The DMG MORI Magazine for customers around the world.

ECOLINE – The new revolutionary *ecoMill* V Series, with a SLIM*line*<sup>®</sup> display.

Additive Manufacturing – Hybrid Machining with laser deposition and 5-axis milling, all on one machine. NLX and CTX – The most successful series in universal turning, with the highest stability and precision. CELOS® and DMG MORI Software Solutions – Fully integrates and networks all machines within your organization.

# **DMG MORI**





#### Visit us at IMTS

in Chicago

at booth S-8900

Septermber 12 – 17, 2016

and experience CELOS® live!

# **CEL()S® and DMG MORI** Software Solutions.

CELOS<sup>®</sup>, the APP-based control and operating software by DMG MORI, is as easy to operate as a smartphone, and networks all machines within your organization. Learn more about CELOS<sup>®</sup> on page

4

# **2016 TRENDS AND INNOVATIONS**









# The Latest Advancements on Display From DMG MORI at IMTS.

The DMG MORI booth is your complete show destination – with industry leading cutting edge technology displayed on 17,000 ft.<sup>2</sup>, inclusive of 30 high-tech machines with live demonstrations.

DMG MORI



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# **DMG MORI 2016**

# **IMTS Show Highlights**

- + More than 30 high-technology machines on display.
- + Live additive manufacturing demonstrations.
- + Automation solutions on our advanced exhibits.
- + Experience our portfolio of machines made in the USA.
- + Discover Smart Manufacturing with CELOS® and Industry 4.0.
- + Learn more about our US Direct Sales and Service model.
- + Take a virtual tour of our US Manufacturing facility in Davis, California.





For more information on IMTS, visit: imts.dmgmori.com



# **ECOLINE** ecoMill V



4

"Thanks to the 0.0002 in. positioning accuracy of the *ecoMill* V, all workpieces comply with our stringent quality requirements."



President Jodai Takanori in front of his *ecoMill* V with a positioning accuracy of 0.0002 in.

President Jodai Takanori describes his vision, "To minimize cycle times with as few machines as possible. We have a large variety of parts with low quantities, but fast delivery times. Our goal is the "Just in Time" Toyota production system." The company predominantly manufactures valve seats and parts for shock absorbers and gearboxes in the **automotive industry**, high-precision sintered components for sliding contacts in train pantographs and hard-tomachine materials like carbon. The key factor in increasing productivity is setup. "A major advantage of the *ecoMill* V is it's great accessibility, which enables us to exchange clamping fixtures easily. The large work area also allows us to use multiple clamping fixtures for **up to** 30 workpieces and positioning accuracy of the machine within **0.0002 in.** is the decisive factor when it comes to the quality of our products. So far, we haven't had a single reject. In addition, the spindle load display helps with the machining accuracy; we now know exactly when a tool needs to be replaced. The high-speed spindle with a maximum speed of 12,000 rpm. and the magazine for 30 workpieces enable us to provide high machining speed and respond to inquiries quickly. Short delivery times; improves the company's competitive position significantly. Another advantage of the ecoMill V is its beautiful **design**", explains the President. "When customers visit our factory, they're very impressed with the machine and it gives them a good feeling about the **quality of the machine.** In addition, the chip removal is optimized and the work area is very easy to keep clean."



# *ecoMill* V – The highest precision at an unbeatable price!

 HIGHEST PERFORMANCE AND EFFICIENCY with a standard 12,000 rpm. milling spindle.

+ HIGHEST PRECISION through directly coupled ball screws.

+ RAPID TOOL CHANG





MAN INDUSTRY CO., LTD. 288-1 Bessho, Maizuru City, JP-Kyoto 624-0805 with 30 pockets standard.

+ **PERFECT ERGONOMICS** for efficient loading and unloading.

+ **VISIBILITY AND ACCESSIBILITY** with large work area and 33.5 in. table height.

+ **EXCEPTIONAL DURABILITY** Scratch and wear resistant surfaces.

+ **24-MONTH WARRANTY** on all parts and labor.

# Manufacturing in the United States

- + Current production includes:
  - Horizontal Machining Centers -
  - NHX 4000 2<sup>nd</sup> Generation, NHX 5000 2<sup>nd</sup> Generation, NHX 6300 - 5-axis Milling Machine - DMU 50
  - ECOLINE ecoTurn 450 and ecoMill 1100 V
- + Machining system includes 4 cells, 8 CNC machines, over 100 machine pallets, and 7 robots for washing, cleaning, and material handling.
- + Our California location offers our North American customers numerous benefits:
  - 221,000 ft.<sup>2</sup> local production facility
  - Production capacity of over 100 machines per month
  - All castings machined in-house to ensure the highest quality
  - Reduced delivery times
  - Customized and price-competitive solutions





ø 3.1 × 3.9 in. Milling cutter // Tool production Material: Stainless steel (grade 1.4305) Machining time: 40 min.



5.9 × 5.9 × 2.8 in. Demo sample // Machine tools Material: Steel (grade 45) Machining time: 2 min.



ø 7.1 × 0.6 in. Collar // Machine tools Material: Aluminum Machining time: 19 min. 13 sec.





# **ADDITIVE MANUFACTURING**

#### **PTOOLING**

"Thanks to Additive Manufacturing, we can now produce 19.7 in. diameter components that are 30% lighter and 50% more stable – and we can do it faster, with lower material costs."





Marv Fiebig, President of PTooling, manufactures components with diameters up to 19.7 in. for the energy, aerospace, and injection molding industries on his LASERTEC 65 3D.

President, Marv Fiebig, of PTooling, based in Amherstburg, Ontario (Canada), is proud to look back on the 35 years of practical experience of his certified, 6-member family enterprise. PTooling has experience in the areas of **manufac**turing technology for components from industries such as oil and gas equipment, gas compression, aerospace, and injection molding. "All of our machine tools are new, well-maintained, rugged, and durable. We have invested in the most innovative technologies on the market, and our foremost goal is to prove to our competitors that we are the "best of the best." We are particularly proud to be the first and so far the only service provider to house a DMG MORI LASERTEC 65 3D in North America. Not only does this machine allow us to provide universally applicable laser deposition welding, it also offers us the benefits of a **5-axis milling machine for** producing components with diameters up to 19.7 in. in finished part quality. The flexible switch between laser machining and milling not only means huge material **cost savings** for our customers; it also opens up new design options for us."



# Additive Manufacturing-**Generative manufacturing** of quality finished 3D parts.

### LASERTEC 65 3D -Laser deposition welding and 5-axis milling intelligently combined.

#### ADDITIVE MANUFACTURING

- + Best surfaces and component precision.
- Laser deposition welding with powder +nozzle: 10 times faster compared to
- powder bed process. Complete machining in finished part + quality with fully automated change between milling and / or turning / milling and laser operation.
- Cross-process software module. +
- Deposit welding included on different +material combinations, such as stainless steel, Inconel 625/718, non-ferrous metal alloys, and stellites.



PTooling 200 St. Arnaud Street, Amherstburg, ON N9V 3X9 Canada marv@ptooling.ca, www.ptooling.ca



(Copyright by CIM-Canadian Industrial Machinery)









Integrated cooling ducts

THE 3 MAJOR AREAS OF APPLICATION





Pelton turbine blade

Coating





Hybrid CAD / CAM for additive buildup and chip removal.



Adaptive process control Automatic adjustment of laser performance.

## LASERTEC 4300 3D -

Laser deposition welding with integrated 6-sided turn-mill complete machining of workpieces up to 26.0 x 59.1 in. and 3,306.9 lbs.

# ULTRASONIC



World Premiere:

ULTRASONIC 20 *linear* – HSC milling with a 60,000 rpm. maximum and ULTRASONIC grinding/milling with a 50,000 rpm. maximum, including CELOS® APP.

- + HSC milling with a 60,000 rpm.\* max.
- + ULTRASONIC external / internal cylindrical grinding with a mill-turn table with a 1,500 rpm.\* max.
- + **CELOS**<sup>®</sup> with integrated ULTRASONIC APP for automatic frequency and amplitude detection / tracking.\*

\* optional

The new ULTRASONIC 20 linear enables ULTRASONIC grinding / drilling / milling and HSC milling on one machine.





# **NLX** Universal Lathes



# Ideal for difficult-to-machine applications by means of flat guides in all axes and turrets with BMT technology.

The right solution for every application – the NLX Series including 12 machines.



NLX 2500SY | 700 – 6-sided machining with main and counter spindle, as well as a turret with 3.9 in. of Y-axis travel.

From the 2-axis lathe, to the 6-sided complete machining with counter spindle and Y-axis, the NLX Series covers all areas of machining.

#### NLX SERIES

- + Flat guides up to 7.1 in. in width in all axes, with optimized damping features and dynamic rigidity.
- + Integrated coolant circulation in machine bed for improved thermal stability.
- + **BMT**<sup>®</sup> **turret** (Built-in Motor Turret) with up to 10,000 rpm. and 86.3 ft./lbs. for milling performances comparable to machining centers.
- + Various automation processes available by including rod loaders and gantry loaders.

For more information on the NLX Series, visit:	
nlx.dmgmori.com	
Download the NLX Series brochure at:	
download.dmgmori.com	_ 🕒

#### NLX 2500 | 700

- + Chuck components up to 18.1 in. or 14.4 in. diameter with Y-axis, maximum chuck size diameter 11.8 in.
- + Rod machining up to 3.1 in. diameter
- + Y-axis (Y- and SY-design) with 3.9 in. for eccentric machining.
- + **BMT**<sup>®</sup> turret (Built-in Motor Turret) with 10,000 rpm. for milling performances comparable to machining centers, up to 20 tool pockets.
- BMT60 interface, optional with VDI-TRIFIX<sup>®</sup> (12 positions).
- + **CELOS**<sup>®</sup> with MAPPS on MITSUBISHI.

NEW: In addition to the NLX 2500SY|700, the NLX 2500Y|700 is now being built by GILDEMEISTER Italiana S.p.A. in Brembate di Sopra, near Bergamo, Italy



ø 3.2 × 5.8 in. Clamping element // Automotive Material: S45C Machining time: 17 min. 43 sec.



NLX 2500SY|700 The most successful model with a counter spindle and Y-axis.



ø 6.0 × 6.7 in. Pulley // Machine tools Material: SCM435 Machining time: 19 min. 10 sec.



# **CTX** Universal Turning Machines





60% shorter throughput times due to turning and milling with up to 73.8 ft./lbs. in one setup.



Gerd Birkenkamp (left), Director of Siefer Trigonal<sup>®</sup>, in front of his NLX 4000|1500.

Wilhelm Siefer GmbH & Co. KG, under its brand name Trigonal®, produces mixing and size reduction machines for processing low to high viscosity products such as liquid mixtures or solids in liquid suspensions. Since early 2015, NLX 4000 | 1500 has been backing up the process chain with a BMT® turret for power-driven tools up to 73.8 ft./lbs. "We exclusively work with stainless steel, so we depend on high-performance manufacturing technologies," explained Director Gerd Birkenkamp. Accordingly, the **stability** of the NLX machine is an essential basis of excellent permanent precision in the µm range. In the same context, he praises the **coolant circulation** integrated into the machine bed and the resulting high thermal stability. Furthermore, the key productivity factor is the option to carry out both turning and milling in one chucking thanks to the Y- and C-axis, said Birkenkamp, quantifying: "The complete machining has reduced throughput times by at least 60 percent."



Wilhelm Siefer GmbH & Co. KG Bahnhofstr. 114, D-42551 Velbert info@siefer-trigonal.de, www.siefer-trigonal.de 50% more precision and speed thanks to the High Precision Turret and active cooling.

- + Chuck components up to 16.1 in. diameter, chuck up to 16 in. diameter and bar machining up to 4.0 in. diameter.
- + **6-sided complete machining t**hrough optional counter spindle with up to 265.5 ft./lbs.
- < 0.0004 in. tolerance in diameter.
- + < 0.0004 in. thermal stability through active cooling.
- 1,160.3 psi. cooling lubricant pressure at each tool place.
- + 50% higher speed of power-driven tools, continuous operation 100% DC with 6,000 rpm.
- + 12 times VDI40 disc turret with 13.4 // 13.4 hp., 26.6 // 20.7 ft./lbs. (40 / 100% DC).
- + Linear drive in the X-axis with 1 g acceleration, maximum precision, and a 5-year warranty.
- CELOS® with Operate on SIEMENS.

CTX beta 500 *linear* and CTX beta 800 *linear* – 50 % higher precision and speed.

CTX beta 800



< 0.0004 in. thermal stability through active cooling of turret disc and tool drive.

CTX beta 800 *linear* Shortest chip-to-chip times due to the linear drive with 1g acceleration.

**linear** 5-year warranty





Magnetic absolute length and angle measurement systems are the perfect solution for machine tools with the highest performance.

For one thing, the SR67A/27A length measurement systems with their high response speed of up to 7,874.0 ipm. are the perfect solution for highly precise and dynamic machine tools with linear motors. For another, the high robustness enables them to be used in difficult-to-machine applications. The absolute magnetic principle of the SR67A/27A series guarantees:

- + 7,874.0 ipm. speed of response for high-speed applications.
- + High resistance to vibrations and shock for highest chip removal rates. The SR67A vibration resistance is 820.2 ft./sec.<sup>2</sup> and the shock resistance is 1,476.4 ft./sec.<sup>2</sup>
- + Same coefficient of thermal expansion as steel for minimized temperature impact.
- + **Up to 0.0000004 in. resolution** for high precision of measurement results.
- + **Resistant to moisture,** oil mist, and dust for **high reliability** even under challenging environmental conditions.

# **CTX TC** Turn-Mill Complete Machining



# 88.5 ft./lbs. torque, 7.9 in. Y-axis

CTX beta 800 TC with the compactMASTER<sup>®</sup> turn-mill spindle – added value compared to any other universal turning machine.

9.1 × 9.8 in. Diameter control casing // Engineering Material: C45 Machining time: 28 min.



16

- + 100% universal turning.
- + 100% milling: 88.5 ft./lbs. and 7.9 in. Y-stroke.
- + **100% more tools** in standard design (24 pockets), optionally chain magazine for up to 80 pockets.
- + **Use of convenient milling tools** through the Direct Drive B-axis with ±110° swivel range and continuously indexable.
- + **Multitools** short chip-to-chip times comparable to a turret machine.
- + **Optimized accessibility,** only 13.8 in. cutting depth to spindle center.
- +  $CELOS^{(e)}$  with Operate on SIEMENS.

Up to a **60% shorter programming time** thanks to 11 exclusive **DMG MORI Technology Cycles** with dialogue-guided programming.

More on page \_\_\_\_\_



Scan to watch the video of the CTX beta 800 TC

For more information on the CTX TC Series, visit:

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ctx-tc.dmgmori.com

Download the CTX TC Series product brochure: download.dmgmori.com



CTX beta 800 TC

**DMG MORI** 

# **DMG MORI COMPONENTS**

## compactMASTER® – Turn-Mill spindle with the same milling performance as a machining center.

- + 32.3 in.<sup>3</sup>/min stock removal rate.\*
- + Planing blade head diameter 2.5 in. // ae = 1.2 in. // ap = 0.4 in.
- Spindle speed: 1,768 rpm. (Vc = 13,779.5 ipm.) +
- M20 threads.\*
- Thread size  $M20 \times 0.1$  in. // spindle speed 606 rpm. +\* CK 45 // compactMASTER® with 88.5 ft./lbs.

compactMASTER <sup>®</sup> design size	CTX beta TC	CTX gamma TC
Spindle length	13.8 in.	17.7 in.
Speed	12,000 / 20,000 rpm.	12,000 rpm.
Torque	88.5 ft./lbs.	162.3 ft./lbs.

CTX TC – Turn-Mill Complete Machining: From universal machining to production turning with second tool holder.



World Premiere: CTX gamma 3000 TC -31.5 in. X-axis travel and the new compactMASTER® turn-mill spindle with 162.3 ft./lbs. torque.





# **NTX** Turn-Mill Complete Machining



6-sided complete machining with main and counter spindle; maximum productivity through use of 2 tool holders.

ø 2.4 in. Acetabulum // Medical Material: Titanium Machining time: 7 Min. 30 Sec.

NTX 1000 -

**Production** 

turning with

second tool

holder.

ø 3.5 × 4.2 in. Tool holder // Tooling Material: 1.2343 (X37CrMoV5-1) Machining time: 15 Min.

- + Direct Drive (DDM<sup>®</sup> technology) B-axis for simultaneous 5-axis machining of complex workpieces for the medical, tooling, aerospace, or automotive industries: ±120° swivel range in B-axis and 100 rpm., rapid traverse.
- Capto C5 turn-mill spindle with up to 20,000 rpm., 12,000 rpm. as standard.
- Simultaneous machining with B-axis and lower optional **10-station turret**.
- Simultaneous machining with B-axis and +lower ø 2.6 in., 2.0 in. as standard; chuck up to ø 7.9 in.
- Workpieces up to 31.5 in. length and + ø 16.9 in.



#### CTX beta 800 TC universal turning package. (incl. chuck, chip conveyor, IKZ, 2 × multi-tools, etc.)





## **SPRINT** Automated / Production Turning



SPRINT 50-3T B  $\rightarrow$  CELOS<sup>®</sup> with SIEMENS  $\rightarrow$  3 Revolver with B-Axis SPRINT 65-3T B  $\rightarrow$  CELOS<sup>®</sup> with SIEMENS  $\rightarrow$  3 Revolver with B-Axis 10 Complexity (linear axes) +B SPRINT 65-3T → CELOS® with MAPPS on FANUC → 3 Revolver 10 SPRINT 50-3T SPRINT 65-3T  $\rightarrow$  CELOS<sup>®</sup> with SIEMENS  $\rightarrow$  3 Revolver  $\rightarrow$  CELOS<sup>®</sup> with SIEMENS  $\rightarrow$  3 Revolver SPRINT 50-2T → CELOS® with SIEMENS → 2 Revolver / TWIN-Concept SPRINT 65-2T → CELOS® with SIEMENS → 2 Revolver / TWIN-Concept SPRINT 42 | 10 linear 8  $\rightarrow$  46 tools  $\rightarrow$  3 tool holders SPRINT 50-2T (FANUC) → CELOS<sup>®</sup> with MAPPS on FANUC → 2 Revolver 7 SPRINT 42|8 linear SPRINT 32|8 SPRINT 2018  $\rightarrow$  28 tools 6  $\rightarrow$  26 tools  $\rightarrow$  3 tool holders → 3 tool holders SPRINT 2015 SPRINT 32|5  $\rightarrow$  23 tools  $\rightarrow$  22 tools  $\rightarrow$  2 tool holders Bar diameter → 2 tool holders (in.) 2.0 2.6 (3.5) 0.8 1.3 1.7 Automated turning – SWISSTYPEkit on turning – up to 3 turrets with B-axis

➤ Work area of the SPRINT 2018 with 6 linear axes and 2 C-axes; up to 25 tools used on 3 independent tool holders for 4-axis machining at the main spindle, including 8 places for powered tools.

NEW: SPRINT 20 | 8 – Machining of workpieces up to  $\emptyset$  0.8 × 23.6 in. with a footprint of less than 21.5 ft.<sup>2</sup>

+ 6 linear axes and 2 C-axes.

- + 25 tools on 3 independent tool holders for 4-axis machining at the main spindle.
  - 4 powered tools for the main spindle (radial)
  - 2 stationary deep-hole drill tool places
  - 4 powered tool places for the counter-spindle (frontal and/or radial)
- + Unloading unit for long workpieces up to 23.6 in. through the counter spindle.\*
- + SWISSTYPE*kit*\* for short and long turning operations on a single machine, < 30 min. setup time.
- + 20% shorter setup times thanks to the quick tool-change system.\*
- + High-pressure coolant supply\* up to 1,740.5 psi.
- + FANUC 32i-B with 10.4" color display.



> SPRINT

Series now

with 14 models.



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





Scan to watch the video on "Local Production in Italy"

For more information on the SPRINT Series, visit:

sprint.dmgmori.com



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Download the SPRINT Series product brochure at:

download.dmgmori.com





# **CTV** Production Turning

SPECK PUMPEN WALTER SPECK GMBH & CO. KG

"In times of smaller lot sizes, automated solutions that can be flexibly adapted are the future."

For over 100 years, SPECK PUMPEN Walter Speck GmbH & Co. KG, based in Roth, has been manufacturing pumps and pump systems for industrial applications. Their customers come from various sectors such as their medical, chemical, and plastics industry and trust in the quality and reliability of the specialized products. DMG MORI's CNC technology has been dominating the manufacturing sector since the start of the century, but since 2010, the automated units of DMG MORI Systems have also held significant value. DMG MORI Systems has optimized the production of motor bearing shields by linking a CTV 160 with a DMC 635 V. In 2015, this area was expanded to include a nearly identical system - a MILLTAP 700 and a CTV 160.

"The output of the two systems is enormous," states Dieter Meier, Mechanical Production Manager. SPECK produces over 250,000 diecast aluminium bearing shields on the two linked machine tools. However, the high quantities should not disguise the fact that the actual lot sizes are relatively small, adds the Production Manager. "We produce very



Dieter Meier, Mechanical Production Manager, is excited about the enormous productivity of the systems.

different variants, so both systems had to have an extremely flexible design." To achieve this, DMG MORI Systems installed flexible chuck jaws. The devices in the round magazine can be adjusted to the appropriate diameter in just a few steps.

DMG MORI Systems designed and implemented the two links based on the components. "Within three months, we were able to start production," says Dieter Meier about the **quick implemen**tation of linking. To him, automation is the future of manufacturing: "Thanks to short cycle times, higher capacities, and a significant increase in productivity due to the multi-machine operation, automated production systems are amortized within a very short time."



Speck Pumpen Walter Speck GmbH & Co. KG Regensburger Ring 6-8, D-91154 Roth www.speck.de

# **WASINO** Automatic Turning



Directors Gianluca Marchetti (left) and Corrado Brevini of DMG MORI Italia (right).

### M.T. S.R.L.

"We now produce workpieces with 0.00002 in. circularity and a surface in grinding quality."

Founded in 1972 as a contract manufacturer, M.T. S.r.l. has continuously expanded its range of services. Today, the company based in Marignano, Italy, produces a multitude of powered and stationary tool holders. In order to further expand production capacities, Director Gianluca Marchetti invested in a WASINO Automatic Lathe in 2015: "The highly precise WASINO G100 | 480 (formerly G-07) is ideally suited for lot sizes between 50 and 1,500 parts." He considers the series an optimized addition to DMG MORI's lathe portfolio. For Gianluca Marchetti, one persuasive argument for purchasing a WASINO G100 was its high precision of 0.00002 in. when it comes to circularity, with an equally high resistance to temperature



Thanks to integrated automation, M.T. produces lot sizes of up to 1,500 parts almost entirely on unmanned systems.

fluctuations. "Even the surface finish achieved was almost in grinding quality," states the Director – even with complex workpieces: "Before, I had to grind the surfaces of my workpieces with specialized tools, changing fixtures several times. Now I can achieve the same surface quality on the G100 in a single chucking." Combined with standard automation, he says, the model is perfectly equipped for the required lot sizes.



M.T. S.r.I. Via Casino Albini 480 IT-47842 S.Giovanni in Marignano www.mtmarchetti.com

#### **BURGMAIER TECHNOLOGIES GMBH + CO. KG**



Johann Bernhard (left) and Gunnar Deichmann, Burgmaier Technologies GmbH.

"By using the SPRINT 65, we were able to increase the process safety and decrease the previous operating



Production on the SPRINT 65 with the highest accuracy, e.g. an evenness of 0.0002 in.

caused by workpiece changes. "This has also helped us increase our **process safety and the machining precision is extremely high**," explains Johann Bernhard, his fellow executive. The tolerance is at a reliable **0.0008 in.** and the evenness and parallelism at an impressive **0.0002 in.** and **0.0003 in.**, respectively. With three turrets, a **swiveling B-axis**, and 36 specialized tools, the **SPRINT 65** is very productive. The experience of the high-precision turning company and the modern **CNC technology of DMG MORI** have **reduced the throughput times** in this process by **50 percent**. Gunnar Deichmann states, "In a large-scale production with 10,000 parts, that is a huge accomplishment."

#### ➤ WASINO portfolio with 10 machines: Ultra-precise lathes with up to 0.000008 in. circularity.



#### time by 50%."

BURGMAIER has been specializing in the production of **precision turned parts** for the automotive engineering, hydraulics, and electronics industries for over 80 years. The company employs over 750 people at four locations in Germany, France, and Slovakia. BURGMAIER has been collaborating closely with **DMG MORI** on its turning operations for many years. As part of an order of eight SPRINT 20 units, the company also invested in a SPRINT 65. "It helped us successfully close a short-term production bottleneck," remembers Gunnar Deichmann, COO. With the SPRINT 65, BURGMAIER produces an injector part for a common rail fuel injection for trucks directly off the bar, eliminating the downtimes previously



BURGMAIER Technologies GmbH + Co. KG Hauptstraße 100-106, D-89604 Allmendingen www.burgmaier.com

# **CELOS® AND DMG MORI SOFTWARE SOLUTIONS**



Christian Thönes Chairman of the Executive Board DMG MORI AKTIENGESELL-SCHAFT, Bielefeld

"With CELOS<sup>®</sup> and our DMG MORI Software Solutions, we accompany our customers on their way towards digital manufacturing."

# What does "Industry 4.0" mean for DMG MORI?

For us, "Industry 4.0" means accompanying customers on their digital transformation with holistic solutions. User benefit is always the main focus. This is proven by the examples of Porsche Motorsport and Schaeffler Technologies (among others) in this edition.

# How does DMG MORI support its customers?

A central element is CELOS®, with its currently 16 APPs. Order, process, and machine data can be managed, documented, and visualized both at the control unit and on a PC. In addition, CELOS® facilitates the exchange of information with superordinate software systems, thus closing the gap between the IT environment and production.

# So, soon nothing will work at all without software?

Many things will work better with software! This is demonstrated by our DMG MORI Software Solutions, for example, the DMG MORI Process Chain with the DMG MORI Virtual Machine. With the support of the digital mirror image of real manufacturing, maximum process safety and product quality can be ensured even before making the very first chip.

The 24 DMG MORI Technology Cycles are another example. Assisted by dialogue-guided programming, the employee can create the NC program 60% faster. In addition, we offer our customers the new sensor package i4.0 for optimized data handling, improved accuracy, and

# DMG MORI Software Solutions for digital production.

CELOS<sup>®</sup> networks Porsche's organization and planning with DMG MORI's production.

EXCLUSIVE PREMIUM PARTNER

## DMG MORI

1. ORDER

#### CAD DATA

 Porsche's developers deliver the component's CAD data to the Porsche Motorsport CNC Competence Center. DMG MORI Software Solutions and CELOS® APPs for production engineering and process planning.

Order / CAD data

from Porsche

# 2. PROCESS PLANNING

#### CAD-CAM / SIMULATION

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

+

#### **CELOS® PC VERSION**

Process Planning &

1:1 Simulation

2





JOB SCHEDULER

JOB MANAGER



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TECH CALCULATOR DOCUMENTS

#### more process safety.



Scan to watch the video of Porsche Motorsport CNC Competence Center inSeebach



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For more information on our technology partnership with Porsche, visit:

microsite.dmgmori.com

#### PORSCHE MOTORSPORT CNC COMPETENCE CENTER IN SEEBACH

- + CNC Competence Center specifically set up for Porsche to develop intelligent manufacturing solutions for sophisticated components.
- + Focus: long-term technology transfer.
- 5 DMG MORI employees work on the production of the Porsche parts in 2-shift operation.
- + Machine outfit currently installed:
  - CTX beta 800 TC with CELOS®
  - HSC 70 linear with CELOS®
  - DMU 60 eVo FD with CELOS®



DMG MORI 15



# Porsche Motorsport CNC Competence Center Success through technology partnership.

Assisted by CELOS<sup>®</sup>, the Porsche Motorsport CNC Competence Center from DMG MORI produces high-quality components in perfectly organized processes.

A successful partnership enters round three: Once again, DMG MORI and the Porsche LMP1 Team join together in the fight for place on the podium at the FIA World Endurance Championship (WEC) 2016. As a leader in innovation, DMG MORI provides the Porsche team with the most cuttingedge manufacturing technologies. In the **Porsche Motorsport CNC Competence Center** at DECKEL MAHO Seebach, DMG MORI combines decades of machining excellence with advanced trend-setting software.

**CELOS® – competitive edge thanks to integrated process organization.** By the end of 2015, DMG MORI produced more than **60 different components**, with a total quantity of over **2,300 individual parts** for the Porsche Team. The range of parts included complex housings for pumps and electric motors, as well as intricate fastening elements for the innovative braking system. The CAD data needed for this process is delivered by the developers of the Porsche LMP1 Team. From that point forward, the machining experts at Seebach handle the **complete process through the finished workpiece**.

**CELOS®** has proven to be a key pillar in the collaboration of DMG MORI and the Porsche Team. At the Motorsport CNC Competence Center, all machine tools are equipped with CELOS<sup>®</sup>. In addition, the **CELOS®** PC version is also available to the team.

The **CELOS® PC** version serves as the central planning and control software. The individual orders are created from a control center, completely independently of the machines. In the Job Manager, NC programs, chucking plans, and tools are linked together into one order. As a result, you won't find any technical drawings or paper documentation at the Porsche Motorsport CNC Competence Center. Detailed planning of jobs, including exact assignment to a machine, takes place in the Job Scheduler. The current status and the effects of rapid changes can be viewed in the CELOS® control center. In addition to the planning and control functions, the CELOS® control center also facilitates real-time access to the machine data of all connected machine tools. The stored data can be used to carry out additional business analyses in order to optimize production in the short and medium term. The networking of the machines in combination with the continuous recording of real-time data represents a crucial step towards Industry 4.0.

SERVICE AGENT

monitoring.



MESSENGER

Workpiece shown:  $4.0 \times 1.8 \times 1.8$  in., Combination holder, milled on HSC 70 *linear* Material: Aluminium; operating time: 3 hrs



ø 1.6 × 0.7 in. Differential sealing cap Turned on CTX beta 800 TC Material: Aluminum Operating time: 4 min.

Selected examples from the wide range of parts produced on DMG MORI machines.



>





7.9 x 3.5 x 1.2 in. Bearing support illed on DMU 60 eVo *linear* Material: Aluminum Operating time: 15 hrs 14.2 × 7.9 × 1.0 in. Exhaust system bracket Milled on DMU 60 eVo *linear* Material: Aluminum Operating time: 4 hrs



CELOS® PC version as the control center: CELOS® combines production engineering and the shop floor in a unique way, resulting in a highly efficient service partnership.

# 16

# **CELOS® AND DMG MORI SOFTWARE SOLUTIONS**

# 24 exclusive DMG MORI Technology Cycles



DIALOGUE-GUIDED PROGRAMMING

+ Up to 60% faster

New applications, e.g. grinding and gearSKIVING

Visualized, interactive, and user-friendly

WITHOUT TECHNOLOGY CYCLES CLASSIC DIN PROGRAMMING

Software solutions for easy implementation of complex machining – dialogue-guided programming.



Scan to watch the video of DMG MORI Technology Cycles



WITH TECHNOLOGY CYCLES DIALOGUE-GUIDED PROGRAMMING

Download the product brochure for the 24 exclusive DMG MORI Technology Cycles:
download.dmgmori.com

➤ 3 selected examples



MPC 2.0 – Machina Protection Control



Easy Tool Monitoring 2.0 –



Multi-threading cycle 2.0

#### Machine Protection Control

#### + Stop at critical vibration states.

- + **Vibrations sensors** at the milling spindle.
- + **NEW cutting force monitoring** for drilling and thread cutting.
- + **NEW unbalance display** when idle.
- + **NEW upgrade** for all milling and mill/turn machines with MPC Version 1.0.

#### tool monitoring system

- + **Damage prevention** due to the controlled stop of the spindle and axis in cases of tool breakage or tool overload.
- + **Immediate feed stop:** Spindle stop after one second (tool cutting free).
- + Sensorless with automated learning of load limits.
- + For turning, milling, and drilling operations.
- + Creating large transmission and/or special threads, that cannot be produced with simple thread chasing.
- + **Free definition** of contours, pitches, and gears possible.
- + **On Point Position** Position-oriented thread creation.

# **NC Program Conversion**

#### **REFERENCE PROJECT – ENGINEERING SECTOR**

Program conversion of old and external controls for Operate on SIEMENS 840D solutionline.

Use old programs on a new machine! Save time by letting us translate your programs now!

- + New DMG MORI machine with **immediately** effective operation.
- + Programs are **available immediately.**
- + **Support for cycles** installed on the old machine.
- + Programs can be **adapted for specific machines**, particularities are accommodated.
- + Additional start-up support by DMG MORI Academy Trainers available
- (e.g. when setting up the workpieces).
  + Time-saving service, no additional personnel required for converting the programs.
- Heal for new machines with CELOS® from DMG MORI.





# Quicker production start by conversion of more than 500 old programs!

When replacing the old lathe with a new, high-performance CTX beta 800 4A, it would have been necessary to completely rewrite all existing programs for this machine type. The perfect solution is now provided with the new "NC program conversion" service by DMG MORI. Within one week, all 535 old programs had been adapted for the new, specific machine concept and converted into the new control format.

# DMG MORI Process Chain

Safe and quick manufacturing with certified post-processors and 1:1 simulation.









Programming with SIEMENS NX CAD / CAM



1:1 Simulation with the DMG MORI Virtual Machine



Production with DMG MORI machine tools

Based in Freiburg, **ZAHORANSKY Formenbau GmbH** (a subsidiary of the Zahoransky Group, which has been successful for over 100 years), together with its **220 employees**, stands for intelligent solutions from mold to process control. Its know-how sets the company apart from its competitors, while its customers from the **medical**, **packaging**, **and personal care** industries sustainably before production starts." After a year and a half, ZAHORANSKY's trust in **DMG MORI Process Chain** remains unbroken. The data from the simulation are transferred, fully automated, to the **DMC 160 H duoBLOCK**<sup>®</sup>, where machining starts at a full 100 percent – even at night, in unmanned operation. "The **time savings are up to 30 percent**, because we neither have to start up manually nor carry out any subsequent corrections on the machine," as Dietmar Glockner describes the productivity increase. "The **complete machine operation is done from the programming place.**" Additional security is provided by the **DMG MORI Machine Protection Control**, which permanently monitors vibrations and cutting forces. The investment in the DMG MORI Process Chain rapidly paid off for ZAHORANSKY, as Matthias Faber concludes, "The **spindle turns practically around the clock**, downtimes are a thing of the past. The capacity of the **DMC 160 H duoBLOCK**<sup>®</sup> **is utilized in an optimized way.**"

"Thanks to the 1:1 simulation in the DMG MORI Virtual Machine, we were able to reduce the set-up time by 30%."



The DMG MORI Virtual Machine is a 1:1 mirror of the DMC 160 H duoBLOCK<sup>®</sup> including the actual control unit.

optimize their plastic products with the help of the company's high-quality, sophisticated molds. Process optimization is also omnipresent in ZAHORANSKY's production operations, as the acquisition of a DMC 160 H duoBLOCK®, including DMG MORI Process Chain and DMG MORI Virtual Machine demonstrates. "With this software solution, we are able to achieve maximum capacity utilization for the machining center," explains Matthias Faber, Head of Engineering at ZAHORANSKY. ZAHORANSKY makes full use of the possibilities of the DMG MORI Process Chain. Designers develop the complex tools and molds in SIEMENS NX CAD. The required NC program is then created in SIEMENS NX CAM. Before production starts on the DMC 160 H duoBLOCK®, the DMG MORI Virtual Machine is used first. "The virtual machine is a 1:1 mirror image of the milling center, including the actual control unit. This enables us to simulate the NC program under real conditions," as Dietmar Glockner, Head of CAD / CAM at ZAHORANSKY, explains the process. The design team's work is so reliable that the machining process usually works without a hitch. "And should any issues arise, we can recognize them



ZAHORANSKY Formenbau GmbH Bebelstraße 11a, D-79108 Freiburg inf@zahoransky.com, www.zahoransky.com **CELOS® AND DMG MORI SOFTWARE SOLUTIONS** 

# Ready for the next Industrial Revolution.

12

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2

CELOS<sup>®</sup>, the APP-based control and operating software by DMG MORI, is as easy to operate as a smartphone and networks all machines within your organization. CELOS<sup>®</sup> Data Management

CAD/CAM

PPS/MES

PDM

ERP

Data Exchange Interface, open for all systems.

CELOS® by DMG MORI is a standardized **APP-based control** with a unique **multi-touch screen** for all new DMG MORI high-tech machines. Thanks to its APP-based structure, CELOS® is as **easy to operate as a smartphone**. Via the multi-touch screen, the CELOS® APPs enable users to **manage**, **document**, **and visualize all** order, process, and machine data. **16 APPs** support the user in handling the preparation, optimization, and error-free processing of production orders. The CELOS® APP **Condition Analyzer** serves as a platform for visualizing, analyzing, and projecting inter-machine status types.

#### **CELOS® INFO HOTLINE**

We'll be happy to answer any questions or assist you with using CELOS<sup>®</sup>. **E-Mail: celos@dmgmori.com** 





#### 19 **DMG MORI**



#### Machine Protection Control (MPC) -+Preventive protection through vibration sensors on the milling spindle.

**NEW: DMG MORI Condition** Analyzer – 60 sensors on

#### **SCHAEFFLER TECHNOLOGIES**



## Intelligent machine tools with permanent status monitoring.

Last year, DMG MORI introduced an Industry 4.0 project developed together with technology partners. They presented the DMC 80 FD duoBLOCK®, a machine equipped with over 60 monitoring sensors and the ability to network the digitized components from the sensor to the cloud in order to detect, store, and analyze data. The objective is a permanent monitoring of the machine status. The APP-based control and operating software CELOS® supports the interaction between man and machine.

The benefit to the user becomes apparent in two ways. On the one hand, the process parameters are visualized in CELOS® with the help of the "Condition Analyzer," so real-time performance and status analyses can be performed on the machine. On the other hand, the recorded data is combined in a superordinate cloud architecture, where they are subjected to a dedicated analysis based on special algorithms.

It is then determined by the production engineering team of Schaeffler Technologies in Höchstadt an der Aisch how the data can be transformed into concrete knowledge. A DMG MORI pilot machine has been in permanent operation there since late October 2015. Schaeffler estimated that the possibilities would be numerous. They range from an improved control method for the machining process, e.g. in order to allow for better consideration of tool wear, to a lower energy or lubricant consumption. The transmitted status data and empirically determined "behavioral patterns" also enable the user to make a qualified prognoses about potential damage, e.g. to the spindle.

The first step towards the future of machining production has been taken, and the results are very promising. However, it has been said that it is still too early for a quantifying evaluation, although Schaeffler is expecting validated insights within the current year. "What's important is that we have made a start and can now gradually learn how Industry 4.0 works in practical applications, based on a real production," emphasizes Martin Schreiber, Head of Production Machinery at Schaeffler

- Spindle Growth Sensor (SGS) -Sensor for detecting and compensating for spindle displacement.
- Tool Dialog System (TDS) -+Tool identification for manual, no-touch reading/writing of tool data.
- IKZ Flow Monitor -+

IKZ volume flow monitor to ensure the required cooling performance.

#### the machine monitoring the machine status.

#### CONDITION ANALYZER

From Big DATA to Smart DATA – detecting and analyzing machine data with direct feedback to service team and customers for the highest machine productivity.

- + **Detection:** Variable scanning rate, secure data transmission to the cloud (every 10 minutes)
- Analysis: Detects patterns of unusual machine behavior and provides direct feedback to service team and customers.

Technologies AG & Co. KG.



Schaeffler Technologies AG & Co. KG Georg-Schäfer-Straße 30, D-97421 Schweinfurt www.schaeffler.de

INA

FAG







ø 15.7 × 13.0 in. Drill head // Energy Material: 21CrNiMo2 (1.6523) Machining time: 18 hrs.



27.6 × 17.7 in. Tubular mold // Tool and Mold Making Material: 21CrNiMo2 Machining time: 8 hrs.



4<sup>th</sup> Generation duoBLOCK<sup>®</sup>

For more information on the duoBLOCK<sup>®</sup> Series, visit

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duoblock.dmgmori.com

Download the duoBLOCK<sup>®</sup> Series product brochure at:

## download.dmgmori.com

# The standard in 5-axis machining.

- + **powerMASTER®** motor spindle with 737.6 ft./lbs. torque, 103.3 hp. performance and Spindle Growth Sensor (SGS) to compensate for spindle growth, for greatest accuracy.
- + Highest flexibility and shortest machining times with the **new B-axis** with 20% more stiffness and integrated cable carrier.

DMU 80 P duoBLOCK®

- + Large workpieces up to max. diameter of 37.4 in. and 57.1 in. height and a max. load of 3,306.9 lbs.
- + **5X torqueMASTER®** 958.8 ft./lbs., 49.6 hp., SK50 / HSK-A100 and up to 8,000 rpm.
- + **Strong speedMASTER® spindle** standard with 15,000 rpm., 46.9 hp. and 95.9 ft./lbs. (40% DC).
- + **Fast, innovative wheel magazine** with tool change time of 0.5 seconds and up to 453 tools within a small footprint.

#### DMU 80 P duoBLOCK<sup>®</sup> 30% less energy consumption.\*

\* due to the new, efficient, frequency-controlled high-pressure pump up to 1,160.3 psi. as a standard option.



## **DMG MORI TECHNOLOGY CYCLES**



Technology cycle grinding for milling/turning machines.

- + NEW: A solid borne sound sensor integrated in the spindle recognizes the initial contact between the grinding wheel and the workpiece.
- + For internal, external, and face grinding.
- + **Dressing cycles** for wheel dressing.
- + Best surface quality, due to integration of grinding technology.
- + **Optimized profitability** in manufacturing due to the lack of fixture changes.

More on DMG MORI Technology Cycles on page \_

16

The right solution for every applicationduoBLOCK<sup>®</sup> Series featuring the World Premiere DMU 160 P duoBLOCK<sup>®</sup> 4<sup>th</sup> Generation for large workpieces up to 63.0 in.



**DMU** Universal Milling Machines

# DMU 50 – The entry point to 5-axis machining.

**GLOBAL PRODUCTION CONCEPT - ON THE MARKET FOR THE MARKET** Direct on-site production ensures short delivery times with a consistently high quality standard.



Davis, USA

Seebach, Germany

Shanghai, China

Chiba, Japan

- + 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" ERGOline<sup>®</sup> Control with multi-touch screen.
- + Heidenhain iTNC 530 with 19" ERGOline® control panel.



Swivel range of NC rotary table: -5° to +110°.







# **PORTAL** 5-Axis Universal Milling Machines

**BRAD FOOTE GEAR WORKS INC** 

DMG MORI 5-Axis Works Faster, Boosts Quality, Helps Grow Product Line at Brad Foote Gear Works



DMU 210 P and gearMILL® Software for complex machining of an AGMA Q11 herringbone.



DMG MORI 5 Axis milling experts Michael and Bartosz of Brad Foote Gearing are proud of their DMU 210 P, increasing productivity around 50%.

"We're really happy with our DMG MORI DMU 210 P 5-Axis Machining Center," says Michael Nowak, Supervisor of Manufacturing Operations at Chicago's Brad Foote Gear Works. Brad Foote engineers, designs, manufactures and rebuilds complex gearing for the booming wind energy market. Brad Foote supplies parts to other industries such as oil, gas, mining, heavy construction, marine, and many more.

In 2013, Brad Foote purchased the DMU 210 P. "We utilize it for 99 percent of what we do," says Nowak. "For bevel gears, we increased productivity around 50 percent vs. our older machines." The DMU 210 P Five-Axis Machining Center has three linear axes and two rotary **axes**. The unique B-axis kinematics within the head is a great advantage to any other 5-axis machining center on the market. According to Nowak, this is better for complex 3D shapes and 3D coordinate conversion.



# World Premiere DMU 210 P: 2<sup>nd</sup> Generation with 5X torqueMASTER® for maximum chipping performance.



- + Extended swivel range of 250° and optimized interference contour of the milling head.
- + Highest long-term precision, due to cooled linear guides and active spindle displacement compensation.
- + 80% more torque at 1,327.6 ft./lbs. thanks to the 5X torqueMASTER®.
- Innovative wheel magazine for up to 243 + tools (SK50 / HSK-A100) with minimum space requirement.
- + Greatest spindle variety on the market.

#### THERMAL CONTROL

- + Cooled drive motors
- Cooled ball screws +
- Cooled linear guides +
- Cooled drive of rotational axes +
- Sensor-based spindle compensation +
- + Cooled machine bed
- Optional: Tempered machine bed +



Nowak concludes, "We now can make a herringbone gear with the DMU 210 P, a part that was impossible for us before. Our oil industry customers just love this new product. We think it will take us into new markets."



Brad Foote Gear Works Inc 3250 S Central Ave, Cicero, IL 60804 bfgw.isales@bwen.com www.bradfoote.com

# DMU G linear 5-Axis XXL Machining Centers



Above: DMU 600 G *linear* being set up at the XXL-Center of DECKEL MAHO in Pfronten, the world's most modern large machine production facility. Below: Consistently high precision due to temperature stability of machine structure.



# World Premiere DMU 600 G *linear*: The new high gantry large-scale machine with up to 150 ton table load.



CEL()S<sup>°</sup>

from DMG MORI

- + High gantry design with a **table load of up to 165.3 tons.**
- + **Direct Drive technology in all axes** for optimum surface quality and the highest dynamics (linear motors: X-, Y-, Z-axis; torque motors: A-, C-rotational axes).
- + **Temperature control** Extensive cooling measures ensure highest temperature stability for consistently high precision.
- + **Highest rigidity** due to FEM-optimized machine structure components and EN-GJS-600-3 (GGG60).



Scan to watch the video of the XXL Center







# World Premiere *DIXI* 125: < 0.0006 in. volumetric precision on the component.

- + Highest positioning accuracy in the linear axes of up to 0.0001 in.
- + Highest precision, due to component selection and **scraped contact surfaces** of all geometrically relevant components.
- + **Temperature control** for all heat-generating machine components.
- + Highest stiffness for maximum milling performance (GGG60 cast components).



Scan to watch the video



# DMG MORI LIFECYCLE SERVICES



Kevin Bowers Chief Service Officer DMG MORILISA

#### DMG MORI Service – The key advantage!

DMG MORI OEM Service offers you flexible and high-quality service that covers all your requirements with great precision. From prevention to customized service products.

"With the service offered by DMG MORI, you're always on the safe side! Today and tomorrow."

#### **KRONES AG**





Left to right: Thomas Gruber, Head of Machines, Georg Hofmeister, Head of Blowmoulds Management, Timo Potratz, Production Technology.

Exacting demands, **Krones AG** follows the highest standard of manufacturing. The company maintains a **long-term cooperation on service** with DMG MORI. Thomas Gruber, Head of Machines, emphasizes the cooperative nature of the partnership: "It's built on very transparent interaction. Our primary focus is **solution-oriented action**." Their priority is a minimum machine availability of 95%.

Krones minimizes the risk of downtime by performing **regular maintenance** work. When purchasing new machines, Krones also makes sure its **own maintenance team is trained by DMG MORI.** If downtime occurs anyway, the production team benefits from the short response time of DMG MORI Service Technicians and the quick delivery of replacement parts. "Our employees are also supported by the toll-free DMG MORI Service Hotline," says Timo Potratz, who is responsible for production technology.



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

(855) DMG-MORI (364-6674)

# 10 Years

On average, DMG MORI service technicians have 10 years experience with DMG MORI machines.

INSPECTION – THE FIRST STEP TOWARDS TOP PERFORMANCE

With our manufacturer's inspection, you always know where things are at. After the inspection, you'll receive a detailed status report from our service experts.



#### MAINTENANCE – MANUFACTURER MAINTENANCE FOR HIGHEST AVAILABILITY

The manufacturer maintenance that will help you increase your productivity and reduce your operating costs. Our experts carry out the maintenance based on the machine condition and a checklist.



# 2,500

More than 2,50 service experts fastest custome 300,000 installe

OMG MORI

MAINTENANCE KITS – AFFORDABLE ORIGINAL REPLACE-MENT PARTS, IN A FULL PACKAGE

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



) KRONES

Krones AG, Böhmerwaldstraße 5 D-93073 Neutraubling, www.krones.com

#### HIGHLIGHTS

- + Inspection of media supply, including pneumatics, hydraulics, cooling and ventilation units, and central lubrication.
- + Depending on the machine, inspection of covers and panels, main drive and axle drives, tool change units and magazines, etc.
- + Optional: Replacement/installation of selected wear parts at a fixed price.

Detailed information is available from your local service team: **www.dmgmori.com** 

#### HIGHLIGHTS

- + Comprehensive maintenance from our service experts.
- + Replacement/installation of necessary wear parts at a fixed price.
- + Extent of maintenance is adjusted based on machine operating time, as needed.

Detailed information is available from your local service team: **www.dmgmori.com** 

#### 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.

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

25 **DMG MORI** 

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

We take action fast: All orders are processed centrally and the spare parts are shipped from the nearest Spare Parts Center. 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



# **SPARE PARTS**

# **Technicians**

0 certified DMG MORI worldwide to ensure the r support on more than d machines.

# **Top Equipment**

Your DMG MORI advantage: Inspection and maintenance with manufacturer know-how, high-tech measurement devices and highly accurate instruments.

**SPINDLE SERVICE -**SPINDLE MAINTENANCE KIT

Take preventive steps and maintain the spindle yourself: Our Spindle Maintenance Kit contains everything you need.



**TRAINING** -YOUR KEY KNOW-HOW ADVANTAGE

DMU 65 monoBLOCK®

Application training helps your productivity really take off, e.g. with reduced programming and set-up times.





Scan to watch the video on DMG MORI Spare Parts



#### HIGHLIGHTS

- Perfectly matched to the relevant tool +clamping system.
- Select your own contents from the following components: Mechanical or digitally variable pull-in force gauge, concentricity mandrel, dial gauge with magnetic support, depth gauge.
- + Professional support during motor spindle maintenance.
- All components in one system. +
- Ensuring machine availability + and productivity.
- System customized for your needs. +

#### HIGHLIGHTS

- Modular and practical training in + programming, setting up and operating your DMG MORI machines.
- Innovative courses, cutting-edge + training equipment.
- Training in small groups directly on + the machine.
- Highly qualified trainers with certified + methods and didactics.
- Training specially tailored to your +needs at our modern training centers or on site at your facility.
- Online training to consolidate + knowledge.





CHINA



#### 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.



Scan to learn more on LifeCycle Services, visit:

lifecycle-services. dmgmori.com

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# DMG MORI TOOL PRESETTING

#### VAN AARSEN MACHINEFABRIEK B.V.



#### Productivity plus in tool presetting.

Whether hammer mill, pelleting machine, or mixer - when it comes to feed production systems for the agricultural industry, Van Aarsen, based in Panheel in the Netherlands, has been the leading global supplier since 1949. Having had good experiences with DMG MORI machine tools, the company decided to use one of the leading innovator's products for tool presetting, as well: "Compared to the models of other suppliers and judging by its wealth of features, the UNO 20170 autofocus is the most attractive option in terms of price," procurement manager

Jack Coumans justifies the purchase. "Its 15.7 in. diameter and its measuring length of 27.6 in. are ideally suited to cover our range of tools." Its FEM-optimized and thermally stable construction also ensure high-quality measurement results.

One highlight of the DMG MORI Microset entry-level device is its autofocus. It reliably ensures that the setting for the cutting edges is sharp, precise, and automatic. Van Aarsen benefits from this function especially with complex tools, since the automatic focus is also capable of automatically calibrating

Scan to watch the DMG MORI	
Microset Video To learn more about DMG MORI	(
Microset, visit: microset.dmgmori.com	(
Download the tool presetting product brochure at:	
download.dmgmori.com	(

multiple edges in succession. Considering Van Aarsen's quality requirements and the large number of tools used. Jack Coumans reaches a clear conclusion, "Overall, the UNO 20|70 autofocus ensures maximum precision and a significant increase in productivity when it comes to tool presetting."

# Van Aarsen

Van Aarsen International B.V. Heelderweg 11, NL-6097 EW PANHEEL www.aarsen.com

## UNO 20|40 autofocus -Precise and quick.

UNO is extremely accurate and offers the perfect results for tool dimensions with a diameter of up to 15.7 in. and measuring lengths of up to 15.7 in. (optional: 27.6 in.).

#### **HIGHLIGHTS OF** THE UNO AUTOFOCUS

- + Automatic focusing on the cutting edge to be measured.
- Best suited for tools with multiple cutting edges.
- Spindle SK50 with automatic focus.
- Can be operated manually.





## Quality made in Germany -100% designed and made by HAIMER

HAIMER, world market leader in tool shrinking and balanc- HAIMER's product offering includes tool holders, balancing holding technology, in order to transfer precision and ing technology, is a family run, medium sized company machines, shrink fit machines, 3D measuring devices and power from the spindle to the cutting edge. The partnerlocated in Igenhausen, Bavaria near Augsburg, Germany. HAIMER has designed, produced and sold innovative, high precision products for the metal cutting industry for nearly 40 years.

most recently also solid carbide end mills - all made in lgenhausen.

In order to make intensive tests on the HAIMER cutting tools and to develop the right milling strategy with the customers, More than 350 of the 500 employees worldwide are work- HAIMER invested into a new Applications Center with three ing at HAIMER's sole production facility in Igenhausen in new DMG MORI machining centers. On a HSC 70 linear, combination with the most modern of machines that utilize a DMU 80 P duoBLOCK and a DMC 1150 V, customer requirements out of various industries can be simulated and training as well as test-cuts can be carried out. With this investment the location Igenhausen has been extended to a Center of Excellence for Tool Holding & Milling.

ship is absolutely profitable for all parties.

a high level of automation.

As the European market leader in the area of tool holding technology, with a daily capacity of approx. 2,000 tool holders, keeping the technological edge of the products is very important. Because of this, every year between 8 to 10% of the revenue is invested into research and development. The daily drive to be better perfectly fits with the corporate philosophy: Quality Wins.

Managing Director and President of the Haimer Group, Andreas Haimer, is excited about the partnership with DMG MORI: "It is a perfect synergy for the customer! High performance machine tools require high precision tool

Haimer USA. LLC 134 E. Hill Street Villa Park IL 60181 | USA Phone: +1-630-833-1500 Fax: +1-630-833-1507 haimer@haimer-usa.com ww.haimer.com

HAIMER



# DMG MORI USED MACHINES

# Immediately available – more than 700 machines.



DMG MORI Used Machines is the world's largest dealer of used CNC machines. We offer certified DMG MORI used machines for all needs and budgets. For you, that means a large selection, short delivery times, and comprehensive all-round service.

#### HIGHLIGHTS

- + More than 700 current used and in-stock machines.
- + Each machine is available immediately.
- + All machines are certified top quality.
- + Technologies for every requirement.
- + Machines in every price category.
- Convenient search functions by type, year of manufacture, etc. in our online portal: www.cnc-scout.dmgmori.com

#### QUICK OFFER

Whether a used or showroom machine, DMG MORI Used Machines offers you an unrivaled variety of machines. Use our convenient online marketplace for used machines: www.cnc-scout.dmgmori.com

#### CERTIFIED TOP QUALITY

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#### ANFOTEC ANTRIEBSTECHNOLOGIE GMBH



Above all other things, Director Christian Hast has been convinced by the high quality.

"Since the used machines are available immediately, we were able to expand our production capacities within a very short time."

Founded in 2000, **ANFOTEC** Antriebstechnologie GmbH has become established in the areas of machine tool construction, measurement technology, and semiconductor processing as a quality-conscious manufacturer of body maker machines including drive technology. ANFOTEC uses **CNC technology by DMG MORI** to meet the high manufacturing standards. Four of its nine models – including a DMU 200 P and a DMF 260 – are from the DMG MORI Used Machines range. Christian Hast, Director of ANFOTEC, says, "We're familiar with the long service life of these machines. That's



Four of nine high-tech machines are already by DMG MORI.

why used models are an attractive option when it comes to expanding our production capacities. New machining centers by DMG MORI feature a future-proof design. Used models benefit from that too." As a result, the performance capacity meets the quality requirements of ANFOTEC – the company is ISO DIN EN 9001-certified. Another great advantage, in the director's opinion, is the quick delivery. "The selection of DMG MORI Used Machines usually include suitable solutions ex works that – unlike new orders – can be installed within a very short time."



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#### **CONTROL TOWER FOR INCREASED** SUPPLY CHAIN TRANSPARENCY

Control towers are a much discussed topic in the logistics industry. Essentially, their purpose is to increase the transparency of complex supply chains in all business areas.



Complex supply chains require quick, fact-based communication. This level of complexity exists with intercontinental or global supply chains, great dependencies, a high degree of outsourcing for supply chain activities, and complex requirements on the customer's part. The more complex the supply chain, the greater the **added value** can get for the customer. If all relevant data can be bundled and analyzed at a central information hub, especially companies with fragmented supply chains benefit from the concept of a Control Tower. The Control Tower provides insights into key information such as delivery information and status, consumption cycles, or production supply, to name just a few.

#### Modular and Scalable Design

A Control Tower can be scaled based on your requirements. However, an overall alignment focusing on a **Control Tower** only becomes useful in the areas of **3PL and 4PL** (Third Party Logistics Provider with its own assets, or Fourth Party Logistics Provider without its own assets), especially if multiple **supply chains** with different shipping routes and requirements have to be coordinated. A **Control Tower** can also feature a **modular design** which allows it to be used – for example – for auditing purposes, but also for supplier evaluations. In order to allow

daily business to proceed as usual, a **Control Tower** should be implemented in multiple stages and have a balanced focus. The scope ranges from basic services provided by a logistics supplier and value-added services of a 3PL to the services of an LLP (Lead Logistics Providers, a combination of 3PL and 4PL competences, such as own truck and warehouses plus the necessary know-how for controlling complex supply chains), and eventually to the 4PL, which coordinated a company's logistical processes without contributing any of its own assets. Whether a company is a medium-sized enterprise or a group, if the outsourcing of logistical processes is a relevant subject, it may be useful to set up a Control Tower. In DMG MORI's case, Gondrand | ATEGE already uses Control Tower solutions for procurement and distribution logistics at the Seebach location, and for the distribution logistics at the Bielefeld location. Our focus is to align our processes using a single full-service logistics provider. Streamlined management structures are to be preferred with Control Tower solutions as well. Currently, additional Control Tower concepts for DMG MORI are in the development stage in order to continue to drive optimization in the supply chain effectively. Especially in the areas of production efficiency, supply chain transparency, logistical service monitoring, and transport cost control, we seek to locate the greatest potential for improvement. An optimization of the logistical processes and bundling of the logistical activities between DMG MORI and Gondrand | ATEGE holds an enormous win-win potential for all parties involves, from the supplier to the end customer.



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