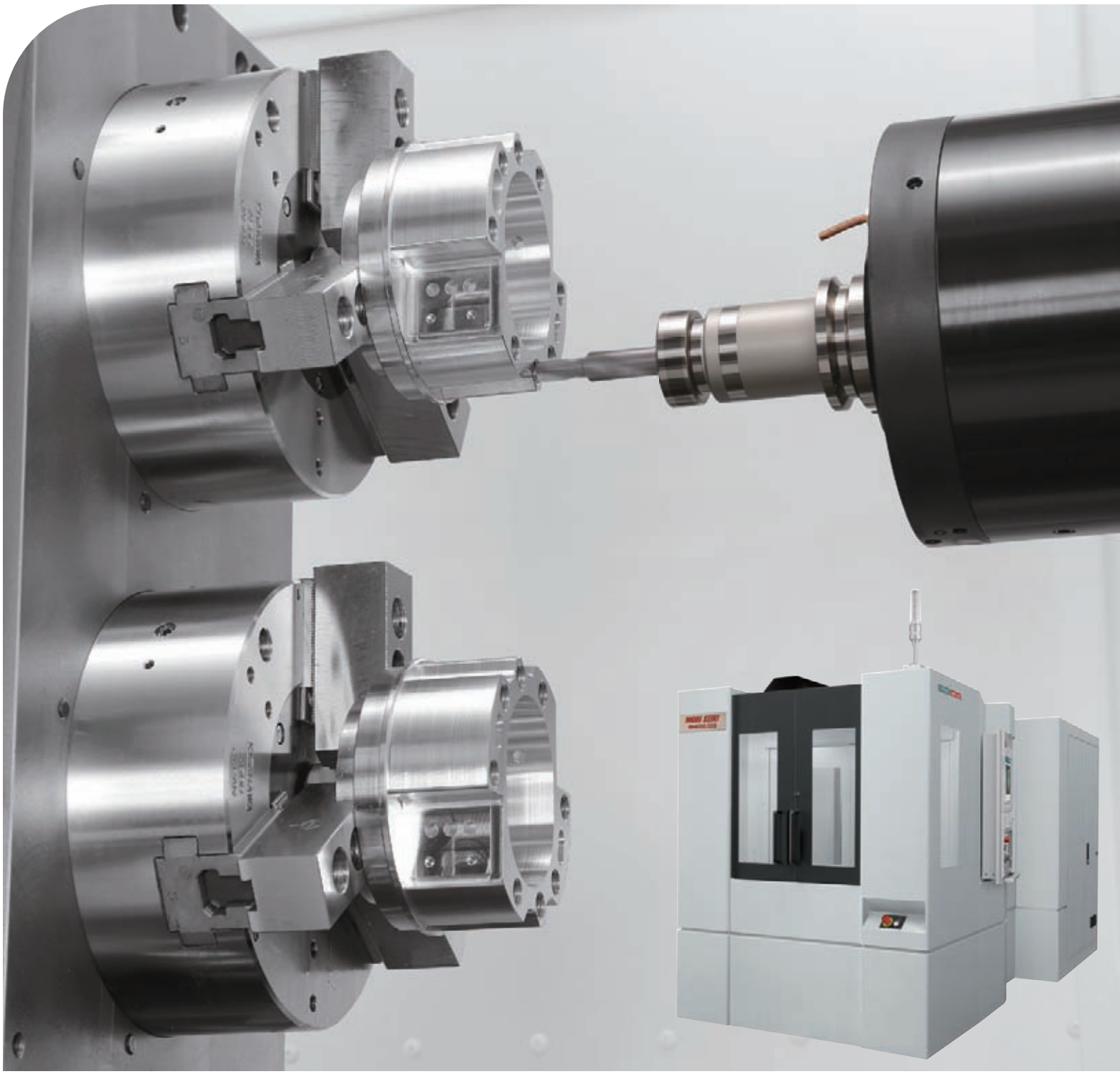
www.dmgmori.com

DMG MORI

High-Precision Horizontal Machining Center

NH4000 DCG

NH4000 DCG
NH4000 DCG HSC

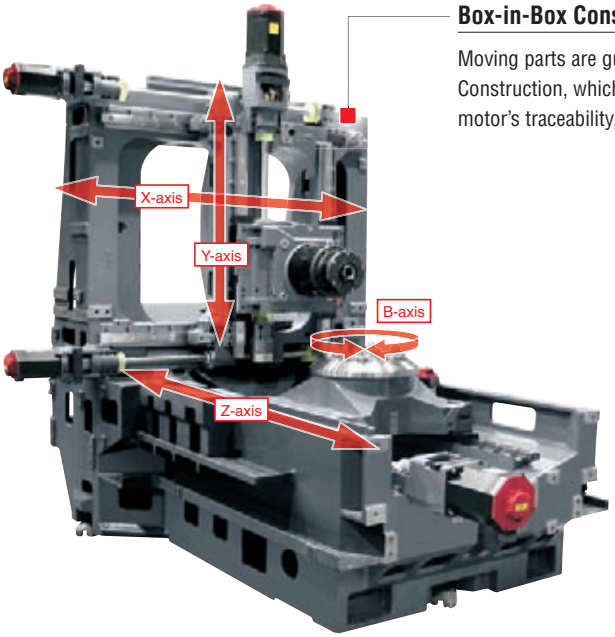


Presenting the ideal machining center.

The NH4000 DCG uses original technologies including the DCG (Driven at the Center of Gravity) for vibration control, and an optional DDM (Direct Drive Motor) for high speed on the rotary axes in addition to the Box-in-Box construction for excellent balance.
It achieves the fastest speed among machines with 400 mm (15.7 in.) square pallets.
It is a high-performance machine incorporating all the features demanded of a horizontal machining center, including high speed, high precision, chip disposal and ease of maintenance, while achieving both a space saving design and a large work envelope.

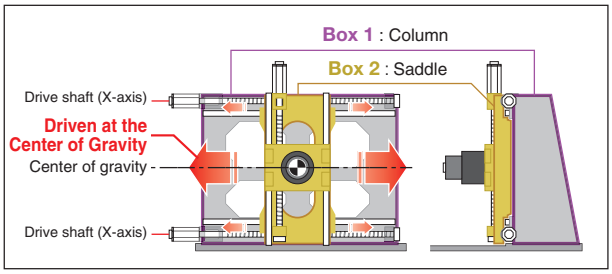
Principal mechanisms

Basic structure



Box-in-Box Construction

Moving parts are guided and driven with perfect balance at their center of gravity by the "Box-in-Box" Construction, which supports the saddle at both ends. At the same time, we have improved the servo motor's traceability, allowing higher speed and greater acceleration than ever before.



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)

Max. acceleration

Standard specifications

X-axis 0.6 G {6.0 m/s^2 (19.7 ft/s^2)}
Y-axis 0.9 G {8.3 m/s^2 (27.2 ft/s^2)}
Z-axis 0.6 G {6.3 m/s^2 (20.7 ft/s^2)}

High-acceleration specifications OP

X-axis 1.1 G {10.8 m/s^2 (35.4 ft/s^2)}
Y-axis 1.2 G {11.7 m/s^2 (38.4 ft/s^2)}
Z-axis 1.1 G {10.4 m/s^2 (34.1 ft/s^2)}

Driven at the Center of Gravity

DCG® Driven at the Center of Gravity

Original technology

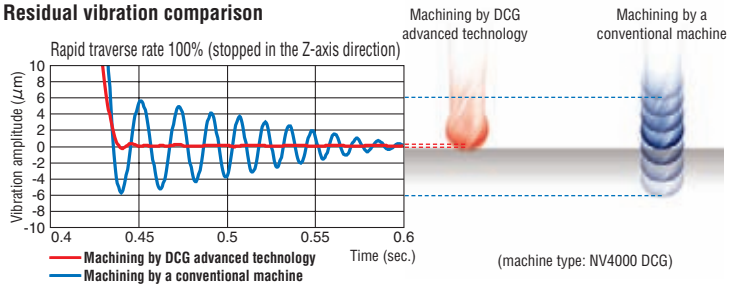
The 24th Technology Development Award from the Japan Society for Precision Engineering

Our DCG (Driven at the Center of Gravity) technology controls vibration, which is one of the main enemies of high speed and high precision, by driving structural parts at their center of gravity.

Vibration Controlled

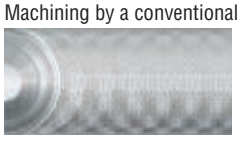
For positioning, machines with DCG virtually eliminate vibration, while machines without DCG continue to vibrate for a long time. DCG controls the rotational vibration which appears at every acceleration start point, and which is proportional to the distance between the drive point and the center of gravity. This prevents deterioration of the quality of the machined surface.

Residual vibration comparison



Machining by DCG advanced technology

Machining by a conventional machine

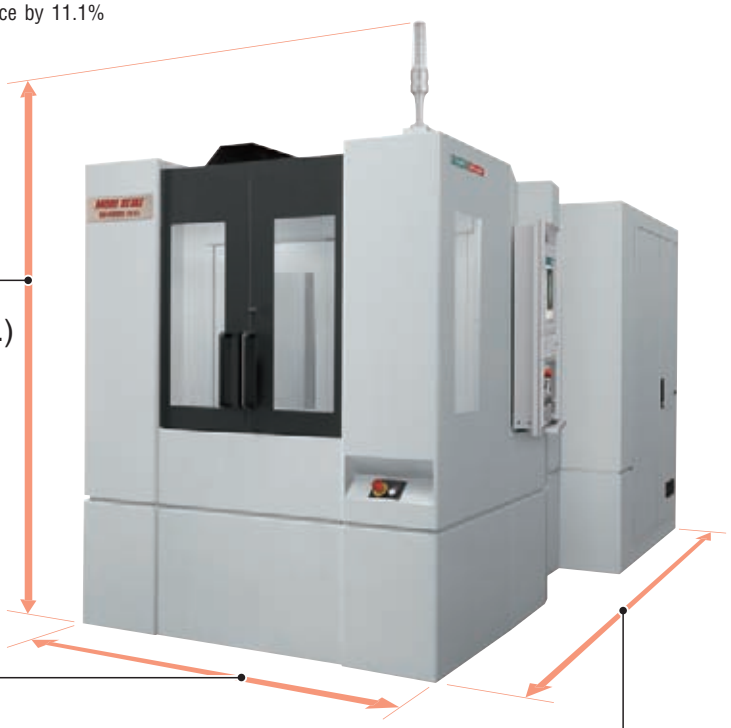


■ Features of DCG

- Improved surface quality
- Improved roundness
- Outstanding acceleration
- Longer tool life

Space-saving design

Offering both space-saving design and a large work envelope, reducing the required floor space by 11.1% compared to existing machines.



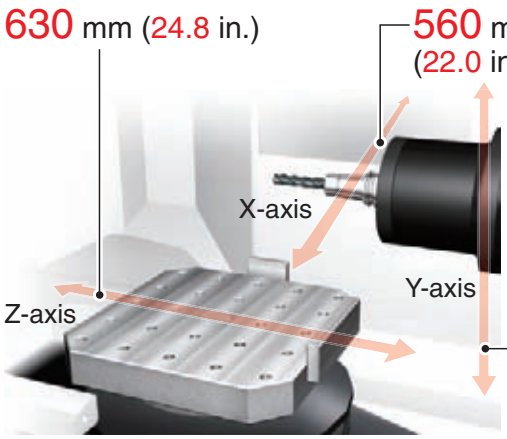
Machine height

2,711 mm (106.7 in.)

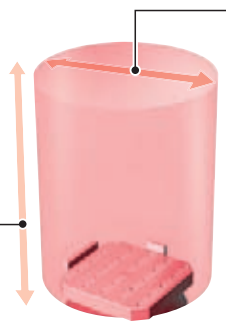
Machine width×Machine depth

2,360×3,914 mm
(92.9×154.1 in.)

Travel <X, Y and Z axes>



Working area



Max. workpiece swing diameter

630 mm (24.8 in.)

560 mm (22.0 in.) OP
<3-station turn-type APC>

Max. workpiece height

900 mm (35.4 in.)

800 mm (31.4 in.) OP
<3-station turn-type APC>

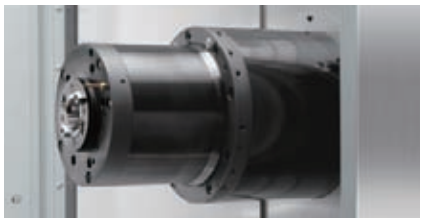
Pallet loading capacity

2-station turn-type APC: 400 kg (880 lb.)

3-station turn-type APC: 300 kg (660 lb.) OP

Principal mechanisms

Spindle



For the spindle drive, we use the high-efficiency DDS (Direct Drive Spindle) motor which extracts full power over a wide range, from high-speed machining to heavy-duty cutting. This machine handles all types of materials from steel to aluminum and other non-ferrous metals.

Max. spindle speed

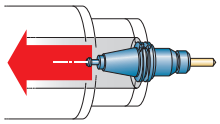
NH4000 DCG
14,000 min^{-1}
14,000 min^{-1} OP <High output>

NH4000 DCG HSC
20,000 min^{-1}

Tool clamp power

Improved 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-precision machining.



12,000 N
(2,697.6 lbf)

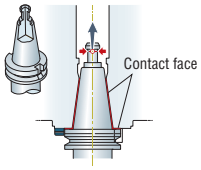
Machine type	Spindle acceleration time	Spindle deceleration time
NH4000 DCG	1.43 sec. (0→14,000 min^{-1})	1.35 sec. (14,000 min^{-1}→0)
NH4000 DCG <High output> OP	2.01 sec. (0→14,000 min^{-1})	1.73 sec. (14,000 min^{-1}→0)
NH4000 DCG HSC	2.64 sec. (0→20,000 min^{-1})	2.42 sec. (20,000 min^{-1}→0)

● Please use a two-face contact tool when cutting at 15,000 min^{-1} or higher.

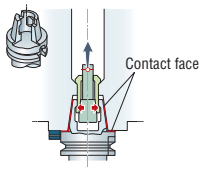
Two-face contact specification OP

Tool rigidity has been improved by contact of both the spindle taper and the tool flange. This extends the useful life of a tool, raises cutting power and improves the machining precision.

BT specifications



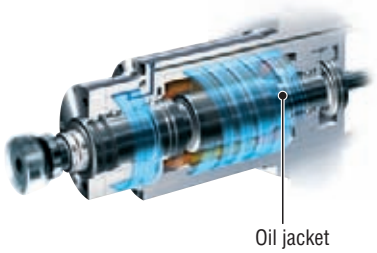
HSK specifications



● All DMG MORI SEIKI spindles are made in-house to better meet our customer needs. For details, please consult with our sales representative.
● When the two-face contact specification is selected, a two-face contact tool and other tools cannot be used together.

Spindle cooling

Stator coil in DDS motor: the coolant supplied by the oil cooler minimizes heat diffusion by circulating through an oil jacket, which is placed around the stator coil.



Tool, Boring

The maximum tool length is the same as the pallet size. Deep hole boring up to the maximum tool length can be done without turning the table around, reducing cutting time and achieving high-precision machining.

Max. tool length

400 mm (15.7 in.)

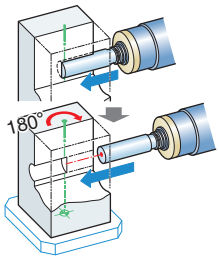
Pallet working surface

400×400 mm
(15.7×15.7 in.)

Boring

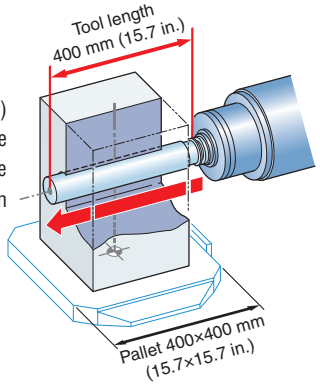
Previous model

Concentric drilling can be done on both sides by flipping the table.



NH4000 DCG

Boring up to 400 mm (15.7 in.) can be done without turning the B-axis, reducing cutting time and achieving high-precision machining.



● Depending on condition, machining may not always be possible.

HSC: High Speed Cutting

Table

A one-degree indexing table is standard, and a full indexing table equipped with DDM is available as an option. These have significant advantages for machining of workpieces that require high speed and high positioning accuracy.

Selection of tables

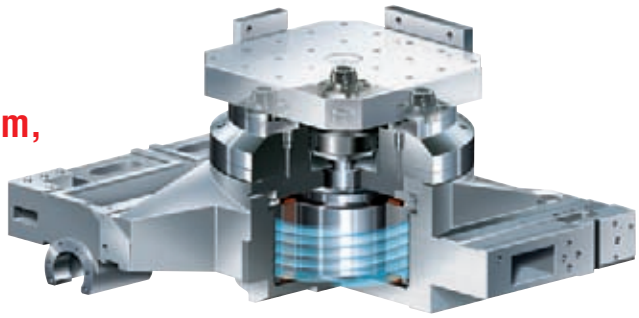
Table type	1° indexing table	Full 4th axis rotary table OP DDM®
Minimum pallet indexing angle	1°	0.001°
Pallet indexing time (90°) <including clamping and unclamping time>	1.54 sec.	0.72 sec.

Direct Drive Motor OP

DDM® Direct Drive Motor **Original technology**

The world's fastest rotary axis drive system, which achieves zero backlash.

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.



Features of DDM

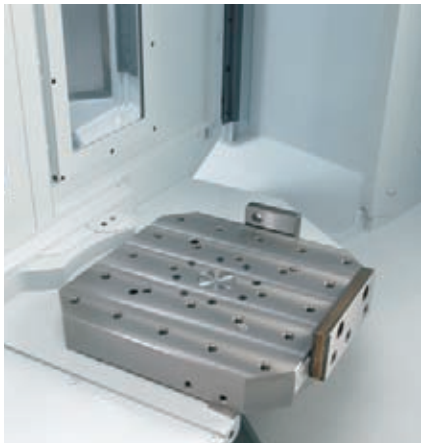
- High-speed rotation
- High-precision indexing
- Less maintenance
- Longer product life

B-axis Max. rotational speed

Previous model (worm gear system) 22 min^{-1} ▶ **NH4000 DCG** (DDM) 100 min^{-1}

Approximately 4.5 times faster

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

6 sec.

Principal mechanisms

ATC

The tool clamp mechanism has been simplified, improving ATC reliability.

Tool changing time

Cut-to-cut (chip-to-chip)

40 tools	60 tools OP	120 tools OP	180 tools OP	240 tools OP
8.7 sec. (max.)	11.4 sec. (max.)	19.7 sec. (max.)	15.8 sec. (max.)	15.8 sec. (max.)
2.8 sec. (min.)	2.8 sec. (min.)	2.8 sec. (min.)	2.8 sec. (min.)	2.8 sec. (min.)

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

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

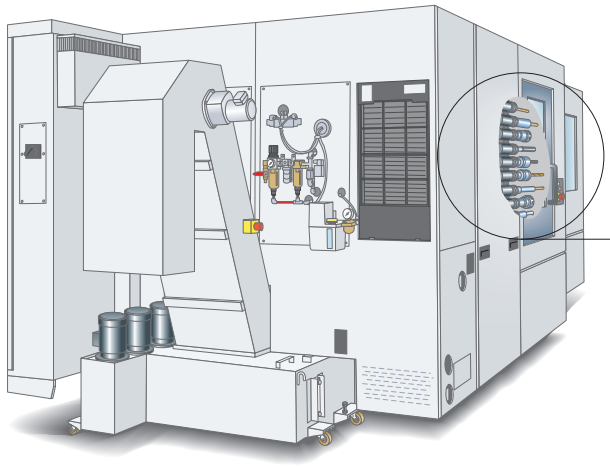
Cut-to-cut (chip-to-chip)

2.8 sec. <MAS>

Tool-to-tool

0.9 sec.

Magazine



We prepared two types of magazine: a chain type and a rack type. Customers can choose either a chain type or rack type to suit their production needs.

Tool storage capacity

Chain-type magazine (attached to the machine)

40 tools 60 tools OP

Chain-type magazine (separate type)

120 tools OP

Rack-type magazine (separate type) OP

180 tools OP
240 tools OP
300 tools OP
360 tools OP

● Magazines incorporate a pot transfer mechanism and the tool capacity includes one tool at the spindle side.

Max. tool length	Max. tool mass	Max. tool diameter
400 mm (15.7 in.)	8 kg (17.6 lb.)	70 mm (2.7 in.) <with adjacent tools> 140 mm (5.5 in.) <without adjacent tools>

High-precision equipment

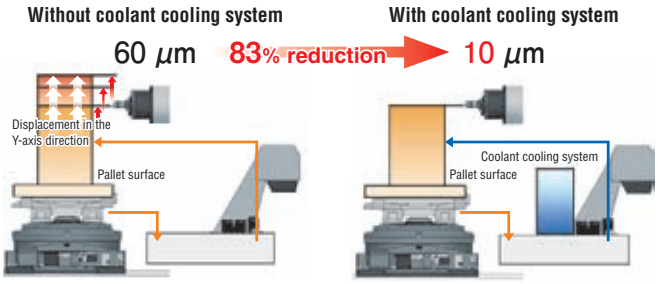
Coolant cooling system (separate type) OP

Increase in the oil temperature, which is caused by heat generation during machining or by coolant circulation, causes thermal displacement in the fixtures and workpiece, affecting the dimensional accuracy of the workpiece. Please use this unit to prevent the coolant from heating. For the machining described below, this unit must be selected.

- **Machining with required accuracy of less than 20 μm**
- **High-precision machining that requires a large amount of high-pressure coolant**
- **Machining that requires oil-based coolant**

<Thermal displacement of the Y-axis tombstone>

As an example, when a coolant cooling system is used, thermal displacement in the Y-axis plus direction decreases by 83% to 10 μm.



● While this unit is not the only way to completely control the temperature of the coolant, it makes a major contribution to preventing increases in the oil temperature.

Direct scale feedback OP

The absolute magnetic linear scale (full closed-loop control) made by Magnescale is effective for high-precision positioning, and is available as an option.

Resolution
0.01 μm

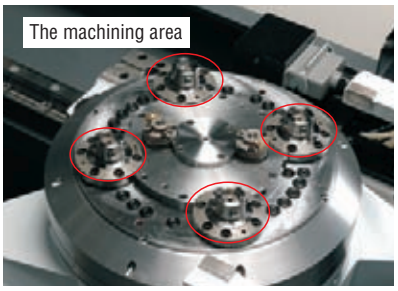
Magnescale

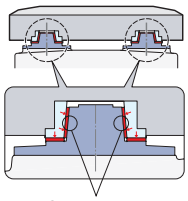
High accuracy absolute scale SR87

- High accuracy, high resolution
- Greater accuracy than optical scale
- Highly resistant to condensation and oil
- Vibration and impact resistant characteristics

Pallet clamp system

The dual contact taper cone pallet stabilizes the pallet with its powerful clamping force, and improves the repeatability.

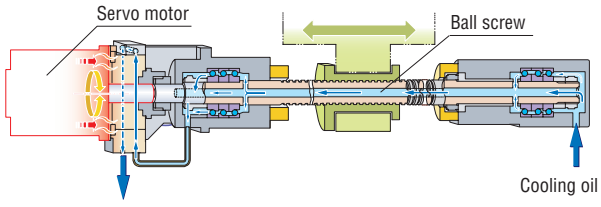




● Auto-coupler specifications pictured

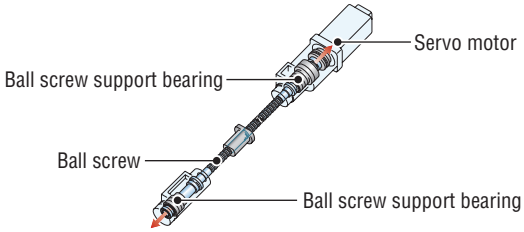
Ball screw center cooling

In order to control thermal displacement and to keep high-accuracy positioning, the ball screw core cooling system in which cooling oil circulates through the support bearings is used.



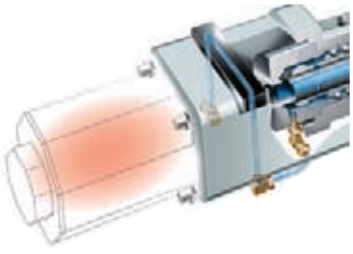
High-rigidity double-anchor support

As well as ball screw core cooling, it uses a double-anchor support for highly rigid feed.



Servo motor thermal insulation

By circulating coolant inside the flange, heat from the motor is prevented from being transmitted to the cast iron body.

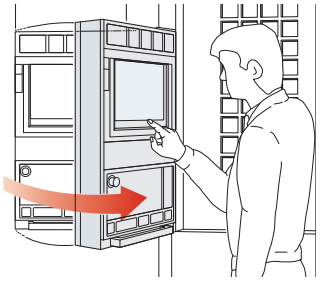


Improved workability

For the NH4000 DCG, we have installed features throughout the machine to improve the operability based on the complete operator-centered concept.

Swivel-type operation panel

The operation panel which can swivel from 0° to 90° improves operability and visibility.



Swivel range 90°

Setup station

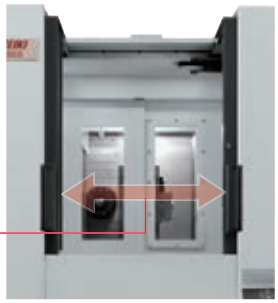
With excellent access to the table and a wide door opening, setup operations such as fixture adjustment can be done smoothly.

Distance from pallet

385 mm (15.2 in.)

Door opening

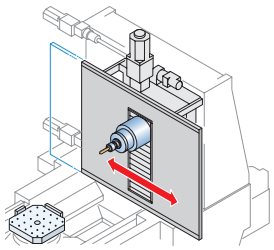
760 mm (29.9 in.)



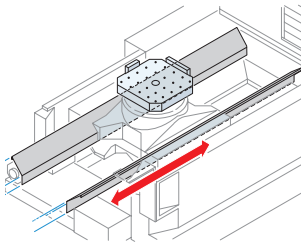
Single cover

A highly reliable design that prevents chip clogging.

X-axis

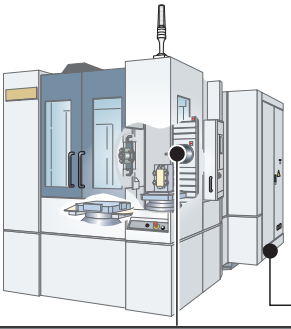


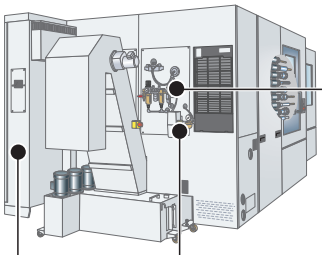
Z-axis



Maintenance

For the NH4000 DCG, the maintenance is improved by placing the oil cooler, hydraulic unit, and pneumatic instruments all in one place and offering better accessibility for operators.





Centralized layout of devices

Controls are on the side panel to facilitate maintenance.

Replacement of spindle unit

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

Slimmer electrical cabinet

A slim electrical cabinet closes the proximity between you and the insides of the machine during maintenance.

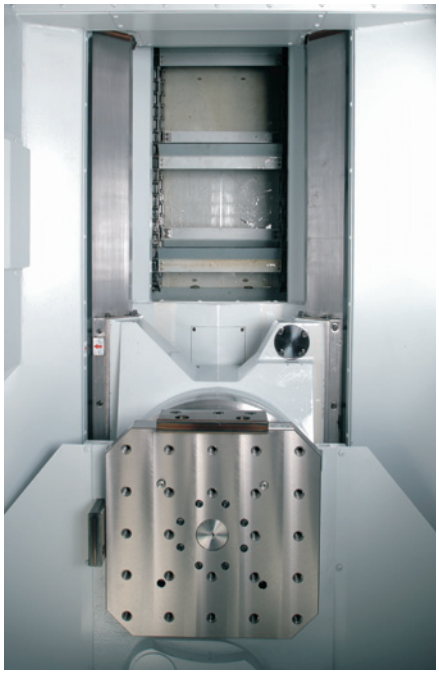
300 mm (11.8 in.) <including doors>

A closer lubrication tank

Peripheral equipment

Chip conveyor

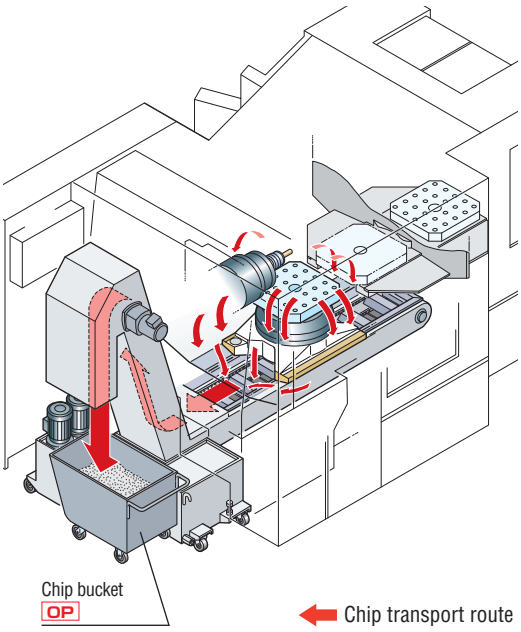
The center conveyor discharges chips directly outside the machine, offering both outstanding chip disposal and space savings.



Scraper type＋drum filter type

Hinge type＋drum filter type OP

Scraper type＋drum filter type

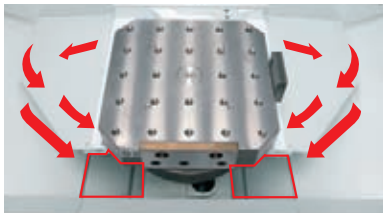


Specifications	Workpiece material and chip size ○: Suitable ×: Not suitable						
	Steel			Cast iron	Aluminum/non-ferrous metal		
	Long	Short	Powdery	Short	Long	Short	Powdery
Scraper type＋drum filter type	×	○	○	○	×	○	○
Hinge type＋drum filter type OP	○	○	○	○	○	○	○

- Chip size guidelines
  Short: chips 50 mm (2.0 in.) or less in length, bundles of chips ϕ 40 mm (ϕ 1.6 in.) or less
  Long: bigger than the above
- The options table below 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.
- Please select a chip conveyor to suit the shape of your chips. When using special or difficult-to-cut material (chip hardness HRC45 or higher), please consult with our sales representative.
- Chip conveyors are available in various types for handling chips of different shape and material. For details, please consult with our sales representative.

Chip disposal groove (setup station)

A chip disposal groove is also included on the setup station.



Chip disposal groove

Shower coolant

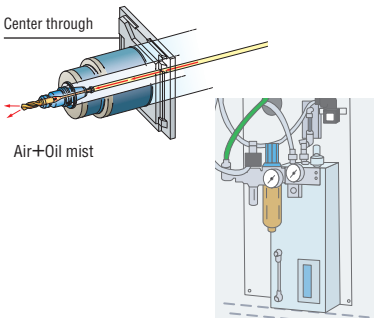
As well as preventing chips from scattering during machining, this allows them to fall smoothly into the center conveyor.

- When using shower coolant, it is used at the same time as spindle coolant.

Semi dry unit

OP Consultation is required

Supplies air and oil mist to the cutting tip. An environmentally friendly device which reduces oil consumption. We recommend using this unit together with a mist collector.

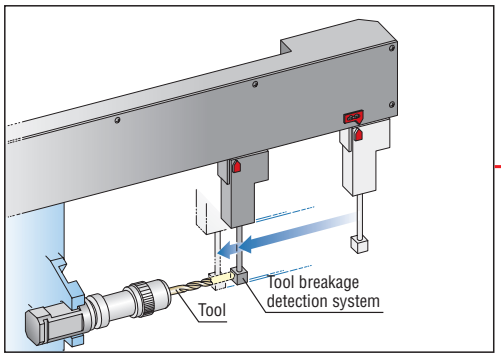


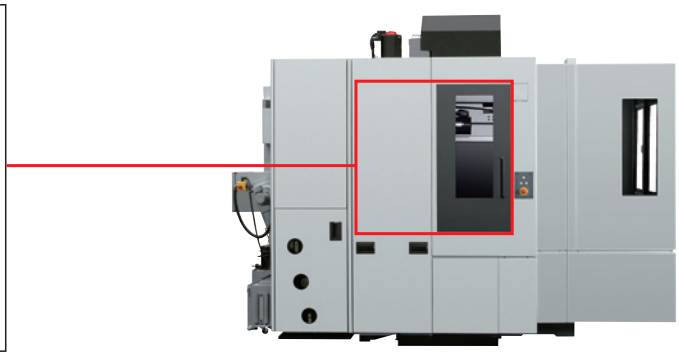
Misting device

Peripheral equipment

Tool breakage detection system (magazine) OP

The tool breakage detection unit at the waiting pot position will detect any tool breakage in the magazine. The tool length is not measured inside the machine, so it has no effect on the operating rate.

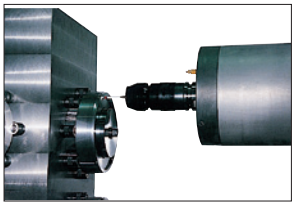




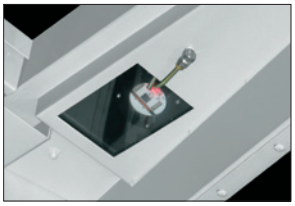
Automatic measurement OP

In-machine measuring system (spindle)

Optical type touch sensor



Sensor

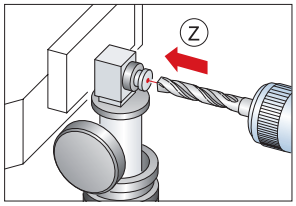


Receiver

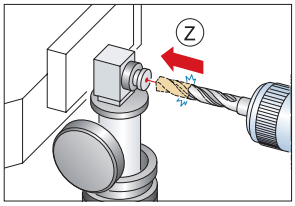
Automatic	■ Centering ■ Measurement
Manual	The workpiece setter function can be added
Workpiece zero point setting and centering are possible	

In-machine measuring system (table)

Touch sensor



Tool length measurement



Tool breakage detection

Automatic	■ Tool length measurement ■ Tool breakage detection
Manual	The tool setter function can be added
Tool length offset is possible	

Automatic measurement+Manual measurement functions OP

Manual measurement applications can be added to the automatic measurement function.

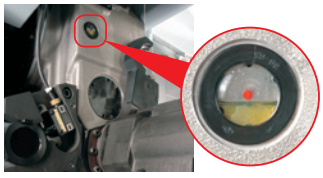
Reduction in environmental burden

Eco-friendly design

Reduced consumption of lubricating oil

Oil-bath ATC

An oil-bath design has been integrated into the ATC unit design. Compared with conventional oil drip designs, the amount of lubricating oil used has been radically reduced.



Power-saving function

Energy-saving settings screen

Automatic sleep function

If the keyboard is not touched after a certain amount of time and NC operation is not being performed, power is cut off to the servo motor, the spindle, the coolant pump and the chip conveyor, thereby saving energy.

Automatic machine light function

If the operation panel is not touched for a certain amount of time, the interior light automatically turns off. This saves energy and lengthens the life of the machine lights.

Transfer systems OP

The versatile systems resolve production issues.

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.

■ Controller

Handy controller
(Standard features)

● MCC-LPS Ⅲ is available as an option.

● System example

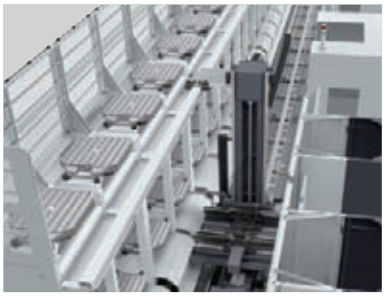
● When the number of machines or workpiece setup stations is two or more, the MCC-LPS Ⅲ is required.
● For models and systems, please consult with our sales representative.

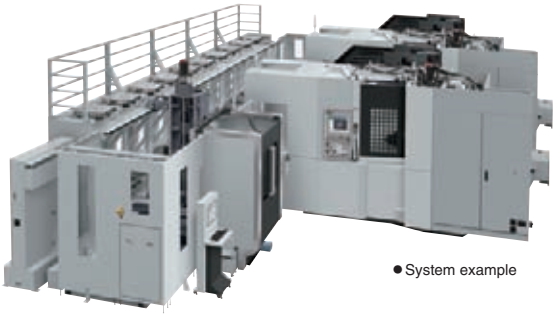
LPP system (Linear Pallet Pool System)

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

■ Controller

MCC-LPS Ⅲ (Standard features)

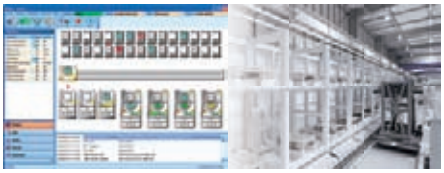




● System example

Applications

Linear Pallet Pool Control System
MCC-LPS Ⅲ



- DMG MORI SEIKI's original, highly reliable system allows easy operation/management of the pallet transfer system.
- Machining programs can be managed and automatically downloaded.
- Urgent production requests will be flexibly prioritized.

The Tool Management System
MCC-TMS

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

● MCC-LPS Ⅲ is installed in the specialized cell controller and MCC-TMS can be installed in the controller and your PC.

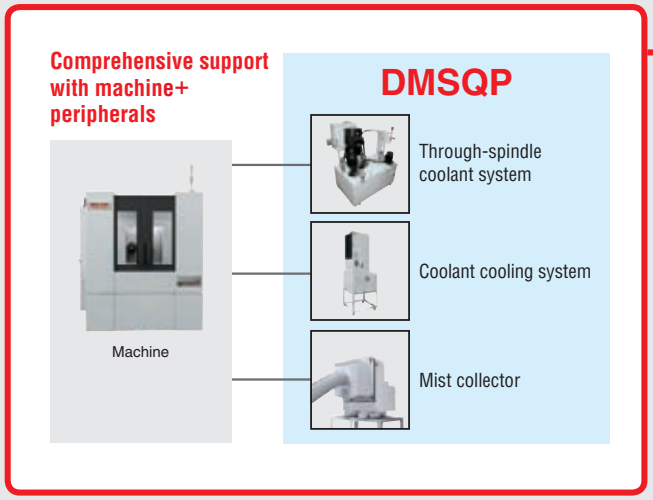
DMSQP (DMG Mori Seiki Qualified Products) OP

Selected peripherals with superior quality, performance and maintainability.

The DMSQP program is designed to certify peripherals that meet DMG MORI SEIKI standards in quality, performance and maintainability. DMSQP provides customers with even greater peace of mind.

Comprehensive support with machine＋peripherals

DMG MORI SEIKI provides comprehensive support, from proposal to delivery and maintenance, for high-quality peripherals that offer superior performance and maintainability.



DMG MORI SEIKI Service Center

Advantages of DMSQP

- Qualified peripherals are arranged by DMG MORI SEIKI
- Two-year warranty, the same as machines
  (Parts relating to machine breakdown will be guaranteed free for 2 years from the date of installation, and labor costs to repair will be free for 1 year)
- Toll-free phone support is available 24 hours a day, 365 days a year (Japan only)

Examples of qualified products (NH4000 DCG)

☐ **Through-spindle coolant system**
Coolant is supplied to the tool tip through the center of the tool and spindle.

☐ **Coolant cooling system**
It cools down coolant to offer better cutting performance and minimize thermal displacement in the workpiece.

☐ **Mist collector**
It removes mist, smoke, etc. generated inside the machine.

☐ **Chip bucket**
Chips discharged from the chip conveyor are collected into this bucket.

☐ **Temperature conditioner in electrical cabinet**
This prevents temperature rise and dew condensation inside the electrical cabinet.

☐ **Refrigerating type air dryer**
This unit removes moisture contained in the compressed air supplied by the compressor, preventing moisture-related problems in the pneumatic equipment.

☐ **CPP**
This is a workpiece transfer system with the packaged system configuration that can be easily introduced at your factory.

☐ **LPP**
This is a workpiece transfer system that can be freely customized for high-level automation.

☐ **Tool wagon**

☐ **Tool cabinet**

☐ **Basic tooling kit**

● For more details on DMSQP items, please contact our sales representative.

CPP: Carrier Pallet Pool　LPP: Linear Pallet Pool

MAPPS Ⅳ

A New High-Performance Operating System
for Machining Centers

● 19-inch operation panel

A new high-performance operating system that pursues ease of use, and combines the best hardware in the industry with the advanced application/network systems.

- **Outstanding operability thanks to upgraded hardware**
- **Enhanced functionality by using CAM software**
- **New functions for easier setup and maintenance**
- **Various types of monitoring, including internal monitoring, are possible on the screen (option)**
- **In the event of trouble, DMG MORI SEIKI's remote maintenance service solves it smoothly MORI-NET Global Edition Advance OP**

Outstanding operability

Vertical soft-keys

Vertical soft-keys are arranged on the left and right sides of the screen. The vertical soft-keys can be used as option buttons or shortcut keys to which you can assign your desired screens and functions, allowing you to quickly display the screen you want.

Keyboard

A PC-type keyboard is used as standard, making key input easy. A keyboard with a conventional key layout is also available as an option.

Advanced hardware

Reduction of drawing time

Shorter drawing time was achieved thanks to increased CPU performance.

MAPPS Ⅲ 68 sec.
MAPPS Ⅳ 45 sec.

Approx. Reduced by 33%

Main specifications

Main memory	2 GB
User area	6 GB
Interface	・USB 2.0 6 ports (Screen side: 2, Bottom of operation panel: 1, Back of operation panel: 3) ・LAN 2 ports (1000BASE-T) ・RS-232-C port
Soft-keys	Left/right 12 keys Bottom 12 keys

Improved ease of setup

File display and Memo function

Data necessary for setups such as operating instructions, drawing data and text data can be viewed on MAPPS. Text data is editable.

Viewable file types

- PDF ・TXT (Editable)
- Any file that can be displayed with Internet Explorer is available

Improved ease of maintenance

Alarm help function

When an alarm occurs, MAPPS identifies the cause of the trouble and provides solutions.

Improved productivity

APC schedule operation function OP

Operation schedule of the APC can be controlled through MAPPS. The ability to set various schedules supports unmanned continuous operation. This function can also handle changes to machining schedules flexibly.

Improved work efficiency

Fixed-point in-machine camera OP Consultation is required

Images taken by cameras installed inside/outside the machine can be viewed on the programming screen. This function is useful for maintenance.

Examples of camera locations

- Inside machine (to check machining)
- Tool magazine (to check cutting tools)
- Chip bucket (to check chip accumulation)

MAPPS: Mori Advanced Programming Production System

Conversational automatic programming

This function allows users to create programs simply by following the guidance on the screen.
Much of the programming process has been simplified due to the minimal key entry required for even the most complex shapes.

Machining menu

List display function

Contour input

Islands, open pockets OP

MORI-POST advanced mode OP

DXF import function OP

MORI Automatic Programming System for Machining Center

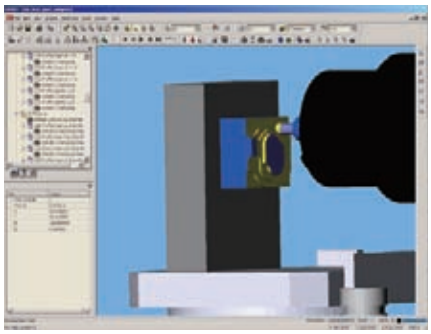
MORI-APM OP

Application systems which let you create machining programs easily on your PC.

- Easy operation, simply by entering the product shapes while following the instructions on the screen.
- Its functions, data and operability are fully compatible with the conversational programming system of the MAPPS Ⅳ operating systems.

CAM software

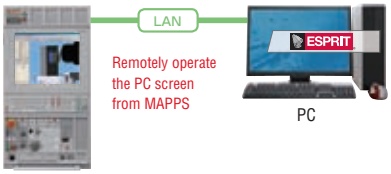
ESPRIT® allows you to create complex 3D programming with high-added value. By just installing the software on your PC with connection to LAN, you will be able to use it. (Once the software is started on the computer, it can be used for up to 7 days without LAN connection)



- **Postprocessor as standard**
- **CAM software will be ready to use once your machine is installed**
- **Cost for introducing CAM software can be saved**
- **ESPRIT® data can be modified on the machine** (through Remote Desktop connection*)
- **The software can be installed on multiple PCs on the network** (It cannot be simultaneously started up on more than one PC)
- **2-year warranty support** (including free update)

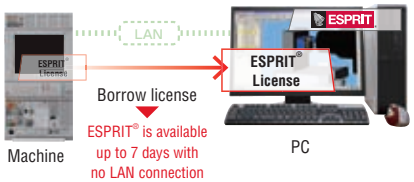
Remote Desktop <Patent pending>

ESPRIT® installed on your PC can be operated from your machine via LAN. (It cannot be simultaneously started up on more than one PC)



License borrowing system

By borrowing the ESPRIT® license from the machine over LAN, ESPRIT® can be run on the PC up to 7 days without LAN connection (or turning on the machine).



Support system

Distributors/Trading companies, DMG MORI SEIKI Technical Centers and ESPRIT® Support Team will answer inquiries about the CAM software.

* Applicable Operating Systems: Windows® Vista Business / Ultimate,Windows® 7 Professional / Ultimate
● A PC is required to use ESPRIT®. Please prepare PCs by yourself.

● The photo shown may differ from actual machine.
● Information about the screen is current as of July 2013.

MORI-NETWORK

Network Application Systems
MORI-NET, MORI-SERVER, MORI-MONITOR

For shorter total production time for all our customers

DMG MORI SEIKI's software Line-up

This network system application achieves fast information sharing and increased production efficiency.

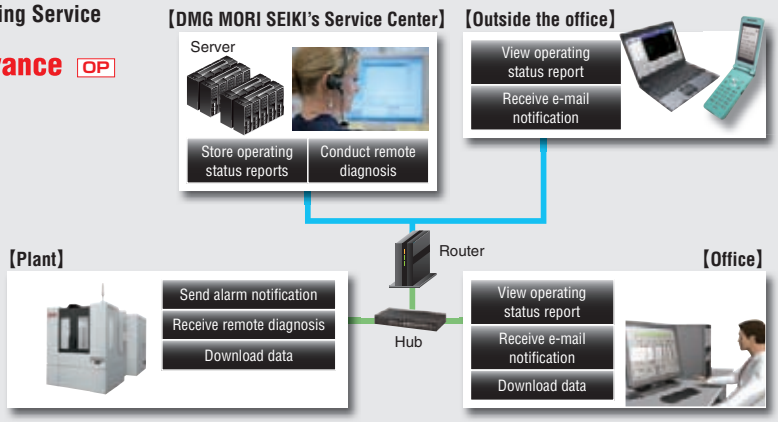
【Internet】
【LAN】

Remote Maintenance/Machine Operation Monitoring Service

MORI-NET Global Edition Advance OP

■ Features

- Remote maintenance service by DMG MORI SEIKI Service Center
- Internet-based, high speed (max. 1 Gbps), large capacity network
- No server installation is required — reduction in initial cost
- Download various data from the server located at DMG MORI SEIKI



■ Remote alarm support

When an alarm goes off,
an alarm notification will be sent to the DMG MORI SEIKI Service Center simply by pressing the "Send e-mail" button on MAPPS.
DMG MORI SEIKI service personnel will remotely diagnose the cause of the problem, and quickly provide solutions for machine recovery.

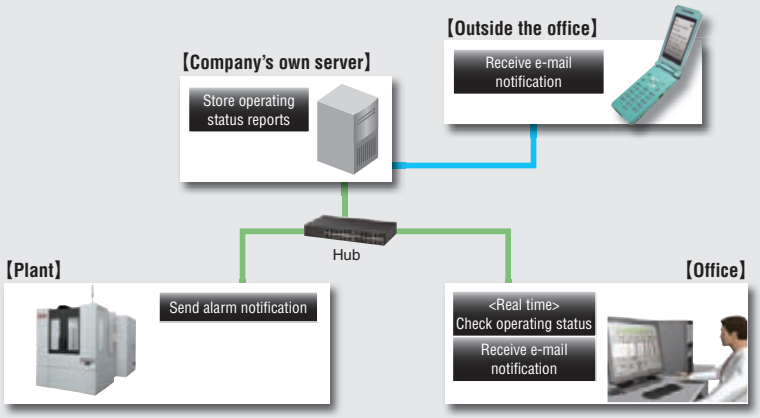
- This service may not be available in some areas. Please contact our sales representative for details.

Machine Operation Monitoring System

MORI-NET LAN Edition OP

■ Features

- Intra-corporate network system
- Up to 30 machines can be connected with one server
- The operating status of your machines can be centrally managed in real time



Application for Data Transmission

MORI-SERVER [Standard features]

This enables high-speed transfer of programming data between your office computer and machine, reducing the lead time of pre-machining processes.

MAPPS Screen Remote Control and Browsing Application

MORI-MONITOR OP

This is an application which allows you to remotely operate and view the MAPPS screens from your office computer.

ACT Advanced Communication Technology

Advanced Communication Technology (ACT) connects machine tool and peripheral devices

DMG MORI SEIKI's new proposal, ACT, is designed to strengthen connections between machine tools and peripheral equipment by standardizing communication and software of the entire system. With ACT, standardization of interfaces of peripherals, simplified wiring, and labor saving can be achieved.

【Internet】
【LAN】

Industrial Network for Peripheral Equipment Control

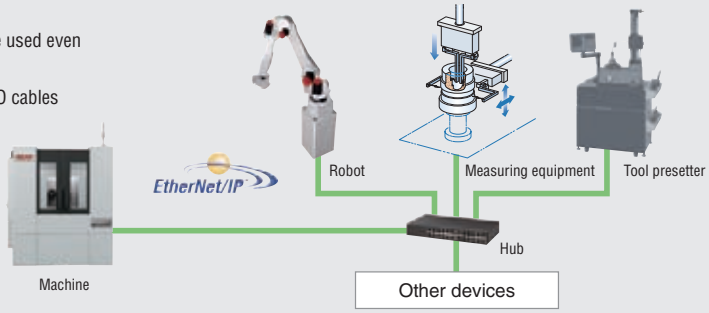
MAPPS EtherNet/IP I/F OP

This industrial network using the standard Ethernet (TCP/IP) offers high speed and reliable connection. Simple Plug and Play connections, which are made available just by connecting to the hub through MAPPS, enable you to build a system easily.
The use of standard cables also helps to reduce costs.

■ Features

- Connections between a machine and peripheral equipment become easy because standard LAN cables are used
- Thanks to increased versatility, your peripheral equipment can be used even when the machine tools are replaced by new ones
- Reliability is significantly increased by reducing the number of I/O cables

- **Easy system construction**
- **Connection with existing devices**
- **Inexpensive devices**



Communication Interface for Monitoring Machine Operation

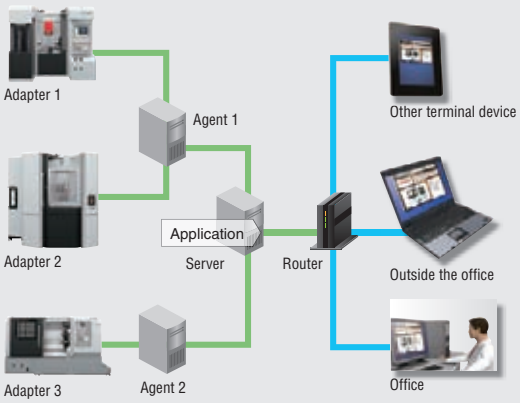
MAPPS MTConnect I/F

MTConnect, which was introduced by the Association for Manufacturing Technology (AMT) in 2008, is a new XML (Extensible Markup Language) based communication protocol that offers an open interface. This interface allows you to build a system to monitor the operating status of your machines.

■ Features

- Open communication interface allows you to access to your company's system
- This makes it possible for you to build a system to monitor the operating status of your machines via the Internet

■ System examples



■ Application examples

Your machines are displayed all at once, allowing you to quickly call up the machine you wish to check.

Operating status can be checked in real time.

You can check the operating history on the Gantt chart screen.

- A server and application must be prepared by the customer.
- For introduction of MTConnect, separate consultation is required.

Machine specifications

Item				NH4000 DCG	NH4000 DCG HSC
Travel	X-axis travel <longitudinal movement of saddle>		mm (in.)	560 (22.0)	
	Y-axis travel <vertical movement of spindle head>		mm (in.)	560 (22.0)	
	Z-axis travel <cross movement of pallet>		mm (in.)	630 (24.8)	
	Distance from pallet surface to spindle center		mm (in.)	80—640 (3.1—25.2) [60—620 (2.4—24.4) <T-slot pallet>]	
	Distance from pallet center to spindle gauge plane		mm (in.)	100—730 (3.9—28.7)	
Pallet	Distance from floor surface to pallet surface		mm (in.)	1,050 (41.3) [1,070 (42.1) <T-slot pallet>]	
	Pallet working surface		mm (in.)	400×400 (15.7×15.7)	
	Pallet loading capacity		kg (lb.)	400 (880) [300 (660) <3-station turn-type APC specifications>]	
	Max. workpiece swing diameter		mm (in.)	630 (24.8) [560 (22.0) <3-station turn-type APC specifications>]	
	Max. workpiece height		mm (in.)	Tap pallet: 900 (35.4) [800 (31.4) <3-station turn-type APC specifications>] [T-slot pallet: 880 (34.6) {780 (30.7) <3-station turn-type APC specifications>}]	
	Pallet surface configuration			M16 (1/2-13 UNC) Tap: 24 Holes. Pitch 80 mm (3 1/8 in.)	
	Minimum pallet indexing angle			1° [0.001° <full 4th axis rotary table>]	
	Pallet indexing time <including clamping and unclamping time>		s	1.54 [0.72 <full 4th axis rotary table>] (90°)	
Spindle	Max. spindle speed		min^{-1}	14,000 [14,000 <high output>]	20,000
	Number of spindle speed ranges			1	
	Type of spindle taper hole			No. 40	
	Spindle bearing inner diameter		mm (in.)	70 (2.8) [65 (2.6) <high output>]	70 (2.8)
Feedrate	Rapid traverse rate		mm/min (ipm)	X, Y, Z: 50,000 (1,968.5)	
	Cutting feedrate		mm/min (ipm)	X, Y, Z: 0—50,000 (0—1,968.5)	
	Max. rotational speed		min^{-1}	B: 44.4 [100 <full 4th axis rotary table>]	
	Jog feedrate		mm/min (ipm)	0—5,000 (0—197.0) <20 steps>	
ATC	Type of tool shank			BT40 [DIN40] [CAT40] [HSK-A63] <when the two-face contact specification is selected, a two-face contact tool and other tools cannot be used together>	
	Type of retention knob			DMG MORI SEIKI 90° type [45° (MAS-I)] [60°(MAS-II)] [DIN] [Special (center through)]	
	Tool storage capacity <including one tool at the spindle side>			Chain-type: 40 [60] [120] Rack-type: [180] [240] [300] [360]	
	Max. tool diameter <without adjacent tools>		mm (in.)	70 (2.7) <140 (5.5)>	
	Max. tool length		mm (in.)	400 (15.7)	
	Max. tool mass		kg (lb.)	8 (17.6)	
	Max. tool mass moment <from spindle gauge line>		N·m (ft·lbf)	7.84 (5.78) <a tool with a mass moment greater than the maximum tool mass moment may cause problems during ATC operations even if it satisfies other conditions>	
	Method of tool selection			Chain-type: fixed address, shorter route access [Rack-type: fixed address]	
	Tool changing time	Tool-to-tool	s	0.9	
		Cut-to-cut (chip-to-chip) <MAS>	s	2.8	
	● The time differences are caused by the different conditions (travel distances, etc.) for each standard.	Cut-to-cut (chip-to-chip)	s	40 tools Max.: 8.7 Min.: 2.8	
				[60 tools] Max.: 11.4 Min.: 2.8	
				[120 tools] Max.: 19.7 Min.: 2.8	
			ISO 10791-9	[180 tools] Max.: 15.8 Min.: 2.8	
			JIS B6336-9	[240 tools] Max.: 15.8 Min.: 2.8	
APC	Number of pallets			2 [3 (3-station turn-type APC specifications)]	
	Method of pallet change			Turn-type	
	Pallet changing time		s	6	
Motor	Spindle drive motor	14,000 min^{-1}	kW (HP)	18.5/11 (24.7/15) <10 min/cont> {high-speed winding side}	—
		14,000 min^{-1} <high output>	kW (HP)	[22/18.5 (30/24.7) <15 min/cont>]	—
		20,000 min^{-1} <standard>	kW (HP)	—	18.5/15/11 (24.7/20/15) <10 min/30 min/cont>
	Feed motor	X/Y/Z-axes	kW (HP)	1.6×2/4/4 (2.1×2/5.3/5.3)	
		B-axis	kW (HP)	1.2 (1.6) [5.3/3.5 (7.1/4.7) <max./cont> {full 4th axis rotary table}]	
	Coolant pump motor		kW (HP)	1.2+1.2 (1.6+1.6)	
Power sources <standard>	Electrical power supply <cont>		I94105A06 kVA	33.1	
	Compressed air supply		MPa (psi), L/min (gpm)	0.5 (72.5), 420 (110.9) {when the tool tip air blow is regularly used, air supply of 300 L/min (79.2 gpm) is required} <ANR>	
Tank capacity	Coolant tank capacity		L (gal.)	500 (132)	
Machine size	Machine height <from floor>		mm (in.)	2,711 (106.7)	
	Floor space <width×depth>		mm (in.)	2,360×3,914 (92.9×154.1)	
	Mass of machine		kg (lb.)	9,600 (21,120)	
Noise data	A-weighted, time-average radiated sound pressure level		dB	61—75 (Measurement uncertainty is 4 dB)	

[ ] Option ISO: International Organization for Standardization JIS: Japanese Industrial Standard

NH4000DCG (201301)

- 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 15,000 min^{-1} or higher.
- ANR: ANR refers to a standard atmospheric state; i. e., temperature at 20 °C (68 °F), absolute pressure at 101.3 kPa (14.7 psi) and relative humidity at 65%.
- Power sources, machine size: the actual values may differ from those specified in the catalogue, depending on the optional features and peripheral equipment.
- Compressed air supply: please be sure to supply clean compressed air <air pressure: 0.7 MPa (101.5 psi), pressure dew point: 10 ℃ (50 °F) or below>.
- A criterion capacity to select a compressor is 90 L/min (23.8 gpm) per 0.75 kW (1 HP). However, this figure may differ depending on the type of compressors and options attached. For details, please check the compressor specifications.
- Noise data: the measurement was performed at the front of the machine with a maximum spindle speed of 14,000 min^{-1}. Please contact our sales representative for details.
- The information in this catalog is valid as of July 2013.

HSC: High Speed Cutting

DMG MORI

2-year warranty, twice the peace of mind.

For machines delivered outside of Japan, parts relating to machine breakdown will be guaranteed free for 2 years from the date of installation, and labor costs to repair will be free for 1 year. Please contact our sales representative for details.

<Precautions for Machine Relocation>

EXPORTATION: All contracts are subject to export permit by the Government of Japan. Customer shall comply with the laws and regulations of the exporting country governing the exportation or re-exportation of the Equipment, including but not limited to the Export Administration Regulations. The Equipment is subject to export restrictions imposed by Japan and other exporting countries and the Customer will not export or permit the export of the Equipment anywhere outside the exporting country without proper government authorization. To prevent the illegal diversion of the Equipment to individuals or nations that threaten international security, it may include a "Relocation Machine Security Function" that automatically disables the Equipment if it is moved following installation. If the Equipment is so-disabled, it can only be re-enabled by contacting DMG MORI SEIKI or its distributor representative. DMG MORI SEIKI and its distributor representative may refuse to re-enable the Equipment if it determines that doing so would be an unauthorized export of technology or otherwise violates applicable export restrictions. DMG MORI SEIKI and its distributor representative shall have no obligation to re-enable such Equipment. DMG MORI SEIKI and its distributor representative shall have no liability (including for lost profits or business interruption or under the limited service warranty included herein) as a result of the Equipment being disabled.

- If you have any questions regarding the content, contact our sales representative.
- The information in this catalog is valid as of October 2013. 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 SEIKI is not responsible for differences between the information in the catalog and the actual machine.

DMG MORI SEIKI CO., LTD.

Nagoya Head Office		☐ 2-35-16 Meieki, Nakamura-ku, Nagoya City, Aichi 450-0002, Japan	Phone: +81-52-587-1811
Tokyo Branch		☐ 18th floor, Shinagawa Intercity Tower A, 2-15-1 Konan Minato-ku, Tokyo 108-6018, Japan	Phone: +81-3-5460-3570
Nara Campus	Nara No. 1 Plant	☐ 362 Idono-cho, Yamato-Koriyama City, Nara 639-1183, Japan	Phone: +81-743-53-1121
	Nara No. 2 Plant	☐ 106 Kita-Koriyama-cho, Yamato-Koriyama City, Nara 639-1160, Japan	Phone: +81-743-53-1125
Iga Campus		☐ 201 Midai, Iga City, Mie 519-1414, Japan	Phone: +81-595-45-4151
Chiba Campus		☐ 488-19 Suzumi-cho, Funabashi City, Chiba 274-0052, Japan	Phone: +81-47-410-8800

NH4000-EJ07ABD(N)
D.1310.CDT.0000
Created in Japan