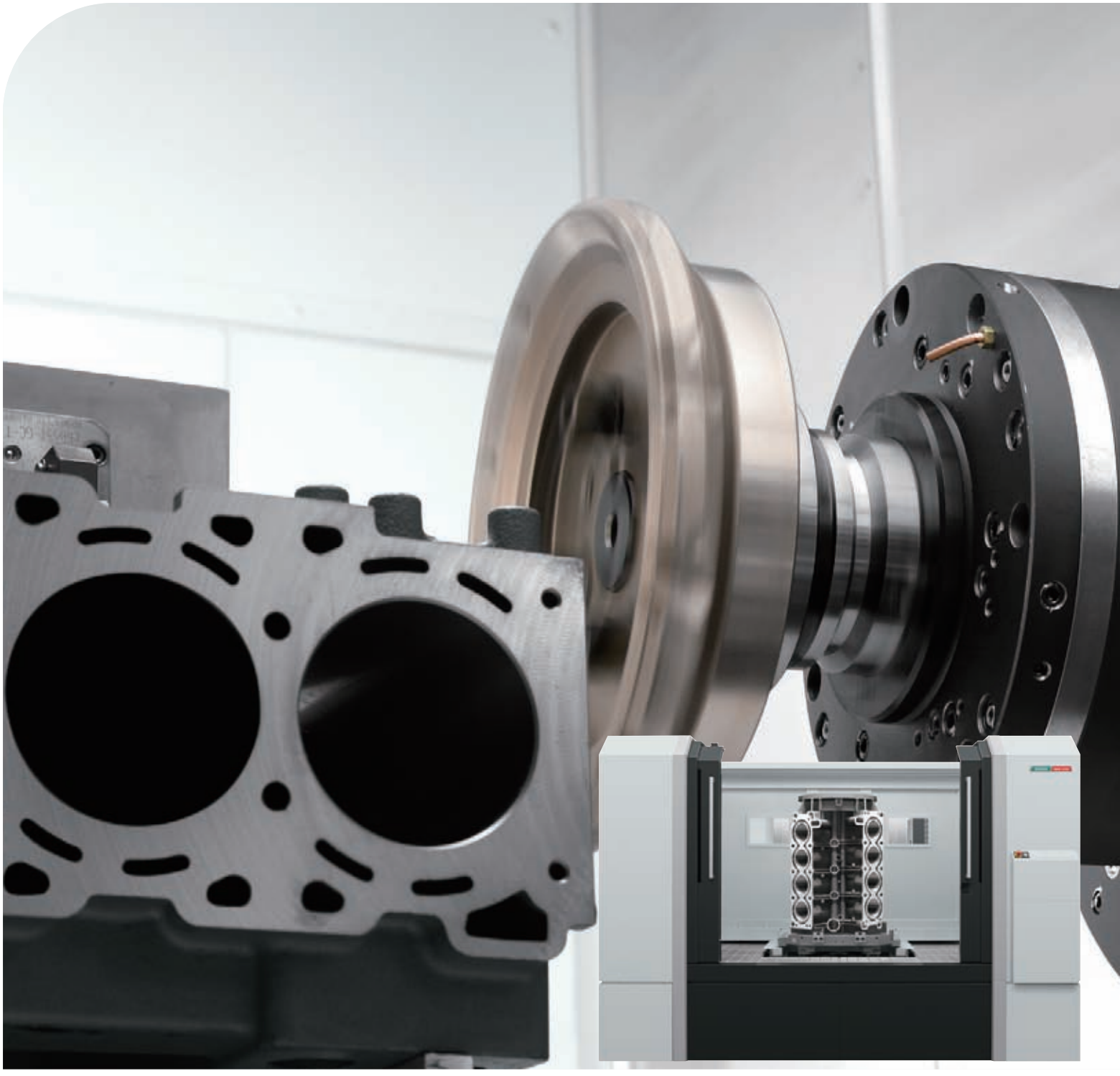
www.dmgmori.com

DMG MORI

High-Precision, High-Speed Horizontal Machining Center

NHX10000

NHX10000



Horizontal machining center that boasts outstanding accuracy, operability and accessibility offers high-speed heavy-duty cutting of large workpieces

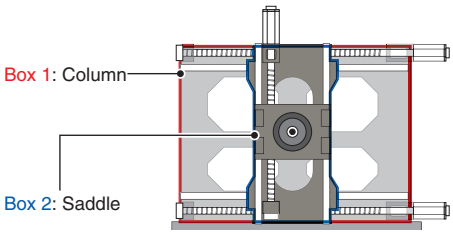
The NHX10000 features two of DMG MORI SEIKI's original technologies, DCG (Driven at the Center of Gravity) and DDM (Direct Drive Motor), as well as the Box-in-Box Construction for excellent balance, achieving high-speed, high-precision machining with large workpieces made of difficult-to-cut materials like titanium and inconel, which are in great demand in the aircraft and construction machinery industries. The NHX10000 is the ultimate large horizontal machining center that comprehensively pursued operability by adopting steps to improve accessibility inside and outside the machine and a sliding swivel operation panel.

Principal mechanisms

Basic structure

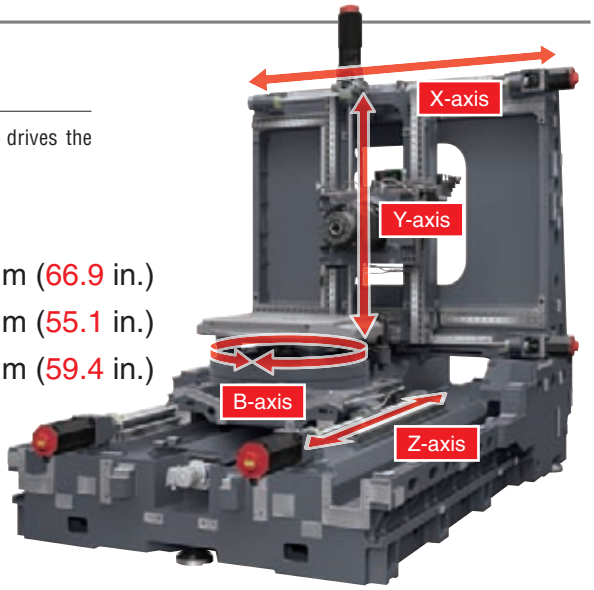
Box-in-Box Construction

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.



Travel

X-axis 1,700 mm (66.9 in.)
Y-axis 1,400 mm (55.1 in.)
Z-axis 1,510 mm (59.4 in.)



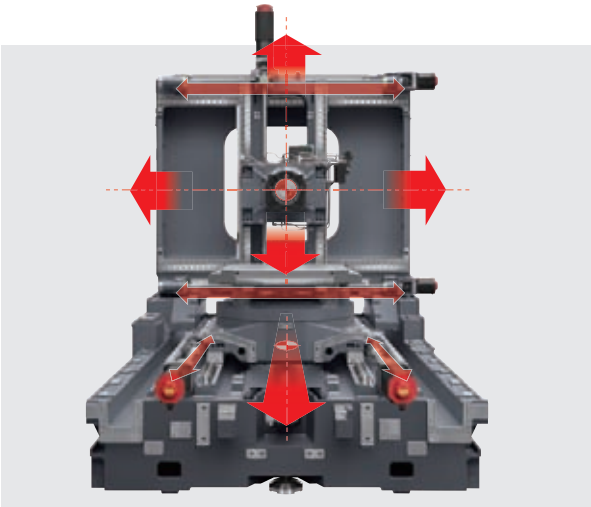
Driven at the Center of Gravity

DCG® Driven at the Center of Gravity

Original technology

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

Our DCG 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.



■ Features of DCG

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

Rapid traverse rate <X, Y and Z axes>

50 m/min (1,968.5 ipm)

- The rapid traverse rate on the Y-axis is 40 m/min (1,574.8 ipm) when using the spindle with the 6,000 min^{-1} specifications <option>.

Feedrate <X, Y and Z axes>

50 m/min (1,968.5 ipm)

- With look-ahead control

Max. acceleration

X-axis 0.63 G {6.2 m/s² (20.3 ft/s²)}
Y-axis 0.51 G {5.0 m/s² (16.4 ft/s²)}
Z-axis 0.45 G {4.4 m/s² (14.4 ft/s²)}

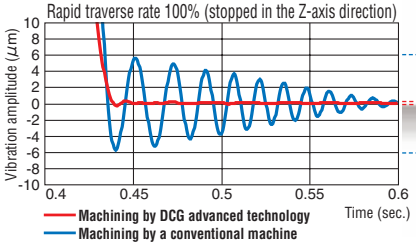
Vibration Controlled

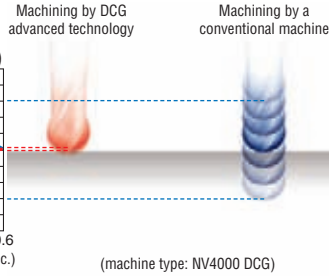
For positioning, machines with DCG virtually eliminate vibration, while machines without DCG continue to vibrate for a long time. DCG controls the rotational vibration which appears at every acceleration start point, and which is proportional to the distance between the drive point and the center of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

Machining by DCG advanced technology

Machining by a conventional machine

Residual vibration comparison

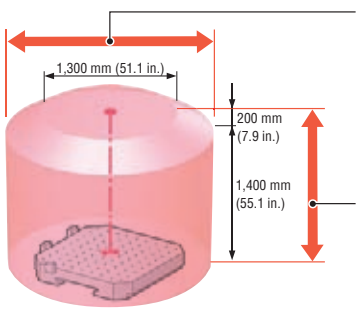




(machine type: NV4000 DCG)

DCG: Driven at the Center of Gravity

Working area



Max. workpiece swing diameter

2,000 mm
(78.7 in.)

Max. workpiece height

1,600 mm
(62.9 in.)

Pallet loading capacity

3,000 kg (6,600 lb.) 5,000 kg (11,000 lb.)* OP

∗ Not applicable for CPP, LPP specification.

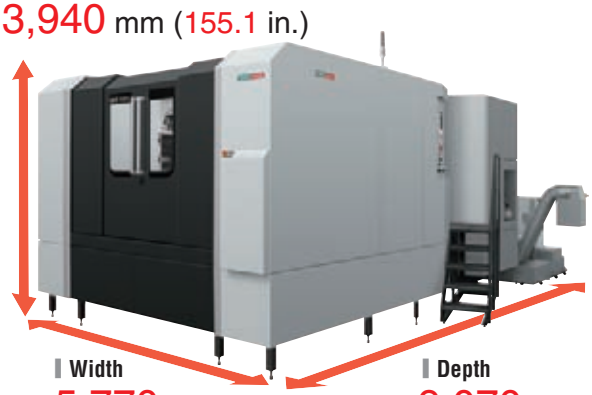
Pallet working surface

1,000×1,000 mm (39.4 in.×39.4 in.)

Machine size

Height

3,940 mm (155.1 in.)



Width

5,770 mm
(227.2 in.)

Depth

9,070 mm
(357.1 in.)

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

10,000 min^{-1}

10,000 min^{-1} OP <high output>
15,000 min^{-1} OP <high speed>
6,000 min^{-1} OP <high torque>

- Please use a two-face contact tool when cutting at higher than 10,000 min^{-1}.

Spindle acceleration time

3.0 sec. (0→10,000 min^{-1})

Spindle deceleration time

2.9 sec. (10,000 min^{-1}→0)

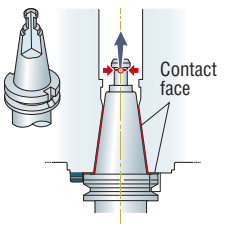
Tool clamp power

24,000 N (5,395.1 lbf) <BT>

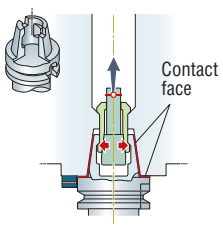
Two-face contact specification OP

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



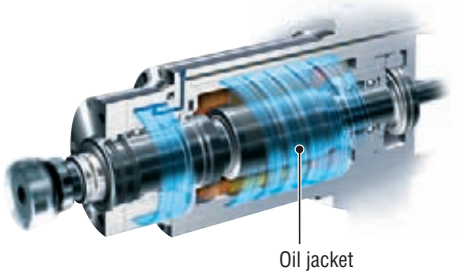
HSK specifications



- 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.

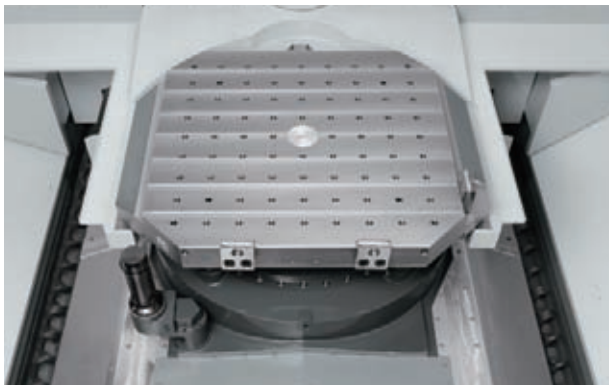
Spindle cooling

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.



Principal mechanisms

Table



Selection of tables

Item	Standard	Full 4th axis rotary table OP
Minimum pallet indexing angle	1°	0.001°
Pallet indexing time (90°) <including clamping and unclamping time>	3.1 sec.	1.8 sec.
	3.6 sec.*	2.0 sec.*

* Pallet loading capacity 5,000 kg (11,000 lb.).

Direct Drive Motor OP

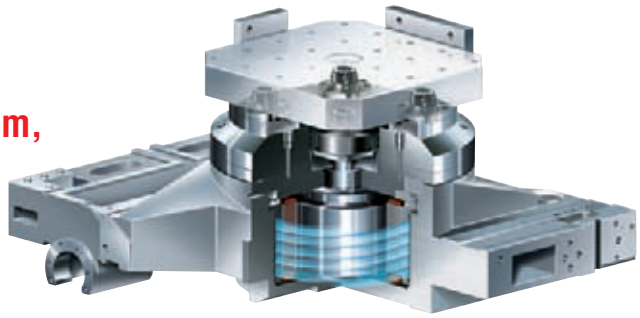
DDM® Direct Drive Motor **Original technology**

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



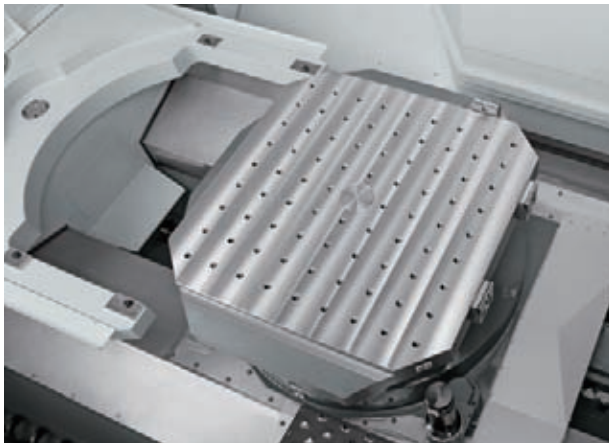
Pallet indexing time (90°) <including clamping and unclamping time>

Previous model (worm gear system) 10 sec. ▶ **NHX10000** (DDM) 1.8 sec. Approx. Reduced by 1/5

B-axis Max. rotational speed

20 min^{-1}

APC



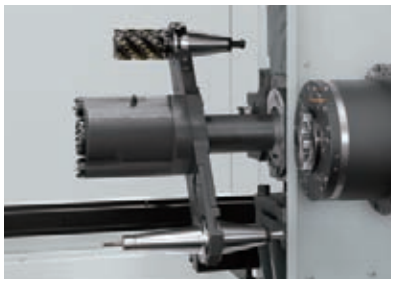
It uses a front 2-station turn-type APC.
This APC offers high-speed pallet change that reduces non-cutting time.

Pallet changing time (2-station turn-type APC)

22 sec.

41 sec. OP <Pallet loading capacity: 5,000 kg (11,000 lb.)>

ATC



● The photo shows the NHX8000.

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

Tool changing time

Cut-to-cut (chip-to-chip) <60-tool specifications>

5.7 sec. (min.)/16.7 sec. (max.)

Tool-to-tool

1.9 sec.

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.

Magazine

● Chain type 60-tool specifications

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

60 tools 80 tools OP 100 tools OP 120 tools OP

Rack-type magazine

180 tools OP 240 tools OP 330 tools OP

● The tool storage capacity includes one tool at the spindle side.

● 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. tool length	Max. tool mass	Max. tool diameter		Max. tool mass moment
800 mm (31.4 in.) [1,000 mm (39.3 in.)] <Long tool specifications>	30 kg (66 lb.)	110 mm (4.3 in.) <With adjacent tools>	320 mm (12.5 in.) <Without adjacent tools>	29.4 N·m (21.6 ft·lbf.) <from spindle gauge line>

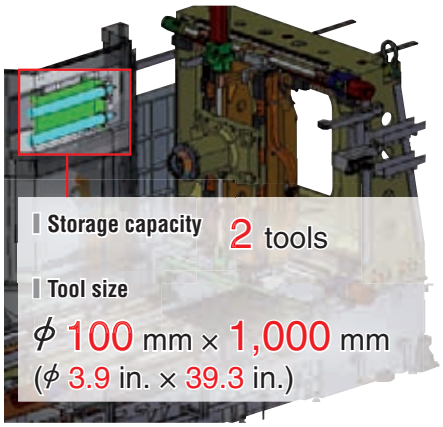
● Max. tool diameter: The maximum tool diameter is limited to 255 mm (10.0 in.) or less when using the spindle at 10,000 min^{-1} or higher.

● 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.

[ ] Option

Long tool specifications OP

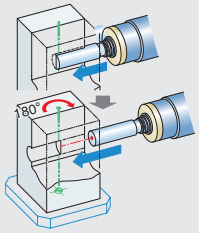
The long tool magazine can hold two long tools up to a length of 1,000 mm (39.3 in.).



Boring

Previous model

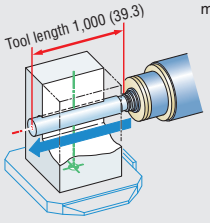
Concentric drilling can be done on both sides by flipping the table.



NHX10000

Boring up to 1,000 mm (39.3 in.)* can be done without turning the B-axis, reducing cutting time and achieving high-precision machining.

mm (in.)



* Long tool specifications

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

High-precision equipment

Coolant cooling system

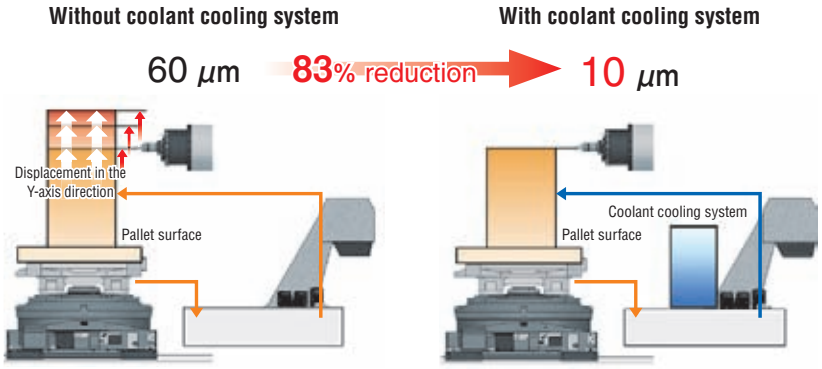
OP

Increase in the oil temperature, which is caused by heat generation during machining or by coolant circulation, greatly affects the dimensional accuracy of the workpieces and thermal displacement in the machines. 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

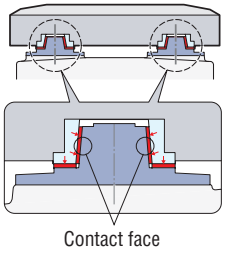
Magnescale

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 two-face contact taper cone pallet stabilizes the pallet with its powerful clamping force, and improves the repeatability.



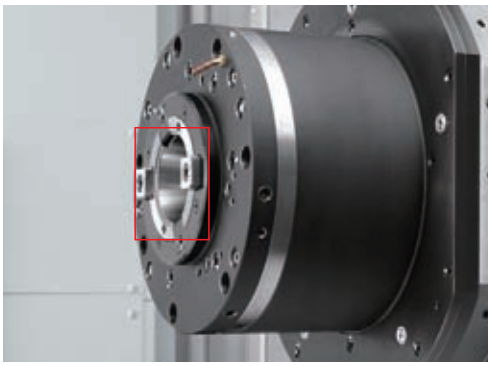
● The photo shows the NH5000 DCG.

Draw-back function for through-spindle coolant

Since coolant left in the spindle is sucked back into the tank when it stops fl owing, the following problems can be avoided and stable machining accuracy is achieved.

- **Adhesion of coolant to the spindle taper (during ATC)**
- **Coolant carried into the tool magazine**
- **Mounting errors and rusting caused by chips**

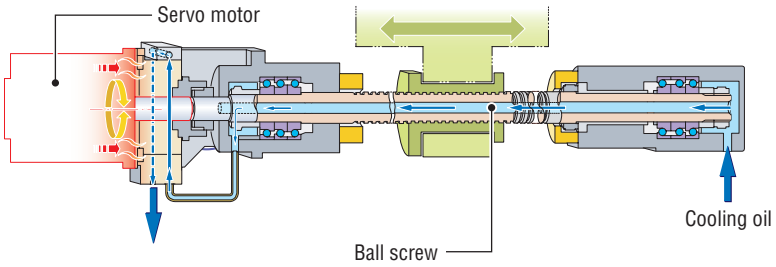
● This function is included in the through-spindle coolant specifications.



Minimizes residual coolant.

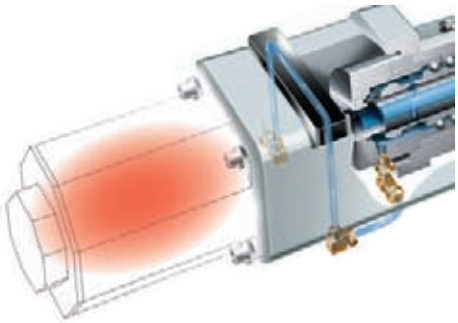
Ball screw center cooling

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.



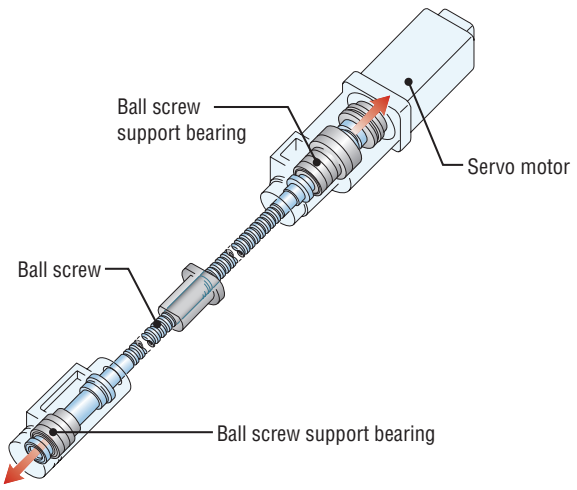
Servo motor thermal insulation

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



High-rigidity double-anchor support

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

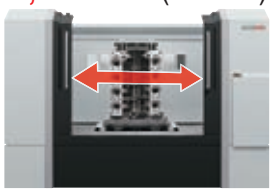


Improved workability

For the NHX10000, we have installed features throughout the machines to improve the operability based on the complete operator-centered concept.

Door opening (setup station)

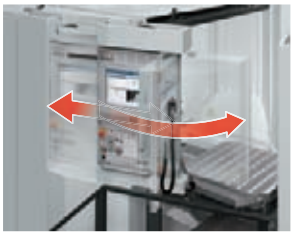
2,300 mm (90.6 in.)



A two-stage double door is used to provide wide door opening, which allows easy loading and unloading of workpieces up to 2,000 mm (78.7 in.) in diameter.

● Automatic indexing setup station (option) is required for turning a pallet at the setup station.

Sliding swivel operation panel



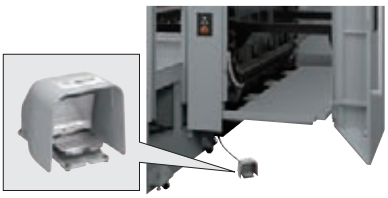
Slide
430 mm (16.9 in.)

Swivel range
175°

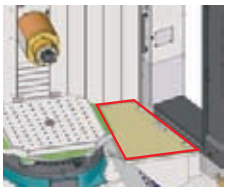
A sliding swivel operation panel allows machine operators to work while looking at the screen, offering better operability.

Foot pedal

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



Step



Steps inside and outside the machine eliminate the level difference to give excellent accessibility.

Maintenance

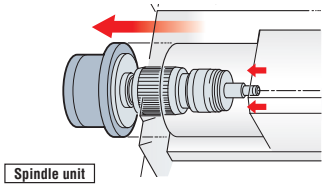
For the NHX10000, the maintenance is improved by placing the oil cooler, hydraulic unit, and pneumatic instruments all in one place and offering better accessibility for operators.

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.



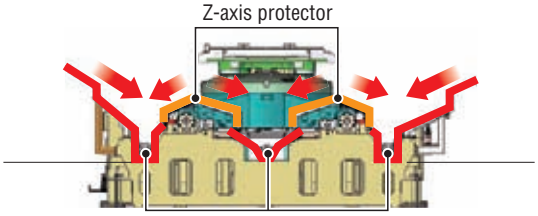
Display of Manuals

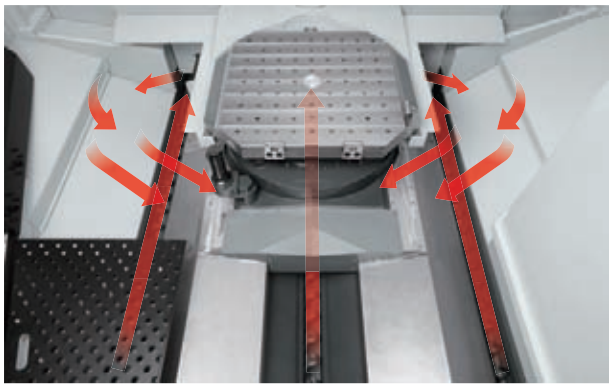
As well as viewing operation manuals on the MAPPS screen, you can perform keyword searches and jump to links in the same way as you do on a PC. This is particularly convenient when searching for information during maintenance.

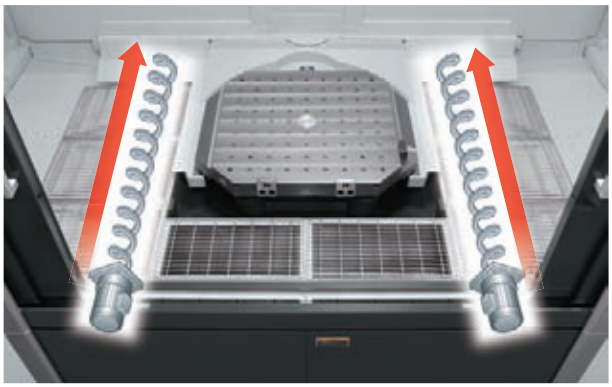
Peripheral equipment

Chip conveyor inside machine (spiral type)

Triple spiral conveyors, which are used for the first time in the NHX Series, offers excellent chip disposal. The right and left spiral conveyors that extend to the setup station transfer chips to the external conveyor.




The machining area


Setup station

Chip conveyor outside machine (scraper type+drum filter type)

A high-performance external chip conveyor, which is used as standard, can discharge both long and short chips on one unit with its filter backwashing structure and excellent chip disposal capacity.

- 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 on multi-axis machines.
- Regardless of water-soluble or water-insoluble, any types of coolant can be used.
- The built-in tank drum filter greatly reduces efforts and times for cleaning the inside of the tank.

◎: Ideal ○: Suitable

Specifications	Workpiece material and chip size						
	Steel			Cast iron	Aluminum/non-ferrous metal		
	Long	Short	Powdery	Short	Long	Short	Powdery
Scraper type+drum filter type	○	◎	○	○	○	◎	○

- 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.

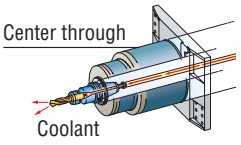
Shower coolant

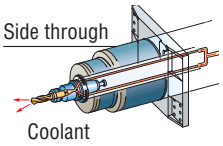
As well as preventing chips from scattering during machining, this allows them to fall smoothly into the chip conveyor inside machine.

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

Through-spindle coolant system (unit on coolant tank) OP

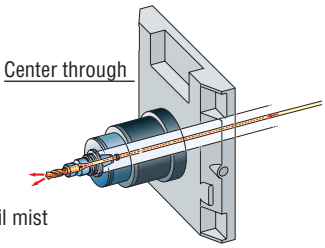
The through-spindle coolant system effectively eliminates chips, cooling the machine point and lengthening the lives of your tools.

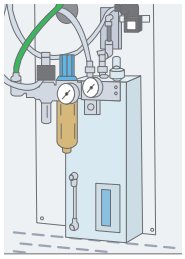




Semi dry unit OP Consultation is required

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.



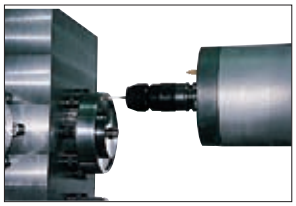


Misting device

Automatic measurement OP

In-machine measuring system (spindle)

Optical type touch sensor



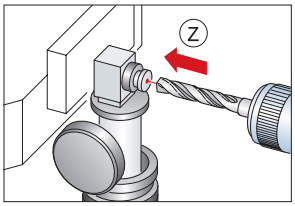
Sensor

Receiver

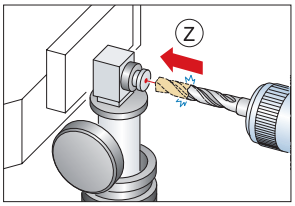
Automatic	■ Centering ■ Measurement
Manual	The workpiece setter function can be added
Workpiece zero point setting and centering are possible	

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.

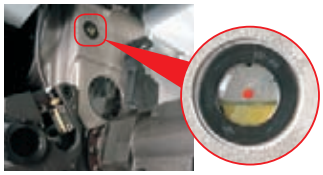
Reduction in environmental burden

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.

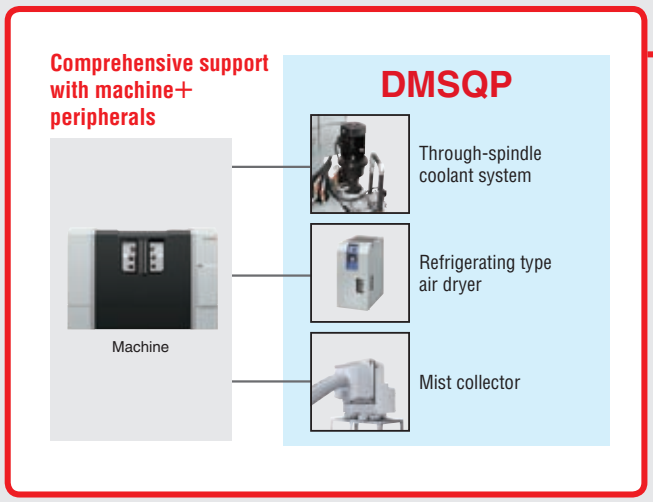
DMSQP (DMG Mori Seiki Qualified Products) OP

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 (NHX10000)

☐ **Through-spindle coolant system (unit on coolant tank)**
Coolant is supplied to the tool tip through the center of the tool and spindle.

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

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

☐ **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.

☐ **Rotary window**
Coolant scattered on the machining chamber window is removed to check the inside of the machine during machining.

☐ **Tool wagon**

☐ **Tool cabinet**

☐ **Basic tooling kit**

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

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

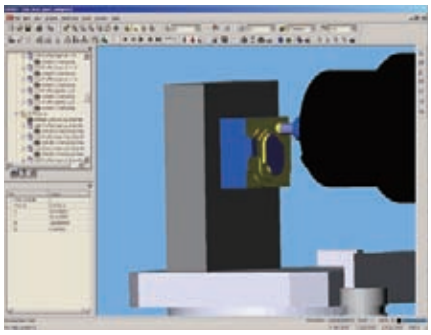
MORI-APM OP

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

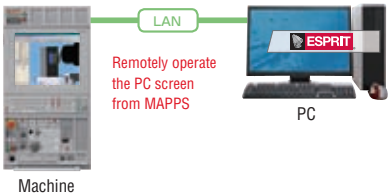
ESPRIT® allows you to create complex 3D programming with high-added value. By just installing the software on your PC with connection to LAN, you will be able to use it. (Once the software is started on the computer, it can be used for up to 7 days without LAN connection)



- **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)

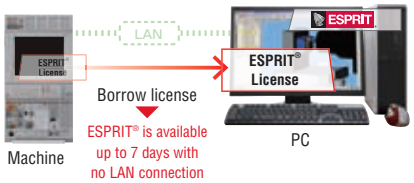
Remote Desktop <Patent pending>

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 June 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.

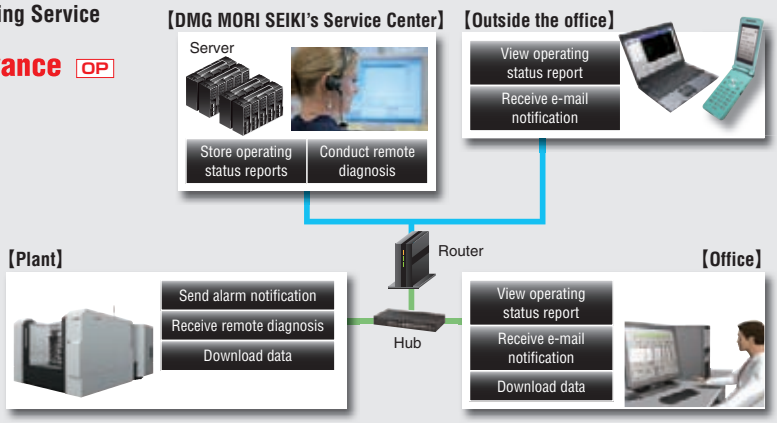
【Internet】
【LAN】

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.

Upon receiving the alarm, the Service Center will contact the customer by phone. (Manual or Automatic alarm sending is selectable)

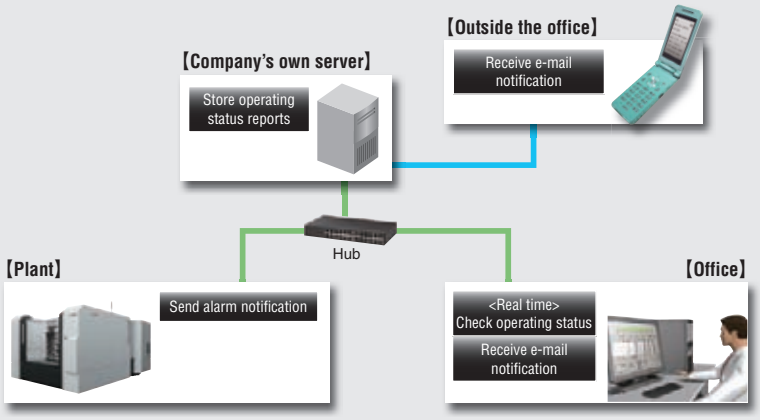
● This service may not be available in some areas. Please contact our sales representative for details.

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

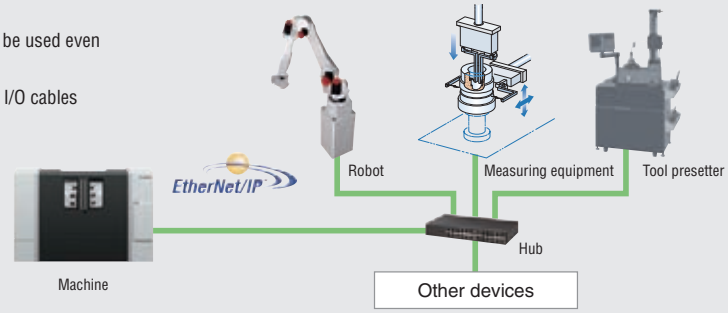
MAPPS EtherNet/IP I/F OP

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

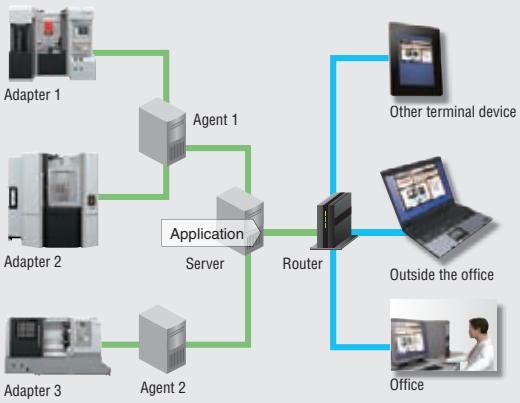
MAPPS MTConnect I/F

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				NHX10000
Travel	X-axis travel <longitudinal movement of saddle>		mm (in.)	1,700 (66.9)
	Y-axis travel <vertical movement of spindle head>		mm (in.)	1,400 (55.1)
	Z-axis travel <cross movement of pallet>		mm (in.)	1,510 (59.4) <1,550 (61.0) when B-axis is at 0°>
	Distance from pallet surface to spindle center		mm (in.)	50—1,450 (2.0—57.1)
	Distance from pallet center to spindle gauge plane		mm (in.)	140—1,650 (5.5—65.0) <100—1,650 (3.9—65.0) when B-axis is at 0°>
Pallet	Distance from floor surface to pallet surface		mm (in.)	1,400 (55.1)
	Pallet working surface		mm (in.)	1,000×1,000 (39.4×39.4)
	Pallet loading capacity		kg (lb.)	3,000 (6,600) [5,000 (11,000) <not applicable for CPP, LPP specification>]
	Max. workpiece swing diameter		mm (in.)	2,000 (78.7)
	Max. workpiece height		mm (in.)	1,600 (62.9)
	Pallet surface configuration			M20 (3/4-10 UNC) Tap: 80 Holes. Pitch 100 mm (4 in.)
	Minimum pallet indexing angle			1° [0.001° <full 4th axis rotary table>] <90°>
	Pallet indexing time <90°> <including clamping and unclamping time>	1° indexing	s	3,000 kg (6,600 lb.): 3.1 [5,000 kg (11,000 lb.): 3.6]
		Full 4th axis rotary table	s	[3,000 kg (6,600 lb.): 1.8] [5,000 kg (11,000 lb.): 2.0]
Spindle	Max. spindle speed		min^{-1}	10,000 [15,000] [6,000]
	Number of spindle speed ranges			1
	Type of spindle taper hole			No. 50 [HSK-A100]
	Spindle bearing inner diameter		mm (in.)	100 (3.9) [120 (4.7) <6,000 min^{-1}>]
Feedrate	Rapid traverse rate	10,000 min^{-1}	mm/min (ipm)	X, Y, Z: 50,000 (1,968.5)
		[10,000 min^{-1}] <high output>	mm/min (ipm)	
		[15,000 min^{-1}] <high speed>	mm/min (ipm)	
		[6,000 min^{-1}] <high torque>	mm/min (ipm)	X, Z: 50,000 (1,968.5) Y: 40,000 (1,574.8)
	Feedrate		mm/min (ipm)	X, Y, Z: 1—50,000 (0.04—1,968.5) <look-ahead control>
	Max. rotational speed		min^{-1}	B: 23 [20 <full 4th axis rotary table>]
	Jog feedrate		mm/min (ipm)	0—5,000 (0—197.0) <20 steps>
ATC	Type of tool shank			BT50 [DIN50] [CAT50] [HSK-A100] <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>] [CAT] [DIN]
	Tool storage capacity <including one tool at the spindle side>			Chain-type: 60 [80] [100] [120] Rack-type: [180] [240] [330] <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. 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 (31.3) [1,000 (39.3) <long tool specifications>]
	Max. tool mass		kg (lb.)	30 (66)
	Max. tool mass moment <from spindle gauge line>		N·m (ft·lbf)	29.4 (21.6) <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			Fixed address, shorter route access
	Tool changing time	Tool-to-tool	s	1.9
	● The time differences are caused by the different conditions (travel distances, etc) for each standard.	Cut-to-cut (chip-to-chip) ISO 10791-9 JIS B6336-9	s	60-tool specifications: 5.7 <min.>/16.7 <max.> [120-tool specifications: 5.9 <min.>/41.5 <max.>]
APC	Number of pallets			2
	Method of pallet change			Turn-type
	Pallet changing time		s	22 [41 <5,000 kg (11,000 lb.)>]
Motor	Spindle drive motor	10,000 min^{-1}	kW (HP)	40/30/25 (53.3/40/33.3) <15%ED/30 min/cont>
		[10,000 min^{-1}] <high output>	kW (HP)	30/25 (40/33.3) <30 min/cont>
		[15,000 min^{-1}] <high speed>	kW (HP)	
		[6,000 min^{-1}] <high torque>	kW (HP)	55/45/37 (75/60/50) <25%ED/30 min/cont>
	Feed motor	X axis	kW (HP)	5.5 (7.5)×2
		Y axis	kW (HP)	8.3 (11.1) [5.5 (7.5) <6,000 min^{-1}>]
		Z axis	kW (HP)	5.5 (7.5)×2 [6.0 (8)×2 <5,000 kg>]
		B axis	kW (HP)	4 (5.3) [full 4th axis rotary table: 9.0 (12.0) <cont>/19.8 (26.4) <max.>]
	Coolant pump motor		kW (HP)	1.2 (1.6) <spindle>, 1.2 (1.6) <chip removable>, 2.2 (3) <shower coolant>
Power source <standard>	Electrical power supply <cont>	I94280A03	kVA	71.8
	Compressed air supply		MPa (psi), L/min (gpm)	0.5 (72.5), 740 (195.4) (when the tool tip air blow is regularly used, air supply of more than 300 L/min (79.2 gpm) is separately required) <ANR>
Tank capacity	Coolant tank capacity		L (gal.)	1,650 (435.6)
Machine size	Machine height (from floor) <60-tool specifications>		mm (in.)	3,940 (155.1) [3,721 (146.5) <6,000 min^{-1}>]
	Floor space (width <60-,100-,120-tool specifications>×depth <60-tool specifications>)		mm (in.)	5,770×9,070 (227.2×357.1)
	Mass of machine <60-tool specifications>		kg (lb.)	41,500 (91,300)
Noise data	A-weighted, time-average radiated sound pressure level		dB	60—73 (Measurement uncertainty is 4 dB)

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

- 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.
- Max. tool diameter: the maximum tool diameter is limited to 255 mm (10.0 in.) or less when using the spindle at 10,000 min^{-1} or higher.
- Please use a two-face contact tool when cutting at higher than 10,000 min^{-1}.
- 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 °C (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 10,000 min^{-1}. Please contact our sales representative for details.
- The information in this catalog is valid as of June 2013.

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.

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

NHX10000-EA04ABD(N)
D.1310.CDT.0000
Created in Japan