

4 world premieres in the first six months of 2015 – introduced in this journal.

CELOS® from DMG MORI  
4 new APPs and the PC version of CELOS®.

ECOLINE  
Highest functionality, best price! The complete ECOLINE series.

DMG MORI Systems  
Innovative automation concepts thanks to focused skills.

**DMG MORI**

N° 1 – 2015

# Journal

The DMG MORI magazine for customers and interested readers

Innovations  
secure  
the future

CELOS® from DMG MORI  
4 new CELOS® APPs  
NEW: PC version of CELOS®

→ More on **PAGE 6**

4 world premieres  
in the first half of 2015

→ More on

**PAGE 5**



[www.dmgmori.com](http://www.dmgmori.com)



DMG MORI EUROPE

# Innovations secure the future – 4 world premieres in the first half of 2015.

## AN OVERVIEW OF 4 WORLD PREMIERES AND 2 EUROPEAN PREMIERES

- CTX beta 1250 TC – TURN & MILL COMPLETE MACHINING CENTRE

Turn-mill complete machining with the new compactMASTER® turn-mill spindle for a 170 mm larger working area
- DMU 100 P duoBLOCK® 4<sup>th</sup> generation –

UNIVERSAL MILLING MACHINE FOR 5-SIDED / 5-AXIS MACHINING

Up to 30 % higher component precision and accuracy with a 100 % water-cooled feed drive
- DMC 125 FD duoBLOCK® 4<sup>th</sup> generation –

UNIVERSAL MACHINING CENTRE FOR 5-SIDED / 5-AXIS MACHINING WITH A PALLET CHANGER

Milling and turning in one clamping operation with Direct Drive table and speeds of up to 500 rpm
- DMC 270 U – 5-AXIS UNIVERSAL MACHINING CENTRE WITH A PALLET CHANGER

High precision of ±12 µm with intelligent temperature management for workpieces weighing up to 9 tonnes
- NZX 4000C | 3000Y – PRODUCTION LATHE

High-efficiency 4-axis turning centre with a spindle bore up to 285 mm in diameter for machining large and long workpieces
- NRX 2000 – PRODUCTION LATHE

Highspeed turning centre with two spindles for mass production



DMG MORI Global Headquarters in Winterthur



DMG MORI SEIKI Europe AG  
Sulzer-Allee 70  
CH-8404 Winterthur  
Tel.: +41 (0) 58 / 611 50 00  
Fax: +41 (0) 58 / 611 50 01

- › 147 DMG MORI locations in 37 countries
- › Over 1,600 certified service engineers in Europe
- › Spare parts availability >95 %  
More than 260,000 different items in stock

## KEY EVENTS IN THE FIRST HALF OF 2015

› INTERMOLD, Seoul (Korea)	10.03. – 14.03.2015
› Open House Bergamo (Italy)	17.03. – 21.03.2015
› INDUSTRIE, Lyon (France)	07.04. – 10.04.2015
› CIMT, Peking (China)	20.04. – 25.04.2015
› Moulding Expo, Stuttgart (Germany)	05.05. – 08.05.2015
› Metalloobrabotka, Moscow (Russia)	25.05. – 29.05.2015
› Open House Bielefeld (Germany)	09.06. – 12.06.2015
› MACHTOOL, Posen (Poland)	09.06. – 12.06.2015

## Journal 1 – 2015

All trendsetting developments and highlights from DMG MORI in 6 topic sections:



PAGES 2 – 4 — Intro  
DMG MORI Europe – An Overview of 4 world premieres in the first half of 2015.



PAGES 5 – 16 — The first 4 world premieres and innovations in 2015  
CELOS® with new APPs.  
An overview of 4 world premieres.

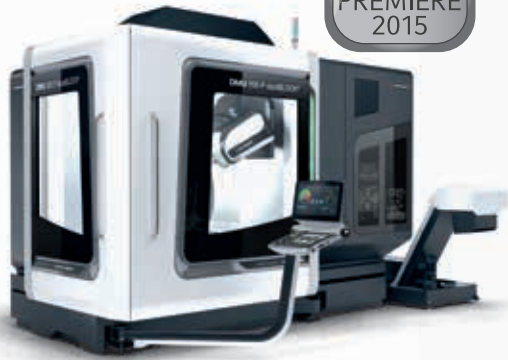


PAGES 17 – 36 — Technologies and customer stories  
Innovative technologies for the aerospace sector.

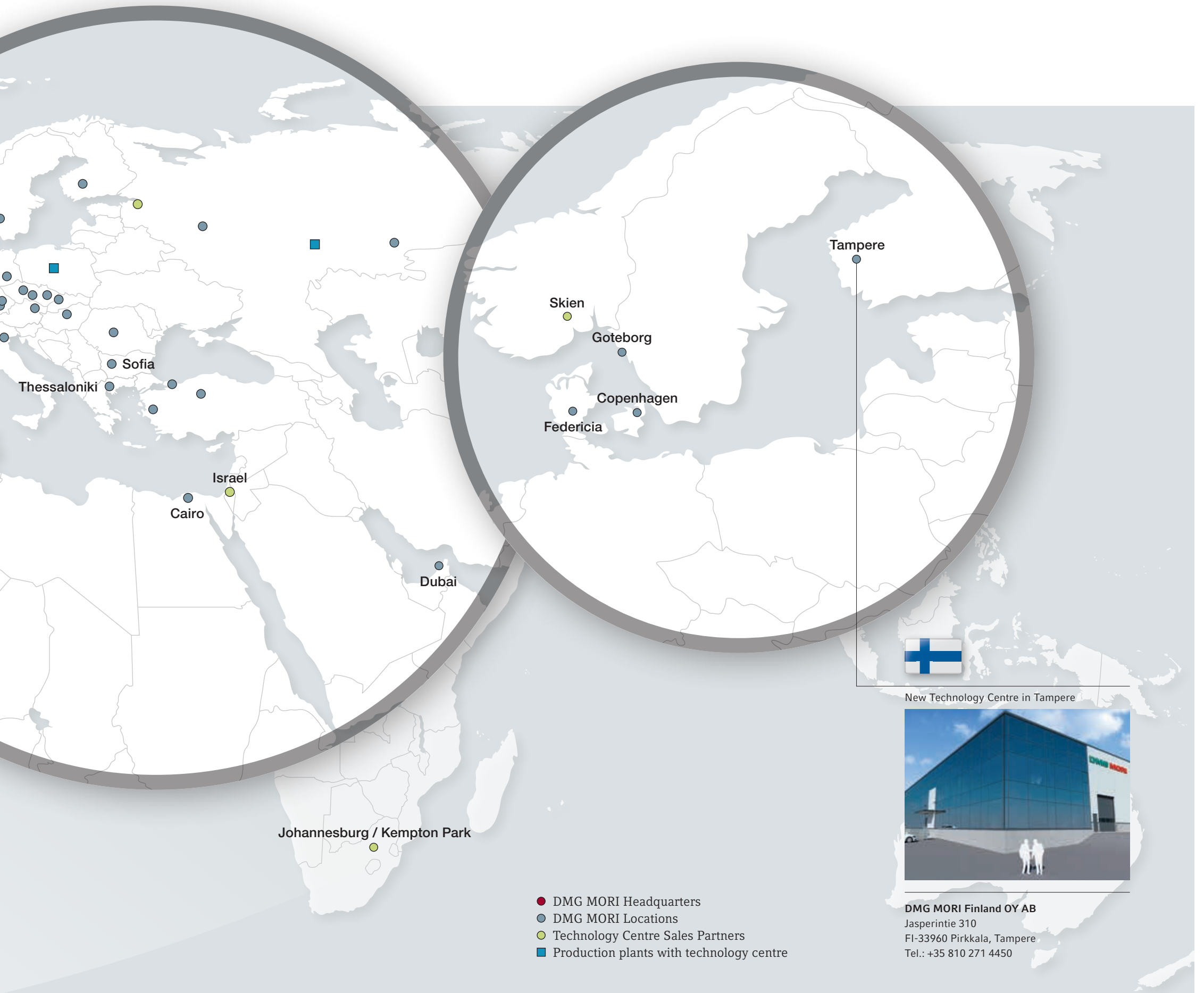
## 4 World premieres – in the first half of 2015.



WORLD PREMIERE  
CTX beta 1250 TC

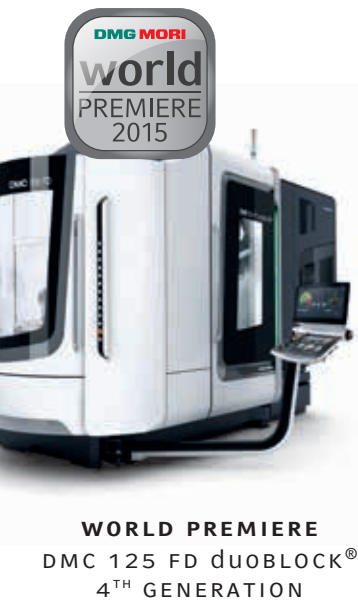


WORLD PREMIERE  
DMU 100 P duoBLOCK®  
4<sup>TH</sup> GENERATION



## 2 European premieres –

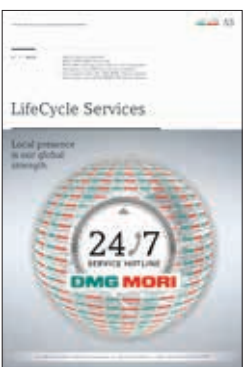
Following their world premieres at JIMTOF 2014 in Japan, for the first time live in Europe: NZX 4000C I 3000Y and NRX 2000.



PAGES 37–44 — **ECOLINE**  
Highest functionality, best price!  
The complete ECOLINE series.



PAGES 45–52 — **DMG MORI Systems**  
Perfect automation in all fields. New location in Wernau. Two reference reports.



PAGES 53–60 — **LifeCycle Services**  
Improve machine availability. Process optimisation with DMG MORI software solutions.



SIEMENS



### SMARTkey®

Personalised user authorisation. Individually adapted access privileges to the control system and the machine.

## SINUMERIK Operate for your DMG MORI machine

The intuitive universal operating interface for all technologies

[siemens.com/sinumerik](http://siemens.com/sinumerik)

Clear, intuitive to operate and equipped with a range of new, high-performance technological functions – the CNC operating interface SINUMERIK® Operate makes it simpler than ever to operate your machine. By combining procedure and high-level language programming into one system interface, NC programming and work

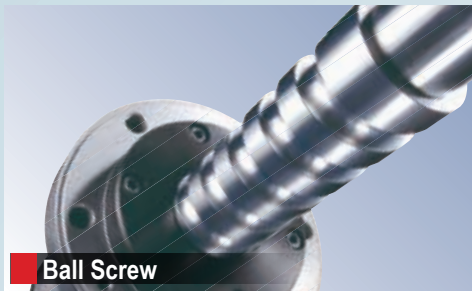
preparation can be carried out quickly and efficiently from the same interface. Be it turning or milling, the look and feel of operation is always the same. And intelligent functions such as animated simulations and screenshots provide you with optimal support during your daily work.



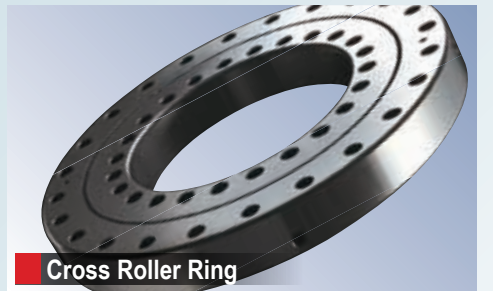
Answers for industry.



LM Guide



Ball Screw



Cross Roller Ring

As the pioneer of the “Linear Motion Guide”, THK supports a wide range of industry fields.

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The Mark of Linear Motion

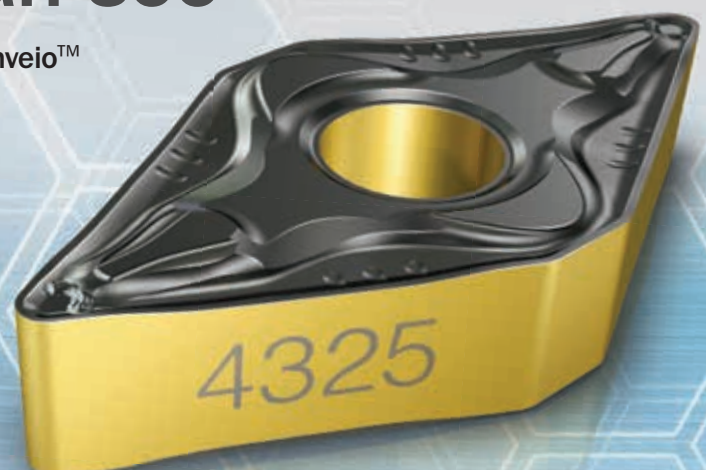
**Inveio™**  
Uni-directional crystal orientation

## New GC4325 for steel turning Performance beyond what the eye can see

The first insert grade featuring Inveio™

An innovation at the atomic level has changed the face of metal cutting. The finely controlled structure of its coating guarantees that GC4325 shows longer tool life and more reliable wear in the widest range of steel turning applications.

It redefines the performance possibilities of ISO P25 and is everything you ever needed in one single insert.



See the whole story at: [www.sandvik.coromant.com/gc4325](http://www.sandvik.coromant.com/gc4325)

**SANDVIK**  
Coromant



N° 1 – 2015

- CELOS® – From the idea to the finished product
- An overview of 4 world premieres in the first half of 2015

# 4 world premieres in the first half of 2015



**DMU 100 P duoBLOCK® 4<sup>TH</sup> GENERATION**  
Up to 30 % higher component precision and accuracy with a 100 % water-cooled feed drive.

**DMC 270 U**  
High precision of  $\pm 12 \mu\text{m}$  with intelligent temperature management for workpieces weighing up to 9 tonnes.



**CTX beta 1250 TC**  
Turn-mill complete machining with the new compactMASTER® turn-mill spindle for a 170 mm larger working area.



**DMC 125 FD duoBLOCK® 4<sup>TH</sup> GENERATION**  
Milling and turning in one clamping operation with Direct Drive table and speeds of up to 500 rpm.



## 21.5" MULTI-TOUCH MONITOR

for quick and  
easy operation



CELOS® with Siemens

# CELOS®

## 4 new APPs

available from 1 April 2015

Simplified machine operation the  
holistic integration of the machine  
into the company organisation.

CELOS® features a **standard user interface** for all new high-tech machines from DMG MORI. On a unique 21.5" multi-touch monitor, **CELOS® APPs facilitate the consistent management, documentation and visualisation of order, process and machine data.** They also simplify, standardise and automate the operation of the machine. The latest version of CELOS® with 16 APPs will be available from April 2015. This includes **four new APPs** which will be introduced at the DECKEL MAHO open house exhibition in Pfronten. The PC version of **CELOS® is also new.** You can now directly plan and control your production process **during job preparation.**

CELOS® connects the machine to higher-level company structures in a unique way and thereby creates the basis for **consistently digitised, paperless production.** **Reach the finished product 30 % faster** with CELOS® thanks to direct connection of ERP / PPS and PDM. DMG MORI is raising the bar with CELOS® and providing the **answer to Industry 4.0.**





CELOS® with MAPPS

*"It is now much easier to operate a machine."*

*"Accessing external computers is simple – with CELOS® I can communicate with my office directly from the machine."*

## MULTI-TOUCH CONTROL PANEL

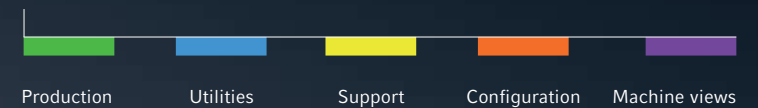
with CELOS® with MAPPS on MITSUBISHI, for innovative convenience of use with a unique range of functions.

*"All the data for my work electronically compiled in one place super."*

## APP MENU

Like on a smartphone, the operator has direct access to all available applications through the APP MENU. The APPs are split into five groups.

### CATEGORISATION OF APPS – A GUIDE TO THE FIVE GROUPS:

**NEW!**

## 4 new APPs

including two for production and two for support



**JOB SCHEDULER**  
Production planning for all machines.



**MESSENGER**  
So you are always aware of the progress in your production.



**SERVICE AGENT**  
Improve machine availability with an intelligent maintenance system.



**TOOL HANDLING**  
Shorter tool change times by assessing the magazine configuration for subsequent orders.

**NEW!**

## PC version of CELOS®

It is now possible to plan and control your production processes during job preparation. With the PC version of CELOS® you can also integrate any machines or equipment into one holistic CELOS® environment.

**MORE ON PAGES 8–9** →



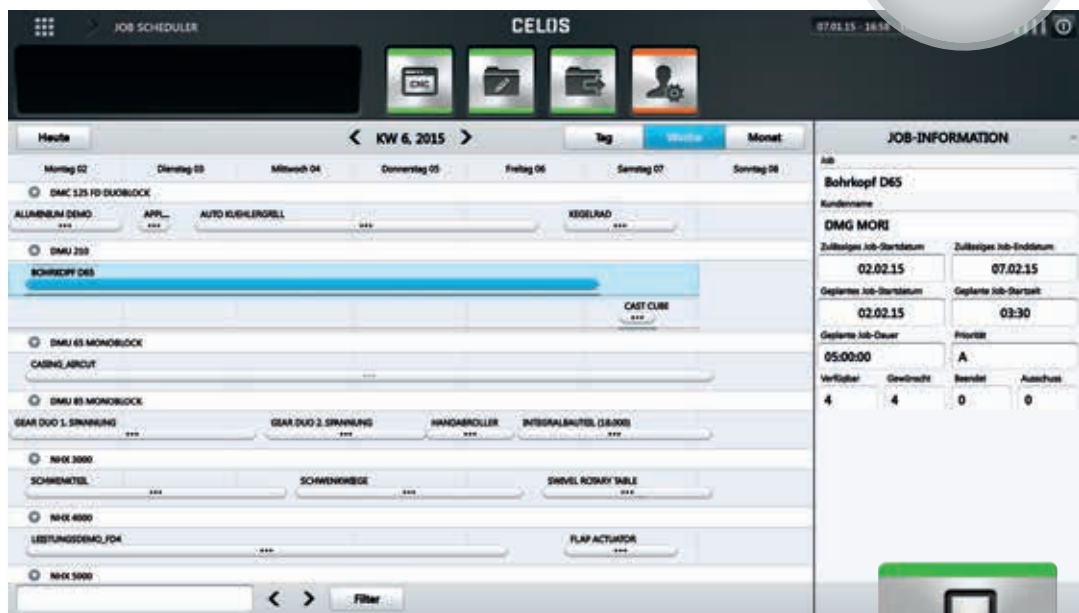
Four new CELOS® APPs » Detailed information and demo versions of all available APPs can be found online: [www.dmgmori.com](http://www.dmgmori.com)

→ Find out more about Messenger

ON PAGE 59

## JOB SCHEDULER

Production planning for all machines.

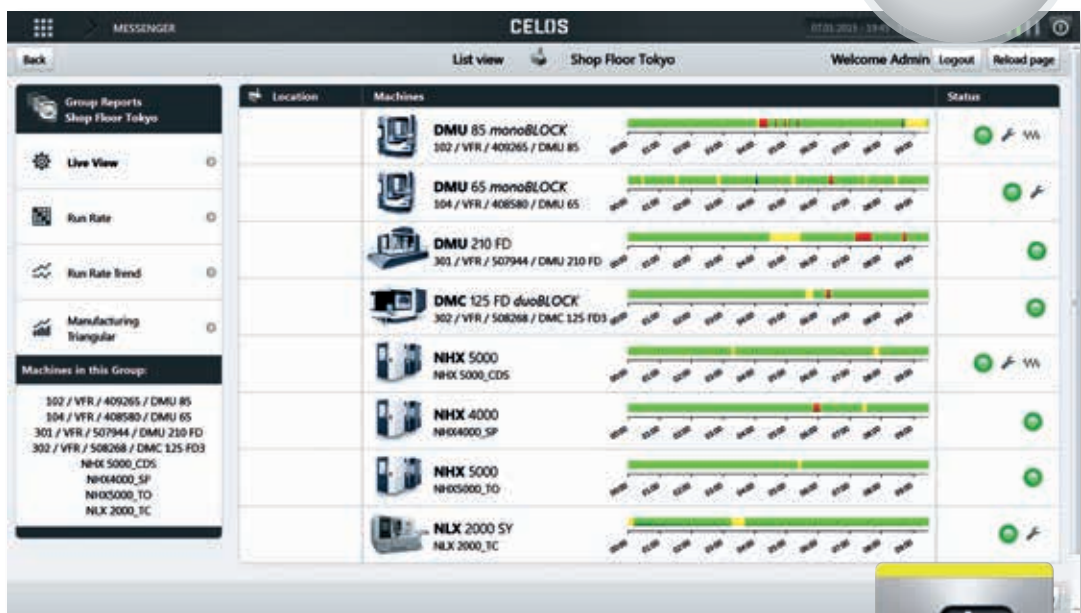


- › Record, manage and schedule various jobs for production
- › Assign and transfer the jobs to the machine(s)
- › Overview of the overall status of all machines



## MESSENGER

So you are always aware of the progress of your production.



- › Clear live status of all networked machines
- › Detailed view of every machine, including machine history
- › Evaluation of machine running time, idle time and stoppages



## CELOS® PC version

# Consistent production planning on a PC with CELOS®.

Install **CELOS® software on your PC** and enjoy immediate access to **all CELOS® functions**. With the new PC version of CELOS® you can now directly plan and control your production process during **job preparation**. With the **JOB MANAGER APP** you can generate jobs and assign them to your machines with the **JOB SCHEDULER APP**. With the **MESSENGER APP** you will always have a live overview of all your machines and be aware of the progress of your production.

The PC version of CELOS® also lets you **integrate any machines or equipment into one holistic CELOS® environment**. Simply install the PC version of CELOS® and import the job data for each machine on your shop floor.

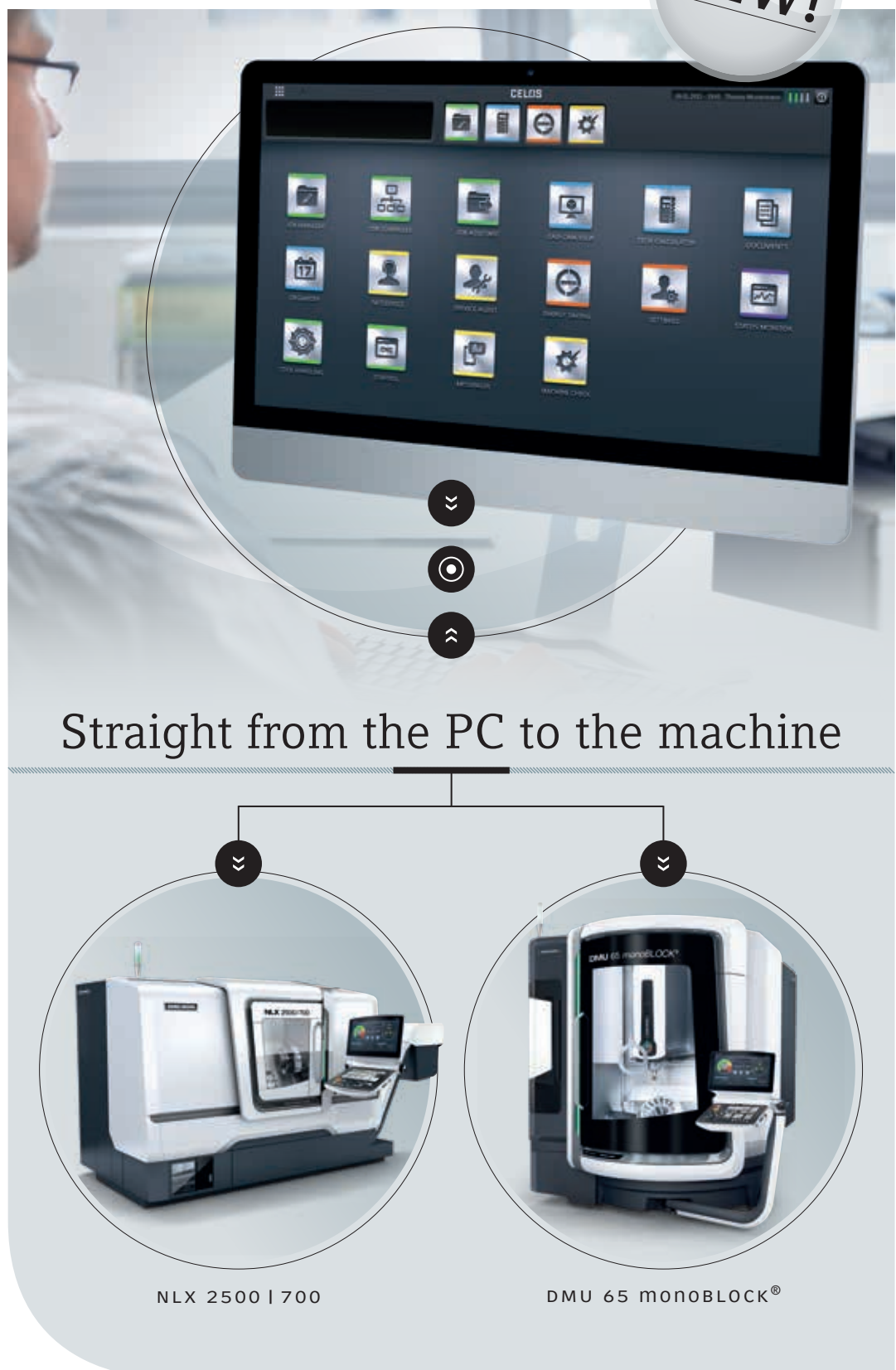
**Combine planning with production** with the PC version of CELOS®. This will allow you to meet the requirements of the future project **Industry 4.0**.

CELOS® – also perfect for training

**FIND OUT MORE ON PAGE 56**



JOB PREPARATION ON A PC WITH A DIRECT LINK TO THE MACHINES



Straight from the PC to the machine

NLX 2500 I 700

DMU 65 monoBLOCK®



### SERVICE AGENT

Improves machine availability with an intelligent maintenance system.

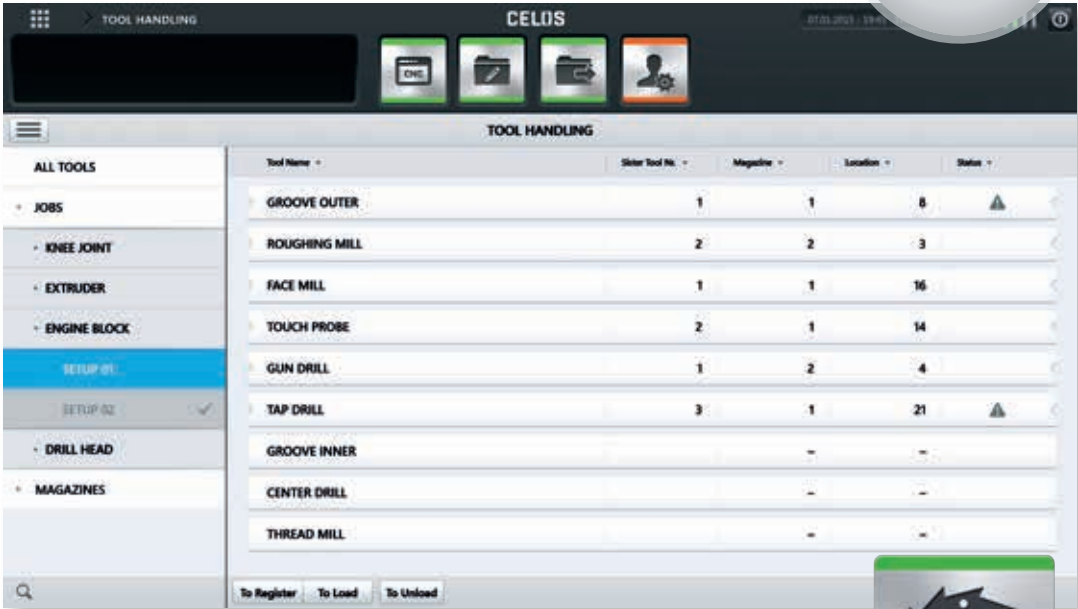


- › Overview of all maintenance work on the machine
- › Advance warning of upcoming maintenance and service work
- › List of all necessary spare parts and equipment
- › In-process support



### TOOL HANDLING

Shorter tool change times through assessments of the magazine configuration for subsequent orders.



- › Display of all tools required for a job, including the automatic generation of a loading list
- › Generation of an unloading list through automatic detection of all tools not required for subsequent jobs



## Paul Horn GmbH

20 % shorter tool change times on the DMU eVo with CELOS®.



At Horn, CELOS® speeds up workshop programming as well as the set-up process.

Werner Fritz (right), Production Manager at Horn and Rainer Bergmann, Head of Fixture Construction.

Paul Horn GmbH in Tübingen is a leading specialist in standard and custom high-performance tools and systems. The company’s own fixture construction is a cornerstone of efficient manufacturing processes and it was recently expanded with four high-tech milling machines from the DMU eVo series. Production Manager Werner Fritz and Head of Fixture Construction Rainer Bergmann agree that they have made the right choice, especially with regard to CELOS®. With its APPs, CELOS® simplifies shop floor programming and optimises the setup of production orders. With CELOS® this leads to higher machine running times and increased production.



Carbide tool manufacturer Paul Horn GmbH  
Unter dem Holz 33–35, 72072 Tübingen  
www.phorn.de



## August Strecker GmbH & Co. KG

Prepare and process jobs perfectly with CELOS®.



CELOS® optimises the set-up process, prevents errors and significantly improves the rate of utilisation.

Satisfied users (FLTR): Bernd Stock, Managing Director of Strecker, and master craftsman Dennis Schöwer.

August Strecker GmbH & Co. KG is a leading manufacturer of butt welding machines for the wire and cable industry. The satisfaction of its international customers is its highest priority. To avoid having to compromise between quality and deadlines, the company decided to expand its own NC production. The latest DMG MORI model is a CTX alpha 500 with Y axis and bar loader – and CELOS®. Bernd Stock, Managing Director of Strecker, was pleased: “CELOS® saves us an enormous amount of time setting up and programming. And with the Y axis and bar loader, we are now also able to fully process the parts in one clamping and with a high degree of automation.”



August Strecker GmbH & Co. KG  
Jahnstraße 5, 65549 Limburg  
www.strecker-limbürg.de





TURN & MILL COMPLETE MACHINING

CTX TC

CTX beta 1250 TC  
with the new compactMASTER®  
turn-mill spindle.

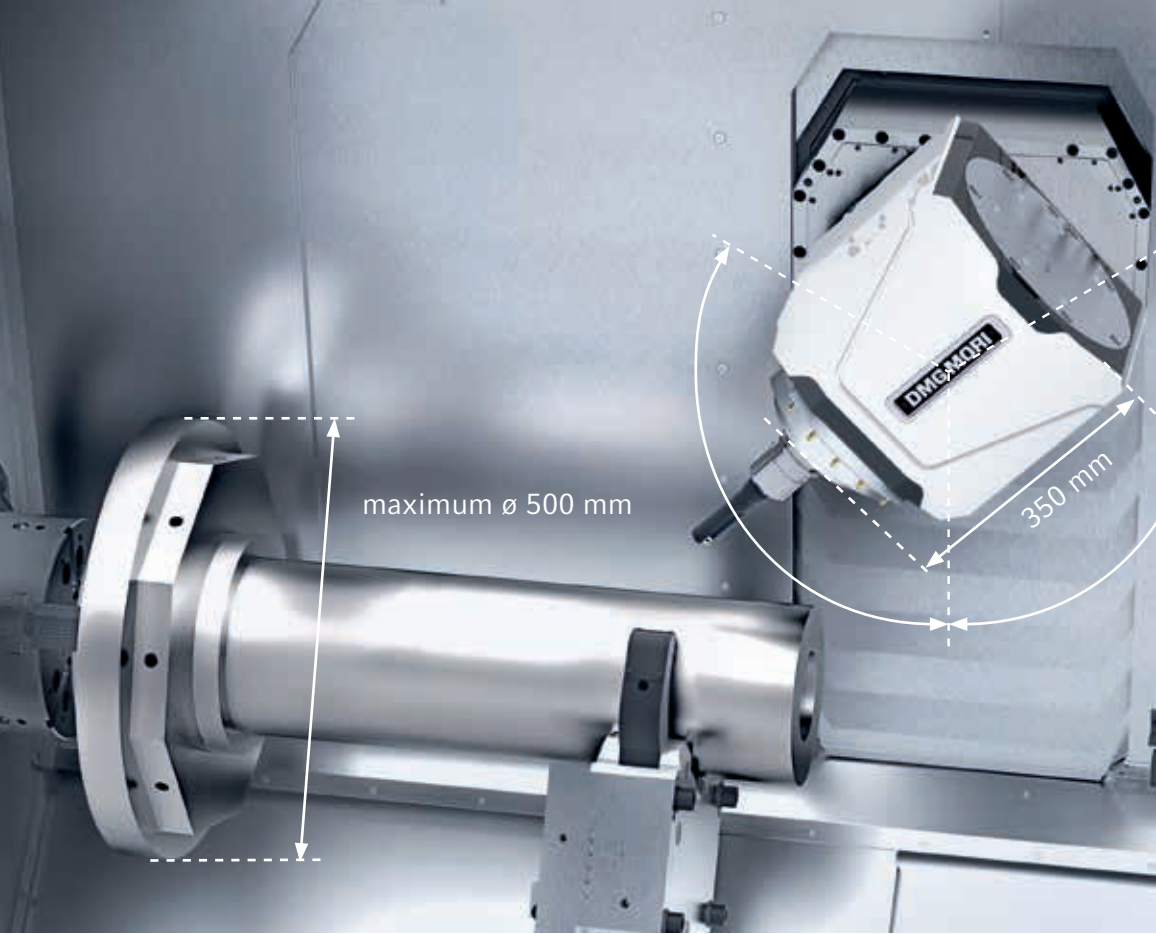
After the successful CTX beta 800 TC, the new CTX beta 1250 TC (second generation) is expanding the CTX TC range. The CTX beta 1250 TC is designed for universal applications in the turning and milling of workpieces up to 500 mm in diameter and with a maximum turning length of 1,210 mm. Up to 65 % higher feed rate (max. 50 m/min) and linear encoders from MAGNETROL featured as standard deliver better dynamics and precision. The automatic tool change system with up to 80 tools provides the customer with maximum flexibility during turning. A key element of the new CTX beta 1250 TC is the Direct Drive B axis with a swivel range of ±120°, equipped with the new compactMASTER® turn-mill spindle. The compact design of the spindle delivers a torque of up to 120 Nm from a spindle just 350 mm in length.

compactMASTER®: Ultra-compact HSK-A63  
turn-mill spindle rated at 120 Nm

Linear drive\* with 1 g acceleration and  
maximum long-term accuracy

Linear encoders from MAGNETROL

After the successful CTX beta 800 TC, the new CTX beta 1250 TC is expanding the second generation of the CTX beta TC range.



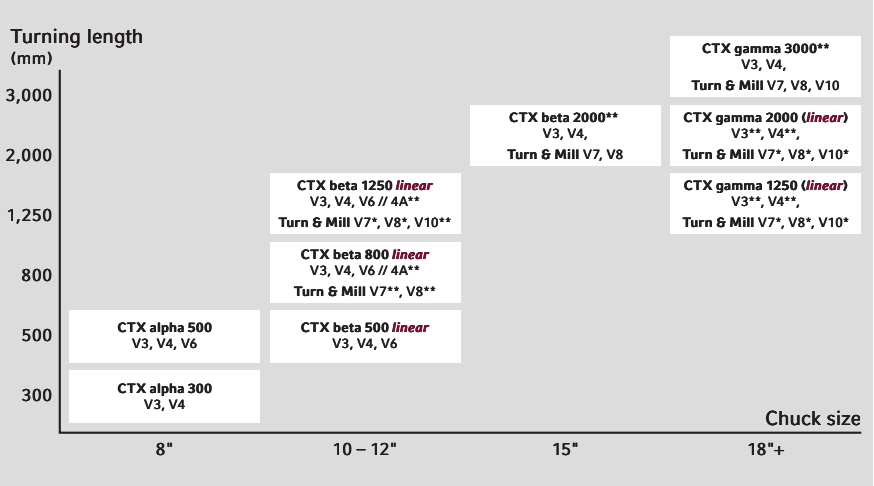
CTX beta TC		
	CTX beta 800 TC	CTX beta 1250 TC
Cutting diameter / turning length	ø 500 / 800 mm	ø 500 / 1,210 mm
Footprint	8.5 m²	10.2 m²

HIGHLIGHTS OF THE CTX beta 1250 TC

- compactMASTER®: Ultra-compact turn-mill spindle for minimal space requirements in the working area and 20 % higher torque, HSK-A63 (Capto\* C6), 12,000 rpm, 22 kW and 120 Nm, high-speed configuration rated at 20,000\* rpm
- 170 mm more space with the new B axis: Bore or drill 350 mm long workpieces horizontally, with a tool up to 400 mm in length
- More dynamic with up to 65 % higher feed rate, max. 50 m/min (X / Y / Z = 40 / 40 / 50 m/min)
- 1 g acceleration and 60 m/min feed thanks to the linear drive\* in the Z axis with maximum long-term accuracy and a 5-year guarantee
- 50 mm larger Y axis travel (250 mm) for greater eccentric machining flexibility
- The latest 3D control technology: CELOS® from DMG MORI with 21.5" ERGOline® Control and SIEMENS
- 5-axis simultaneous machining (in combination with the technology cycle\*) with the B axis with Direct Drive technology

\* Optional

9 machines with 40 configuration levels –  
from universal turning to turn & mill.



\* Optional linear drive, \*\* Not with linear drive

Turning: V3 (MC) = driven tools; V4 (Y) = driven tools and Y axis; V6 (SY) = driven tools, Y axis and counter spindle; 4A = 2 turrets, including driven tools and two Y axes (optional)

Turn-mill: V7 (T) = turn-mill spindle and tailstock; V8 (S) = turn-mill spindle and counter spindle; V10 (SZM) = turn-mill spindle, counter spindle and lower turret

CTX beta 1250 TC –  
Enhancement of the second  
generation of CTX TC for  
machining workpieces up  
to 500 mm in diameter  
and 1,210 mm in length  
in a 10.2 m² footprint



ø 140 × 495 mm  
Sprocket / mechanical engineering  
Material: 42CrMo4  
Machining time: 35 minutes



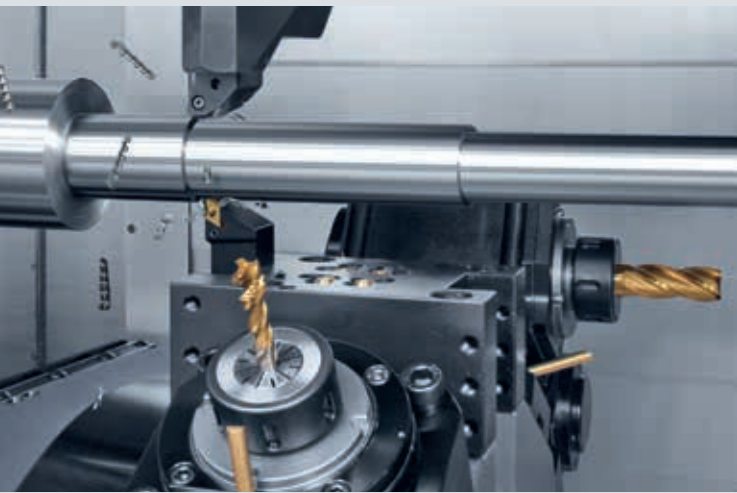
TECHNICAL DATA  
Maximum turning length: 1,210 mm; maximum workpiece diameter: 500 mm; Y axis travel: ±125 mm; main spindle ISM 76 rated at 5,000 rpm; tailstock; optional 6-sided complete machining with main spindle rated at up to 770 Nm and counter spindle rated at up to 6,000 rpm or 360 Nm



TURN & MILL COMPLETE MACHINING

# NTX

## NTX 1000 – Production turning with a second tool carrier.



Two tools working simultaneously for maximum productivity.

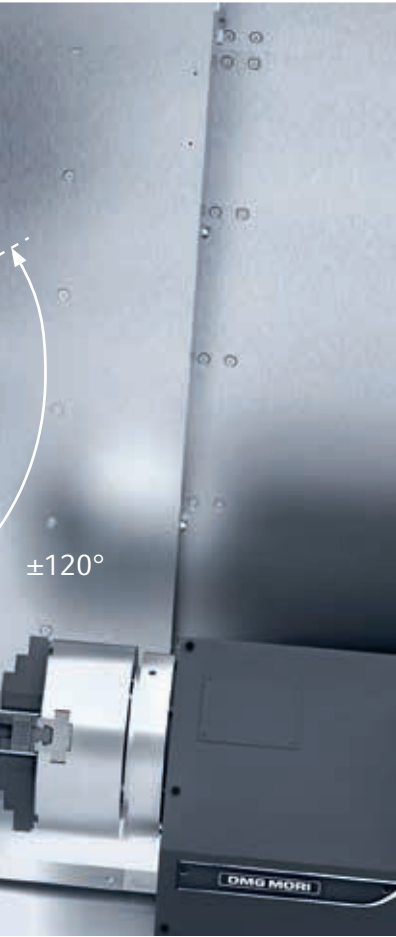
Bar machining of complex workpieces up to 65 mm in diameter,  
52 mm as standard; chuck up to 200 mm in diameter.



5-axis simultaneous machining of complex workpieces  
with Direct Drive (DDM® technology) on the B axis

Synchronous machining with B axis and lower  
10-position turret (optional)

Up to 10 driven tools on the BMT® turret (optional)  
rated at up to 10,000 rpm



±120°



155 × 110 × 770 mm

Guide vane / energy technology  
Material: X13Cr12Ni2W1V-5  
Machining time: 180 minutes

**NTX 1000**  
Bar machining of complex  
workpieces up to 65 mm  
in diameter, 52 mm  
as standard

### HIGHLIGHTS OF THE NTX 1000

- \_ **Direct Drive** (DDM® technology) on the B axis for **5-axis simultaneous machining** of complex workpieces for the medical, tool, aerospace and automotive industries: **±120° swivel range** on the B axis and 100 rpm rapid traverse
- \_ **Capto C5 turn & mill spindle** rated at up to 20,000 rpm, 12,000 rpm as standard
- \_ **Bar machining** of complex workpieces up to 65 mm in diameter, 52 mm as standard; **chuck up to 200 mm in diameter**
- \_ Large working area for **workpieces up to 800 mm in length** and **430 mm in diameter**

*“Compact foot-  
print: 10.4 m<sup>2</sup>”*



ø 60 mm

Acetabulum / medical  
Material: Titanium  
Machining time: 7 mins 30 sec



ø 90 × 106 mm

Tool holder / tooling  
Material: 1.2343 (X37CrMoV5-1)  
Machining time: 15 minutes



### TECHNICAL DATA

Traverse X / Y / Z: 455 / 105 / 800 mm; maximum  
turning length: 800 mm; bar capacity: ø 52 mm (ø 65 mm\*);  
B axis spindle speed: 12,000 rpm

\* Machine with 38 tool pockets, including chip conveyor  
Image: Configuration with double chain for 76 tools



**linear DDM**  
5-year guarantee



## EROFIO S.A. – Portugal



Manuel Novo, Managing Director of EROFIO: "With the latest 5-axis technology from DMG MORI we are setting new standards in precision and machining performance whilst simultaneously reducing energy consumption."

## Universally successful with the 4<sup>th</sup> generation duoBLOCK®.

EROFIO S.A. was founded in Portuguese Batalha in 1993 and currently employs 125 people. The core competence of the company is the **development, construction and manufacture of injection mould tools for the automotive sector**, which are produced either as a customer order including initial sampling or used in the injection moulding machines operated by its sister company EROFIO ATLÂNTICO.

Where machining is concerned, EROFIO has trusted in **high-tech from DMG MORI** since 1996 – initially in the form of vertical machining centres. However, since the turn of the millennium investment has been made primarily in **5-axis technology from DECKEL MAHO**. Nine of the company's **14 machines** offer the possibility of 5-axis precision machining.

The very latest highlight is a **4<sup>th</sup> generation DMU 80 P duoBLOCK®** universal milling machine. EROFIO CEO Manuel Novo is fascinated by the possibilities offered by this machine in particular: "We were able to achieve record highs straightaway, both in **precision** and machining performance – and this with a simultaneous reduction in **energy consumption**." They also gained considerable flexibility thanks to the **large swivel range of the B-axis**.

And as for the importance of 5-axis technology generally, Manuel Novo explains: "**The performance of the DMG MORI machines has given us an enormous boost, which we have been able to translate into double-digit growth rates every year.**" And to ensure this continues, the large **DMU 270 P** portal milling centre will soon quite literally be leading the performance of the company into a new dimension.



EROFIO S.A.  
Rua do Pinhal n.º 200, Jardoeira,  
2440-373 Batalha, Leiria, Portugal  
geral@erofio.pt, www.erofio.pt



## duoBLOCK® 4<sup>TH</sup> GENERATION 5-AXIS MILLING

## DMU 100 P duoBLOCK® DMC 125 FD duoBLOCK® 4<sup>th</sup> generation – 30 % more precision, performance and efficiency.

After the groundbreaking success of the recently introduced fourth generation of duoBLOCK® machines, three more versions of this range will be available after the open house exhibition in Pfronten.

The **DMU 100 P duoBLOCK®**, which ticks all the boxes both in terms of **high-performance heavy machining** and **precise all-round applications**, is characterised by its superior milling performance. The high level of stiffness in the design ensures **30 % higher accuracy** (compared to its predecessor), supported by intelligent temperature management. The new **DMC 125 U** and **DMC 125 FD duoBLOCK®** models with **pallet changers** also benefit from **optimised overall stiffness**.

These feature an automatic pallet changer which allows offline **set-up**. This reduces non-productive time, thereby optimising the production process. The **DMC 125 FD duoBLOCK®**, whose **mill-turn technology** allows complete machining on just one machine, is perfect for **process optimisation**. Another advantage of the duoBLOCK® principle is the universal kit for tailored, complete solutions for a wide range of applications. For example, the range of spindles includes models optimised for **heavy machining** – including the **powerMASTER® 1000** with 1,000 Nm torque and 9,000 rpm or the gear-driven spindle rated at 1,300 Nm and 8,000 rpm available from April 2015.

### DMU 100 P duoBLOCK® 4<sup>th</sup> generation



660 × 800 × 800 mm

**Drill head / energy**  
**Material:** 21CrNiMo2 (1.6523)  
**Machining time:** 20.5 hours

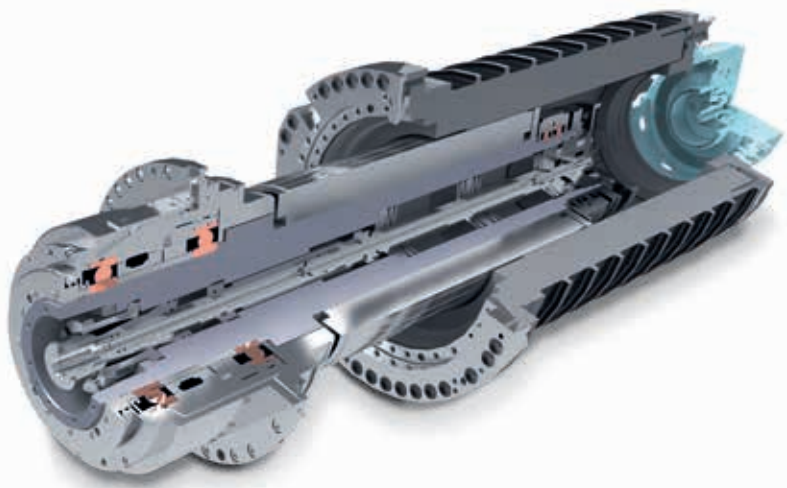
#### TECHNICAL DATA

Traverse X / Y / Z: 1,000 / 1,250 / 1,000 mm;  
rapid traverse: 60 / 60 / 60 m/min; spindle speed:  
12,000 rpm; power: 35 kW; torque: 130 Nm;  
workpiece size: ø 1,100 × 1,600 mm; workpiece  
weight: 2,200 kg; tool magazine: 40 (63 / 123) stations

ø 950 × 400 mm

**Fan blade / aerospace**  
**Material:** Titanium (Ti6Al4V)  
**Machining time:** 38 hours





**powerMASTER® 1000** – with a 10,000-hour or 18-month warranty, 1,000 Nm torque and 9,000 rpm

**78 % higher torque** with the new **5X-torqueMASTER®** – a gear-driven spindle rated at 8,000 rpm, 1,300 Nm and 37 kW (available from Q4 2015)

**HIGHLIGHTS OF THE 4<sup>TH</sup> GENERATION duoBLOCK®**

- **Performance:** up to 30 % higher stiffness for maximum cutting performance
- **Efficiency:** up to 30 % lower energy consumption with intelligent accumulators
- **The highest flexibility** and shortest machining times with the **new B axis** with 20 % higher stiffness and integrated cable carrier
- Rapid, intelligent wheel magazine with a **tool-changing time of 0.5 second** and up to 453 tools in spite of its minimal footprint



**TECHNICAL DATA**

Traverse X / Y / Z: 1,250 / 1,250 / 1,000 mm;  
rapid traverse: 60 / 60 / 60 m/min; spindle speed:  
10,000 rpm; power: 44 kW; torque: 288 Nm; workpiece  
size:  $\varnothing$  1,250 x 1,600 mm; workpiece weight: 2,000 kg;  
tool magazine: 63 (123 / 183 / 243) stations

**PORTAL 5-AXIS MILLING**

## DMC 270 U with pallet changer for high-efficiency machining of large parts weighing up to 9 tonnes.

— The 5-axis machine of the highly stable portal design generates **maximum precision** with the **highest dynamics**. A **rapid and compact pallet changer** in combination with the **high flexibility** of the basic machine paves the way for efficient production. **Maximum pallet loads of 9 tonnes, set-up during machining, more extensive automation options** and the **best accessibility** to the working area, set-up station and maintenance equipment are additional factors promoting efficiency in production. The extremely high inherent stiffness of the machine and constant temperature control throughout ensure top precision.

Highly productive machining with the powerMASTER® 1000 motor spindle rated at 1,000 Nm and 77 kW.



**HIGHLIGHTS OF THE DMC 270 U**

**DMC 270 U**  
High precision of  $\pm 12 \mu\text{m}$   
with intelligent temperature  
management

- Large working area for workpieces up to  $\varnothing$  3,000 x 1,600 mm and 9,000 kg
- **50 % higher dynamics** with the new drive technology in the NC rotary table
- **Wheel magazine featured as standard** for set-up during machining (two wheels or more)
- **B-axis** with improved interference contour and internal cable carrier, swivel range of 250°
- **High precision** thanks to optimised temperature stability
- **Three-point support**



$\varnothing$  2,560 x 750 mm

**Bevel spur gear / mechanical engineering**  
**Material:** 18CrNiMo-6  
**Machining time:** 25 hours

**TECHNICAL DATA**

Traverse X / Y / Z: 2,700 / 2,700 / 1,600 mm;  
rapid traverse: 60 / 30 / 40 m/min; spindle speed:  
12,000 rpm; power: 44 kW; torque: 288 Nm; workpiece  
size:  $\varnothing$  3,000 x 1,600 mm; workpiece weight: 9,000 kg;  
tool magazine: 63 (123 / 183 / 243) stations



## DMG MORI HIGH-TECH COMPONENTS



Christian Thönes  
Member of the Board  
DMG MORI SEIKI  
AKTIENGESELLSCHAFT  
Product Development,  
Production & Technology



Dr Naoshi Takayama  
Board of Directors  
DMG MORI SEIKI CO., LTD  
Senior Executive Managing  
Director & Quality

## Quality First at DMG MORI.

The high quality and reliability of our products and services are a cornerstone of DMG MORI. DMG MORI guarantees top quality for all its customers with globally consistent standards and targeted measures.

### What does quality mean to DMG MORI?

**CHRISTIAN THÖNES** \_\_\_ Quality has always been a high priority at DMG MORI. We have made it our mission to continue raising the bar in the sector in terms of both innovation and the quality of our products. Our work focuses on the value to our customers. Our customers benefit from the top quality of DMG MORI, from our products to our services.

**NAOSHI TAKAYAMA** \_\_\_ It is the high reliability and durability of our products that are the results of our holistic quality approach. We mutually benefit from the cooperation because both DMG and MORI have always implemented a trend-setting quality management system, producing the same quality products at any factory from both companies.

### “Quality First” – what does that mean in terms of your perception of quality?

**CHRISTIAN THÖNES** \_\_\_ With our cutting-edge Quality First standards we are now even more capable of identifying, minimising and preventing errors. These standards are enforced, for example, by expanded prototype testing in our new test centres which reproduce the most difficult customer conditions. Additionally, every machine must pass a 100-hour quality check with flying colours before it is shipped out. During development, we focus on the robustness of our products. Our 10,000-hour guarantee on our new spindles, e.g. speedMASTER and power-MASTER®, as well as the 5-year guarantee on direct linear drives show just how much we believe in the reliability and longevity of the components we use.

**NAOSHI TAKAYAMA** \_\_\_ In Supplier Management we worked with our partners to develop Quality First standards in combination with extremely high quality management standards for our suppliers. That’s why we only work with first-class suppliers which we can integrate, along with their expertise, into the development process. Our customers also benefit from our focused development experience. For example, both companies now use highly accurate magnetic linear encoders from MAGNESCALE.

### QUALITY FIRST MEANS ...

- Maximum availability even under the most extreme environmental conditions with robust technologies including wear-free linear drives with a 5-year guarantee and the highest long-term accuracy and our magnetic MAGNESCALE linear encoders with high resistance to oil and condensation
- Maximum reliability with robust components, e.g. the new DMG MORI spindles with a 10,000-hour guarantee (maximum 18 months)
- Excellent value retention thanks to the new design with robust surfaces for use in production
- At least 100 hours of quality testing in line with the advanced DMG MORI best practice methods (BPM)

## Linear drive 5-year guarantee.

### NEW: CTX beta 800 *linear* WITH LINEAR DRIVE AS STANDARD

- The shortest non-productive times thanks to rapid jerk and 1 g acceleration: **Rapid positioning** even over short distances – **ideal for grooves and recesses**
- Maximum stiffness = maximum long-term accuracy** and surface finish: Reliable positioning thanks to the elimination of backlash in the drive train – **ideal for hard turning**
- Low maintenance, minimal life cycle costs:** No mechanical transmission elements, **no wear** and a **5-year guarantee** – **ideal for use in production**

More on the CTX beta 800 *linear* + reference report

### ON PAGE 30

## More than 15,000 linear motors in successful use.

DMG MORI has successfully been using linear drives since 1999. The linear drive is now available on **46 machine models** across 12 ranges.

## New milling spindles from DMG MORI 10,000-hour guarantee\*.

- Large spindle bearing for long service life
- Optimised sealing, no coolant contamination
- Spindle cooling designed to minimise thermal movement

### speedMASTER #40 universal milling spindle

As standard for the 2<sup>nd</sup> generation of the NHX range; available from 2015 for monoBLOCK®, NVX, DMC V and DMU.

### FIND OUT MORE ON PAGE 34

### compactMASTER® #40 turn-mill spindle

As standard for the 2<sup>nd</sup> generation of the CTX beta TC range.

### FIND OUT MORE ON PAGE 10

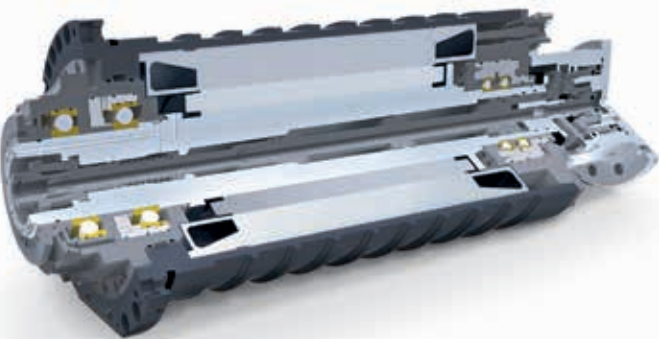
### DMG MORI QUALITY FIRST

## Over 100 hours of quality testing per machine – We know how they work, so we know just how to test them!

### DMG MORI QUALITY FIRST

- › We test your machine under rigorous everyday production conditions
- › A 100-hour quality check under strict quality criteria and realistic workshop conditions
- › Maximum performance and availability





speedMASTER with oil-cooled stator and new tool clamp with a constant holding force for up to 500 million cycles.

**powerMASTER®**  
#50 universal milling spindle

Optional for the 4<sup>th</sup> generation of the duoBLOCK®, DMU / DMC 270 and NHX 6300.

\* Maximum 18 months

MAGNETIC FOR MAXIMUM PRECISION



Now at Wernau: MR sensor adjustment to exactly 2 µm by microscope.

Maximum precision thanks to magnetic measurement systems rated at 0.01 µm.

MAGNESCALE – A DMG MORI company. MAGNESCALE has over 45 years of experience in the development and production of high-precision linear and angular measurement systems for the machine tool and semiconductor industries.

—MAGNESCALE Co. Ltd., based Isehara and Iga (Japan) as well as in Wernau, Stuttgart (Germany), specialises in ultra-precise length and angle measurement systems. The DMG MORI company develops, produces and distributes unique technological measurement solutions based on magnetic elements.

- \_ Sealed design
- \_ Resistant against oil and condensation
- \_ High impact resistance
- \_ High vibration resistance
- \_ Same coefficient of thermal expansion as steel



MAGNESCALE in Isehara.

Besides their resolutions ranging from 0.01 µm to the atomic pm scale, MAGNESCALE systems boast high reliability even in the most extreme environmental conditions. The company's production facilities are located in Isehara and Iga, Japan. It has a NEW site in Wernau near Stuttgart, through which European markets will now have direct access to this unique measurement technology.

The magnetic measurement systems from MAGNESCALE are based on the magnetic storage technology of audio tape systems. Similar to an optical measurement system which detects changes to light intensity on a grid, the reading head of the magnetic measurement system detects the magnetic strength of a division. This technology is **not sensitive to harsh environmental conditions** such as moisture, oil, dust and vibrations. It guarantees **high-precision positioning and feedback** on the machine tool.

SR27A / SR67A range\*



Absolute magnetic encoder with slender (SR27A) or robust (SR67A) design.

RS97 range\*



Absolute magnetic angle encoder of open design for mounting in restricted spaces.

RU97 range\*



Absolute magnetic angle encoder with integral bearing. Ideal for integration into rotary tables and swivelling axes.

DK800S range

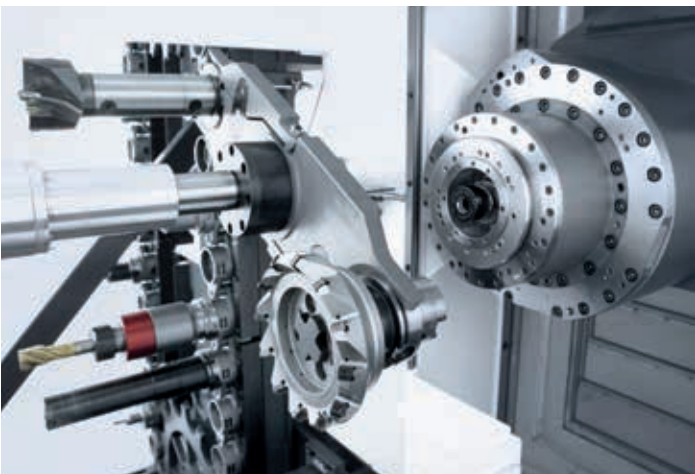


Digital probes for automated quality control applications in production and assembly lines.  
Measuring ranges: 5 mm to 205 mm  
Precision: up to ±0.5 µm  
Service life: up to 90 million strokes

**DRIVE-CLiQ** \* MAGNESCALE absolute measurement systems with the Siemens DRIVE-CLiQ interface ensure the highest precision and reliability.



18 hours of geometry checks on the machine and spindles.



33 hours of functionality testing on the components, e.g. the tool change system.



52-hour endurance test including milling and turning.





**eni lubricants and solutions**  
for high-tech metalworking

**technology comes alive**



### eni downstream & industrial operations

cutting fluids and industrial lubricants

Based on its long experience and certified research laboratories, eni, leader in the Italian industrial lubricants market, has developed high tech metalworking products

- Aquamet - coolants
- Aster - mineral based neat cutting oils
- Metalcut - mineral based and vegetable biodegradable cutting oils

The partnership with DMG MORI calls for the use of eni lubricants, greases and cutting oils on all group's machine tools and encourages the development of new technological solutions for improving the customer's production and manufacturing processes.

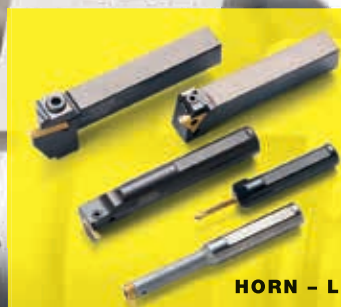
eni downstream & industrial operations' commercial structure is available to identify the most suitable solutions for all lubrication needs in European countries.

eni downstream & industrial operations  
via Laurentina, 449 - 00142 Roma  
Ph.+39 06 5988.1 - eni.com

## Grooving, part-off, perfection. Performance at its peak



www.phorn.co.uk



Whichever alloys you have to machine, Horn offers innovative solutions. Efficient, economical, precise; individually customized when required to create the perfect process. Ours is the most complete grooving and part-off program worldwide, supported by expert process planning and augmented by first class special tool design and build capability. As a technology leader, we define the standards in the sector. With more than 18,000 standard precision tools and experience of more than 100,000 application solutions, we are your advantage. [www.phorn.co.uk](http://www.phorn.co.uk)

**HORN - LEADERS IN GROOVING TECHNOLOGY**



### CTX/TC technological package



GROOVING PARTING SLOT MILLING BROACHING COPY MILLING DRILLING REAMING

## 'Best in Class Winner'

Jungheinrich EFG S40s: The most efficient electric fork lift truck with the power of a diesel engine. With upto 28 per cent lower consumption than its competitors even under the harshest conditions. The best in its class.

More highlights: [www.jungheinrich.com](http://www.jungheinrich.com)



**IFOY AWARD**  
counter balanced truck  
of the year 2014

**JUNGHEINRICH**  
Machines. Ideas. Solutions.



Member IMC Group  
**Ingersoll**  
Cutting Tools

**Von der Idee zum  
perfekten Werkzeug**

**From the idea  
to the perfect tool**

**Ingersoll Werkzeuge GmbH**  
Hauptsitz:  
Kalteiche-Ring 21-25 • D-35708 Haiger

Telefon: +49 (0)2773-742-0  
Telefax: +49 (0)2773-742-812/814  
E-Mail: [info@ingersoll-imc.de](mailto:info@ingersoll-imc.de)

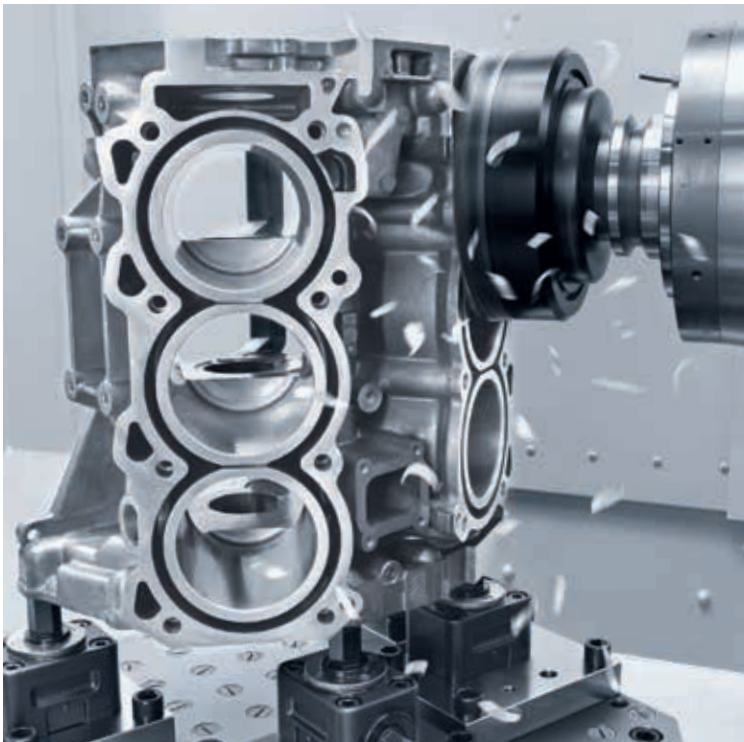
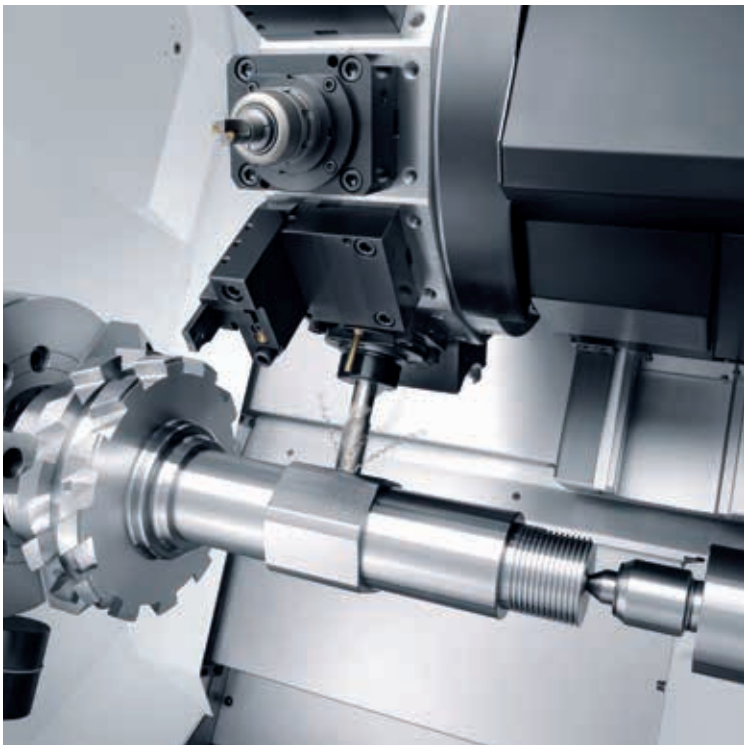
[www.ingersoll-imc.de](http://www.ingersoll-imc.de)



N° 1 – 2015

- Innovative technologies for the aerospace industry
- DMG MORI – The exclusive premium partner of the LMP1 team
- CTX and NLX – The success stories in universal turning
- NHX – Local production in the market, for the market

# Technologies and customer stories





GLOBAL TECHNOLOGY EXPERTISE

77 technology centres around the world

Over 500 DMG MORI machines are always nearby!

Technological expertise with a global presence – In 69 DMG MORI and 8 technology centres operated by our sales partners, we are able to demonstrate our full range of products. At **15 locations** you can also consult our specialists for **special technological and industrial solutions** at any time.



15 locations for special technological and industrial solutions.

Aerospace  
Centre of excellence



1 SITE  
DECKEL MAHO PFRONTEN GMBH

- › Highlights
  - \_ Global technological support
  - \_ Sector-specific options for aerospace applications
  - \_ Turnkey process development for complex workpieces and difficult materials
- › monoBLOCK®, eVo, FD duoBLOCK®, Portal, CTX TC, NTX, ULTRASONIC, LASERTEC

5-axis  
Centre of excellence



5 SITES WORLDWIDE  
PFRONTEN, TORONTO, CHICAGO, IGA, TOKYO

- › Highlights
  - \_ Local expertise in 5-axis machining from the global market leader
  - \_ Global presence of experienced product managers and application engineers with experience across the entire process chain
  - \_ Universal 5-axis portfolio
  - \_ Contact partner for technology planning, complex feasibility studies or custom solutions
- › DMU, NMV, monoBLOCK®, eVo, HSC, DMF, duoBLOCK®, Portal, DIXI, DMC H linear, NMH

XXL  
Centre of excellence



1 SITE  
DECKEL MAHO PFRONTEN GMBH

- › Highlights
  - \_ Twice the production capacity on DMU 600 P portal machines
  - \_ The perfect manufacturing conditions: Two foundations with a complex structure and crane, environment fully air-conditioned to ±1°C
  - \_ Highly skilled team of 190 employees in the fields of development, assembly, sales and application engineering
- › DMU/C Portal for workpieces weighing up to 40 tonnes and X traverses of up to 6 metres

Die & mould  
Centre of excellence



2 SITES WORLDWIDE  
GERETSRIED (HSC CENTRE), NARA (MOULD LABORATORY)

- › Highlights
  - \_ Holistic solutions for tool and mould making
  - \_ Experience the full process chain of the latest HSC technology LIVE
  - \_ Technology workshops and training courses for our customers
- › HSC, DMU, DMF, DMC V, NMV, NVX, NVD
  - \_ High-speed cutting, maximum precision and the best surface quality





## Production turning

### Centre of excellence



**1 SITE**  
GILDEMEISTER ITALIANA S.P.A.  
(BERGAMO)

- › Highlights
  - Over 45 years of experience in automated turning
  - 50 application engineers for technology and time studies
- › **SPRINT (linear)**
  - Automatic turning, short and long part turning
- › **SPRINT 50 / 65**
  - Bar machining with up to 3 turrets
- › **GM / GMC**
  - Multi-spindle turning machines

## Turn & mill

### Experience centre



**8 SITES WORLDWIDE**  
BIELEFELD, STUTTGART, WERNAU, PARIS, TORTONA, SHANGHAI, IGA, TOKYO

- › Highlights
  - LIVE demonstration on the customer's workpiece
  - Technology developments for our customers
  - DMG process chain and **exclusive DMG MORI technology cycles**
- › **CTX TC, CTX TC 4A, NT and NTX**
  - 5-axis universal turning with B axis
  - 5-axis universal turning with B axis and a second tool carrier

## ULTRASONIC

### Centre of excellence



**3 SITES WORLDWIDE**  
STIPSHAUSEN, TOKYO, CHICAGO

- › Highlights
  - More than 30 years of experience in machining hard, brittle and difficult-to-machine materials
  - **Experienced, skilled application technology team:** Feasibility studies, process development and optimisation, complete turnkey solutions
  - **More than 600 ULTRASONIC machines installed worldwide**
  - **ULTRASONIC technology workshops**
- › **Second generation ULTRASONIC:**
  - Grinding, milling and drilling of advanced materials with reduced process forces

## LASERTEC

### Centre of excellence



**3 SITES WORLDWIDE**  
PFRONTEN, TOKYO, CHICAGO

- › Highlights
  - Over 25 years of experience in precision laser machining
  - **Expertise in application technology:** Training, customer support, feasibility studies, complete turnkey solutions
  - **More than 600 LASERTEC machines installed worldwide**
  - **LASERTEC technology workshops**
- › **Five LASERTEC technology fields:**
  - Shape, PrecisionTool, FineCutting, PowerDrill, 3D / Additive Manufacturing



AEROSPACE

TAKE OFF WITH THE LATEST TECHNOLOGY!

Aerospace Excellence Centre in Pfronten

A partner of the international aviation industry.

— The aviation sector will be a growth market for decades to come. For this growth to happen, manufacturers and their suppliers all along the value-creation chain need reliable, highly innovative partners. For years DMG MORI has supported its customers in the aviation sector with the **Aerospace Excellence Centre in Pfronten**.

We provide **the latest technology** and the capability to innovatively support and even help steer our customers own developments. **Turnkey solutions** can be developed in close collaboration with the customer, even for complex workpieces and hard-to-machine materials.

As a **technology leader** in the field of **5-axis technology**, DMG MORI has a unique product range of high-tech machine tools with industry-specific options and **engineering services** for parts manufacturing in the aerospace and aviation sectors.






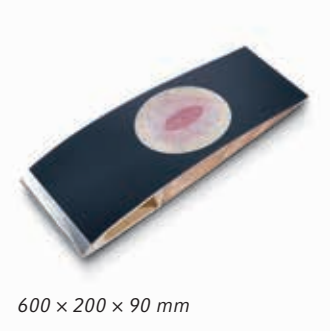


Our team of aerospace specialists is happy to help you with any queries arising from your process chain.



The DMG MORI aerospace video  
If your mobile has QR code recognition software, you can view the video immediately.

High-tech components for the aerospace industry

Fan blade	Blisk	Turbine housing	Compressor blade	Turbine guide vane	Rotor blade segment
 <div>ø 950 × 400 mm</div>	 <div>ø 450 × 120 mm</div>	 <div>ø 180 × 150 mm</div>	 <div>ø 40 × 120 mm</div>	 <div>ø 80 × 90 mm</div>	 <div>600 × 200 × 90 mm</div>
<b>DMC FD duoBLOCK® range</b> <b>Material:</b> Titanium <b>Machining time:</b> 38 hours High-precision milling and turning on one machine	<b>DMU monoBLOCK® range</b> <b>Material:</b> Titanium <b>Machining time:</b> 55 hours Swivelling rotary table with Direct Drive technology on the A and C axes	<b>LASERTEC 65 3D</b> <b>additive manufacturing</b> <b>Material:</b> Stainless steel <b>Machining time:</b> 306 minutes The intelligent combination of laser deposition welding and milling allows additive manufacturing in finished parts quality	<b>NTX 1000 2<sup>nd</sup> generation</b> <b>Material:</b> Inconel 600 <b>Machining time:</b> 3 hours 4-axis milling and turning thanks to the lower BMT® turret with driven tools	<b>LASERTEC 50 PowerDrill</b> <b>Material:</b> Inconel <b>Machining time:</b> 20 minutes 5-axis laser precision drilling of cooling holes, including with flared diffuser geometry	<b>ULTRASONIC 260 Composite</b> <b>Material:</b> CFRP <b>Machining time:</b> 55 seconds Accurate exposure of the various CFRP laminate layers with no delamination or fibre fraying with ULTRASONIC



## AMRC – Research centre for Boeing

### Redefining technological limits.



AMRC machines the most demanding components with dynamic high-precision machining centres such as the DMC 160 FD duoBLOCK®.



Research Director Keith Ridgway, Advanced Manufacturing Research Centre (AMRC) affiliated with the University of Sheffield.

Since its foundation in 2001 the **University of Sheffield Advanced Manufacturing Research Centre (AMRC)** with Boeing has established itself as one of the leading research centres for aerospace technology. With founding partner Boeing and other well-known member companies, the AMRC links training and business in an exemplary way. And the common goal of all those involved: to ensure research findings are implemented in the production process quickly and effectively. Since 2003, Executive Dean, Professor Keith Ridgway, CBE, and his team have relied on the **machining competence of DMG MORI**, using high-performance machines from the **NT and NMV series** for the sophisticated machining of titanium, nickel-aluminium alloys and sintered materials. Just recently, the AMRC also invested in a **DMC 160 FD duoBLOCK®**. “Our applications require the use of **dynamic high-precision machining centres**”, is how Keith Ridgway explains the purchase. The duoBLOCK® concept meets this demand in a multitude of respects.

Production at the AMRC is always working at the limit. Or even beyond: the researchers are continuously redefining technological limits, so investments in production are always farsighted. Keith Ridgway also sees the **DMC 160 FD duoBLOCK®**, on which the AMRC produces among other things engine casings, in this light: “**Milling-turning technology** is certainly the technology of the future, especially where high-performance materials are concerned.” After all it is AMRC’s goal to develop **productive and efficient manufacturing solutions** for industry and to boost technology transfer in actual production. DMG MORI has equipped the milling-turning centre with both the **heavy duty machining package** – gearbox spindle with a **maximum torque of 1,100 Nm** – and the precision package. Keith Ridgway believes the added value of the machine lies in its high degree of flexibility: “The DMC 160 FD duoBLOCK® stands for **integral machining processes**, from rough machining right through to precision machining.”



AMRC with Boeing  
Advanced Manufacturing Park  
Wallis Way, Catcliffe, Rotherham S60 5TZ  
enquiries@amrc.co.uk



Advanced Manufacturing Research Centre



#### Structural component



1,042 × 788 × 131 mm

**DMC 340 U**  
**Material:** Aluminium  
**Machining time:** 5 hours  
50 % faster with 5-axis simultaneous machining in just three clamping operations

#### Door lock fitting



360 × 300 × 125 mm

**NHX 4000 2<sup>nd</sup> generation**  
**Material:** ALMg4,5Mn  
**Machining time:** 1 hour 24 minutes  
90 % material removal with the new speedMASTER milling spindle

#### Chassis component



1,080 × 610 × 210 mm

**DMU 160 duoBLOCK®**  
**Material:** Titanium  
**Machining time:** 23 hours  
43 % reduction in machining time with the 1,100 Nm gear-driven spindle

#### Helicopter skid



ø 300 × 300 mm

**NLX 4000**  
**Material:** 42CRM04  
**Machining time:** 57 minutes  
6-sided complete machining with the main and counter spindles

#### Undercarriage cylinder



ø 130 × 290 mm

**CTX beta 1250 TC 4A**  
**Material:** Steel  
**Machining time:** 165 minutes  
5-axis simultaneous machining

#### Valve housing



170 × 150 × 100 mm

**DMU 60 eVo linear**  
**Material:** Titanium  
**Machining time:** 10.5 hours  
25 % reduction in machining time through the high dynamics of the linear drives with up to 80 m/min rapid traverse



## DMU monoBLOCK®

### Cutting-edge blisk production with the DMU 65 monoBLOCK® and a swivelling rotary table.

At Santa Fe in California, the American company **TECT Power** manufactures highly complex **blisks (bladed disks) for the aerospace industry**. The components of the latest generation of engines are manufactured on **seven DMU 65 monoBLOCK®**. The high stability of the machine in a footprint of just 7.5 m<sup>2</sup> allows efficient and **highly productive production**.

Close collaboration between TECT Power and the **Aerospace Excellence Centre** in Pfronten on all technological issues, as well as the impressive technology of the monoBLOCK® range, were key to this outstanding success.



The maximised stability and dynamics of the monoBLOCK® range are ideal for machining blisks.



In the first phase, seven DMU 65 monoBLOCK® machines were successfully installed at TECT Power – and more are set to come.



**TECT Power**  
8839 Pioneer Boulevard  
Santa Fe Springs, CA 90670, USA  
www.tectpower.com

## TECT Power



Direct Drive swivelling rotary table with torque drives on the A and C axes.

And now, for highly dynamic machining tasks, with the **Direct Drive swivelling rotary table** customers have another table option for the DMU 65 monoBLOCK®. With **backlash-free direct drive technology on the A and C axes**, it ticks all the boxes for 5-axis simultaneous machining of components such as bladed disks.

#### Highlights of the Direct Drive swivelling rotary table

- › Table size ø 600 mm and large workpieces up to ø 700 x 500 mm, weighing 600 kg
- › Swivel range of ±120°
- › The highest dynamics:  
A axis up to 20 rpm and 21 rad/s<sup>2</sup>  
C axis up to 80 rpm and 24 rad/s<sup>2</sup>

## NT / NMV

### Optimal performance for the aerospace industry thanks to turn & mill and 5-axis technology.

**Advanced Manufacturing Sheffield Ltd (AML)** is an advanced sub-contract machinist that specialises in the manufacture of complex hard metal parts. It works collaboratively with major players in the **aerospace industry** and undertakes scheduled delivery of parts to these Primes. **AML's processes enable it to cut metal significantly faster** than many other suppliers, yielding benefits to its customers at the new product introduction phase. The company's advanced methods eliminate the need for incremental learning changes to processes, delivering instantaneous returns for its customers and saving costs, which would normally need to be recovered over several years. These techniques, combined with the **exceptional flexibility that the DMG MORI machines offer**, has seen AML grow substantially since 2008. It started by offering manufacturing, training and consultancy to aerospace Primes and Tier



AML's six DMG MORI machines deliver reliability, rigidity and repeatability.

1 suppliers. However, in 2010, it extended its capabilities with its own manufacturing facility, producing critical parts such as **blades, disks, blisks, and combustion casing components**. It is also a Tier 2 member of the The University of Sheffield **Advanced Manufacturing Research Centre with Boeing (AMRC)** and benefits from a close technological relationship with the organisation to continually enhance its advanced machining capabilities.

By combining technology and experience from **AMRC with DMG MORI machinery**, AML routinely offers its clients metal removal rates 2–3 times faster than could previously be achieved. Evaluation of machine performance was always demanded by Dr Gareth Morgan, Managing Director of AML: **"DMG MORI always came out high on the list for machine up-time, service, rigidity and repeatability and, without these characteristics, it would**



Because of advanced methods the AML works significantly faster and efficiently than many other suppliers.

be impossible for us to achieve the results we do." Currently, AML has six DMG MORI machines, **one NT 5400, two NT 4300s, one NMV 5000 and two NMV 8000s**. It also has a Mitutoyo CMM, Factory Master MRP, NX CAD/CAM and Vericut. "We chose **DMG MORI** machines for their 5-axis capabilities as they give us maximum flexibility for the wide range of parts we produce", he says. In addition, the machines give AML an insight into ways of maximising capabilities by optimising factors such as workpiece holding and cutting methods. Dr Gareth Morgan continues: "Where necessary, we also have access directly to Japan through dedicated DMG MORI service personnel for more advanced technological questions."



**Advanced Manufacturing (Sheffield) Ltd**  
Poplars Business Park, Poplar Way,  
Catcliffe, Rotherham S60 5TR  
Tel.: +44 (0) 1709 720 478, www.amlsheffield.co.uk





## DMF Loll Feinmechanik GmbH



Jens Loll, Managing Director of Loll Feinmechanik, with an aerospace structural component manufactured on a DMF travelling column milling machine from DMG MORI. The dynamics and positioning accuracy of the linear technology help Loll Feinmechanik to machine large workpieces.



In eight years Loll Feinmechanik has acquired a total of six DMF machines from DMG MORI.

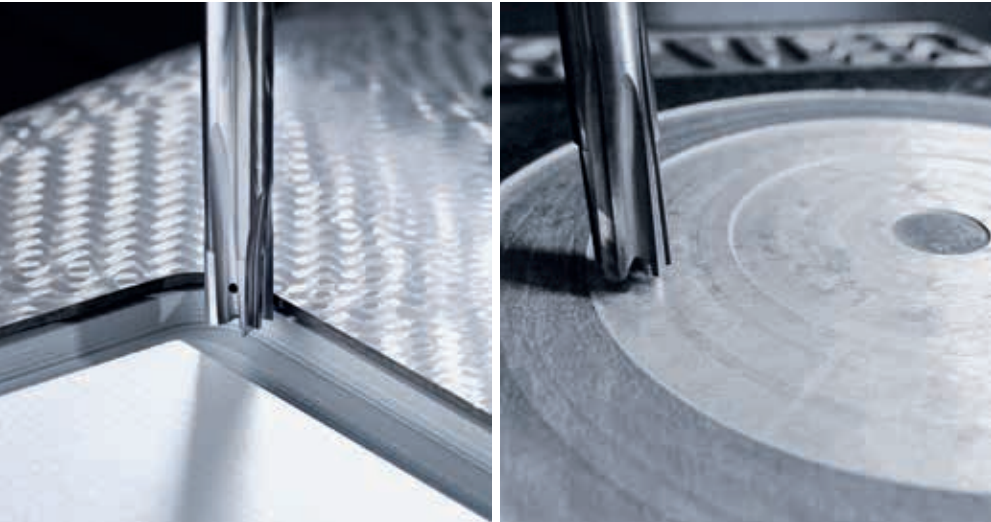
## Maximum cutting performance with the highest precision and dynamics through linear technology.

With almost 70 years of experience in machining, **Loll Feinmechanik GmbH** from Tornesch, Hamburg, embodies the motto **“Quality through passion”**. The general contract manufacturer supplies challenging sectors such as the **energy sector**, the **aviation industry** and the **medical sector**. 230 employees carry out the specialised work whilst **60 CNC machines** form the technological backbone of the company. Most of the machining centres were supplied by **DMG MORI**. In the past eight years alone, Loll Feinmechanik has invested in six travelling column milling machines from the **DMF range**.

The **DMF models** allow the company to machine **large workpieces** and are available in practically every size. The most recent models include a **DMF 260 linear** and a **DMF 360 linear**, the heavy version of which Loll Feinmechanik has ordered featuring a large Y traverse. **“Stability and speed** were decisive factors in favour of **DMG MORI travelling column milling machines”**, recounts Managing Director Jens Loll. The company often works on large aluminium structural components for aviation. **“In some cases the material removal can exceed 90 %.”** **Powerful spindles and the dynamic linear drives** are absolutely ideal for **productively machining** these components. However, the **precision of the linear technology** is another important factor for the Managing Director: **“The high positioning accuracy** is crucial for meeting our quality standards.” The **stable design** of the column milling machines play a role in this context. **“The concept of the DMF models guarantees minimal deviations over long periods as well as large traverses.”**



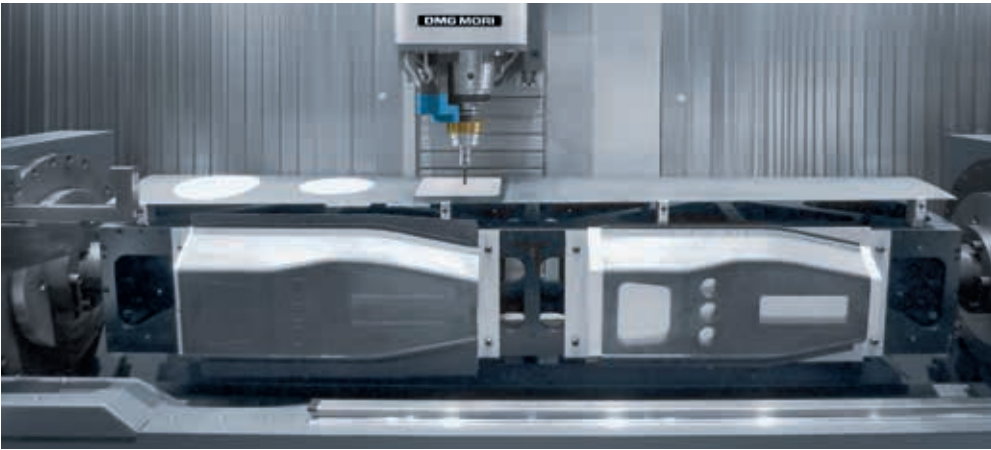
## ULTRASONIC COMPOSITES



Trimming and scarfing CFRP without edge chipping, fibre fraying or delamination.

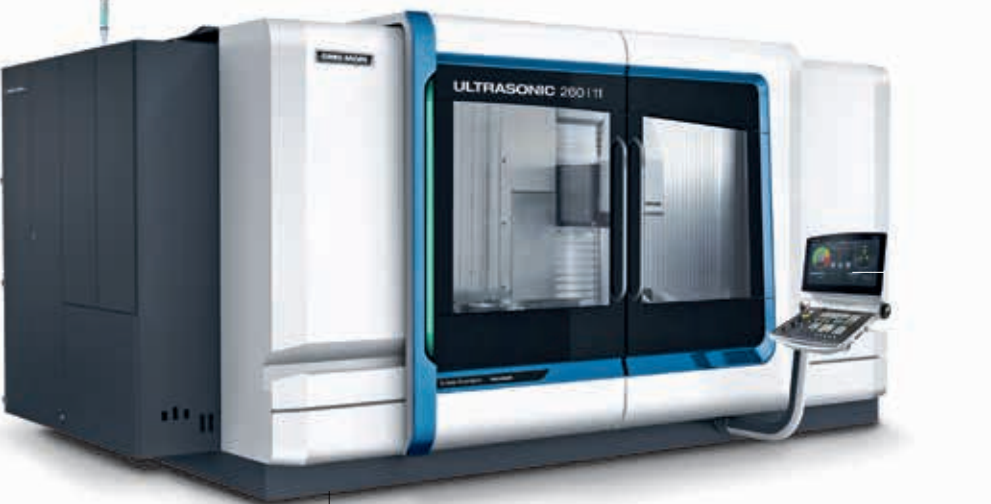
## ULTRASONIC milling of composites with up to 40 % less process forces.

- |   |  |
|---|--|
| <b>Technology benefits:</b>   | <b>Materials:</b>  |
| › Up to 40 % less process forces for the prevention of delamination and fibre fraying     | › CFRP, GRP, AFP   |
| › Accurate stripping of laminate layers (scarfing)  | › CMC  |
| › Sharp edges during trimming   | › Stacks   |
| › Mobile and stationary ULTRASONIC machining for series production, repairs and reworking |  |
|   | <b>Target markets:</b>   |
|   | › Aerospace, renewable energies: Rotor blade, wing, housing components |
|   | › Automotive components  |



ULTRASONIC 260 with integrated technology framework and special component clamping device: Scarf joints in a rotor blade segment; trimmed edges, holes and pockets in CFRP centre console.

 <b>800 × 400 × 250 mm</b> <b>Storage shelf / automotive</b> <b>Material: CFRP</b> <b>Machining time: 3 mins 50 sec</b>	 <b>1,100 × 390 × 300 mm</b> <b>Instrument panel / shipbuilding</b> <b>Material: CFRP</b> <b>Machining time: 9 mins 20 sec</b>	 <b>Unique integration:</b> <b>Atmospheric-pressure plasma</b> for surface activation / cleaning.
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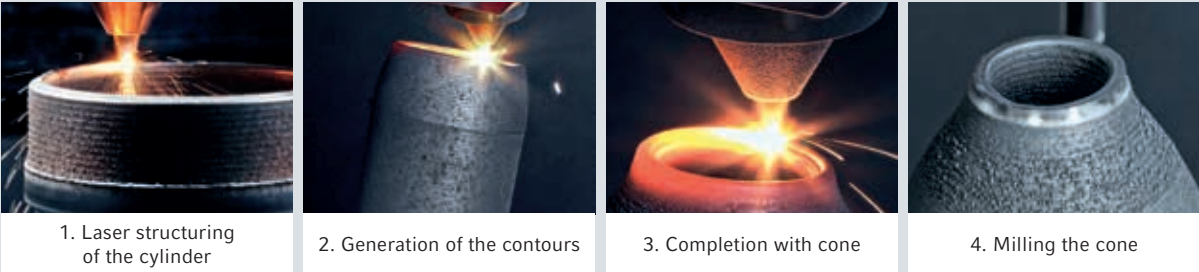
ADDITIVE MANUFACTURING

LASERTEC 65 3D

Additive manufacturing of 3D components in finished parts quality.

Production of an impeller / stainless steel

Laser deposition welding – duration: 312 minutes



Milling – duration: 240 minutes



Application fields



Prototypes and production of small batches of complex integral components.

Repair of damaged and worn components.

Application of partial or even full coatings (corrosion-resistant).



The video on LASERTEC 65 3D  
If your mobile has QR code recognition software,  
you can view the video immediately.  
Download the latest brochure now on: [www.dmgmori.com](http://www.dmgmori.com)

LASERTEC 65 3D

Laser deposition welding and milling cleverly combined

- HIGHLIGHTS
- The best surfaces and component precision
  - **Laser deposition welding with powder feed:** 10x faster than a powder bed
  - **3D components up to 500 mm in diameter**, even with steep contours and no supporting geometry
  - **Cross-process software module** for design, programming and machining

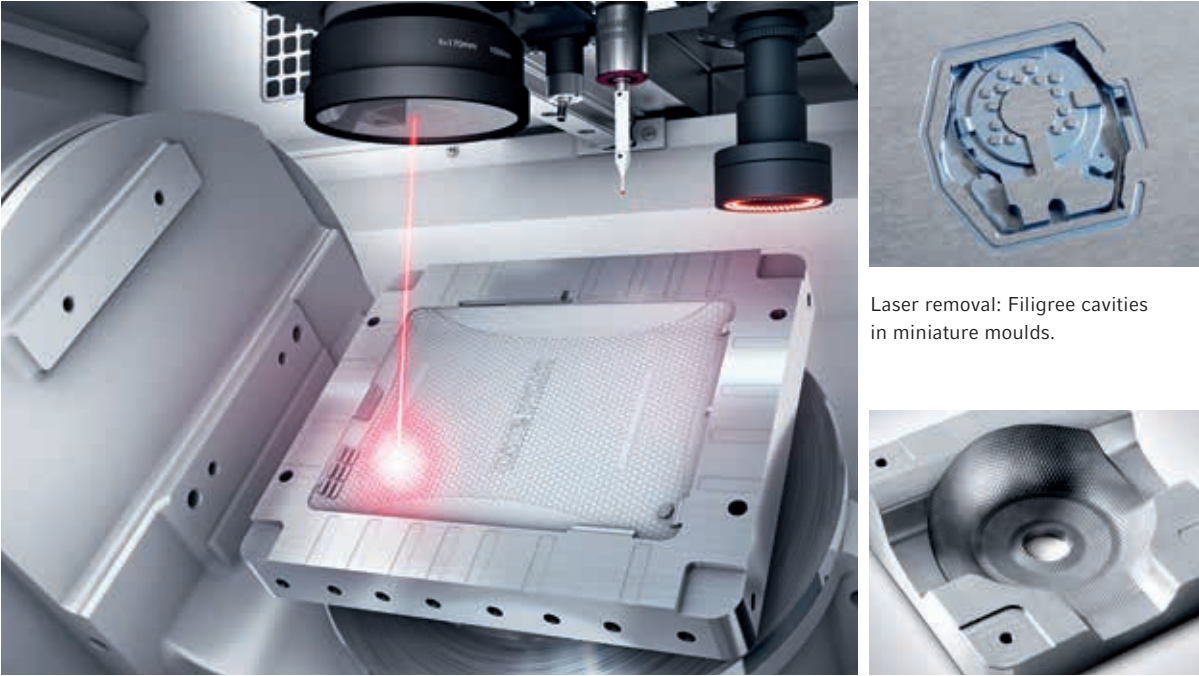


TECHNICAL DATA

Traverse X / Y / Z: 735 / 650 / 560 mm; maximum workpiece dimensions (5-axis): ø 500 x 350 mm; maximum load (5-axis): 600 kg; footprint (machine only): approx. 12 m<sup>2</sup>; control system: CELOS® from DMG MORI with 21.5" ERGOline® Control with Operate 4.5 on SIEMENS 840D solutionline

LASERTEC 45 Shape

High-precision 3D laser ablation and texturing in a new dimension.



LASERTEC 45 Shape

5-axis laser precision machining of components up to ø 300 mm in a footprint of under 4 m<sup>2</sup>\*

\* Only the machine

- HIGHLIGHTS
- **80 % larger working area** with the same footprint plus **3x higher dynamics** with 60 m/min rapid traverse (compared to the LASERTEC 40)
  - **5-axis laser machining** made possible by the integrated swivel / rotary axis with torque motors (optional)



LASERTEC SHAPE RANGE

Machine injection moulds measuring up to **2,100 mm** and weighing up to **8 tonnes**.



## WEIHBRECHT

### Rapid prototyping by combining technologies – lasers and milling.



Managing Partner  
Gerhard Weihbrecht.



Headquarters of the family-owned company in Wolpertshausen.

Since 1986 **WEIHBRECHT Lasertechnik GmbH** in Wolpertshausen has stood for **precision, product perfection and innovation**. In line with its maxim “From the idea to the solution”, WEIHBRECHT provides a comprehensive range of machining processes from laser technology to conventional machining to water jet cutting. “We are a medium-sized laser machining and rapid prototyping company. That’s why we integrate every feasible **cutting-edge innovation** to enable us to carry out almost any machining task which can be done with a laser”, says Gerhard Weihbrecht, Managing

Partner. The first **LASERTEC 65 3D** arrived in Wolpertshausen in January 2015. “In direct comparison with alternative additive manufacturing processes, I think that the hybrid technology of the **LASERTEC 65 3D** will allow us to **produce complex workpieces with new geometries** easily and efficiently, without a process chamber or time-consuming supporting geometries. In this context I already see progress in the product development stage. Additionally, the integrated **milling option is an exceptionally important unique feature.**”



**WEIHBRECHT Lasertechnik GmbH**  
Frankenstraße 1, D-74549 Wolpertshausen  
info@weihbrecht.de, www.weihbrecht.de



## Laser factory GmbH

### Efficient and precise with LASERTEC, even with carbides and ceramics.



Laser factory GmbH Managing Directors  
Michael Köppel and Björn Büchel.



Laser machining of recessed 3D contours  
in carbide with a picosecond laser.

**Laser factory GmbH**, based in Rebstein, Switzerland, has been a major presence in the field of **precision laser removal** since 2002. With a total of **ten LASERTEC 40 Shape machines from DMG MORI**, this innovative service provider manufactures **complex, sophisticated 3D shapes** designed for **plastic injection moulding, pressing, embossing and cold working** for sectors

including tool and mould making. With laser technology the company is able to work extremely **quickly** and it often delivers within one day. The **picosecond laser** is a particular advantage in the opinion of Managing Directors Björn Büchel and Michael Köppel: “Unlike with our previous laser sources, we are also able to **machine carbides and ceramics efficiently and with high precision.**”



**Laser factory GmbH**  
Alte Landstrasse 106, CH-9445 Rebstein  
info@laser-factory.ch, www.laser-factory.ch



## ULTRASONIC

### ULTRASONIC

### The efficient grinding, milling and drilling of advanced materials.



#### ULTRASONIC grinding

##### Technology benefits:

- › Up to 10× higher productivity through reduced process forces
- › Reduced sub-surface damage
- › Improved tool service lives
- › Optimal particle flushing
- › Complete machining (grinding, drilling, polishing) on one machine

##### Materials:

- › Oxide ceramics, Si<sub>3</sub>N<sub>4</sub>, SiC
- › Glass and glass ceramics
- › Corundum (sapphire, ruby), carbide

##### Target markets:

- › Semiconductor industry, aviation industry
- › Watch industry, precision engineering
- › Optics industry, medical sector
- › Pump, valve and textile industries

#### ULTRASONIC milling

##### Technology benefits:

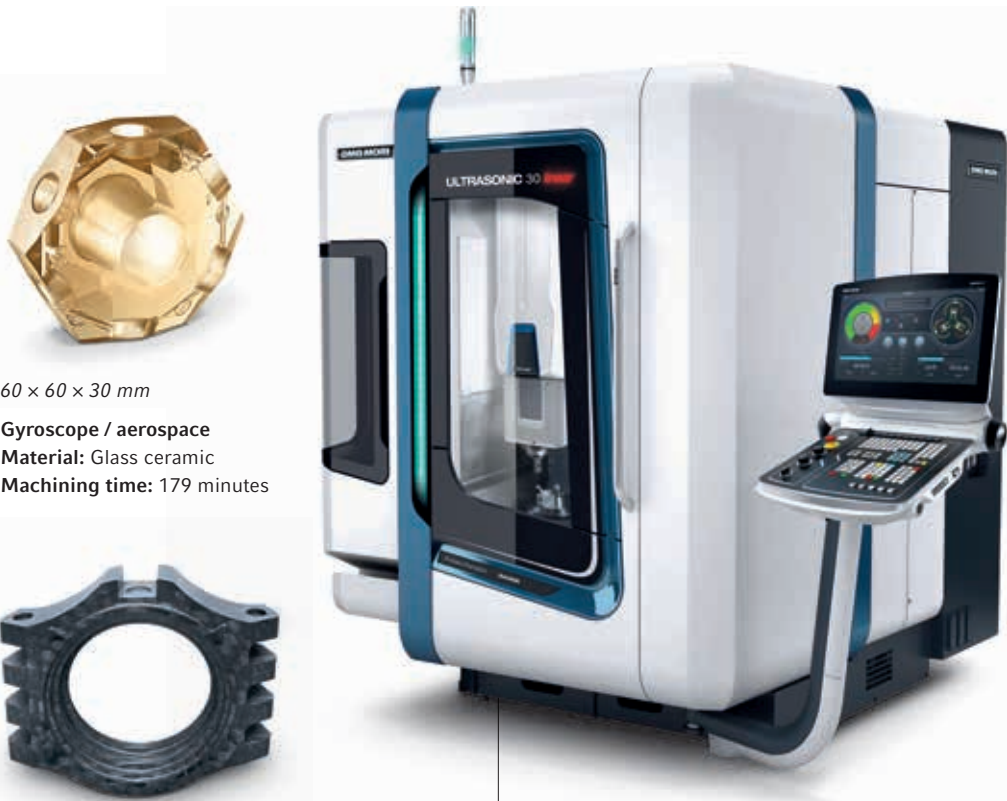
- › Reduced process forces for improved productivity and reduced tendency to chatter
- › Even surface structures
- › Higher material removal rates during finishing
- › Longer tool service lives

##### Materials:

- › Inconel
- › Titanium aluminide
- › Magnesium and aluminium alloys

##### Target markets:

- › Turbine components
- › Engine components
- › Drive shafts
- › Medical implants



60 × 60 × 30 mm

**Gyroscope / aerospace**  
**Material:** Glass ceramic  
**Machining time:** 179 minutes

55 × 50 × 10 mm

**Watch case / watch industry**  
**Material:** CFRP  
**Machining time:** 13 minutes

**TECHNICAL DATA**  
Traverse X / Y / Z: 320 / 300 / 280 mm;  
rapid traverse: 50 m/min; acceleration: 12 m/s<sup>2</sup>;  
spindle speed: 40,000 rpm;  
table load: max. 80 kg (5-axis version)



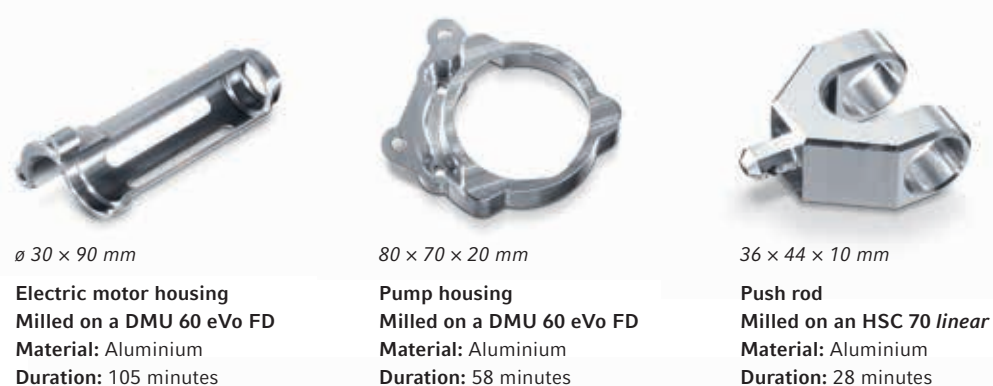
## DMG MORI & PORSCHE

# Manufacture within and beyond specification.

On its return to the **FIA World Endurance Championship** after 16 years of absence, Porsche is bringing tradition and experience back to the LMP1 class. In **DMG MORI** the team has found a **technology partner** which will contribute to its success as a leader in machine tool innovation. DMG MORI will support Porsche in two ways: As a long-term machine supplier to the companies manufacturing the **high-quality vehicle components** for the team. Additionally, during the 2014 season the machine tool manufacturer built a **parts facility** at **DECKEL MAHO Seebach** which develops and manufactures a growing range of components for the Porsche 919 Hybrid – including complex housings for pumps, electric motors and end caps for the differential. Bearing shafts, bearings, mounting pins and thermoplastic spacer discs are manufactured for the pedals. The range of materials used includes steel, aluminium, titanium and plastic. The **Porsche Motorsport CNC Competence Centre** is therefore synonymous with precision, flexibility and the transfer of innovative technologies.

“For us, this partnership is a great opportunity to demonstrate the capabilities of our machines and our technical expertise”, explains Dr Thomas Hauer, Head of Application Technology at DECKEL MAHO Seebach. The cutting-edge facility in Thuringia is ideal for the role of the technology partner: DECKEL MAHO Seebach possesses comprehensive expertise in the production of **HSC machining centres with long-term precision** and innovative machine tools for **5-axis universal machining** as well as the **DMU eVo linear range**. Additionally, the site is distinguished by its high degree of vertical integration and manufacturing expertise in the production of machine components. This is all combined with expertise in application technology and a deep understanding of process and machine. Currently, an **HSC 70 linear** and a **DMU 60 eVo** are machining components both within and beyond specification – in terms of **precision** as well as **complexity**.

With the **Porsche Motorsport CNC Competence Centre**, DMG MORI has underlined its intention to support the team from Weissach in the development of top-quality components. The range of components will be expanded in the future. Ultimately, it is a question of developing intelligent production solutions for challenging components. In this regard, the focus is explicitly on a long-term technology transfer as a central pillar of sustainable success.



The new partnership between DMG MORI and Porsche will bring their shared values of tradition, precision and technological leadership with a global presence to the fore once again and prove that DMG MORI is a reliable partner.





Applied perfection. Find out more about the production of the high-tech steering wheel of the Porsche 919 Hybrid on the next page.



**PORSCHE**  
**MOTORSPORT**  
LMP1 TEAM

EXCLUSIVE PREMIUM PARTNER

**DMG MORI**



## DMG MORI & PORSCHE

# Porsche Motorsport LMP1 team – “Success through innovation”



Alexander Hitzinger, Technical Director of the Porsche team.

Alexander Hitzinger, Head of LMP1 Development at Porsche, speaks about the challenges of returning to the World Endurance Championship and the close collaboration with the technology partner DMG MORI.

**Mr Hitzinger, why has Porsche decided to return to the LMP1 class after 16 years?**

**A. HITZINGER** \_\_\_ Porsche has always had very close ties with motorsport and will continue to see it as the main essence of the company. We chose the LMP1 class because it is top-level motorsport and Porsche has a history of successes in endurance races. The rules also provide lots of leeway for us to demonstrate technological innovations on the race track, such as hybrid technology.

**What were the greatest challenges of this project, and especially of developing the Porsche 919 Hybrid?**

**A. HITZINGER** \_\_\_ Over the past ten years the levels in the LMP1 class and of the Le Mans prototypes have increased dramatically. The greatest challenge was to rebuild a suitable organisational structure. The development team grew very quickly from 10 to 150 employees today. Likewise, in developing the Porsche 919 Hybrid we had to start from scratch as we had no basic vehicle and therefore no reference data.

**What experience have you gathered from this first season on the track and from the development of the vehicle?**

**A. HITZINGER** \_\_\_ We made continuous improvements from race to race and were soon able to deploy a truly competitive vehicle on the starting line. Porsche is in a league of its own in the qualifying stages. This growing success is the result of a very steep learning curve, as we are always optimising our processes.

**Before the season opened you announced DMG MORI as the exclusive premium partner of the Porsche team. What makes this cooperation special?**

**A. HITZINGER** \_\_\_ DMG MORI and Porsche are both highly technologically innovative. This is a good platform for exploiting our combined expertise and developing new, efficient production solutions for our challenging components. In motorsport such innovations play a considerable role in achieving success.

**What goals do you have for the new season?**

**A. HITZINGER** \_\_\_ We will be focusing on optimising our processes and refining the Porsche 919 Hybrid. By collaborating with DMG MORI in production we will be able to build up a lead in technology and time which we ultimately want to transfer to the track. On the track is where we need to continue last year's positive trend – with as many podium finishes as possible.



The workpieces featured here are selected examples from the wide range of components manufactured on DMG MORI machines.



### Steering wheel mould

Milling a mould for the carbon-fibre steering wheel of the Porsche 919 Hybrid on a DMC 105 V linear

**Material:** Aluminium

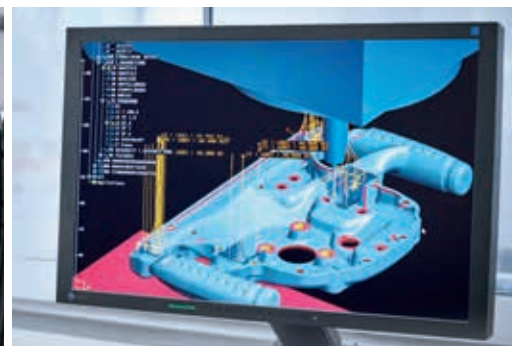
**Duration:** approx. 5 hours

ubc GmbH

## Lightweight construction and safety in motorsport.



Thorsten Lengwenus, CNC Team Leader, values the flexibility and reliability of DMU machining centres from DMG MORI.



The services offered by ubc starts with CAD / CAM. This is where the steering wheel of the Porsche 919 Hybrid is created.

\_\_\_ **ubc GmbH** from Murr is one of the **partners of the Porsche team** involved in the construction of the Porsche 919 Hybrid in the LMP1 class. The 150-strong company is able to contribute **experience in working with carbon fibre** to the success of the Porsche team. For around 20 years, ubc has designed and produced challenging components made of high-performance carbon fibre – for **motorsport** as well as for **production vehicles** such as the recent Porsche GT3 RS. “Due to its high resilience, carbon fibre is a perfect alternative to conventional lightweight materials like aluminium and titanium”, explains Thorsten Lengwenus, CNC Team Leader. **Quality assurance and flexibility** in this demanding work carried out by ubc are achieved through professional skill, **total vertical integration of manufacture** and the use of the **latest technology**.

For complex milling work, ubc can call on **three DMU machining centres from DMG MORI**: a **DMU 200 P**, a **DMU 125 P duoBLOCK®** and a **DMC 105 V linear**. “The quality of the end product also depends on the accuracy of the moulds”, explains Thorsten Lengwenus. DMG MORI reliably meets these requirements with its **powerful and precise machines**. **Reliability** is another key issue for him: “We rely on the CNC machines working smoothly”. Especially in the non-stop racing world, you sometimes have to have very **quick reaction times**.



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Porsche 919 Hybrid



**Wheel bearing**  
Milled on a DMC 125 U duoBLOCK®  
Material: Special variant of aluminium



**Brake disc housing**  
Turned on a CTX beta 800  
Milled on a DMU 80 eVo linear  
Material: Titanium  
Duration: 5-axis milling  
approx. 7 hours

## MBFZ toolcraft GmbH

### Precision machining in record time.



Christoph Hauck (left), Managing Director of toolcraft, with the project managers responsible for Porsche: Stefan Auernhammer (centre) and Robert Renner.



toolcraft manufactures complex precision components like this wheel bearing with highly accurate and productive 5-axis machining.

MBFZ toolcraft GmbH, established in 1989, provides customers in the aviation and aerospace sectors, the optics industry, the medical sector and the racing world with quick and reliable production of **precision components**. Over the last three years it has been growing in significance due to its work for the **Porsche LMP1 team** in the World Endurance Championship. On a shop floor measuring 10,500 m<sup>2</sup>, over **260 quality-conscious employees** guarantee seamless production of the challenging vehicle components.

In doing so, toolcraft utilises the full range of machining methods, supported by **15 CNC machines from DMG MORI**. The components range from heat-resistant manifold flanges made of nickel-based alloys to **highly resilient wheel bearings**. Christoph Hauck, Managing Director of toolcraft, explains: "We produce prototypes, small batches and medium batches of several hundred components per year." The diverse and **powerful machine capacity** provides the necessary **flexibility**. Highly advanced production methods are also necessary to meet the high quality standards. "This is where we benefit from the **high level of innovation of DMG MORI**", adds Christoph Hauck, referring to the recently developed **LASERTEC 65 3D**. toolcraft currently operates four laser melting machines and sees great potential for complex geometries in the combination of laser deposition welding and milling on one machine.



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**toolcraft**

## Kaiser Werkzeugbau GmbH

### Quality components for motorsport success.



(FLTR) Kathrin Hebgen, Team Communication; Ragnar Bregler, Sales Manager; Hans Ihrlich, Factory Manager; Birgit Jachmann, Team Communication.



Complete quality control is the norm at Kaiser Werkzeugbau.

Kaiser Werkzeugbau GmbH, founded in Helferskirchen in 1984, has been a **contract manufacturer in motorsport** for years and is perfectly aware of the challenges. Around 50 highly trained employees with professional experience work to ensure **top quality and punctual results**. Over the past two years the team has gradually updated its portfolio with difficult mechanical components which, since last season, have been in use in the **Porsche 919 Hybrid** in the LMP1 class of the World Endurance Championship. Kaiser Werkzeugbau will meet the high production requirements with cutting-edge machines: **17 machining centres and turning machines from DMG MORI** guarantee reliable and flexible production.

The company's most recent acquisitions include two turning machines from the **CTX beta range** and **two DMU eVo machining centres**. "With our machines we can cover a very **wide range of components**", says Sales Manager Ragnar Bregler. "From brake disc housings and steering or engine components to structural parts, we can build almost all of the essential components of a racing car." Due to the **high degree of complexity**, they focus on productive manufacturing solutions such as **5-axis technology** and **high-speed milling**. The next machining centre purchase has already been planned: "The **HSC 70 linear** is destined for producing the **high-quality surface finishes** of our products."



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**Kaiser**  
RACE TECHNOLOGY



# MD Drucklufttechnik GmbH & Co. KG



Claus-Werner Bay, Managing Director of MD Drucklufttechnik: "The linear drive of the CTX beta 800 linear guarantees the highest dynamics and outstanding positioning accuracy."

## The highest precision with maintenance-free linear drives.

The successor to the Mannesmann Group, MD Drucklufttechnik GmbH & Co. KG can look back on years of experience in **compressor and compressed air technology**. The company, based in Stuttgart since 1983, produces **high-quality pneumatic tools** and **compressed air motors** for trades and industry. "It takes a lot of expertise and the latest manufacturing technology to produce the high-



Highly precise and challenging workpieces are an everyday occurrence at MD Drucklufttechnik.

precision components for our products", explains Managing Director Claus-Werner Bay. Since 2010 MD Drucklufttechnik has met the **high quality and flexibility requirements** with its own internal production facility featuring **three CTX beta 800 linear** lathes. With its **linear drive on the X axis**, the **CTX beta 800 linear** accelerates at up to **1 g**. "For one, this lets us generate impressive dynamics, which boosts **productivity**. **Positioning accuracy** is also extremely high", says Claus-Werner Bay. The latter is a great advantage in meeting the **high quality standards**. The experienced industrial engineer sees further benefits in the fact that the **linear technology is wear-free**: "This affects both **long-term accuracy** and the reliability of the axes."



MD Drucklufttechnik GmbH & Co. KG  
Weissacher Straße 1, D-70499 Stuttgart  
www.mannesmann-demag.com



**CTX beta 800 linear**  
Linear drive in the X axis with 1 g acceleration and maximum long-term accuracy

### HIGHLIGHTS OF THE CTX beta 800 linear

- CTX linear – Turning with 1 g acceleration thanks to the linear drive with a 5-year guarantee
- Manufacture up to 30 % more quickly with the highest long-term accuracy
- 28 % lower energy consumption than the previous model from 2010, full KfW subsidy

### linear **II**DRIVE

- The highest dynamics and best long-term accuracy
- 5-year guarantee



**TECHNICAL DATA**  
Bar machining up to  $\varnothing 76$  mm (optional ISM 102 up to  $\varnothing 102$  mm); 850 mm max. turning length and 410 mm max. workpiece diameter; ISM 76 main spindle rated at 5,000 rpm, 380 Nm, 34 kW; 12-position VDI 40 turret, 4,000 rpm, 11.3 kW and 28 Nm, plus 6 block tool stations

# NLX RANGE

## NLX range – 9 models in 30 different configurations.

The NLX range, with **9 models in 30 different configurations**, provides users with **maximum performance, flexibility and reliability**. From a 2-axis turning machine to 6-sided complete machining with counter spindle and Y axis, the **NLX range** covers every machining requirement.

Available immediately with **MAPPS IV** and **10.4" TFT display**.\*\*\*\*

\* Available in the new design and with CELOS®  
\*\* Available exclusively in the new design and with CELOS®  
\*\*\* Currently: NLX 2500|700MC, NLX 2500|1250MC are not available in the new design and with CELOS®  
\*\*\*\* 19" for the NLX 4000  
**Turning** = fixed tools; **MC** = driven tools; **Y** = driven tools and Y axis; **SMC** = driven tools and counter spindle; **SY** = driven tools, Y axis and counter spindle

**NLX 2500SY|700**  
The successful model with counter spindle and Y axis

*Best-seller!*  
*The best-selling machine from DMG MORI*



$\varnothing 80 \times 100$  mm  
**Guide bush / automotive**  
**Material:** S45C  
**Machining time:** 13 mins 29 sec

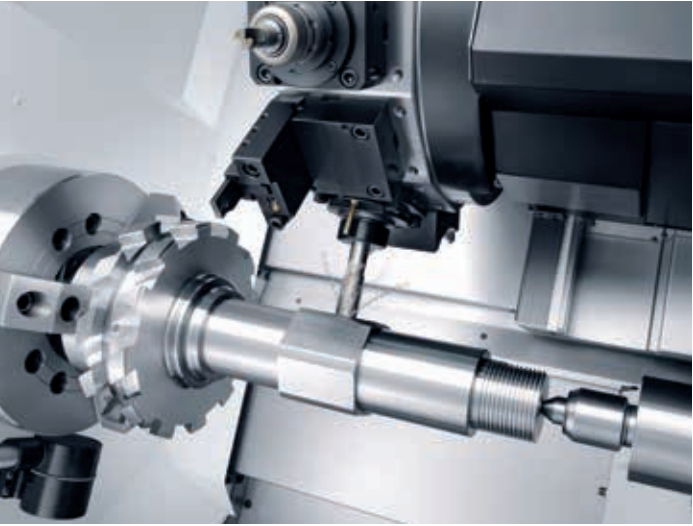


$\varnothing 120 \times 100$  mm  
**Hydraulic valve / fluid technology**  
**Material:** S45C  
**Machining time:** 30 mins 35 sec

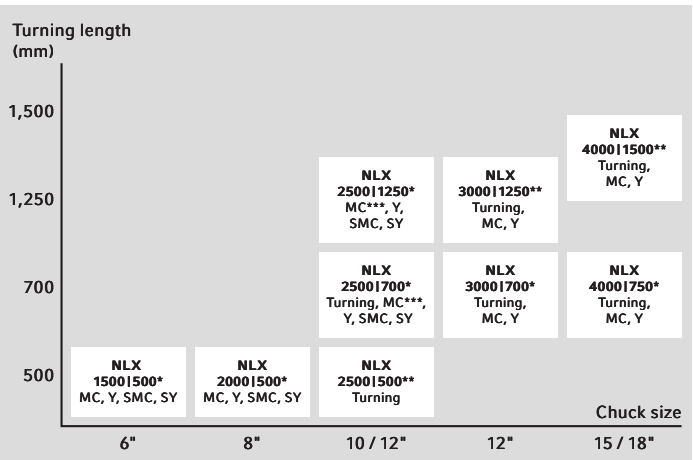




BMT® technology for outstanding milling performance from driven tools rated at 4,000 rpm (optionally 10,000 rpm)



9 machine models with 30 variants.



NLX 2500SY|700 produced for the European market in Bergamo.

HIGHLIGHTS OF THE NLX RANGE

- \_ New DMG MORI design with CELOS®
- \_ **Box ways in all axes** with optimal damping characteristics and dynamic stiffness
- \_ **Integrated coolant circulation** in the machine bed for improved thermal stability
- \_ **BMT® turret** (built-in motor turret) for milling, similar to machining centres
- \_ **Various additions for automation** available, including bar loader and portal loader

**TECHNICAL DATA**  
Maximum turning diameter: 366 mm (460 mm cutting diameter without Y axis); maximum turning length: 705 mm, bar capacity: 80 mm, main spindle: 4,000 rpm, 18.5 kW; counter spindle: 6,000 rpm, 11 kW; 12-position turret (optional 10, 16 or 20-position turret), driven tool speed 10,000 rpm



Since 2008 microart has worked exclusively with NLX turning machines from DMG MORI.



The latest acquisition for microart is an NLX 2500Y|700.

Precision as an art form.

\_\_\_\_\_ **microart e.K.**, founded seven years ago, has rapidly established itself as an **expert in machining technology**. The contract manufacturer, based in Roding, supplies well-known customers in the automotive, aviation and other high-tech sectors with **complex precision components**. microart is a reliable partner for discerning companies and in order to maintain its high level of performance over the long term, this rising star in the field of metal machining uses reliable **CNC solutions**

**from DMG MORI**. Seven models from the **NLX range** – five with tailstocks and two with counter spindles – represent the technological foundations of the company’s high-precision turning services. The latest acquisition was a **NLX 2500Y|700**.

No one at microart has regretted opting for **DMG MORI** since acquiring the first model in 2008. “One of the deciding factors for us was and is the **high stability of the machines**”, explains Michael Kerscher, Director of Operations and authorised representative of microart, when discussing the company’s investments. This is crucial for **high precision**. “Ultimately we have made this expertise our main mission.” As **efficient production** is reliant on stable processes, the **reliability** of the NLX machines was another important factor: “In the past six years we have had **very little need to service the machines**.”



microart e.K.  
Turonstraße 16, D-93426 Roding  
info@microart-roding.de, www.microart-roding.de



**NLX 4000|1500**  
Efficient complete machining of large workpieces up to 500 mm diameter (600 mm diameter without Y axis)



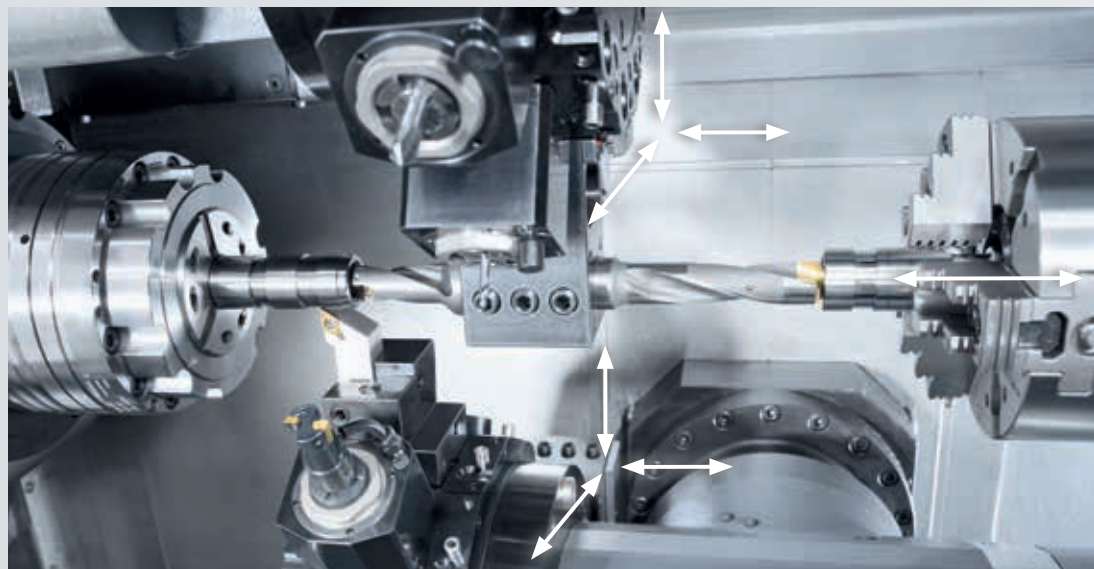
**TECHNICAL DATA**  
Maximum turning diameter: 600 / 500 mm; maximum turning length: 1,538 / 1,584 mm; maximum bar capacity: 117 mm; maximum speed of main spindle: 2,000 rpm; power of main spindle: 37 / 30 kW; number of tool stations: 10 (12 optional)



## SPRINT

AUTOMATED TURNING

## SPRINT 50-2T – NEW: CELOS® from DMG MORI with MAPPS on FANUC 31iB.



Simultaneous machining on the main and counter spindles; Y axis with  $\pm 35$  mm for the upper turret as standard, lower optional.

2 x VDI 25 turrets including TRIFIX® precision quick-change system, each with 12 positions for driven tools.

### HIGHLIGHTS OF THE SPRINT 50

**SPRINT 50-2T**  
4-axis production turning  
with up to 24 driven tools  
and two Y axes

- 4-axis production turning of bar material up to  $\varnothing 50$  mm (65 mm\*)
- 6-sided complete machining from bar in two operations at the main and counter spindles thanks to **synchronous transfer without loss of speed**
- Large working area, deep hole drilling to over 300 mm possible at the main and counter spindles
- 12-position VDI 25 turret with TRIFIX® quick-change system, tool set-up in less than 30 seconds and repeatability of under 6  $\mu$ m
- The best machining performance thanks to the turret with 12 positions for driven tools, 6,000 rpm\*\*, 12 Nm and 6.3 kW (S6 – 40 %)

\* Optional, \*\* 8,000 rpm Siemens version



$\varnothing 48 \times 62$  mm

**Nozzle / hydraulic**  
**Material:** Stainless steel (AISI 303)  
**Machining time:**  
210 seconds

### ALTERNATIVE

CELOS® from DMG MORI with SIEMENS (from June 2015)

- Machine with 2 turrets and TWIN concept
- 3 turrets
- 3 turrets, with B axis for the lower turret

## NZX

PRODUCTION TURNING

## NZX 4000 | 3000 Highly productive shaft machining with two turrets.

Long shaft components with large diameters, such as those for oil and gas pipelines, are indispensable in the energy industry. With two turrets, the NZX 4000 is ideal for this job and boasts optimal processing capability up to **high-performance machining**. Thanks to the extreme stability of the machine, the impressive optional upper turret with **BMT® technology** (Built-in Motor Turret) is brought fully to bear. The milling performance of the BMT® turret equals that of an SK40-class machining centre. Thanks to the wide range of available spindle bores, the user can machine countless types of workpiece on these machines. **The NZX is therefore the ultimate manufacturing system for maximum productivity in the machining of large parts.**

### HIGHLIGHTS OF THE NZX 4000 | 3000

**NZX 4000 | 3000 –**  
High-efficiency 4-axis  
turning centre with a  
spindle bore up to  
285 mm in diameter  
for machining large and  
long workpieces

- Highly stiff, stable, heavy-duty machining thanks to wide box ways
- 4-axis machining of long shaft components with a large diameter: turret 1, Y axis, turning and milling; turret 2, turning; number of tool stations: 12 (turret 1) and 8 (turret 2)
- Turret 1, milling performance similar to that of an SK40 machining centre: 11 / 7.5 kW thanks to BMT® technology
- Three spindle bore variants:  $\varnothing 145$  /  $\varnothing 185$  /  $\varnothing 285$  mm (A / B / C)
- Long boring bars for deep hole drilling\*
- Up to two NC steady rests can be used simultaneously\*

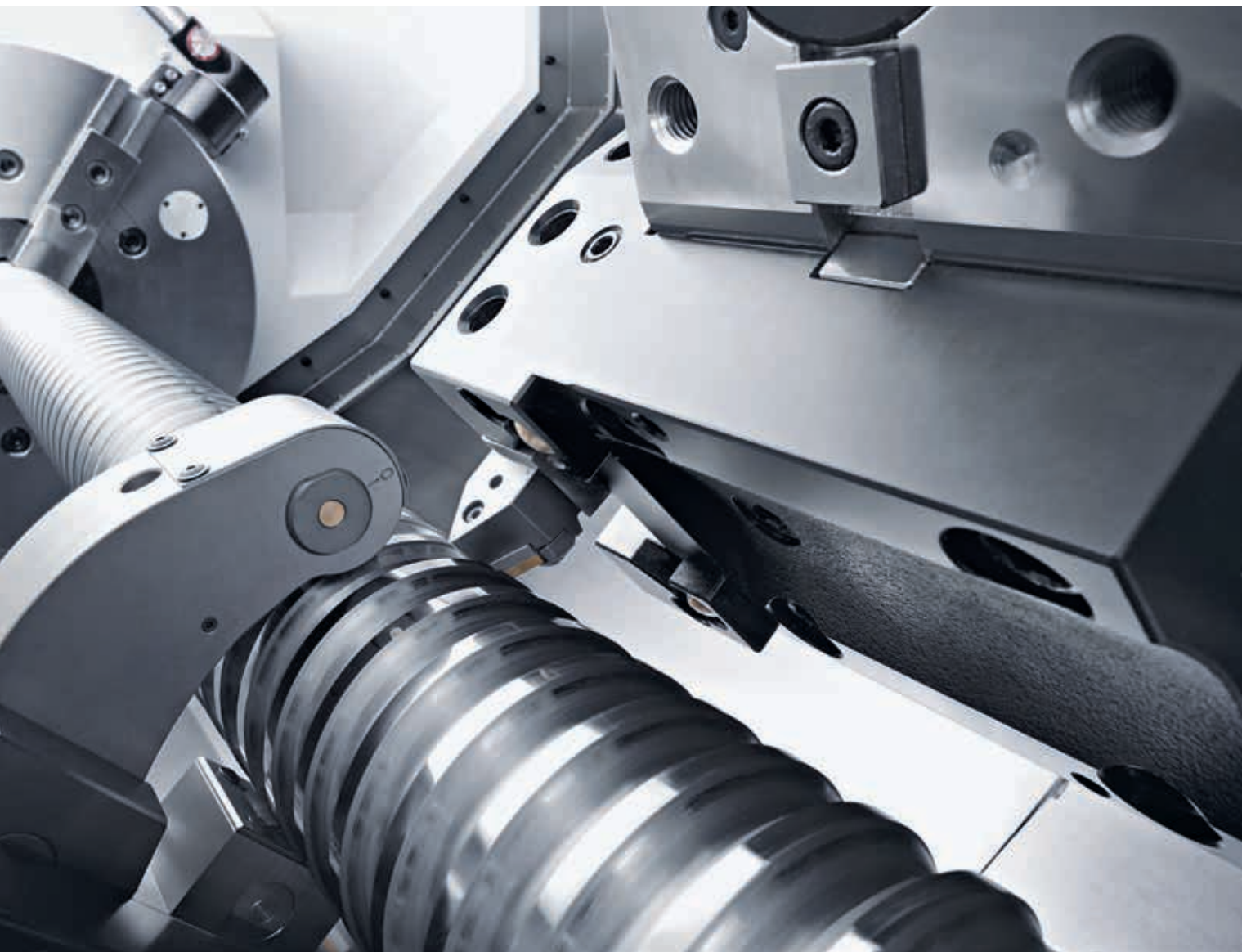
\* Optional



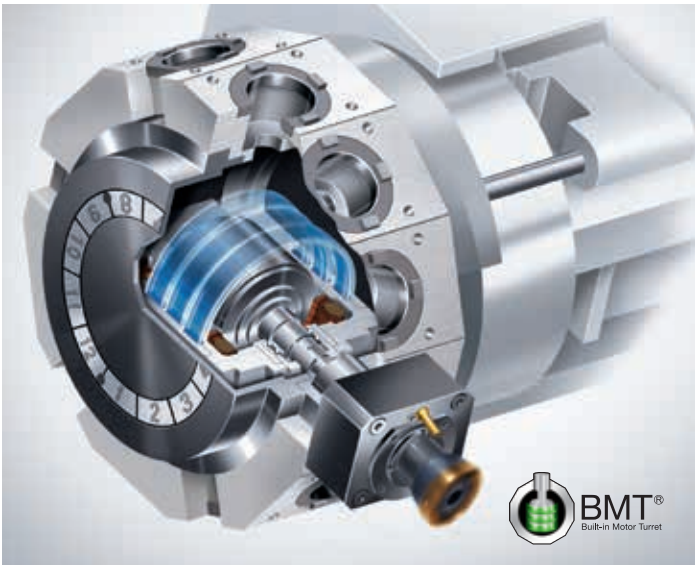
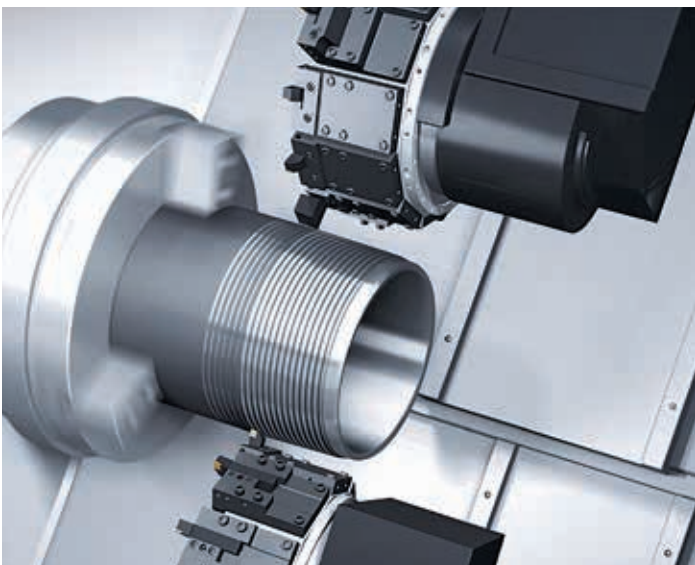
### TECHNICAL DATA

Maximum cutting diameter:  $\varnothing 660$  mm; maximum turning length: 3,000 mm; main spindle max.: 2,000 / 1,500 / 1,000 rpm (A / B / C); chuck: 15–24"; number of turrets: 2 (Y axis only available for turret 1); maximum speed of driven tools (turret 1): 3,500 rpm





The NZX 4000/3000 allows efficient heavy-duty machining of large workpieces measuring up to  $\varnothing$  660 mm and 3,000 mm.



BMT® turret (built-in motor turret) with up to 117 Nm torque.

## Geiger Fertigungstechnologie GmbH

Productive and flexible with NZX turning machines.



Geiger has long relied on automated production lines with NZX machines from DMG MORI.



Rainer Krausz, Head of Production, and Dieter Neller, Technical Manager, are responsible for developing optimised production methods for challenging products.



$\varnothing$  200  $\times$  1,000 mm  
Crankshaft / automotive  
Material: S45C  
Machining time: 40 minutes

$\varnothing$  40  $\times$  2,500 mm  
Ball screw / mechanical engineering  
Material: SCM440  
Machining time: 14 mins 10 sec

— In over 50 years **Geiger Fertigungstechnologie GmbH** has grown into a major provider of complex turned and milled components. As a tier 2 supplier, the Pretzfeld-based company primarily manufactures **high-quality automotive components**, including injectors for Bosch. Geiger has earned its status as a preferred supplier to the Bosch Group due to its 350 skilled employees and a **high degree of innovation** in production. Numerous **twin-spindle turning machines** from the NZ and NZX ranges from DMG MORI guarantee impressive machining quality, whilst **robots and transfer lines** ensure the necessary level of **productivity** for the automotive sector. In production,

Geiger combines mass production with flexibility. For years Geiger has worked with **twin-spindle machines from DMG MORI**. Two production lines were recently installed with a total of **30 NZ 1500 and NZX 1500** machines. “We re-check our approaches with every job and look for the most prudent manufacturing solution”, explains Dieter Neller, Technical Manager at Geiger. Twin-spindle machines are highly productive on the shop floor due to their **ease of setup**. “This allows us to react better to component design changes than if we had more complex multi-spindle turning machines”, explains Rainer Krausz. It is generally very easy to operate and manage the NZ and NZX machines.



Geiger Fertigungstechnologie GmbH  
Espachweg 1, D-91362 Pretzfeld  
www.geiger-pretzfeld.de





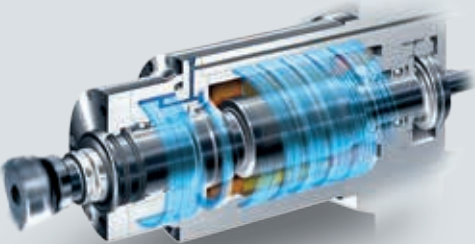
NHX HORIZONTAL MACHINING

# NHX Series – Global production concept – in the market for the market.

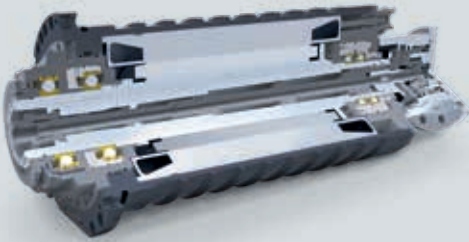
— **21 production sites around the world** and a production capacity of more than 20,000 machines per year make DMG MORI a global player with close local ties. Local production ensures a uniformly high standard of quality – of both our products and services. Our NHX machines are built in **4 of our most cutting-edge factories**. The primary facility for the production of this range is in **Iga, Japan**. All machines in the NHX series are manufactured there, from the **NHX 4000 to the NHX 10000**. The **NHC range for China**, an adaptation of the NHX range, is produced at **Tianjin** in China in the form of the NHC 4000 and NHC 5000. From 2015, the NHC range will be expanded to include the 50 series, the NHC 5500, and the NHC 6300. For the **American market** DMG MORI has transferred production of the **NHX 4000, NHX 5000 and NHX 6300** to the factory in Davis, California. The **NHX 4000 and NHX 5000** for the **European market** are manufactured at **DECKEL MAHO Pfronten** in Bavaria.

## speedMASTER from DMG MORI – #40 universal milling spindle with 10,000-hour or 18-month guarantee.

- Maximum cutting performance in the basic configuration,  
standard for the 2<sup>nd</sup> generation of the NHX range**
- \_ 15,000 rpm, 111 Nm and 21 kW (40 % DC)
  - \_ High torque (optional): 15,000 rpm, 200 Nm and 46 kW (40 % DC)
  - \_ High speed (optional): 20,000 rpm, 120 Nm and 35 kW (40 % DC)



**Spindle cooling**  
The oil jacket cooling around the stator minimises the transmission of heat within the spindle.



**Tool clamping**  
New tool clamping system with a constant clamping force for up to 500 million cycles.

- Maximised service life and precision**
- \_ Large spindle bearing for long service life
  - \_ Optimised sealing, no coolant contamination
  - \_ Durable tool clamping for the highest repeatability

## MAGNESCALE – Maximum precision thanks to magnetic linear encoders rated at 0.01 µm as standard



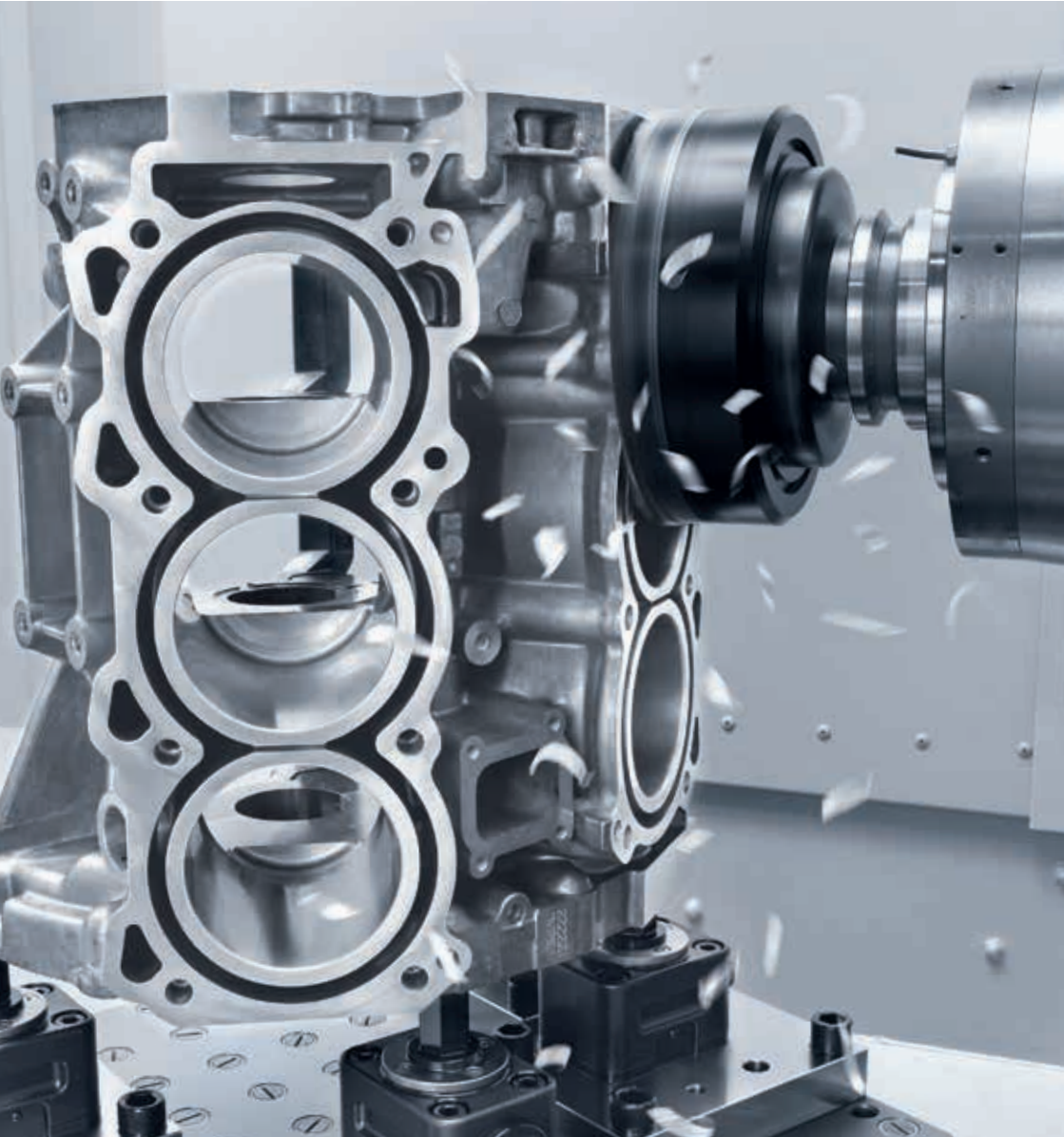
FROM DMG MORI

More from Magnescale

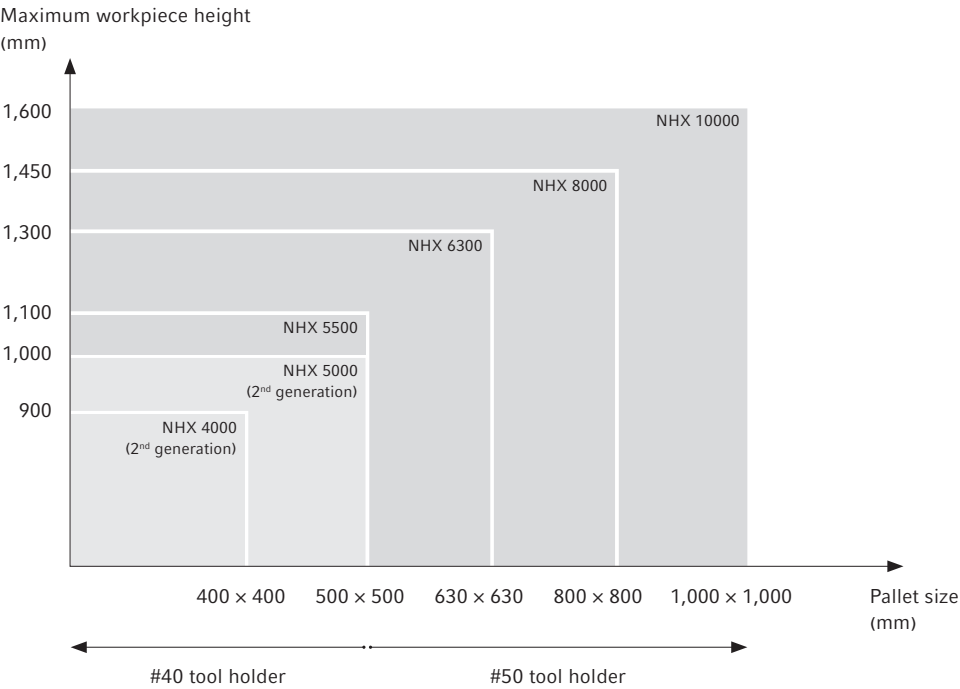
ON PAGE 15



Unbeatable machining performance, speed and precision with the new 15,000 rpm speedMASTER spindle.



### NHX series

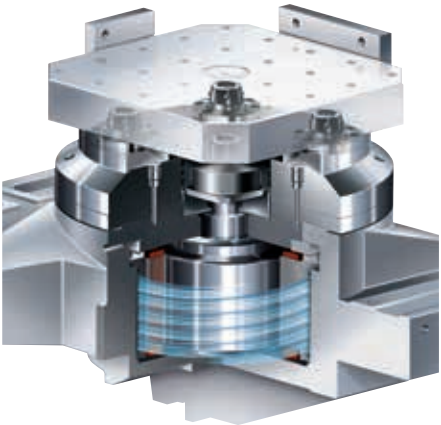


### DDM® technology – Direct Drive table (option)



- \_ Up to 100 rpm for shortest positioning time, 0.8 sec. for the NHX 4000 and 1.54 sec. for the NHX 5000; 2.09 sec. for the NHX 6300

- Gearless table drive with direct transmission of the drive power**
- \_ No gear = zero backlash
  - \_ Outstanding transmission efficiency and high-speed feed
  - \_ Wear-free for less maintenance and longer product life





LOCAL PRODUCTION

ASIA



**IGA Campus –**  
Iga City, Japan



At 80,000 m<sup>2</sup>, the IGA Campus in Japan is the largest DMG MORI production site.

Approx. 80,000 m<sup>2</sup> production area for 300 machines per month.

➤ #40: NHX 4000, NHX 5000  
➤ #50: NHX 5500, NHX 6300, NHX 8000, NHX 10000



**Tianjin Factory –**  
Tianjin, China



Local production of the NHC machines in China, for China.

Approx. 22,000 m<sup>2</sup> production area for 100 machines per month.

➤ #40: NHC 4000, NHC 5000  
➤ #50: NHC 5500 (from Q4/2015), NHC 6300 (from Q4/2015)

USA



**DMG MORI Manufacturing USA –**  
Davis, California



Local production of the NHX for the local market in Davis, USA.

Approx. 20,500 m<sup>2</sup> production area for 100 machines per month.

➤ #40: NHX 4000, NHX 5000  
➤ #50: NHX 6300

EUROPE



**DECKEL MAHO Pfronten –**  
Bavaria, Germany



Local production in the heart of Europe: DECKEL MAHO Pfronten in Germany.

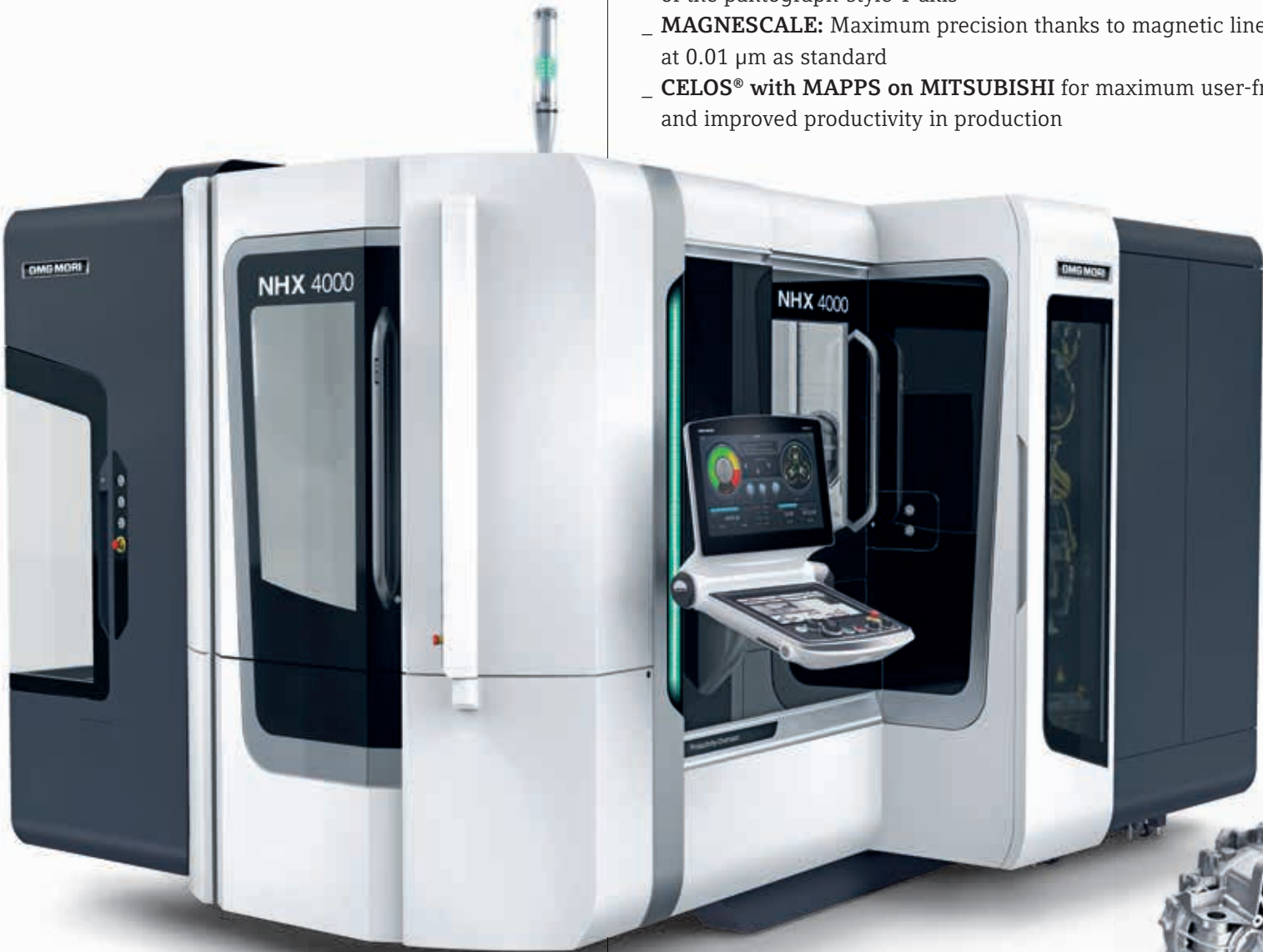
Approx. 75,000 m<sup>2</sup> developed area for approx. 1,500 machines per year.

➤ #40: NHX 4000, NHX 5000

**NHX 4000, NHX 5000**  
**2<sup>nd</sup> generation / #40 tool holder**  
Horizontal machining centres with the highest stability, precision and dynamics

HIGHLIGHTS OF THE NHX 4000 / NHX 5000 2<sup>nd</sup> GENERATION

- **High dynamics** for the shortest chip-to-chip times down to 2.2 seconds: 1.2 / 1.2 / 1.2 g (NHX 4000) and 1.1 / 1.2 / 1 g (NHX 5000)
- Rapid traverse of up to 96 m/min, 60 m/min as standard; 35 % higher dynamic stability
- **Maximised machining performance with the new speedMASTER spindle**
- **Direct Drive table (DDM®)**, optional, rated at up to 100 rpm
- **Optimised chip flow** thanks to steep covers in the working area and robust cladding of the pantograph-style Y axis
- **MAGNETSCALE:** Maximum precision thanks to magnetic linear encoders rated at 0.01 µm as standard
- **CELOS® with MAPPS on MITSUBISHI** for maximum user-friendliness and improved productivity in production



**TECHNICAL DATA**  
Traverse X / Y / Z: 560 / 560 / 660 mm;  
maximum workpiece dimensions: ø 630 × 900 mm;  
maximum table load: 400 kg; pallet size:  
400 × 400 mm; tool interface: ISO40

470 × 380 × 230 mm  
**Gearbox / automotive**  
**Material:** Al SiMg-T6  
**Machining time:** 10 minutes

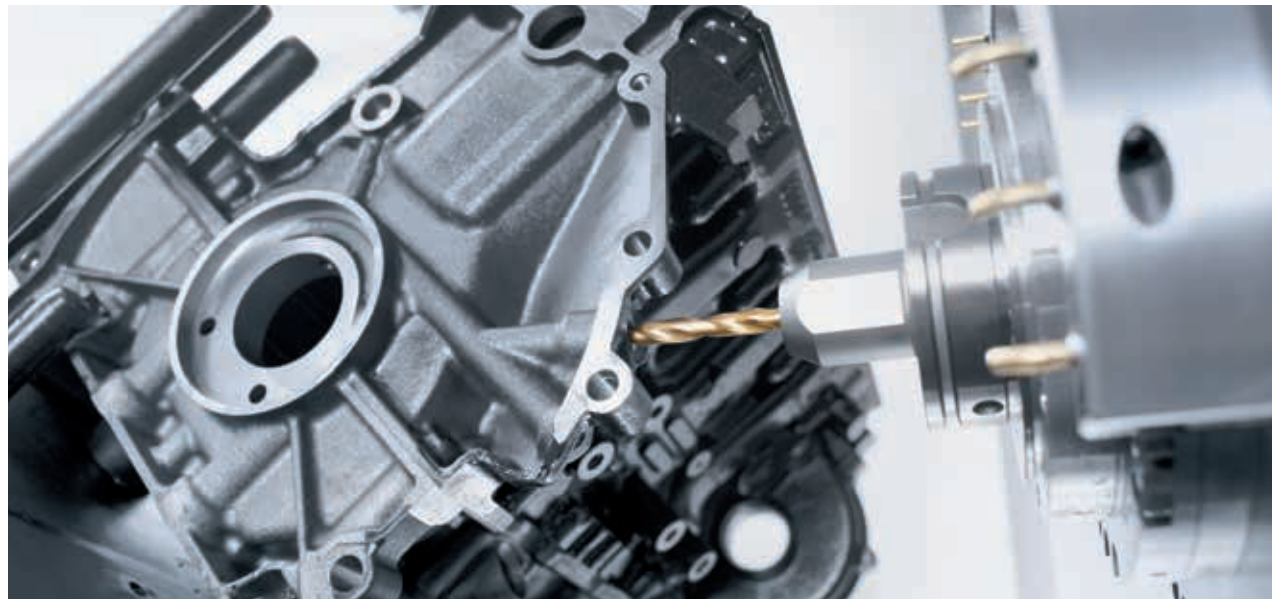


ø 350 × 325 mm  
**Bearing flange /**  
**mechanical engineering**  
**Material:** 42CrMo4  
**Machining time:** 26 minutes



## DMC H HORIZONTAL MACHINING

**DMC H *linear*** –  
Highly dynamic linear drive  
technology rated at up to 100 m/min  
for maximum long-term accuracy.



Swivelling rotary table with a swivel angle of 225° – highly productive 5-axis complete machining in one clamping.

Be it highly productive or flexible, the modularity of the DMC 60 / 80 H *linear* horizontal machining centres provides the solution for every application. Linear drives in all main axes, with rapid traverses of up to 100 m/min and accelerations of up to 10 m/s<sup>2</sup>, generate the best dynamics and incredible precision.

The unrestricted crane loading system on machines with a pallet changer, the easily visible working area and the optimally accessible Fluidbox underpin the outstanding ergonomics of these machines and tick all the boxes for productive applications.

**DMC 60 H *linear***  
Footprint of just 17.2 m<sup>2</sup>  
for the machine with  
pallet changer and chip  
conveyor

### HIGHLIGHTS OF THE DMC 60 H *linear*

- **Productive** – linear drives in all axes with up to 100 m/min rapid traverse, 10 m/s<sup>2</sup> acceleration and a chip-to-chip time of 2.5 seconds
- **Precise** – Long-term accuracy with linear drives, circularity of up to 5 µm, roundness of up to 6 µm
- **Flexible** – NC rotary table or swivelling rotary table for 5-axis simultaneous machining
- Compact wheel magazine with at least 2 wheels for tool call-up during machining



500 × 300 × 250 mm

Crankcase / automotive

Material: AlSi8Cu3

Machining time: 24.5 minutes



### TECHNICAL DATA

Traverse X / Y / Z: 630 / 800 / 850 mm;  
rapid traverse: 100 / 100 / 100 m/min; spindle speed:  
12,000 rpm; power: 20 kW; torque: 110 Nm; workpiece  
size: ø 800 × 1,030 mm; workpiece weight: 600 kg;  
tool magazine: 40 (63 / 123 / 183 / 243 / 303) stations

**linear** **II DRIVE**

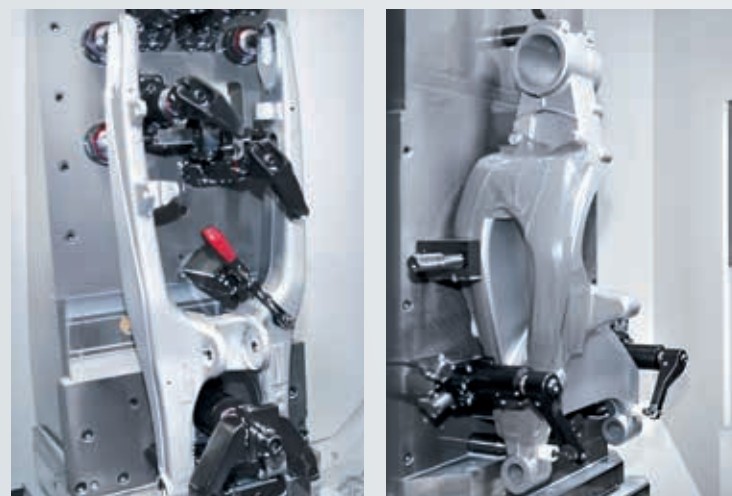
- The highest dynamics and best long-term accuracy
- 5-year guarantee

## ZBG Zerspanungstechnik

Top quality in the  
shortest possible time  
with linear drives.



At ZBG three new DMC 60 H *linear* process challenging motorcycle components in the shortest time and highest quality.



With the DMC 60 H *linear*, ZBG saves roughly 20–25 % machining time per part compared to horizontal machining centres with ball screws.

In over 20 years of business, **ZBG Zerspanungstechnik Bruck GmbH** has evolved into a major system supplier of customers in the fields of automotive and motorcycle engineering. **BMW, Audi and KTM** are just three well-known giants of industry that source all important value-added parts from ZBG. As a result, the company and its 200 specialists manufacture and assemble **complex engine and chassis components**.

ZBG is only able to live up to its corporate motto, “**The highest precision, quality and flexibility**”, by using the latest high-tech machine tools – now including **three new DMC 60 H linear machines**. The excellent results in terms of **workpiece geometry and surface finish** together with **higher productivity** have become a crucial factor, according to Markus Forster, Managing Director of ZBG: “Thanks to the DMC 60 H *linear* we were able to **reduce machining time by up to 25 % whilst retaining the same quality**.”



**ZBG Zerspanungstechnik Bruck GmbH**  
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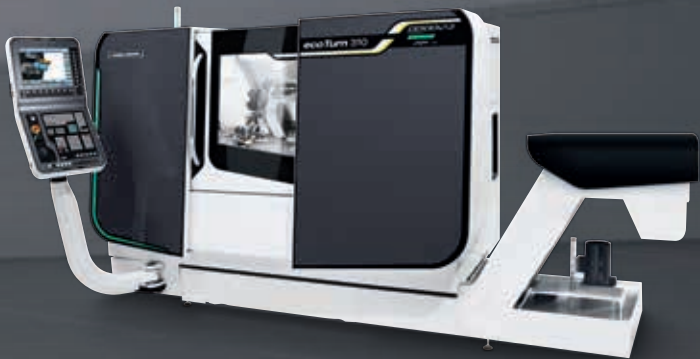
N° 1 – 2015

- ECOLINE turning technology: *ecoTurn*
- ECOLINE milling technology: *ecoMill*, *ecoMill V* and MILLTAP
- The fastest, most dynamic 3D control systems on all ECOLINE machines
- ECOLINE factory near you

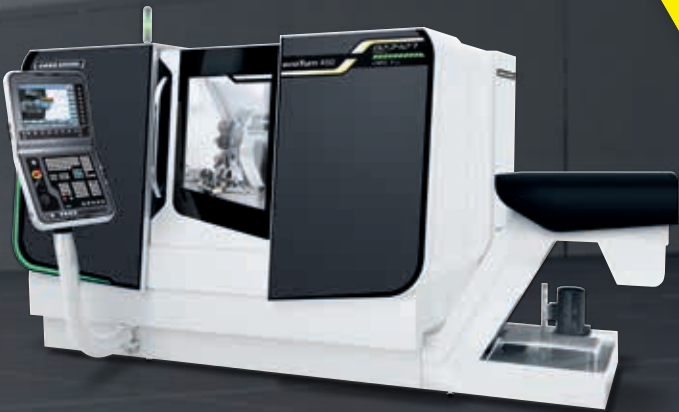
# ECOLINE

## Highest functionality, best price!

### TURNING TECHNOLOGY



*ecoTurn 310*



*ecoTurn 450*



*ecoTurn 510*

The full  
ECOLINE range  
at a glance

### MILLING TECHNOLOGY



*ecoTurn 650*



*ecoMill 50*



*ecoMill 70*



*ecoMill 635 V*



*ecoMill 1035 V*



MILLTAP 700



ECOLINE

HIGHEST FUNCTIONALITY, BEST PRICE!

# Turning technology: ecoTurn

Kick off 2015 with the *ecoTurn* range with a turning diameter of ø 200–600 mm.

- HIGHLIGHTS
- › Highly dynamic, rapid servo turret\* with VDI 30 / 40 / 50 tool holders and optionally up to 12 driven tool stations and 6 block tools (not available for the *ecoTurn* 310)

› Large optional bar capacities ranging from ø 65 to 110 mm

› Automation interfaces for rapid production

› Hollow clamping cylinder as standard

› Double track ball bearing for the highest stability

› 3D control technology with SLIMline®:

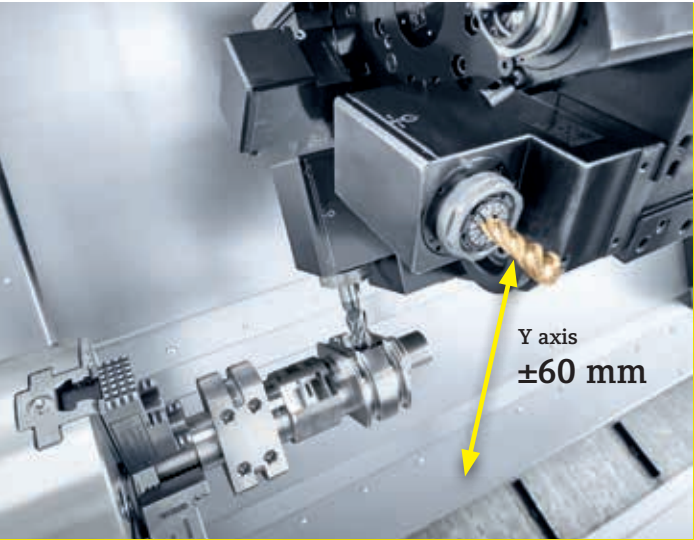
– Operate 4.5 on SIEMENS 840D solutionline

– MAPPS IV on MITSUBISHI\* (only for the *ecoTurn* 450)

› DMG AUTOshutdown\*: Intelligent standby control system to avoid unnecessary energy consumption when idle

\* Optional

More flexibility during complex turn-mill machining thanks to the Y axis with ±60 mm\* (available for the *ecoTurn* 510).



Parts catcher (part of the bar package).

**ecoTurn 310**  
Standardised technology with 30 m/min rapid traverse and maximum bar capacity of up to 65 mm\*

Chuck diameter: 210 mm\*  
Tool holder: VDI 30

**ecoTurn 450**  
Large working area ø 400 × 600 mm in a compact footprint of 4.9 m<sup>2</sup>

Chuck diameter: 210–315 mm\*  
Tool holder: VDI 40



## SANDVIK COROMANT TOOL KITS for the *ecoTurn* range

Purchase an ECOLINE machine and get a **tool kit** from our technology partner **SANDVIK COROMANT** at a special price. The tool kit contains **tools, tool holders** and **inserts** so you can get your production under way as quickly as possible. Thanks to our technology partnership with SANDVIK COROMANT, you can take advantage of **tooling packages optimally suited to ECOLINE** and personalised advice.

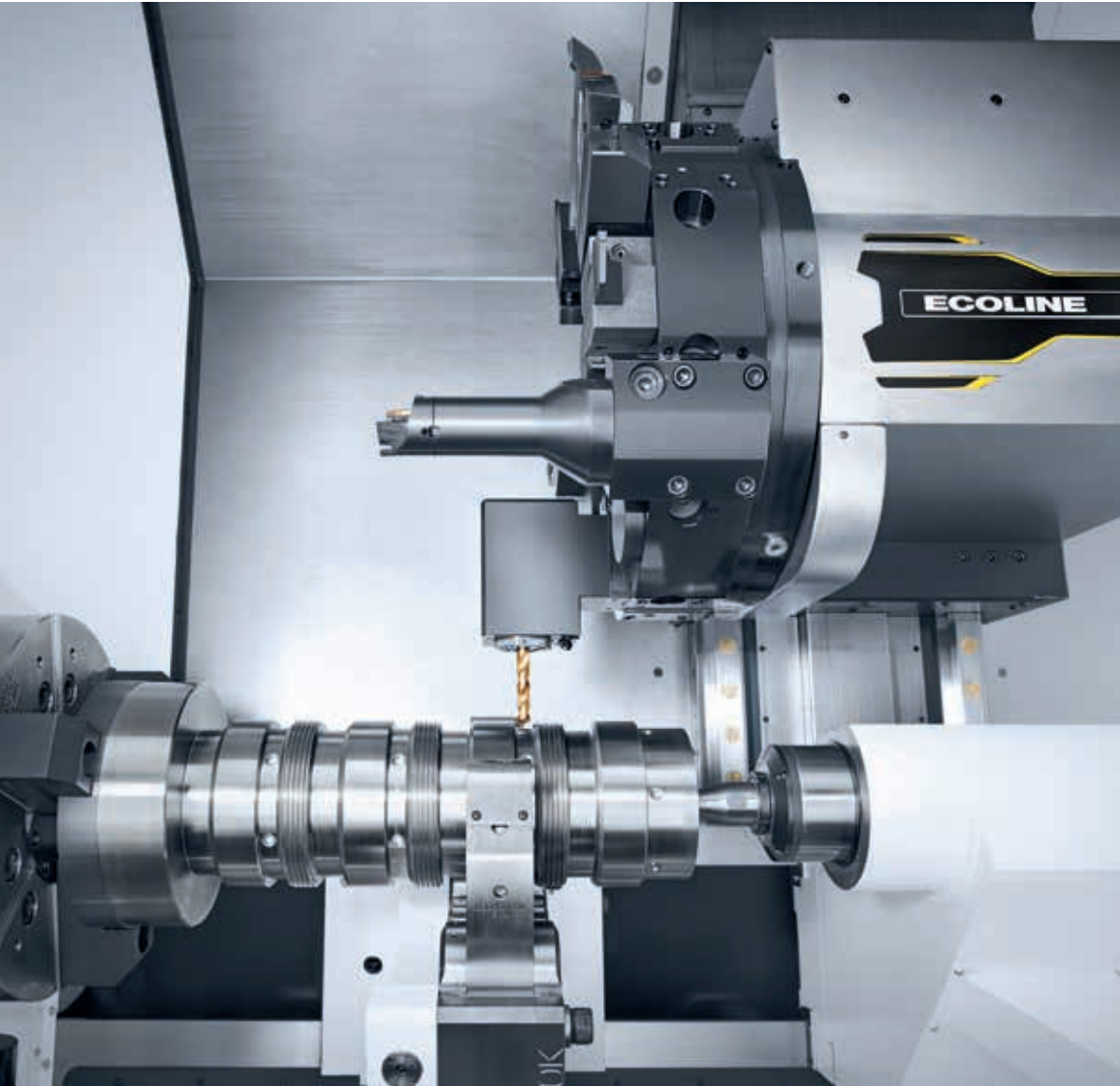


	Operate 4.5 on SIEMENS 840D solutionline	HEIDENHAIN CNC PILOT 640	MAPPS IV on MITSUBISHI
ecoTurn 310	•	◦	
ecoTurn 450	•	◦	◦
ecoTurn 510	•	◦	
ecoTurn 650	•	◦	

• Standard ◦ Optional



Optional dynamic VDI 50 servo turret for the *ecoTurn 650* with up to 12 driven tool stations and 6 block tools.



◀ Sample application with a VDI 50 servo turret	
Chuck size	ø 400 mm
Raw material dimensions	ø 300 x 1,000 mm
Material	C45 steel
Machining time	25 minutes (per section)
Roughing	Cutting speed (Vc) 180 m/min, feed f = 0.5 mm/rev and 10 mm cutting depth
Finishing	Cutting speed (Vc) 280 m/min, feed f = 0.12 mm/rev
Motor-driven drill ø 14.5 mm	Cutting speed (Vc) 120 m/min, feed f = 0.12 mm/rev
Trailing steady rest (from the turret)	
Approx. 40 % material removal rate	

 ø 36 x 35 mm	<b>Nozzle</b> <i>ecoTurn 310</i> Material: Steel Machining time: 6 mins 12 sec Sector: Mechanical engineering	 ø 150 x 25 mm	<b>Drive wheel</b> <i>ecoTurn 510</i> Material: Aluminium Machining time: 9 mins 57 sec Sector: Mechanical engineering
 ø 120 x 395 mm	<b>Coupling shaft</b> <i>ecoTurn 450</i> Material: Stainless steel type 1.4305 Machining time: 48 minutes Sector: Mechanical engineering	 ø 500 x 400 mm	<b>Drive shaft</b> <i>ecoTurn 650</i> Material: C45 steel Machining time: 55 minutes Sector: Mechanical engineering

**ecoTurn 510**  
The best quality and enormous power with the VDI 40 turret and Y axis\*

Chuck diameter: 250–315 mm\*  
Tool holder: VDI 40

**ecoTurn 650**  
The highest torque 2,000 Nm and 230 rpm without gears for highly accurate, backlash-free C axis machining\*

Chuck diameter: 315–500 mm\*  
Tool holder: VDI 50



Technical data

		<i>ecoTurn 310</i>	<i>ecoTurn 450</i>	<i>ecoTurn 510</i>	<i>ecoTurn 650</i>
Swing over bed	mm	ø 330	ø 650	ø 680	ø 860
Maximum cutting diameter	mm	ø 200	ø 400	ø 465	ø 600
Longitudinal travel (Z)	mm	455	600	1,050	1,150
Tool holder	VDI	30	40	40	50
Bar capacity	mm	ø 51 (65*)	ø 65 (75*)	ø 76 (90*)	ø 102 (110*)
Drive power (40 / 100 % DC)	kW	16.5 / 11	17.5 / 12.5	33 / 22	48 / 41
Maximum speed	rpm	5,000	4,000	3,250	2,250
Torque (40 / 100 % DC)	Nm	166.5 / 112	370 / 280	630 / 420	2,000 / 1,700
Chuck diameter	mm	ø 210*	ø 210* / ø 250* / ø 315*	ø 250* / 315*	ø 315* / ø 400* / ø 500*

\* Optional



You can find more information online at:  
**ecoline.dmgmori.com**



ECOLINE

HIGHEST FUNCTIONALITY, BEST PRICE!

Milling technology:  
ecoMill, ecoMill V and MILLTAP

From 3 to 5-sided machining and 5-axis simultaneous machining:  
The ECOLINE range has it all!

- HIGHLIGHTS

  - › 12,000 rpm in-line spindle as standard
  - › Compact C-frame design for an optimal ratio between the footprint and working area
  - › 3D control technology with SLIMline® with Operate 4.5 on SIEMENS 840D solutionline
  - › DMG AUTOShutdown\*: Intelligent standby control system to avoid unnecessary energy consumption when idle

\* Optional
- HIGHLIGHTS OF THE ecoMill

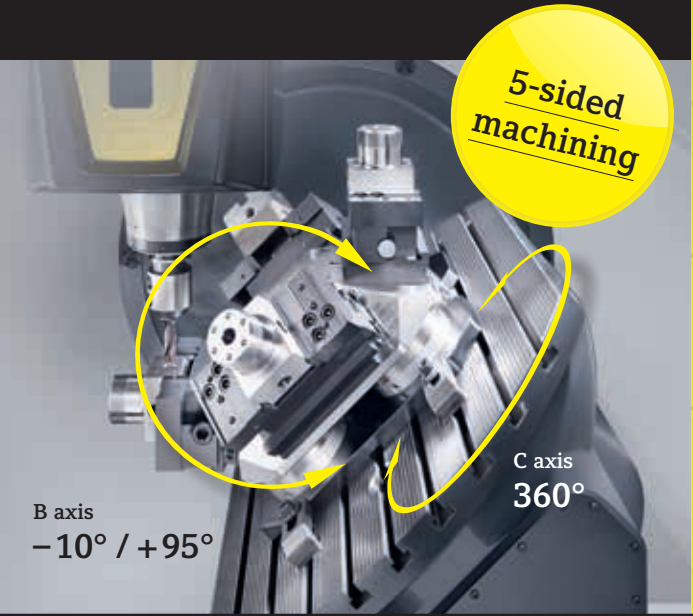
  - › Maximum efficiency – NC swivelling rotary table with digital drives for 5-sided machining
- HIGHLIGHTS OF THE ecoMill V

  - › Shorter non-productive times: 24 m/min rapid traverse
  - › Tool magazine for 16 / 32 tools with quick double gripper (32 stations for the ecoMill 70 as standard, optionally 50 for the ecoMill)
  - › Thermally stable mineral composite bed – four-point support

5-sided machining with NC swivelling rotary table for the highest dimensional and positional tolerances (6 µm\*\*)

- ecoMill 50
- \_ Maximum table load 200 kg
  - \_ Footprint ø 630 × 500 mm
  - \_ Swivel range –5° to +110°

- ecoMill 70
- \_ Maximum table load 350 kg
  - \_ Footprint ø 800 × 620 mm
  - \_ Swivel range –10° to +95°



\*\* With linear encoders

ecoMill 50  
Patented NC swivelling rotary table for the highest precision

ecoMill 70  
Maximum precision and the best surface finish with 5-sided machining in just one clamping

ecoMill 635 V  
Compact, innovative C-frame design and X axis in the table



	Operate 4.5 on SIEMENS 840D solutionline	HEIDENHAIN TNC 620
ecoMill 50	•	◦
ecoMill 70	•	◦
ecoMill 635 V	•	◦
ecoMill 1035 V	•	◦
MILLTAP 700	•	

• Standard ◦ Optional

SANDVIK COROMANT TOOL KIT  
for ecoMill / ecoMill V machines

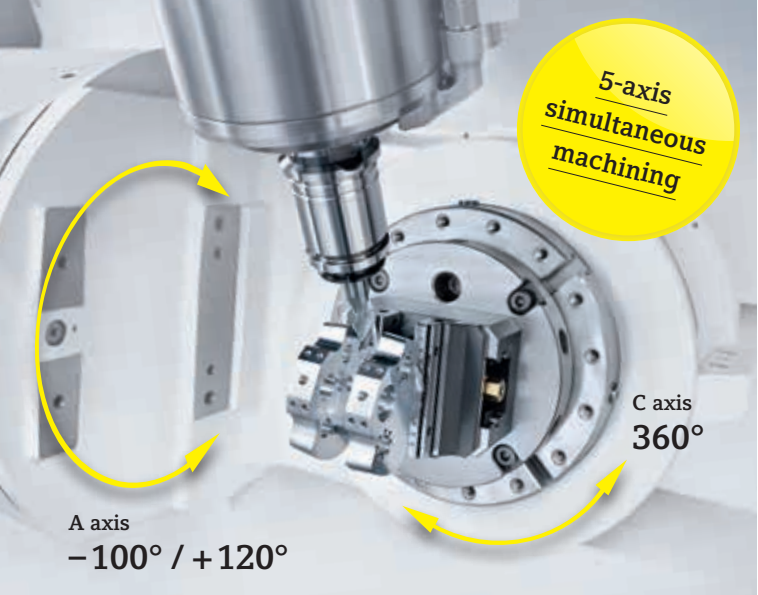
Purchase an ECOLINE machine and get a tool kit from our technology partner SANDVIK COROMANT at a special price. The tool kit contains tools, tool holders and inserts so you can get your production under way as quickly as possible. Thanks to our technology partnership with SANDVIK COROMANT, you can take advantage of tooling packages optimally suited to ECOLINE and personalised advice.





Even more efficient and flexible thanks to the optionally integrated 4<sup>th</sup> / 5<sup>th</sup> axis – a DMG MORI development (DDR).

NEW: 12,000 rpm in-line spindle now featured as standard (in combination with SIEMENS 840D solutionline)



*ecoMill 635 V /  
ecoMill 1035 V*

- Stable C-frame design with optimised chip removal
- Positioning accuracy of 6 µm\*\*

HIGHLIGHTS OF THE MILLTAP 700 –  
QUICK AND PRECISE

- › Patented tool changer with a tool-changing time of 0.9 second and a chip-to-chip time of less than 1.5 seconds
- › High axis acceleration of 18 m/s<sup>2</sup>, 60 m/min rapid traverse and linear guideways, size 35
- › Dynamic main spindles rated at 10,000 rpm (air-cooled spindle) and 24,000 rpm\* (water-cooled spindle)
- › Linear encoders in X / Y / Z\* for the best repeatability and long-term precision
- › Material removal rate of the 10,000 rpm spindle: 200 cm<sup>3</sup> in steel, 2,000 cm<sup>3</sup> in aluminium
- › Operate 4.5 on SIEMENS 840D solutionline

*ecoMill 1035 V*  
Ball screws of the highest quality and linear roller guideways

**MILLTAP 700**  
Universal optional configurations up to the 5-axis high-performance centre rated at 24,000 rpm



Technical data

		ecoMill 50	ecoMill 70	ecoMill 635 V	ecoMill 1035 V	MILLTAP 700
Traverse (X / Y / Z)	mm	500 / 450 / 400	750 / 600 / 520	635 / 510 / 460	1,035 / 560 / 510	700 / 420 / 380
Speed	rpm	12,000	12,000	12,000	12,000	10,000 / 10,000 high torque* / 24,000*
Torque (40 / 100 % DC)	Nm	83 / 57	83 / 57	83 / 57	83 / 57	12.5 / 8; 45 / 29 (max. 78)*; 12 / 8*
Drive power (40 / 100 % DC)	kW	13 / 9	13 / 9	13 / 9	13 / 9	6.7 / 4.5; 6.5 / 4.5 (max. 13.6)*; 6 / 4*
Tool stations		16 (32*)	32	20 (30*)	20 (30*)	15 (25*)
Rapid traverse	m/min	24 / 24 / 24	24 / 24 / 24	30 / 30 / 30	30 / 30 / 30	60 / 60 / 60
Table load	kg	200	350	600	1,000	400 / 100***
NC swivelling rotary table	Degrees	–5 / +110	–10 / +95	–	–	–100 / +120

\* Optional, \*\*\* Price for the MILLTAP 700 with integrated 4<sup>th</sup> / 5<sup>th</sup> axis

**Workpiece handling**  
High degree of autonomy with short cycle times, a small footprint and high workpiece storage capacity

**FIND OUT MORE  
ON PAGE 45** →



## CONTROL SYSTEMS

HIGH-END SIEMENS AND MAPPS IV CONTROL SYSTEMS

# The fastest, most dynamic 3D control systems on all ECOLINE machines.

*The right 3D control technology for every application.*

— Irrespective of what your demands for performance of a modern control system may be and what your preferences are. Do not settle for compromises: time is money. That's why ECOLINE provides the right

**3D control technology for every user.** Whatever you want and need, we will supply **optimal hardware and software solutions** for the entire process chain – from the drawing to the completed workpiece.

You can find all the information about ECOLINE on

→ [www.ecoline.dmgmori.com](http://www.ecoline.dmgmori.com)

### SLIMline®

with MAPPS IV\* on MITSUBISHI

15" TFT display with 3D workpiece simulation

Storage: 50 MB (6 GB optional)

Programming: ISO & conversational programming

HELP button for rapid programming assistance

\* optionally available for the *ecoTurn 450*

### SIEMENS 840D solutionline

Holistic operating concept on all DMG MORI machines

#### YOUR ADVANTAGES

The same functions of a high-tech control system as on the premium DMG MORI machine lines

Save money by only having to train your machine operators once

Improve the effectiveness and versatility of your machine operators across all DMG MORI machines

3D

## Power tools for ECOLINE



#### DMG Netservice

Thanks to the **online connection to the DMG MORI service hotline**, you can always get in touch with an expert on your machine.



#### DMG Service Agent\*\*

This tool helps you to plan necessary maintenance with the right materials, resulting in **shorter and scheduled machine down time**.



#### DMG MORI Messenger\*\*

This web-based software keeps you aware of the **current status of your machine** at all times. You can open it wirelessly **with your smartphone or iPad**.



3D

## SLIMline®

with Operate 4.5 on  
SIEMENS 840D solutionline

ShopMill / ShopTurn  
as standard

15" TFT display with  
3D workpiece simulation

Storage: 5 MB + 4 GB

Scratch-resistant surfaces

All conventional  
turning / milling cycles  
are already included as standard

### MDynamics\*\*

The best surface finishes,  
rapid adjustment and optimised  
machining times for milling

Block machining time: 1.5 ms

### Flexible, combinable programming:

1. ShopTurn / ShopMill
2. ProgramGuide: innovative  
cycle programming
3. DIN / ISO: user-friendly  
G-code support

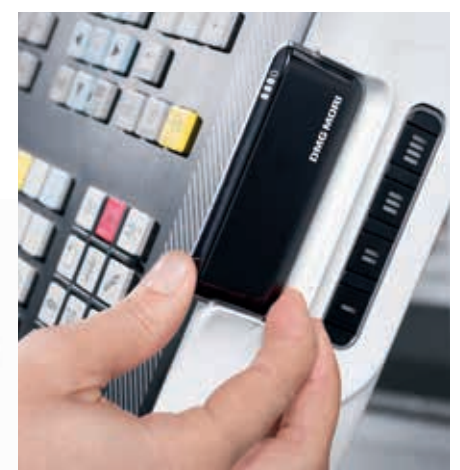
### DMG MORI SMARTkey®

Personalised authorisation –  
the operator has privileges in line  
with his / her experience

\*\* Optional

## DMG MORI SMARTkey®

Personalised authorisation with the  
DMG MORI SMARTkey® allows you to  
grant each user access rights befitting  
their level of experience. These rights  
are divided into machine operation  
(operating modes) and control system  
operation (access level).





**ECOLINE**

HEADQUARTERS IN WINTERTHUR, SWITZERLAND

The **ECOLINE**  
from DMG MORI –  
ECOLINE production  
near you.

**ECOLINE**

- › The ECOLINE headquarters in the Global Headquarters in Winterthur, Switzerland
- › Globally consistent production and quality standards
- › Production facilities as close to you as possible
- › Rapid delivery and low transportation costs
- › No currency risk – local currency advantages

## PRODUCTION SITES INCLUDING DMG MORI TECHNOLOGY CENTRES

**USA****DMG MORI**

Davis, USA

**PRODUCTION:**  
*ecoTurn 450\**

\* from April 2015

**EUROPE****DMG MORI**Seebach,  
Germany

**PRODUCTION:**  
MILLTAP 700

**DMG MORI**Bielefeld,  
Germany

**PRODUCTION:**  
*ecoTurn 650*

**DMG MORI**

Pleszew, Poland

**PRODUCTION:**  
*ecoTurn 310*  
*ecoTurn 450*  
*ecoTurn 510*  
*ecoMill 50*  
*ecoMill 70*  
*ecoMill 635 V*  
*ecoMill 1035 V*

**DMG MORI**Ulyanovsk,  
Russia

**PRODUCTION:**  
*ecoTurn 310*  
*ecoMill 50\**  
*ecoMill 635 V*  
*ecoMill 1035 V*

\* from March 2015

**ASIA****DMG MORI**

Shanghai, China

**PRODUCTION:**  
*ecoTurn 310*  
*ecoTurn 450*  
*ecoTurn 510*  
*ecoMill 50*  
*ecoMill 635 V*  
*ecoMill 1035 V*  
MILLTAP 700

**DMG MORI**

Chiba, Japan

**PRODUCTION:**  
*ecoTurn 450\**  
MILLTAP 700

\* from April 2015



You can find all information on the new ECOLINE online at:  
[www.ecoline.dmgmori.com](http://www.ecoline.dmgmori.com)



Find out more at  
[www.dmgmori.com](http://www.dmgmori.com)



N° 1 – 2015

- DMG MORI Systems – The future is automation
- Complex turn-key solutions from a single source
- Unbeatable systems expertise – new technology centre in Wernau
- The right production line for your workpiece
- Perfect automation in all fields:  
Machine-integrated automation, standard automation,  
flexible production cells and production lines

# DMG MORI Systems

The full range of  
systems expertise for  
the highest productivity

**TECHNOLOGY**

Our core skill

**MACHINES**

Compact, robust and innovative

**AUTOMATION**

Perfect solutions

**ACCESSORIES**

Customer-specific

**Image:**  
Vehicle cylinder head line with ten NHX 5000 machines  
and automatic loading and unloading for high-efficiency  
production with low personnel requirements.





## DMG MORI Systems – The future is automation.



Silvio Krüger  
Managing Director

**Contact:** DMG MORI Systems  
Antoniusstraße 14, D-73249 Wernau  
**Tel.:** +49 (0) 7153 / 934 – 150  
**Email:** silvio.krueger@dmgmori.com

\_\_\_\_\_ In the era of “**Industry 4.0**”, the **automation of production processes** is rapidly gaining importance. At the same time, the merging of virtual and physical production worlds requires machines, systems and components to be able to **communicate continuously**.

### Universal systems expertise for our customers

**DMG MORI Systems** is stepping up to meet the challenges of the future with a holistic range of services **from a single source** encompassing technology, machine tool and automation solutions for the manufacture of a wide range of workpieces in all batch sizes, **from individual parts to series production**.

### Reliable systems and maximum productivity

**Our unique full range** from system solution design and machine and process technology to **turnkey projects** is a guarantee that our customers can manufacture even more efficiently, with certainty and with control. We will also continue to build on our expertise in the new centre of excellence in tool and equipment technology, control system design and project management which is under construction in **Wernau, Stuttgart**.

You can find everything to do with automation and the services of DMG MORI Systems online at

→ [www.dmgmori.com](http://www.dmgmori.com)

## +++ NEWS TICKER +++ DMG MORI Systems

+ 68 projects in progress

+ 14 recent customer acceptances in Q1 2015,  
of which 2 were in Wernau

THE EXPERT PARTNER FOR YOUR PRODUCTION SYSTEMS

## Complex turnkey solutions from a single source.

**As a global provider of machine tools**, DMG MORI has years of experience in **technology and automation**. In conjunction with our engineering skills and our strong supplier network, we are always able to develop the right solution for you. With our global presence we represent absolute certainty for your production.



## DMG MORI Systems – Perfect material handling and the shortest cycle times.



HIGH WORKPIECE  
FLEXIBILITY



HIGH CUTTING  
POWER



PARALLEL  
MANUFACTURING  
PROCESSES



EFFICIENT  
SYSTEMS



FLEXIBLE  
PROGRAMMING



### DMG MORI SYSTEMS HIGHLIGHTS

- \_ DMG MORI Systems is an efficient combination of **technology, machines, automation and accessories**
- \_ We **plan, simulate and implement** your turnkey solutions
- \_ **Our main skills include:** Control system design, tool construction, fixture design, machine tools and automation
- \_ We provide **new leading machine concepts for series production**
- \_ Top project management = **one contact for all your needs**
- \_ An expert partner for the **integration of peripheral machines and tools**

### DMG MORI SYSTEMS

## DMG MORI Systems – Perfect automation in all fields.

— In every area of automation, we offer a comprehensive service from planning to implementation. Thanks to our modular systems we can engineer an efficient solution for each production environment!

### AREA 1 MACHINE-INTEGRATED AUTOMATION

- › Integrated into the machine
- › Universal production



PRODUCTION PLANT SOLUTIONS

### AREA 2 STANDARD AUTOMATION

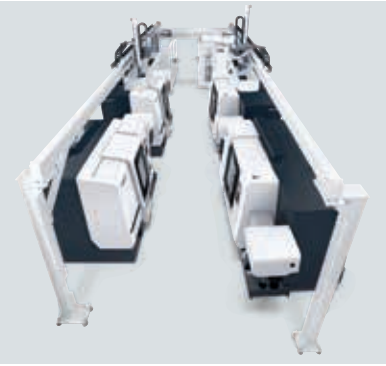
- › Solutions for tool and workpiece handling
- › Overhead transfer and robot solutions



SOLUTIONS IN HÜFINGEN

### AREA 3 FLEXIBLE MANUFACTURING CELLS

- › Implementation of the customer's personalised machining process in combination with the automation of machines and third-party products



SOLUTIONS IN WERNAU

### AREA 4 PRODUCTION LINES

- › Planning, simulation and implementation of turnkey solutions based on the **DMG MORI modular** solution



SOLUTIONS IN WERNAU

In its flexible manufacturing cell, Xylem machines shafts for sewage pumps – roughing, turning, finishing as well as grooving and hole milling. The automatic dimension correction system negates the need for quality controls at the end.

»  
HIGH SYSTEM  
AVAILABILITY  
OF OVER 95 %

»  
MAXIMUM  
OUTPUT

»  
COMPACT  
FOOTPRINT

»  
SHORTEST  
CYCLE TIMES

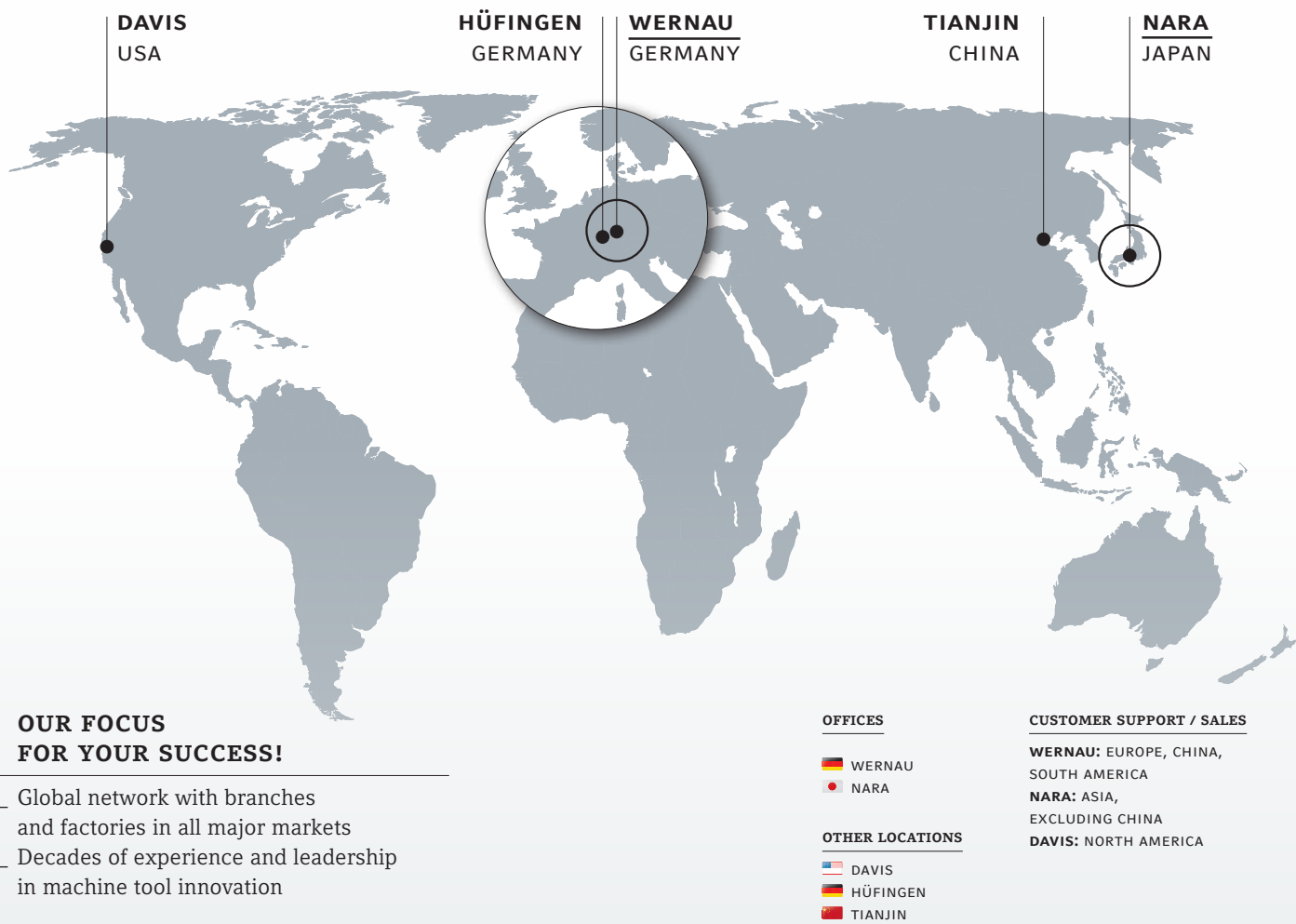


THE EXPERT PARTNER FOR YOUR PRODUCTION SYSTEMS

# New technology centre – Effective pooling of our systems expertise.

The DMG MORI SEIKI Group focuses its **comprehensive holistic system solutions expertise** in DMG MORI Systems GmbH. The product portfolio ranges from standard automation to flexible manufacturing cells to complete production lines. The portfolio’s strength in this regard is our holistic, optimally coordinated system of technology, machine tools and automation solutions. The **full range** of DMG MORI Systems is therefore a guarantee of **future-proof and productive manufacturing** for customers.

**DMG MORI Systems** – A global presence in the most important markets in the world.



We remain your point of contact throughout the entire product life cycle.

## Production planning

- › Process analysis
- › Technology planning
- › Simulation

## Production logistics

- › Automation planning
- › Material handling analysis
- › Layout planning

## Start-up support

- › Training
- › Process visualisation
- › Back-up strategy







The **DMG MORI factory in Wernau:** A cutting-edge centre of excellence in tool and equipment technology, control system design and project management is under construction on this site.

**Due to open by early 2016!**

#### NEW TECHNOLOGY CENTRE IN WERNAU

- 47,000 m<sup>2</sup> total area
- 12,000 m<sup>2</sup> production area with seamless communication to management
- Fully air-conditioned to 21 °C ±1 °C
- 6 central cooling sections
- Central extraction system for dry machining dust
- 450 m<sup>2</sup> inspection area for CMK and CPK measurements



HOLISTIC TURNKEY SOLUTIONS WITH DMG MORI SYSTEMS

You have the  
workpiece ...

Besides our wide range of machine tool products, we provide proven engineering expertise in technology applications, material handling processes and the necessary accessories. **We can design your series production to meet your individual requirements.**



DMG MORI Systems is

- + Technology
- + Machines
- + Automation
- + Peripherals



Example: cylinder block,  
machined on a DMC 80 H linear

Dimensions: 400 × 360 × 180 mm  
Material: AlSi9Mg  
Machining time: 23 minutes



Example: cylinder head,  
machined on a DMC 60 H linear

Dimensions: 560 × 340 × 210 mm  
Material: AlSi7Mg  
Machining time: 20 minutes



Example of a drive train and gearbox,  
machined on a DMC 60 H linear

Dimensions: 376 × 345 × 315 mm  
Material: AlSiMg-T6  
Machining time: 8 minutes



Example of a crankshaft,  
machined on a CTX gamma 2000 TC

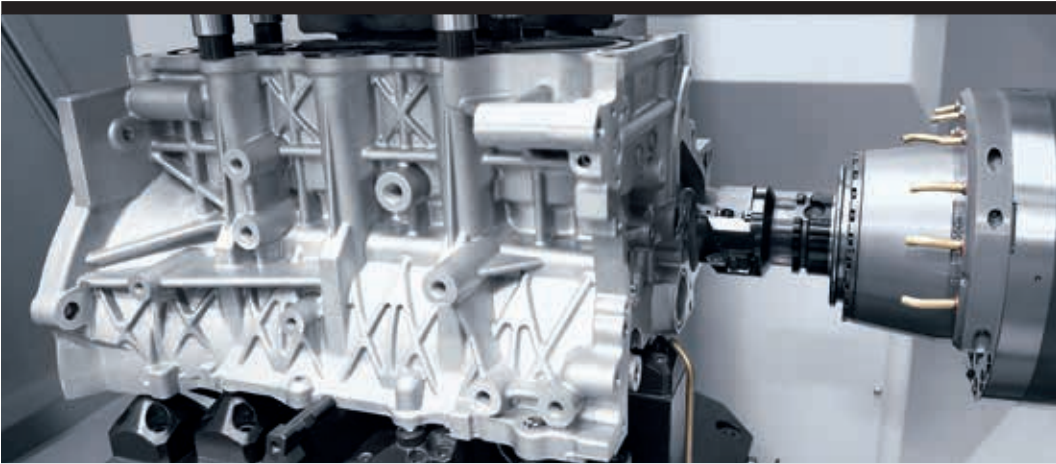
Dimensions: 175 × 774 mm  
Material: 42CrMo4  
Machining time: 180 minutes  
single part production from a solid blank

... We have the production line.

TECHNOLOGY



“We plan the entire technological set-up based on your requirements”



HIGHLIGHTS

- \_ An expert partner for tool and equipment technology (blank clamping, adapter clamping, zero-point clamping)
- \_ Centre of excellence for control technology / control systems
- \_ Simulation of the machining process
- \_ Our team has years of experience in systems
- \_ Heavy-duty machining and maximum workpiece precision

MACHINES



“We provide highly productive machine tools from the global market leader for your series production”



HIGHLIGHTS

- \_ Compact, space-saving design
- \_ Precision and reliability through high stiffness
- \_ Highly dynamic with linear drives
- \_ Top expertise in 5 axes
- \_ Perfect loading options (front and top loading)
- \_ Absolute precision with chip-to-chip times of under 2.5 seconds




AREA 4 PRODUCTION LINES

Maximum productivity  
with an integrated  
production line.

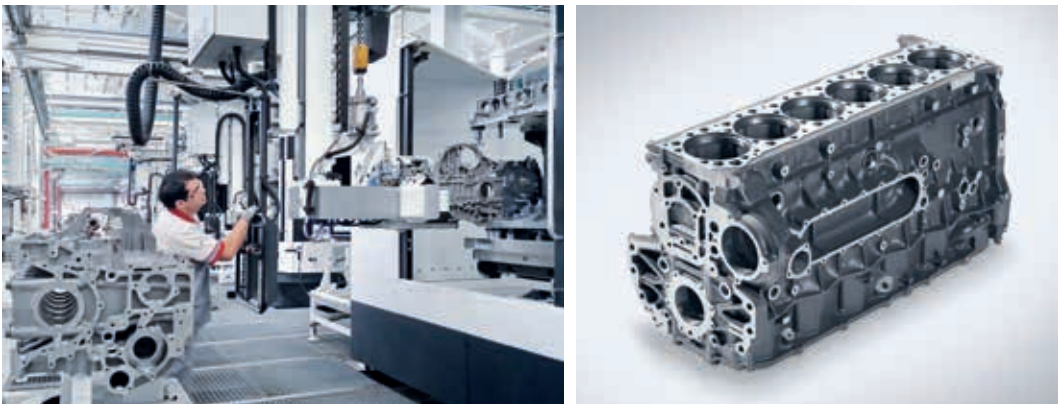
Specialised in complex, fully automatic production solutions, **DMG MORI Systems** has installed a **production line** in Cordoba for **FPT Industrial Argentina S.A.**, which will manufacture **15,000 cylinder heads and blocks for HGVs** each year. **11 DMC 125 H duoBLOCK® machines** and **two DMC 160 H duoBLOCK® machines** are integrated in the system. **DMG MORI Systems** has designed the production process to be a **turnkey project**, selected tools and coordinated the handling for the workpieces including turning stations. This also gives rise to the **manufacturing concept** – a fixture can hold two types of workpiece – and **in-process measurement** of the cylinder bores and **NC programming** by the subsidiary of the machine tool manufacturer. “The throughput times of the cylinder heads and blocks are between 20 and 23 minutes”, says Factory Manager Jose Scigliana about the **capacity enhancement**. The **challenging cam and crank shaft bore machining process** using long tools runs particularly well. **DMG MORI Systems** has set up its own loading area at the set-up station for these boring bars. Jose Scigliana summarises: “The production line is **productive** and meets our **high quality standards**.”



FPT Industrial Argentina S.A.  
Ruta 9 km 695, CP: X5925XAD, Ferreyra,  
Córdoba, Argentina  
www.fptindustrial.com

FPT  
POWERTRAIN TECHNOLOGIES

FPT Industrial Argentina S.A.



The components are loaded at the set-up station.  
A turning station in the foreground.

Every year, FPT Industrial Argentina S.A. produces  
15,000 cylinder blocks and heads for HGVs on its  
production line.



DMG MORI Systems designed a production line with 13 DMG machining centres as a turnkey project for FPT Industrial Argentina S.A.

AUTOMATION



ACCESSORIES

“Our own equipment and control  
concepts for your production system”



HIGHLIGHTS

- \_ Modular kit for all requirements
- \_ Loading capacities of up to 400 kg
- \_ Linear portals to meet every requirement (including I and H-loader concepts)
- \_ Robotic systems (5 to 7 axes)
- \_ Workpiece buffer (rotary, paternoster, stacking cells, decoupling modules)
- \_ Gripper attachments for working in various axes
- \_ Individual cell control

“We integrate all necessary additional  
functions for turnkey solutions”



HIGHLIGHTS

- \_ Measuring machines, leak testing machines
- \_ Honing machines
- \_ Washing machines (interim and final washes)
- \_ Extraction for dry and wet machining
- \_ Assembly and marking stations
- \_ Setting stations
- \_ Deburring station



AREA 1 MACHINE-INTEGRATED AUTOMATION

Up to 40 % higher machine utilisation!  
The new compact rotary storage solution in a footprint of 21 m².

With the new **RS6 rotary storage** with six pallets in the system for the **DMC 65 monoBLOCK®**, you can **boost your efficiency even further!** With its swivelling rotary table the **DMC 65 monoBLOCK®** is capable of **5-axis simultaneous machining** as standard and, with 735 / 650 / 560 mm, features a large working area. With **perfect accessibility** to the working area, set-up station and tool loading bay, it boasts the **best ergonomics in its class**.

*Minimally manned production – highly efficient and flexible.*

DMC 65 monoBLOCK® with RS6 rotary storage

RS6 ROTARY STORAGE

- Six pallets in the system
- Perfect accessibility to the working area, set-up station and tool loading bay
- Minimal footprint of just 21 m²
- Pallet size 500 × 500 mm
- Maximum workpiece measurements ø 630 × 500 mm and 500 kg
- Also available as a mill-turn model

HIGHLIGHTS OF THE DMC 65 MONOBLOCK®

- Up to 180 tool magazine stations available\*
- Maximum reliability with tool measurement in the working area or tool breakage monitoring\*

RS6 available from June 2015  
\* Optional



AREA 2 STANDARD AUTOMATION

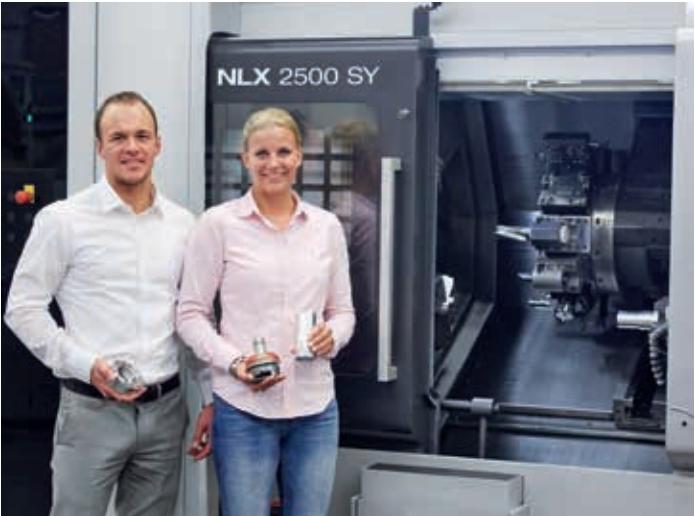
Karl-Heinz Maske & Söhne GmbH



Maske has recently invested in an NLX 2500 with WH 10 top handling in order to improve its capacity and productivity.



The handling system of the NLX 2500 is designed for workpieces weighing up to 12 kg.



Maik Maske, son of the Managing Director Michael Maske, and his sister Melanie Maske explain: “The unmanned production of small to large batches is a competitive advantage.”

Workpiece handling for safety and maximum productivity.

Karl-Heinz Maske & Söhne GmbH has been committed to **top quality in metal machining** since 1967. The contract manufacturer, based in Bönningstedt in Hamburg, supplies clients in growth sectors such as **medical technology**, the **aviation sector** and **mechanical engineering** with complex components which require the full expertise of the company’s 90 employees. Its range of services also includes support during the development phase. In terms of its production facilities, Maske has worked with **DMG MORI** for many years and continuously expands its machine capacity – which currently features **60 models from DMG MORI** – in order to enhance its capacities and retain its technological edge. One of the most recent acquisitions by Maske was an **NLX 2500 with WH 10 top handling**.

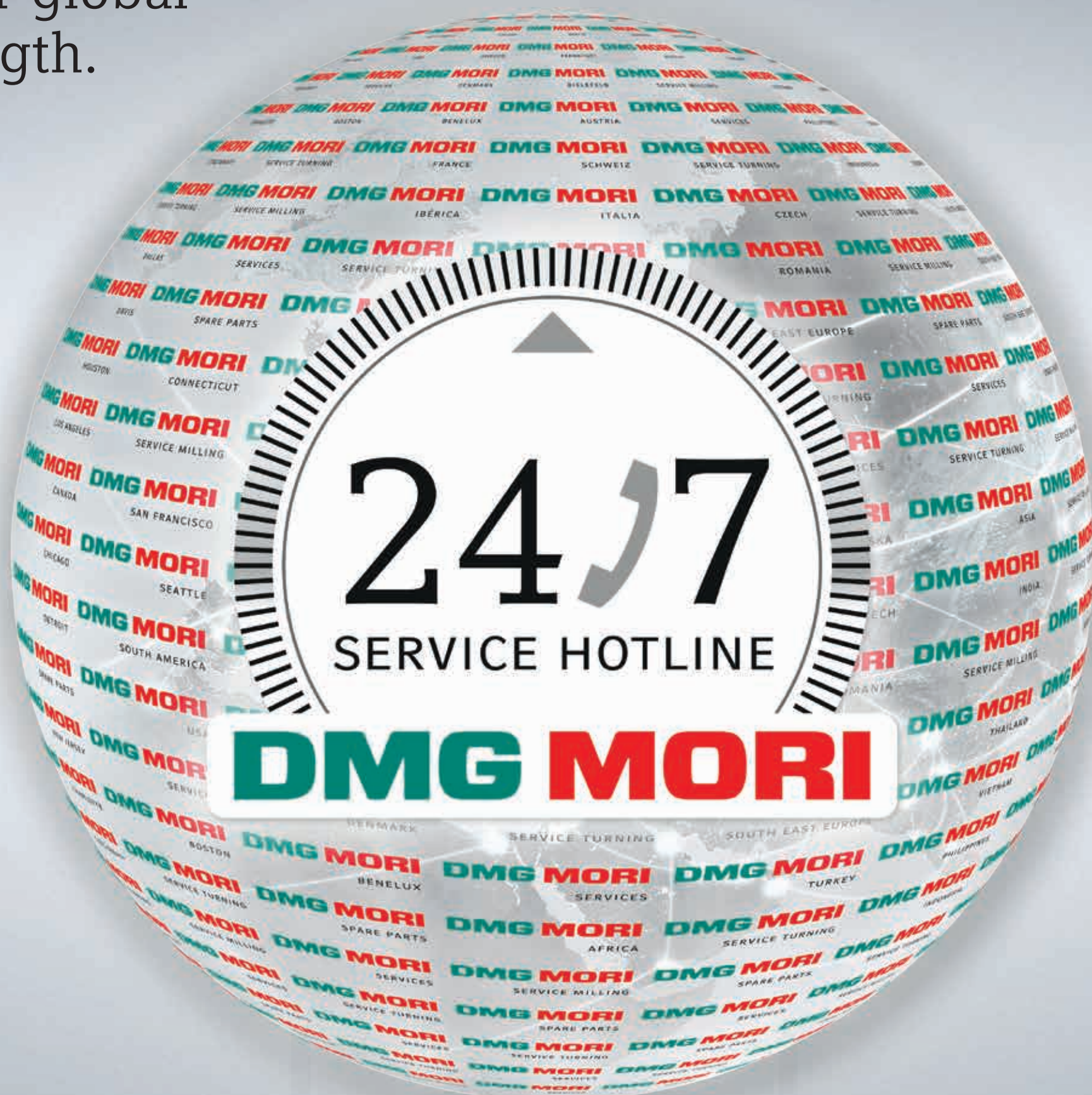
“We have long relied on handling systems to boost our **capacity and productivity**”, says Maik Maske, son of the Managing Director Michael Maske, about the company’s acquisition of **automated equipment from DMG MORI Systems**. In this case, the handling system is designed for workpieces weighing up to 12 tonnes, so it is well suited to the range of parts at Maske. The **unmanned production** of small to large batches also gives the company another **competitive edge**. “The automated **NLX 2500** works so economically that we are able to accept jobs that would otherwise have been awarded to foreign providers”, says Maik Maske. “As we produce highly **complex and high quality parts**, the hallmark **made in Germany** remains an important factor for many customers.”





# LifeCycle Services

Local presence  
is our global  
strength.





## LifeCycle Services – More than just a machine.



Dr Maurice Eschweiler  
Board of Industrial Services  
DMG MORI SEIKI  
AKTIENGESELLSCHAFT

\_\_\_\_\_ **The availability** of a machine is a **decisive factor for productivity** and economic success in production. Our services focus on the **elements** which can significantly affect and improve your machine availability. The best possible spare parts service, continuous availability of highly qualified technicians over our free 24/7 service hotline, solution of problems over secure online connections, improvement of your employees' skills through training, high-quality services and numerous preventative measures designed to maximise machine availability.

In order to **meet your exact requirements**, we have designed our products and services to be modular and flexible.

Whatever you need, we'll be there to help. At over 145 locations worldwide – always nearby. **That's because local presence is our global strength!**

## Skilled support round the clock.



Find out more at [www.dmgmori.com](http://www.dmgmori.com)

## OUR SERVICES FOR MAXIMUM MACHINE AVAILABILITY

## Go-ahead for your production – We support you round the clock.

**We aim to maximise your machine availability.** That's why we have laid the groundwork for an excellent partnership with our global manufacturing service and service products.

### 1. Top spare parts service

- › Global availability of over 95 %
- › More than 260,000 different items in stock, including 1,000 spindles
- › Original spare parts straight from the manufacturer
- › DMG MORI online shop

**The best quality, available immediately and delivered quickly**

### 2. Quality service from the manufacturer

- › 24/7 service hotline: Available round the clock
- › We resolve 60 % of queries over the phone
- › 2,500 certified service technicians always nearby
- › DMG MORI spindle service

**Highly qualified staff always on hand with the expertise of the manufacturer**

#### YOUR BENEFITS:

- 1 TOP SPARE PARTS SERVICE
- 2 QUALITY SERVICE FROM THE MANUFACTURER
- 3 FAST ONLINE SERVICE
- 4 STATUS MONITORING AND FAULT PREVENTION
- 5 TRAINING AND WORKSHOPS

## Minimum downtime thanks to fast and competent service.

\_\_\_\_\_ As a manufacturer of high-quality light alloy wheels, the **RONAL GROUP** is completely dependent on accurate tools and moulds for die-cast aluminium. Since 1990 **ALRON Lda.** in Murte de, Portugal, a daughter of this group, has been producing these moulds. And the 74-man company has relied equally long on the high level of specialist competence and **CNC technology from DMG MORI.** "The accuracy and reliability of the machines are an important mainstay in our daily business", is how João Romão explains the cooperation with machine tool manufacturer. As the person responsible for service and maintenance at ALRON, he places equal importance

on the competent and **quick-response service provided by DMG MORI:** "We can **reduce machine downtimes to a minimum.**" João Romão also considers the **DMG MORI Service Hotline** a great help, because of the uncomplicated manner with which it handles so many challenges. "**Technical problems can often be solved simply over the phone**", he explains. He claims the service staff identify causes very exactly and give detailed instructions for solving the problems. João Romão is also very pleased with the **fast response when spare parts are needed:** "DMG MORI delivers from Germany within 20 hours."



ALRON Lda.  
Zona Industrial de Murte de  
3060-372 Murte de, Portugal

**RONAL**GROUP



SPARE PARTS, SOFTWARE AND ACCESSORIES

DMG MORI Online Shop.  
Quick to order, delivered  
immediately.



— You can now also order lots of **products and services** from **DMG MORI LifeCycle Services** online. Every product is compiled **individually by machine type**. See our variety for yourself on **shop.dmgmori.com**. Don't miss out: take a look!

HIGHLIGHTS

- \_ Wide range of spare parts, software and accessories
- \_ Products tailored to your machine
- \_ Book training courses online with ease
- \_ Book spindle services online
- \_ Monthly offers with exclusive online bonuses
- \_ All orders include free shipping

Now available in our online shop –  
DMG MORI Inspectron.

— **Quick and professional appraisals.** The new Inspectron from DMG MORI is a multifunctional tool with an integrated digital camera which is designed to independently and professionally identify and assess damage and defects in machines and workpieces.

HIGHLIGHTS

- \_ 7" (18 cm) TFT LCD display with a native resolution of 800 × 480
- \_ Digital camera technology
- \_ File naming for easy file management
- \_ Video recordings with a rate of 15 frames per second
- \_ 2x digital zoom with 10 steps
- \_ Micro USB port for uploading images
- \_ Micro HDMI video output
- \_ External micro SD card port
- \_ External micro USB port



**Availability:**  
› For all DMG MORI machines

—> **shop.dmgmori.com**

Register now and take advantage  
of attractive offers!

3. Fast online service

- › DMG Netservice / MORI Monitor:  
Our service technicians can access  
your DMG MORI machine in seconds
- › DMG MORI Messenger: Keeping a  
constant eye on your machine

Modern, cost-effective and time-saving  
online solutions

4. Status monitoring  
and fault prevention

- › Regular maintenance by our experts
- › MPC: Preventative protection of machine  
and tools with rapid shut-down
- › DMG Service Agent: Early warnings  
for punctual maintenance

Manufacture safely with our top-quality services  
and intelligent software solutions

5. Training and workshops

- › Top operator and service training courses
- › Cutting-edge training centre for operators  
and service technicians
- › Professional service training for electronics  
and mechanics
- › 200 highly qualified trainers

Top training for all requirements

Maximum  
machine  
availability

ALRON Lda.



Left to right: Fernando Silva (Head of Tooling Production),  
João Romão (Manager Maintenance and Facilities) and  
Andreas Dusold (Managing Director).



ALRON Lda. manufactures moulds for  
high-quality light alloy wheels produced  
by the RONAL GROUP.



USED MACHINES

DMG MORI

Used Machines

Trade-in: New for old –  
Your old machine is worth  
more than you think!



We'll make you an offer you can't refuse! DMG MORI Used Machines will buy your used machine at a top price! If you decide to invest your newly earned capital straight into a more powerful DMG MORI machine, we will be happy to take your old machine in payment.

Your benefits

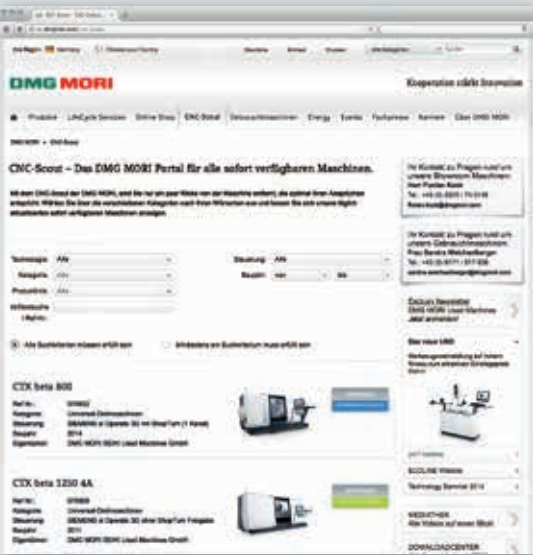
- › Quick and market-based valuation with a binding price offer
- › Quick payment and quibble-free processing
- › Professional disassembly and removal by our service team
- › Attractive financing solutions



Thomas Trump  
Managing Director  
DMG MORI Used Machines GmbH  
Tel.: +49 (0) 81 71 / 8 17-80  
usedmachines@dmgmori.com

Let us make you a  
personalised offer now on  
→ [www.dmgmori.com](http://www.dmgmori.com)

Sales: Immediately available machines –  
updated daily in CNC Scout.



Browse our online list of immediately  
available machines, updated daily,  
and find your dream machine with  
the right configuration at:

→ [cnc-scout.dmgmori.com](http://cnc-scout.dmgmori.com)



If your mobile phone has  
QR code recognition software,  
you can jump straight to all  
available offers.

DMG MORI ACADEMY

Industrial master craftsman (DIMI) in CNC manufacturing technology

Master craftsman title for the  
next international generation.

“In the light of growing internationalisation of industry, demand is increasing for well-trained executives who are able to oversee, organise and optimise manufacturing processes”, says Jörg Harings, Head of Application Training at the **DMG MORI Academy**, on human resource trends in the manufacturing industry. DMG MORI supports this trend with years of experience in training and further education, not to mention CNC technology. Fundamentally, the trend concerns the **course to qualify as an industrial master craftsman (DIMI) in CNC manufacturing technology**. The DMG MORI Academy introduced this advanced training course in collaboration with the **Eckert Schools** and the **East Bavarian Academy (IHK-Akademie Ostbayern)**.

The DIMI is expected to be of particular benefit in non-European countries where there is often a missing link between management and production. As partners, the DMG MORI Academy and the Eckert Schools are filling this training course with skills in CNC technology, organisation, management and human resources. Jörg Harings explains: “By completing the final examination at the IHK-Akademie, the international graduates are broadening their professional horizons with a master craftsman’s degree that is officially recognised in Germany.”

TOOL PRESETTING

UNO – Tailored to  
all parameters.

Tool pre-setting to a high level at an attractive entry-level price. The UNO works exceptionally accurately and offers perfect results for tool dimensions with a diameter of 400 mm and measuring lengths of up to 400 mm (optional: 700 mm). This is ensured by a thermally stable design, high quality measuring systems and powerful software.

HIGHLIGHTS OF THE UNO RANGE

- \_ New design, improved ergonomics
- \_ FEM-optimised and thermally stable cast iron construction
- \_ Individual design through modular concept
- \_ Tool measurement based on the snap gauge principle for diameters of up to 100 mm
- \_ 47 cm (19") screen in 16:9 format with 45× magnification
- \_ LED incident segment light for visual cutting inspection
- \_ Edge-finder for easy axial positioning
- \_ Data connections via USB, LAN, Ethernet and RS232
- \_ Optional RFID tool identification

UNO manual



- \_ Intuitive menu navigation and control system
- \_ Diverse measurement functions for turning, milling and drilling tools
- \_ SK 50-HSK spindle, VDI, Capto and other adapters available
- \_ Stepless manual adjustment of the axes



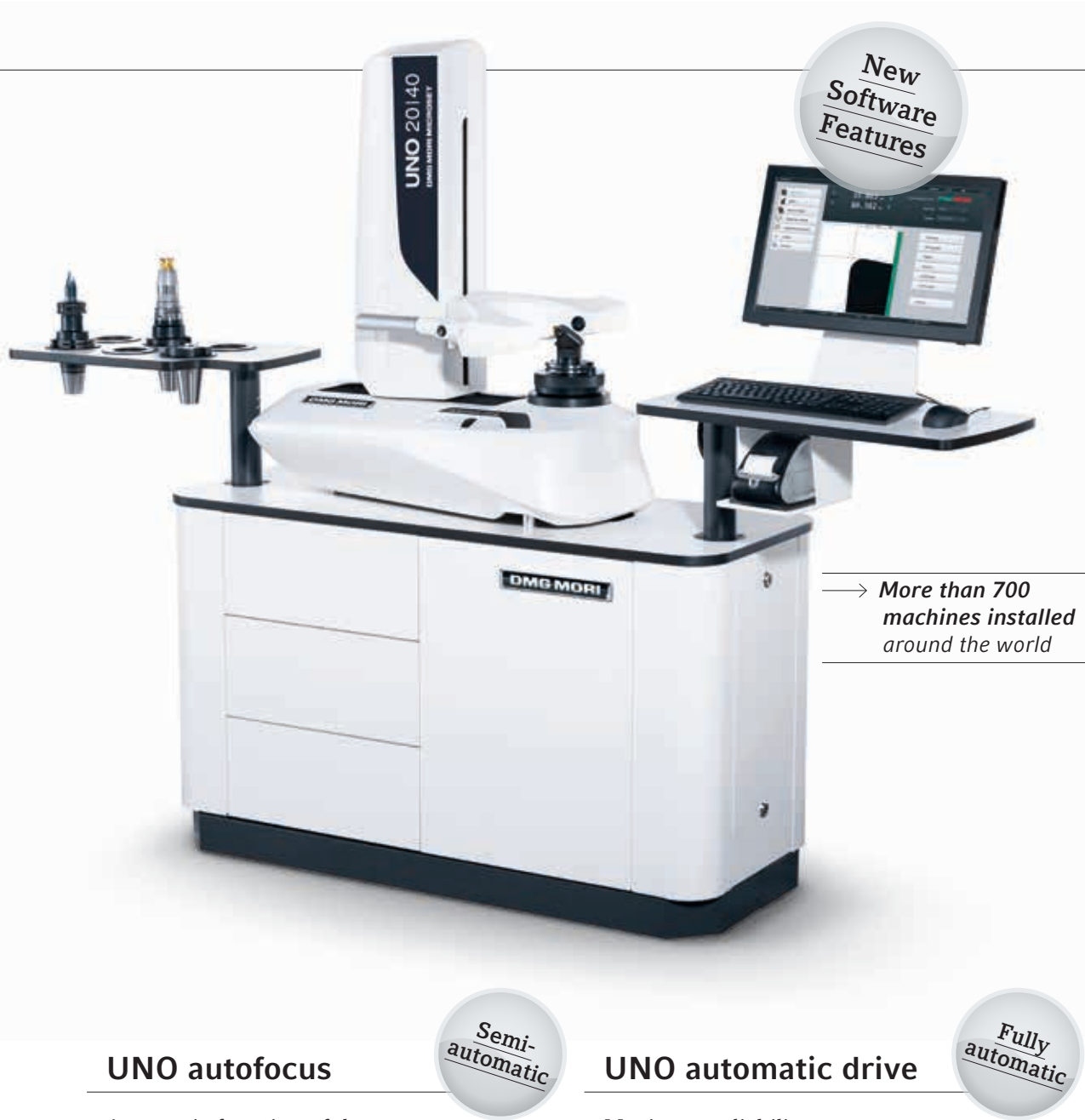


The first group from Malaysia has already completed the DIMI course in Germany. (Photo: Eckert Schools)

The course to qualify as an **industrial master craftsman (DIMI) in CNC manufacturing technology** lasts seven months and consists of 960 hours of classes which also contain basic business management and organisational elements. The specific business section of the CNC manufacturing technology qualification explores all levels in detail. “We want to turn the participants into **experts** on a technical and organisational level, not to mention in management and human resources, in order that they can carry out high-responsibility work confidently”, comments Jörg Harings on the intensive training. The DMG MORI Academy also guarantees that the training courses involve the **latest CNC technology**. Jörg Harings believes this approach is necessary: “As machining is a key process, our highly qualified trainers always teach in line with the **current level of the industry**.” This is the only way to prepare the next generation for the future challenges of the industry and machining in particular.

New courses are starting on an ongoing basis.

Contact: Jörg Harings  
Email: joerg.harings@dmgmori.com



### UNO autofocus

- \_ Automatic focusing of the cutting edge to be measured
- \_ Best suited for tools with multiple cutting edges
- \_ SK 50 spindle with automatic focus
- \_ Can be operated manually

### UNO automatic drive

- \_ Maximum reliability
- \_ Automatic positioning and focusing of the cutting edges to be measured
- \_ Automatic measurement, even of complex tools
- \_ No special user expertise required

### UNO RANGE – NEW FEATURES

**autofocus** – measure multiple-point tools quickly and efficiently.



For automatically focusing the cutting edge. Motor-driven spindles with useful system cabinet and 24" touch display as standard.

**automatic drive** – fully automatic and autonomous measurement processes.

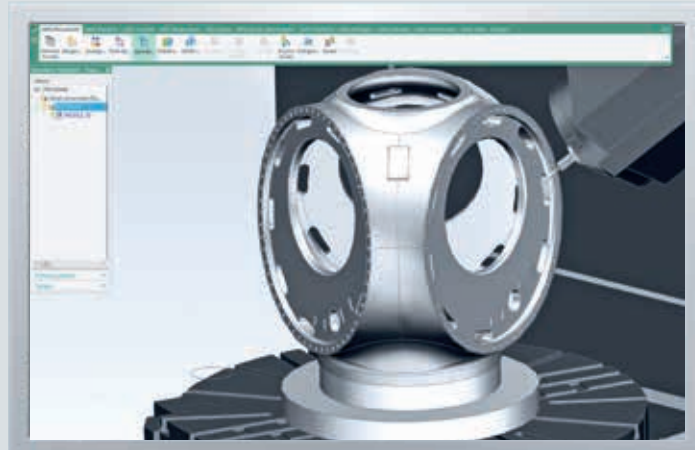


For fully automatic tool pre-setting and measurement independent of the operator (CNC-controlled, 3 axes). With useful system cabinet and 24" touch display as standard.



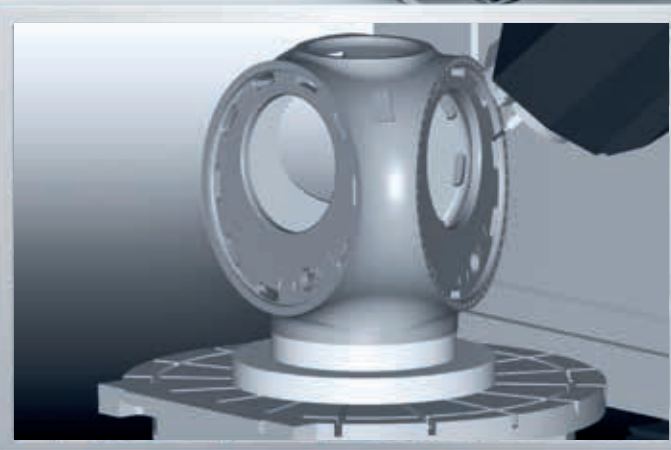
## DMG PROCESS CHAIN

Manufacture quickly and reliably with certified CAD/CAM and unique **1:1 simulation**.



### PROGRAMMING SIEMENS NX CAD / CAM

Siemens NX CAD/CAM supports all the machining strategies of your DMG MORI machine, both in turning and milling. The output of programs by certified post-processors guarantees the feasibility of the NC paths.



### 1:1 SIMULATION DMG VIRTUAL MACHINE

Thanks to the full integration of the control system and the precise reproduction of the real machine, DMG Virtual Machine generates a unique 1:1 machine simulation. Collisions and program errors are detected immediately.



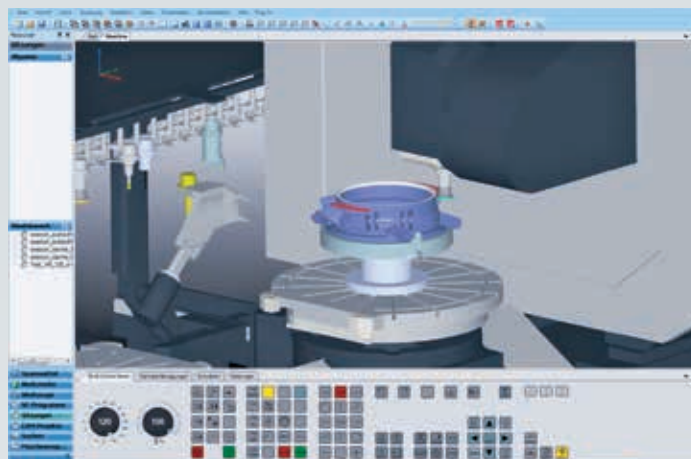
### PRODUCTION DMG MORI MACHINE TOOLS

The NC programs run without manual adjustments. Manufacture your workpieces on your DMG MORI machine 100 % free from collisions. Even more economical, safe and fast thanks to Siemens and DMG MORI!

## Airbus Defence and Space



In the eyes of Wolfgang Simon, Head of Mechanical Production, the most important argument in favour of DMG Virtual Machine is its reliability: "When an NC program enters the machine, it has to run."



Thanks to the full integration of the real control system, DMG Virtual Machine can accurately simulate the entire machining process, including tool changing.



Due to costly special alloys, the blanks – in this case an outlet ring for the engine of the Ariane 5 rocket – cost Airbus Defence and Space up to € 100,000.

Perfect machining results thanks to unique **1:1 simulation** on the PC.

Formed from the former EADS in 2014, Airbus Defence and Space at Ottobrunn is responsible for the development and construction of **engine components for the Ariane 5 rocket**. The high quality standards are met by means of the latest **CNC technology from DMG MORI**. One of the company's most recent acquisitions for its production facility is **DMG Virtual Machine**, with which the machining processes are accurately simulated on two **DMU 70 eVo linear** machines and one **DMC 125 FD duoBLOCK®** in advance. The software is a **1:1 reproduction of the real machine** and includes the entire machine geometry and kinematics, as well as the actual control system and real PLC. In the eyes of Wolfgang Simon, Head of Mechanical Production, the most important argument in favour of **DMG Virtual Machine** is its **reliability**: "We work with blanks worth up to € 100,000. That's why we have to get it right first time."

In the simulation you can **verify the feasibility of a program** and **ensure there are zero collisions**. "When an NC program enters the machine, it has to run", adds Wolfgang Simon.

In addition to reliability, with **DMG Virtual Machine** Airbus Defence and Space also gains **productivity**, as Wolfgang Simon explains: "The simulation of our programs on the PC completely replaces the time-consuming start-up on the machine and **minimises tool setting times**." This results in a significant **increase in machine running times**. The optimisation of programs also plays a major role: "As the full **functionality of ShopMill** of the Siemens control system is available in the simulation, we can optimise the machining times of the programs." This way, **DMG Virtual Machine** ultimately ensures **competitiveness**.



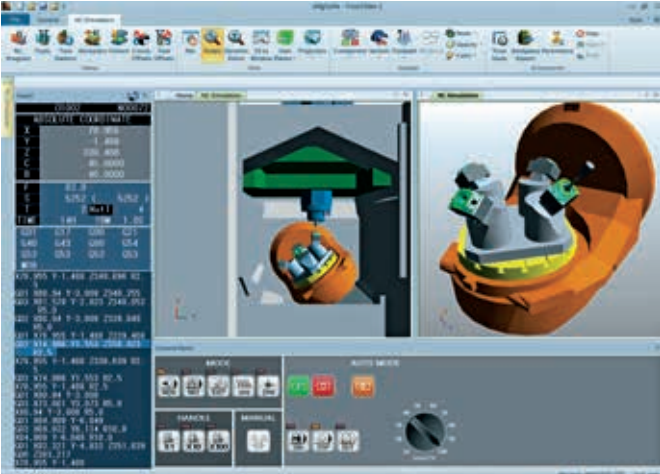
Airbus Defence and Space GmbH  
Willy-Messerschmitt-Straße 1, D-85521 Ottobrunn  
[www.airbusdefenceandspace.com](http://www.airbusdefenceandspace.com)





JOB PREPARATION

## Manufacturing Suite – Accurate program simulation.



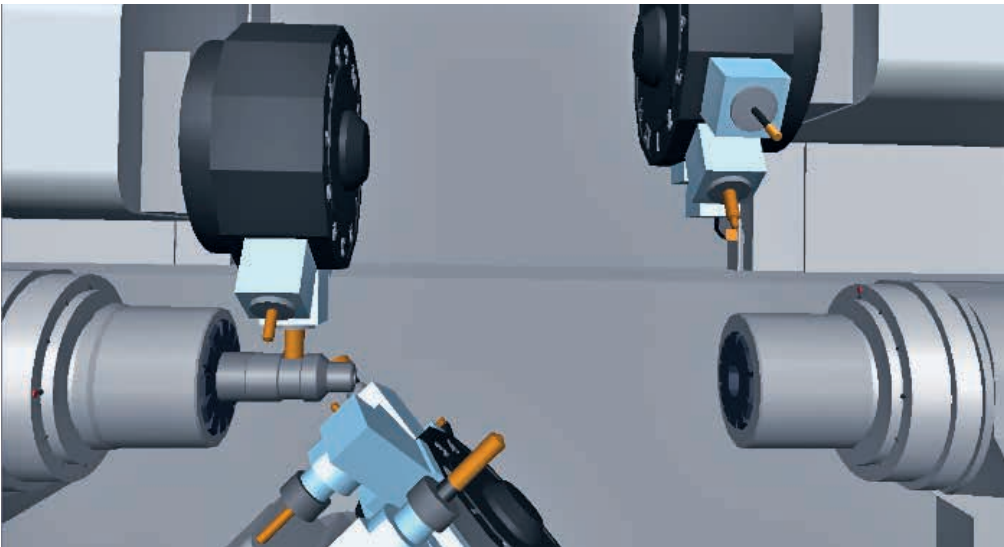
- Your benefits:**
- › Simple machine selection and switching
  - › Accurate DMG MORI machine models with standard settings
  - › Offline verification of NC programs

### HIGHLIGHTS

- \_ Short set-up time thanks to the simple machine configuration
  - \_ Simple, clear screen design for excellent user-friendliness
- Post processor**
- \_ Integration of the tested standard template for every MORI SEIKI machine
  - \_ Adaptable post-template, which can be tailored to the specific NC program version of the customer
- NC simulation**
- \_ Verification of NC programs with simultaneous display
  - \_ Collision detection and runtime display

JOB PREPARATION

## DMG Programmer 3D Turning – 50 % shorter set-up times for multi-axis machines.



- Your benefits:**
- › 50 % reduction in set-up costs
  - › Avoid repair costs caused by collisions
  - › Launch NC programs in automatic mode

### HIGHLIGHTS

- NEW: SPRINT 50 / 65 with 3 turrets and B axis**
- Complete package, fully adapted to the machines:**
- \_ Program templates for various machining methods
  - \_ Complete tool catalogue for programming and simulation
- Programming:**
- \_ CAM turning, milling and drilling
  - \_ Automatic structure generation
  - \_ Synchronisation mark manager



JOB MONITORING

## Metalltechnik Vils GmbH

## DMG MORI Messenger – Keeping you informed of what is happening in your production.



With DMG MORI Messenger, Thomas Allgaier, a member of the family which owns Metalltechnik Vils, can always see the current status of his machines.



We see from our machines  
exactly what is currently ...

- ✓ ... running
- ✓ ... how much has been produced so far
- ✓ ... how long the machines have been active
- ✓ ... the idle times
- ✓ ... the reasons for stoppages
- ✓ ... what happens when the machine is unmanned
- ✓ ... which is the most productive

During unmanned shifts, DMG MORI Messenger displays mobile information about the machine activity on smartphones or tablets and alerts employees by email in the event of a shutdown.

\_\_\_\_ Thanks to maximum precision in the manufacture of large components, **Metalltechnik Vils GmbH** from Vils in Tyrol is a skilled contract manufacturer for challenging sectors such as machine tool construction and the **automotive industry**. Metalltechnik Vils generates high productivity using its capacity of over 50 CNC-controlled machines over two normal shifts and one unmanned shift. “We aim to have the machines **working around the clock**”, explains Thomas Allgaier, part of the family which owns Metalltechnik Vils. For this reason, great importance is attached to the **planning and monitoring of production contracts**. **DMG MORI Messenger** is an important tool in this regard. “With this tool we can display the current **machine status** of the machines clearly for all employees on a large screen.” This is particularly useful in **large parts manufacturing**, where machine idle time might go unnoticed due to the enormous size of the hall.

In unmanned operations, **DMG MORI Messenger** uses its strengths to full effect too, as Thomas Allgaier knows: “During unmanned shifts, the relevant employees check the machine activity **remotely by smartphone or tablet** and are alerted by email in the event of a shutdown.” This allows fast reaction in such cases. **DMG MORI Messenger** provides another benefit in the form of **analysis options**. “The software provides information on quantities produced, the reasons for disruptions and the actual machine process durations”, explains Thomas Allgaier. This is enormously helpful in **optimising production** and calculating quotations.



Metalltechnik Vils GmbH  
Allgäuer Str. 23, A-6682 Vils  
www.metalltechnik-vils.com





# Generate your own energy – like many of our satisfied industrial customers.

## Zimmer Group – Independent of external energy suppliers and political decisions thanks to its own energy supply.



\_\_\_\_\_The Zimmer Group has secured a high degree of independence in the face of spiralling electricity costs and energy policy decisions in the form of photovoltaic systems from GILDEMEISTER energy solutions. The core elements of the photovoltaic installations in Rheinau and Haslach consist of 70 SunCarrier 22 tracking systems. Compared to fixed systems,

these tracking systems can generate up to 35 % higher yield. The total annual production of the installations is approximately 335,000 kWh. This is enough electricity to supply around 100 four-person households for an entire year.

In focusing so strongly on generating electricity through solar energy, the Zimmer Group is making a significant statement for the future. “We already have a feeling that we will reach our goal of maximum energy independence and that the calculated 10-year pay-back period will be achievable”, says Bernd Kruzinna. The economic benefits aside, he also points to a matter of aesthetics: “The SunCarrier 22 systems are eye-catchers which match the locations of the Zimmer Group perfectly.”



The Rheinau site. 28 compact and easy-to-install SunCarrier 22 tracking systems generate 135,000 kWh of electricity each year.

**Zimmer Group**  
Im Salmenkopf 5,  
D-77866 Rheinau



**Become your own energy supplier!**  
Contact us – we can design a custom concept for you with no obligations.

**GILDEMEISTER energy solutions**  
Tel.: +49 (0) 931 250 64-120, [energysolutions@gildemeister.com](mailto:energysolutions@gildemeister.com)  
[www.energy.gildemeister.com](http://www.energy.gildemeister.com)



**GILDEMEISTER**  
energy solutions

The GILDEMEISTER energy solutions park at the new DMG MORI Global Headquarters in Winterthur generates electricity for the building and the e-mobility fleet!



- The energy park has an area of around 10,000 m<sup>2</sup>
- Over 40 SunCarriers and two WindCarriers generate electricity for consumption in the building and in order to charge the CellCube
- 330,000 kWh of independently generated electricity equates to the electricity consumption of 100 four-person households per year
- Independent electricity generation – we generate 45 % of all the energy we use ourselves
- E-mobility – free recharging for employees and residents of Winterthur
- Saves 40,000 litres of petrol per year
- Rapid charging in under 30 minutes



E-mobility is only as green as the electricity driving it. Show that your company is brimming with energy. Demonstrate the sustainability and innovation of your company with an electric vehicle fast charging station.