

JOURNAL

N° 1 – 2017

Virtual becomes real

The digital path from the idea to the finished part

More on Page _____ 4

PATH OF DIGITIZATION

CELOS® Manufacturing

CELOS® Machine

Digital Factory

NEW



Automation

More on Page _____ 12

NEW



Additive Manufacturing

More on Page _____ 24



Come and see us at

DMG MORI Innovation Days

in Chicago

May 15th – 18th, 2017

Read more on pages 2–3

Shape the future with manufacturing and automation solutions for Industry 4.0

DMG MORI promotes automated technology and solutions for small, medium and large customers and invests in pioneering processes and digital solutions for the shop floor of the future.

Read more about this topic on page 4

Shape the Future with Industry 4.0 at Innovation Days in Chicago!

DMG MORI USA Innovation Days

in Chicago, May 15th –18th, 2017

Dear Valued Customer,

At Chicago Innovation Days 2017, we invite you to "Shape your future production with Industry 4.0."

We are excited to showcase over 30 of our cutting-edge machines in action, including the latest CMX 1100 V – Solution-based machine for every shop! In an exhibition space of 42,000 ft², DMG MORI presents the latest innovations in technology, including daily seminars on the Internet of Things with CELOS® – learn more about integrated production planning and control with digital solutions from DMG MORI. Additionally, explore our 5-axis Center of Excellence, which features small-footprint 5-axis Universal Milling Machines up to XXL Machines for large production. Learn about our factory in Davis, CA, and discover automation solutions to minimize your downtime and maximize your output!

Register online today at www.chicago.dmgmori.com
We look forward to your visit!

Sincerely,

Dr. Thorsten Schmidt
Chief Executive Officer
DMG MORI USA

Mr. Randall Harland
Regional Director
DMG MORI Chicago



HIGHLIGHTS



US PREMIERES

The Universal 5-axis Milling Machine for every shop, the DMU 50 has the **highest flexibility** with variable table options, from fixed to swivel rotary table, for 5-axis simultaneous machining! At Innovation Days, see it live with Fanuc control for easy programming!

With milling, turning, and grinding all on the same platform, the DMC 80 FDS duoBLOCK® offers all users with the **highest performance** and options. A highly rigid 5-axis machining center, the duoBLOCK® is a show-stopper at Innovation Days!



DIGITALIZATION / INDUSTRY 4.0 + CELOS®

In a new era of digital production planning, partner with us to increase your productivity. Learn about **Industry 4.0 with CELOS® integrated digital solutions** for high capacity utilization and efficiency.



5-AXIS CENTER OF EXCELLENCE

From 5-axis Universal Milling machines with a small footprint to XXL machines, explore the variety of offerings in the **5-axis Center of Excellence!**

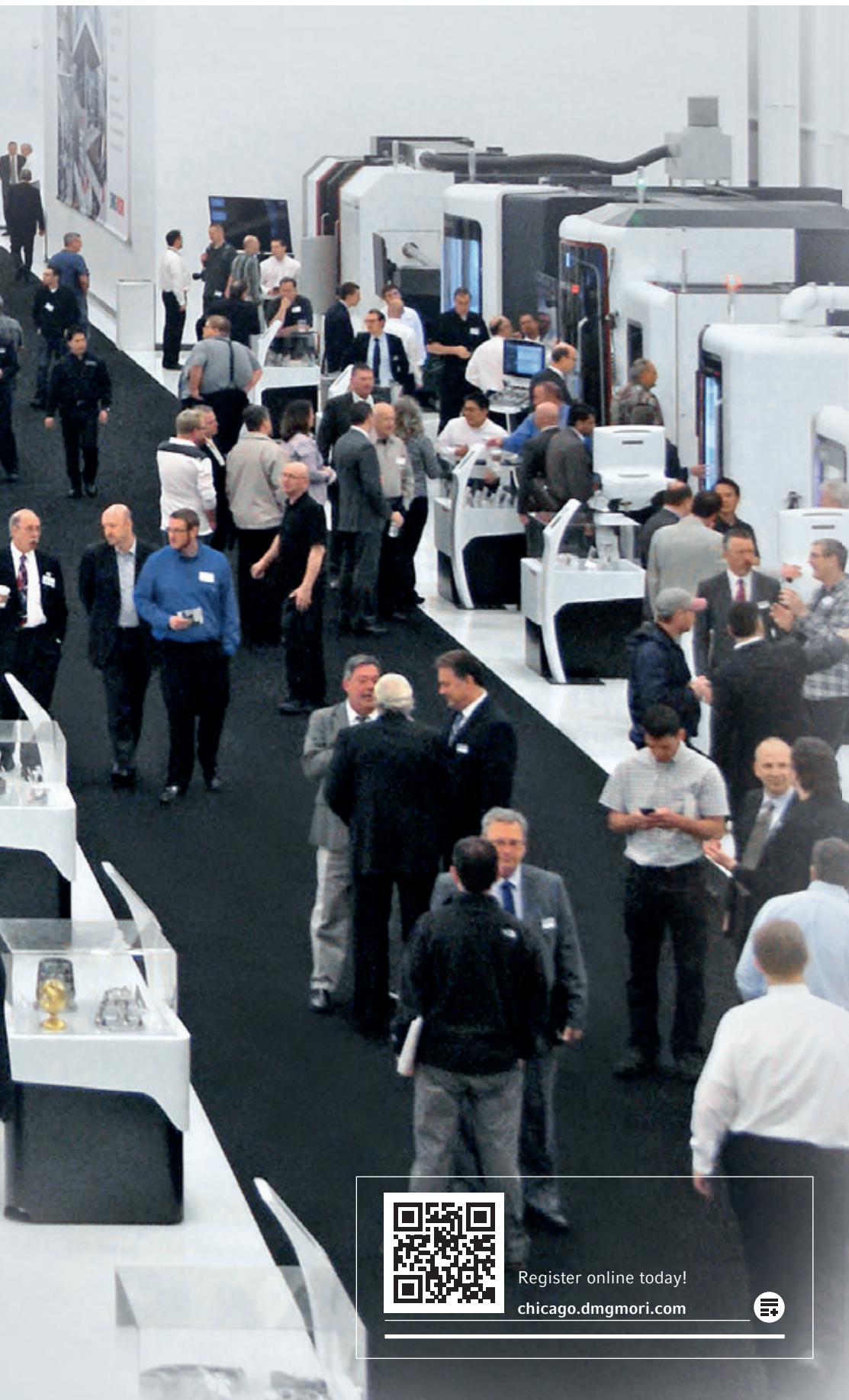
DMG MORI AUTOMATION SOLUTIONS

Better allocate your employees' time by automating repetitive operations. Experience a variety of Automation Solutions that can help you **maximize output and minimize downtime.**



LOCAL PRODUCTION

Whether a 5-person shop or a fortune 100 OEM, discover a **range of machines fit for your needs from our Davis, CA, factory** – includes the latest vertical machining center, CMX 1100 V to our horizontal machining centers, NHX series.



Register online today!
chicago.dmgmori.com



MACHINES LIVE AT INNOVATION DAYS 2017

TURNING MACHINES

- | | |
|-------------------|-------------------|
| NLX 2500Y | CTX gamma 2000 TC |
| NLX 2500SY | ■ Wasino G-100 |
| NLX 6000 | NRX 2000 |
| NTX 1000 | ■ SPRINT 2018 |
| ■ NTX 2000 | ■ SPRINT 3215 |
| ■ CTX beta 800 TC | NZX 2000SY |

MILLING TECHNOLOGY

- | | |
|--------------------------|------------------------|
| CMX 1100 V | DMU 50 |
| CMX 1100 V | DMU 50 |
| ■ CMX 1100 V | DMU 65 monoBLOCK® |
| ■ NHX 4000 | ■ DMC 65 monoBLOCK® |
| ■ NHX 5000 | DMF 260 |
| ■ NHX 6300 | ■ DMC 80 FDS duoBLOCK® |
| ■ DMC 80 H <i>linear</i> | ■ DMC 125 FD duoBLOCK® |
| ■ DMU 50 with Fanuc | DMU 210 FD |

LASERTEC

- | | |
|-----------------------|-------------------------|
| LASERTEC 45 Shape | LASERTEC 4300 <i>3D</i> |
| ■ LASERTEC 20 PT | LASERTEC 4300 <i>3D</i> |
| LASERTEC 65 <i>3D</i> | |

ULTRASONIC

- ULTRASONIC 20 *linear*
- ULTRASONIC 60 eVo

GRINDING

- Vertical Mate 85

■ Machines with Automation ■ US Premiere
 made in the USA



Photo courtesy: IMS Photography



REGISTER AND ATTEND INNOVATION DAYS IN CHICAGO ...

... for a chance to win an exclusive Race Weekend Experience with Andretti Autosport from May 26th - 28th*

Trip includes an exciting package as detailed below:

- + Two packages offered, each for 1 adult and +1 accompanying guest
- + Transportation cost to Indianapolis and home
- + Hotel accommodations for three nights (May 26th - 28th - Friday, Saturday, and Sunday)
- + Indy 500 Race Day Bus Seat (Per Person/Round Trip with Police Escort)
- + Indy 500 Silver Badge Credential (pre-race grid and garage access)
- + Enjoy complimentary food and beverages at Andretti Autosport's Gasoline Alley Suite Ticket for Carb Day (Friday)
- + Enjoy complimentary food and beverages at Andretti Autosport's annual Night Before the Indy 500 Party
- + Enjoy complimentary food and beverages at Andretti Autosport's Gasoline Alley Suite Ticket for Race Day (Sunday)

* Visit chicago.dmgmori.com for trip details and terms

CELOS®

With CELOS® into the age of Industry 4.0



➤ INTELLIGENT WORKFLOW

CELOS® Manufacturing

- + CELOS® APP-based digital workflows for maximum efficiency on the shop floor

➤ MORE THAN JUST SMART

CELOS® Machine

- + CELOS® APP-based control and operating system
- + 26 CELOS® APPs for machine configuration, process optimization and digital interaction
- + Up to 60 sensors for monitoring and supervision of machine and process
- + DMG MORI technology cycles for efficient dialogue-based workshop programming

NEW CELOS® PERFORMANCE PACKAGE

Software package for the
visualisation of machine status



Condition Analyzer
Analysis of
machine and
process signals



Performance Monitor
Transparency and
monitoring of manu-
facturing parameters

Extended functional scope in conjunction
with sensor package I4.0

LIVE AT
CHICAGO
INNOVATION
DAYS!

26 CELOS® APPs in the process

Current CELOS® APPs for Digital Manufacturing

MATERIAL/ WORKPIECE



JOB
MANAGER



JOB
ASSISTANT



3D PART
ANALYZER



SURFACE
ANALYZER



CAD-CAM
VIEW



JOB
MANAGER



JOB
ASSISTANT



CONTROL



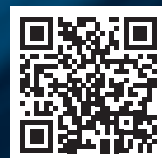
TECH
CALCULATOR



CAD-CAM
VIEW



DOCUMENTS



FIND OUT ALL ABOUT OUR
26 CELOS® APPs, CURRENT CELOS®
PROJECTS AND FREE UPDATES:

celos.dmgmori.com



EDITORIAL



➤ EXCELLENCE IN PRODUCTION

Digital Factory

- + Integrated production planning and control with digital solutions from DMG MORI

TOOL / CLAMP



JOB MANAGER



PALLET MANAGER



JOB ASSISTANT



CLAMP CHECK



TOOL HANDLING

CELOS® MACHINE



CONTROL



STATUS MONITOR



PERFORMANCE MONITOR



JOB MANAGER



MESSENGER



SERVICE AGENT



JOB SCHEDULER



JOB ASSISTANT



NET-SERVICES



ENERGY SAVING



ROBO2GO



DOCUMENTS



SETTINGS



CONDITION ANALYZER



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

Successful new alignment and exciting innovations

Dear customers, partners and potential customers,

DMG MORI is developing dynamically. We are reorganizing ourselves and are concentrating on our core business with machine tools and services. We hope to impress you with our innovations and integrated technology solutions to continue to be a leader in this field. Our objective is your success! If you are satisfied, then we are too!

Dear customers and partners, you are at the center of our customer focus and therefore our "Customer First" program. Take advantage of our 5 service promises! You can now get original spare parts with a "Best Price" guarantee and highest availability, quality service at reasonable prices and much more. Please see page 8 of this journal for more details.

We are continuing to work on our "First Quality Strategy" with great passion. As a "Global One Company", with DMG MORI COMPONENTS we are combining quality, accuracy and rigidity. The 24-month warranty for speedMASTER® spindles is an example of how you can benefit directly from our global logistics network.

In 2017, we are concentrating on EMO Hannover. Our new developments are aimed at this industry highlight. Nevertheless, right at the start of the year, we are now able to present to you three world premieres and important innovations:

- + We are strengthening our expertise in Additive Manufacturing! In collaboration with REALIZER, DMG MORI will in future also be offering Selective Laser Melting and with it a perfect addition to our Advanced Technologies.
- + We will be promoting digitization! We are further expanding our software with innovative solutions. These are based on CELOS®. With 26 APPs, we already support networked intelligent production. Our 26 exclusive DMG MORI technology cycles enable shop floor programming to be carried out quickly and easily. In production engineering, our DMG MORI Powertools simplify the automatic production of programs.

You will see that, as a "Global One Company", we are highly diversified and possess great technical expertise, innovation and global presence. We are here for you – no matter where, no matter when! Please get in touch with us! Our staff throughout the world are always ready to help!

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

Christian Thönes,
Chairman
DMG MORI AKTIENGESELLSCHAFT

DMG MORI Technology Cycles | Power tools

Up to 60 % faster programming

HIGHLIGHTS: DMG MORI TECHNOLOGY CYCLES

- + **Dialogue-assisted programming** with 26 exclusive cycles for handling, measuring, clamping and monitoring
- + **NEW:** Intelligent grinding cycles for internal, external and surface grinding
- + **Real-time monitoring** for maximum process safety and component quality

Shop floor programming with exclusive DMG MORI Technology Cycles



Watch the video on
3D quickSET®
dmgmori.com/en6450



➤ HANDLING CYCLES



➤ MEASURING CYCLES



➤ MACHINING CYCLES



➤ MONITORING CYCLES



SELECTED EXAMPLES:

TOOL SORTING CYCLE

- + Shorter idle times thanks to automatic sorting of the tools in the magazine in the required sequence
- + Time-optimized sorting in the chain magazine by using the tool shuttle instead of the spindle

3D QUICKSET®

- + Tool kit for checking and correcting the kinematic accuracy of 4 and 5-axis machine configurations
- + All head variants and table axes
Note: In conjunction with the measuring probe option only

GRINDING 2.0

- + The AE (Acoustic Emission) sensor detects the first contact between grinding wheel and workpiece
- + For internal, external and surface grinding
- + Dressing cycles for dressing the grinding wheel

MPC 2.0 – MACHINE PROTECTION CONTROL*

- + Vibration sensor on the milling spindle
- + NEW: Cutting force monitoring for drilling and thread-cutting

* For turning-milling machines including Easy Tool Monitoring 2.0 as a package

CAM programming with exclusive DMG MORI power tools

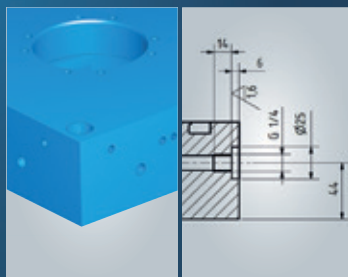
HIGHLIGHTS

- + Automatic program creation in production engineering
- + **NEW:** Technology Library, Adaptive Process, CAM Agent of SIEMENS NX, AUTODESK FeatureCAM and ESPRIT
- + Exclusive modular DMG MORI software solutions

Technology Library

Reliable production based on your expertise!
Save and retrieve whole sequences and tool technologies at the push of a button.

- + **Recognized features** are specified with familiar tools and technology parameters
- + **Approved cutting parameters** are automatically assigned in new programs



Virtual Machine

Avoid real problems in the virtual world!
Multi-machine control and unmanned production by controlling your NC programs.

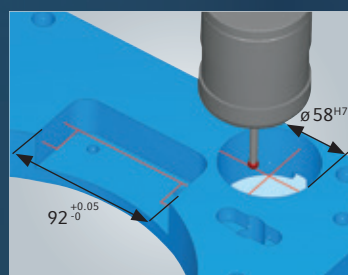
- + **1:1 simulation with numerous new functions**
- + **Simple handover to the simulation software using DMG MORI interfaces for:**
 - Clamping devices
 - Zero points and table positions
 - Tools and NC programs



Adaptive Process

Quality under control!
Fully automatic in-process alignment of components, machining of fits and recording.

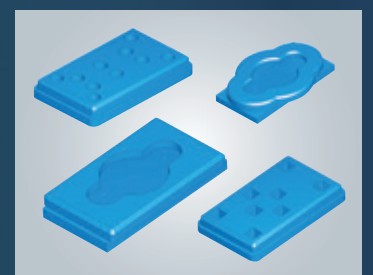
- + **Easy-to-use input screens enable ...**
 - Fits to be produced with high accuracy
 - Measuring probes to be calibrated
 - Measurements to be recorded
- + Adaptive process control
- + All directly on the controller without interfering with the machine



CAM Agent

NC programs without end!
Component families from your CAD software once learned automatically generate NC programs to your requirements for any variants.

- + **DMG MORI Smart Programming enables:**
 - Learning of a template from any CAD system
 - Automated program creation while maintaining all previously defined procedures and technologies
 - Automatic matching of programs to existing tools and technologies when changing machines



CUSTOMER FIRST

Our 5 service promises!



Kevin Bowers
Chief Support Officer
DMG MORI USA

1



2



» SPARE PARTS

LOCAL SERVICE COMMITMENT



LOCAL SERVICE COMMITMENT

- + Over 300 Service and Parts employees and more than 100 Application Engineers nationwide for immediate support
- + 2-year warranty on labor and spare parts for new machine purchase*
- + Over \$150 million in spare parts stock
- + 24-or-free: guaranteed replacement-part shipping within 24 hours of receiving your order – or it's free**
- + New parts and replacement parts available
- + Ordering available via our 24/7 Service Hotline



DMG MORI 24/7 Service Hotline – support around the clock!
(855) DMG-MORI (364-6674)

* 2-year warranty on labor and spare parts for new machine purchase
** 24-or-free guarantee: subject to DMG MORI terms and conditions, some restrictions apply

BEST PRICES ORIGINAL SPARE PARTS

BEST PRICE GUARANTEE

If you should find a spare part quoted or supplied by us elsewhere at least 20 % cheaper, we will immediately refund you the price difference up to 100 %. Guaranteed!

IT'S THAT EASY



Simply email with our quotation or order number together with the cheaper alternative quote or Internet link to the alternative supplier to:
usaparts@dmgmori-usa.com



DO YOU HAVE ANY INQUIRIES?

For inquiries about best prices on original spare parts, contact:

usaparts@dmgmori-usa.com



3

4

5



» SERVICE

BEST PRICES SPINDLE SERVICE

DMG MORI SPINDLE REPAIR

- + Fast, reputable and reliable
- + **NEW: 9 months** warranty
- + Fixed price at no additional costs
- + Replacement of rotary union included

DMG MORI REPLACEMENT SPINDLE SERVICE

- + Fully refurbished replacement spindles or new spindles for immediate use
- + Up to 24 months (for new parts) or 9 months (replacement parts) warranty

DO YOU HAVE ANY INQUIRIES?

For inquiries about best prices on spindles or replacement and repair, contact:

bestprice@dmgmori-usa.com



PREVENTIVE SERVICE TO MINIMIZE DOWNTIMES

DMG MORI SERVICE PLUS

- + **Inspection Plus:** Cost-efficient service entry package with detailed report on machine status
- + **Maintenance Plus:** Full 2,000 hour maintenance with replacement of all necessary wear parts
- + **Service Competence Plus:** We help you maintain your machine and show you all you need to know about performing your own maintenance

DO YOU HAVE ANY QUESTIONS?

Find out more about fixed and lower operating costs at:

serviceplus.dmgmori.com



SERVICE APPRENTICESHIP TRAINING

DMG MORI APPRENTICESHIP PROGRAM

- + DMG MORI Academy holds NIMS (National Institute for Metal Working Skills) accreditation as of April 2013
- + Utilizing a blend of classroom and online courses for programming, operating, maintenance and repair
- + In 2016, DMG MORI Academy saw a record of nearly 24,000 online course completions
- + Training provided at headquarters in Hoffman Estates, IL, and manufacturing in Davis, CA, using CNC machines, sub-assemblies, and simulators

TRAINING

- + Instructor led training courses at the DMG MORI Academy
- + Online training
- + Hands-on training in the field with expert Service Engineers who teach apprentices to repair, install, and maintain the lifespan of a machine tool

ARE YOU INTERESTED?

Visit learn.dmgmori.com for more details, or simply send an E-mail to:

infodmsa@dmgmori-usa.com



6-sided complete machining

From Universal Turning ...

BMT® turret with 10,000 rpm

- + Improved machining capacity and milling accuracy

Flat guides on all axes

- + Optimum damping characteristics and dynamic rigidity

3.9 in. Y-axis

- + Eccentric machining



NLX 2500SY | 700

- + The top-seller with counter spindle and Y-axis
- + Turning diameter up to 14.4 in.
- + Turning length up to 27.7 in.

➤ TECHNOLOGY CYCLES: EXAMPLES OF UNIVERSAL TURNING



GEAR MILLING

- + Programming of gear parameters via dialogue inputs
- + Tool life maximized by shifting the milling cutter
- + Achievable quality \leq AGMA 8



EASY TOOL MONITOR

- + Damage prevention in the case of broken or overloaded tools
- + Immediate feed stop after one second
- + No sensors thanks to innovative evaluation algorithms
- + Automated learning of load limits

... to Turn & Mill

Up to 80 tools
+ Unlimited flexibility and
shortest set-up times

compactMASTER® with 120 Nm
+ 32.3 in³/min chip removal rate
(Ck45)

< 5µ thermal stability
+ Excellent surface quality
thanks to spindle length
compensation

CTX BETA 800 TC

- + Universal package with chuck, chip conveyor, internal coolant supply and multi-tools as standard
- + Turning diameter up to 19.7 in.
- + Turning length up to 31.5 in.

LIVE AT
CHICAGO
INNOVATION
DAYS!

➤ TECHNOLOGY CYCLES: EXAMPLES TURN & MILL

PROTECTION PACKAGE*

- + Increased efficiency due to reduced idle times
- + Machine Protection Control
 - Vibration sensor on the milling spindle
 - Rapid shutdown < .01 seconds
- + Easy Tool Monitor 2.0
 - Tool monitoring system

*Package comprising of MPC and Easy Tool Monitor 2.0

5-AXIS SIMULTANEOUS MACHINING

- + Precise movement for perfect surfaces
- + Free-form surfaces using 5-axis interpolation
- + 5-axis movements programmed using customer's CAD/CAM system
- + Look-ahead function for continuous processing



**From the raw material
to the finished part:
Expertise from
a single source!**



Adam Hansel
Chief Systems and Sales Officer
Tel.: 530-746-7402
ahansel@dmgmori-usa.com

➤ EXAMPLES OF PALLET HANDLING

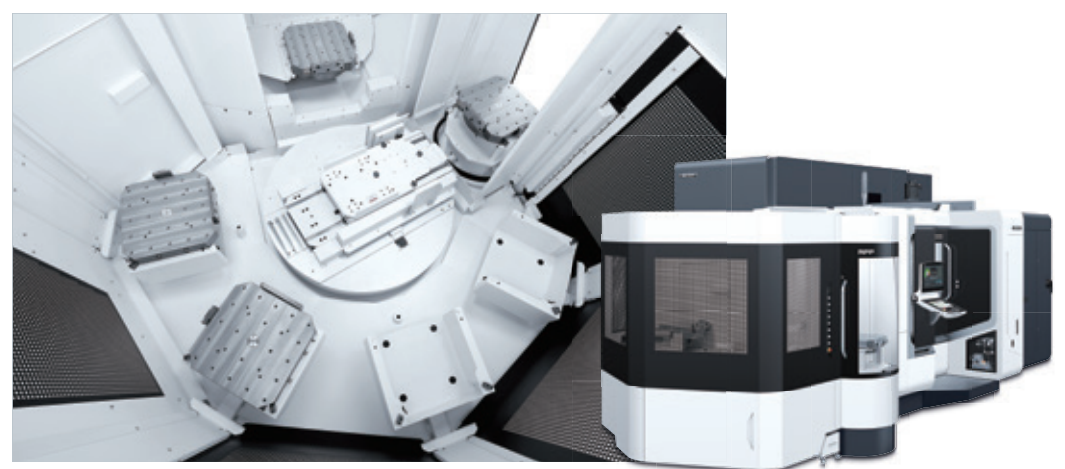
PH – PALLET HANDLING

- + Cost-effective automation solution for 1 machine with 1 set-up station
- + 8 additional pallet positions as standard, 30 max.



RPP & RS – ROTARY PALLET POOL

- + Simple automation solution for 1 machine with 1 set-up station
- + Up to 11 additional pallet positions



➤ EXAMPLES OF STANDARD AUTOMATION

CTX beta 800 TC WITH Robo2Go

- + Available for all DMG MORI universal lathes with CELOS®
- + Easily installed with no additional training required, control via CELOS®
- + Free accessibility for the operator



MILLTAP 700 WITH WH3

- + Workpieces up to a maximum of 15.4 lbs.
- + Working radius of 35.1 in.
- + 15-fold workpiece-carrier circulating system



➤ EXAMPLES OF CELLS

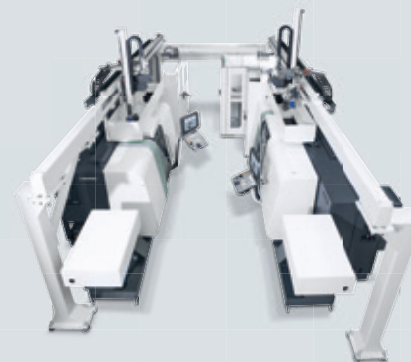
MODULAR CELL SYSTEM

- + Workpiece and tool handling
- + Standardized 28 in. module width for easy cell matching
- + Wide range of peripheral modules, e.g.
 - Deburring
 - Washing
 - Measuring
 - Tool handling



- NRX 2000 with robotic loading incl. position detection for bulk material**
- + Gantry loader for transfer from buffer to Process 1 and 2

2x CTX alpha WITH GANTRY LOADING



- + Integration of up to 8 machines
- + Standardized, function-oriented modules
- + Modular system
- + Workpiece, pallet and tool handling

CPP – CARRIER PALLET POOL

- + Extendable to max. 4 machines with up to 2 set-up stations
- + Up to 29 additional pallet positions



LPP – LINEAR PALLET POOL

- + Extendable to max. 8 machines with up to 5 set-up stations
- + Up to 99 additional pallet positions on 2 levels



Local Manufacturing in Davis, California



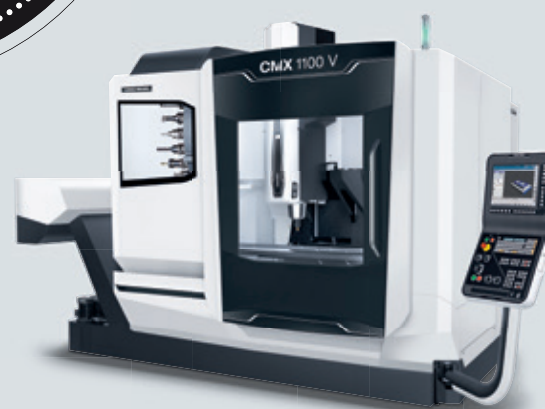
Local Production

VERTICAL MILLING MACHINES

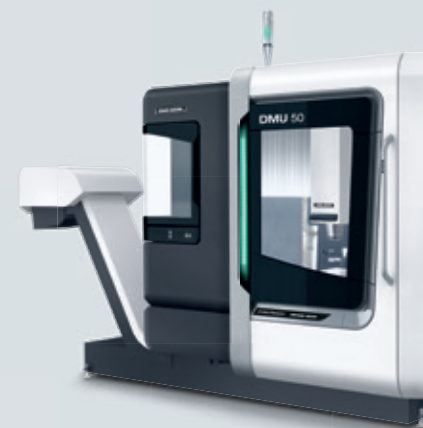
- + CMX 1100 V
- + DMU 50 2nd Generation with FANUC control

HORIZONTAL MACHINING CENTERS

- + NHX 4000 2nd Generation
- + NHX 5000 2nd Generation
- + NHX 6300



CMX 1100 V
Vertical Machining Center



DMU 50
Universal Milling Machine



Daniel Amendola
CMX/DMU Product Manager
Tel.: 530-746-7400
damendola@dmgmori-usa.com

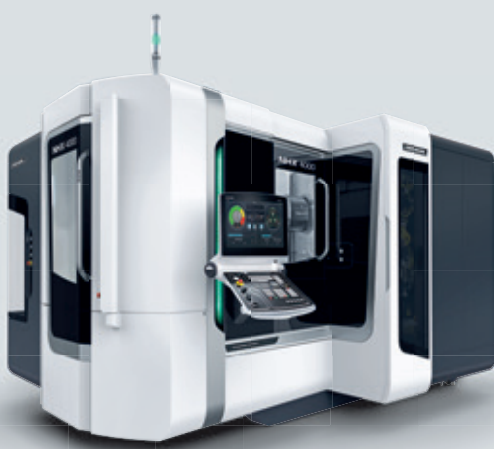
Contact to schedule a factory tour!



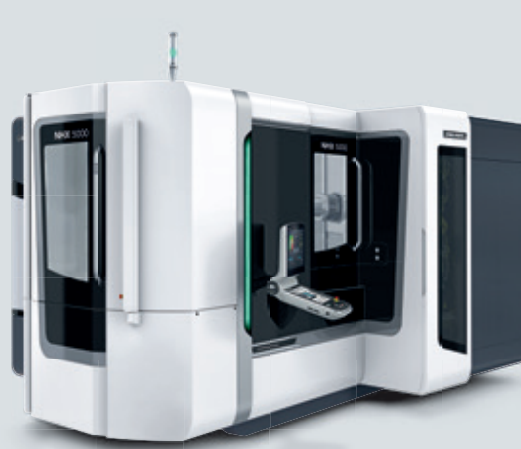
HIGHLIGHTS

Our Davis, CA, factory offers customers in North America with the quickest machine delivery times and local factory support for their urgent needs.

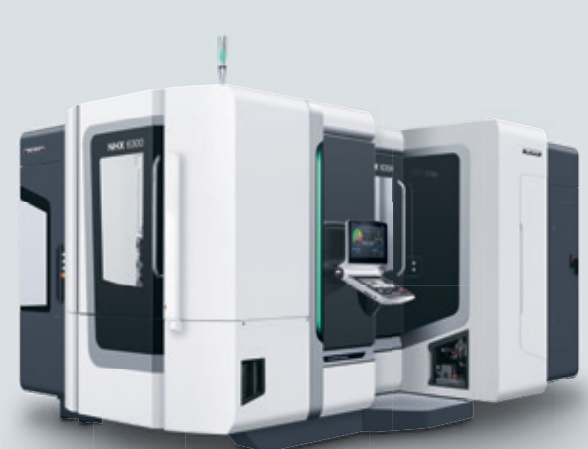
- + **221,000 ft²** production floor
- + Production capacity of over 100 machines per month
- + Machining of key components and parts on DMG MORI machines such as **LPP** (Linear Pallet Pool) lines on the NHX 4000, and **5-station RPP** (Round Pallet Pool), for exceptional space-saving and convenient setup on the NHX 4000 and NHX 5000
- + DMG MORI quality control process totaling **over 100 hours of tests** for each machine
- + All castings machined in-house to ensure the highest quality
- + Reduced delivery times
- + Customized and price-competitive solutions



NHX 4000 2nd Generation
Horizontal Machining Center



NHX 5000 2nd Generation
Horizontal Machining Center



NHX 6300
Horizontal Machining Center

CMX

High-performance milling with powerful spindles and wide range of options!

CMX

=

Compact

Competitive

Customized



		VERTICAL MACHINING			5-SIDED MACHINING	
Technical Data		CMX 600 V	CMX 800 V	CMX 1100 V	CMX 50 U	CMX 70 U
Travel (X/Y/Z)	in.	26.6 / 22 / 20	31.5 / 22 / 20	43.3 / 22 / 20	19.7 / 17.7 / 15.7	29.5 / 23.6 / 20.5
Tool pockets	#	30	30	30	30	30
Max. table load	lbs.	1,323	1,764	2,205	441	772
Max. spindle speed	rpm	12,000	12,000	12,000 (15,000 optional)	12,000	12,000
Spindle power	hp	17.4 (40 % DC)	17.4 (40 % DC)	17.4 (40 % DC)	17.4 (40 % DC)	17.4 (40 % DC)
19" DMG MORI SLIMline® Multi-Touch control with Operate 4.7 on SIEMENS		•	•	•	•	•
15" DMG MORI SLIMline® with HEIDENHAIN TNC 620		•	•	•	•	•
15" DMG MORI SLIMline® with MAPPS IV on FANUC		•	•	•	–	–

• available, – not available



You will find more on the CMX V range at cmx-v.dmgmori.com



MODULAR SYSTEM



15" DMG MORI SLIMline®
with MAPPS IV on FANUC

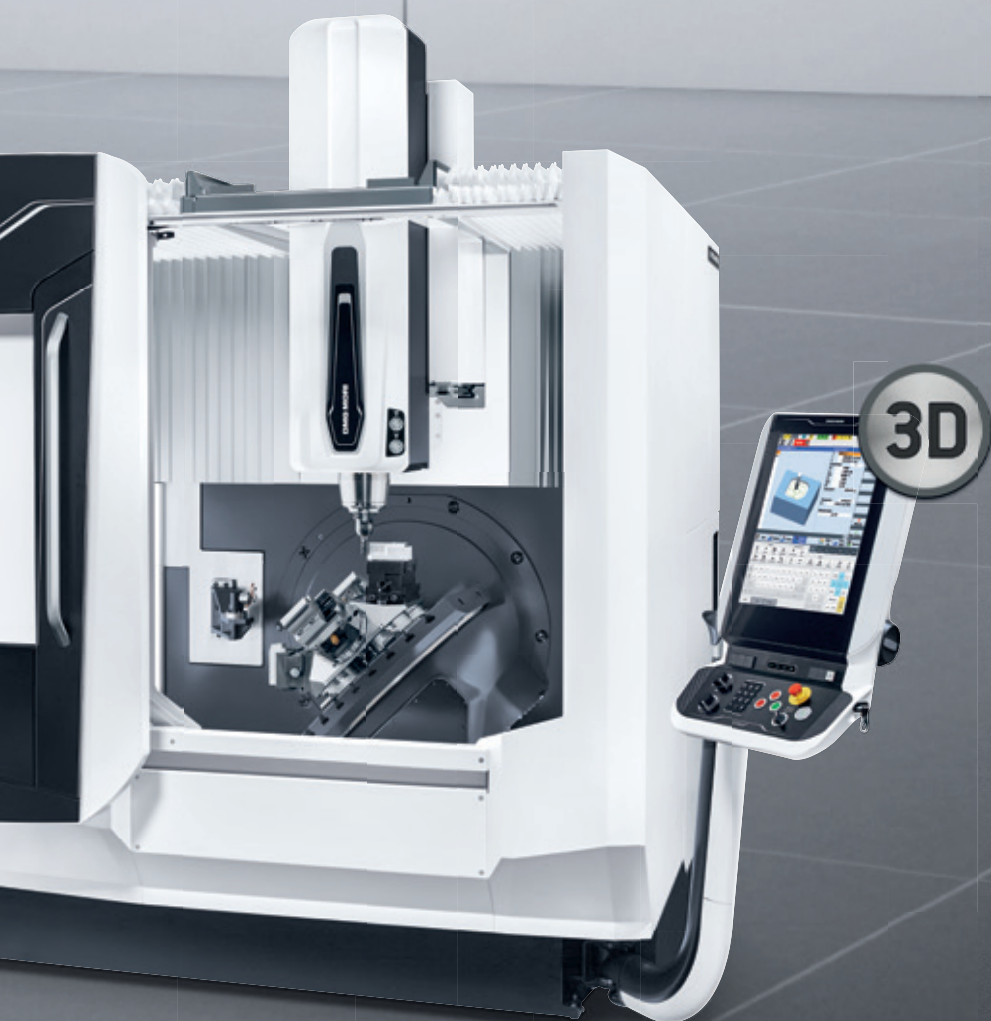


19" DMG MORI SLIMline®
Multi-Touch control
with Operate 4.7 on SIEMENS



NEW

15" DMG MORI SLIMline®
with HEIDENHAIN TNC 620



CUSTOMIZATION

NEW

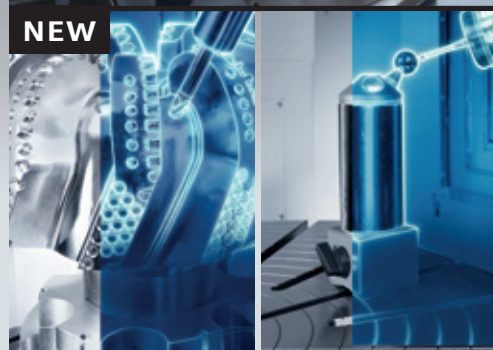


NEW OPTIONS

- + Rotary table with 2 additional axes exclusively for CMX V series
- + 4-axis simultaneous machining + Indexing table with tilting axis
- + Rotary table and vice can be used in combination
- + Two types of wiring & piping connections: ceiling connection and table connection*

*A chip conveyor is required for table connection.

NEW



NEW TECHNOLOGY CYCLES

- + 3D quickSET® for the CMX U range: Quick and easy for maximum 5-axis precision!

DMG MORI – Your tool and mold making partner

➤ 3-AXIS



➤ 5-AXIS UNIVERSAL



DMC V

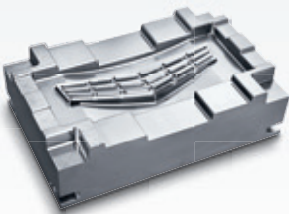
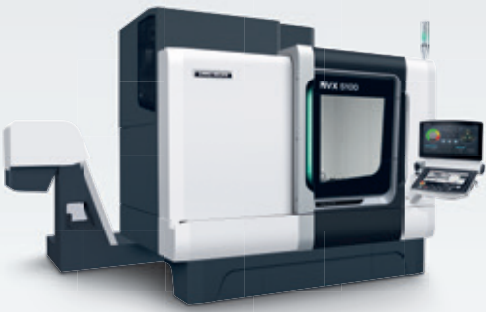
- + 14,000 rpm speedMASTER® spindle as standard
- + Innovative cooling concept and direct travel measuring systems for high precision



Forging die for hip nails
Machine: DMC 650 V
Material: 1.2343
Dimensions: 9.8 x 7.9 x 3.9 in.

NVX 5000 SERIES

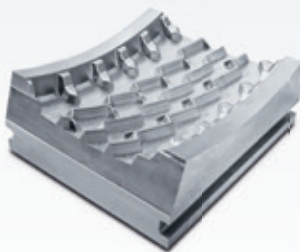
- + 15,000 rpm speedMASTER® spindle with integral cooling as standard
- + High stability and damping thanks to slideways on all axes



Mold for radiator grill
Machine: NVX 5100
Material: SKD61
Dimensions: 27.6 x 17.7 x 5.9 in.

DMU eVo *linear*

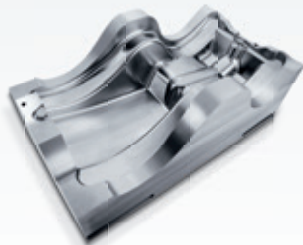
- + Dynamic 5-axis machining up to 262 ft/min
- + 20,000 rpm speedMASTER® spindle as standard



Tire mold
Machine: DMU 60 eVo
Material: Toolox 33
Dimensions: 14.6 x 12.6 x 5.1 in.

DMU monoBLOCK®

- + Swivel rotary table concept with high loads and high dynamics
- + Fully traversable table for rapid machining and top-quality surfaces



Mold for Bobby Car
Machine: DMU 65 monoBLOCK®
Material: 1.4122
Dimensions: 22.8 x 11.8 x 15 in.

DIE & MOLD MATRIX

	3-axis	5-axis universal	5-axis High Precision	New Technology
XXL > 106 in.		DMU 340 P, DMU 600 P DMF 360/600	DMU 600 Gantry <i>linear</i>	
Large 59 – 106 in.		DMU 210/ 270 DMF180/260	DMU 270 <i>μPrecision</i> DMU 210 <i>μPrecision</i>	LASERTEC 210 Shape
Small / Medium < 59 in.	DMC V NVX	DMU duoBLOCK® DMU monoBLOCK® DMU eVo <i>linear</i>	DMU 125 <i>μPrecision</i> NVD HSC <i>linear</i>	LASERTEC 75 Shape LASERTEC 45 Shape

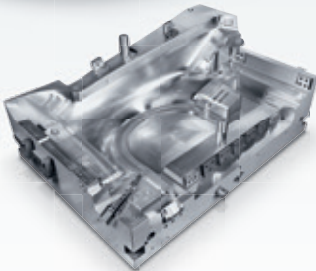
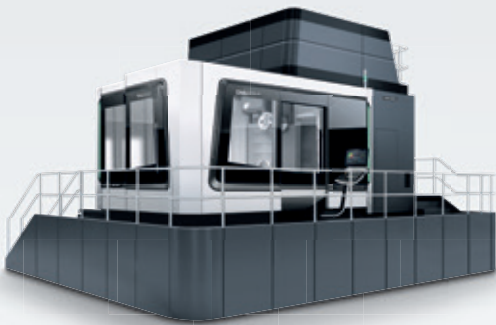
➤ 5-AXIS HIGH PRECISION

➤ NEW TECHNOLOGY



DMU duoBLOCK® / DMU PORTAL

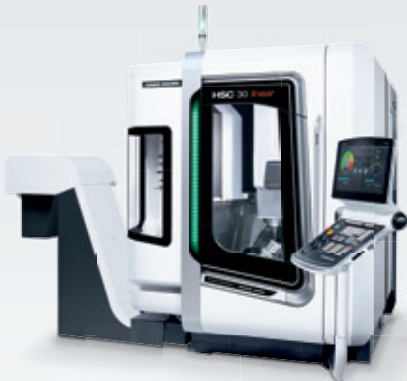
- + Machining of large workpieces of up to 118 x 236 in.
- + Also available as *μPrecision* for highest accuracies



Press tool for car wings
Machine: DMU 340 P
Material: 1.2343
Dimensions: 39.4 x 70.9 x 15.8 in.

HSC 30 / 70 *linear*

- + Linear drives for maximum long-term accuracy and Ra < 0.15 μ
- + HSC spindles up to 40,000 rpm with shaft, flange and sleeve cooling



Injection mold for headlamps
Machine: HSC 70 *linear*
Material: 1.2312
Dimensions: 26.8 x 15.8 x 13.8 in. Ra < 0.15 μ

DMU 600 Gantry *linear*

- + High-gantry design with table loading up to 165 t
- + 0.3 g path acceleration thanks to linear drives on all axes



Mold insert for car bumpers
Machine: DMU 600 Gantry *linear*
Material: 21CrNiMo2
Dimensions: 98.4 x 39.4 x 55.1 in.

LASERTEC Shape

- + Texturing of geometrically defined surface structures
- + Low space requirement thanks to integral laser



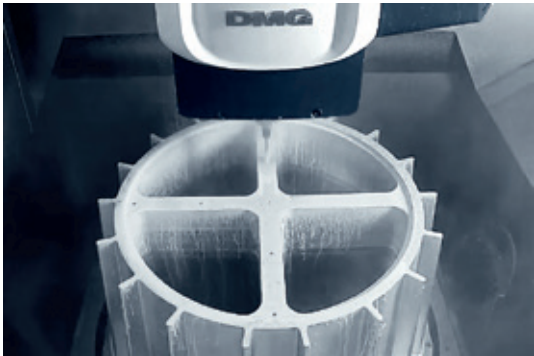
Injection mold for Tablet PC cover
Machine: LASERTEC 75 Shape
Material: Aluminum
Dimensions: 10.4 x 8.7 x 2.6 in.



Reliability, repeatability, and increased capacity with the DMU 105 monoBLOCK® for the Mold market



Group photo of the Ravenna Pattern & Manufacturing team



Green sand molding process for creating aluminum castings; finish dimensions 39.939" (diameter) x 20.397" (height)



A family-owned business that originated in 1958, **Ravenna Pattern & Manufacturing** based in Ravenna, Michigan, understands the challenges of **efficiency** and **capacity utilization**. At its peak, the company employed over 120 employees at 2 plants, but due to harsh economic times was forced to down size to 1 plant with 4 employees. From 2004 onward, Mr. Joshua Emery, current President of Ravenna Pattern & Manufacturing, and his cousins, completely transformed the family business and understood that they had to make investments and move from mainly a manual and 3-axis shop to a 5-axis CNC milling shop. They purchased their first **DMU 105 monoBLOCK®** in 2014, and since then, they have not looked back.

Traditionally a Pattern shop, now with the monoBLOCK® machines, Ravenna Pattern has penetrated the Mold market. Ravenna Pattern also does work in the Foundry industry – heavily automotive, and in **Tooling – permanent molds, semi-permanent molds, pattern and precision-sand equipment**. Their core manufacturing consists of complex contour milling and hole work for plainer milling. They have utilized their monoBLOCK® machines for the pattern-making industry because they make many core boxes. In the past, they did a majority of hole drilling on traditional radial drills. It use to take about 60 hours on radial drills, but with the **monoBLOCK®, they have cut their hole work down to 12 hours. Overall, the hole work for plainer milling has increased with the monoBLOCK®, at an average of 500 %**. After realizing that their first DMU 105 monoBLOCK® increased their capacity utilization – milling capacity increased by 100 % in comparison to their 3-axis

machines, and hole work increased, without taking up too much floor space, Ravenna Pattern has continued to invest in the monoBLOCK® machines. Since 2014, they have purchased 4 monoBLOCK® machines: **1 – DMU 65 monoBLOCK®, 1 – DMU 85 monoBLOCK®, 2 – DMU 105 monoBLOCK® and 1 – Milltap 700** for the foundry industry.

Prior to purchasing the monoBLOCK®s, **Ravenna Pattern’s challenges were floor space and efficiency**. The amount of time it took to polish a workpiece has now decreased with the monoBLOCK® machines. In the past, Ravenna Pattern had 4–5 employees spending time running their radial drills to finish the part whereby certain angles couldn’t be reached on a traditional 3-axis milling machine. However, now, their workforce has shifted away from manual drilling to 5-axis CNC milling for their core boxes. In effect, their employees are now running their 5-axis machines and trying things that they wouldn’t have before with their 3-axis machines. **They have seen profitability and efficiency increase dramatically**. On Ravenna Pattern’s 3-axis machines, they had to do multiple set-ups, but now, with the 5-axis machines from DMG MORI, **they are able to reduce set-up times and the number of overall set-ups**. To finish a knuckle cavity, for example, they needed 36 finishing tools with repetitive cutters of the same diameters but of different lengths. Now, they’ve gone from 36 to 16, as **Ravenna Pattern is able to get faster into the cavity with better results and higher accuracy with the monoBLOCK® machines**.

Ravenna Pattern also has **DMG MORI exclusive Technology Cycles** on their machines, such as **MPC 2.0 (Machine Protection Control)** and **3D quickset®**. With MPC 2.0, Ravenna Pattern is able to monitor cutting forces for drilling and there is a vibration sensor in the milling spindle. These user-friendly cycles contribute to Ravenna Pattern’s efficiency in monitoring any issues ahead of time. Mr. Emery says, *“we do not have a significant amount of downtime because of these alerts, and we can reach our service representative to get the problem solved if anything arises.”*

In making these investments with DMG MORI, Ravenna Pattern states that **service, machine reliability, and overall machine package** is what separates DMG MORI from its competition. *“DMG MORI machines are incredibly versatile, taking the work of 2–3 or more machines on one machine platform – and machining faster than what you’d cumulatively do on more machines. They are reliable and repeatable machines. When you see improvements of 100 %–500 %, you’ve found a partner that’s a homerun,”* says Emery.



Ravenna Pattern & Manufacturing
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www.ravennapattern.com

We're entering the future of manufacturing. Are you coming?

Optimize your machining processes and decision-making with CoroPlus®, the new suite of connected solutions for digital machining.

Save time and improve quality in design and planning

+

Get real-time machining insights

+

Improve your processes through advanced machining analytics

C5-3-80-LL35060-10C
3-80-101112-8-M5 4315
3D MODEL STP
2D MODEL DXF
KAPR 94.7°
Vc 381 m/min
f_r 0.4 mm/r
IN STOCK

Visit us online at coroplus.sandvikcoromant

DMU monoBLOCK® 4 new options



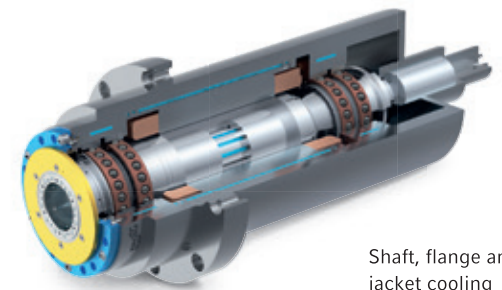
You will find more on the
DMU monoBLOCK® range at
monoblock.dmgmori.com



SPINDLES

1 Motorized spindles up to 40,000 rpm

- + Best quality surface finishes thanks to maximum speeds of up to 40,000 rpm
- + HSK-E50 / 27 hp (40 % duty cycle) / 12 ft-lbs (40 % duty cycle)

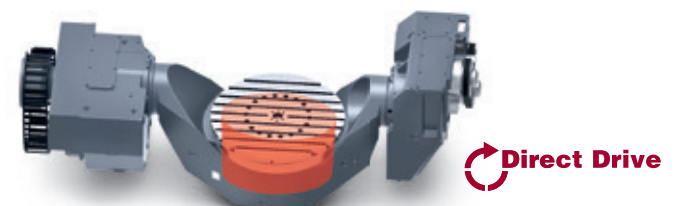


Shaft, flange and jacket cooling

DRIVE

2 Direct Drive technology on the C-axis

- + Dynamic C-axis with up to 80 rpm rapid traverse
- + Water-cooled Direct Drive on the C-axis



3 Direct Drive technology on the A and C-axes

- + Maximum dynamics thanks to Direct Drive on the A-axis (tandem drive) and C-axis
- + Best positional uncertainty on the A and C-axis (7ws)
- + Best positional accuracy (7 arcsec)



PACKAGE MACHINE DMU 75 monoBLOCK®

4

CELOS® with MAPPS on FANUC on DMU 75 monoBLOCK®

SEE IT LIVE AT
MANUFACTURING DAYS
IN DAVIS, CA!
NOVEMBER 13th – 16th, 2017



CELOS®

HIGHLIGHTS

- + Equipped with simple and easy-to-follow dialogue programming function
- + Rapid access to required information and manual data thanks to search function
- + 6-window display for checking all necessary machine information at once
- + Two multi-touch panels

Also available with:

- + CELOS® with SIEMENS
- + HEIDENHAIN iTNC 640

The XXL range for all sizes and applications!

Dynamic machining of large parts!

up to
max. **165t**
workpiece weight



0.3 g
PATH
ACCELERATION

Body mold

Sector: Tool and mould making
Dimensions: 155 × 87 × 37 in.
Material: Tool steel (1.2312)
Machining time: 18 hours

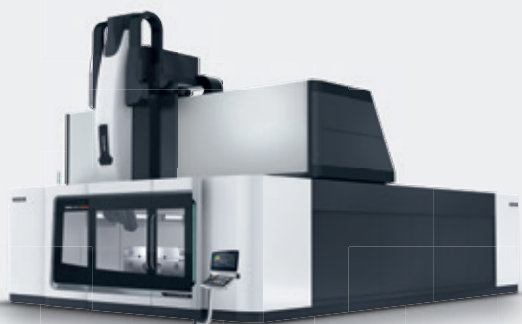
197 in.

118 in.

NEW

DMU 600 Gantry *linear* Gantry machine

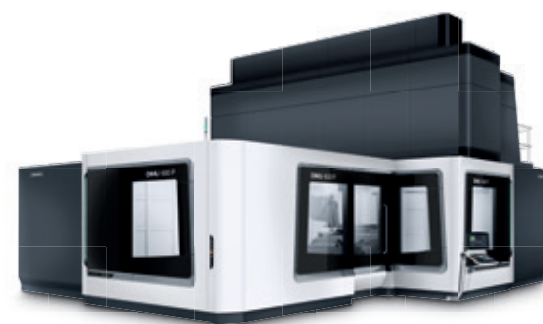
- + Flexible interchangeable milling heads with C / A and C / B kinematics similar to the DMU 600 P
- + Direct Drive technology on all axes for best quality surface finish and maximum dynamics, 0.3 g path acceleration and 1,771 ipm feed rate
- + X-axis with 236 in. as standard can be extended
- + Z-axis ram with different travel distances up to max. 79 in.



DMU 600 P Portal machine

- + Maximum rigidity for machining components up to 44 t
- + Portal design for maximum rigidity and precision
- + Up to 1,181 ipm rapid traverse/feed rates on X / Y / Z-axis
- + High machining performance due to max. 1,844 lbf ft

up to
max. **44t**
workpiece weight



PREMIUM PARTNER

HAIMER GMBH – NOW ALSO WITH TOOL PRESETTERS

Premium partnership of DMG MORI and HAIMER – procurement of Microset GmbH

Joint sales of tool presetters



From left to right: Dr. Maurice Eschweiler, Board Member DMG MORI AKTIENGESELLSCHAFT, Claudia Haimer, Managing Partner Haimer GmbH, Christian Thönes, Chairman DMG MORI AKTIENGESELLSCHAFT, Andreas Haimer, Managing Director Haimer GmbH

The long-established partnership between DMG MORI and HAIMER is becoming closer. With effect from 1st January, 2017, HAIMER has taken over tool presetting technology from DMG MORI and with it the company Microset GmbH, which will now be known as HAIMER Microset GmbH. For HAIMER, this is the perfect addition to its market-leading assortment in the fields of tool clamping technology and Tool Management. All Microset products and services can still be obtained from DMG MORI as a provider of integrated solutions. All DMG MORI Technology and Solution Centers as well as suppliers' works throughout the world will be equipped exclusively by HAIMER with products in the fields of tool presetting, balancing and shrinking, including shrink chucks and tool rooms.



HAIMER PORTFOLIO IN THE DMG MORI TECHNOLOGY- AND SOLUTION CENTRES



ADVANTAGES

- + Your DMG MORI contacts will still be responsible for the sales and servicing of Microset products
- + We will continue to present HAIMER Microset units in all Technology Centers and at exhibitions
- + HAIMER as a comprehensive system provider for the Tool Management sector
- + Joint developments for digital production

HAIMER Microset tool presetting technology will complement the existing portfolio with high-precision tool (clamping), shrinking and balancing equipment. This will make HAIMER a Tool Management system provider for all aspects of machine tools.



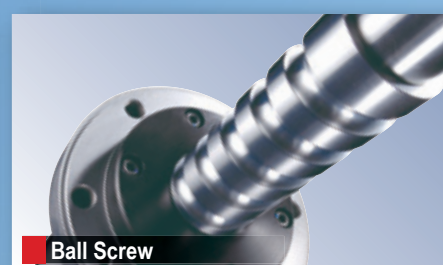
HAIMER USA, LLC
134 E. Hill Street, Villa Park IL 60181
haimer@haimer-usa.com, www.haimer-usa.com

Reliability & Availability - Worldwide

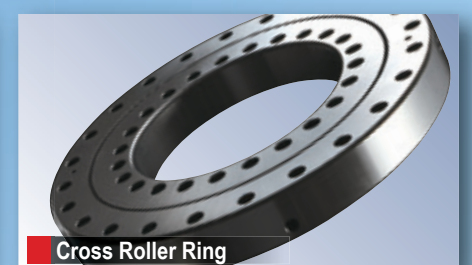
THK provides original technology in the highest quality for smooth and accurate movement.



LM Guide



Ball Screw



Cross Roller Ring

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THK
The Mark of Linear Motion

ADDITIVE MANUFACTURING

Coming attraction – the LASERTEC 30 SLM. DMG MORI is now extending its portfolio with the addition of powder bed processes!

Coming in 2018 to the USA: Selective Laser Melting

In collaboration with REALIZER GmbH, a pioneer in the field of SLM technology (Selective Laser Melting), DMG MORI is consolidating its position as GLOBAL ONE in the field of ADDITIVE MANUFACTURING!

HIGHLIGHTS

- + Generative manufacturing in the powder bed with a volume of 11.8 x 11.8 x 11.8 in.
- + Application-specific fiber laser sources of 0.54 hp up to 1.34 hp
- + High-precision build-up of 3D components with layer thicknesses of 20 to 100 μ
- + Integral powder conditioning system for even better efficiency and material
- + Optimum process chain for subsequent machining on DMG MORI machines in the HSC and DMU range – for highest component accuracy and best surface finishes



Impeller
Dimensions: \varnothing 1.7 in. x 1.1 in.
Material: Titanium
Machining time: 49 Min.



FIT FOR THE FUTURE
WITH SINUMERIK

DMG MORI

**PREMIUM
PARTNER**

SIEMENS

www.siemens.com/sinumerik

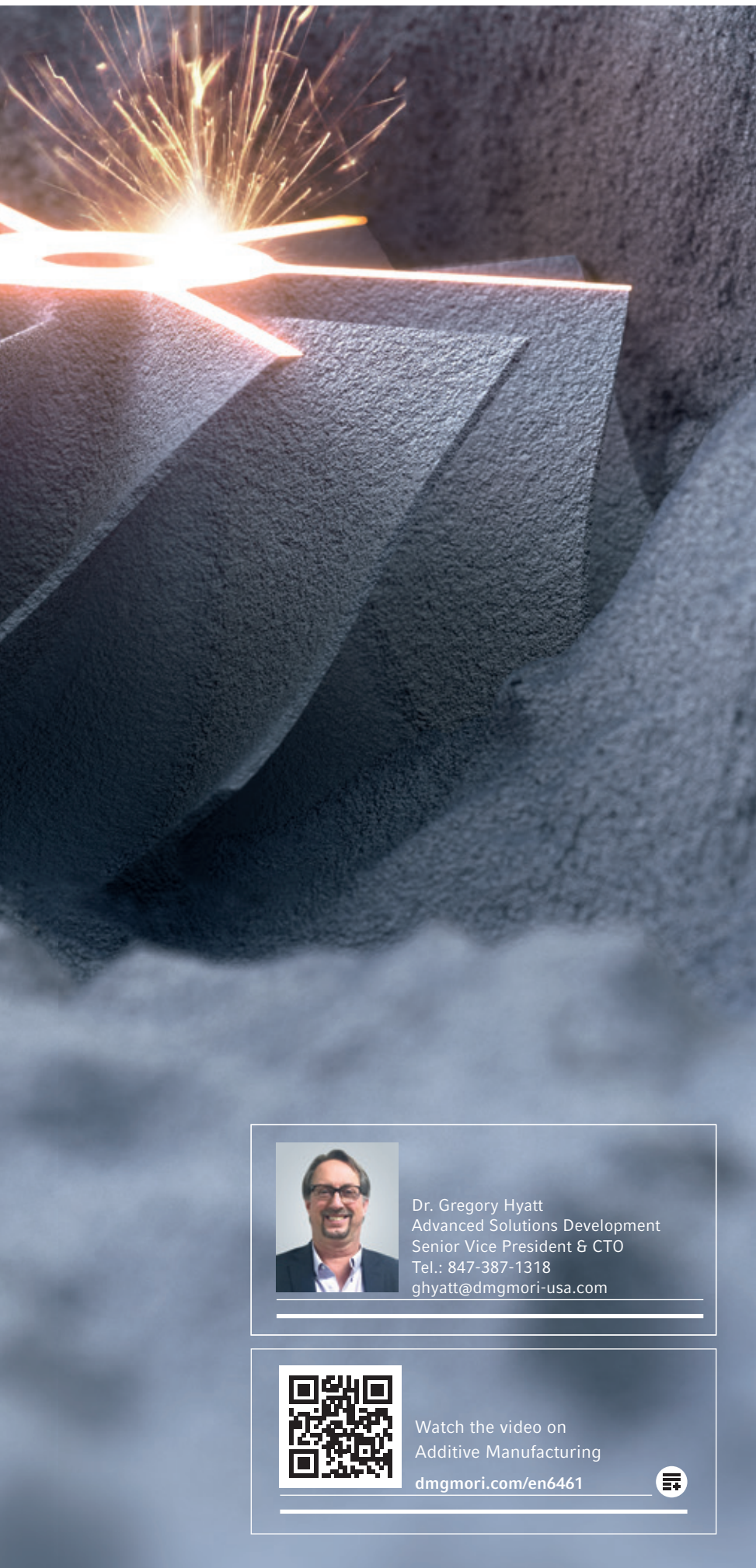


smartOperate – SINUMERIK Operate
optimised for multi-touch operation

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

Top Surface – Perfect Workpiece
Surfaces in Tool and Mold Making

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



Dr. Gregory Hyatt
Advanced Solutions Development
Senior Vice President & CTO
Tel.: 847-387-1318
ghyatt@dmgmori-usa.com



Watch the video on
Additive Manufacturing
dmgmori.com/en6461



REALIZER GMBH



Cooperation strengthens expertise in Additive Manufacturing

DMG MORI is specifically expanding its future technologies: With a majority shareholding of 50.1 % in Borchsen-based REALIZER GmbH, the Group has now strengthened its position in the field of Additive Manufacturing.

With SAUER GmbH, DMG MORI already has extensive know-how in the Laser Metal Deposition field with powder nozzles. For its part, REALIZER has more than 20 years experience in "Selective Laser Melting" (SLM). Here, the powder material is deposited layer-by-layer and specifically melted using a laser, thus successively building up the component. The incorporation of REALIZER into the SAUER product range therefore now enables DMG MORI to offer the main generative manufacturing processes for metal workpieces from a single source.

"Selective laser melting in a powder bed opens up completely new applications for our customers. It is therefore an ideal complement to our LASERTEC 3D machines in the field of Advanced Technologies," says Christian Thönes, Chairman of DMG MORI Aktiengesellschaft.



Christian Thönes (right), Chairman of DMG MORI AKTIENGESELLSCHAFT, and Dr. Matthias Fockele, Managing Partner of REALIZER GmbH, look forward to the future collaboration.

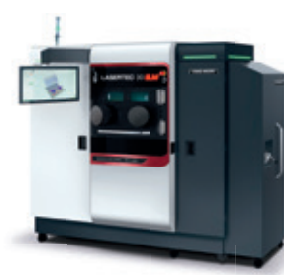
Complex, metal components can be manufactured from powder using Additive Manufacturing. A wide range of weldable materials, extending to multi-material applications, are used for this purpose depending on the application.

REALIZER

REALIZER GmbH
Hauptstraße 35, D-33178 Borchsen
www.realizer.com

Globally unique – Additive Manufacturing with powder nozzle and in the powder bed from a single source

POWDER BED

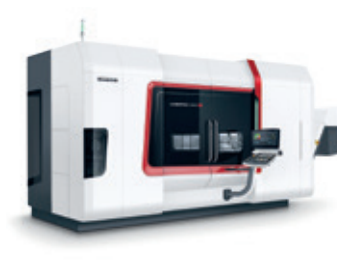


LASERTEC 30 SLM

POWDER NOZZLE



LASERTEC 65 3D



LASERTEC 4300 3D

LASER STRUCTURING

LASER STRUCTURING + MILLING / TURNING

SIEMENS
Ingenuity for life

NX Hybrid Additive Manufacturing

The integrated software solutions for Additive Manufacturing, incl. simulation and programming of Laser Metal Deposition and Laser Metal Fusion.

siemens.com/plm/additivemanufacturing

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- + **Integrated manufacturing solutions** and technology support for medical applications
- + **Customized developments and consultation** as well as training courses and seminars
- + **Pioneering and innovative developments** of processes and machines, e.g. ULTRASONIC
- + **Highly accurate endoprostheses**, e.g. knee and hip joints made from titanium, CoCr and ceramic



MEDICAL EX



NTX 1000
(DDM® technology) on the B-axis for the 5-axis simultaneous machining of complex workpieces

1

Hip joint socket
Dimensions: ø 2.4 in.
Material: Titanium



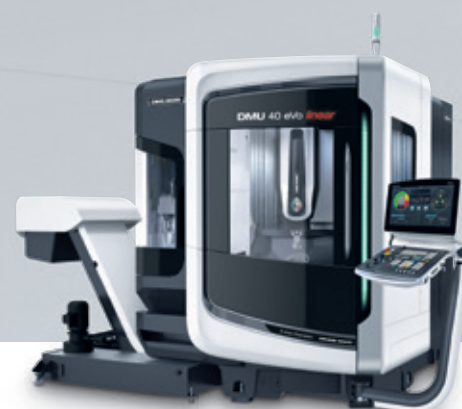


2

Tooth implant
Dimensions: $\varnothing 0.4 \times 0.3$ in.
Material: Titanium (Ti6Al4V)



MILLTAP 700
Highly productive compact machining center for the economic mass production of implants and bone plates



4

Knee prosthesis
Dimensions: $2.4 \times 2.8 \times 2.7$ in.
Material: CoCr



DMU 40 eVo *linear*
Dynamic 5-axis simultaneous machining of implants and joints made from difficult-to-machine materials



3

Bone screw
Dimensions: $\varnothing 0.4 \times 3.3$ in.
Material: Titanium (Ti6Al4V)



SPRINT 2015 SWISSTYPEkit®
for the short and long turning of high-precision implants on one machine



5

Bone plate
Dimensions: $2.4 \times 0.7 \times 0.1$ in.
Material: Titanium



ULTRASONIC 20 *linear*
5-axis ULTRASONIC and HSC machining for prototypes and automated mass production up to 8 in. component size

Highest accuracy

3X
MORE PRECISE

- + 500 hours scraping on the guideways
- + +80 % volumetric accuracy to < 15 μ
- + Positioning accuracy of up to 3 μ*
- + Individual optimization at the user's premises

* Applies to 125 duoBLOCK® frame size

AVAILABLE FOR


DMU/C 125 P/U/FD duoBLOCK®

+

DMU/C 210/270 P/U/FD PORTAL

+

NHX 8000




AEROSPACE

Gearbox housing for turbine units

Material: Aluminium

Holes better than H5

Positional tolerances: 12 – 15 μ



MECHANICAL ENGINEERING

Table console

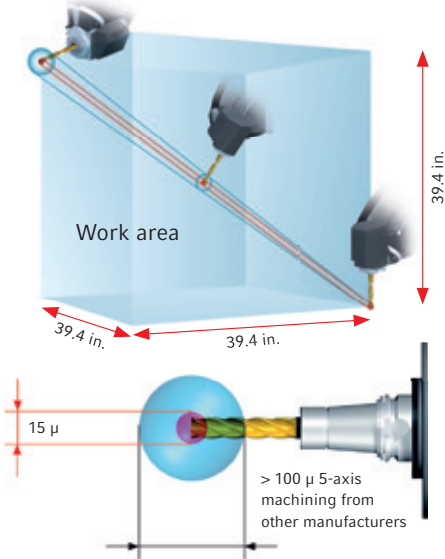
Material: Cast iron

High-precision finishing and 5-sided milling

Shape and positional tolerances in the range of 10 μ

3-TIMES HIGHER ACCURACY!

15 μ volumetric accuracy



At least 3-times higher accuracy over the whole machining range.

Technical Data		DMU/C 125 μPrecision	DMU/C 210 μPrecision	DMU/C 270 μPrecision	NHX 8000 μPrecision
Max. travel (X)	in.	49.2	82.7	106.3	55.1
Positioning accuracy X/Y/Z	μ	4/3/4	4/4/4	6/6/6	4/4/4
Positioning accuracy A/B/C	arcsec	5/4/4	5/4/4	5/4/4	–/4/–

* after space compensation; only linear axes taken into account

Experience DMG MORI live!

UPCOMING EVENTS:

+ Chicago Innovation Days	05/15 – 05/18/2017
+ Technology Days, Denver	05/24 – 05/25/2017
+ Technology Days, Dallas	06/07 – 06/09/2017
+ Technology Days, Davis	06/14/2017
+ Technology Days, New Jersey	06/14/2017
+ Grand Opening, Houston	06/13 – 06/15/2017
+ Technology Days, Iowa	06/21/2017
+ Technology Days, New Hampshire	06/28/2017
+ Technology Days, Tampa	06/29/2017
+ Technology Days, Grand Rapids	07/12/2017
+ Technology Days, New Jersey	07/13/2017
+ Technology Days, Iowa	07/19/2017
+ Technology Days, Chicago	07/26 – 07/27/2017
+ Grand Opening, Cincinnati	08/15 – 08/17/2017



Register for upcoming events at:
oh-usa.dmgmori.com

Innovation Days in Chicago
05/15/2017 – 05/18/2017

