DMG MORI magazine for customers around the world.

DMG MORI Software Solutions: 24 exclusive Technology Cycles and 10 new CELOS® APPs.

DMG MORI Manufacturing Service: CUSTOMER IS FIRST – We heard you! Our Promise is to deliver the highest quality service at reasonable prices.

CLX / CMX: The evolution of the ECOLINE - more options, technology and quality at reasonable prices.

Comprehensive technology solutions for the Automotive and Aerospace Industries.

DMG MORI

JOURNAL

Nº 2 – 2016

NEW

ONE STEP MANUFACTURING TECHNOLOGY

Milling, turning and grinding (MTG) – in a single setup.

For more, see page 28

DMG MORI Technology Cycles: Milling, turning and grinding.

Innovative technologies with unique Software Solutions.

24 exclusive DMG MORI Technology Cycles – Up to 60% faster programming with user friendly dialogue based input screens.

For more on this topic, see page 4

Dr. Ing. Masahiko Mori, President DMG MORI COMPANY LIMITED and Christian Thönes, Chairman of the Executive Board of DMG MORI AKTIENGESELLSCHAFT.

Integration, Innovation, Quality.

Dear Customers and Partners,

The goal of ˝**GLOBAL ONE**˝ is to combine DMG MORI COMPANY LIMITED and DMG MORI AKTIENGESELLSCHAFT into a globally integrated machine tool company. More than 12,000 employees in our production facilities around the world and our 164 international Technology Centres and service locations are currently working hard at making us **# 1 in the world for our customers**.

We guarantee you **stability and continuity** in our partnership with you, our customers and suppliers. Our goal is to refocus our efforts in new areas together with you: ˝**GLOBAL ONE**˝ stands for forward-looking innovations in machines, DMG MORI Components, Software Solutions; and Lifecycle Services. It stands for top quality, from production to customer-oriented total solutions; it also represents a new dimension in technologies and processes, for automation and digitization in the age of Industry 4.0.

Our objective is to promote the wide range of global skills and expand the regional strengths of our production facilities. The Pfronten and Seebach facilities are particularly good examples of this, as plants leading the way with the fascinating 5-axis complete machining. Meanwhile, the Bielefeld and Iga facilities will continue to collaborate closely on advancing the Universal Turning and Turn & Mill Technologies. The Bergamo facility will also be focusing on production and automated turning in the future. Additionally, we are relying on the strengths of our Excellence Centres in Nara for the Automotive Industry and in Pfronten for the Aerospace Industry.

Our status as an integrated machine tool manufacturer means that we will be continuing to **innovate** into the future in ways that will benefit you. Benefiting our customers is always a key priority for us. Above all, our goal is to listen to you and create solutions to meet your needs. In addition to machines and select DMG MORI Components, we will be placing integrated technologies and process solutions at the forefront.

Digitization is a key topic for us for the future. We are expanding our APP-based CELOS® control and operating software to a digitization platform. We have the technologies and products we need for Industry 4.0 and the necessary process know-how to go along with them. With CELOS®, we are already offering our customers the key to networked intelligent production. Select partners now have the new and easy option of integrating their own CELOS® APPs. The latest ULTRASONIC & LASERTEC Technologies already offer a wide variety of differentiated options today. We are focusing, in particular, on further enhancing Additive Manufacturing and metallic materials.

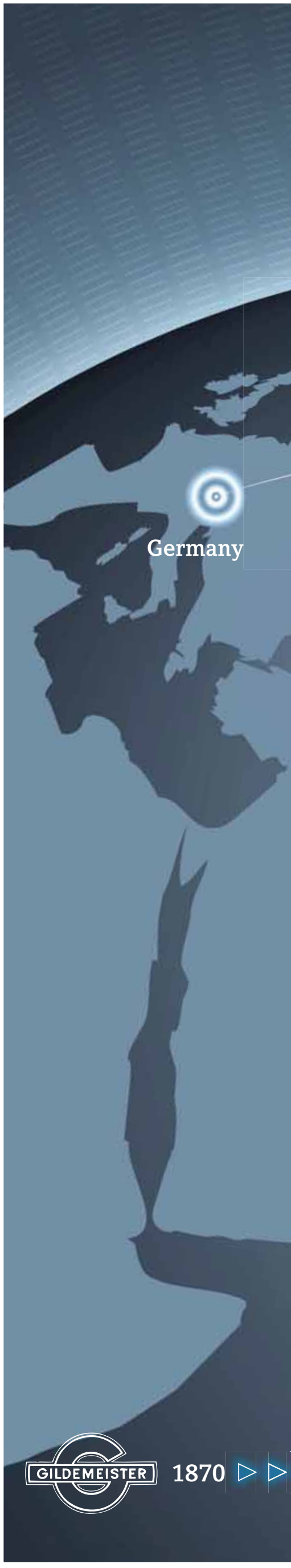
As for the area of **quality**, we will be continuing to advance our ˝Quality First˝ strategy. A consistent approach to quality is being implemented across the board in our globally integrated company. The evolution of the ECOLINE to the new CLX and CMX Series is an example of this. Designed as attractive, standard machines for the global market, this line places the entire bandwidth of technological performance, as well as DMG MORI's complete control and automation know-how at the disposal of the user. Improved quality and productivity – now NEW from HEIDENHAIN for the CMX V. We will never overlook you, our loyal customers!

We have completely reworked our service and spare parts prices. Our **Service Promises** are designed to meet your high demands for quality of service – and to do so at a best price guarantee. Put us to the test!

We are convinced that you, our customers, suppliers and business partners will benefit from our further consolidation into a ˝**GLOBAL ONE**˝ company. It is thanks to you that we have become what we are today. Together with you, we will shape the future. That's why we are asking you to get in touch with us! Your feedback is important!

Dr. Ing. Masahiko Mori,
President
DMG MORI COMPANY LIMITED

Christian Thönes,
Chairman of the Executive Board
DMG MORI AKTIENGESELLSCHAFT



GLOBAL ONE

"Our goal: to be #1 for our customers worldwide."

SOFTWARE SOLUTIONS

CELOS® – APP-based control and operating platform as an entry point into digitization. **Technology Cycles**: 60% faster programming with user friendly dialogue based input screens.

SERVICE AND SPARE PARTS

CUSTOMER IS FIRST – We heard you! Our Promise is to deliver the highest quality service at reasonable prices.

CLX / CMX

The evolution of the ECOLINE – more options, **technology and quality** at reasonable prices. NEW: now also with HEIDENHAIN.

AUTOMATION

New and innovative automation solutions like **Robo**2Go – no robotic expertise required, completely controlled by CELOS®.

TECHNOLOGY SOLUTIONS

Our Technology Centres – comprehensive technology and industrial sector skills, including Additive Manufacturing.

Japan

DMG MORI

2016
GLOBAL ONE – a globally integrated machine tool manufacturer

2013
Globally uniform branding

2011
First collaborative projects

2009
Start of cooperation

Over 200 years of experience in the machine tool industry.

1948 MORI SEIKI

24 exclusive DMG MORI Technology Cycles

Your support systems for efficient programming and the highest level of machine safety.

Up to 60% faster programming
of complex machining via automatic generation of DIN programming:

+ Easy input of settings in user friendly dialogue based input screens
+ No need for CAD / CAM systems, e.g., in the manufacturing of threading and gearing

› A few examples:

Interpolation Turning – Turn/Cut Cycle

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

"I can now do lathe machining and off-centre work, even though I don't have a lathe."

Multi-Threading Cycle 2.0

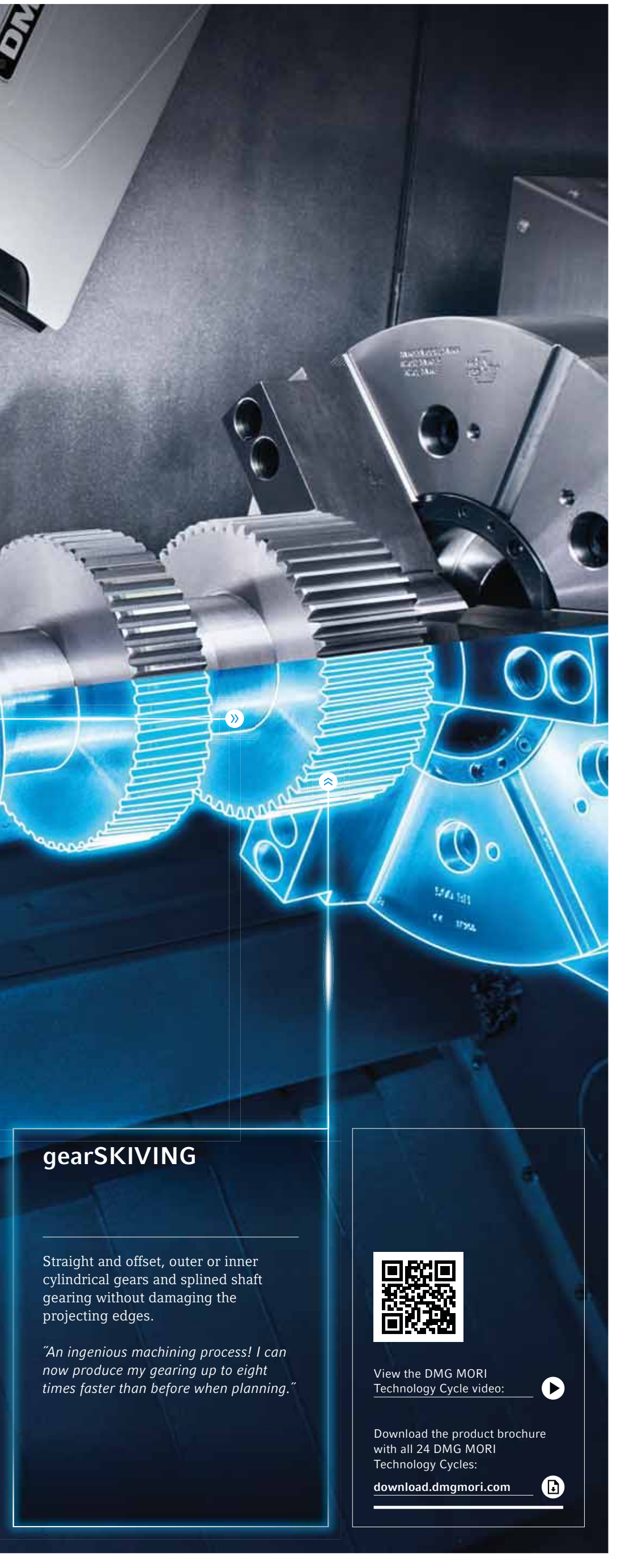
Positional thread machining with unlimited definition of contours, slopes and threads.

"I can create complex thread geometries right on the machine without the need for an expensive CAD / CAM system."

Off-Centre Turn & Mill Machining

Create off-centre turning and milling contours by superimposing additional X- and Y-travel options.

"Instead of having to use a complex CAD / CAM system, I now only have to enter a few settings."



gearSKIVING

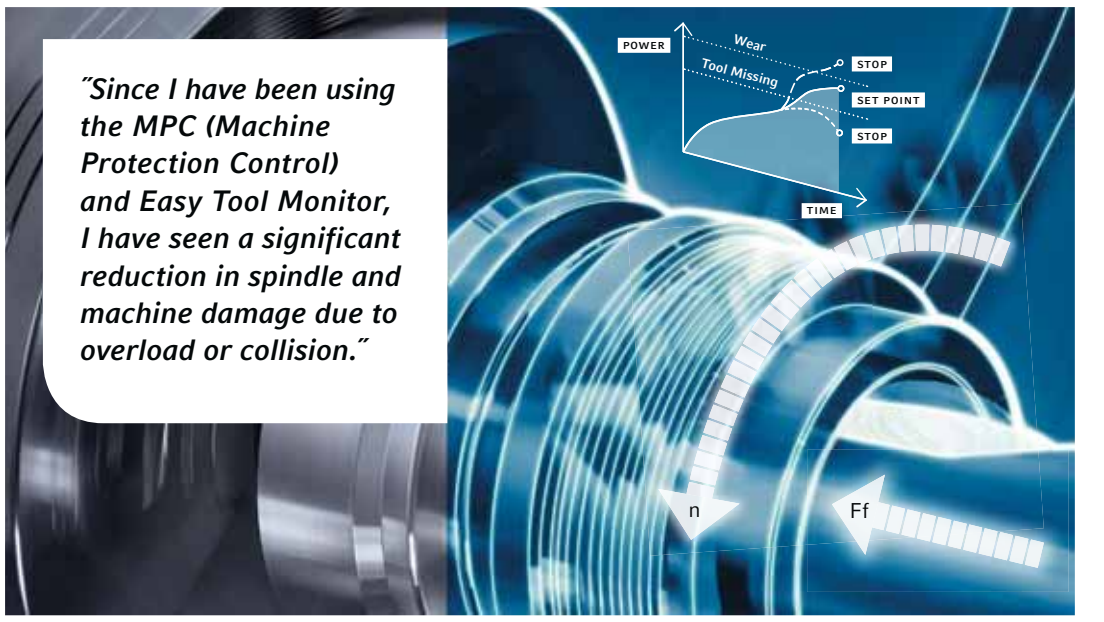
Straight and offset, outer or inner cylindrical gears and splined shaft gearing without damaging the projecting edges.

"An ingenious machining process! I can now produce my gearing up to eight times faster than before when planning."

View the DMG MORI Technology Cycle video:

Download the product brochure with all 24 DMG MORI Technology Cycles:

download.dmgmori.com



"Since I have been using the MPC (Machine Protection Control) and Easy Tool Monitor, I have seen a significant reduction in spindle and machine damage due to overload or collision."

Protection Package, including easy Tool Monitor 2.0 and Machine Protection Control (MPC).

OPTIMISED MACHINE PROTECTION

+ Vibration and feed monitoring with built-in quick shutoff (MPC - Machine Protection Control)
+ Automated load limit learning via innovative evaluation algorithms (Easy Tool Monitor 2.0)

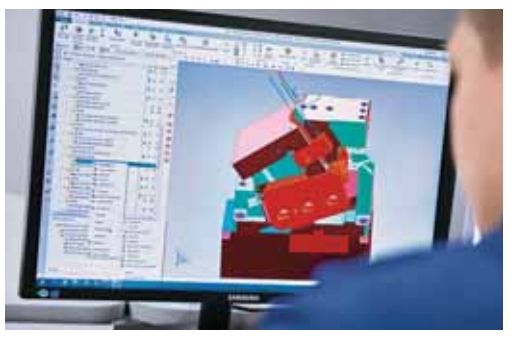
DMG MORI PROCESS CHAIN

NEW: Adaptive measurement module

VOESTALPINE GIESSEREI LINZ GMBH

"Thanks to the ability to automatically measure components and adjust milling settings, we now have zero error production."

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



Programming the measurement steps on the NX CAM to allow for automatic correction of milling parameters when machining on the DMC 80 U duoBLOCK®.

Founded in 1954, the foundry, **voestalpine Gießerei Linz GmbH,** has been developing and producing slide valves for punching and shaping machine tools for the automobile industry since the 1990's. Greater customer demands are requiring a higher degree of measurement accuracy in these slide valves. "**We have to meet these accuracy demands within shorter and shorter delivery schedules**," says Herwig Riess, Head of NEM Production. That was the impetus behind a collaborative effort between DMG MORI, JANUS Engineering AG and Renishaw to add an **Adaptive Measurement Module** to the **DMG MORI Process Chain**. The current parameter from the in-process measurement can now be fed **100% automatically** into special cycles **during 5-Axis Machining** on a DMC 80 U duoBLOCK® and adjusted **in real time. Accuracies of < 0.0002 in. can be achieved regardless of shape and positional tolerance fluctuations in the component**. The measurements for the slide valves are stored in the CAM programme and performed automatically between machining steps. According to Herwig Riess, "The system detects and compensates setup errors or kinematic inaccuracies completely autonomously." This removes the need for manual measurement procedures and eliminates tedious areas of quality control. "In short, we are achieving a reject quota of nearly zero percent."

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

voestalpine
ONE STEP AHEAD.

CELOS® – Your solution is with the Partner APP.

+ **Integration of your Software Solutions with the CELOS® Partner APP** including intuitive look and feel - tested and certified by DMG MORI
+ **Proven solutions perfectly integrated into CELOS®** ensure smooth procedures and functional interfaces
+ **Create your own APP in seven easy steps** We'll be glad to assist you!

"The CELOS® DEVELOPER allows us to offer our customers and business partners the simple option of developing their own CELOS® APPs."

Dr. Holger Rudzio
Managing Director, DMG MORI Software Solutions

2 New Partner APPs:

NEW

SURFACE ANALYZER

+ Machine integrated roughness measurement
+ In-process surface quality control
+ Certified for Medical and Aerospace applications

NEW

CLAMP CHECK

+ Increase machine safety by monitoring clamping forces
+ Wireless measurement, even during lathe machining

NEW

Now with 26 APPs – A total of 10 new APPs and 50 new functions.

For more on CELOS®, visit:
celos.dmgmori.com

Download the CELOS® brochure:
download.dmgmori.com

View the CELOS® video:

SENSING TECHNOLOGY

NEW

DMG MORI Condition Analyzer – 60 sensors on the machine that monitor status.

From **BIG DATA to SMART DATA** – Collect and analyze machine data with direct feedback to the customer for increased machine productivity.
> Analysis of one or more machines at multiple locations.

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

CONDITION ANALYZER

+ NC-programme optimization
+ Early detection of machine problems
+ Analysis of causes of damage
+ Data storage for long-term analysis

Sensor Pack i4.0

for improved **precision** and greater **process safety:**

TURNING*

+ **Advanced Sensor Control –** analyzes energy and air consumption, as well as monitors media
+ **Temperature Control –** misalignment compensation and precision truing
+ **Machine Protection Control (MPC) –** preventive protection via vibration sensing at the milling spindle
+ **Easy Tool Monitor 2.0 –** monitors tool breakage and wear

MILLING**

+ **Machine Protection Control (MPC) –** preventive protection via vibration sensing at the milling spindle
+ **Spindle Growth Sensor (SGS) –** sensor for detecting and compensating spindle displacement
+ **IKZ Flow Sensor –** IKZ flow monitoring to ensure the required level of cooling

* For all CTX beta and gamma TC machines with compactMASTER® turn/mill spindle.

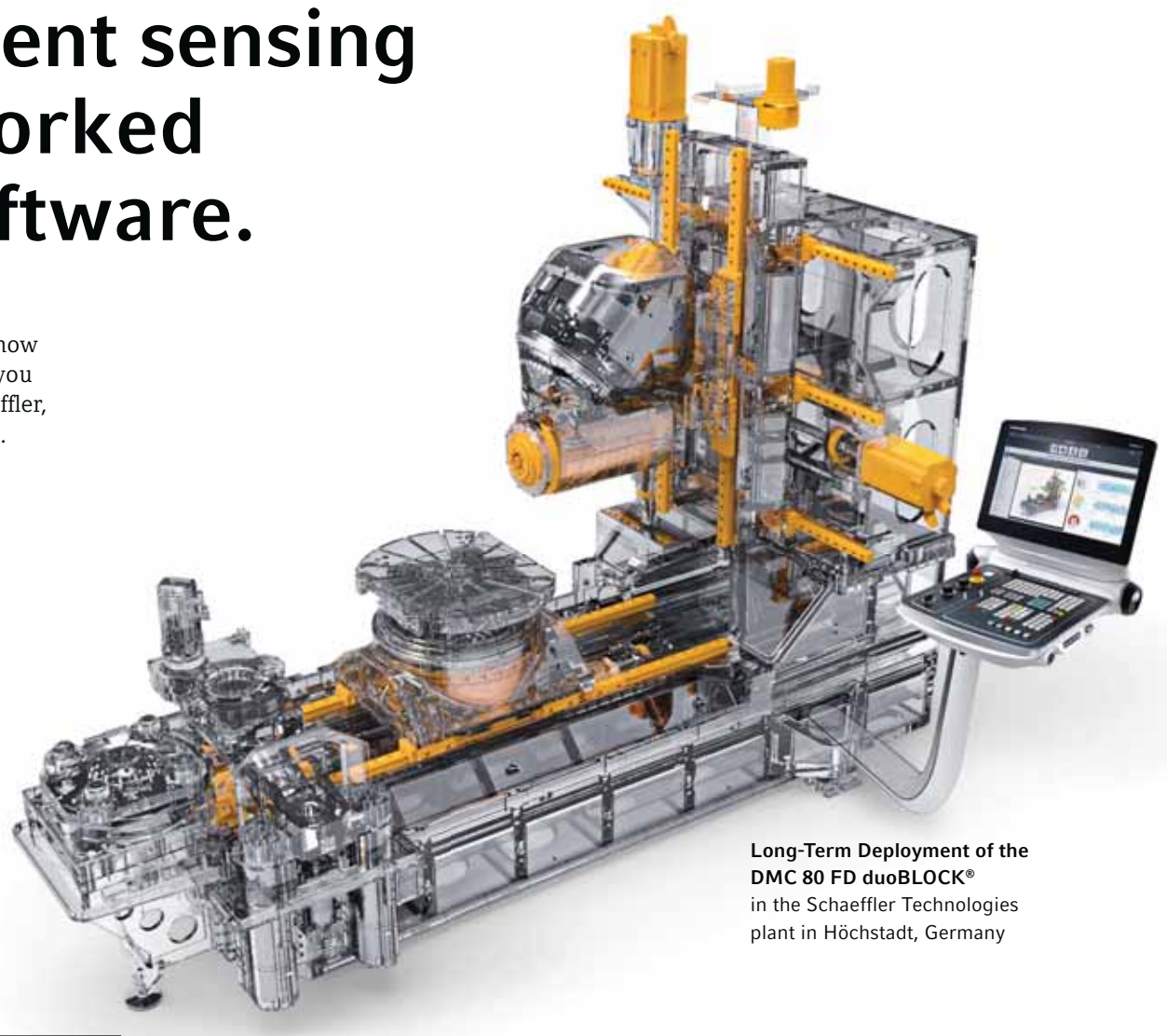
** For all monoBLOCK®, duoBLOCK® and portal machines equipped with IKZ 600 / 980 / 2500 l (580.2 / 1,160.3 psi.); Not for use with gear driven spindles.

Equipped with intelligent sensing technology and networked Industry 4.0 ready software.

Passion 4.0 Machine Tools: From mechatronic bearing systems and ˝know-how in the roller bearing domain,˝ to digitized solutions in Machine Tool 4.0., you benefit from the new possibilities for digitizing with microservices from Schaeffler, such as automated roller bearing diagnostics and remaining life calculations.

YRTMA Rotary Table Bearing
with an integrated angle measurement system.

RUE 4.0 Linear Roller Bearing
with piezoelectric acceleration pickups.



Long-Term Deployment of the DMC 80 FD duoBLOCK®
in the Schaeffler Technologies plant in Höchstadt, Germany

> Forward-looking service via monitoring of **force, vibration, temperature and lubrication.**

Dr. Stefan Spindler
Industry Chairman, Schaeffler AG

˝Together with DMG MORI we will further develop our digitalized 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 digitalized 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 point into the world of digitization.

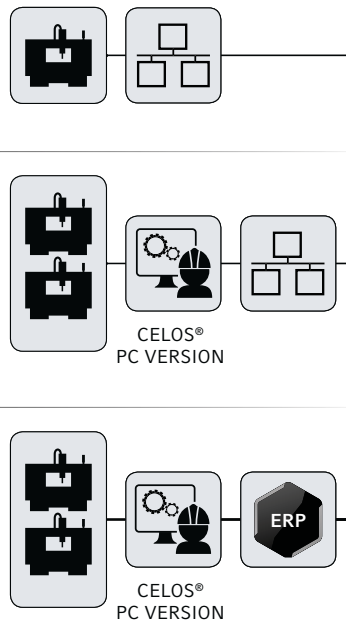
˝Let us show you solutions for achieving digital transformation and meeting the challenges that we are all facing with Industry 4.0. With its APP functionality, CELOS® is already revolutionizing paperless interaction between humans and machines.˝

3 STEPS TO DIGITIZATION

1 **Easily connect a machine to the corporate network –**
Direct access to job data on the machine.

2 **Network multiple machines using the CELOS® PC Version –**
Directly transmit all the relevant job data to a given machine during the job setup, including synchronization of machine use.

3 **Use the CELOS® PC Version to connect to an existing ERP System (e.g. SAP) or web application –**
Automatic control of the production sequence directly from the existing plant.



OUR SOFTWARE SOLUTIONS FOR ALL STAGES OF DIGITIZATION

› JOB

+ Customer supplies CAD data or workpiece schematics
+ Job is created in the Job Manager > process planning

JOB MANAGEMENT

JOB MANAGER

CAD / CAM VIEWER

Andreas Böttcher (left), Senior Manager for Production and Special Tools at Oerlikon Barmag and skilled technician, Bahtiyar Ayar (right) have both been won over by CELOS®.

OERLIKON BARMAG

˝CELOS® links intelligently and completely with the ERP.˝

The company **Oerlikon Textile GmbH & Co. KG** in Remscheid, with its brand **Oerlikon Barmag,** is part of the Swiss corporation OC Oerlikon. Among other things, this group of companies is a **world leader in the field of fiber spinning systems** for industrial threads, fibers and non-woven materials. Remscheider's core competencies also include the **manufacturing of safety-related know-how elements**. An outstanding example of this is its **high-speed spools** designed for winding fibers at up to 314,960.6 ipm. All in all, the high-tech production facility in Remscheid comprises of **around 120 machine tools**. These also include several mill/turn and turn/mill machines from DMG MORI. Its latest investment, a **CTX beta 800 TC with CELOS®**, is an especially important element.

As part of a forward-looking pilot project, the Turn & Mill machine has been connected **with the ERP system** in such a way that **jobs, complete with their NC-programme and machine tool data, can now be transmitted, managed, processed and fed back with status information to the ERP from the management level in CELOS®** using a special middleware. This pilot project is part of a **corporate-wide comprehensive initiative**, as explained by Andreas Böttcher, Senior Manager for Production and Special Tools. He explains that the **patency and transparency of the data flow across the entire value creation chain** is at the heart of the effort, with the goal of perfecting **internal procedures and processes that result from it as sustainably and uniformly as possible**. According to Böttcher, the third most important aspect is seamless **traceability of components throughout the process documentation**. He draws our attention in this regard to the labeling station next to the **CTX beta 800 TC**, which gives every individual part a **unique identifying OCR code**.

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

Experience Industry 4.0 LIVE: CELOS® Experience Centre with > 21,527.8 ft² of floor space with GILDEMEISTER lathes in Bielefeld.

› PROCESS PLANNING / PREPARATION

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

CAD/CAM SIMULATION

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

CELOS® PC VERSION

JOB MANAGER

JOB SCHEDULER

TECH CALCULATOR

DOCUMENTS

› MACHINING

CELOS® APPs for tooling and processing jobs with live machine monitoring.

MACHINES

JOB ASSISTANT

TOOL HANDLING

SERVICE AGENT

MESSENGER

Kevin Kucala (left) and Boris Soldo (right) working on the CTX gamma 2000 TC.

Boris Soldo President of Solmac, holding a complex part machined in one chucking.

OD helical gear part with 60deg helix.

SOLMAC, INC.

"It was DMG MORI technology that justified a major investment. The CTX gamma gave us a huge advantage."

Purchasing the CTX gamma 2000 TC has transformed Solmac, Inc, a precision machine shop in Williamsville, NY, from a maker of simple components into a manufacturer of highly complex parts. It has also opened doors to new markets, including **Aerospace, Petroleum, Automotive and Renewable Energy** – to name a few.

When they purchased the CTX gamma 2000 TC in 2012, Solmac, Inc. President, Boris Soldo, expected it to transform his company. "**We wanted to do things more efficiently**," Soldo explains. The CTX gamma 2000 TC delivered big-time by cutting three to four setups down to one or two, and making five-sided and eight-sided machining possible. It could also machine parts in one chucking. "You're not going to do better," he confirms.

"By purchasing the CTX gamma, my goal was to offer our customers machining services on highly complex parts as well as price reduction on simpler parts that needed multiple setups before. The time saved on material handling alone justified the investment and allowed us to stay competitive and offer the latest technology to our customers," Soldo explains.

Solmac, Inc. became a more advanced and efficient shop. It was manufacturing large complex components, which helped differentiate them from the marketplace. "Not too many shops our size invest in this type of equipment", says Soldo. "**The bottom line is that the CTX gamma 2000 TC has delivered on the toughest applications, and certainly justified the investment**". Without it, Soldo explained that he wouldn't even try to manufacture many of the parts that come his way daily. "One thing I know for sure," he concludes, "I can manufacture them with this machine." It's the CTX gamma 2000 TC that he can trust to get the job done.

Solmac, Inc.
1975 Wehrle Dr, Williamsville, NY 14221
www.solmac.com

CUSTOMER FIRST – Our Service Promises!

"We have heard you! Our Service Promises have been adjusted to meet the high demands you have for top quality service at reasonable prices. Put us to the test!"

Marco Fernandes
National Service Manager
DMG MORI Canada

1

YOUR DMG MORI SERVICE EXPERTS – WE'VE GOT YOU COVERED!

2

SPINDLE SERVICE - DIRECT FROM THE MANUFACTURER

REPLACEMENT PARTS

DMG MORI SPARE PARTS

HIGHLIGHTS

+ Global logistics network for fast worldwide delivery
+ Over $226 million worth of inventory in stock
+ More than 275,000 unique spare parts in stock
+ Original spare parts direct from the manufacturer
+ Spare parts availability for many early models (machine model year 1970 or later)
+ Global ordering via our 24/7 Service Hotline
+ New parts and replacement parts available

LOCAL SERVICE SUPPORT

Our Service Commitment.

+ Over 36 Service, Application, and Spare Parts employees nationwide for immediate support.
+ 2 year warranty on labor and spare parts for new machine purchase
+ Over $140 million in spare parts stock

24/7 SERVICE HOTLINE
DMG MORI

DMG MORI 24/7 Service Hotline – support around the clock!

(905) 795-2891

Top manufacturer support – DMG MORI Spindle Service!

SPINDLE REPAIR

Expert repair service.

+ 6-month warranty*
+ Includes turning mechanism replacement
+ Includes replacement of stator and rotor if faulty
+ Expert removal and installation of your spindles by experienced DMG MORI service technicians

SPINDLE REPLACEMENT SERVICE

The choice is yours: Fully rebuilt replacement spindle or new spindle for immediate use.

+ 6-month warranty*
+ Includes replacing the turning mechanism
+ Quick delivery times for minimal downtime
+ Expert replacement of damaged spindles by experienced DMG MORI service technicians

**1-year warranty on new spindles or running hours limitation*

3

SERVICE PLUS

4

PREVENTIVE SERVICE

SERVICE

Reduced operating costs, highest machine availability, and superior precision over the entire service life of your machine – DMG MORI Service *Plus*!

MAINTENANCE *PLUS*

Manufacturer's maintenance for highest possible availability.

+ Replacement / installation of required consumable parts at a discounted rate
+ 10% discount on spare parts that are quoted as a result of maintenance inspection
+ Scale of maintenance adapted corresponding to machine run time
+ Maintenance period: 3 years (new machine) or 2 years (in-stock machine)

SERVICE COMPETENCE *PLUS*

Become a service expert with our support

+ Replace your most important consumable parts using maintenance kits perfectly customized to each machine type
+ Comprehensive training in 2000-hour maintenance
+ Handover and training in the use of iKey (Inspection Key)

MAINTENANCE KITS –

Affordable original replacement parts, in a full package

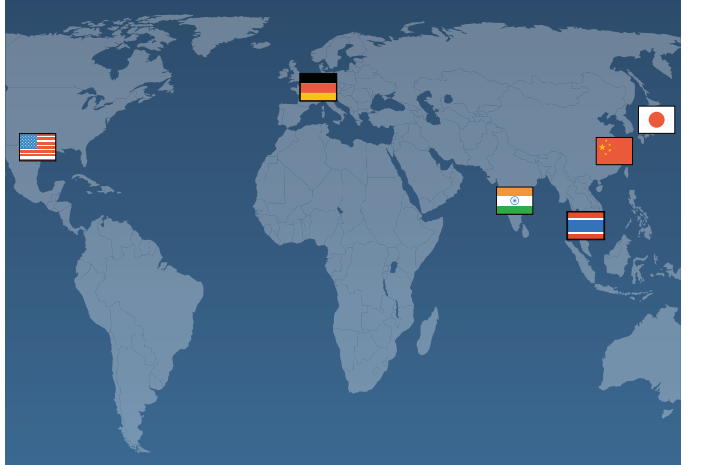
+ Affordable original replacement parts, in a full package
+ Safe DIY maintenance. Put together by our experts, perfectly customized for individual machine types
+ Your advantage – everything in one package, at a reduced price

HIGHLIGHTS

+ More than 200 different maintenance kits available, all perfectly customized 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

Spare parts service – The highest availability, due to our global presence.

We take action fast: All orders are processed centrally and spare parts are shipped from the nearest Spare Parts Centre. We use the global network of all DMG MORI warehouses – for the shortest delivery times.

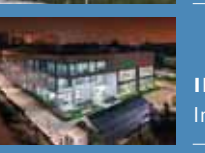


6 LARGE SPARE PARTS WAREHOUSES –
FOR TOP SPARE PARTS SERVICE

USA
American Parts Centre, Dallas

GERMANY
Global Parts Centre, Geretsried

JAPAN
Global Parts Centre, Nara



INDIA
India Parts Centre, Chennai

THAILAND
Thailand Parts Centre, Ayutthaya

CHINA
China Parts Centre, Shanghai

Evolution of the ECOLINE to CLX / CMX.

C =
COMPACT,
COMPETITIVE,
CUSTOMISED

NEW STANDARD MACHINE STRATEGY

+ CLX – Universal Lathes
+ CMX V – Vertical Machining Centres
+ CMX U – Universal Milling Machines

WHY THE NEW APPROACH?

⊕ **More technologies and solutions!**

3D-CONTROLS:
SIEMENS, HEIDENHAIN, FANUC, MITSUBISHI

SOFTWARE SOLUTIONS:
Technology Cycles

CUSTOMER-SPECIFIC MODIFICATIONS:
Wide variety of options

⊕ **Top quality and excellent prices!**

HOW WILL OUR CUSTOMERS BENEFIT FROM OUR NEW APPROACH?

+ Entire range of Technology Solutions from DMG MORI
+ Automation options

HOW WILL IT AFFECT OUR EXISTING CUSTOMERS?

+ Same service and replacement parts availability for ECOLINE machines

19″ DMG MORI SLIM*line*® Multi-Touch Control
with Operate on SIEMENS

2016 DELIVERY – ECOLINE IN-STOCK MACHINES

Fast delivery:

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

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

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

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

The new standard: machines from DMG MORI with more technology.

OPTION // Y-axis with 2.4 in. travel for milling machining on lathes

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

SOFTWARE SOLUTIONS // exclusive DMG MORI Technology Cycles: 3D-quickSET®

19″ DMG MORI SLIM*line*® Multi-Touch Control with Operate on SIEMENS

19″ DMG MORI SLIM*line*® Multi-Touch Control with Operate on SIEMENS

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

+ Maximum rigidity thanks to cast iron, C-frame construction and patented NC-swivelling rotary table
+ Heavy-duty 12,000 rpm. milling spindle for top machining performance
+ Fast loading tool magazine with 30 slots standard, including two-grip design for rapid tool changes
+ Greater productivity and efficiency with dynamic drives – up to 20% less idle time and 1,181.1 ipm. rapid traverse in all axes
+ 3D-controller technology:
  – 19″ DMG MORI SLIM*line*® Multi-Touch control with Operate on SIEMENS
  – 15″ DMG MORI SLIM*line*® with HEIDENHAIN TNC 620

NEW CMX V – NOW AVAILABLE WITH HEIDENHAIN CONTROL

For more on the CMX V Series, visit:

cmx-v.dmgmori.com

DMG MORI SYSTEMS

ZAHORANSKY AG

˝Thanks to our new manufacturing cell consisting of three 5-axis machining centres with a total of 580 machine tools and 112 pallet slots, we can now produce over 4,000 different workpieces automatically and with a high degree of flexibility.˝

Flexible manufacturing cell with two DMU 60 eVo units, one DMU 70 eVo, one 7-axis CAD / CAM coupled robot and the master computer for controlling the machine, tool demand and job prioritization.

Since the beginning of the 20th Century, ZAHORANSKY AG has been a leader in automated brush production. With approximately 300 employees at the corporate headquarters in Todtnau-Geschwend, they are dedicated to the development and manufacturing of special machines that produce twisted brushes, household brushes, technical brushes, toothbrushes and their packaging. **The order of the day at ZAHORANSKY AG is small lot sizes and single item productions of machine components. ˝That requires a high degree of flexibility right at the machining level,˝** says Lothar Wagner, Head of Production for ZAHORANSKY AG. **The first effort at achieving this flexibility occurred in 2015 in the form of a manufacturing cell from DMG MORI Systems.** As part of this turnkey project, **the automation experts at DMG MORI** interconnected three 5-axis machining centres, **two newly installed DMU 60 eVo units and one DMU 70 eVo dating from 2007 with each other via a robot**. ˝This was done practically in the middle of ongoing production,˝ recalls Lothar Wagner, **˝We were even able to continue production during the installation phase.˝** For ZAHORANSKY, automation with regard to the **great demands and flexibility of the workpieces being produced is a very customized solution.** The component spectrum to date includes more than 4,000 workpieces of different sizes made of aluminum, steel and stainless steel. **This requires a large number of tool and pallet slots.** In addition to the 120 or 210 tool slots in the machines, **the robot cell also has slots for another 130 tools that can be changed into each of the machines automatically.** This same flexibility was applied to the pallets, Lothar Wagner explains, **˝DMG MORI Systems setup 112 shelf slots here.** They are able to cover all the components using only six standard clamping systems, so all of the pallets fit into each machining centre.˝ Thanks to the six loading stations, idle times due to tool loading have been reduced to a minimum. **˝We now have enough of a buffer that employees can inspect and load with no wait times.˝** ZAHORANSKY operates in two shifts, but the production cell is equipped so that it can also run automatically overnight and into the weekend. The head of production also adds, **˝We are shooting for 6,000 operational hours per year, per machining centre.˝**

ZAHORANSKY
PERFECTLY DIFFERENT

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

WADA MACHINE MANUFACTURING CO., LTD.

˝The NHX 4000 equipped with the RPP system is the ideal solution for unmanned production of many components with low piece counts.˝

Components with diameters up to 24.8 in., e.g., for an MRI or CT machine, are machined on the NHX 4000.

CEO Shuhei Wada has been completely won over by the fast service and high precision of DMG MORI machines.

After its move to the Numazu Iron Industrial Park in 1973, **WADA Machine Manufacturing Co., Ltd.,** founded in 1957, began specializing in the field of Medical Technology. Since then, the company has been machining precision parts for the latest medical devices of a major medical device producer. **˝One customer praised us several times for always meeting our deadlines while delivering very high quality,˝** recalls President Yoshihisa Wada, looking back on the company's history. **Modern medical devices such as MRIs and CTs require a high degree of flexibility regarding number and variety of pieces, all with maximum precision.** "We were the first in Japan to use an NHX 4000 with 5-slot rotating pallet positioner (RPP).˝ **A traditional pallet pool system requires twice as much space as one machine. Thanks to the RPP incorporated in the NHX 4000, this space requirement has been cut in half. ˝A critical factor in our decision to purchase the machine was the possibility of leaving the machine to run unmanned overnight; the extremely long service life, stability and precision of the DMG MORI machines and the fast service,˝** explains CEO Shuhei Wada. ˝We used to run production on multiple machines with different processes in order to reach the desired number of pieces. Thanks to the **NHX 4000 with its integrated 5-RPP system for unmanned production, we only need one machine now**. We are now able to react to urgent machining requests by holding one of the five pallets in reserve for emergencies.˝

WADA
WADA Machine Manufacturing

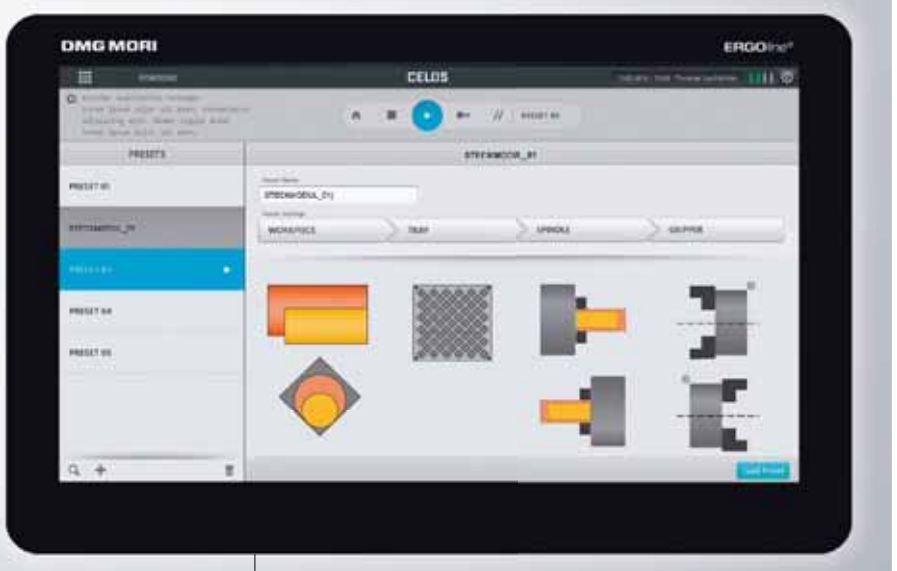
WADA Machine Manufacturing Co., Ltd.
Numazu Iron Industrial Park
294-26, Ashitaka, Numazu City, Shizuoka 410-0001
www.wada-machine.co.jp

NEW: Robo2Go – That‘s how easy automation can be!

For more information
about our offerings, visit:
systems@dmgmori.com

AUTOMATE WITH EASE

+ **Available for all DMG MORI universal lathes with CELOS®**
+ **Free access for greater user experience**
+ **No robotic expertise required, completely controlled by CELOS®**
+ **Adaptable for use on many different machines**
+ **Implementation and changing for workpiece storage using an elevated forklift**
+ **Three variants:** Load-bearing capacity: 22.0 lbs., 44.1 lbs. or 77.2 lbs.



CELOS® control –
no robotic expertise required!

Safety Zone –
Laser scanner monitors the safety zone and performs immediate safety shutdown when someone enters the area. Modern work environment without a safety fence for maximum user experience.

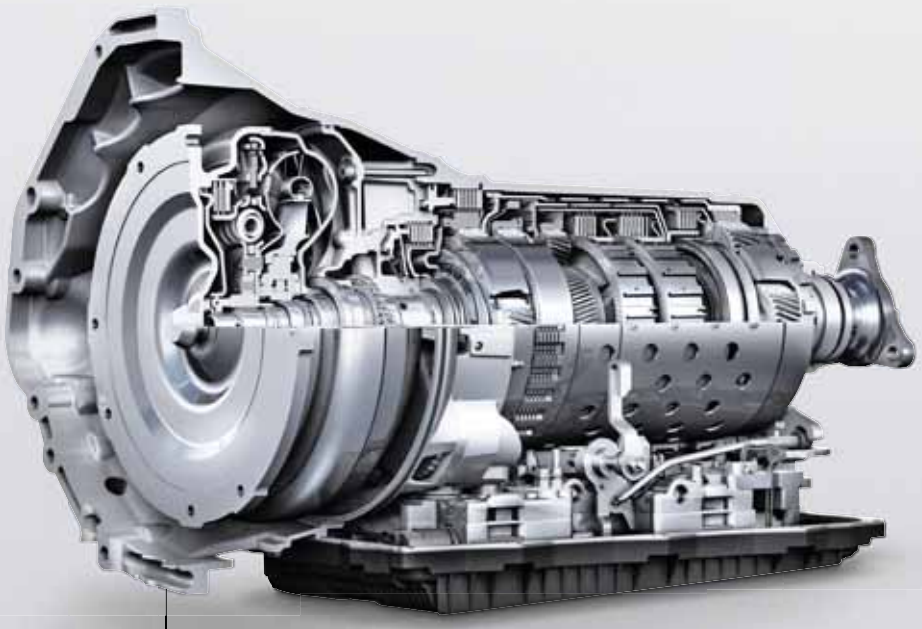
Watch Videos
on the ″**Robo**2Go″

More DMG MORI Systems
can be found at:
systems.dmgmori.com

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

DMG MORI – Total supplier for machines, technologies and processes.

+ **More than 1,500 DMG MORI machines are delivered annually for the Automotive Industry**
+ **Global competence partner** for superior support, superior availability and end-to-end turnkey projects
+ Intelligent monitoring functions **for maximum process safety**
+ **All-inclusive system modules** for unique manufacturing solutions



1

25.6 × 14.0 × 15.4 in.
ZF 8HP Gear Housing
Material: Aluminum

2

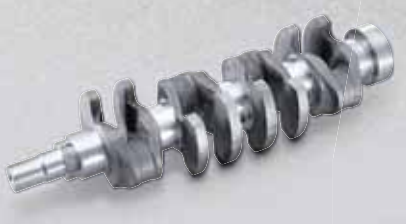
19.7 × 11.8 × 9.8 in.
Crankcase / Automotive
Material: Aluminum

3

16.1 × 7.1 × 4.7 in.
Cylinder Head
Material: Aluminum

4

13.8 × 16.1 × 9.1 in
Cylinder Block
Material: Aluminum



5

ø 5.9 × 22.0 in.
Crankshaft
Material: GG20

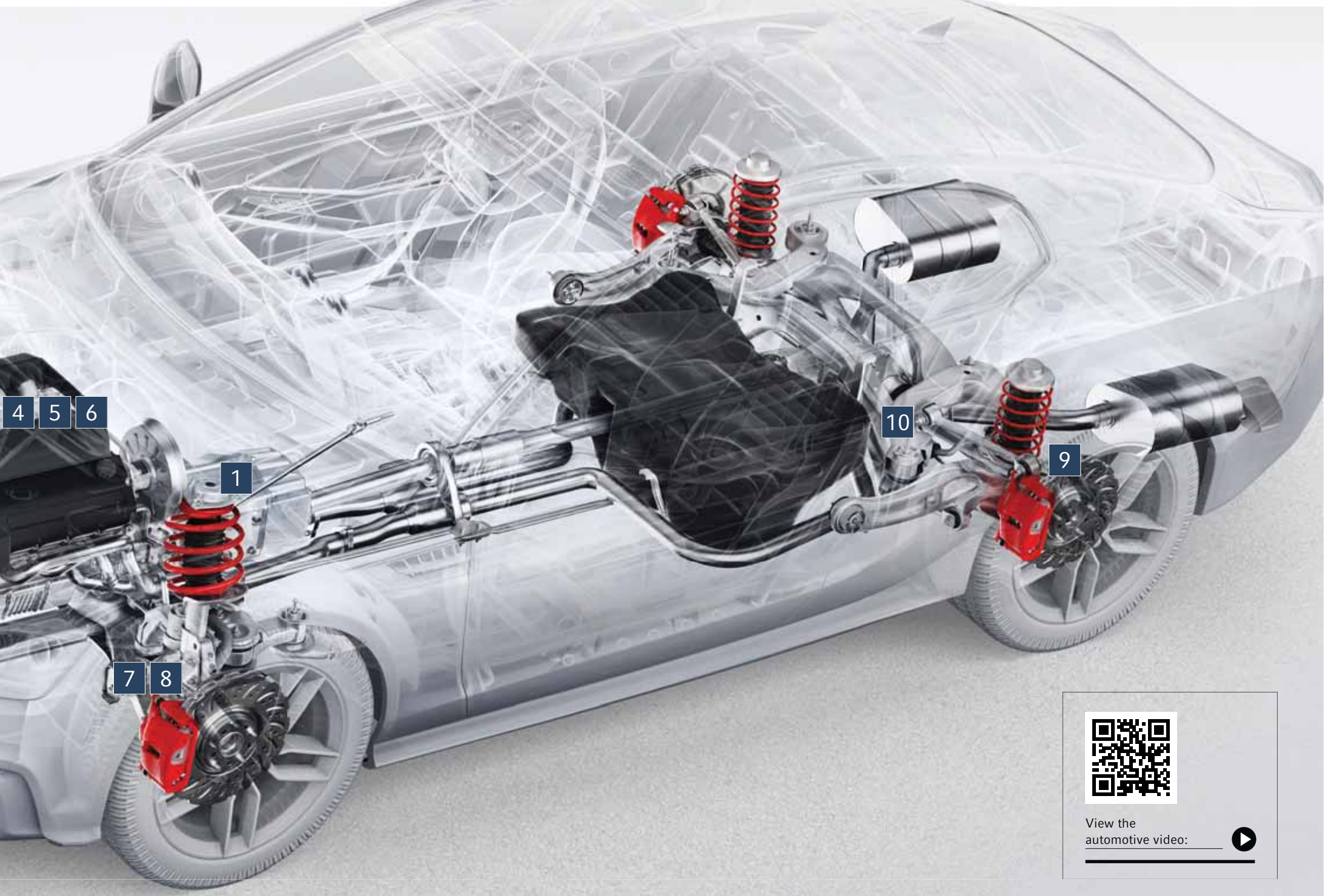
DMC H *linear* – highly dynamic 1 g linear drives with long-term precision.

+ **Linear drives for all axes with up to 3,937.0 ipm. rapid traverse, 1 g acceleration and 2.5 second chip-to-chip time**
+ **Maximum precision, e.g., up to 0.0002 in. of roundness**
+ NC-rotary table or swivelling rotary table for 5-axis simultaneous machining
+ **Machine requires 185.1 ft.² of space, including pallet changer and chip conveyor**

iSeries – high productivity design for series production of 4-cylinder engines.

+ **Patented Z-axis spindle kinematics:** maximum stability thanks to two guides arranged at angles
+ **Low mass movement due to X / Y / Z spindle travel:** highly dynamic machine for short chip-to-chip times; optimal chip fall path through the machine bed
+ **Occupies only 72.1 ft.² of installation space**

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



View the automotive video:

6

ø 1.6 × 18.5 in.
Camshaft
Material: GG25

7

ø 0.7 in. Ball Diameter
AC Ball Hub
Material: 20MnCr5

8

ø 0.7 in. Ball Diameter
VL Steering Knuckle
Material: CF53

9

ø 4.7 × 3.1 in.
Wheel Hub
Material: S53C (JIS)

10

ø 2.4 × 3.9 in.
Connector
Material: Heat-Treated Steel Alloy

+ **Space-saving design** for production lines with short travel and optimised spindle performance
+ **Thermo symmetric arrangement** in relation to the spindle centre for maximum machining precision
+ **Optimum accessibility** for workpieces and tools
+ **Vertical basic setup** for optimum chip fall

CTV 250 DF – vertical Turn & Mill Centre for machining constant velocity joints.

+ **Maximum dynamics** thanks to turn & mill (TM) oscillating link as direct drive with speed of 90 rpm., range: +105 / –45 °
+ TM oscillating link for up to two milling spindles at 6,000 rpm., 19.4 hp. and 33.9 ft./lbs. (Default: one milling spindle)
+ **Additional Capto C5 Holder** for multi-tool with up to four cutting edges

NRX – highly productive dual spindle turning centre for series production.

+ Max. turning diameter of ø 7.1 / 5.9 in. (turn/mill specification), chuck size up to max. ø 7.9 in.
+ **Maximum productivity** thanks to world's fastest tool loading (5.6 sec.)
+ **Parallel loading** of one spindle while the other is machining
+ Two 8x (optional 10*) revolvers for optimum chip fall
+ **Excellent accessibility** for chucks, tools and transfer system

* MC Model: Standard

STRUCTURAL COMPONENTS

6 7

UNDERCARRIAGE COMPONENTS

4 5

DMG MORI – Your expert partner for the Aerospace Industry.

AEROSPACE EXCELLENCE CENTRE IN PFRONTEN

+ **Perfectly harmonized interaction** between machine, tool and machining strategy
+ **Branch know-how** from technical consulting to delivery of customer-specific total solutions

Typical Aerospace Components

Turbine Components

1

ø 37.4 × 15.7 in.
Fan Blade
DMC FD duoBLOCK® Series
Material: Titanium 6-4

High precision complete machining using milling and turning on one machine in four setups.

2

ø 17.7 × 4.7 in.
Blisk
DMU monoBLOCK® Series
Material: Titanium 17

Dynamic 5-axis simultaneous milling of blade profiles with swiveling table and direct drives in the A- and C-axes.

3

ø 59.1 × 29.5 in.
Manifold
DMU Portal FD Series
Material: Titanium 6-4

5-axis simultaneous machining of manifold for aviation turbine using milling and turning.

Undercarriage Components

4

ø 11.8 × 11.8 in.
Undercarriage Component
NLX Series
Material: Steel

Heavy-duty chip removal using flat guides with optimum damping characteristics; milling using 73.8 ft./lbs. BMT® Revolver.

5

ø 5.1 × 11.4 in.
Undercarriage Cylinder
NTX Series
Material: Steel

5-axis simultaneous machining; parallel machining with lower BMT® Revolver as second tool holder.

TURBINE COMPONENTS

1 2 3

AEROSPACE EXCELLENCE CENTRE AT DECKEL MAHO PFRONTEN, GERMANY

+ Over 20 years of expertise in the Aerospace Industry
+ Comprehensive Technology Solutions all the way up to multi-machine turnkey process development: machine layout, tools, chuck systems, programming
+ Forward-looking and innovative advanced development of processes and machines e.g., Additive Manufacturing

View the Aerospace Video:

Download the Aerospace Brochure at:
download.dmgmori.com

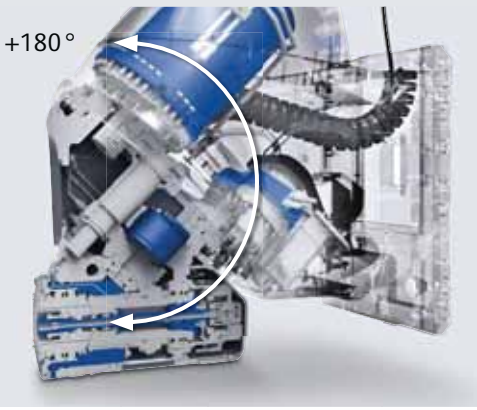
Heavy-duty chip removal package for the 4th Generation duoBLOCK®

Up to 50% higher chip removal performance of titanium with simultaneous reduction in tool costs and improved surfaces thanks to:

+ Hydraulic clamping in the NC-rotary table
+ **Damping shoes** in the Y-axis*
+ Software side optimization using **ATC heavy-duty chip removal***

* Available when sold with SIEMENS CNC control

Perfect for heavy-duty chip removal!
NEW: 5x torqueMASTER with 60% higher torque (1,327.6 ft./lbs.) and 180° swivel range.



Structural Components

6

23.6 × 19.7 × 1.8 in.
Pylon Rib
DMC duoBLOCK® Series
Material: Titanium 6-4

Complete machining with heavy-duty 737.6 ft./lbs. powerMASTER® motor spindle and heavy-duty chip removal kit in one setup.

7

47.2 × 7.9 × 7.9 in.
Aileron Integral Part
DMF 180
Material: Aluminum

Dynamic machining of long, narrow components up to 236.2 in. in length and at speeds of up to 18,000 rpm.

New Technologies – LASERTEC Additive Manufacturing and ULTRASONIC

ø 17.7 × 18.5 in.
Rocket Propulsion Engine Nozzle
LASERTEC *3D* Series
Material: Stainless Steel (X5CrNiMo 17-12-2)

5-axis complete machining – laser setup and turning on a single machine.

ø 7.1 × 3.1 in.
Turbine Housing
LASERTEC *3D* Series
Material: Inconel / Copper

5-axis complete machining – laser setup and milling on a single machine.

ø 15.0 × 16.5 in.
Camera Housing
ULTRASONIC Series
Material: Silicon Nitride

Finishing of sintered semi-finished part in multiple setups.

Impressive rigidity and precision!

Available with CELOS® on SIEMENS or with HEIDENHAIN.

DMU 50 – The entry point to 5-axis machining

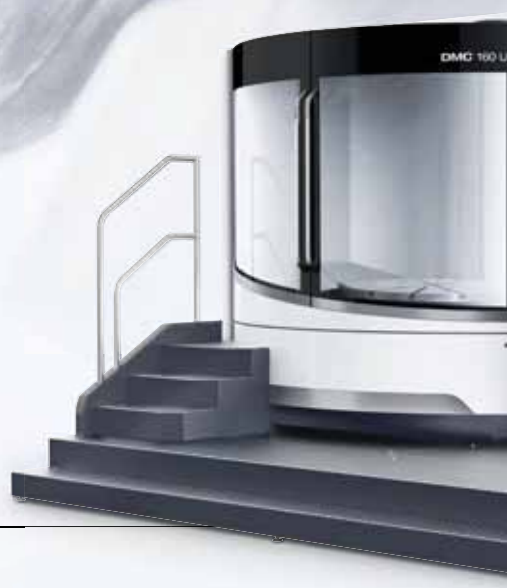
+ **High-performance NC swivel rotary table** for simultaneous 5-axis machining with high stiffness.
+ High loading weight of up to 661.4 lbs
+ **A standard high-performance inline spindle with 14,000 rpm.**, optionally 18,000 rpm
+ Digital drives with a standard rapid traverse up to 1,181.1 ipm.
+ **Tool magazine can be loaded during machining** and has space for up to 60 tools
+ **CELOS® by DMG MORI** with SIEMENS and 21.5″ ERGO*line*® control with multi-touch screen
+ HEIDENHAIN iTNC 530 with 19″ ERGO*line*® control panel

DMU 60 eVo *linear* – unbeatable 5-axis technology with a linear drive.

DMU eVo *linear*

+ **X-axis and Y-axis linear drive** for superior precision and dynamics of up to 3149.6 ipm. rapid traverse
+ **NC swivel rotary table for 5-axis simultaneous machining at** 115° swivel range and up to 881.8 lbs. loading weight
+ **speedMASTER® spindle** with 20,000 rpm. and 95.9 ft./lbs. as standard model
+ **Optimised gantry construction for maximum stability** with small footprint and maximum accessibility
+ Optional equipment includes Mill & Turn Technology or 2x pallet changer

Standard models now include:
Chip conveyor and MPC



FIT FOR THE FUTURE WITH SINUMERIK

DMG MORI

PREMIUM PARTNER

SIEMENS

www.siemens.com/sinumerik

smartOperate – SINUMERIK Operate optimised for Multi-touch operation

+ Faster interaction
+ Intelligent zoom and scroll functions
+ Full control via gesture control using the proven SINUMERIK Operate control panel

5 axis CHAMPION

2016 World Premiere DMG MORI

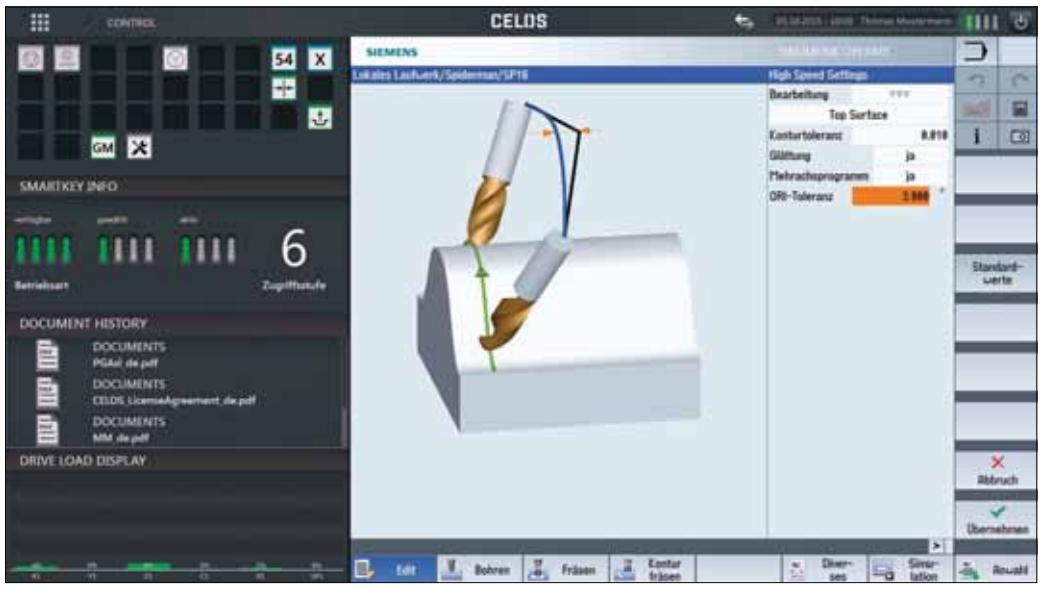
DMC 160 U duoBLOCK®
4th Generation

+ **Cubic workspace** with X=63.0 in., Y=63.0 in, Z=43.3 in. for the machining of large workpieces with a diameter of up to 63.0 in and a max workpiece weight of 8,818.5 lbs.
+ Powerful gear spindle available: **5X torqueMASTER® with up to 1,327.6 ft./lbs.**
+ **Maximum long-term precision** by intensive cooling and **linear guideways bounded on carbon rods**

2016 World Premiere DMG MORI

DMC 210 U
2nd Generation

+ **Innovative wheel magazine for up to 243 tools** (SK50 / HSK-A100) with a minimal footprint and shortest non-productive time
+ **Expanded swivel range** and optimised milling head interference contour (250° instead of 210°), internal cable drag
+ **Highest long-term precision and temperature stability** due to extensive cooling: linear guideways, feedrate axis, ball screws, rotary axis, insulation of the back side from the electrical cabinet



Top Surface – Perfect workpiece surfaces in tool and die construction.

+ Intelligent motion guide
+ Optimal surface quality
+ Maximum milling precision
+ Easy to use
+ NEW: from Operate 4.7

Stay ahead of the pack with 5-axis technology from DMG MORI.

John Kenny (centre), CEO of JK Engineering, with two of his dedicated professionals.

5-axis machining on a DMU 60 eVo.

Complex aluminum workpiece for Formula 1.

Artificial titanium joint for the Medical Industry.

Aluminum gear housing.

JK ENGINEERING HOLDINGS LTD.

˝DMU eVo's super stability enables us to machine titanium parts for the aerospace or medical industry with superior precision.˝

JK Engineering, founded in 2001, has its origins as a manufacturing service provider for Formula 1, where complex precision parts are all in a day's work. Based in Kings Langley, England, the company has also pursued this high demand into the Medical, Dental and Electronics industries and – since becoming AS 9100 and ISO 9001 certified – the Aerospace and Defense Industries as well. The backbone of JK Engineering's staff includes 25 skilled and dynamic experts. The technological base of the company is a modern shop consisting of 14 DMG MORI machining centres and lathes. A good share of this is taken up by 5-axis universal machines and automation.

˝We are operating in a fast-moving market with extremely high quality demands,˝ summarizes John Kenny, CEO of JK Engineering. His team has quickly learned that they must not just meet these typical market demands but they must exceed them as well. ˝We will only be able to remain competitive if we consistently expand our know-how and invest in the most up-to-date machining technologies.˝ One result of this thinking was the introduction of 5-axis machining 7 years ago. **˝DMG MORI's DMU 50 was, in our opinion, the first truly reliable 5-axis machine,˝** recalls John Kenny, speaking of the purchase. In addition, the compact model with its small installation footprint fit perfectly into the production environment. **˝5-axis machining enabled us to significantly reduce the number of setups, which gave us a great advantage over our competition.˝** The competition was still manufacturing using 3-axis machines at that time.

Since then, JK Engineering has remained loyal to DMG MORI. Ten of the 14 models are DMG MORI milling machines using 5-axis technology: three DMU 50 units, five DMU 40 eVo units and two DMU 60 eVo units, the newest of which are equipped with pallet changers. John Kenny lists another critical feature of the machines: **˝Thanks to their stable construction and high-performance spindles, we are able to do extremely productive and precise work in the area of heavy-duty chipping.˝ Degrees of accuracy of 0.0004 in. are routine.** ˝The temperature management of the DMG MORI machines also contributes to this precision.˝ The fact that JK Engineering manufactures in air-conditioned rooms goes almost without saying.

5-axis machining was JK Engineering's first step toward sustainable process optimization. **˝Automation is the key to the most efficient possible use of this machine park,˝** says John Kenny knowingly. Robots and loading equipment are indispensable for unmanned production done overnight and on the weekends. **˝The robots give us additional flexibility in the area of small lots, because we can easily adjust the job priorities as needed without tedious setup times.˝** The automated tooling of the machines also eliminates imprecision introduced by manual chucking. John Kenny is optimistic about the future: **˝Our professional skill combined with the reliable and precise machines from DMG MORI will help us to deliver extremely challenging components quickly and at competitive prices in the future.˝**

jkengineering

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

Ronda Peterson, CEO and Todd Peterson, COO have owned and operated PMI in the same Boulder, CO location for 27 years.

Peterson discusses part data with machine operator, Lynn Olson.

Lynn Olson pulls a finished workpiece out of the DMU 65 monoBLOCK®.

Precision part, 5-sided machining in one holding.

RETÜL Muve SL Bike Fit part with bores and alignment held to +/- 0.0002 in.

PETERSON MACHINING INC.

˝We would not be the shop that we are today without DMG MORI's DMU 65 monoBLOCK®.˝

Peterson Machining Inc., founded in 1989, is a woman owned company, based in Boulder, Colorado, and has long been a believer in quality and forward thinking. It is that thought process that was a key factor in the decision to partner with DMG MORI on multiple machine purchases. ˝DMG MORI has superior technology. We looked at other suppliers, but they didn't come close to measuring up.˝

Ronda Peterson, the company Chief Executive Officer, adds that ˝we wanted longevity, something that we know will be competitive for five, ten, fifteen years. We take meticulous care of our machines and care about every part of our company, our customers and our processes.˝

There have been ups and downs throughout their journey from a very small job shop that was barely known, to being a ˝go to partner˝ for leading companies in Aerospace, Automotive, Technology and beyond. Peterson Machining felt at a disadvantage without the industry leading DMG MORI 5-axis technology, so after a very short time they decided to take advantage of the only partnership they deemed necessary. After watching a demonstration of the DMU 65 monoBLOCK®'s capabilities at DMG MORI's Innovation Days, the Petersons were so impressed by the machine's superior technology that they purchased it that same week. Now with two DMU 65 monoBLOCK®s, Peterson Machining has grown its team and customer base to new heights.

˝We're a job shop and never know what's coming in the door,˝ says Todd Peterson. ˝With its small footprint and large work envelope, the flexible DMU 65 monoBLOCK® makes sense for a shop of our size.˝

˝The DMU 65 monoBLOCK® opened the door for vast amounts of new business,˝ states Ronda Peterson. ˝Customers have found us through a web search associated with capabilities, while others came to us once it became known that we could do what others could not. We even have business from LASP / NASA and have become a key partner in the production and development for RETÜL.˝

PETERSON MACHINING INC.
CELEBRATING 25 YEARS OF MACHINING EXCELLENCE

Peterson Machining Inc.
6661 Arapahoe Rd Unit #6, Boulder, Colorado 80303
ronda@gotopmi.com, www.gotopmi.com

After the collapse of Lehmann Brothers, Hidenobu Shigeki visited 30 potential customers a month because the company experienced a sharp drop in orders. Thanks to his marketing efforts, the company is larger and more successful than ever today.

Tomoei Seimitsu's most experienced operators on 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 can now machine superalloys four times faster – and we're doing it at a precision of ±0.00008 in.˝

˝Our company primarily manufactures prototype parts for air conditioners, vehicles and bicycles, and sometimes does it with delivery lead times of only two days,˝ explains Plant Manager Hidenobu Shigeki, referring to the typical challenges involved in prototype manufacturing. **˝With respect to precision, we allow no compromise, regardless of how short the delivery schedule is. Many orders specify a geometric precision of 7.9 in. These sometimes involve hard-to-cut materials such as Hastelloy.˝**

In order to ensure a high level of precision, Tomoei Seimitsu always checks all the temperature fluctuations on the machines and puts every workpiece through their quality control. **˝With every order, we accept the challenge to meet short delivery times while maintaining the highest possible precision part,˝** says Shigeki. In order to be able to meet the growing number of orders, Tomoei Seimitsu has invested in nine new machines in the plant during the past two years.

˝The DMU 80 eVo *linear* above all contributes significantly to increasing our productivity,˝ explains Hitoshi Nagao, Director of Production. He praises the performance of the DMU 80 eVo *linear* and says that **˝the machine's linear drive makes it four times more productive than machines from other manufacturers when machining 3D-open-die moulds.˝ The DMU 80 eVo *linear* is far and away the favorite among the 5-axis machines in the plant. Every operator prefers to work on the eVo and ˝Grab the eVo whenever it's free˝ has become a byword on the production floor.**

Production Director Nagao explains why this is the case, **˝The eVo is very easy to use, particularly when it's a matter of machining high precision workpieces just-in-time. The wide door to the workspace provides ideal accessibility and makes setup easy. Plant Manager Shigeki explains his hopes for the company's future from a management perspective: ˝DMG MORI machines have an incredibly small footprint and achieve extremely high productivity per unit area. We would like to continue expanding and to maintain our leadership position in the field of prototype manufacturing.˝**

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

DMF Moving Column Milling Machines

5-axis machining of a traverse on the DMF 260|7 with engineering racks.

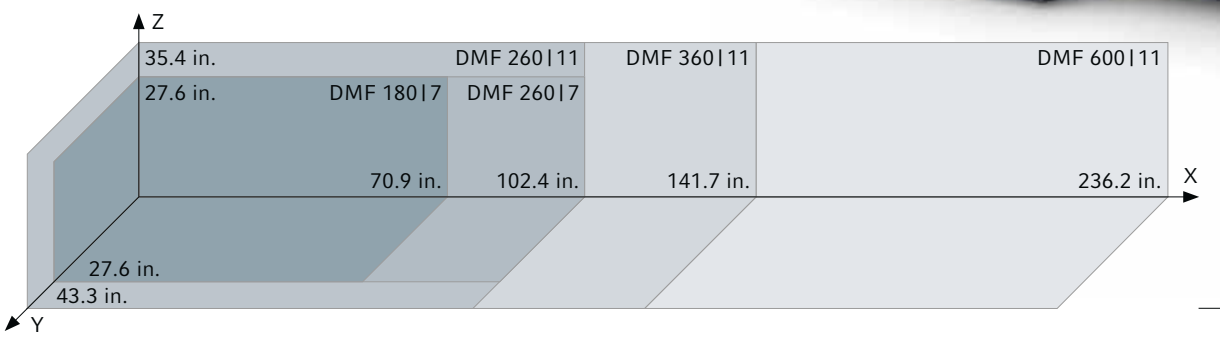
Linear X-axis drive with up to 3149.6 ipm. rapid traverse.

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

DMF Series – B-axis now standard.

+ Linear X-axis drive with up to 3149.6 ipm. rapid traverse
+ Large workspace or workspace divider for two separate workspaces
+ 5-axis machining with B- / C-axis, including Mill & Turn technology
+ X-travel up to 236.2 in., table loading up to 11.0 t.
+ Spindle speed up to 18,000 rpm. or 10,000 rpm. at 304.6 ft./lbs. and SK50 / HSK-A100

Moving column milling machine in two model sizes, 27.6 in. or 43.3 in. traverse in the Y-axis:

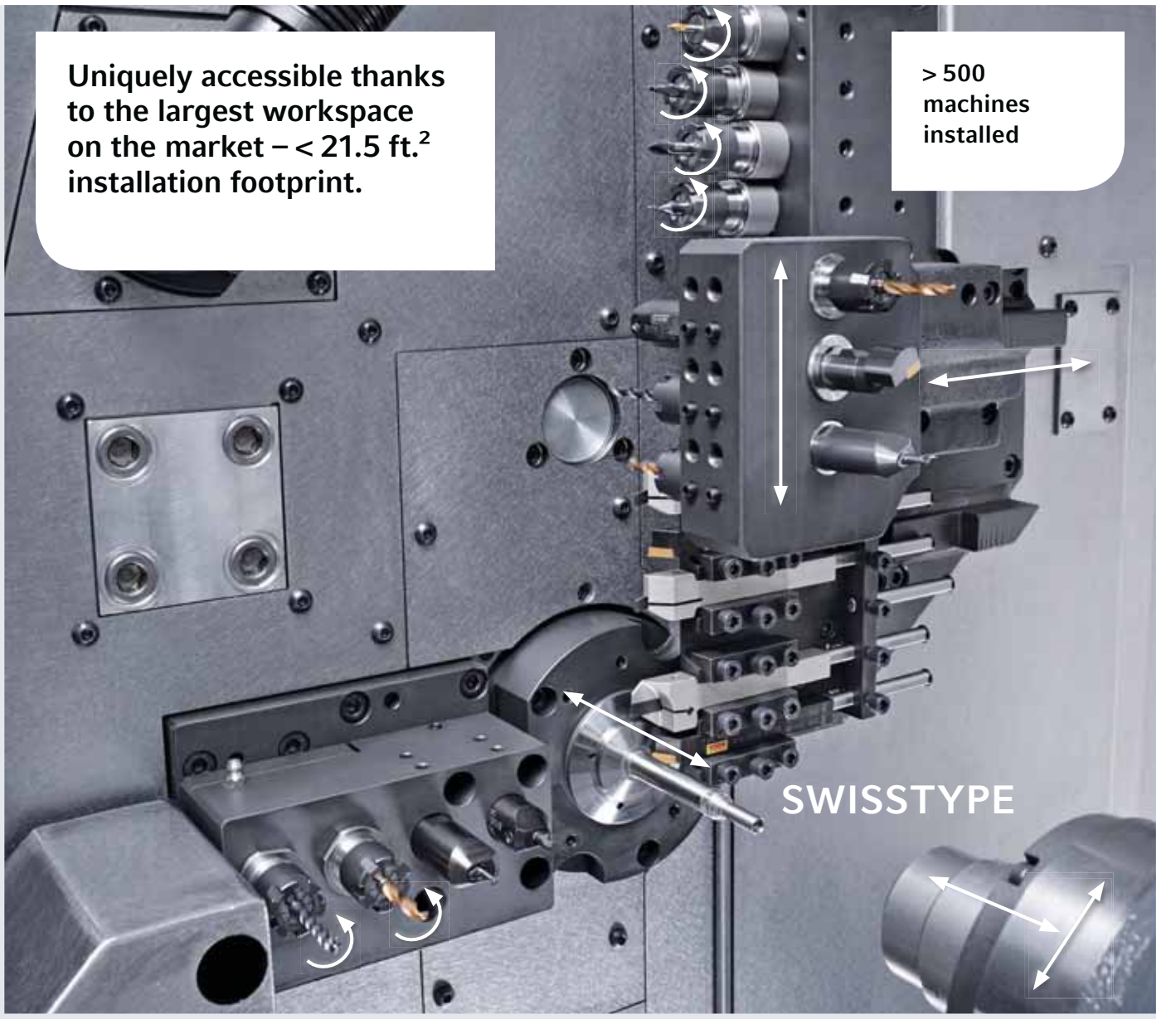


SPRINT Turning on Automatic Lathes / for Production

SPRINT 20|5 – Parts up to ø 0.8 × 23.6 in., with best precision in their class at < 0.0002 in.

+ **< 0.0002 in. precision** thanks to maximum rigidity and thermal stability
+ **Optimal chip fall** thanks to steeply sloped covers in the workspace
+ Five linear axes and two* C-axes
+ 23 tools on two independent tool holders; up to six motor-driven tool slots
+ **SWISSTYPE*kit**** for short-term and long-term turning on one machine, setup time < 30 min.
+ FANUC 32i-B with 10.4″ color display

* Optional



Workspace with slots for 23 tools on two independent tool holders, of which four are motor-driven tool slots for the main spindle and an optional two for the counter spindle (including C-axis for the counter spindle).

SWISSTYPE*kit*

ø 0.4 × 3.3 in.
Bone screw // Medical
Material: Titanium (Ti6Al4V)
Machining time: 240 sec.

ø 0.2 × 2.6 in.
Shaft // Automotive
Material: AISI 304
Machining time: 38 sec.

SHORT-TERM TURNING

ø 0.6 × 2.0 in.
Valve // Hydraulics
Material: Stainless steel (X8CrNiS18-9)
Machining time: 98 sec.

ø 0.7 × 1.7 in.
Washer // Engineering
Material: Ck45
Machining time: 78 sec.

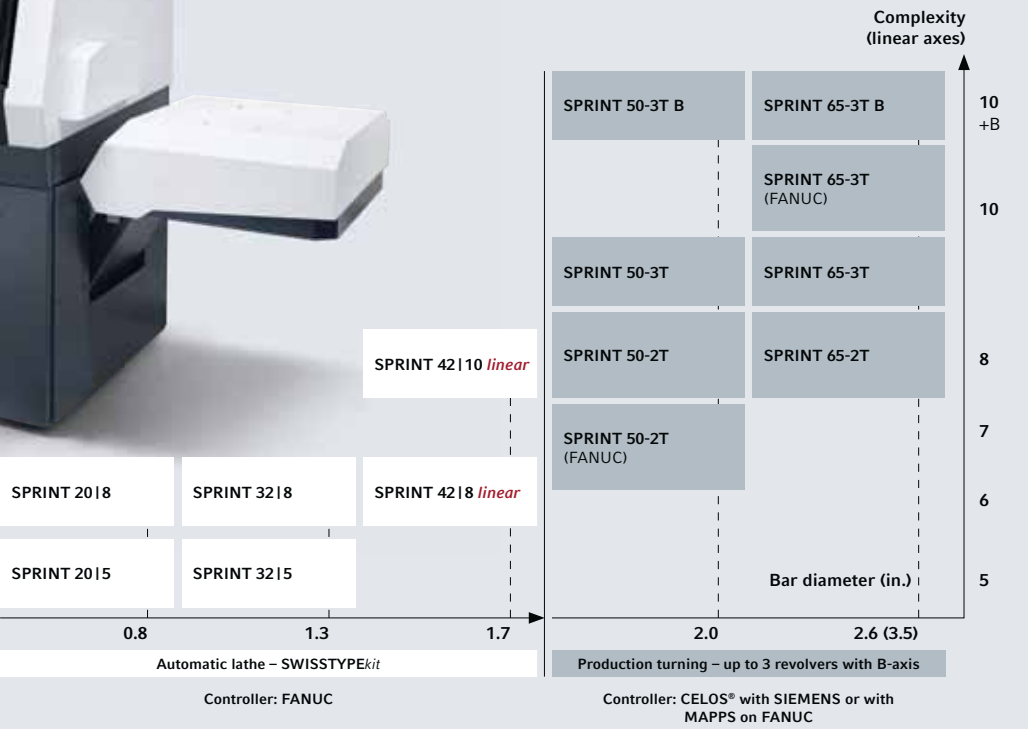
SPRINT 20|5
< 21.5 ft.² installation footprint,
outstanding workspace / space requirement ratio.

View the video on ″Local Production in Italy″:

For more on the SPRINT Series, visit:
sprint.dmgmori.com

Download the SPRINT Series brochure at:
download.dmgmori.com

›SPRINT Series now includes 14 models.



LASERTEC 65 *3D* / 4300 *3D* – Hybrid machining of challenging 3D-components.

HIGHLIGHTS LASERTEC *3D*

+ Unique technology combination including laser metal deposition, milling / turning and ULTRASONIC* grinding / milling
+ Powder nozzle enables unique material combinations while simultaneously reducing material consumption
+ Automatic laser tool changer**

* LASERTEC 65 *3D* only

** LT 4300 can stock up to 5 deposition heads

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 Generates NC-paths for laser and milling machining; outputs through post processor; determines the programming sequence.

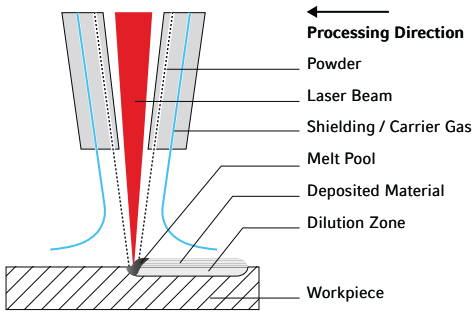
2 3D-simulation for collision monitoring with consideration of the built-in laser head.

3 Combination laser metal deposition and milling on the LASERTEC 65 *3D* (flexible changing possible).

4 Finished workpiece at quality control.

CAD / CAM HIGHLIGHTS

+ Fully integrated software solution for additive and subtractive process programming
+ Simulation of additive and subtractive NC paths
+ Preprogrammed setup strategies to speed up programming process
+ Multiple setup strategies can be combined



› THE APPLICATIONS

MANUFACTURE OF 3D-COMPONENTS, COATINGS, REPAIRS

Oil & Gas

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

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

Drill Bit

Die & Mould

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

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

Aerospace

Volume Materials:
+ Oerlikon Metco 316 L (X2CrNiMo 17-13-2)
+ Oerlikon Metco INC 718

Coating Materials:
+ Stellite 6

Reactive materials:
+ Titanium (TiAl6V4)

Turbine Housing

Engineering

Volume 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 Bits
LASERTEC 65 *3D*

Multi-material deposition:
Steel > Inconel > Tungsten Carbide

Complete machining, including laser deposition, milling and ULTRASONIC grinding in one setup.

STANDEX ENGRAVING MOLD-TECH

˝Highly dynamic, faithfully reproducible laser texturing and finish application via optimal laser focus.˝

LASERTEC 65 Shape: 5-axis laser texturing / application of finish to a steering wheel mould.

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

Know-how across the spectrum of the CAD / CAM process chain.

Measuring tool geometry using a 3D scanner.

Since 1967, **Standex Engraving / MOLD-TECH**, with over 1000 employees around the world, has been known for the development and manufacturing of deformation-resistant, visually and haptically attractive surface structures for plastic products. ˝We are the only texturing firm with a global network composed of 35 branches,˝ explains Thorsten Miebach, Director of Laser Technologies.

He directs the laser competence centre in the International Centre for Coordination and Grain / Texture Development in Krefeld, Germany. Since 2013, Standex has installed a total of nine LASERTEC Shape machines in Germany, China and the USA. **˝The main thing that the Shape technology has done for us is open up the possibility of more creative designs in texture, while also often proving more economical than etching,˝** says Thorsten Miebach. He also points to the highly dynamic operation and precision of DMG MORI machines as an important aspect: **˝When we acquired the first LASERTEC Shape machine, it was the only machine on the market that was capable of reproducibly texturing our dashboard panels with the right quality and in the right amount of time using lasers. Thanks to the good experience we have with this machine, we have been able to steadily grow our global capacity.˝** But Standex is more than just a structuring service provider. **˝We set the bar very high for ourselves. That allows us to keep developing customized and innovative solutions for our customers that echo throughout the entire texturing industry sector.˝** Investments in new and innovative technologies are of course a part of its business: **˝In China, we will be purchasing a LASERTEC 210 Shape specifically to enable us to better serve the automobile industry in this important market.˝**

Standex ENGRAVING MOLD-TECH

Mold-Tech
34497 Kelly Road, Fraser, MI 48026
michigan@mold-tech.com
www.mold-tech.com

› MATERIAL-KNOW-HOW

MATERIAL DATABASE / METALLURGY

Injection Mould

Flange / Piping

Additive Manufacturing materials database for users

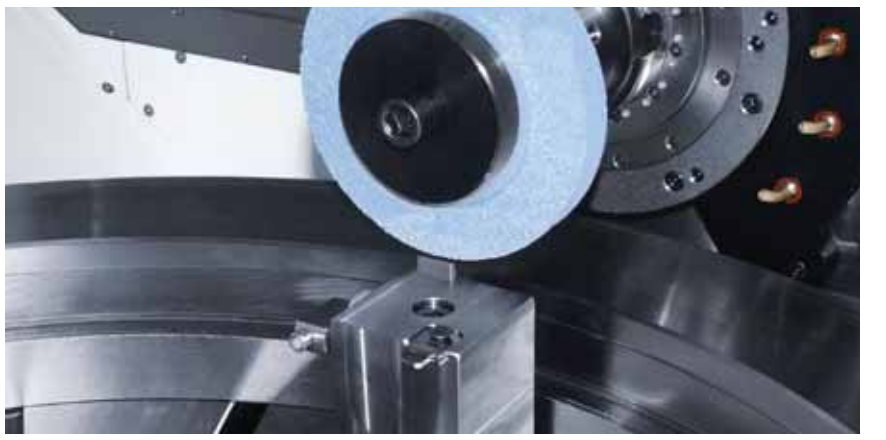
+ Development of process parameters for surfaces, supports, 3D objects
+ Database evaluated based on qualified components approved for material qualification
+ Development of customer-specific materials at four Additive Manufacturing Technology Centres around the world

Continuously research material properties

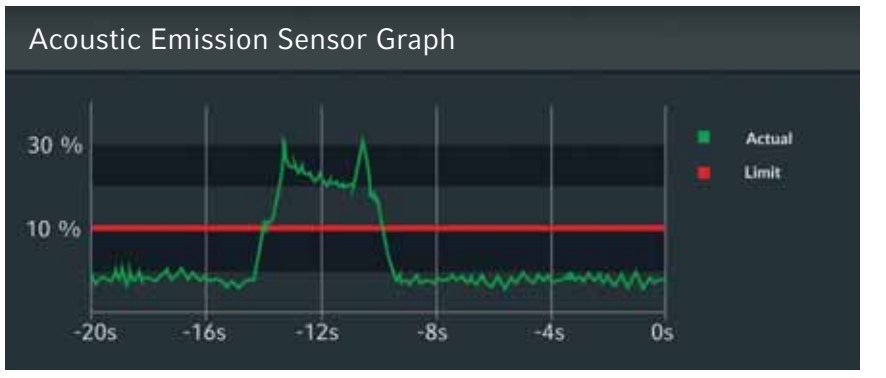
+ Powder material research
+ Density measurements, structural analysis
+ Mechanical testing procedures (tension, compression, bending)
+ Measurement: surface finish quality, hardness, corrosion
+ Attainment of material density > 99.8%

TECHNOLOGY INTEGRATION: GRINDING

Unique: MTG – Milling, turning, grinding – all in a single setup.



Grinding disk turning process.



Measurement window incorporated into the CELOS® display.

HIGHLIGHTS

+ **Best surface quality** (Ra < 0.00001 in.) thanks to the integration of grinding technology
+ **Economical manufacturing** thanks to elimination of re-chucking
+ **Grinding cycles for internal, external and face grinding**
+ **NEW: Structure-borne sound sensing for startup and turning**

MTG PACKAGE WITH

+ MTG spindle with structure-borne sound sensing
+ Grinding and turning cycles
+ MTG cooling system, 343.4 gal.
+ Enhanced machine protection

Available for DMC FD duoBLOCK®

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