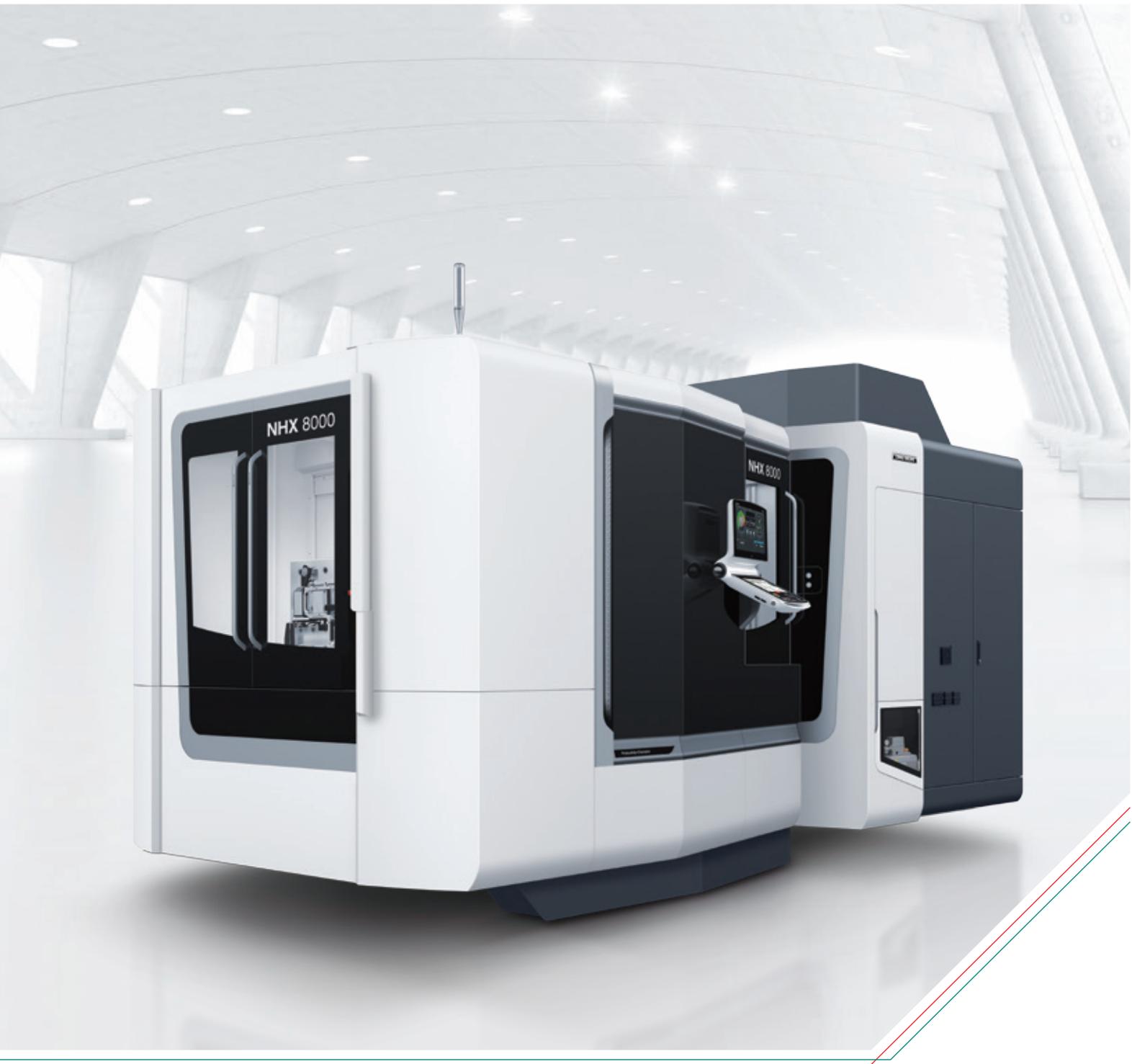


# DMG MORI

High-Precision, High-Speed Horizontal Machining Center

NHX 8000

## NHX 8000



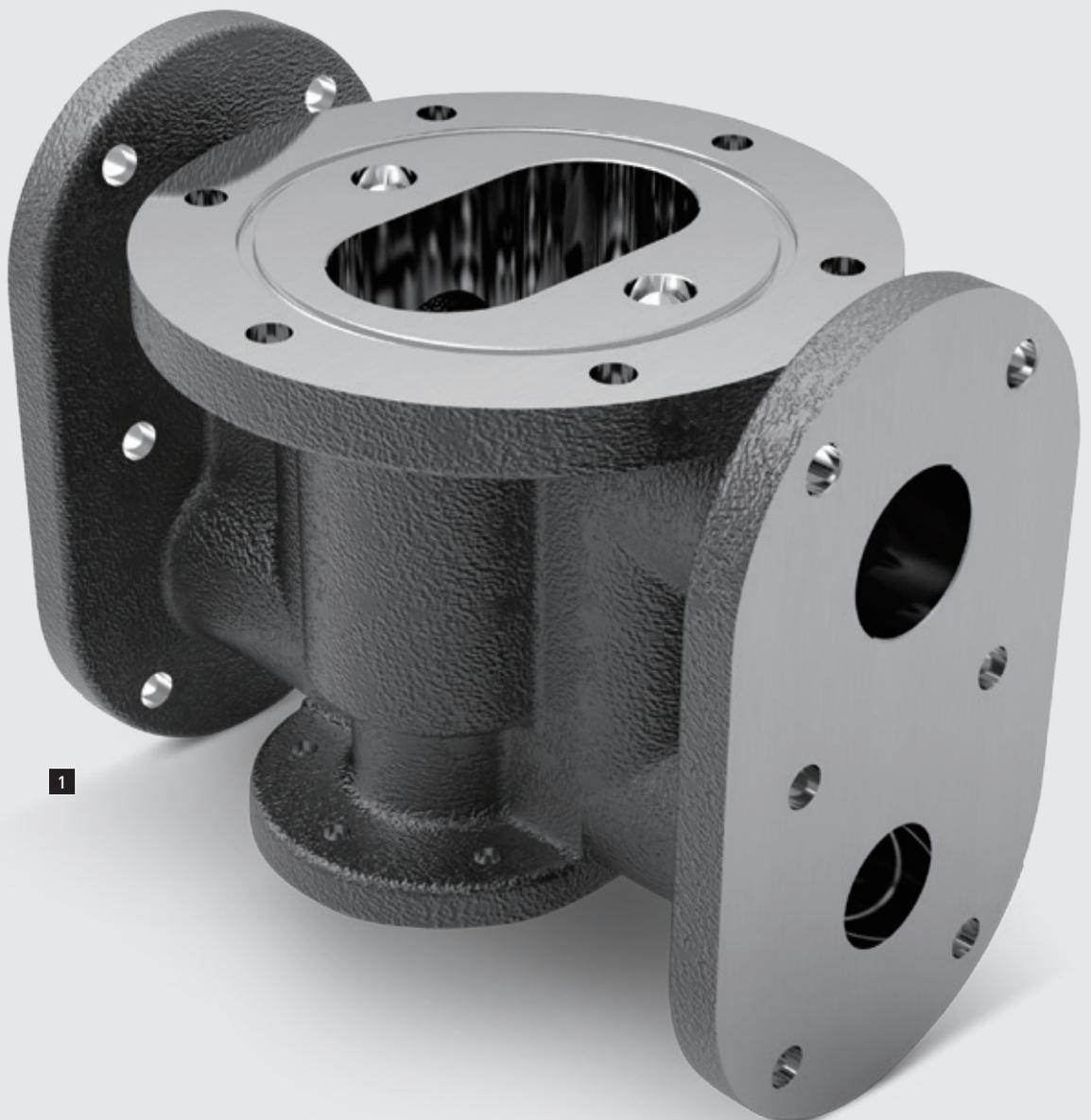
DMGMORI.COM

NHX 8000

## Absolute Confidence for Machining of Large and Difficult-to-Cut Materials

The NHX 8000 is a horizontal machining center that demonstrates powerful cutting of large and difficult-to-cut workpieces in the construction machinery, aircraft, vessel and energy industries. The model mounting the powerful and high-performance spindle powerMASTER has evolved with higher cutting capabilities than that of the existing machine.

The model is also capable of high-speed, high-precision machining, contributing enormously to customers' success.





#### Boats & Ships

1 Gear housing

#### Automobiles

2 Cylinder block

3 Cylinder head

#### Aerospace

4 Engine case

#### Construction machinery

5 Housing

NHX 8000

## Combination of Overwhelming Cutting Capabilities and Advanced Technologies

A maximum workpiece size of  $\varnothing 1,450 \text{ mm} \times 1,450 \text{ mm}$  ( $\varnothing 57.0 \text{ in.} \times 57.0 \text{ in.}$ ) and 40% higher heavy-duty cutting performance than the conventional model - The NHX 8000 equipped with incomparable rigidity and durability has further evolved by the CELOS, a user interface that employs touch panels and the optimal menus appropriate for each production scene. The ergonomic cover design is created taking into account every machine operation conceivable at the shop floor.



### **High Precision**

- + Driven at the Center of Gravity
- + Box-in-Box Construction

### **High speed**

- + Max. acceleration <X- / Y- / Z-axis>:  
0.82 / 0.57 / 0.69 G  
{8.0 / 5.6 / 6.7 m/s<sup>2</sup> {26.2 / 18.4 / 22.0 ft/s<sup>2</sup>}}
- + Rapid traverse rate <X, Y and Z axes>:  
50 m/min [1,968.5 ipm]
- + Cutting feedrate <X, Y and Z axes>:  
50 m/min [1,968.5 ipm]\*
- \* Look-ahead control
  - The rapid traverse rate on the Y-axis is 40 m/min [1,574.8 ipm] when using the spindle with the 8,000 min<sup>-1</sup> specification <option>.

### **High cutting performance**

- + High-output spindle with a max. output of 55 kW [75 HP]
- + Max. spindle torque: 1,413 N·m [1,042.2 ft·lbf] <10%ED> (option)

### **CELOS**

- + Consistent administration, documentation and visualization of order, process and machine data
- + Extension of functions possible by adding applications, and high compatibility with existing information infrastructure and software

### **Power-saving**

- + Function for energy-saving and visualization of the effect

NHX 8000

# High-performance Structure Supporting Outstanding Cutting Capabilities

With the DCG (Driven at the Center of Gravity) technology and the Box-in-Box construction, the machine drives the moving units of the machine at the center of gravity in a well-balanced manner. The DCG controls vibration, one of the factors that hamper high-speed and high-accuracy machining. This enables high-speed traveling of large workpieces that require long-distance travel, improving productivity.

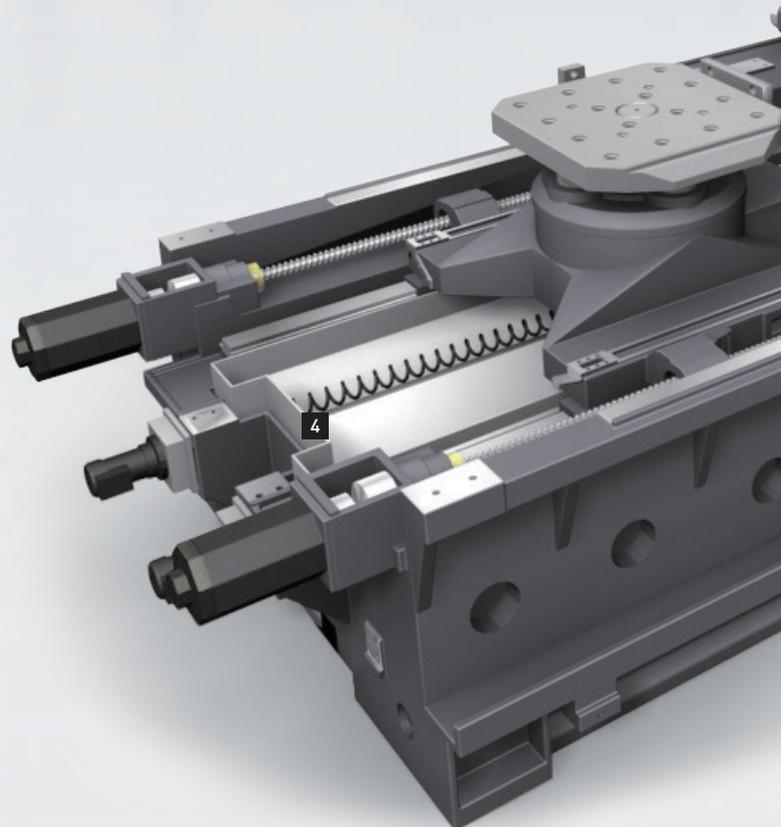
DCG: Driven at the Center of Gravity

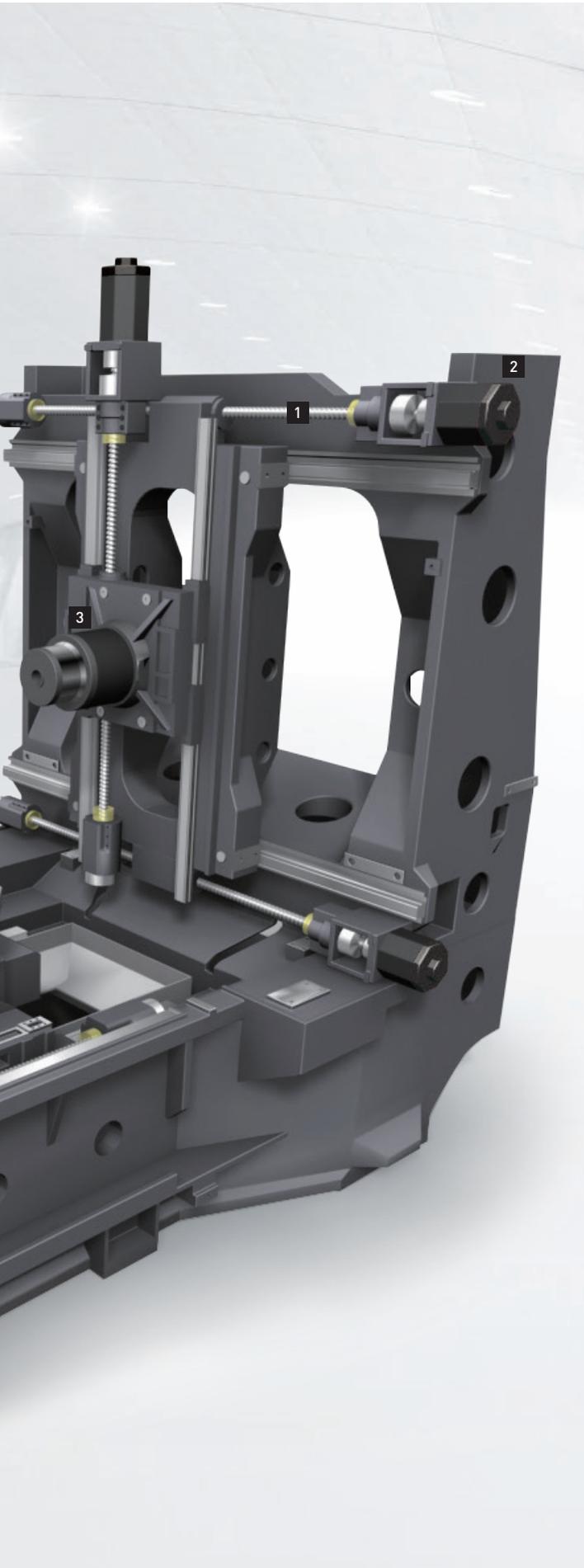
## 1 Driven at the Center of Gravity

- + The DCG technology controls vibration, which is one of the main factors that prevent high-speed and high-precision machining, by driving the moving units at the center of gravity
- + Improved surface quality
- + Outstanding acceleration
- + Improved circularity
- + Longer tool life

## 2 Box-in-Box Construction

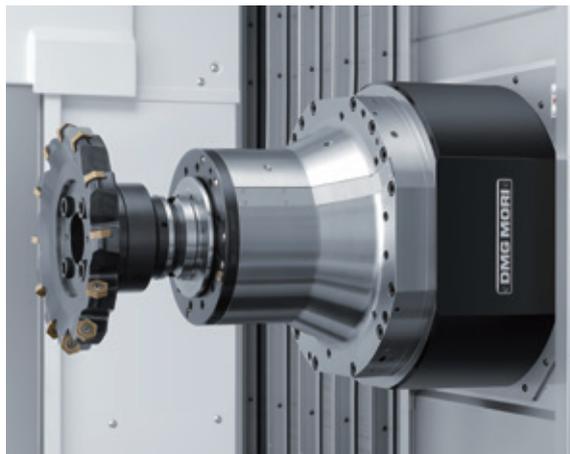
- + The Box-in-Box design, which supports the saddle from both sides, guides and drives the moving parts by its center of gravity in a more balanced manner





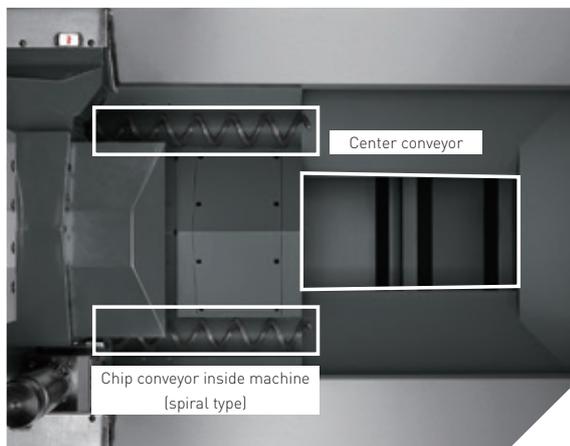
### **3 Spindle structure with higher rigidity**

- + The powerMASTER that achieves overwhelmingly powerful cutting performance as standard
- + Spindle bearings lined up in four rows



### **4 Chip conveyor inside machine (spiral type)**

- + Thorough disposal of chips under the table which are difficult to remove by coolant flush
- + Applicable to dry machining that does not use coolant



NHX 8000

# Perfect Equipment for Ultimate Machining Accuracy

The NHX 8000 model is equipped with everything required for stable high-precision machining. In addition to perfect spindle cooling, a highly reliable SmartSCALE (Magnescale) with extreme accuracy is employed on all axes as standard to ensure the best positioning accuracy for a long period of time.

Full closed loop control (Scale feedback) as standard on all axes (SmartSCALE)



### Simple non-contact structure

- + Saves space bearingless compact design
- + Can be mounted in proximity to workpieces, enabling easy installation of multiple scales on one axis



Conventional model



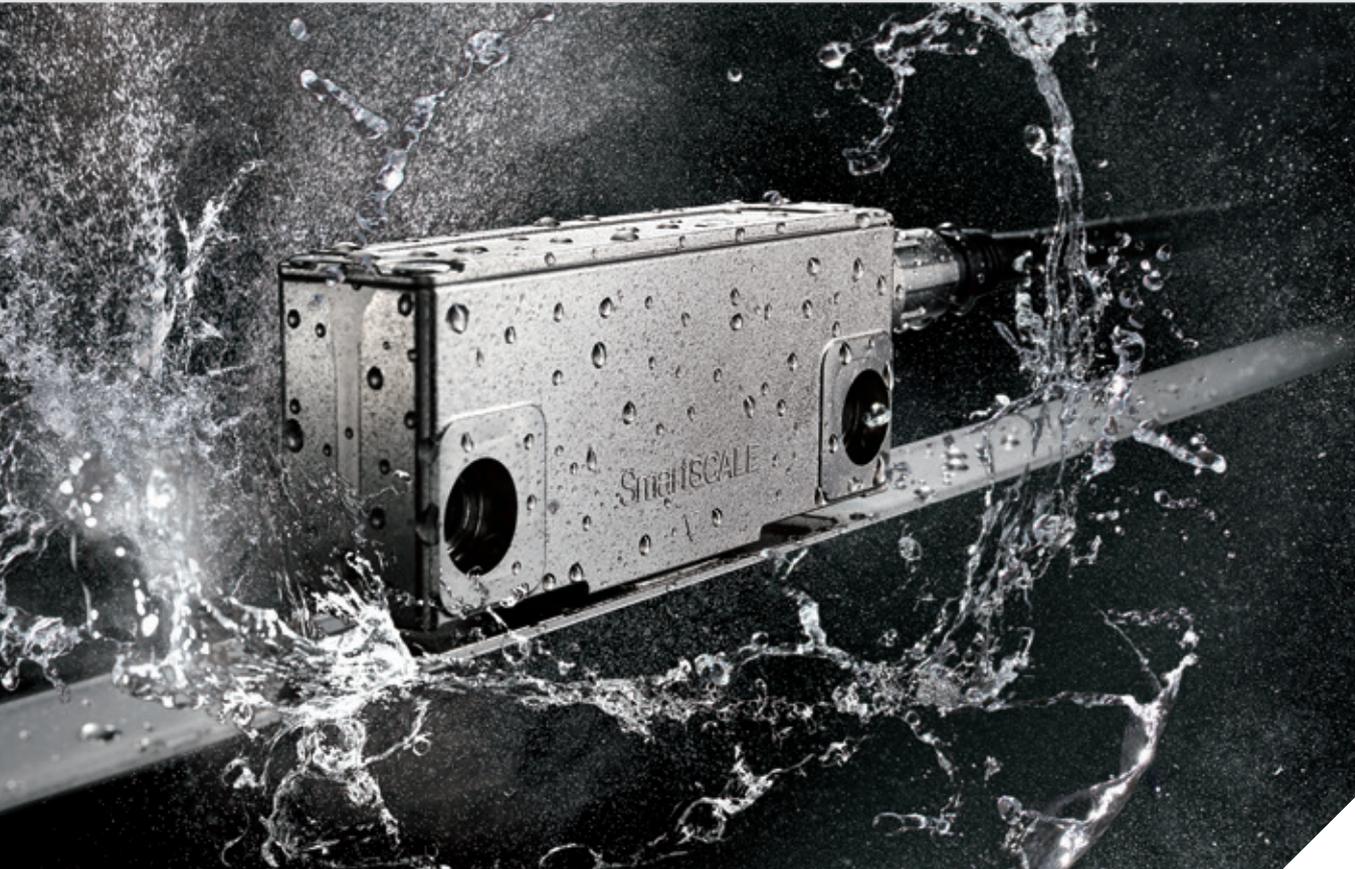
SmartSCALE

### High resolution of 0.01 μm

- + Newly developed algorithm employed to improve the high-performance arithmetic processing circuit

### No air purge necessary thanks to the sealing structure with a protection degree of IP67

- + The magnetic scale and the detection device surfaces completely covered with a metal cover for even higher durability against coolant and chips



#### Draw-back function for through-spindle coolant

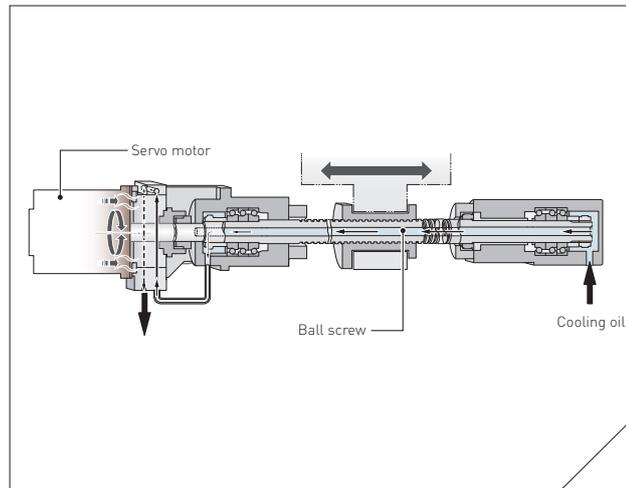
Any remaining coolant in the spindle is drawn back into the tank when the coolant flow is stopped, which minimizes the residue to ensure stable machining accuracy.



- + Prevent coolant from adhering to the spindle taper during ATC
- + Prevent mounting errors and rust caused by chips
- + Prevent coolant from entering the magazine

• This function is included in the through-spindle coolant specifications (option).

#### Ball screw center cooling

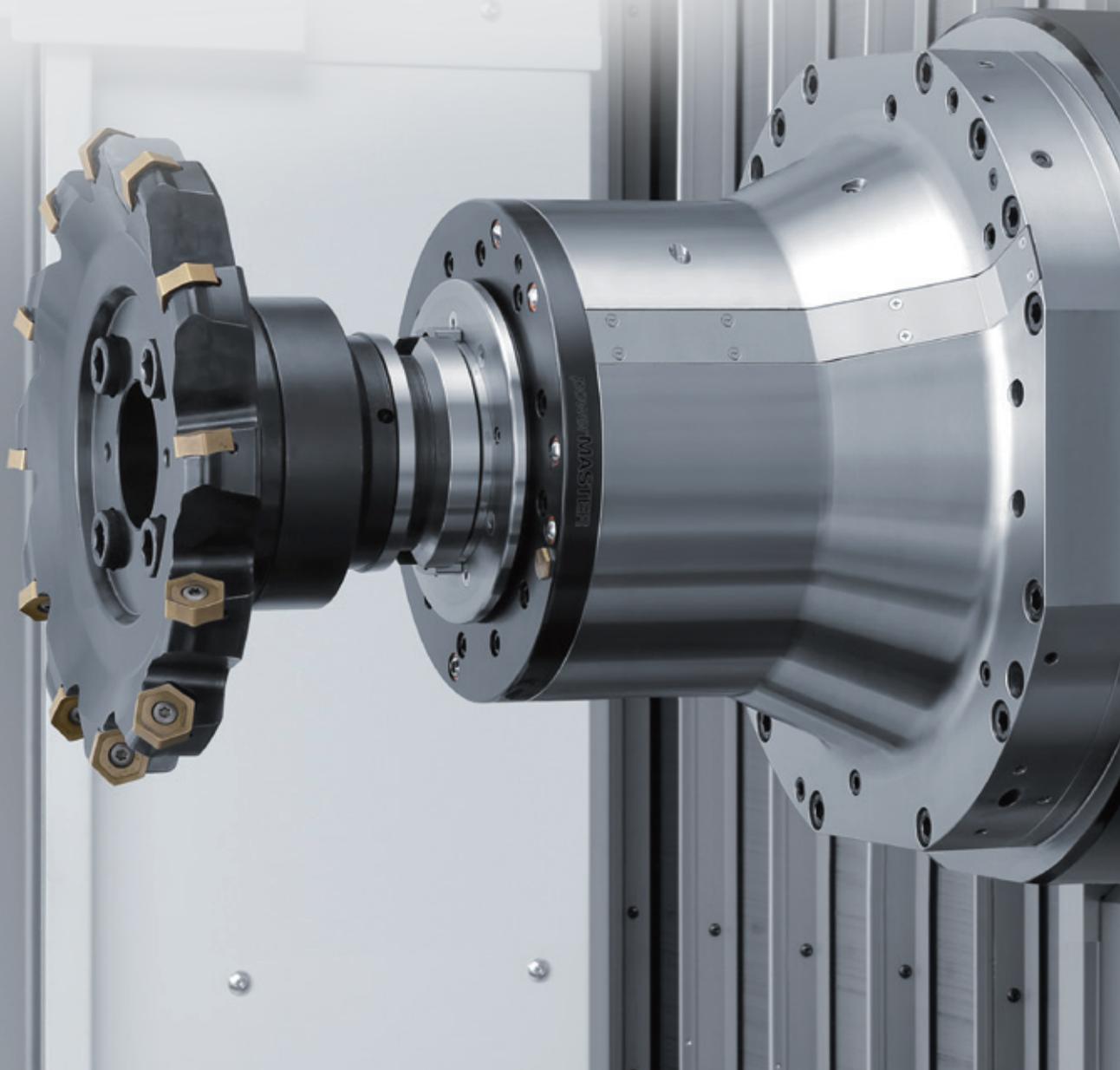


In order to control thermal displacement and to keep high-accuracy positioning, the ball screw core cooling system is used.

NHX 8000

## Outstanding Machining Capability High-power Spindle powerMASTER

The high-performance spindle powerMASTER with DMG MORI's cutting-edge technologies and know-how. The model demonstrates outstanding performance in machining of steel to non-metals such as aluminum. The high-torque specification  $<8,000 \text{ min}^{-1}>$  (option), with a max spindle output of 55 kW (75 HP)  $<25\%ED>$  and a max. spindle torque of 1,413 N·m (1,042.2 ft·lbf)  $<10\%ED>$ , is suited to machining of difficult-to-cut materials, which is in increasing demand, mainly in the aircraft industry.





#### **Powerful tool clamping force**

- + Using the newly developed collet, clamping power on the tool has been increased. The ability to control vibration during spindle rotation ensures high-accuracy machining
- + Tool clamp power: 30,000 N (6,743.9 lbf)

• Please use a two-face contact tool when cutting at higher than 10,000 min<sup>-1</sup>.

#### **Two-face contact specifications (option)**

- + Coming into contact with both spindle taper and spindle nose, a tool achieves greater flexural rigidity and longer useful life

#### **No. 50 taper spindle**

- + Type of tool shank: BT50, CAT50, DIN50, HSK-A100
- + Max. spindle speed: 12,000 min<sup>-1</sup>  
16,000 min<sup>-1</sup> <high speed>  
8,000 min<sup>-1</sup> <high torque>
- + Output:  
55 / 30 kW (75 / 40 HP) <15%ED / cont>  
37 / 26 kW (50 / 34.7 HP) <25%ED / cont> {high speed}  
55 / 45 kW (75 / 60 HP) <25%ED / cont> {high torque}
- + Max. spindle torque:  
807 N·m (595.2 ft·lbf) <10%ED>  
528 N·m (389.4 ft·lbf) <10%ED> {high speed}  
1,413 N·m (1,042.2 ft·lbf) <10%ED> {high torque}

• Please use a two-face contact tool when cutting at higher than 10,000 min<sup>-1</sup>.

NHX 8000

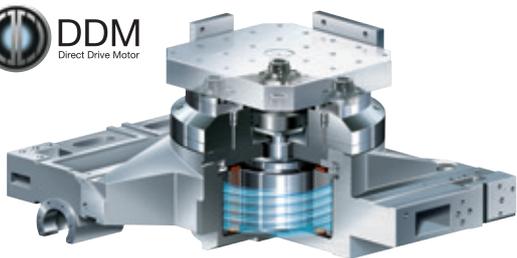
## Minimum Table Indexing Angle of $0.001^\circ$ with Zero Backlash

The optional rotary table uses a high-speed rotary axis drive system DDM (Direct Drive Motor) that achieves zero backlash.

The DDM transmits the drive power directly to the rotary axis, delivering high performance in machining that requires high-speed indexing and high-precision positioning.

DDM: Direct Drive Motor





### Direct Drive Motor (option)

Until now, gears have been used to transmit the drive power to the rotary axes, but this drive system had a negative effect on drive speed and precision. By transmitting the drive power to the rotary axes directly without using gears, DDM offers outstanding transmission efficiency and high-speed feed. DDM also achieves zero backlash for highest accuracy.

- + High-speed rotation  
(B-axis max. rotational speed: 100 min<sup>-1</sup>)
- + High-precision indexing
- + Less maintenance
- + Longer product life

### Optimal acceleration / deceleration for each workpiece

#### Servo Sense for Workpiece (Z-axis, B-axis)

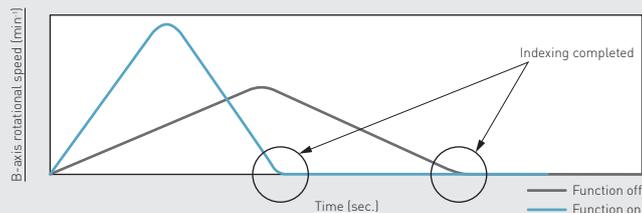
Drastically decrease overall cycle time by automatically finding the optimal acceleration / deceleration for each pallet (Z-axis and B-axis). The auto servo tuning function allows for efficient and smooth acceleration / deceleration, as well as ensuring stable positioning and higher machining accuracy. It automatically controls machine vibration and caused by gradual change in the machine and unbalanced fixtures.

- + Optimized acceleration / deceleration for reduction of machining time
- + Improved positioning accuracy
- + Reduced machine vibration

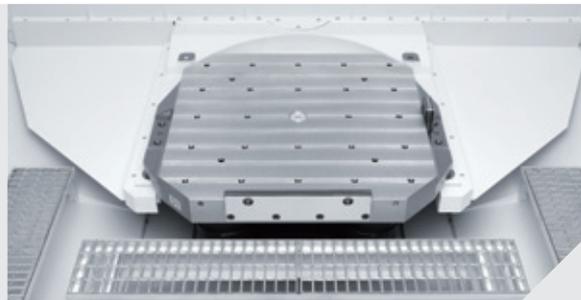
#### Example: Reduction in the B-axis indexing time

Increase acceleration according to workpiece mass and reduce positioning and machining time

Comparison of 180 degree indexing time (NHX 6300): Workpiece mass 500 kg (1,100 lb.)



• The data above is an example of a past test result. The results on the catalog may not be achieved according to workpieces or environmental conditions at the time of measurement.



### APC

It uses a front 2-station turn-type APC. This APC offers high-speed pallet change that reduces non-cutting time.

- + Pallet changing time (2-station turn-type APC): 16.0 sec.\*

\* When equipped with the auto-coupler, time taken to shut off / supply hydraulic pressure to the fixture is not included.

• The photo shows the machine equipped with options.

Travel <X- / Y- / Z-axis>	mm (in.)	1,400 / 1,200 / 1,350 (55.1 / 47.2 / 53.1)	
Pallet size	mm (in.)	800 × 800 (31.4 × 31.4)	
Pallet loading capacity	kg (lb.)	2,200 (4,840), 3,000 (6,600)	
Max. workpiece size	mm (in.)	<div style="text-align: center;"> <p>∅ 1,450 (∅ 57.0) 1,450 (57.0)</p> </div>	
		1° indexing table	Full 4th axis rotary table: DDM (option)
Minimum pallet indexing angle		1°	0.001°
Pallet indexing time (90°) <including clamping and unclamping time>	sec.	3.2	1.8

NHX 8000

## Variety of Magazines

The NHX 8000 comes standard with the 60-tool chain type magazine that enables smooth and high-speed tool indexing. Two types of magazines, the chain type and the rack type, with a maximum tool storage capacity of 330 tools are available according to customers' production needs.

- + Tool storage capacity <chain-type / rack-type>:  
60, 100, 120 tools / 180, 240, 330 tools
- + Max. tool length: 800 mm [31.4 in.]
- + Max. tool mass: 30 kg [66 lb.]
- + Max. tool diameter: 320 mm [12.5 in.] <without adjacent tools> /  
110 mm [4.3 in.] <with adjacent tools>

- Chain-type magazines (60-, 100- or 120-tool capacity) incorporate a pot tilting mechanism and the tool capacity includes one tool at the spindle side.
- Rack-type magazines (180-, 240- or 330-tool capacity) incorporate a pot transfer mechanism and the tool capacity includes one tool at the spindle side.
- The maximum tool diameter is limited to 230 mm [9.0 in.] or less when using the spindle at 10,000 min<sup>-1</sup> or higher.

### Magazine separated from the machine body (rack-type)

As the magazine is separated from the machine body, the load nor the vibration does not affect machining, which leads to improvement of machining accuracy.

14



### ATC

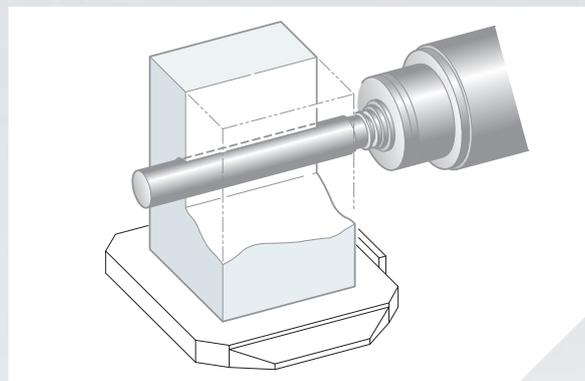
By using a double arm, which offers high-speed tool change, non-cutting time is dramatically reduced.

- + Cut-to-cut (chip-to-chip)\*:  
16.6 sec. (max. <ISO>) / 5.0 sec. (min. <ISO>)
- + Tool-to-tool: 1.9 sec.

ISO 10791-9 JIS B6336-9 ISO: International Organization for Standardization  
JIS: Japanese Industrial Standard

\* Chain-type: 60 tools

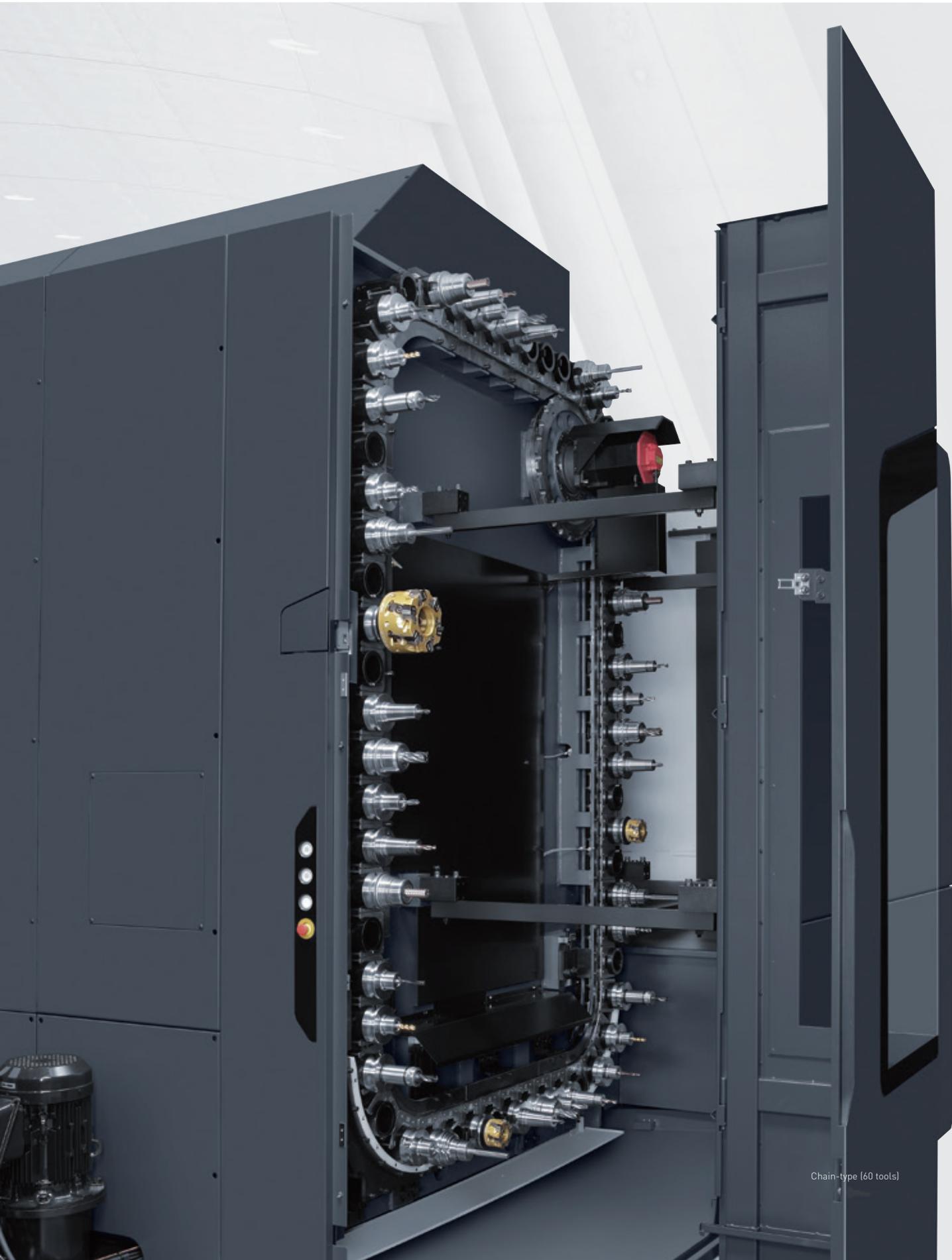
- The time differences are caused by the different conditions (travel distances, etc) for each standard.
- Depending on the arrangement of tools in the magazine, the cut-to-cut (chip-to-chip) time may be longer.



### Maximum tool length equivalent to pallet size

For the conventional model with its maximum tool length being shorter than the pallet, the table needs to reverse on the B-axis to perform deep hole boring. In contrast, with the NHX 8000, the maximum tool length is set to be the same as the pallet. So deep hole boring up to the maximum tool length is now possible without reversing the table. It also contributes to reducing cutting time and achieving high-precision machining.

- + Max. tool length: 800 mm [31.4 in.]
- Depending on condition, machining may not always be possible.

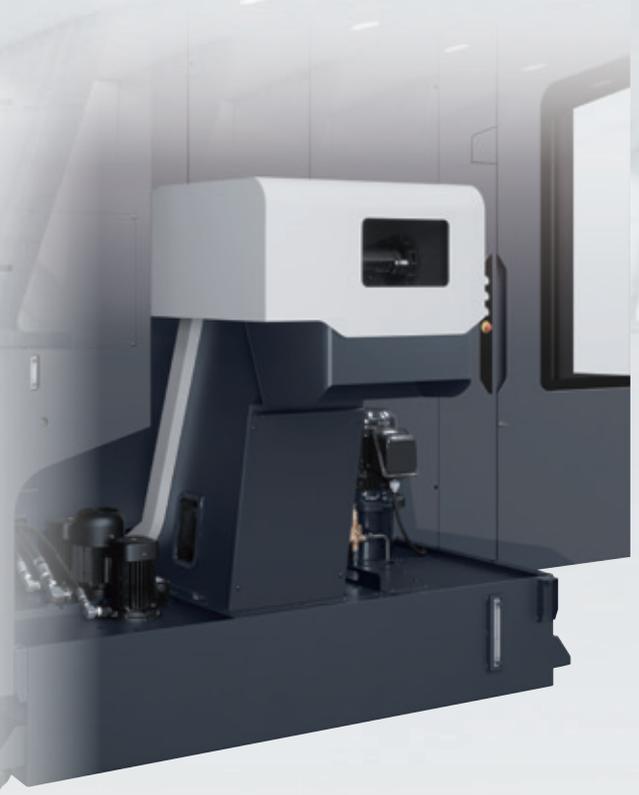


Chain-type (60 tools)

NHX 8000

# Cutting-edge Chip Disposal Solution

Chips can be one of the main causes leading to machining failure and machine stop. DMG MORI conducted an in-depth study on them by carrying out various experiments and analyses, and achieved outstanding chip disposal performance. We offer optimal chip disposal solutions according to a machining condition of each customer.



## Zero sludge coolant tank as standard

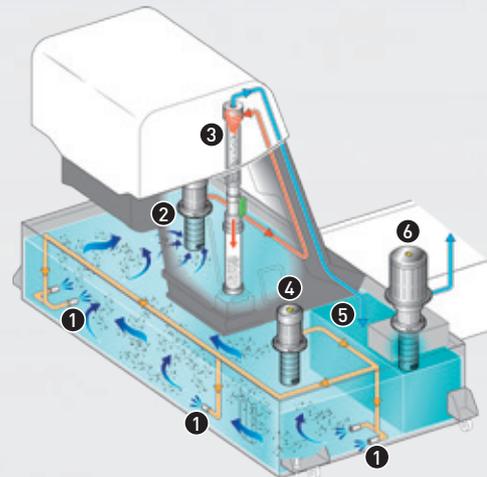
Multiple coolant nozzles are arranged to stir coolant and efficiently collect fine casting sludge with a highly accurate cyclone filter.

- + Reduce cleaning work of the coolant tank dramatically
- + Prevent clogging of pipes / coolant nozzles and pump breakage
- + Expand coolant life

- ❶ Coolant nozzle
- ❷ Inlet filter pump
- ❸ Cyclone filter
- ❹ Stirring nozzle coolant pump
- ❺ Clean coolant tank (from cyclone filter)
- ❻ Through-spindle coolant pump

• Not compatible with oil-based coolant.

Image of sludge collection



Click here to watch the video of the zero sludge coolant tank.



### Chip conveyor outside machine (rear discharge, drum filter type)

- + Regardless of shapes or materials, any types of chips including long / short chips can be transferred on one conveyor
- + Suitable for discharging various types of chips
- + Tank capacity: 1,260 L (332.6 gal.)
- + Depth of tank: 400 mm (15.7 in.)

●: Ideal ○: Suitable △: Consideration required

Workpiece material	Steel			Cast iron		Aluminum / non-ferrous metal		
Chip form								
Chip size	Long	Short	Powdery	Short	Powdery	Long	Short	Powdery
Rear discharge, drum filter type	○*1	◎	△*2	○	△*2	○*1	◎	△*2

\*1 Please consult our sales representative in the case that chips length is more than 200 mm (7.9 in.).

\*2 Depending on the size, some chips may pass through the drum filter and accumulate in the coolant tank. It is recommended to use the zero sludge coolant tank to minimize the impact on machining accuracy.

- <Chip size guidelines> Powdery: minute particles / Short: chips 50 mm (2.0 in.) or less in length, bundles of chips  $\phi$  40 mm ( $\phi$  1.6 in.) or less / Long: over 50 mm (2.0 in.)
- The options table shows the general options when using coolant. Changes may be necessary if you are not using coolant, or depending on the amount of coolant, compatibility with machines, or the specifications required.
- Be sure to select a chip conveyor that suits the shape of your chips. When using special or difficult-to-cut material (chip hardness HRC45 or higher), please consult our sales representative.
- Please consult our sales representative if dry machining or carbon machining needs to be performed.
- Chip conveyors are available in various types for handling chips of different shape and material. For details, please consult our sales representative.

### Through-spindle coolant system (option)

- + Coolant to be supplied to the tip through the holes of the spindle and tool
- + Effective for chip removal, cooling of machining points and extension of tool life

●: Applicable —: Not applicable

		Unit on coolant tank	Separate type
Discharge pressure (center through)	MPa (psi)	1.5 / 7.0 (217.5 / 1,015)	
Discharge pressure (side through)	MPa (psi)	1.5 / 7.0 (217.5 / 1,015)	
Installation space <width X depth>	mm (in.)	Not necessary	780 X 1,190 (30.7 X 46.9) <high-pressure coolant system>
Water-soluble coolant		●	●
Oil-based coolant		—	●*
Coolant filtration accuracy	$\mu$ m	40	20

\* Oil-based coolant may not be filtered appropriately depending on its viscosity. In such cases it is advisable to select the high-pressure coolant unit (special option), which uses a ceramic backwashing filter in the filtration system instead of a regular cyclone filter. For details, please consult our sales representative.

⚠ Flammable coolant such as oil-based coolant has a high risk of ignition, and will cause fire or machine breakage if ignited. If you have to use a flammable coolant for any reason, please be sure to consult our sales representative.

#### Center through

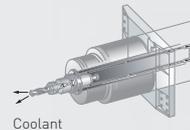


Coolant



High-pressure coolant system (unit on coolant tank)

#### Side through



Coolant



#### Shower coolant

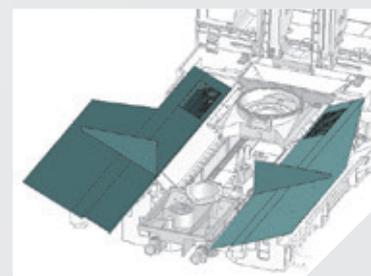
Washes chips off the machining chamber walls & allows them to flow smoothly into the center conveyor.



#### Chip disposal groove (setup station)

Chip disposal channels are also included on the setup station.

- The photo shows the machine equipped with options.



#### Slanted cover

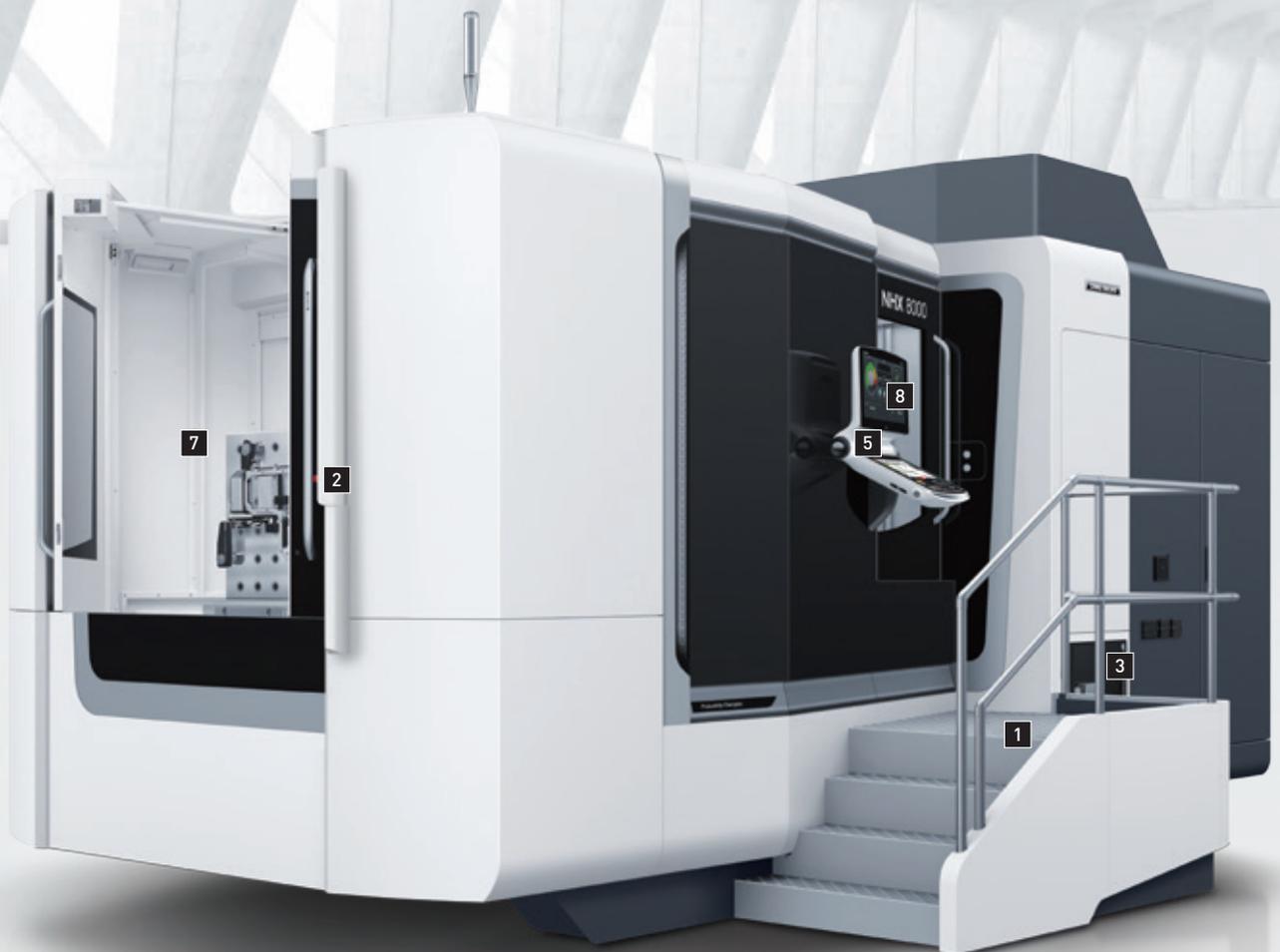
The center trough structure with greater cover inclined angle than the previous machine improves the chip disposal capacity.

NHX 8000

## Pursuit of Usability

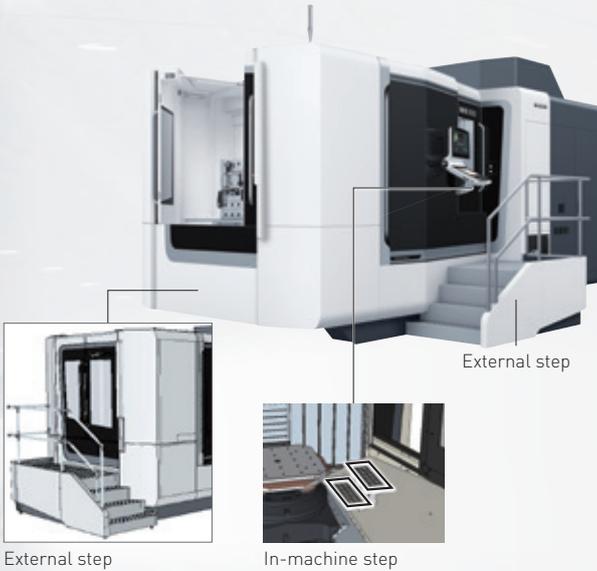
The NHX 8000 features good accessibility to the machining chamber and the setup station as well as a sophisticated cover design.

What's more, the model is equipped with various mechanical ingenuities in every part of the body such as centrally arranged hydraulic unit and other equipment for easy maintenance.



### 1 Step (option)

Steps placed inside and outside the machine allow for excellent accessibility.



### 2 Setup station button

The setup buttons are arranged at the optimal height for the operators so that they can use the machine comfortably.



\* The distance from the top face of the external steps <option> to the setup button position is 1,033 mm (40.7 in.).

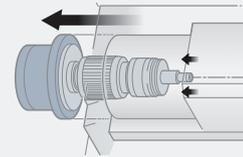
### 3 Centralized layout of devices

Peripherals requiring periodic maintenance are located in one place, which contributes to improving operators' work efficiency.



### 4 Replacement of spindle unit

By changing the spindle unit to a cartridge, which even includes the rear bearings, we have dramatically reduced replacement time.



### 5 CELOS / ERGOline Touch

Improved access to the spindle and workpieces thanks to the touch screen operation panel with a turning mechanism.

+ Swivel angle: 105°



### 6 Foot switch

The chain type magazine has a foot switch so that an operator can hold a tool with both hands during tool changes.



### 7 Setup station

The model has a good access to the table. The wide door opening and the open / close ceiling for loading / unloading of large workpieces enable operators to carry out smooth setups.



+ Distance from floor surface to pallet surface:  
1,350 mm (53.1 in.)

+ Door opening: 1,470 mm (57.9 in.)

### 8 Display of Manuals

As well as viewing operation manuals on the CELOS screen, you can perform keyword searches and jump to links in the same way as you do on a PC. This is particularly convenient when searching for information during maintenance.

CELOS: Control Efficiency Lead Operation System

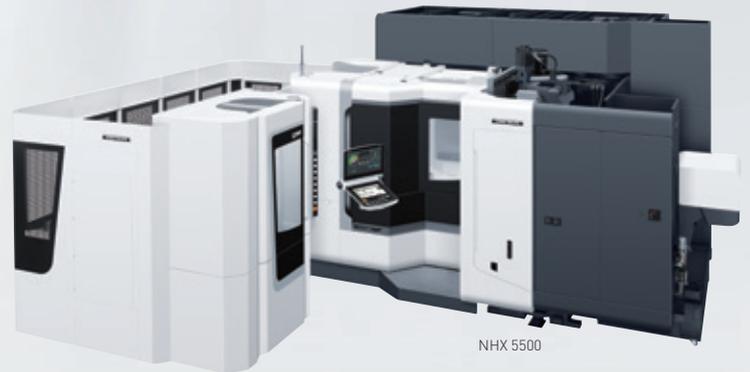
NHX 8000

# Flexible Automation Solutions

DMG MORI provides number of proven automation solutions for our customer diverse production requirements. We have installed automation systems around the world. With the advanced know-how we provide our customers with modular of fully customized solutions best suited for your floor.

## 1 CPP system (Carrier Pallet Pool System)

With its simple construction provided in predefined packages, this system is easy to introduce. For the system configuration, the customer can select from 8 packages to provide the optimum specifications for their needs.



- MCC-LPS III is available as an option.
- When the number of machines or workpiece setup stations is two or more, the MCC-LPS III is required.
- For models and systems, please consult our sales representative.

## 2 LPP system (Linear Pallet Pool System)

This system can be equipped with multi-level pallet racks, providing a high level of automation. The system construction can also be customized however you wish, achieving the optimum productivity and operation rate.



## Simple Control System

### PALLET MANAGER\*

\* MAPPS V function, available to RPP and CPP only.

#### Easy check of pallet status on CELOS



- + Displays the entire system layout in an easy-to-see manner
- + Able to check the latest pallet status and shorten setup time
- + Able to transfer pallets by drag and drop of the pallet icon on the screen

#### Tool check to prevent troubles in advance



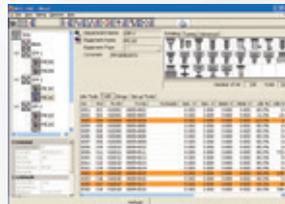
- + Automatically identifies and displays tools that are not suitable for machining by central tool management
- + Prevents machining failure and troubles caused by tool breakage
- + Improves productivity by minimizing problem-caused rework

### MCC-LPSIII (Linear Pallet Pool Control System)



- + Easy operation / management of the pallet transfer system
- + Machining programs can be managed and automatically downloaded
- + Able to flexibly change production priority in response to urgent requests

### MCC-TMS (The Tool Management System)



- + Improves the system operating rate through highly efficient, centralized tool management
- + Compatible with ID tags
- + Compatible with tool presetter interface

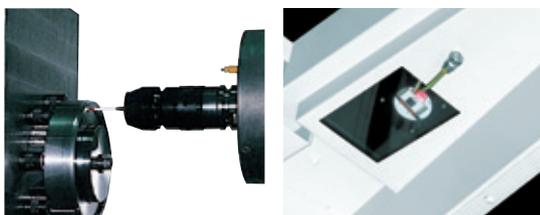
MAPPS: Mori Advanced Programming Production System  
CELOS: Control Efficiency Lead Operation System

## Automatic measurement (option)

### In-machine measuring system (spindle)\*

- + Automatic centering and automatic measurement are possible
- + The manual workpiece setter function that enables workpiece zero point setting and centering is available

#### Touch sensor (optical signal transmission type)



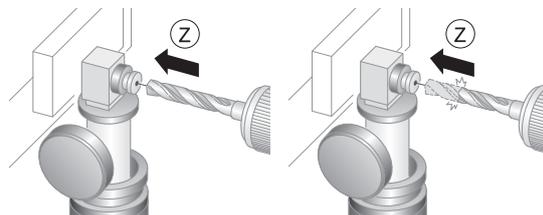
Sensor

Receiver

### In-machine measuring system (table)

- + Automatic tool length measurement and automatic breakage detection are possible
- + The manual tool setter function that enables tool length offset is available

#### Touch sensor



Tool length measurement

Tool breakage detection

\* Equipped with the spindle for which the spindle bearing uses a high wear resistance ceramic ball. So the energization type touch sensor cannot be used.



NHX 8000

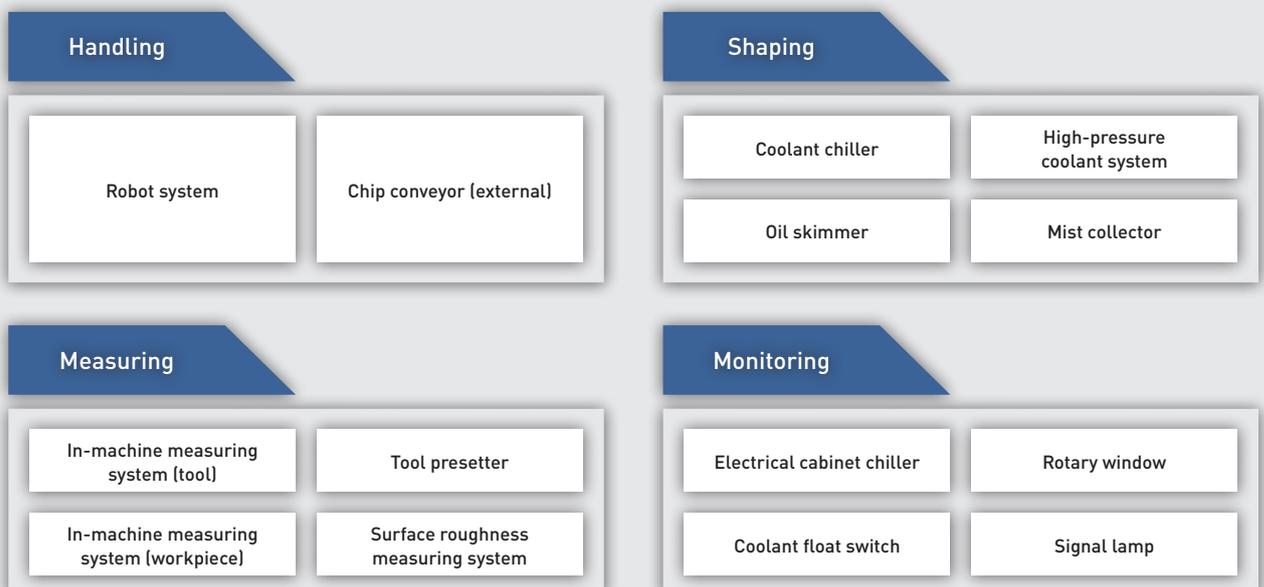
# One Stop Service for Various Needs DMG MORI Qualified Products

The DMG MORI Qualified Products (DMQP) program <option> is designed to certify peripherals that meet DMG MORI standards in quality, performance and maintainability. DMG MORI collaborates with our partners in the world and provides customers with peripherals required for their machining. We take care of the arrangement from selection to installation to support best-quality machining. DMG MORI helps customers improve productivity by offering the total solutions including quality peripherals as well as machine tools.

- + Offer peripheral equipment optimal for each customer at one stop
- + Provide support including connection and setup of machines and peripheral equipment
- + Achieve efficient connections with optimal interfaces



## Four DMQP categories



• The options above are examples. For details, please consult our sales representative.  
 DMQP: DMG MORI Qualified Products

Robot



In-machine measuring system (workpiece)



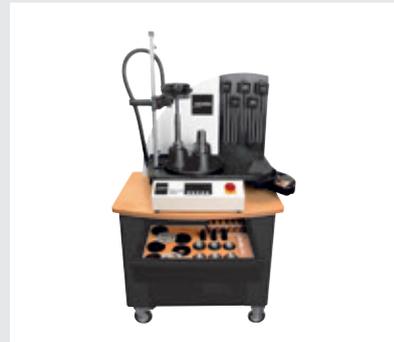
Tool presetter



Tool balance measuring system



Shrink fit system



Coolant filtration filter



Air dryer



Air compressor



Electrical cabinet chiller



Oil skimmer



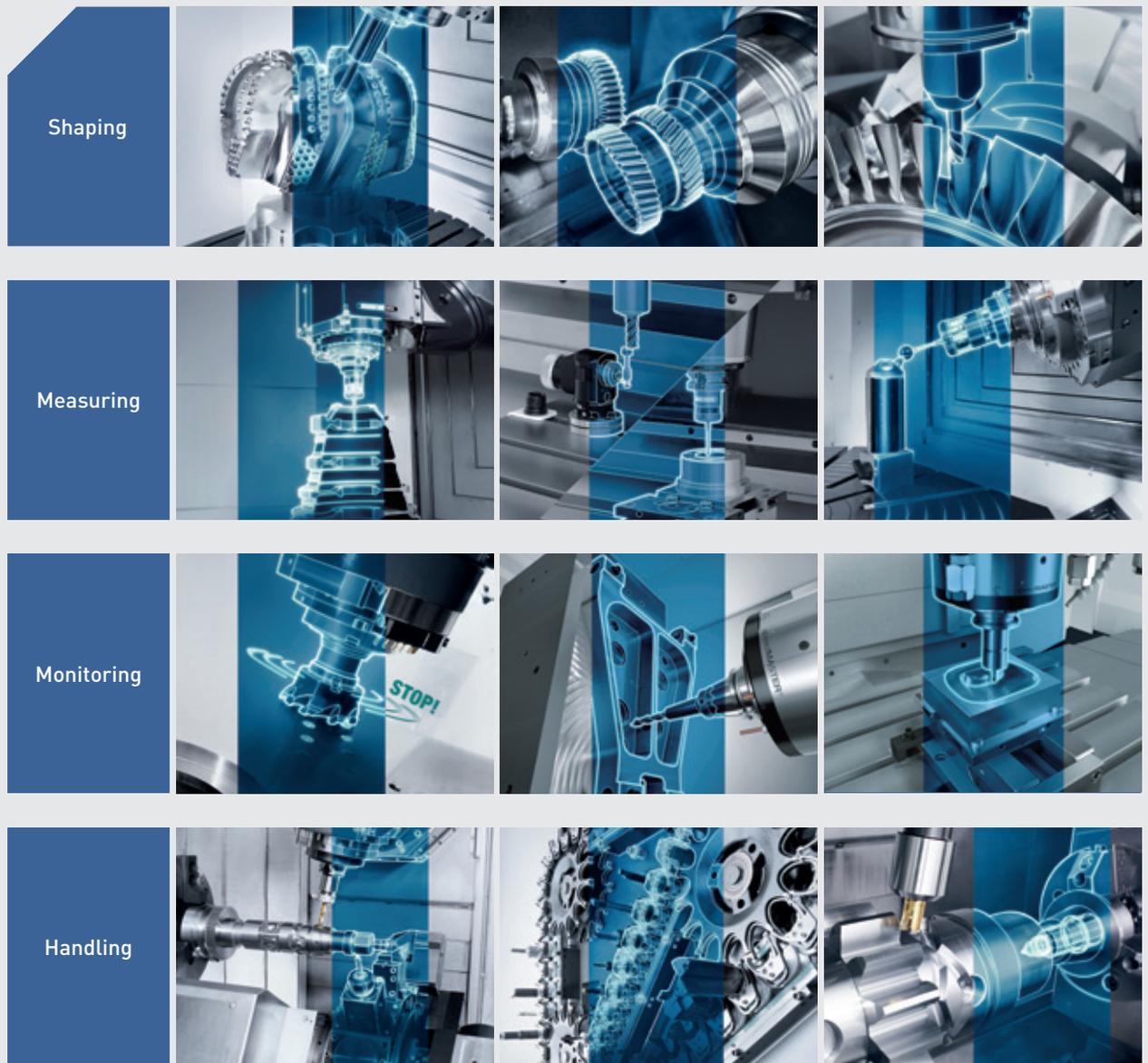
Tool



NHX 8000

# DMG MORI Technology Cycles

Technology Cycles (option) are total solutions that achieve complex machining easily in a short time. They enable every operator to easily perform high-quality machining, setups and measurement with general-purpose machine tools and standard tools / fixtures, which used to be done with specialized machines, programs and tools.



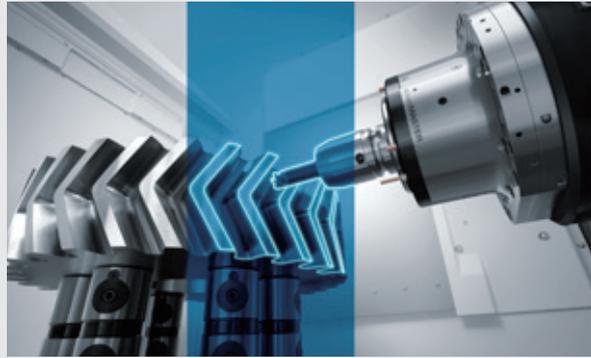
- The availability of the functions differ depending on the machine. For details, please consult our sales representative.
- The above is an image picture.

## Interpolation turning



Easy programming of interpolation turning

## DMG MORI gearMILL



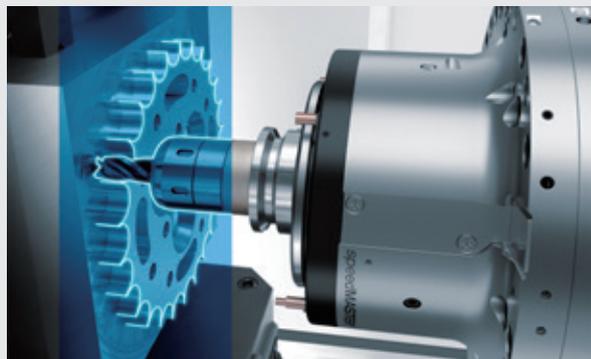
Integrating gear cutting into milling

## MVC (Machine Vibration Control)



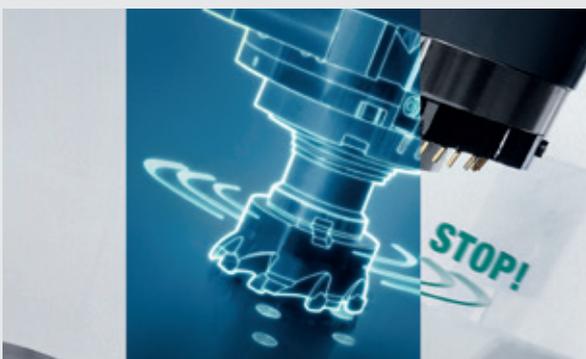
Selects optimum conditions for preventing chatter

## ATC (Application Tuning Cycle)



Easy setting of optimum feed according to the machining operation

## MPC (Machine Protection Control)



Minimizing load to the spindle when interference occurs

## Efficient Production Package (High-speed canned cycle)



Easy inputting of various machining patterns

NHX 8000

# From the Idea to the Finished Product

DMG MORI's cutting-edge operation system, CELOS, enables consistent management, documentation and visualization of orders, processes and machine data. CELOS can be extended with apps and is also compatible with your company's existing infrastructures and programs.

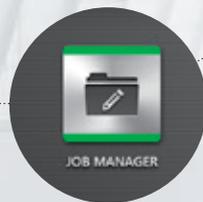
## CELOS APPs facilitate quick and easy operation: three examples »»



### JOB MANAGER

Systematic planning, administration and preparation of work orders

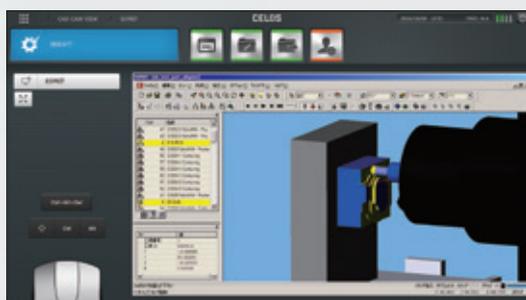
- + Machine related creation and configuration of new work orders
- + Structured storage of all production related data and documents
- + Easy visualization of job information on drawings, models, tools, fixtures, etc.



### JOB ASSISTANT

Process-defined orders

- + Menu guided set-up of the machine and conversational processing of production orders
- + Reliable error prevention thanks to windows-based assistance instructions with a mandatory acknowledgement function



### CAD-CAM VIEW

Visualize workpieces and improve program data

- + Direct remote access to external CAD / CAM workstations
- + Central master data as basis for component viewing
- + Immediate change options for machining steps, NC programs and CAM strategies, directly in the CNC system



# CELOS |

APP menu:  
Central access to all available  
applications



ERGOline operation  
panel with 21.5-inch  
multi-touch screen and  
NC unit from FANUC

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## STANDARD

Standard user interfaces for all new high  
technology machines from DMG MORI

## CONSISTENT

Consistent administration, documentation and  
visualization of order, process and machine  
data

## COMPATIBLE

Compatible with PPS and ERP systems  
Can be networked with CAD / CAM products  
Open to trendsetting CELOS APP extensions

PPS: Production Planning and Scheduling System  
ERP: Enterprise Resource Planning

NHX 8000

# Revolutionary Productivity with Cutting-edge Technology DMG MORI's Connected Industries

By making full use of cutting-edge technology, DMG MORI realizes its Connected Industries\* to help improve your productivity and profitability significantly. Our Connected Industries is structured in three layers. Centering around the cutting-edge operation system "CELOS," our Connected Industries networks not just individual machines but also production systems and the entire plant. This network will help clearly define your problems, offering the best and customized solutions.

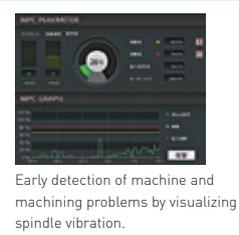
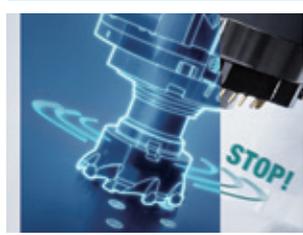
\* An industrial society in which new added value will be created through connected humans, machines, and technologies – A new vision for the future of Japanese industries that the Ministry of Economy, Trade and Industry advocates.



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## MPC (Machine Protection Control)



- + Minimizing the effect on the machine by stopping the spindle within 0.01 seconds after vibration of a certain level or higher is detected
- + Learning tool-dependent machining vibration in advance to compare the data with the actual value and to determine abnormal vibration at the time of mass-production
- + Diagnosing the spindle bearing status for preventive maintenance

## MVC (Machine Vibration Control)



- + Automatically calculating the optimal cutting conditions to control chatter by detecting it with the sensor mounted on the spindle
- + No advanced skill necessary due to easy operation with a button
- + Capable of reflecting the automatically calculated optimal cutting conditions in the NC program right away

Easy operation just by pressing the button for no-chatter condition (left and right) for the current machining (center).

## CELOS Machine Extremely easy-to-use machine

- + This machine is loaded with the cutting-edge operation system CELOS, offering various applications useful for your machining
- + By accumulating machining know-how on the CELOS, all operators are able to make products at the same level of quality
- + Productivity will be improved by streamlining time-consuming and burdensome setups to reduce the operator's workloads
- + Complex machining, which used to require dedicated machines and technical knowledge, is made simpler and faster with Technology Cycles
- + The use of AI prevents the occurrence of machine problems

\* The information needed to machine a workpiece (setups, tools, programs, etc.)



### JOB MANAGER

Job\* preparation /  
process planning

### JOB SCHEDULER

Machining  
preparation

### JOB ASSISTANT

Machining /  
checking



## CELOS Manufacturing Connected production processes

- + A CELOS application called "MESSENGER" connects machines in your plant, visualizing the status of machine operation
- + The causes of machine stops will be identified easily, contributing to improved machine operation rates
- + CELOS applications can be upgraded to their latest versions through CELOS Club, allowing for smooth IoT deployment
- + The machine's operational status can be monitored through smartphones and tablets even from outside your plant



## Digital Factory Digitization accelerates connected plants

- + Your plant can be connected to external business partners by the utilization of IoT, significantly streamlining the flow of your entire production system
- + CELOS Club can maximize the ability of CELOS
- + ADAMOS\* offers an open platform for IoT

\* Please consult our sales representative for more detailed information, including the service start time in your country.

CELOS: Control Efficiency Lead Operation System



## CELOS Club



### Continuously supporting your productivity improvements

- + Latest functions always available through version upgrades
- + Centralized machine management and streamlined programming
- + Maximizing operating time
- + CELOS Club Platinum (option)

● Japan only.

MAPPs: Mori Advanced Programming Production System

## WERKBLiQ



### Productivity improvements through cutting-edge machine maintenance services

- + Streamlined maintenance work based on digitized plant equipment information
- + Minimizing down time by promptly identifying the cause of machine stop
- + The integrated management of maintenance procedures and standards eliminates dependency on individual operator skills

● Please consult our sales representative for more detailed information, including the release time in your country.

NHX 8000

# High-Performance Operation System MAPPS V

MAPPS V is a high-performance, smart operation system mounted on CELOS. It enables operators to easily control machine operation with touch operation.



The 6-window display provides access to a variety of information at the same time >>>

The screen combinations can be freely customized >>>

MAPPS: Mori Advanced Programming Production System  
 CELOS: Control Efficiency Lead Operation System



### Lower Touch Panel Screen Layout

- ① Individual function operation area : Displays function buttons at all times regardless of the operation mode.
- ② Operation mode selection area : Displays mode selection buttons at all times.
- ③ Status display area : Displays the override status.
- ④ Machine operation area : Displays buttons related to spindle / turret operation and optional functions over multiple pages.
- ⑤ Mode-by-mode operation area : Displays buttons related to axis feed, zero return or automatic operation over multiple pages. The available buttons will change depending on the mode selected.
- ⑥ In-machine display area : Displays the machine model view.

NHX 8000

# Unique Energy-saving Function GREENmode



DMG MORI has developed the energy-saving function "GREENmode" to accomplish sustainable development goals (SDGs).

SDGs: Sustainable Development Goals

The machine's power consumption is reduced by cutting unnecessary standby power and using efficient machining programs to shorten machining time.

- + Improve cutting conditions to reduce machining time by bringing the best out of machine tools and tools
- + Reduce unnecessary power consumption during stand-by time by shutting off power of the spindle, chip conveyor and coolant pump at a time of machine stop
- + Visualize power consumption and CO<sub>2</sub> emission amount

## GREENmode

### GREEN monitoring

- + Visualize power consumption and CO<sub>2</sub> emission amount on the CELOS operation screen



### GREEN device

- + High-brightness LED light

### GREEN idle reduction

- + Shut off the power of the servo motor, spindle and coolant pump at a time of machine stop
- + Turn off the operation panel screen when a machine is not in operation for a certain time

### GREEN control

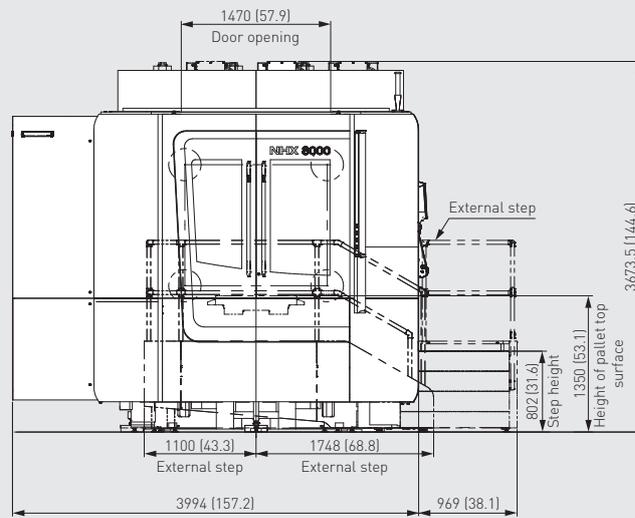
- + Reduce machining power by energy-saving pecking cycles
- + Quicken standard M codes
- + Simultaneous acceleration / deceleration of the spindle and feed axes
- + Inverter-controlled coolant supply

NHX 8000

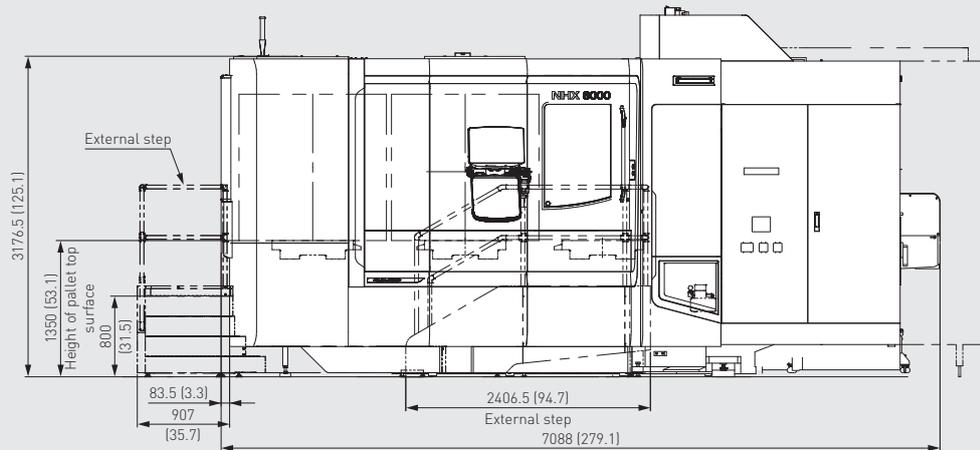
# Machine Size

mm (in.)

Front view



Side view



# Machine Specifications

			NHX 8000
<b>Travel</b>			
X-axis travel <longitudinal movement of saddle>	mm (in.)		1,400 (55.1)
Y-axis travel <vertical movement of spindle head>	mm (in.)		1,200 (47.2)
Z-axis travel <cross movement of pallet>	mm (in.)		1,350 (53.1)
Distance from pallet center to spindle gauge plane	mm (in.)		100—1,450 (3.9—57.1)
<b>Pallet</b>			
Pallet working surface	mm (in.)		800 × 800 (31.5 × 31.5)
Pallet loading capacity	kg (lb.)		2,200 (4,840), 3,000 (6,600)
Max. workpiece swing diameter	mm (in.)		1,450 (57.0)
Max. workpiece height	mm (in.)		1,450 (57.0)
Pallet indexing time	s		3.2, 1.8 <full 4th axis rotary table>*1 <90°> 3.7, 2.3 <full 4th axis rotary table>*1 <180°>
<b>Spindle</b>			
Max. spindle speed	min <sup>-1</sup>		12,000 16,000 <high speed> 8,000 <high torque>
<b>Feedrate</b>			
Rapid traverse rate	mm/min (ipm)		X, Z: 50,000 (1,968.5) Y: 50,000 (1,968.5), 40,000 (1,574.8) <8,000 min <sup>-1</sup> >
Cutting feedrate	mm/min (ipm)		X, Y, Z: 1—50,000 (0.04—1,968.5) <look-ahead control>
<b>ATC</b>			
Type of tool shank			BT50*2, DIN50*2, CAT50*2, HSK-A100
Tool storage capacity <including one tool at the spindle side>			Chain-type: 60, 100, 120 Rack-type*3: 180, 240, 330
Max. tool diameter <with adjacent tools>	mm (in.)		110 (4.3)
Max. tool diameter <without adjacent tools>	mm (in.)		320 (12.5)
Max. tool length	mm (in.)		800 (31.4)
Max. tool mass	kg (lb.)		30 (66)
Tool changing time	Tool-to-tool	s	1.9
	Cut-to-cut (Chip-to-chip)	MAS s	5.0
	<60-tool specifications>	ISO 10791-9 JIS B6336-9 s	16.6 / 5.0 <max. / min.>

ISO: International Organization for Standardization JIS: Japanese Industrial Standard

\*1 Including clamping and unclamping time

\*2 When the two-face contact specification is selected, a two-face contact tool and other tools cannot be used together.

\*3 With rack type 180-, 240- or 330-tool magazines, the number of tools with a diameter of 110 mm (4.3 in.) or greater that can be stored in the magazine is restricted. Up to nine of the tools with the maximum permissible diameter of 320 mm (12.5 in.) can be stored.

● Max. spindle speed: depending on restrictions imposed by the workpiece clamping device, fixture and tool used, it may not be possible to rotate at the maximum spindle speed.

● Please use a two-face contact tool when cutting at higher than 10,000 min<sup>-1</sup>.

● Max. tool diameter: the maximum tool diameter is limited to 230 mm (9.0 in.) or less when using the spindle at 10,000 min<sup>-1</sup> or higher.

● Tool changing time: the time differences are caused by the different conditions (travel distances, etc.) for each standard.

● For details, please check the Detailed Specifications.

● The information in this catalog is valid as of August 2019.

NHX 8000

# Machine Specifications

			NHX 8000
<b>APC</b>			
Number of pallets			2
Pallet changing time		s	16*4
<b>Motor</b>			
Spindle drive motor	12,000 min <sup>-1</sup>	kW (HP)	55 / 30 [75 / 40] <15%ED / cont>
	16,000 min <sup>-1</sup> <high speed>	kW (HP)	37 / 26 [50 / 34.7] <25%ED / cont>
	8,000 min <sup>-1</sup> <high torque>	kW (HP)	55 / 45 [75 / 60] <25%ED / cont>
<b>Machine size</b>			
Machine height <from floor> {60-tool specifications}		mm (in.)	3,674 [144.6]
Floor space <width × depth> {60-tool specifications}		mm (in.)	3,994 × 7,088 [157.2 × 279.1]
Mass of machine {60-tool specifications}		kg (lb.)	26,800 [58,960]
<b>Control unit</b>			
FANUC			F31iB

\*4 When equipped with the auto-coupler, time taken to shut off / supply hydraulic pressure to the fixture is not included.

- For details, please check the Detailed Specifications.
- The information in this catalog is valid as of August 2019.

NHX 8000

# Standard & Optional Features

● : Standard features  
○ : Options

Spindle		
Type of tool shank	BT50	●
	CAT50	○
	DIN50	○
	HSK-A100	○
12,000 min <sup>-1</sup> : 55 / 30 kW (75 / 40 HP) <15%ED / cont>		●
16,000 min <sup>-1</sup> : 37 / 26 kW (50 / 34.7 HP) <25%ED / cont> {high speed}		○
8,000 min <sup>-1</sup> : 55 / 45 kW (75 / 60 HP) <25%ED / cont> {high torque}		○
Magazine		
Tool storage capacity	60 tools (chain-type) *1	●
	100 tools (chain-type) *1	○
	120 tools (chain-type) *1	○
	180 tools (rack-type) *2	○
	240 tools (rack-type) *2	○
	330 tools (rack-type) *2	○
Coolant		
Coolant system		●
Shower coolant		●
Coolant gun	Machining side	○
	Setup station	○
	Setup station + machining side	○
Through-spindle coolant system (unit on coolant tank) center through	1.5 MPa (217.5 psi)	○*3
	7.0 MPa (1,015 psi)	○*3
Through-spindle coolant system (separate type)	Interface	○
	1.5 MPa (217.5 psi)	○*3
Through-spindle coolant system (unit on coolant tank) side through	7.0 MPa (1,015 psi)	○*3
	Optional when using water-soluble coolant	○*3
Coolant chiller (separate type)	Essential when using oil-based coolant (please be sure to consult our sales representative)	○*3
	Coolant chiller (through-spindle coolant system)	○*3
Mist collector HVS-300	Including stand*4	○*3
	Interface <duct ø 200 mm (ø 7.9 in.) + electric parts only>	○
Mist collector AFS-1600*5	Including stand	○*3
	Interface <duct ø 200 mm (ø 7.9 in.) + electric parts only>	○

\*1 Chain-type magazines (60-, 100-, or 120-tool capacity) incorporate a pot tilting mechanism and the tool capacity includes one tool at the spindle side.  
 \*2 Rack-type magazines (180-, 240- or 330-tool capacity) incorporate a pot transfer mechanism and the tool capacity includes one tool at the spindle side.  
 \*3 DMQP [DMG MORI Qualified Products]  
 \*4 Cannot be used in Europe.  
 \*5 Not compatible with oil-based coolant. If using oil-based coolant, select the HVS-300.  
 ● Please use a two-face contact tool when cutting at higher than 10,000 min<sup>-1</sup>.  
 ● DMQP: Please see Page 22 for details.  
 ● For details, please check the Detailed Specifications.  
 ● The information in this catalog is valid as of August 2019.  
 ● Specifications, accessories, safety device and function are available upon request.  
 ● Some options are not available in particular regions. For details, please consult our sales representative.

⚠ Flammable coolant such as oil-based coolant has a high risk of ignition, and will cause fire or machine breakage if ignited. If you have to use a flammable coolant for any reason, please be sure to consult our sales representative.

NHX 8000

# Standard & Optional Features

●: Standard features

○: Options

Chip disposal			
Chip conveyor	Rear discharge, drum filter type		●
Zero sludge coolant tank			●
Measurement			
In-machine measuring system (table)* <sup>6</sup>	Touch sensor	(M)	○
	Touch sensor	(R)	○
	Touch sensor + tool setter function (tool length + diameter)	(M)	○
	Touch sensor + tool setter function (tool length + diameter)	(R)	○
In-machine measuring system (spindle)* <sup>6</sup> * <sup>7</sup>	Touch sensor (optical signal transmission type)	(R)	○
	Touch sensor (optical signal transmission type) + workpiece setter function	(R)	○
Improved accuracy			
Oil chiller			●
Automation			
Manual pulse generator (separate type)			●
Other			
Signal lamp	4 colors (LED type: red, yellow, green, blue)		○

\*<sup>6</sup> The specifications vary depending on the manufacturers. (M: made by Magnescale R: made by RENISHAW)\*<sup>7</sup> Equipped with the spindle for which the spindle bearing uses a high wear resistance ceramic ball. So the energization type touch sensor cannot be used.

- For details, please check the Detailed Specifications.
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#### <Precautions for Machine Relocation>

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This product is deemed regulated cargo when exported under the Japanese government's Foreign Exchange and Foreign Control Trade Law. Government authorization is required when exporting this product. The product shipped to you (the machine and accessory equipment) has been manufactured in accordance with the laws and standards that prevail in the relevant country or region. If it is exported, sold, or relocated to a destination in a country with different laws or standards, it may be subject to export restrictions of that country.

This product detects machine relocation. Once the machine is relocated, it is not operable unless its legitimate relocation is confirmed by DMG MORI or its distributor representative. If the restart of the machine can result in unauthorized export of cargo or technology or will violate legitimate export controls, DMG MORI and its distributor representative can refuse to restart the machine. In that case, DMG MORI and its distributor representative do not assume any loss due to the inability to operate the machine or any liability during the warranty period.

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+ DCG, DDM, ORC, speedMASTER, powerMASTER, 5X-torqueMASTER, ZEROCHIP, CELOS, ERGOline, SLIMline, COMPACTline, DMG MORI SMARTkey, DMG MORI gearMILL and 3D quickSET are trademarks or registered trademarks of DMG MORI CO., LTD. in Japan, the USA and other countries.

- + If you have any questions regarding the content, please consult our sales representative.
- + The information in this catalog is valid as of September 2019. Designs and specifications are subject to changes without notice.
- + The machines shown in the catalog may differ from the actual machines. The location and the size of the nameplates may also differ from the actual machines, or the nameplates may not be attached to some machines.
- + DMG MORI is not responsible for differences between the information in the catalog and the actual machine.

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