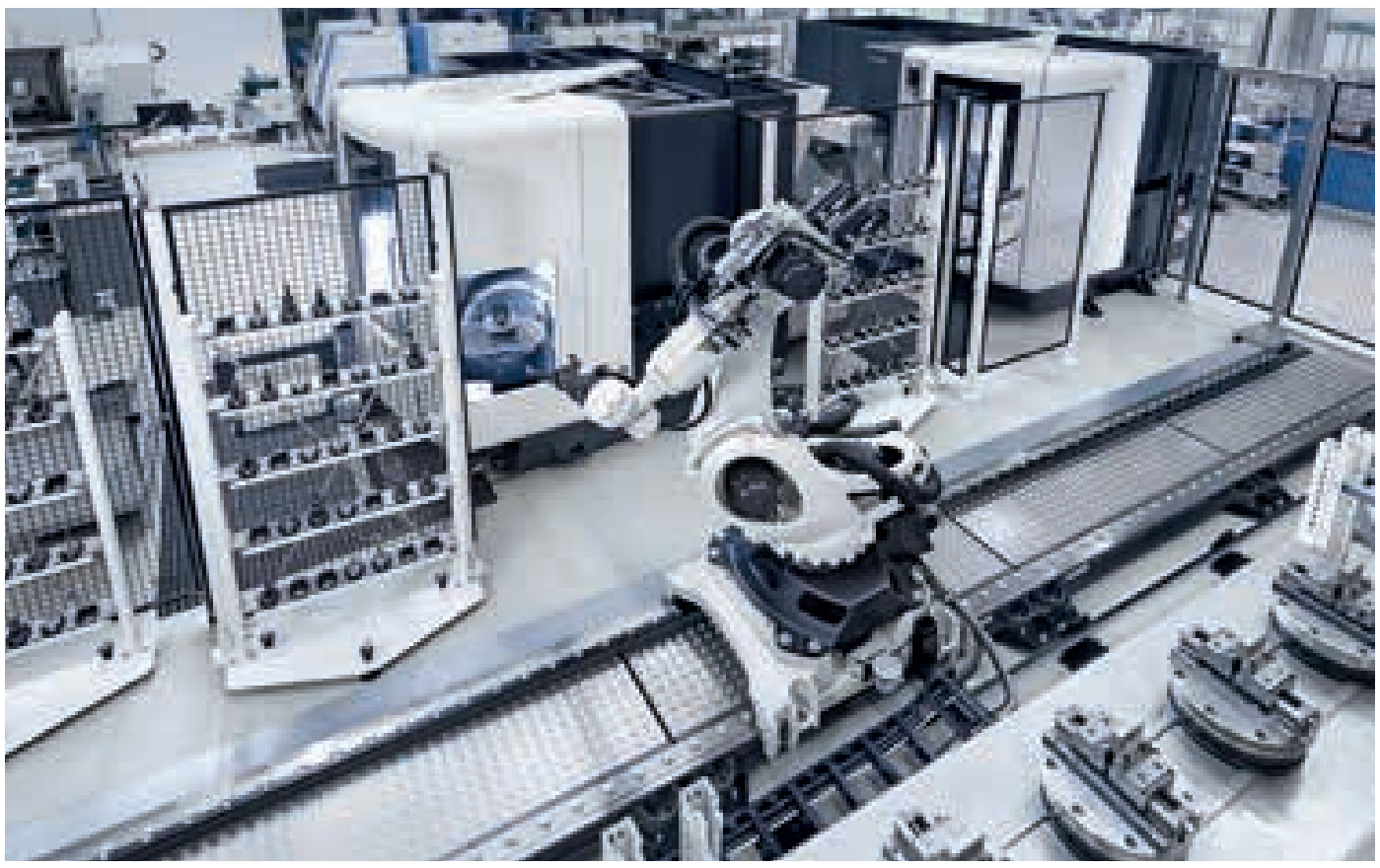
NEW CMX V –
NOW ALSO AVAILABLE WITH HEIDENHAIN CONTROL SYSTEM

Find out more about the CMX V series at:
cmx-v.dmgmori.com

DMG MORI SYSTEMS

ZAHORANSKY AG

"Thanks to the new manufacturing cells consisting of three 5-axis machining centres with a total of 580 tool pockets and 112 pallet positions, we can now manufacture more than 4,000 different workpieces highly flexibly and fully automatically."



Flexible manufacturing cell with two DMU 60 eVo, one DMU 70 eVo, one robot on the 7th axis and CAD/CAM connection to the process control computer for controlling the machine and tooling requirements as well as order prioritisation.

Since the start of the 20th century, ZAHORANSKY AG has been acknowledged as the leader in automated manufacture of brushes. At the head office in Todtnau-Geschwend, approximately 300 employees attend to the development and manufacture of special machines for the production of twisted brushes, household brushes, technical brushes, toothbrushes and their packaging. **Small batch sizes and one-off production are the order of the day. "This requires a high degree of flexibility, especially regarding swarf management"**, according to Lothar Wagner, Manager Production of ZAHORANSKY AG. **This flexibility was expanded in 2015 with a manufacturing cell from DMG MORI.** During the turnkey project, **automation experts from DMG MORI** linked three 5-axis machining centres – **two newly installed DMU 60 eVo and one DMU 70 eVo dating from 2007 – via a robot**. "This was carried out while production continued", remembers Lothar Wagner. For ZAHORANSKY, this automation is a **bespoke solution** with **stringent demands on the flexibility with which workpieces must be produced.** The range of components presently comprises more than 4,000 **part numbers,** with components made of aluminium, steel and even stainless steel **in varying sizes**. Therefore a **large number of tool positions and pallet positions is required**. Besides the 120 or 210 tool positions in the machines, the **robot cell has space for 130 additional tools, which can be supplied to any of the machines fully automatically**. "The same flexibility exists for the pallets", explains Lothar Wagner: **"DMG MORI Systems have set up 112 shelf positions." With only six standardised clamping devices, all components can be covered.** "All pallets fit into every machining centre." Thanks to the six loading stations, idle times during loading are reduced to a minimum. "**We now have sufficient buffer capacity, so that employees can load without having to wait.**" ZAHORANSKY works in two shifts, but the manufacturing cell is loaded so that it can **autonomously run overnight and into the weekend.** The Manager Production states: **"We aim for 6,000 running hours per year on each machining centre."**

ZAHORANSKY
PERFECTLY DIFFERENT

ZAHORANSKY AG
Anton-Zahoransky-Strasse 1, D-79674 Todtnau
info@zahoransky.com, www.zahoransky.com

WADA MACHINE MANUFACTURING CO., LTD.

„RPP system-integrated NHX 4000 improves efficiency of high-mix low-volume production."

Medical equipment component machined by comprehensive features of the NHX 4000 with a max workpiece swing diameter of 630 mm.

Executive Director Shuhei Wada has every confidence in DMG MORI's prompt service and machine stability and accuracy.

WADA Machine Manufacturing Co., Ltd., established in 1957, expanded into the medical equipment field after relocating to Numazu Iron Industrial Park in 1973. Since then the company has specialised in **machining of precision parts for cutting-edge medical equipment** for a major medical equipment company. "We have been commended by the customer several times for **keeping to strict delivery schedules** despite our distance from them, while maintaining high product quality," says Yoshihisa Wada, President of the company, looking back on the company history. **Advanced medical equipment such as MRI and CT scanners requires quick responsiveness to high mix, low volume production as well as high precision.** "For the first time in Japan, we employed the 5-pallet RPP (Round Pallet Pool)-integrated NHX 4000." **A normal pallet pool system requires a footprint twice as large as the size of a machine. With the RPP-integrated NHX 4000, the floor space requirement is 50 % less.** The decisive factors for our purchasing the machine are the **capability for unmanned operation during the night; high reliability, durability, stability and precision that the DMG MORI machine is offering and prompt service,"** explains Shuhei Wada, Executive Director of the company. "We previously used **multiple machines and set up multiple processes** to meet quantity requirements. But with the NHX 4000 + 5RPP, which is able to perform unmanned operation during night, **the required number can be achieved on one machine.** We now can respond to urgent requests to machine a single component by always having one of the five pallets available and ready."

WADA

WADA Machine Manufacturing Co., Ltd.
Numazu Iron Industrial Park
294-26, Ashitaka, Numazu City, Shizuoka 410-0001
www.wada-machine.co.jp

NEW: Robo2Go – Automation can be that easy!

Find out more about
our retrofit offers:
systems@dmgmori.com

SIMPLY AUTOMATE

+ Available **for all DMG MORI universal turning machines with CELOS®**
+ **Free access** for maximum operator acceptance
+ **No robot knowledge required,** control system completely via CELOS®
+ **Can be used flexibly on multiple machines**
+ **Simple positioning of the automation equipment by pallet truck**
+ **Three options:** Loading capacity 10 kg, 20 kg or 35 kg

Controlled by CELOS® –
no robot knowledge required!

Safety Zone:
Laser scanner monitors the working area – immediate safety stop when someone enters. Modern working environment without guarding for maximum operator convenience.

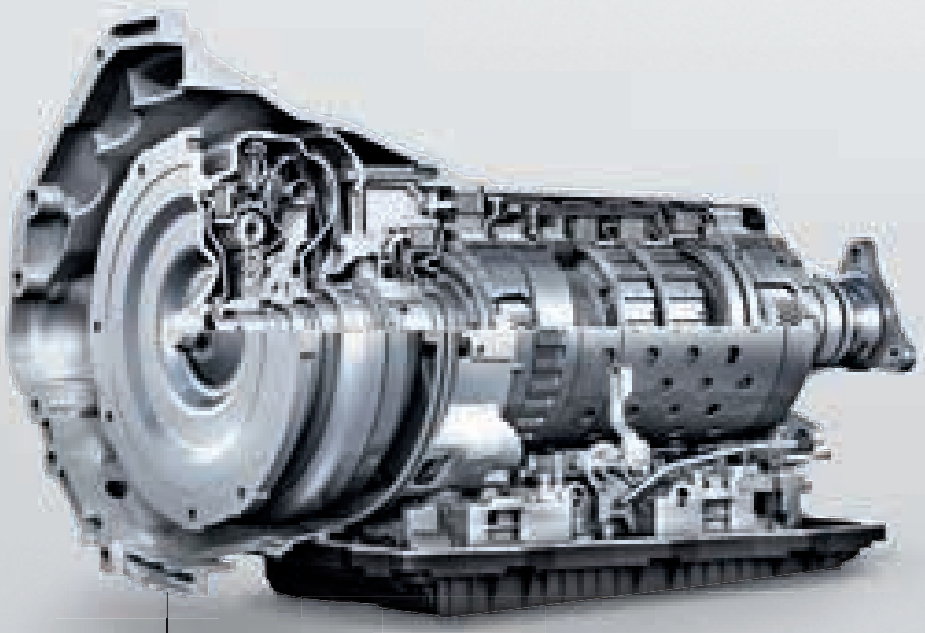
View the video on the topic „**Robo**2Go“

Find out more about
DMG MORI Systems at:
systems.dmgmori.com

Download product brochure
DMG MORI Systems:
download.dmgmori.com

DMG MORI – Holistic supplier of machines, technologies and processes.

+ **More than 1,500 DMG MORI machines per year for the automotive industry**
+ **Global competence partner** for the best support, maximum availability and comprehensive turnkey projects
+ Intelligent monitoring functions **for maximum process safety**
+ **Holistic system configuration** for unique production solutions



1

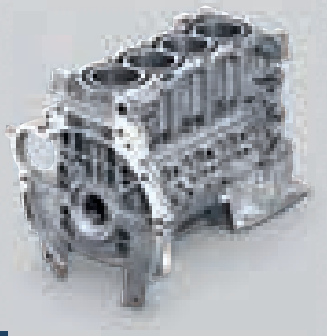
650 × 355 × 390 mm
ZF 8HP gearbox housing
Material: Aluminium

2

500 × 300 × 250 mm
Crankcase housing / automotive
Material: Aluminium

3

410 × 180 × 120 mm
Cylinder head
Material: Aluminium



4

350 × 410 × 230 mm
Cylinder block
Material: Aluminium

5

ø 150 × 560 mm
Crankshaft
Material: GG20

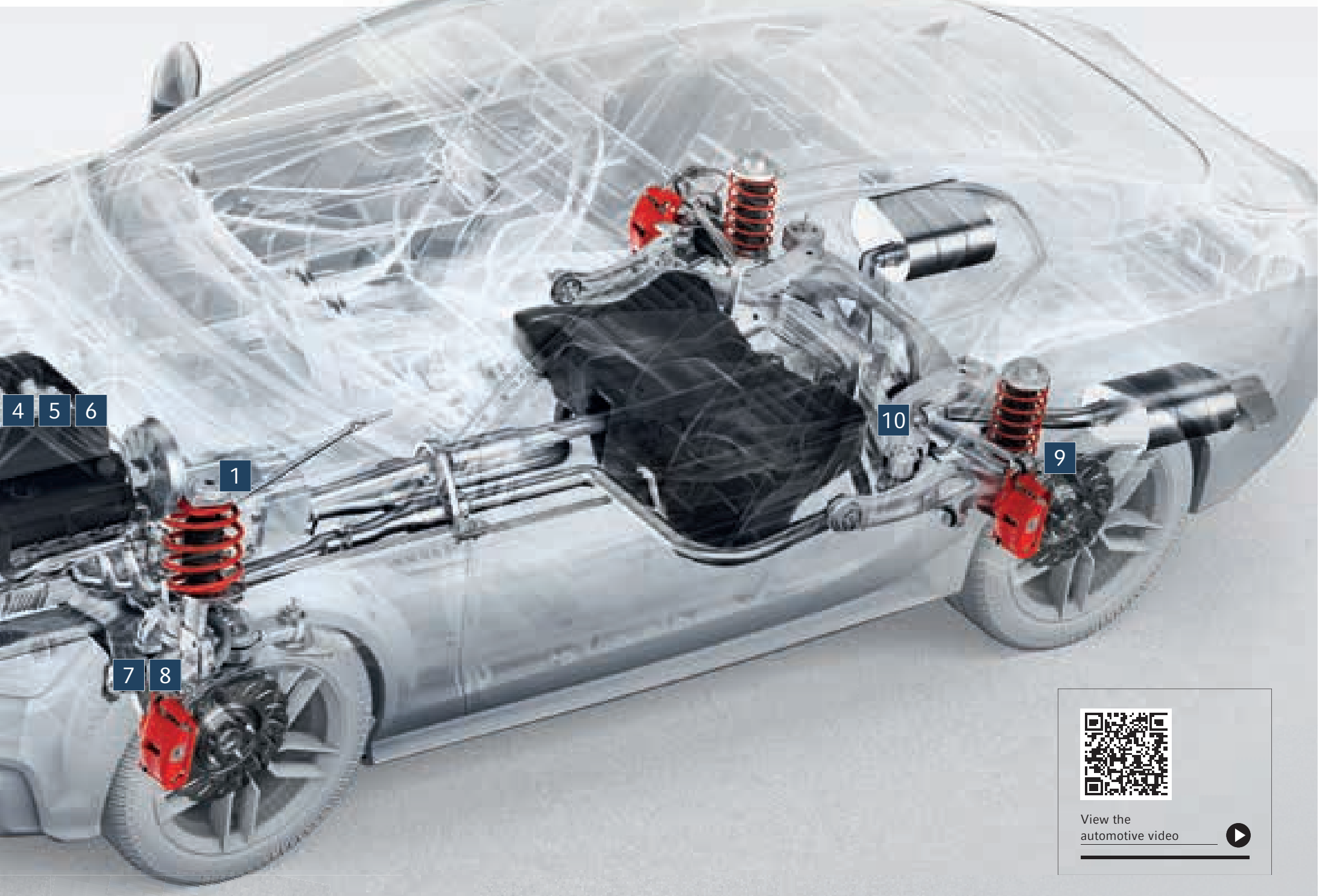
DMC H *linear* – Highly dynamic linear drives with 1 g acceleration and maximum continuous accuracy.

+ **Linear drives in all axes** up to 100 m/min rapid traverse, 1 g acceleration and a chip-to-chip time of 2.5 seconds
+ **Maximum continuous accuracy,** e. g. for down to 6 µm roundness
+ NC rotary table or swivelling rotary table for **5-axis simultaneous machining**
+ **17.2 m² space requirement,** including pallet changer and chip conveyor

i-Series – Highly productive concept for series production of 4-cylinder engines.

+ **Patented Z-axis kinematics of the spindle:** Maximum stability due to angled guideway
+ **Low moving mass due to X / Y / Z spindle traverse:** High machine dynamics for short chip-to-chip times; Optimal chip discharge through the machine bed
+ **Footprint of only 6.7 m²**

NZX-S series – Compact turning centres for series production of shafts.



View the automotive video

6

ø 40 × 470 mm
Camshaft
Material: GG25

7

ø 18 mm ball diameter
CV joint AC ball inner race
Material: 20MnCr5

8

ø 18 mm ball diameter
CV ball plunging joint
Material: CF53

9

ø 120 × 80 mm
Wheel hub
Material: S53C (JIS)

10

ø 60 × 100 mm
Connector
Material: heat-treated alloy steel

+ **Space-saving construction** for production lines with short traverses and optimised spindle power and feed
+ **Thermo-symmetrical construction** for consistency of spindle centre position and maximum machining accuracy
+ **Optimal access** to workpieces and tools
+ **Vertical construction** for optimal chip discharge

CTV 250 DF – Vertical turn-mill centre for machining constant velocity joints.

+ **Maximum dynamics** from the turn-mill swing arm (TM) with 90 rpm direct drive and a swivel range of +105° / –45°
+ TM swing arm for up to two HSK-C63-F80 milling spindles, 6,000 rpm, 14.5 kW and 46 Nm (one milling spindle as standard)
+ **Additional Capto C5 holder** for multiple tools with up to four cutting edges

NRX – Highly productive double spindle turning centre for series production.

+ Maximum turning diameter ø 180 / 150 mm (turning specification / milling specification), chuck size maximum ø 200 mm (8")
+ **Maximum productivity** due to world's fastest workpiece loading in just 5.6 seconds
+ **Parallel loading** of one spindle while the second spindle is machining
+ Two 8-station (optionally 10*) turrets for optimal chip discharge
+ **Excellent accessibility** to chucks, tools and transfer system

* MC configuration: Standard

DMG MORI – Your competent partner for aviation and aerospace.

AEROSPACE EXCELLENCE CENTRE IN PFRONTEN

+ **Perfectly matched synergy** between machine, tool and machining strategy
+ **Industry know-how** starting with technical advice up to provision of customer-specific turnkey solutions

Typical aerospace components

Turbine components

1

ø 950 × 400 mm
Casing
DMC FD duoBLOCK® series
Material: Titanium 6-4

High precision complete machining with milling and turning on one machine in four set-ups.

2

ø 450 × 120 mm
Blisk
DMU monoBLOCK® series
Material: Titanium 17

Dynamic 5-axis simultaneous milling of blade profiles with swivelling rotary table and direct drive in the A- and C-axes.

3

ø 1,500 × 750 mm
Intermediate housing
DMU portal FD series
Material: Titanium 6-4

Simultaneous 5-axis machining of the intermediate housing for aviation turbine by milling and turning.

Undercarriage components

4

ø 300 × 300 mm
Undercarriage component
NLX series
Material: Steel

Heavy machining with box ways with optimal damping characteristics, milling with BMT® turret with 100 Nm.

5

ø 130 × 290 mm
Landing gear cylinder
NTX series
Material: Steel

Simultaneous 5-axis machining; simultaneous machining with bottom BMT® turret as second tool carrier.

TURBINE COMPONENTS

1 2 3

AEROSPACE EXCELLENCE CENTRE AT DECKEL MAHO PFRONTEN

+ More than 20 years of aerospace competence
+ Holistic technology solutions up to turnkey process development across machines: Machine design, tools, clamping systems, programming
+ Future-oriented and innovative additional development of processes and machines, e. g. Additive Manufacturing
+ **Your contact:**
  Michael Kirbach, *Manager Aerospace Excellence Centre*
  michael.kirbach@dmgmori.com

View the aerospace video

Download the aerospace brochure:
download.dmgmori.com

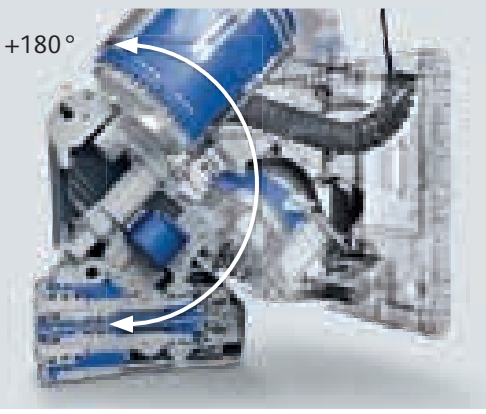
Heavy-duty machining package for the 4th Generation duoBLOCK®

Up to 50 % better chipping in titanium with a simultaneous reduction in tooling costs and improved surface finish through:

+ Hydraulic **clamping** of the **NC rotary table**
+ **Damper shoes** in the Y-axis*
+ Software optimisation for **heavy duty machining ATC***

* Available in conjunction with SIEMENS CNC control system

Optimal for heavy duty machining!
NEW: 5X torqueMASTER® with 60 % higher torque (1,800 Nm) and 180° swivel range.



Structural components

6

600 × 500 × 45 mm
Pylon support
DMC duoBLOCK® series
Material: Titanium 6-4

Complete machining with powerful motor spindle powerMASTER® with 1,000 Nm and heavy duty machining in one set-up.

7

1,200 × 200 × 200 mm
Aileron component
DMF 180
Material: Aluminium

Dynamic machining of long slender components up to 6,000 mm long at speeds up to 18,000 rpm.

New technologies – LASERTEC Additive Manufacturing and ULTRASONIC

ø 450 × 470 mm
Jet for rocket engine
LASERTEC *3D* series
Material: Stainless steel (X5CrNiMo 17-12-2)

Complete 5-axis machining – laser deposition and turning on one machine.

ø 180 × 80 mm
Turbine housing
LASERTEC *3D* series
Material: Inconel / Copper

Complete 5-axis machining – laser deposition and milling on one machine.

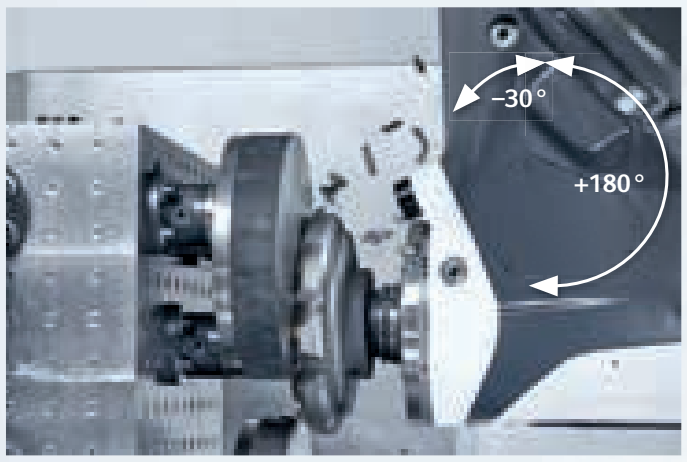
ø 380 × 420 mm
Camera housing
ULTRASONIC series
Material: Silicon nitride

Final machining of sintered semi-finished part in multiple set-ups.

Our 5-axis packages at an unbeatable price!

5 axis CHAMPION

Available with CELOS® on SIEMENS or with HEIDENHAIN.



NEW

DMU 90 P duoBLOCK® – Heavy machining with a price advantage of more than € 50,000!

HIGH QUALITY PACKAGE CONFIGURATION

+ **Maximum accuracy and performance of the duoBLOCK® concept with attractive price advantage**
+ **Motor spindle SK50 12,000 rpm,** 430 Nm / 52 kW (40 % DC)
+ **Machine Protection Control** (MPC)
+ **Spindle Growth Sensor** (SGS)

DMU 90 P duoBLOCK® with 900 mm X-axis.

Delivery times starting at just 18 weeks!

* Delivered ex works from Pfronten.

FIT FOR THE FUTURE WITH SINUMERIK

DMG MORI

PREMIUM PARTNER

SIEMENS

www.siemens.com/sinumerik

smartOperate – SINUMERIK Operate optimised for multi-touch operation

+ Quicker interaction
+ Smart zooming and scrolling functions
+ Full control through gesture commands with reliable SINUMERIK Operate user interface

DMU 75 / 95 monoBLOCK® – Top configuration for simultaneous 5-axis machining.

HIGH-TECH AS STANDARD

+ **NC swivelling rotary table**
+ **speedMASTER® spindle** SK40, 20,000 rpm, 130 Nm, 35 kW (40 % DC)
+ **Machine Protection Control** (MPC)

DMU 75 / 95 monoBLOCK®
with up to 950 mm X-axis.

Delivery times starting at just 8 weeks!
* Delivered ex works from Pfronten.

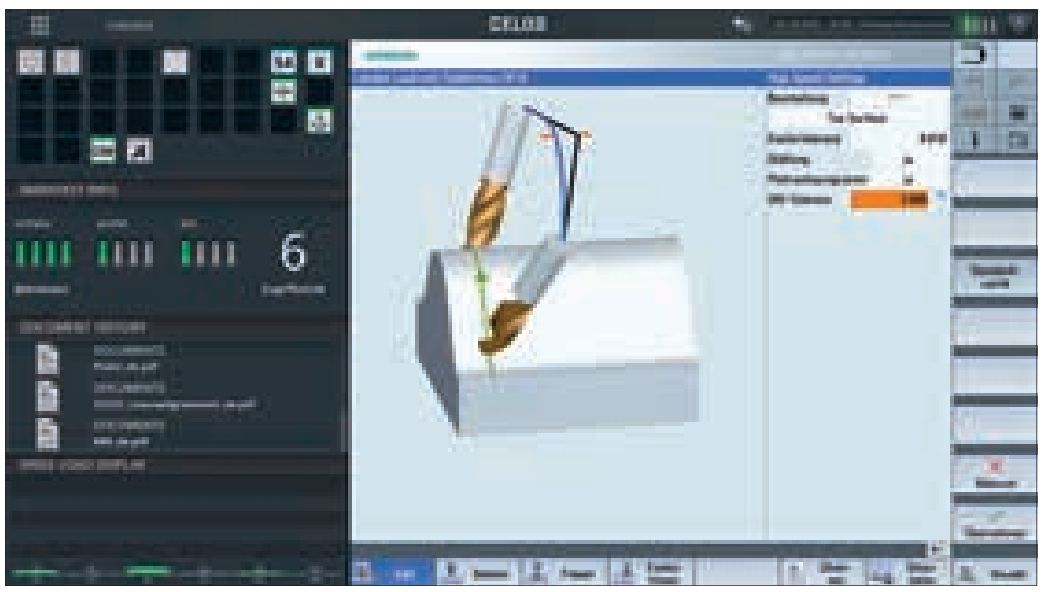
DMU 60 eVo *linear* – Unbeatable 5-axis technology with a price advantage of more than € 14,000!

DMU eVo *linear*

+ **Linear drive in the X-axis and Y-axis** for maximum precision and dynamics with up to 80 m/min rapid traverse
+ **Swivelling rotary table for 5-axis simultaneous machining** with swivel angle of 115° and 400 kg load capacity
+ **speedMASTER® spindle** with 20,000 rpm and 130 Nm as standard
+ **Optimised gantry construction for maximum stability** with low space requirement and optimal access
+ Optional with mill-turn technology or twin pallet changer

Standard with immediate effect:
Chip conveyor, spray gun and MPC.

Delivery times starting at just 8 weeks!
* Delivered ex works from Seebach.



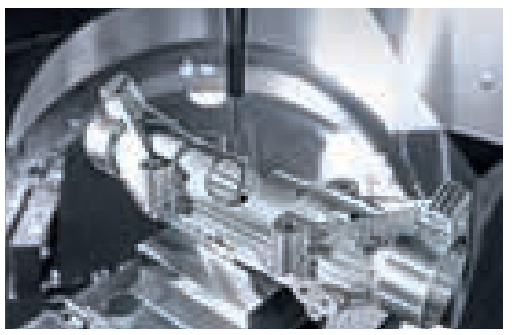
Top Surface – Perfect Workpiece Surfaces in Tool and Mould Making

+ Smart motion control
+ Optimal surface quality
+ Highest milling precision
+ Simplest handling

+ NEW: Starting at Operate 4.7

Clear advantage of 5-axis technology from DMG MORI.

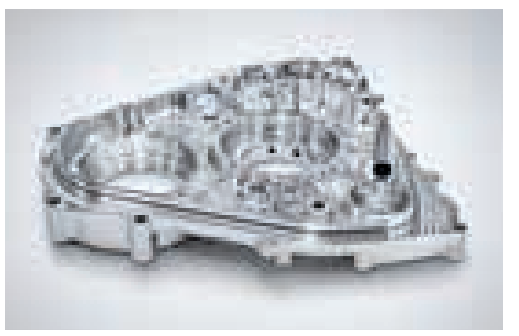
John Kenny (middle), Managing Director JK Engineering, together with two of his dedicated specialists.



5-axis machining on a DMU 60 eVo.

Complex aluminium workpiece for Formula 1.

Artificial titanium joint for the medical sector.



Aluminium gearbox housing.

JK ENGINEERING HOLDINGS LTD.

"The high stability of the DMU eVo allows us to machine titanium components for the aerospace or medical industries with maximum precision."

The origins of JK Engineering, which was founded in the UK in 2001, are as manufacturing service provider for Formula 1, where precision parts are the order of the day. The company in Kings Langley fulfils similarly demanding manufacture for the medical, dental and electronics sectors and – since its certification to AS 9100 and ISO 9001 – in the aerospace and defence industries as well. 25 competent and dynamic specialists are employed by JK Engineering. A modern workshop consisting of 14 machining centres and turning machines from DMG MORI form the subcontractor's core manufacturing capacity. 5-axis universal milling and automation are prominently represented.

"We operate in a fast-moving market with high demands on quality" John Kenny, Managing Director of JK Engineering, states in summarising the daily challenges. His team has quickly learned not only to comply with these market requirements but to exceed them. "We can only remain competitive if we consistently expand our know-how and invest in the most modern machining technology." The introduction of 5-axis machining seven years ago was a result of this philosophy. **"The DMU 50 from DMG MORI was in our opinion the first really reliable 5-axis machine"** John Kenny remembers about the purchase. Besides that, the compact model with its small footprint fitted perfectly into our production environment. **"With 5-axis machining we were able to significantly reduce the number of set-ups, which gave us a big advantage over our competitors."** At that time the competition was still using 3-axis machines.

JK Engineering has been loyal to DMG MORI ever since. Ten of the total of 14 DMG MORI machines are 5-axis models: three DMU 50, five DMU 40 eVo and two DMU 60 eVo, the latest with a pallet changer. John Kenny points out another decisive feature of the machines: **"Thanks to the stable construction and the powerful spindles we can work productively and accurately, especially during heavy duty machining." Accuracies of 10 µm are routine.** "The temperature management of the DMG MORI machines also contributes towards precision." The fact that JK Engineering manufactures in air-conditioned factory units makes their pursuit of top precision self-evident.

For JK Engineering, 5-axis machining was only the first step towards sustainable process optimisation. **"Automation is the key to the most efficient utilisation of our capacity",** according to John Kenny. Robots and loading equipment are indispensable for unmanned manufacturing overnight and at weekends. **"The robots provide additional flexibility for small series production, because we can easily adapt order priorities as required – and without long set-up times."** In addition, automatic loading of the machines eliminates inaccuracies due to manual set-up. John Kenny looks to the future with optimism: **"Our technical competencies combined with reliable and accurate machines from DMG MORI are helping us to deliver the most demanding components quickly and at competitive prices."**

jk engineering

JK Engineering Holdings Ltd.
Unit 2 Leewood Farm, Harthall Lane, Kings Langley,
Watford, Herts, WD4 8JJ.
sales@jk-engineering.co.uk, www.jkeng.co.uk

Hans Keller (left), Manager Prototype and Tool Construction at AESCULAP and Dr Uli Sutor, Key Account Manager Medical at DMG MORI.

Machining of deep drawing moulds measuring up to 800 mm.

AESCULAP AG

The 2,500th monoBLOCK® machine!

"The DMU 75 monoBLOCK® is the best solution for 5-axis simultaneous machining of our high precision workpieces in hard-to-machine chrome steel."

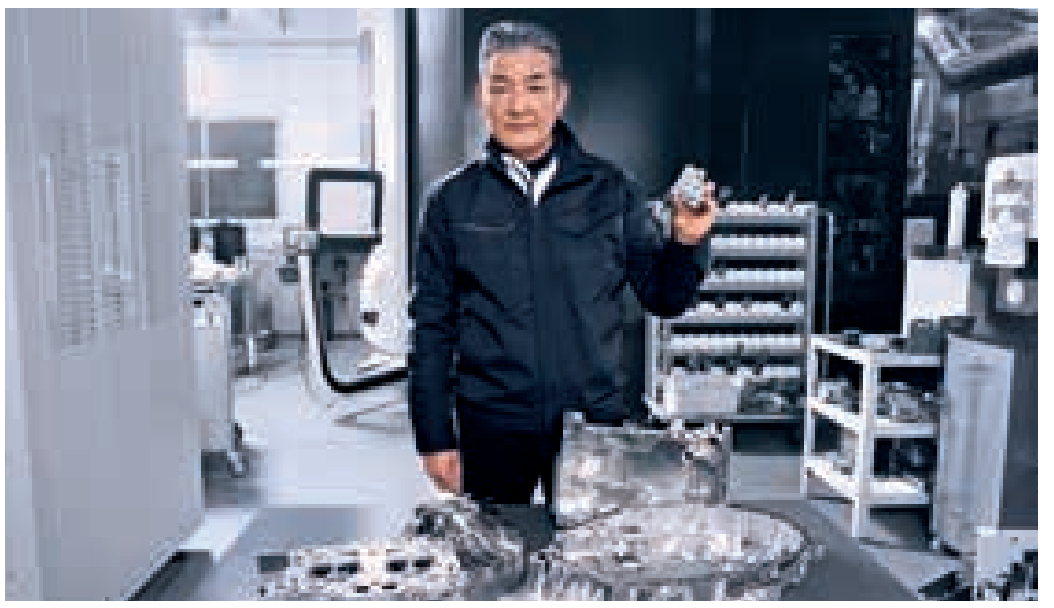
Within the B. Braun Group, AESCULAP AG in Tuttlingen is a subsidiary specialising in surgery, with products and services for all types of surgical intervention. One core component in the value-adding chain is the multiple award winning Tool and Prototype Construction section. **With many years of experience in 5-axis simultaneous machining, DMG MORI acts as supplier of powerful machining centres.** Recently the 2,500th monoBLOCK® machine from the machine tool manufacturer found a good home at AESCULAP. The DMU 75 monoBLOCK® overcame four rival products in a tough selection process.

"**We were looking for the best way to simultaneously machine challenging deep drawing moulds weighing up to 300 kg in five axes from hard-to-machine high-alloy chrome steel and finally found it in the Allgäu region**", explains Hans Keller, head of Prototype and Tool Construction enthusiastically.

Besides the excellent milling performance – the DMU 75 monoBLOCK® has a 20,000 SK40 motor spindle as standard – he specifically praises **the stability of the new monoBLOCK® for achieving high surface quality and long tool service life.** In addition, the NC swivelling rotary table can easily be loaded from the top by crane with workpieces up to 800 mm. The vertical chain magazine with space for 60 tools and a small footprint of only 8 m² round off this unique 5-axis all-round package.

AESCULAP

AESCULAP AG
Am Aesculap-Platz, D-78532 Tuttlingen
info@aesculap.de, www.aesculap.de



Factory Director, Hidenobu Shigeki visited 30 potential customers a month when the company experienced a sharp decline in orders triggered by the collapse of Lehman Brothers. His sales activities, brimming with vitality, led to today's growth and success.

Tomoei Seimitsu's elite operators who skillfully run the DMU 80 eVo *linear* (From left to right: Satoshi Sumitani, Hitoshi Nagao, Junji Oki and Hayato Ikenaga).

TOMOEI SEIMITSU CO., LTD.

"Thanks to the DMU 80 eVo linear we are now 4 times faster when machining superalloys – achieving an accuracy of ±2 µm."

"Our company mainly manufactures prototype parts for air conditioners, automobiles and bicycles. Most delivery time requirements are demanding, for example one week or even only two days." Factory Director Hidenobu Shigeki explains the difficulties inherent in prototype manufacturing. **According to the company, they are not allowed to compromise on accuracy, no matter how short the delivery time. Most orders require a dimensional accuracy of within ±2 µm. Moreover, some prototypes use difficult-to-cut materials such as Hastelloy.**

"In order to ensure high accuracy, we constantly control the small temperature differences between the upper and lower parts of the machine and conduct quality inspections on every machined workpiece. **"Every time we receive an order, we are taking on the challenge of shorter delivery times while maintaining high accuracy"** says Shigeki. Tomoei Seimitsu has invested in plant and equipment to accommodate rapidly increasing order volumes and has purchased nine machine tools over the past two years.

"**Among those machines, the one that is particularly contributing to boosting our productivity is the DMU 80 eVo *linear*,"** says Production Director Hitoshi Nagao. He also praises the performance of the DMU 80 eVo *linear* saying, **"Equipped with optional linear drives, the machine achieves approximately four times greater productivity in 3D shape machining compared to other companies' machines." The output of the DMU 80 eVo *linear* is by far the highest of any 5-axis machine in the factory and almost all of the operators want to use it, "Use eVo if not in use" has become a catchphrase among them.**

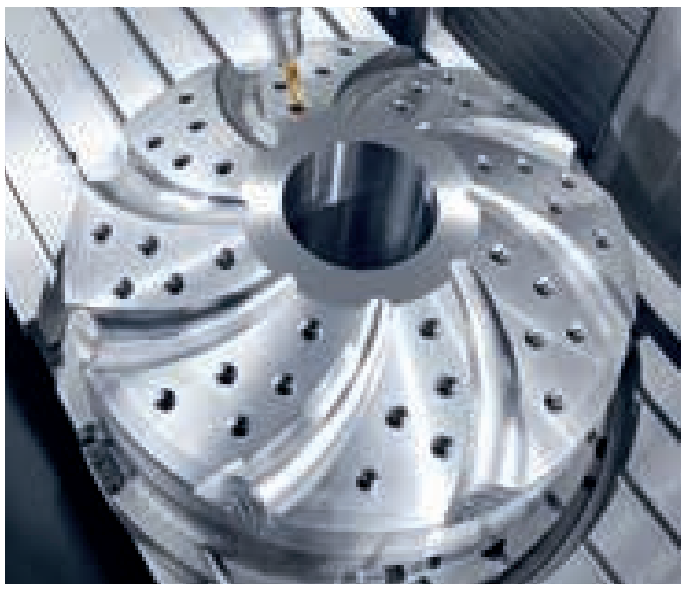
Production Director Nagao explains the reason for that. **"eVo is easy to use even during machining that requires high accuracy and high speed. Its excellent accessibility due to the wide door opening also makes setup easier."** Factory Director Shigeki speaks about his hopes for the company's future from a management perspective, **"DMG MORI machines offer good space efficiency and can achieve extremely high productivity per unit area.** We would like to further increase production rates, and are aiming to hold a dominant position in the prototype manufacturing field."

Tomoei Seimitsu Co., Ltd.
2-2-11, Nakano-cho-higashi, Tondabayashi City, Osaka 584-0022
www.tomoeiseimitsu.co.jp

DMF Travelling column milling machines

5-axis machining on the DMF 260|7.

Linear drive in the X-axis for up to 80 m/min rapid traverse.

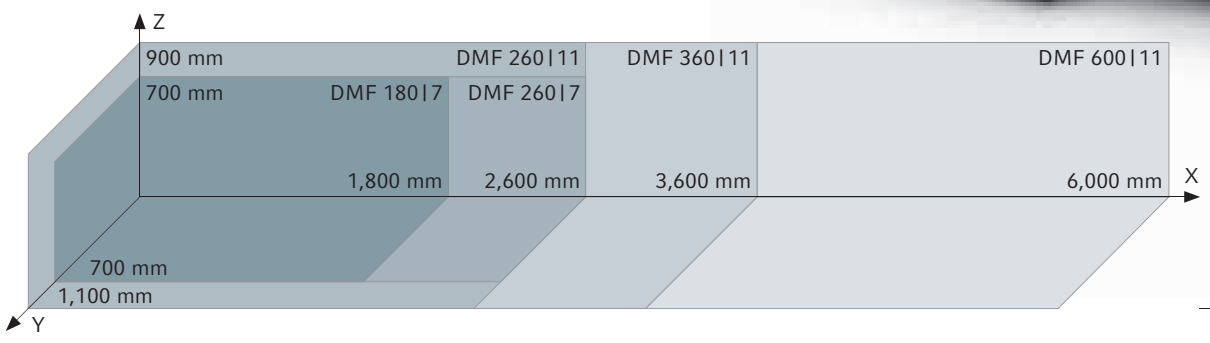


Integrated rotary table for 5-axis and mill-turn machining.

DMF series – B-axis now standard, more than € 30,000 price advantage.

+ Linear drive in the X-axis providing 80 m/min rapid traverse
+ Large single working area or working area partition for pendulum machining
+ 5-axis machining with B- / C-axis for mill-turn technology
+ X-axis traverse up to 6,000 mm, table load up to 10 t
+ Spindle speed up to 18,000 rpm or 10,000 rpm at 413 Nm and SK50 / HSK-A100

Travelling column milling machines in two sizes with 700 mm or 1,100 mm traverse in the Y-axis

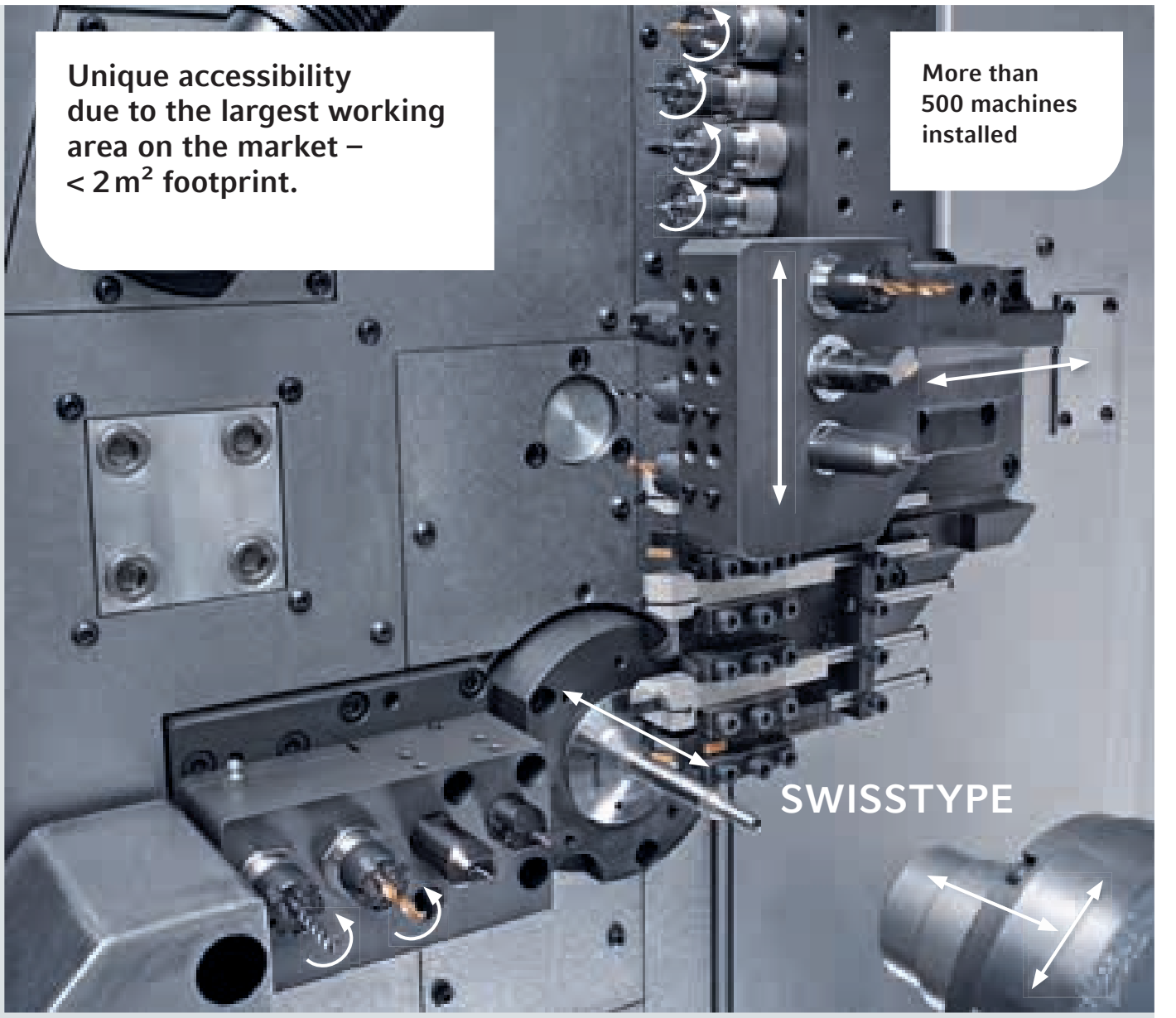


SPRINT Automated / production turning

SPRINT 20|5 – Parts up to ø 20 × 600 mm machined with maximum precision of < 5 µm – best in class.

+ **< 5 µm accuracy** due to exceptional rigidity and thermal stability
+ **Optimal chip removal** thanks to steep covers in the working area
+ 5 linear axes and 2* C-axes
+ 23 tools in 2 independent tool carriers; up to 6 driven tool positions
+ **SWISSTYPE*kit**** for short and long part turning on one machine, changeover time of less than 30 minutes
+ FANUC 32i-B with 10.4" colour display

* Optional



Working area with space for 23 tools in 2 independent tool carriers, including 4 driven tool positions for the main spindle and 2 optional driven tool positions for the counter spindle (including C-axis for the counter spindle).

Short delivery times starting at just 2 weeks!*

* Delivered ex works from Bergamo.

SWISSTYPE*kit*

ø 10 × 85 mm
Bone screw // Medical
Material: Titanium (Ti6Al4V)
Machining time: 240 sec.

ø 6 × 65 mm
Shaft // Automotive
Material: AISI 304
Machining time: 38 sec.

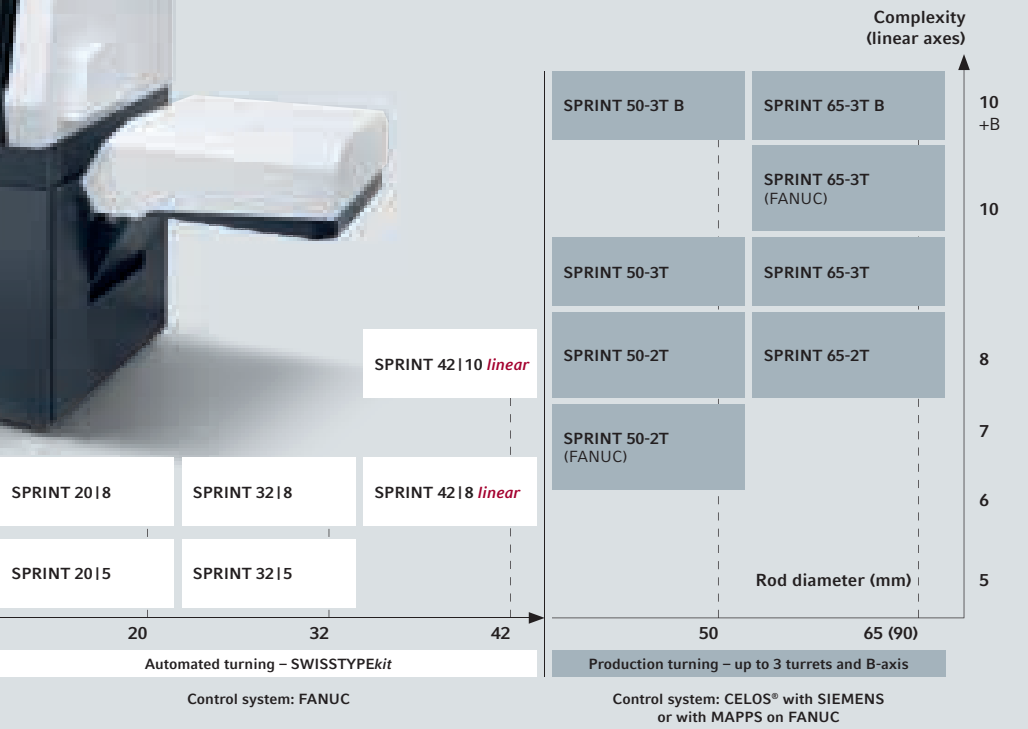
SHORT TURNING

ø 16 × 50 mm
Valve // Hydraulics
Material: Stainless steel (X8CrNiS18-9)
Machining time: 98 sec.

ø 19 × 42 mm
Disc // Engineering
Material: Ck45
Machining time: 78 sec.

SPRINT 20|5
< 2 m² footprint,
outstanding ratio of working area to footprint.

› SPRINT series now with 14 models.



View the video on "Local production in Italy"

Find out more about the SPRINT series at:
sprint.dmgmori.com

Download the product brochure for the SPRINT series:
download.dmgmori.com

LASERTEC 65 *3D* / 4300 *3D* – Full hybrid construction for efficient complete machining of challenging 3D components.

HIGHLIGHTS LASERTEC *3D*

+ Unique technology combination of laser deposition welding, milling / turning as well as ULTRASONIC grinding / milling
+ Powder nozzle allows unique material combinations and reduced material consumption
+ Cross-process software module

* only LASERTEC 65 *3D*

View the LASERTEC 65 *3D* video

Flexible HSK interface LASER + Mill + ULTRASONIC*

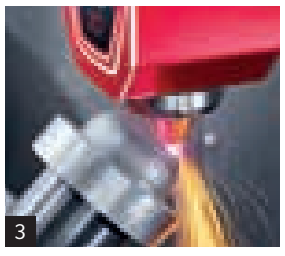
LASER + Turn & Mill

ALL-IN-ONE: THE PROCESS

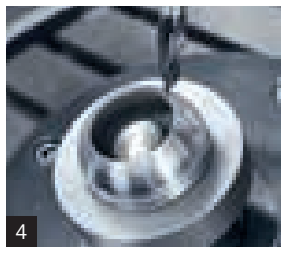
HYBRID CAD / CAM FOR ADDITIVE AND SUBTRACTIVE NC-PROGRAMMING

1 Generation of NC paths for laser machining and milling; output via post-processor; definition of program sequence.

2 3D simulation for collision avoidance, taking into consideration the integrated laser head.



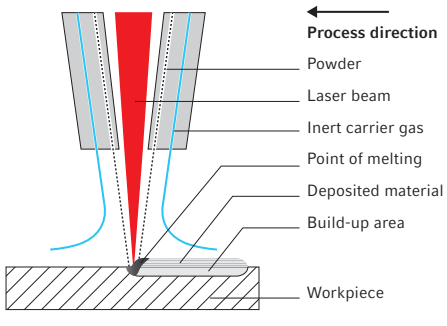
3 Laser deposition welding and milling combined on the LASERTEC 65 *3D* (flexible change possible).



4 Completed workpiece being inspected.

CAD / CAM HIGHLIGHTS

+ Fully integrated software solution for programming the additive and subtractive processes
+ Simulation of additive and subtractive NC paths
+ Pre-programmed strategies for accelerated programming
+ Combination of multiple structure strategies is possible



THE APPLICATIONS

MANUFACTURE OF *3D* COMPONENTS, COATINGS, REPAIRS

Oil & Gas

Base materials:
+ Oerlikon Metco INC 625
+ Oerlikon Metco INC 718

Coating materials:
+ Oerlikon Metco 60 % WC (Ni base)
+ UTP 40 % WC (Ni base)

Drill head

Die & Mould

Base materials:
+ UTP Ferro 44 (X20CrCoMo 15-15-3)
+ UTP Ferro 55 (X35CrMoMn 7-2-1)

Coating materials:
+ Sandvik M2 (S 6-5-2)

Aerospace

Base materials:
+ Oerlikon Metco 316 L (X2CrNiMo 17-13-2)
+ Oerlikon Metco INC 718

Coating materials:
+ Stellite 6

Reactive materials:
+ Titanium alloy (TiAl6V4)

Turbine housing

Engineering

Base materials:
+ Oerlikon Metco 316 L (X2CrNiMo 17-13-2)
+ Oerlikon Metco 316 L + Si
+ Oerlikon Metco INC 718

Coating materials:
+ Stellite 694
+ Stellite 21

LASERTEC SHAPE

Drill head
LASERTEC 65 *3D*

3 materials in sandwich construction:
Steel > Inconel > Tungsten carbide

Complete machining, including laser deposition, milling and ULTRASONIC grinding in one set-up.

YOUR CONTACT

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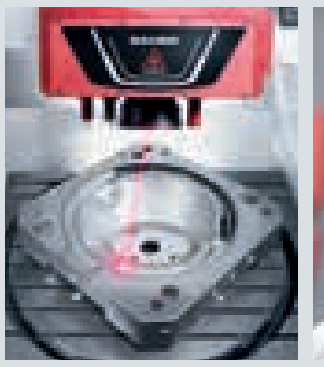
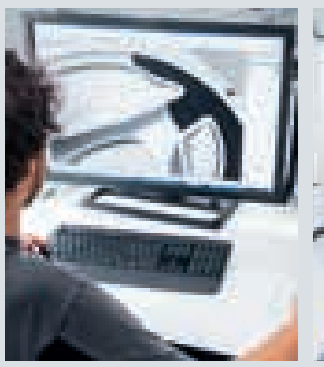
STANDEX ENGRAVING MOLD-TECH

"Highly dynamic, high repeatability laser texturing and paint removal using optimal laser focus."

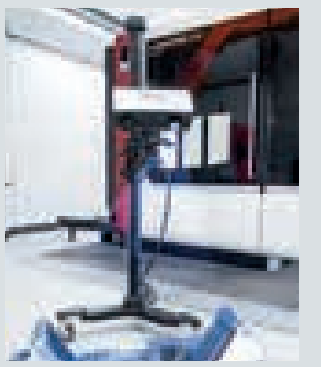


LASERTEC 65 Shape: 5-axis laser texturing / paint removal from a steering wheel mould.

Thorsten Miebach, Director Laser Technologies, at Standex in Krefeld.



Know-how of the holistic CAD/CAM process chain.



Measuring the mould geometry with a 3D scanner.

Since 1967 **Standex Engraving / MOLD-TECH** with its more than 1,000 employees is renowned for the development and manufacture of plastic products with high visual and tactile surface qualities as well as absence of warpage. "We are the only texturing company with a global network consisting of 35 subsidiaries", explains Thorsten Miebach, Director Laser Technologies. He manages the laser competence centre of the worldwide Centre for Coordination and Grain / Texture Development in Krefeld. Since 2013 the company has installed nine LASERTEC Shape machines in Germany, China and the USA. **"Above all, the Shape technology opens up creative possibilities in design and texturing and is often more economical than etching"** according to Thorsten Miebach. The high dynamics and precision of the DMG MORI machines is an important aspect too: **"At the time of acquisition of the first LASERTEC Shape, it was the only machine on the market, capable of texturing our dashboards with a laser with the required quality and within the specified time and with repeatable accuracy. As a result of our positive experience with this machine, our global capacity expanded continuously."** But Standex is more than just a structuring service provider. "We set very high standards for ourselves. We continuously develop individual and innovative solutions for our customers, that have an effect on the entire texturing industry sector." Investment in new, innovative technologies is part of the business. "For our operation in China we will acquire a LASERTEC 210 Shape to optimally serve the automotive industry in this important market."

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t.miebach@standex-gmbh.de
www.standex-gmbh.de

› MATERIAL KNOW-HOW

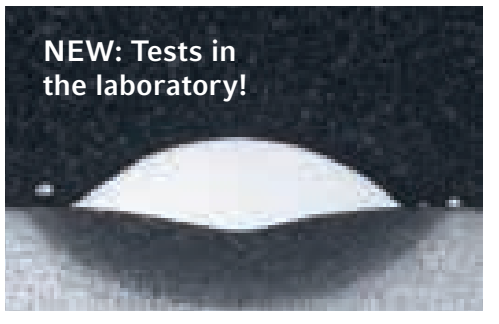
MATERIAL DATABASE / METALLURGY

Injection mould

Flange / piping

Additive Manufacturing material database for users

+ Development of process parameters for surfaces, webs, 3D objects
+ Evaluated database based on acceptance of components for material qualification
+ Customer-specific material development in four Additive Manufacturing technology centres worldwide



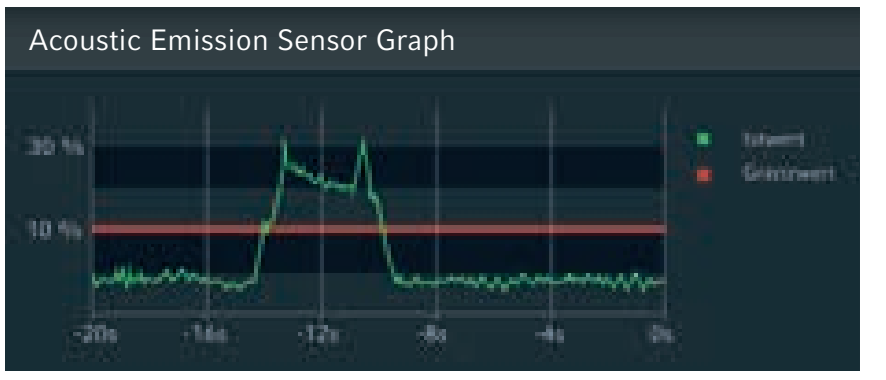
Continuous inspection of material characteristics

+ Inspection of the powder material
+ Density measurements, structural analysis
+ Mechanical test procedures (tension, pressure, bending)
+ Measurement: Surface quality, hardness, corrosion
+ Achievement of a metal density of > 99.8 %

TECHNOLOGY INTEGRATION GRINDING

Unique: MTG – Milling, turning, grinding in one set-up.

Dressing of the grinding wheel.



Measuring window integrated in the CELOS® display.

HIGHLIGHTS

+ **Best surface quality** (Ra < 0.3 µm) through integration of grinding technology
+ **Economic manufacturing** through elimination of repeated set-ups
+ **Grinding cycles for internal, external and face grinding**
+ **NEW: Integral sound sensor** to assist start-up and dressing

MTG PACKAGE CONSISTING OF

+ MTG spindle with integral sound sensor
+ Grinding and dressing cycles
+ MTG coolant system 1,300l
+ Extended machine protection

Available for the DMC FD duoBLOCK®

YOUR CONTACT

Thomas Lochbihler
thomas.lochbihler@dmgmori.com

Experience DMG MORI live!

NEXT EVENTS:

+ IMTS, Chicago / USA	12–17/09/2016
+ AMB, Stuttgart / DE	13–17/09/2016
+ Open House Ulyanovsk / RU	27–30/09/2016
+ MSV, Brno / CZ	03–07/10/2016
+ TOOLEX, Sosnowiec / PL	04–06/10/2016
+ BIMU, Milano / IT	04–08/10/2016
+ MAKTEK, Istanbul / TK	11–16/10/2016
+ Open House Seebach / DE	08–11/11/2016
+ Open House Hilden / DE	08–11/11/2016
+ PRODEX, Basel / CH	15–18/11/2016
+ JIMTOF, Tokyo / JP	17–22/11/2016

Experience
DMG MORI live!

events.dmgmori.com

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