

NH8000 DCG

MORI SEIKI



High Precision Horizontal Machining Center

NH8000 DCG

MORI SEIKI
THE MACHINE TOOL COMPANY



Presenting the ideal machining center.



DCG™

Driven at the Center of Gravity

C O N T E N T S

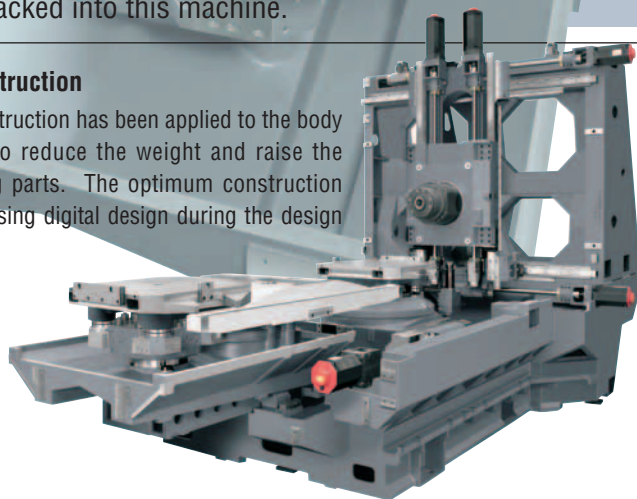
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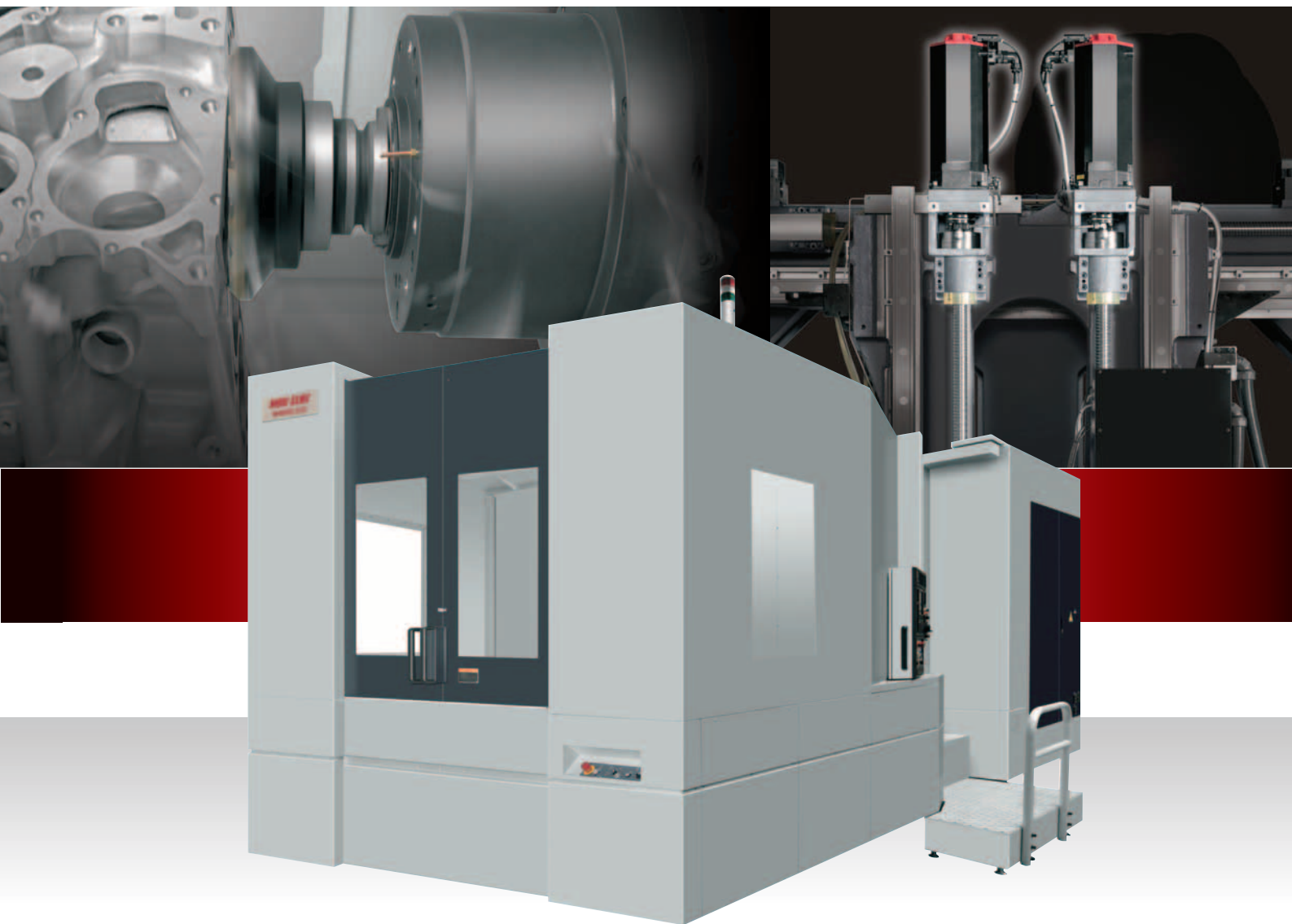
It's been 50 years since the birth of the machining center. As performance reaches maturity, we at Mori Seiki decided to wipe the slate clean and take a completely fresh look at machine tool design. The result was "Driven at the Center of Gravity," a method to minimize the vibration of moving parts. The perfect "Driven at the Center of Gravity" system was made possible for the NH8000 DCG by achieving the ideal form of the machining center. It fuses high speed and high quality at a top level.

However, the machining center still has room to grow. This is proven by how much of the future is packed into this machine.

Box in Box construction

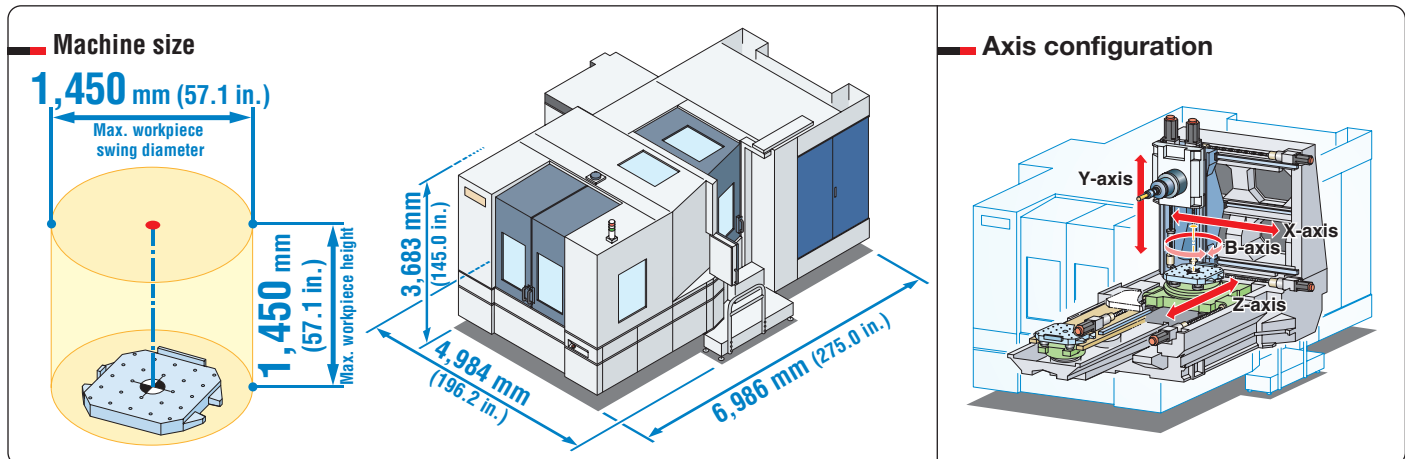
A box-in-box construction has been applied to the body design in order to reduce the weight and raise the rigidity of moving parts. The optimum construction was determined using digital design during the design stage.





High Precision Horizontal Machining Center

NH8000 DCG



● Figures in inches are converted from metric measurements.

“Driven at the Center of Gravity” – Changing the Face of Cutting



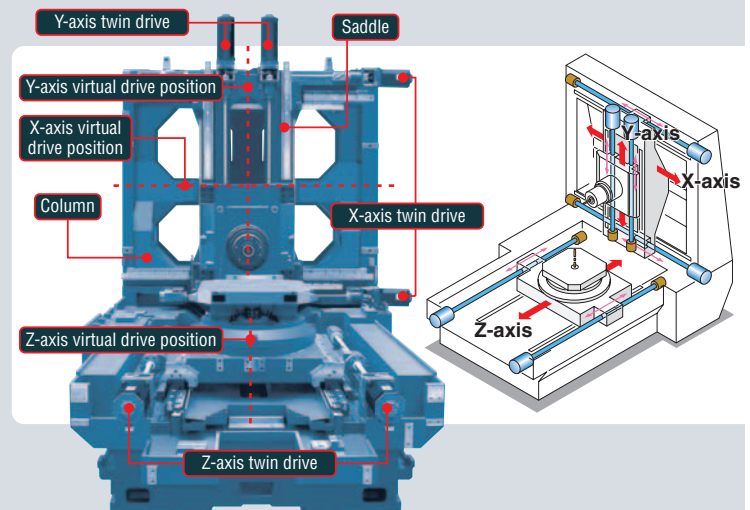
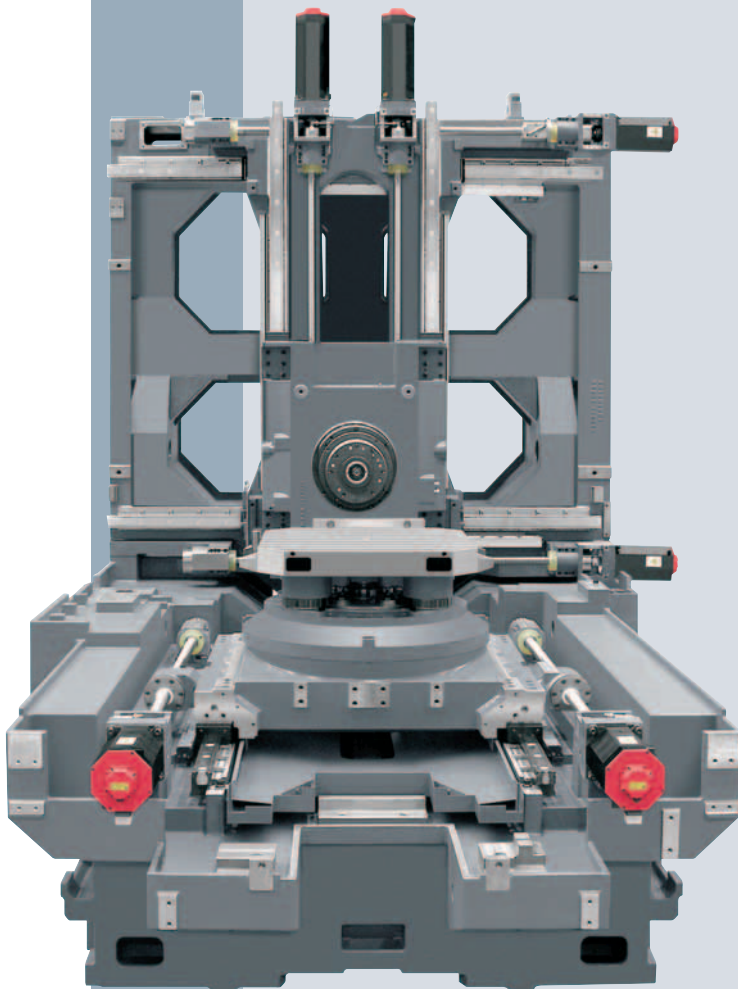
DCG™

Driven at the Center of Gravity

Vibration is the enemy of machine tools. The vibration created by moving components is the biggest factor in slowing machines down and lowering precision. At Mori Seiki, we have succeeded in minimizing vibration by creating the “Driven at the Center of Gravity” technology (DCG™).



By pushing the center of gravity of the structure with two ball screws, the vibration created during travel is controlled.



Box in Box construction

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

3-axis Twin-Drive System

We use two ball screws on all three axes (X, Y, and Z). Because we put the “Driven at the Center of Gravity” technology to use on all three axes, vibration is minimized.

■ The DCG™ Advantage

Reduction of machining time

Improved machining precision

Improved contouring precision

**Vibration
Controlled**

Improved surface quality

Longer tool life

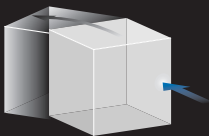
The “Driven at the Center of Gravity” technology fundamentally improves the following areas by controlling vibration.



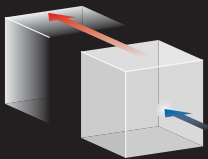
This is the Mori Seiki approach to “Driven at the Center of Gravity”.

~Driven at the Center of Gravity: The story behind its development and the advantages it can bring you~

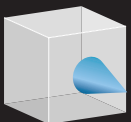
The “Driven at the Center of Gravity” principle



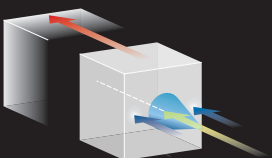
If the edge of the part is being pushed, balance is lost and vibration is created.



If the center of gravity is pushed, the part moves straight without any vibration.



Machine tools hold objects above the center of gravity, making it impossible to push them at the center of gravity.



However, if the edges on other side of the center of gravity are pushed, the object moves straight.

1 A breakthrough in high-speed, high-precision machining technology after 15 years.

Starting in the mid-1980s, machine after machine was produced for high speed and high precision. The biggest challenges during the first 10 years were size and speed and spindle motors, developing the technology to deal with the resultant heat, designing machines to match fast NC devices, and other areas. The results were quite impressive. However, the past 5 years have seen a loss of direction in the search for technologies to increase speed and precision. Machining time was only slightly reduced by increasing speed, but on the other hand speed had to be sacrificed for higher precision or surface quality.

In comes “Driven at the Center of Gravity” – a technology created by approaching the actual movement dynamics of the machine. Any machine tool engineer worth his salt knows it’s always better to push against the center of gravity. Few engineers thought about why this is so important.

At Mori Seiki, we believe this technology will make possible the most fundamental improvements in machining time, precision, surface quality, and tool life. This principle is common to all machine tools in which the tool and the workpiece move relatively to each other, not just machining centers.

Mori Seiki machines using the “Driven at the Center of Gravity” principle can move as instructed, accurately and with ease.

2 Driven at the Center of Gravity

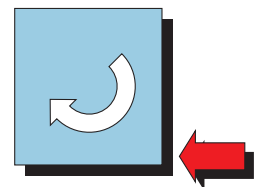
The “Driven at the Center of Gravity” principle reduces machining time, improves contouring precision, and delivers better surface quality. Everyone knows you have to push something at its center of gravity; otherwise it will spin and become unstable. “So push it at the center” – that, in so many words, is the “Driven at the Center of Gravity” principle. (Fig. 1)

Machine tools use ball screws and linear motors to move tools and workpieces. If they are pushed at their center of gravity, moving them poses no problem, although, sometimes this is not true.

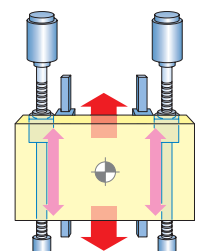
Why? Take, for example, the axis that moves the spindle up and down in a vertical machining center. The center of gravity of the spindle is the center of the spindle itself, but you cannot put a ball screw there.

On the other hand, the center of gravity of the axis which moves the table back and forth in a horizontal machining center is somewhere just above the surface of the table when working with a heavy workpiece. In other words, the table’s center of gravity is inside the workpiece. There is no way you can get a ball screw in there, either.

The solution? At Mori Seiki, we had the idea to enclose the center of gravity with two drive points on either side. The line connecting the middle of two ball screws would have to pass through the center of gravity of the object being moved. (Fig. 2)



(Fig. 1)



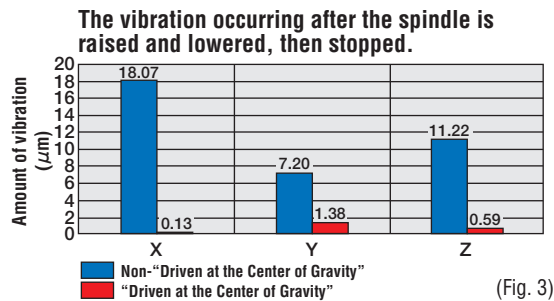
(Fig. 2)



3 Vibration during axis travel

So what, specifically, are the advantages of the “Driven at the Center of Gravity” innovation? In a word (or two): less vibration. The graph (Fig. 3) compares vibration in our “Driven at the Center of Gravity” machines and standard machines.

■ shows the amount of vibration during travel in the NV4000 DCG without the “Driven at the Center of Gravity” principle applied. ■ shows the same situation, but with the principle applied. The results are dramatic and clear.



4 What’s so bad about vibration?

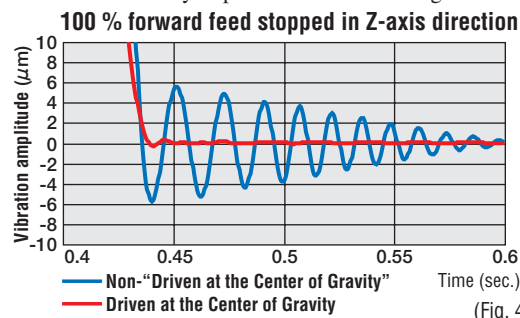
This graph (Fig. 4) shows a time-based representation of vibration. Note how the “Driven at the Center of Gravity” machine stops the vibration almost right away, while the ordinary machine continues to vibrate long after.

At the edge of the vibrating machine, a tool and a workpiece are attached. Obviously, the vibration will adversely affect the quality of the machined surface.

Additionally, if the tool enters the workpiece while both are vibrating, the tool tip will wear down. Vibration is the natural enemy of tool life.

There is an even graver problem. When there is vibration, the NC device reacts to it by deviating from the instructions and attempts to correct it by moving the feed motor. This, of course, results in even more vibration in most cases.

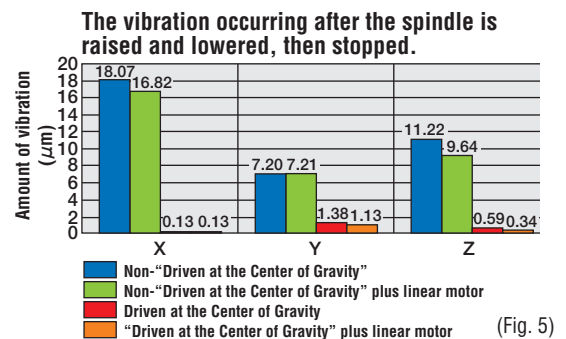
Engineers are familiar with this phenomenon, so to counteract it, they adjust the NC device to react with less sensitivity. In other words, they make the NC device ignore minor discrepancies. As a result, operating precision plummets or speed is sacrificed. Therefore, vibration could be called the natural enemy of precision and machining time.



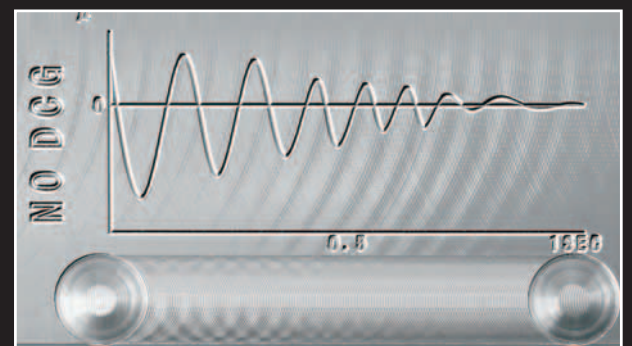
5 Why linear motors?

Linear motors are touted as the end-all be-all when discussing dynamic characteristics of machine tools, supposedly because the ball screw acts as a torsion bar. Is this really the case when compared with the “Driven at the Center of Gravity” principle? The graph (Fig. 5) adds a linear motor to the previous graph (Fig. 3).

■ is a non-“Driven at the Center of Gravity” machine with a linear motor and ■ is a “Driven at the Center of Gravity” machine with a linear motor. The effects of the linear motor are negligible compared with those of the “Driven at the Center of Gravity” design.



Minimize residual vibration of the tool tip



《without DCG™》



《with DCG™》



6 Improving machined surface quality

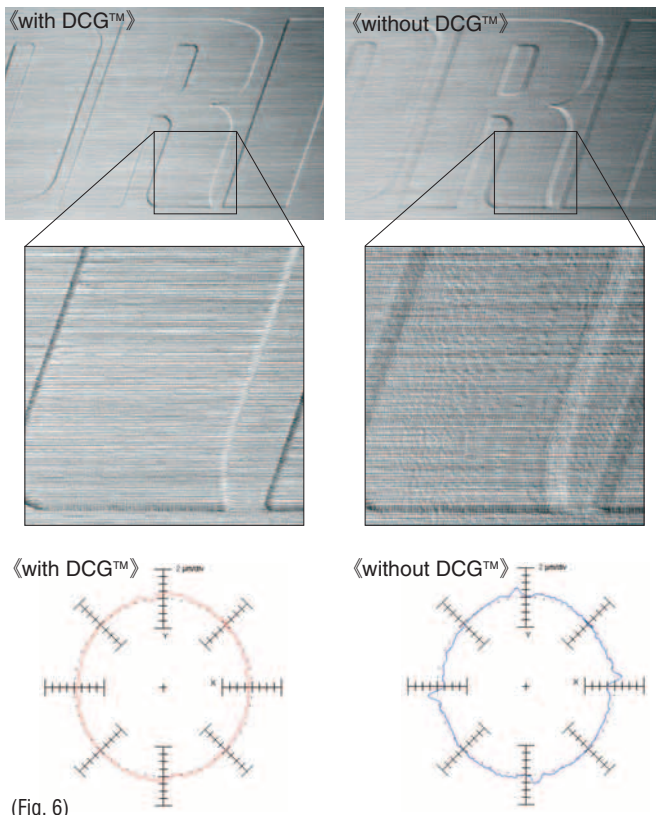
The “Driven at the Center of Gravity” design is said to be effective in improving machined surface quality. Let’s examine this claim.

Machining of curved surfaces is a major part of die and mold machining. The curved surface can be looked at as a succession of subtle polygonal lines – the direction of travel changes ever so slightly at each corner along the line. In order to make these changes without losing speed, powerful acceleration is needed, even if the changes in direction are only slight.

At each point where acceleration starts, rotational vibration proportional to the distance between the drive point and the center of gravity occurs. This is particularly noticeable when the machining point descends down the side of a pocket, reaches the bottom, and then suddenly changes direction. The unstable lines in Picture are traces of a sudden change in direction by the machining point in an ordinary machine.

However, the “Driven at the Center of Gravity” technology gets to the heart of the cause of deterioration in the quality of the machined surface.

Another example of this type of sudden change in direction is the cutback during round cutting. This problem occurs when the tool cuts into the workpiece at 0°, 90°, 180°, and 270°. Roundness is very important when replacing boring with contouring using an end-mill that easily makes diameter correction. The “Driven at the Center of Gravity” technology improves roundness, too. (Fig. 6)



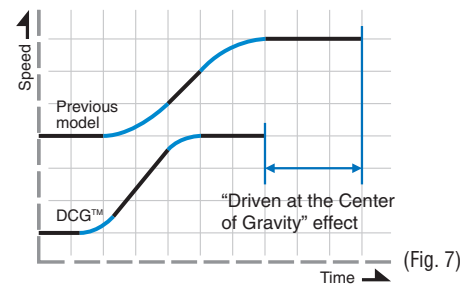
(Fig. 6)

7 Reduction of machining time

The “Driven at the Center of Gravity” innovation is very useful for reducing machining time.

Machines that are “Driven at the Center of Gravity” produce little vibration at the start of acceleration, which means they can accelerate at full force right from the start. Machines not endowed with this innovative technology, however, must apply accelerating force gradually, for fear of creating too much vibration when starting to accelerate.

This graph (Fig. 7) shows non-“Driven at the Center of Gravity” machines on top and “Driven at the Center of Gravity” machines on bottom. It clearly shows the difference in time to maximum acceleration when starting to accelerate, indicated by the blue curve, creates a very large gap in the time it takes to reach maximum speed.



(Fig. 7)

8 Gain

Is the “Driven at the Center of Gravity” innovation necessary on all axes? The point of using “Driven at the Center of Gravity” technology is to reduce the amount vibration caused when an axis begins moving. This vibration is caused when the location being pushed and the center of gravity of the object being moved are not the same. If the difference is minor, then this innovative technology is not needed. That’s where gain comes into play, so let’s take a closer look.

Gain is a parameter used to control the accuracy of a machine’s movement. The greater the gain, the more a machine tries to move accurately in accordance with its control instructions. Some machines cannot follow those instructions faithfully, causing a great deal of variation in the movement.

Machine designers know you can set the gain high on a good machine but cannot on a bad machine, so they try to find ways to raise the gain. The size of the gain can vary within the same machine, depending on the axis involved. Some axes can handle high gain, and some cannot. At Mori Seiki, we think this depends on the distance between the center of gravity and the drive point.

Therefore, it is not unreasonable to say there is little need to add ball screws or use careful axis-center drive on axes when distance is short and gain can be set high.

High speed

The NH8000 DCG's High-Speed Performance - A Recipe for Productivity

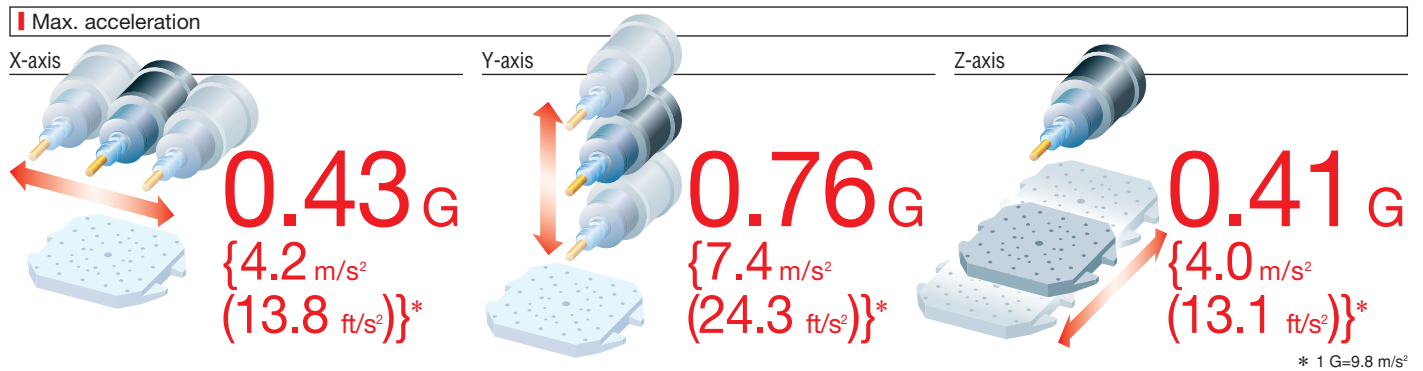
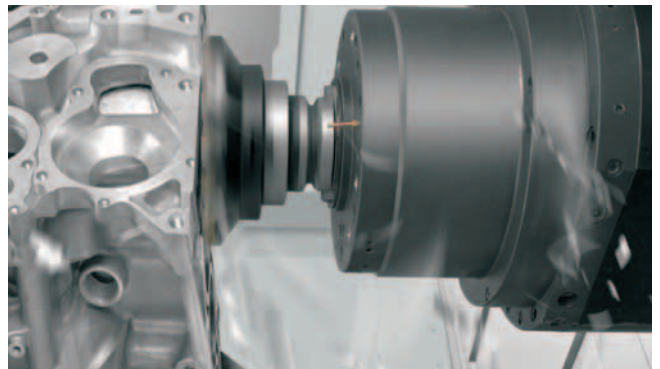
One of the biggest challenges facing horizontal machining centers, machines that must always attain greater efficiency, is the reduction of the machining time. The NH8000 DCG has been designed with a twin-drive system on all linear axes – X/Y/Z. By applying DCG™ to all axes, acceleration is speeded up and machining time is reduced. We've also worked to reduce non-cutting time by reviewing the specs of other components, like the spindle, table, and feed. Let's take a closer look at the NH8000 DCG's high-speed performance, and how it can improve productivity.

■ Rapid traverse rate <X-/Y-/Z-axis>

50 m/min
(1,968.5 ipm)

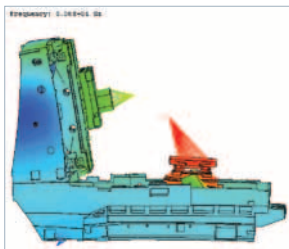
DCG™ Delivers Unrivalled Acceleration

Earlier machines have always hit a limit on how much the spindle acceleration could be raised, because of the load created by vibration of traveling parts. However, the NH8000 DCG achieves unprecedented acceleration rates due to the “Driven at the Center of Gravity” innovation.



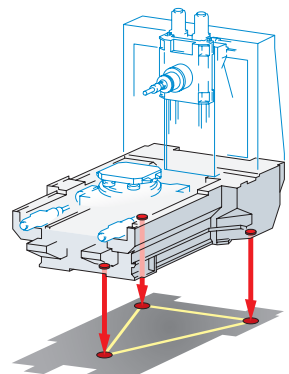
Box-in-box Design – Bringing Out Speed and Acceleration

The NH8000 DCG uses a box-in-box design that supports the saddle from both edges. This makes it possible to guide and drive the moving component from its center of gravity with better balance. At the same time, this improves the compatibility of the servomotor, delivering never-before-reached speed and acceleration.



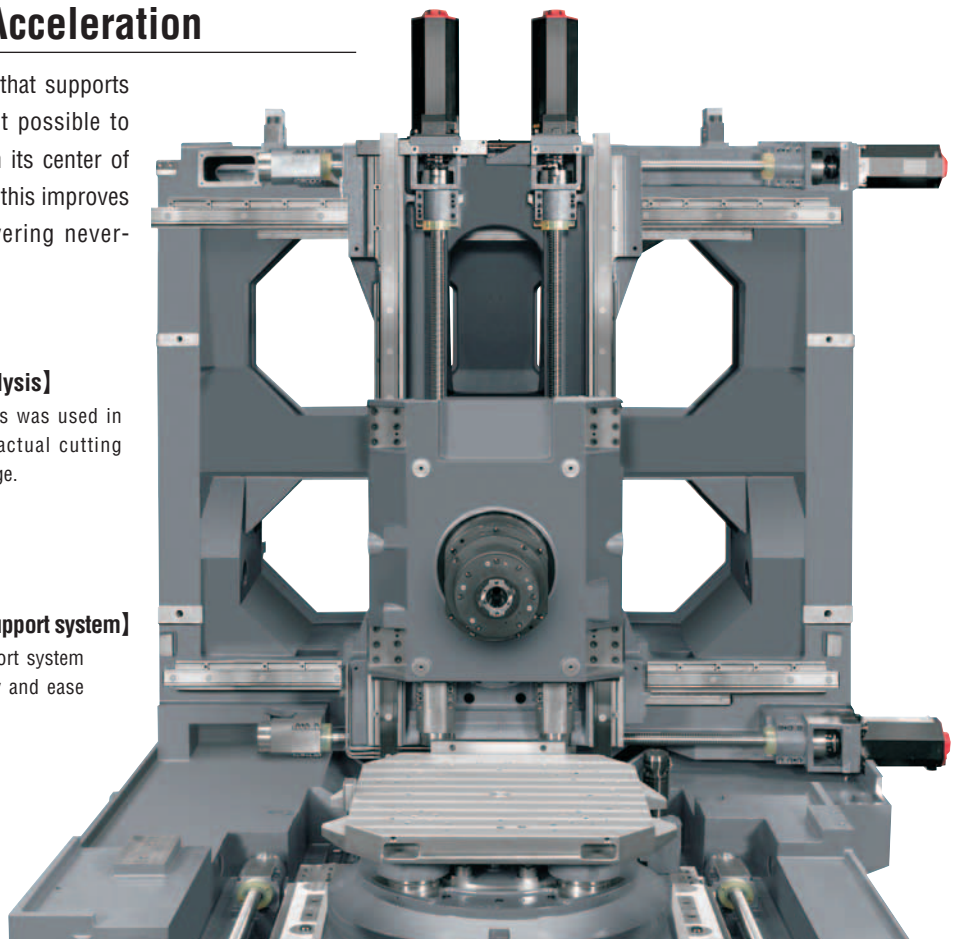
[Dynamic analysis]

Dynamic analysis was used in simulations of actual cutting during design stage.



[Three-point support system]

Three-point support system provides stability and ease of installation.



NH8000 DCG

Spindle

From high-speed machining to powerful cutting – all bases are covered.

The NH8000 DCG's spindle uses a high-efficiency DDS motor that can handle everything from high-speed machining to powerful cutting. This machine handles all types of materials from steel to aluminum and other non-ferrous metals.



● The photo shows 8,000 min⁻¹

Max. spindle speed

10,000 min⁻¹ 10,000 min⁻¹*1 **OP**
15,000 min⁻¹ 15,000 min⁻¹*2 **OP**
8,000 min⁻¹ 8,000 min⁻¹*3 **OP**

Acceleration

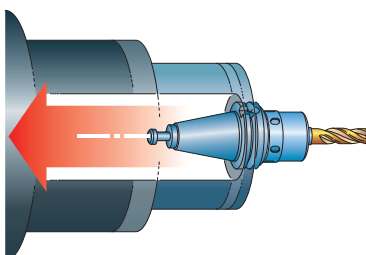
Spindle acceleration time (0→10,000 min⁻¹)

Previous model **NH8000 DCG** Compared against previous model
3.9 sec. → **3.20 sec.** → **Reduced by 18 %**

Spindle deceleration time (10,000→0 min⁻¹)

Previous model **NH8000 DCG** Compared against previous model
3.8 sec. → **3.36 sec.** → **Reduced by 12 %**

Tool clamp power



27,000 N

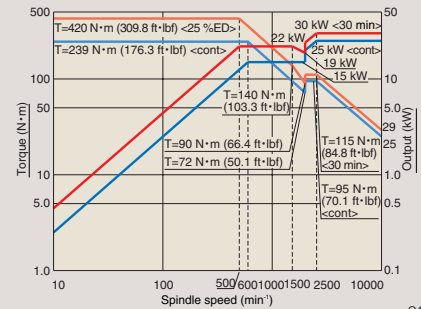
Using the newly developed collet, clamping power on the tool has been increased. The ability to control vibrations during spindle rotation assures high accuracy processing.

DDS: Direct Drive Spindle *1 High output *2 High speed *3 High torque

Spindle speed-torque/output diagram

Standard

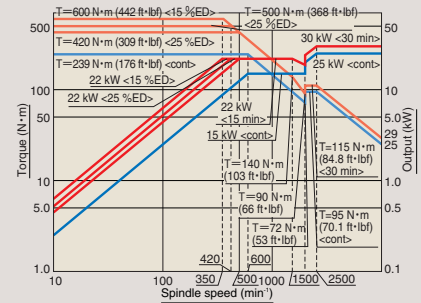
- 30/25 kW (40/33.3 HP) <30 min/cont>
- Max. spindle speed: 10,000 min⁻¹



Q43605A04

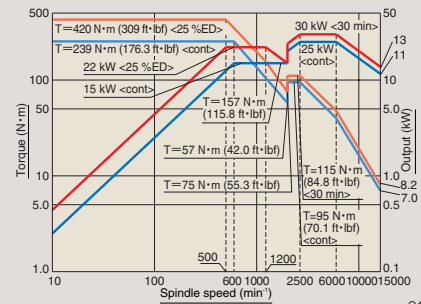
High output (option)

- 30/25 kW (40/33.3 HP) <30 min/cont>
- Max. spindle speed: 10,000 min⁻¹



High speed (option)

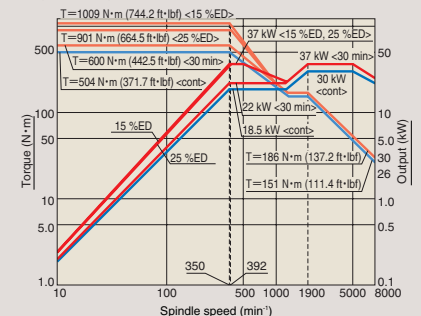
- 30/25 kW (40/33.3 HP) <30 min/cont>
- Max. spindle speed: 15,000 min⁻¹



Q43603A04

High torque (option)

- 37/30 kW (50/40 HP) <30 min/cont>
- Max. spindle speed: 8,000 min⁻¹

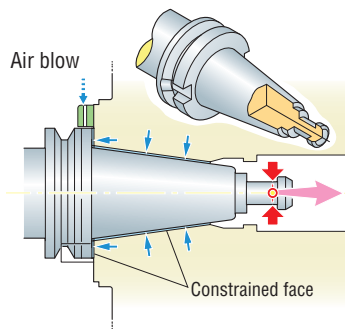


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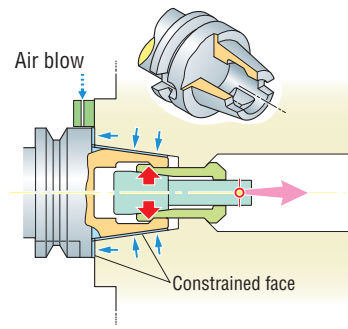
Flange contact specification

All Mori Seiki spindles are made in-house to better meet our customer needs. Contact Mori Seiki for more information.

BT specification

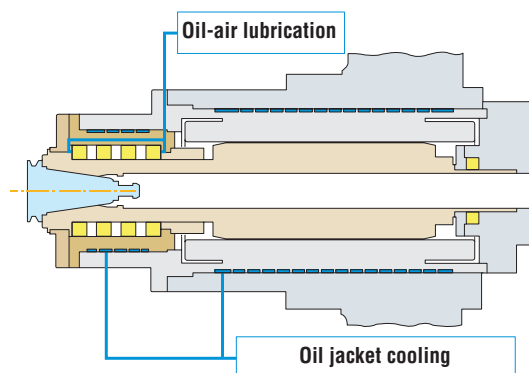


HSK specification



Spindle lubrication

- Oil feed is kept to a minimum to reduce frictional loss.
- Air purge prevents dust infiltration.



Oil circulated through a jacket surrounding the spindle minimizes thermal displacement.

Oil cooler

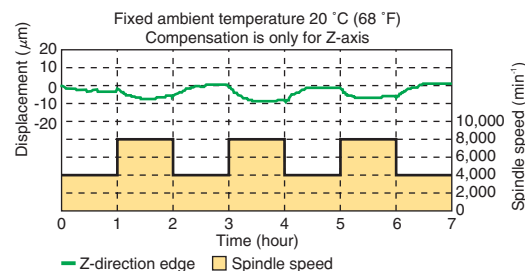
Cooling oil is circulated to counter thermal displacement.



Dynamic Thermal Displacement Control

Minimizes thermal displacement of the spindle

Processing accuracy is stable and can be maintained even over long periods of use.



- The cutting test results indicated in this catalog are provided as an example. The results indicated in this catalog may not be obtained due to differences in cutting conditions and environmental conditions during measurement.

ATC

Tool changing time (chip-to-chip)

Previous model
6.4 sec. ▶ **NH8000 DCG 5.5 sec.**

Compared against previous model

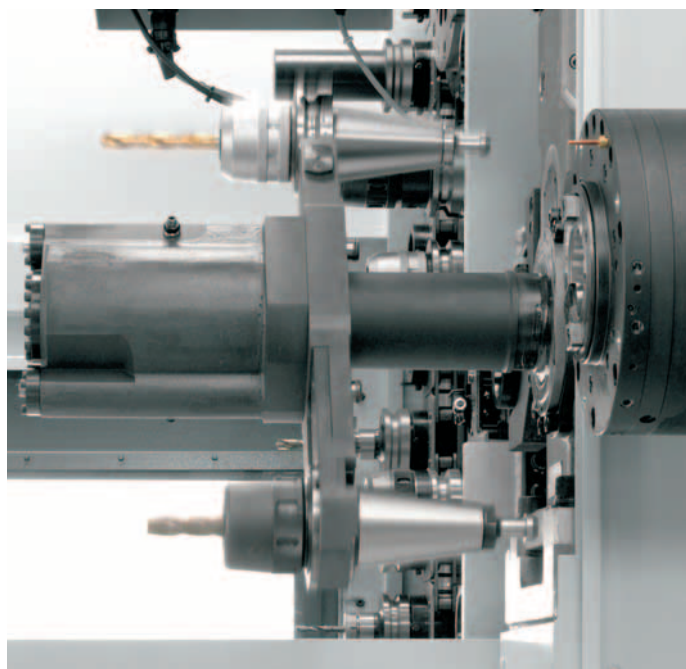
Reduced by **14 %**

Tool changing time (tool-to-tool)

Previous model
3.5 sec. ▶ **NH8000 DCG 2.1 sec.**

Compared against previous model

Reduced by **40 %**



NH8000 DCG

Table, APC

Greater speed through the direct drive.

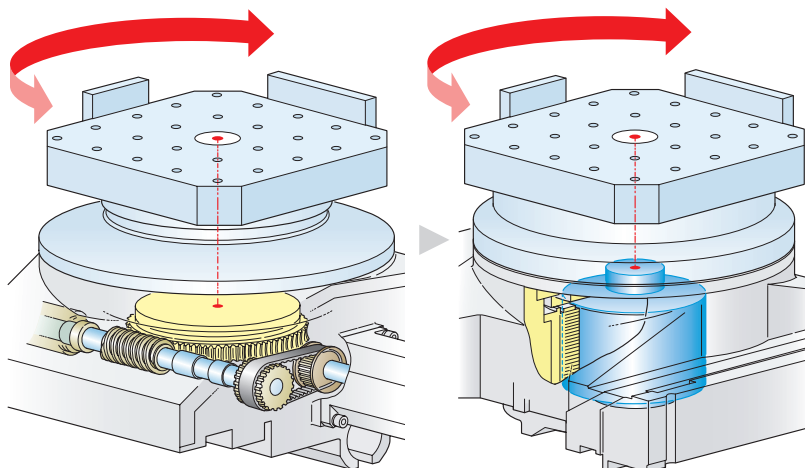
The new rotary table uses a direct drive system and delivers greater speed and high positioning precision. Not only does it handle multicavity machining, B-axis outer diameter cutting is also no problem.



B-axis control

OP

Changing from the worm gear system used on previous models to a direct drive servo (DDS) has made indexing much faster.



Previous model
《Worm gear》

NH8000 DCG
《Direct drive servo》



The NH8000 DCG can perform outer diameter cutting using the rapid B-axis. Machining is possible for large workpieces that would otherwise be impossible to chuck.

Maximum rotational speed of the table

100 min⁻¹

2-station turn-type APC



Pallet changing time

14 sec.

Table



Minimum table indexing angle

1° [0.001°*1]

Table indexing time*2

2.1 sec. [1.7 sec.*1] (90°)

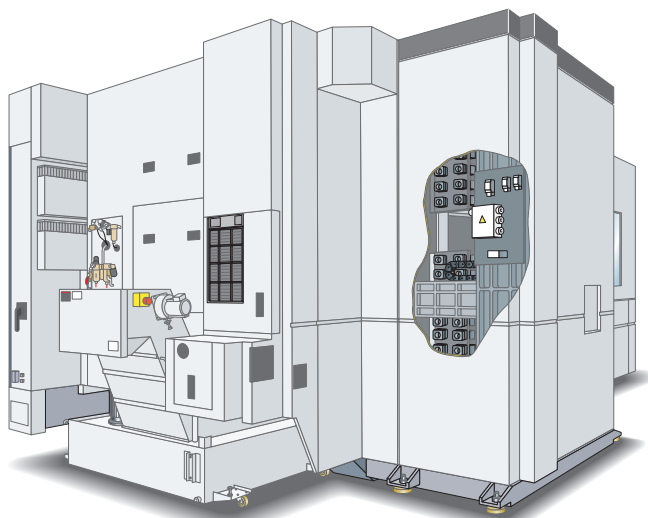
[] Option

*1 Full 4th axis rotary table.

*2 Including clamping and unclamping time.

Tool magazine

Rack-type magazine



The magazine unit is separated from the machine body.

Tool storage capacity

60-tool*
140-tool* **OP**
180-tool* **OP**
240-tool* **OP**
330-tool* **OP**

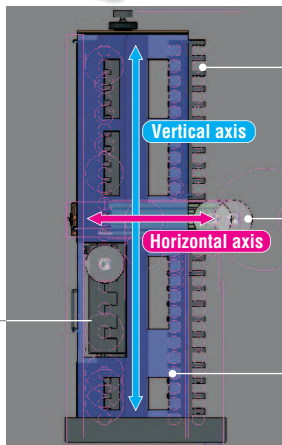
Reduction of tool prep time

2-axis servo drive

Improved tool transport speed thanks to the 2-axis servo drive.

No tilting arm is needed

The transport device moves directly to the location where the ATC is standing by.



Tool shelf
 $\phi 110 \text{ mm}$
($\phi 4.3 \text{ in.}$)

Vertical axis

Horizontal axis

ATC standby location

Tool shelf
 $\phi 300 \text{ mm}$
($\phi 11.8 \text{ in.}$)

Tool shelf
 $\phi 150 \text{ mm}$
($\phi 5.9 \text{ in.}$)

Separation of magazine unit

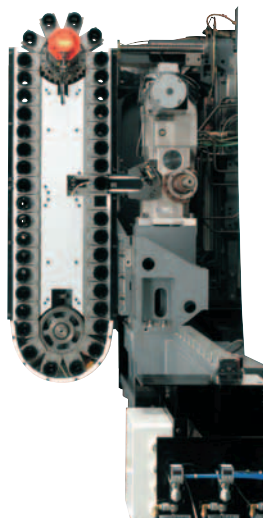
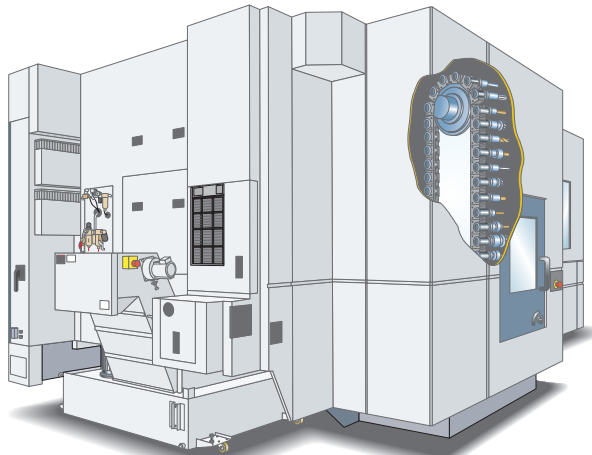
The static precision of the main body is unaffected

Since the magazine is separated from the body of the machine, the weight of the magazine has no effect, ensuring stable static precision for the machine body.

Unaffected by magazine vibration

As a result of the magazine being separated from the body, vibration from the magazine does not create cutter marks in workpieces being machined.

Chain-type magazine



Tool storage capacity

40-tool*

A chain-type magazine specification is also available as an option.
 Magazine design which does not increase machine width.

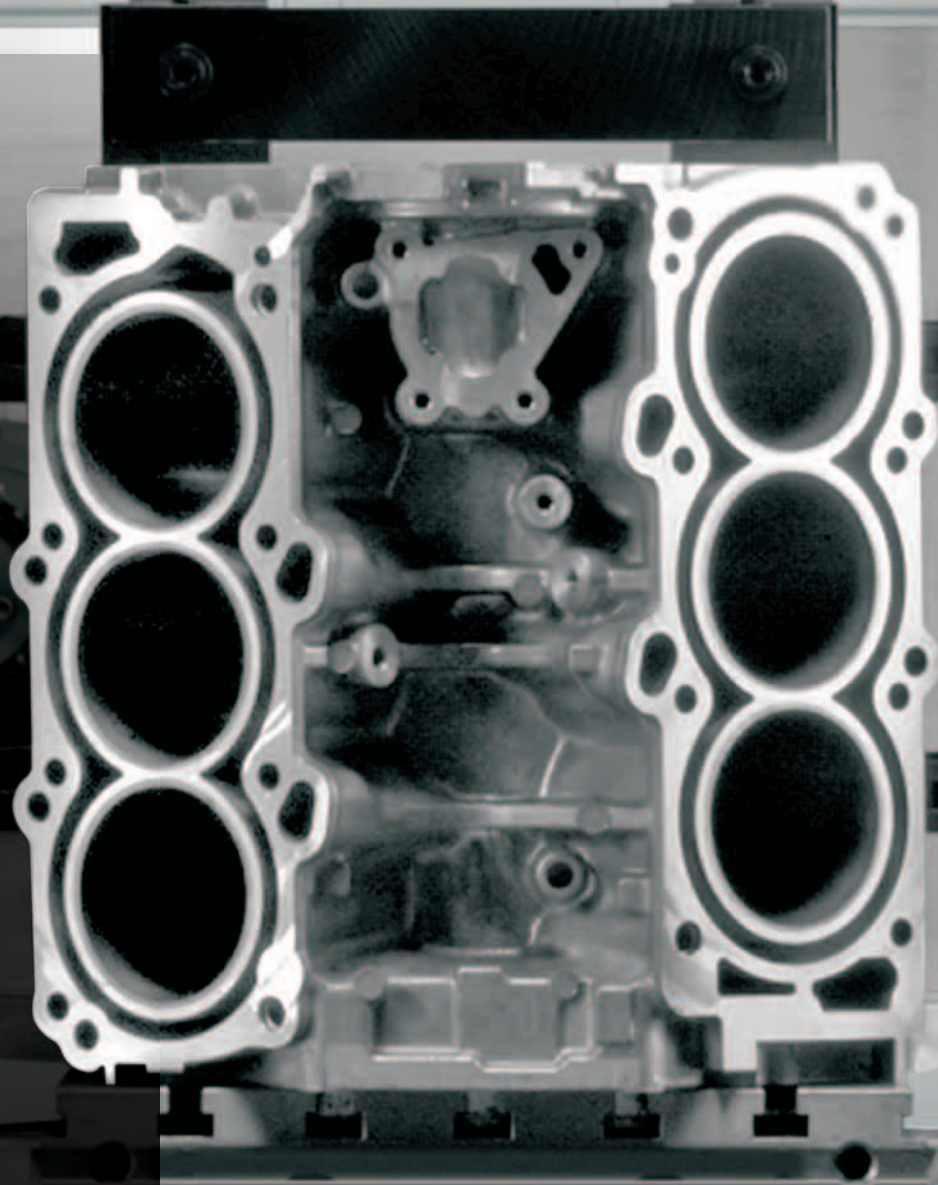
* Including a dummy tool.

NH8000 DCG

High precision

High Precision and High Quality That Only DCG™ Can Deliver

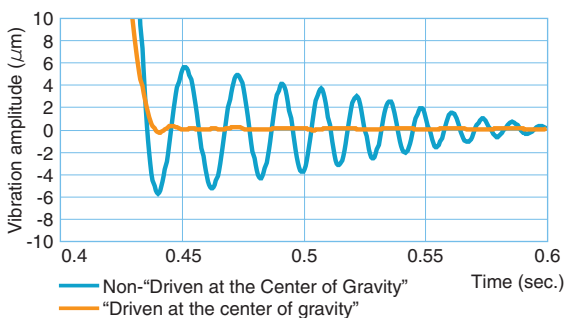
Besides higher speed, the other advantage DCG™ delivers is high precision. The NH8000 DCG uses DCG™ technology to reduce vibration, making dramatic improvements in surface quality and roundness. Serious effort has been made to improve total machining precision and surface quality by controlling heat from parts that produce heat and implementing improvements positioning precision. Because of all of these improvements, continuous machining provides you with a stable supply of high-precision workpieces.



Eliminating Vibration As Soon As the Spindle Stops

You can see from the graph below that while DCG™ eliminates vibration quickly, machines not equipped with it continue vibrating for a long time after the spindle stops. Since vibration affects surface quality, and at the same time causes NC devices to mistakenly detect such movement as deviations from instructions, this causes them to adjust the feed motor to correct these perceived discrepancies. These actions result in even more vibration in most cases.

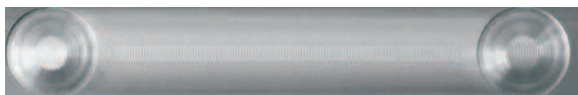
100 % forward feed stopped in Z-axis direction



▼ Without DCG™

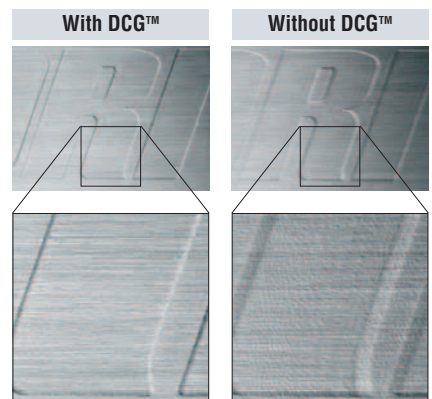


▼ With DCG™



The DCG™ Effect – Improving Surface Quality

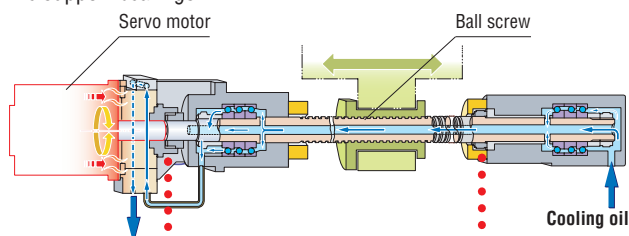
Curved machined surfaces are actually made up of many very short straight lines, which means the moving component has to change direction ever so slightly at every angle. In order to do this without dropping speed requires very fast acceleration. The vibration caused by each revolution is proportional to the distance from the drive point to the center of gravity for all start points; but DCG™ controls this vibration and prevents a drop in surface quality.



Always Evolving – Mori Seiki's High-Precision Machining Technology

Ball screw cooling

Ball screw axle coolant which also flows through the support bearings.

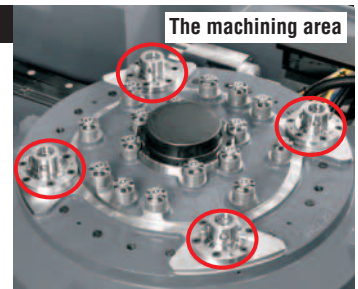
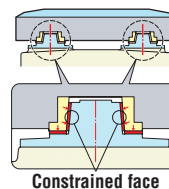


This prevents heat from the motor from transferring to the ball screws.



Pallet clamp system

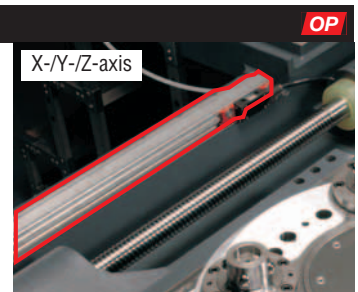
A flange contact taper cone with excellent clamping power and high pallet-positioning precision.



● Auto-coupler specifications pictured

Direct scale feedback

The absolute positioning optical scale demonstrates unequalled positioning accuracy and can be used for the X-/Y-/Z-axis.



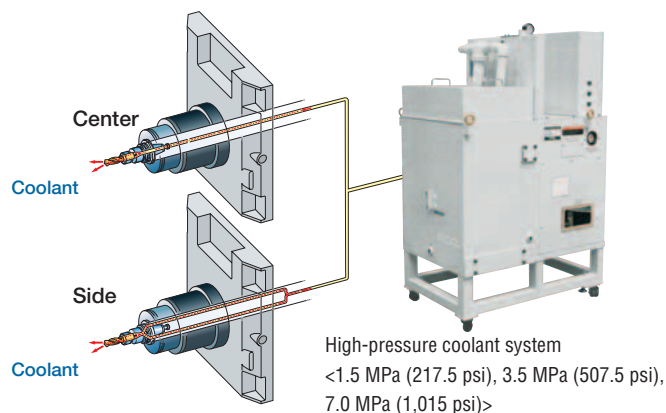
● The photo shows the NH6300 DCG

Coolant

Through-spindle coolant system

OP

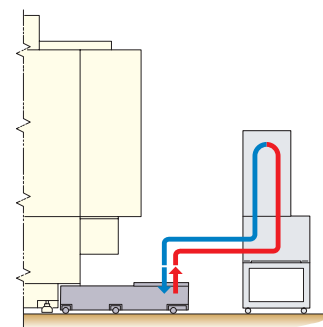
The through-spindle coolant system effectively eliminates chips, cooling the machine point, and lengthening the lives of your tools.



Coolant cooling unit

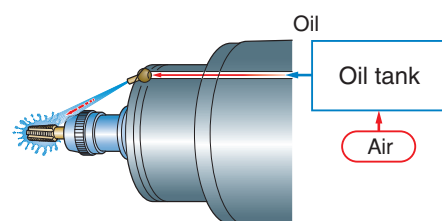
OP

Machining accuracy is stabilized by the coolant cooling unit that controls heat transmission to a workpiece, tool, and table. Especially it is effective when using oil-soluble coolant. The coolant cooling unit with a heater will be customized.



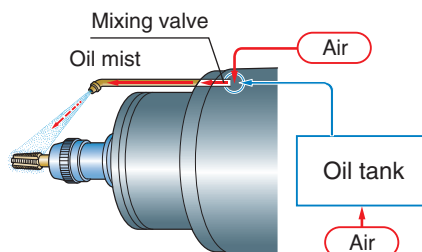
Oil shot system

OP



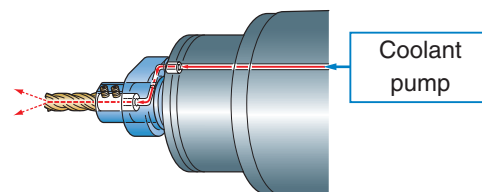
Oil mist system

OP



Oil-hole drill coolant system

OP



Coolant gun

OP



Use the high-pressure coolant gun to flush the chips from the machine and fixtures.

Coolant system



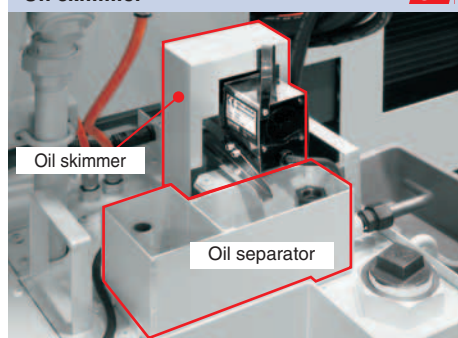
Shower coolant

Wash away excess chips from the parts and fixture using the directed coolant coming from five nozzles.



Oil skimmer

OP



Efficiently separates coolant and lubricating oils.

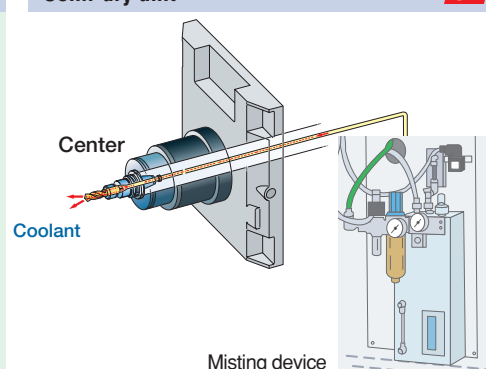
Oil mist collector

OP



Semi-dry unit

OP

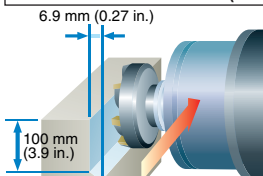


Processing speed

Cutting test <High torque, Max. spindle speed: 8,000 min⁻¹>

OP

Face mill 125 mm dia. (4.9 in.) <6 blades>



Material <JIS>: S50C*1

Machining rate per minute

927 mL/min (56.5 in³/min)

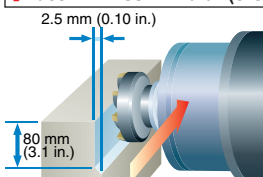
Spindle speed

600 min⁻¹

Feedrate

1,344 mm/min (52.9 ipm)

Face mill 100 mm dia. (3.9 in.) <9 blades>



Material <JIS>: A5052*2

Machining rate per minute

3,200 mL/min (195.2 in³/min)

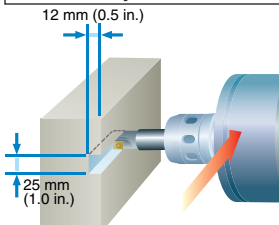
Spindle speed

8,000 min⁻¹

Feedrate

16,000 mm/min (629.9 ipm)

Throw-away end mill 25 mm dia. (1.0 in.)



Material <JIS>: S50C*1

Machining rate per minute

152.7 mL/min (9.3 in³/min)

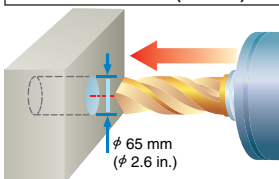
Spindle speed

2,546 min⁻¹

Feedrate

509 mm/min (20.0 ipm)

Drill 65 mm dia. (2.6 in.)



Material <JIS>: S50C*1

Machining rate per minute

222.3 mL/min (13.6 in³/min)

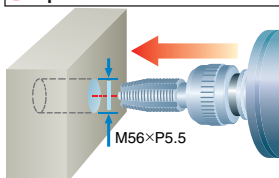
Spindle speed

122 min⁻¹

Feedrate

67 mm/min (2.6 ipm)

Tap



Material <JIS>: A5052*2

Tool

M56×P5.5

Spindle speed

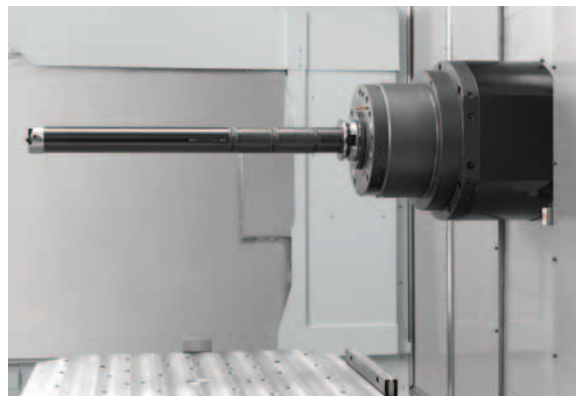
58 min⁻¹

Feedrate

319 mm/min (12.6 ipm)

Setting tool length

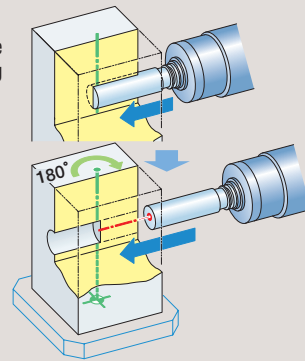
Inverse B-axis boring used to be required with previous machines. With the NH8000 DCG, however, boring can be done without having to invert the table by setting the maximum tool length to 800 mm (31.5 in.), the same as the pallet.



Boring

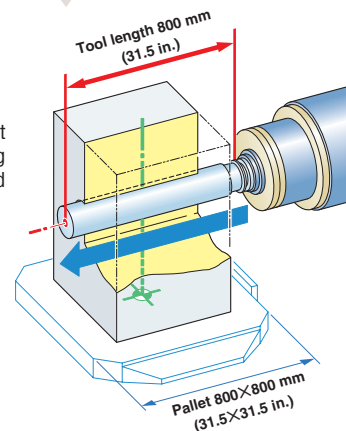
Previous model

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



NH8000 DCG

Since the B-axis does not need to be inverted, cutting time can be shortened and precision can be increased.



● The cutting test results indicated in this catalog are provided as an example. The results indicated in this catalog may not be obtained due to differences in cutting conditions and environmental conditions during measurement.

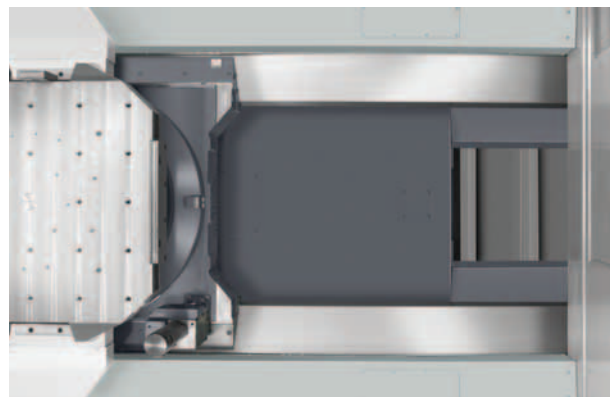
* 1 Carbon steel * 2 Aluminum JIS: Japanese Industrial Standard

NH8000 DCG

Chip disposal

Dramatically improved machine operation capacity.

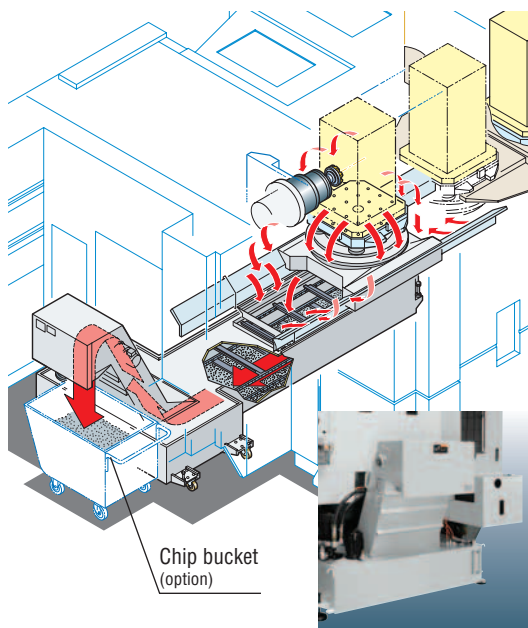
The other area we worked on to improve operating capacity is chip disposal. The NH8000 DCG, which was built with reliability and chip disposal in mind, is ideal for extended unmanned operation.



Chip conveyor

Employing a pocket-type center trough and using the center conveyor outside the machine has allowed us to create the world's smallest depth. (pocket-type center trough patent pending)

Scraper type with drum filter



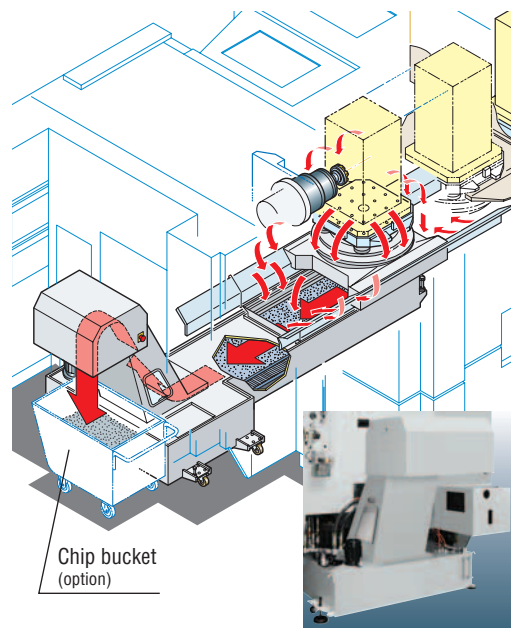
Center conveyor

The chips drop straight down into the conveyor from the machining point.



Hinge type with drum filter

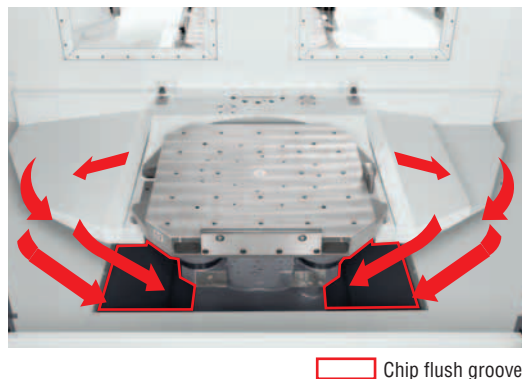
OP



Chip strategy

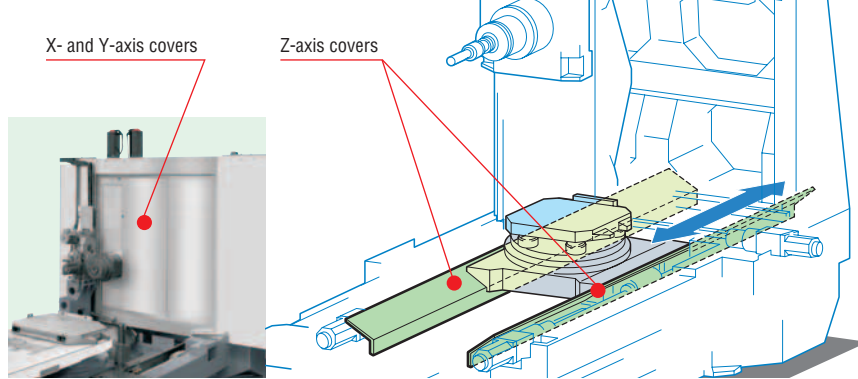
Setup station

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



Protective cover

A highly reliable design that prevents chip clogging.



Operability

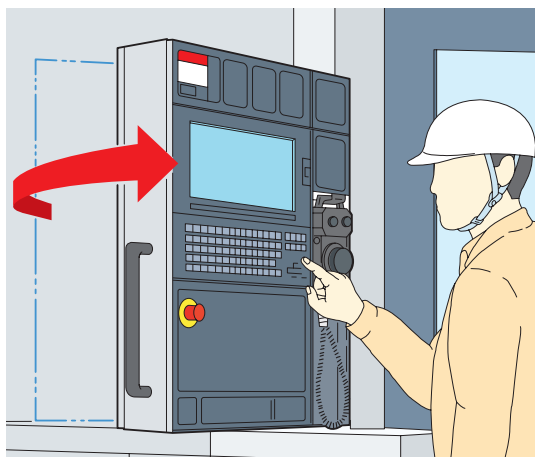
Thorough convenience.

The NH8000 DCG has been designed with the operator in mind, as seen by the labor-saving features throughout the machine.



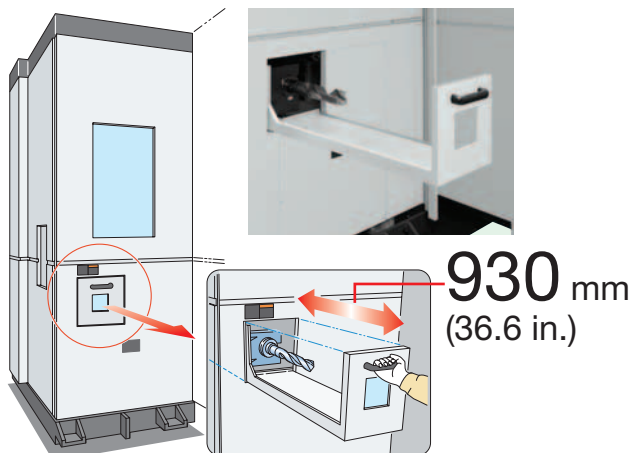
Improved convenience

Adjustable operating panel



Visibility has been improved by placing windows in the front and sides of the magazine. This allows the operator to see the workpiece while working on it.

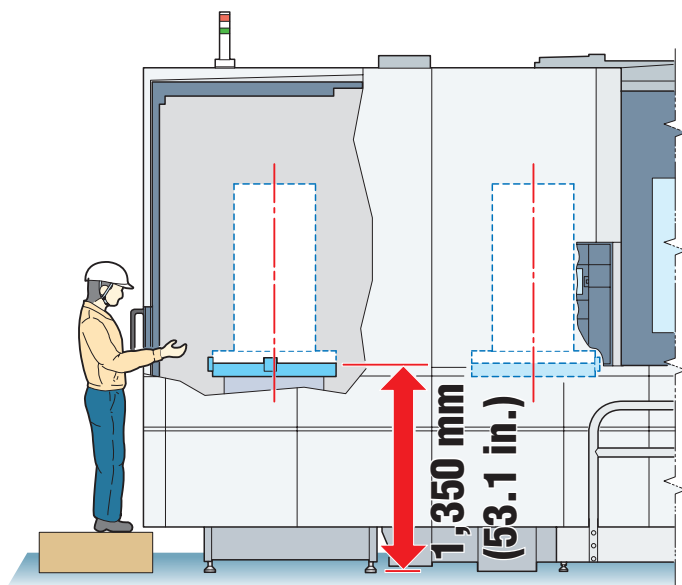
Magazine



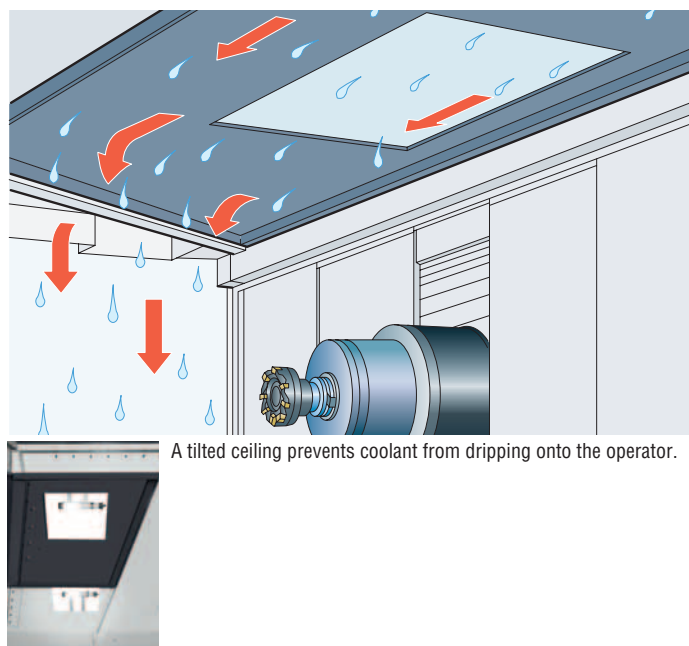
The door is ideally located for easier tool exchange.

Closer approach to the table

Operators can get closer to the table, which makes setup easier.



Ceiling tilt



A tilted ceiling prevents coolant from dripping onto the operator.

NH8000 DCG

Maintenance

Maintenance has been made extremely easy.

MTTR is an index that rates how easy it is to maintain a machine. The NH8000 DCG is extremely easy to maintain, since there are design concepts incorporated throughout the machine to make maintenance easy and quick-important factors in reducing downtime.

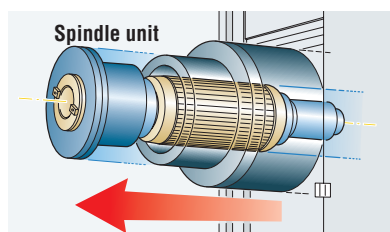


MTTR : Mean Time To Repair

MTTR : Mean Time To Repair

Spindle unit replacement

Adoption of a cartridge design that even includes the back bearings has significantly reduced spindle replacement time.



Changing time **90 min.**

Fewer parts



《Number of parts in the table design》

1° Index table

Previous model	NH8000 DCG
Approx. 69 parts	Approx. 41 parts
Compared against previous model	

Less **41 %**

Full 4th axis rotary table

OP

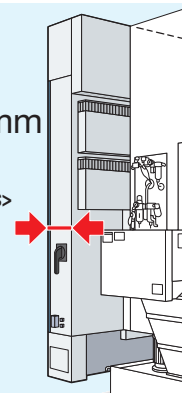
Previous model	NH8000 DCG
Approx. 67 parts	Approx. 33 parts
Compared against previous model	

Less **51 %**

Slimmer electrical cabinet

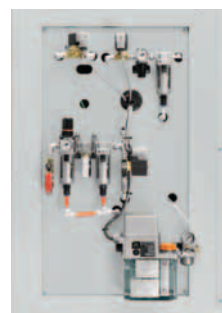
A slim electrical cabinet closes the proximity between you and the insides of the machine during maintenance.

300 mm
(11.8 in.)
<including doors>

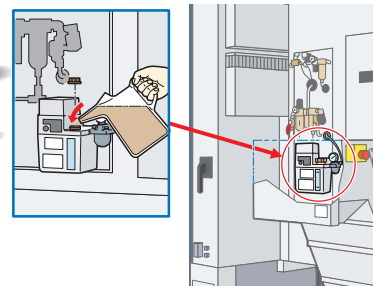


Centralized layout of devices

Controls are on the side panel to facilitate maintenance.



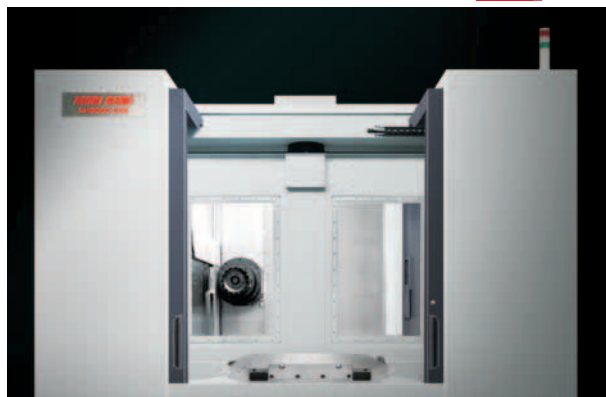
A closer lubrication tank



Eco-friendly design

A variety of functions reduce the environmental burden.

Reducing the strain on the environment has become an important task facing companies today. The NH8000 DCG has been designed with environmentally friendly functions to make this task easier. The new functions focus on reducing lubricant and electricity consumption. This focus fills customer needs at reduced costs.



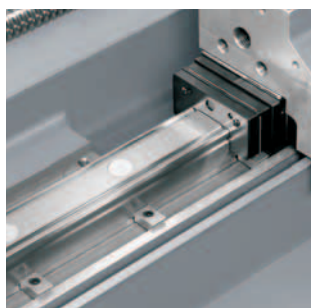
Reduced consumption of lubricant

Oil-bath ATC

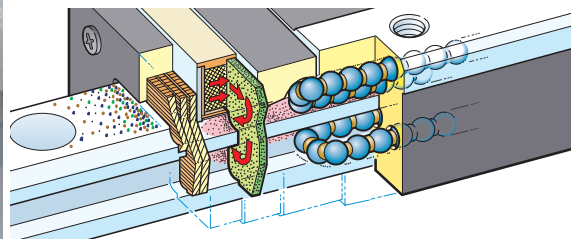


An oil-bath design has been integrated into the ATC unit. Compared with conventional oil drip designs, the amount of lubricant used is radically less.

Oil-free roller guides



A lubricating oil system for the roller guide is installed on both ends of the block.



Lubricant consumption per hour

Previous model

9.9 mL/hour

NH8000 DCG

3.1 mL/hour

Approximately

1/3

Reduction in electricity consumption



Energy-saving settings screen

Automatic machine light function

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

Low speed/low acceleration control function

This function limits the speed and acceleration of the feed axes when manual operations are carried out during setup with the interlocks released. By adding a restriction on acceleration to the speed restriction, an even greater power saving is achieved.

Automatic power-off 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 servomotor, the spindle, the coolant pump, and the chip conveyor, thereby saving energy.

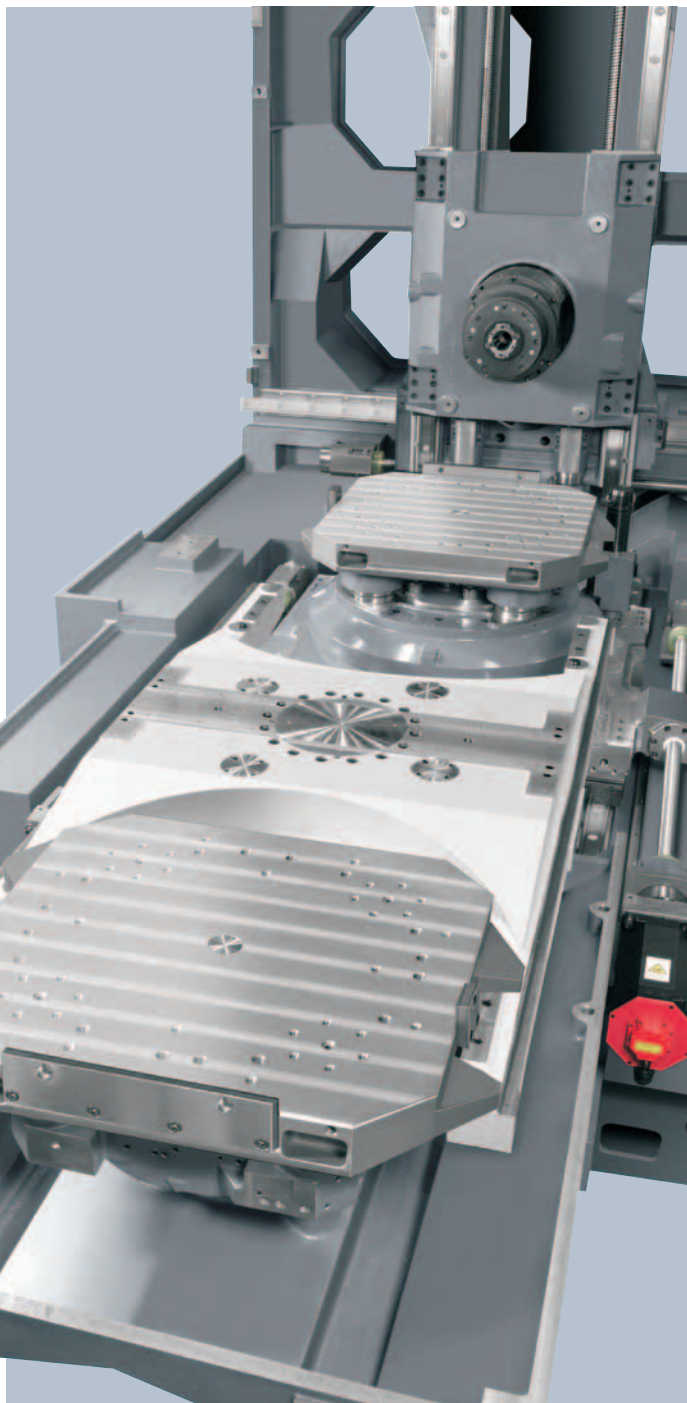


● The photo shows 8,000 min⁻¹

Fixture support

Proposing the right machining methods for your needs.

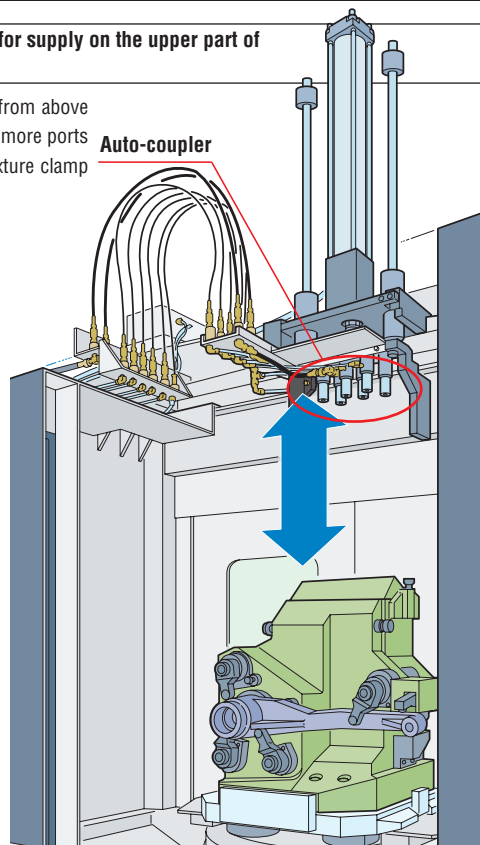
At Mori Seiki, it is our goal to offer you “total engineering solutions,” which means looking at fixtures as a vital part of the overall system and providing you with the fixtures and interfaces that fit your needs.



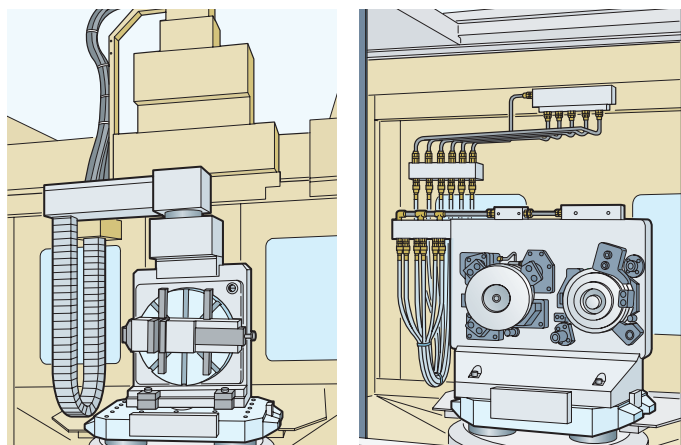
Fixture interface

Interface specified for supply on the upper part of the coupler

A method of supplying from above the machine that allows more ports to be added to fit the fixture clamp method.



Custom fixture interfaces are available for connecting any fixture, either part time or full time

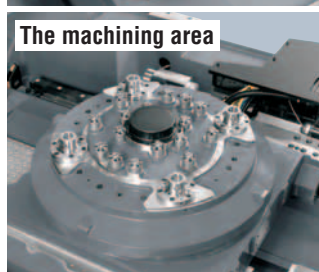
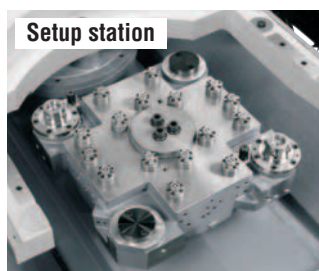
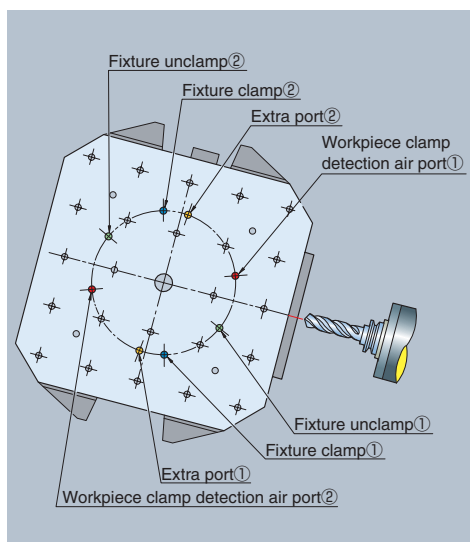
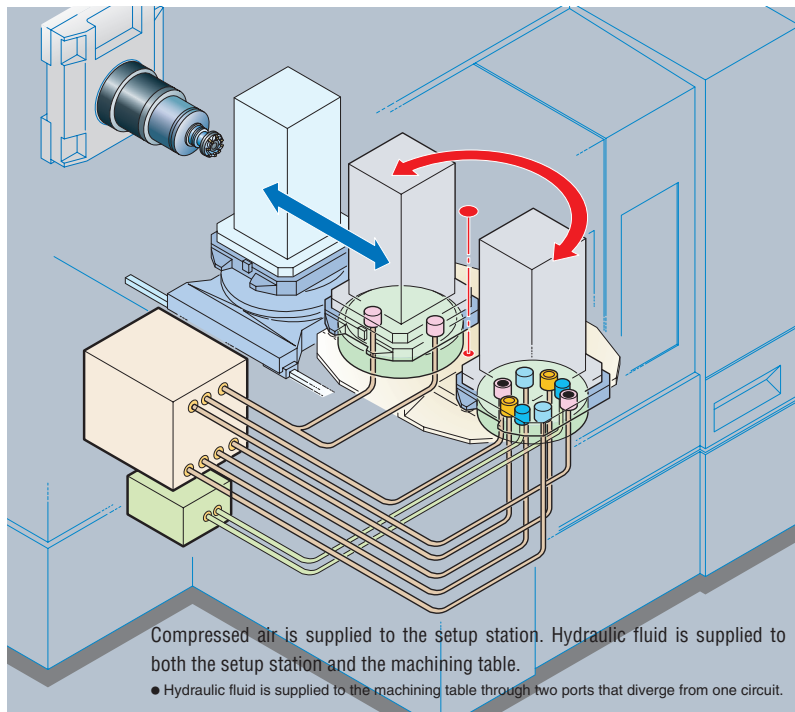


Check list (for hydraulic/pneumatic fixtures)

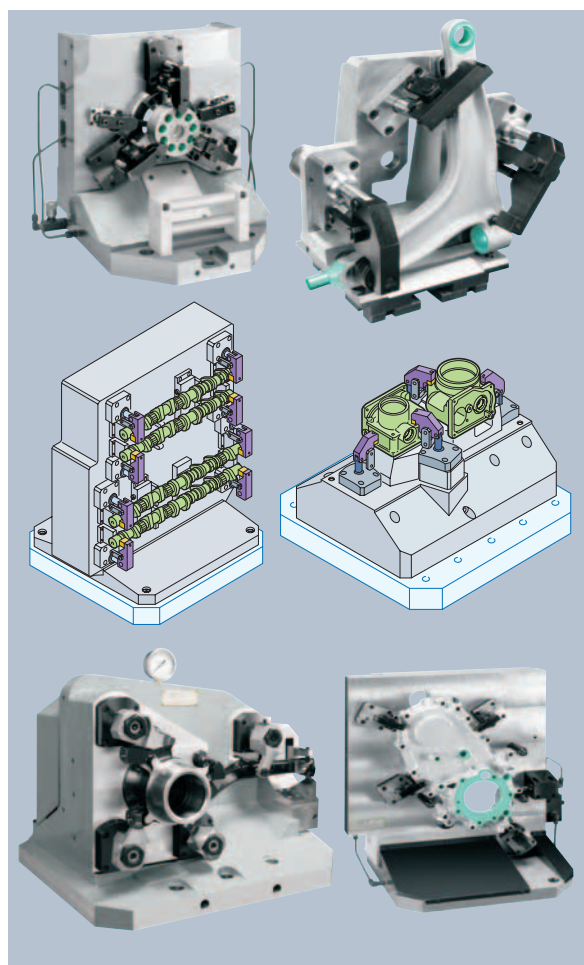
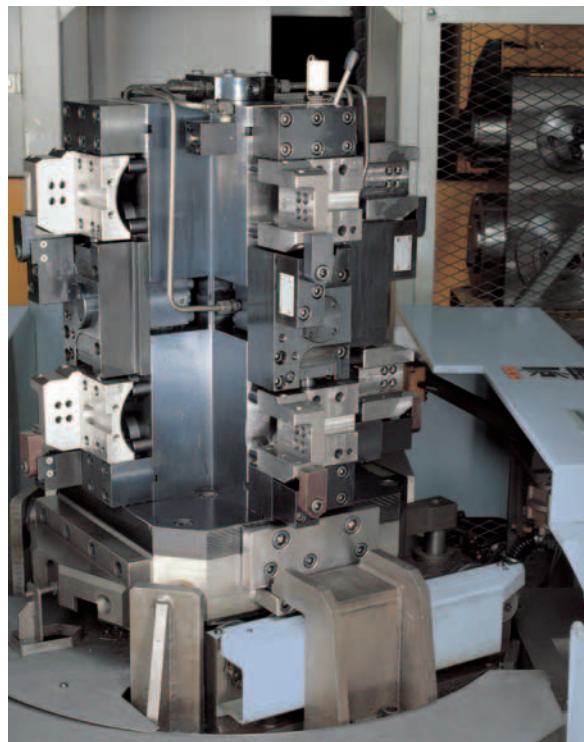
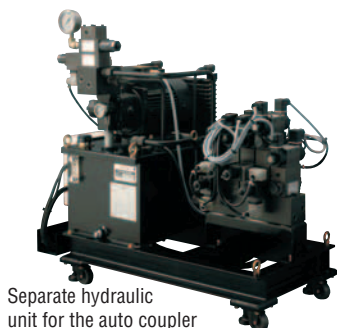
- Pressure source
 - ☐ Hydraulic
 - ☐ Pneumatic
- Supplied pressure _____ MPa
- No. of circuits
 - Hydraulic × _____
 - Pneumatic × _____
 - For workpiece holding detection × _____
- Others
 - ☐ Clamp check system
 - ☐ Fixture chip wash
 - ☐ Fixture air blow system

Auto-coupler fixture interface

Easily transfer the pallets between the setup station and the work area and avoid external hoses and couplers.



● 16-port specifications pictured



● Contact Fixture Peripheral Device R&D for more information.
● The photo shows the NH5000

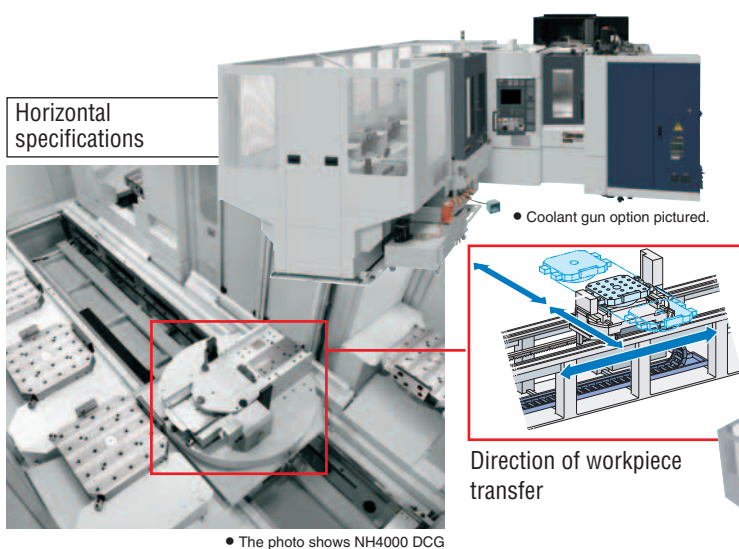
Automatic operation support

CPP (carrier pallet pool)

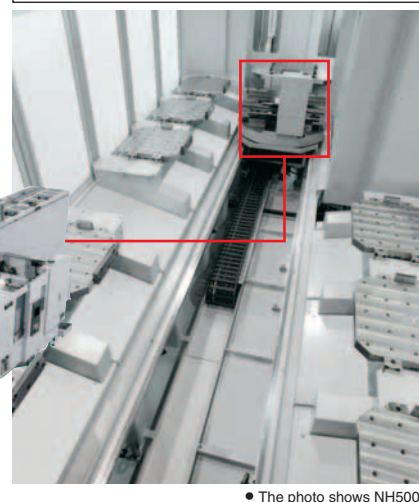
OP

A one-shelf CPP with outstanding extensibility.
Package systems with rapid set up are available.

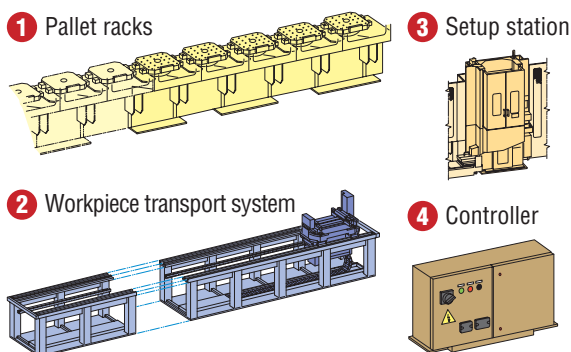
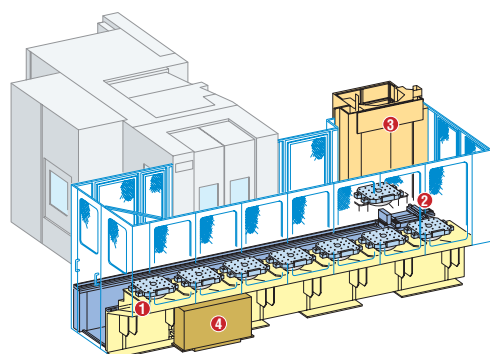
Horizontal specifications



Vertical specifications



System construction (One level of racks)



System chart

CPP system configuration options example (one level of racks)

Horizontal specifications

	6CPP	8CPP	10CPP	12CPP	×2-14CPP*
Machine (units)	1	1	1	1	2
Number of pallets (surfaces)	6	8	10	12	14
Number of racks (racks)	5	7	9	11	12
Setup station (units)	1	1	1	1	1

Vertical specifications

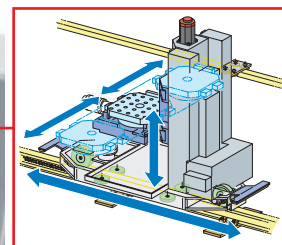
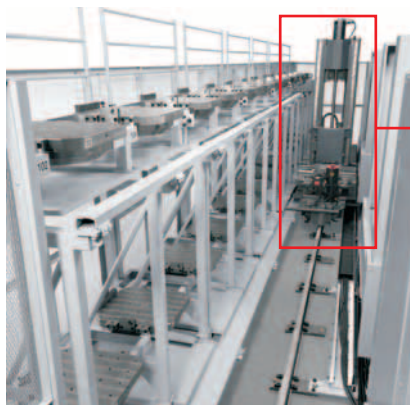
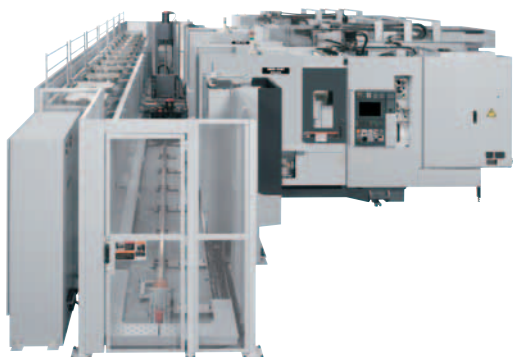
	5CPP	7CPP	9CPP	11CPP
Machine (units)	1	1	1	1
Number of pallets (surfaces)	5	7	9	11
Number of racks (racks)	4	6	8	10
Setup station (units)	1	1	1	1

* Contact Mori Seiki for more information.

LPP (linear pallet pool)

OP

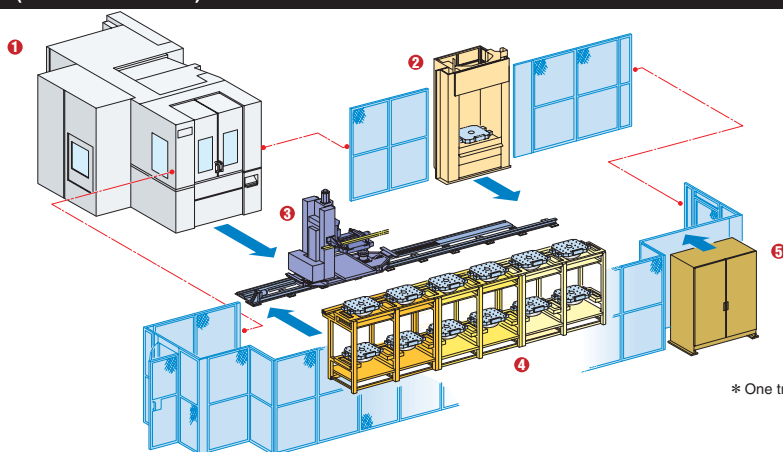
To meet your needs, we offer a variety of systems with various options including a change in the number of pallets and set up. Increasing the number of shelves can save space.



Direction of workpiece transfer

• The photo shows NH5000.

System construction (two level of racks)



- 1 Machine
- 2 Setup station
- 3 Workpiece transport system
- 4 Pallet racks*
- 5 Controller

* One tray of four pallets (two racks) can be added on as a single set.

• The illust. shows NH6300 DCG.

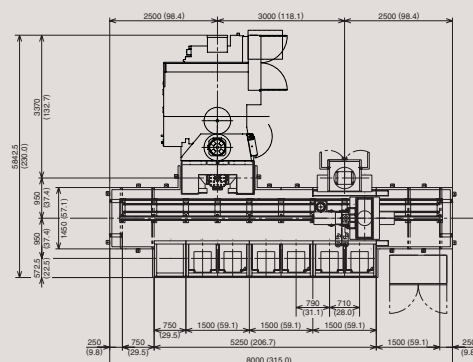
System chart

LPP system configuration options example

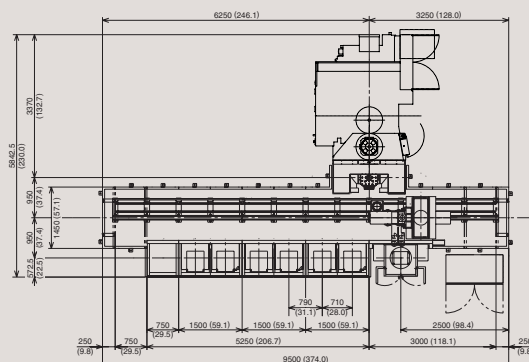
	LPP-1	LPP-2	LPP-3	LPP-4	LPP-5	LPP-6	LPP-7	LPP-8
Machine (units)	1	1	2	2	2	2	3	3
Number of pallet racks (racks)	13	13	22	14	26	14	35	23
Number of pallets (surfaces)	12	12	20	12	24	12	32	20
Setup station (on machine) (units)	1	—	1	—	2	—	2	—
Setup station (on opposing side) (units)	—	1	—	1	—	2	—	2

Example system (layout diagram)

LPP-1



LPP-2



mm (in.)

• Layout diagrams show NH4000 DCG

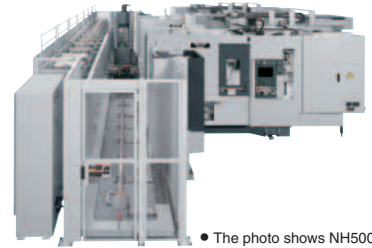
System control

OP

CAPS-LPS

Computer Aided Production System

Automation system to maximize efficiency in a flexible production system.



• The photo shows NH5000

- Scheduling
- Management and automatic download of machining programs
- Real time pallet information and system status
- Production and error logging
- Intelligent machine usage balance
- Intranet web reports
- E-mail/pager notification

System data creation



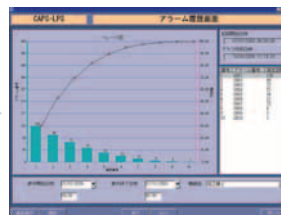
- Job detail
Simple settings
- Job group detail
Makes assembly easier

Processing



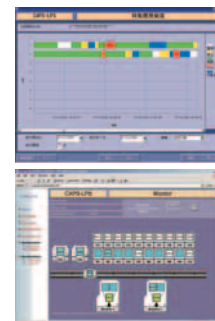
- Pallet registration
- Schedule
- Tracking
Quick response

Post-process/Assembly



- Alarm history
- Machine history and results
- Operating result
Easy-to-understand graphs are displayed

All processes



- E-mail/pager notification (option)
E-mail notification

■ Gantt chart
Easy perusal

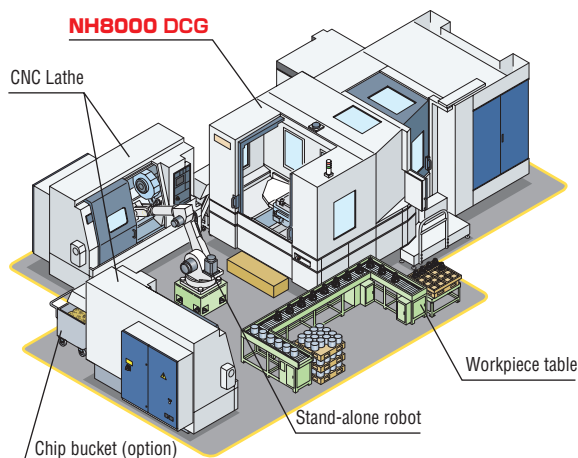
■ Intranet web reports (option)
Remote checking

Work transfer system

OP

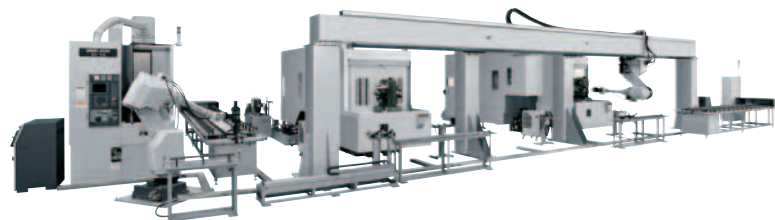
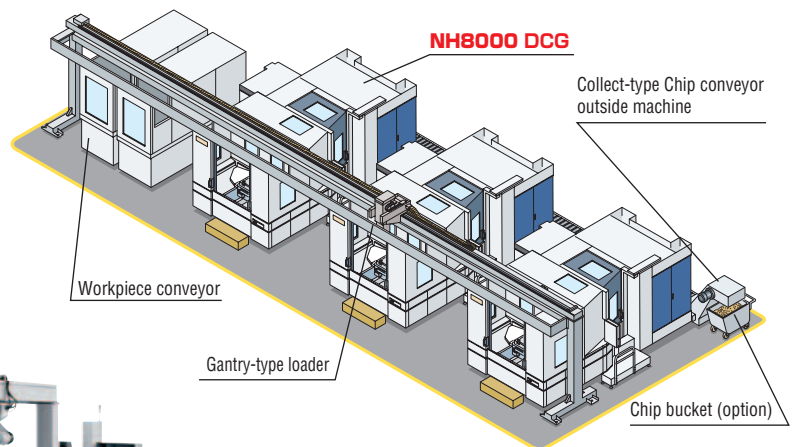
Robot

Robots make workpiece loading and unloading more efficient, improving productivity.



Gantry-type loader

This line-ready mass-production system is completely automated, from materials supply to ejection of the final product.

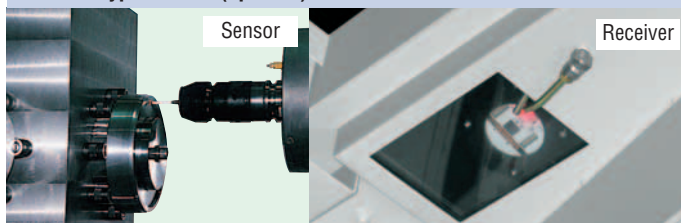


VL-25+NH5000 robot specification

Peripheral equipment

Contact type sensor (spindle)

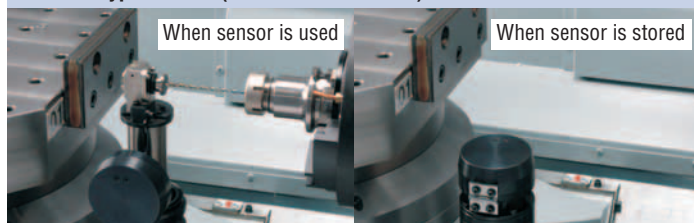
OP



Automates measurement of tools and workpieces using a spindle-mounted sensor and automates setting of tool length using a table mounted sensor.

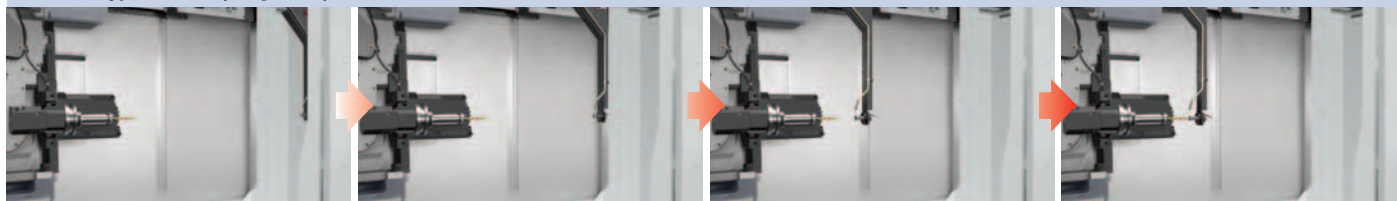
Contact type sensor (table mount sensor)

OP



Contact type sensor (magazine)

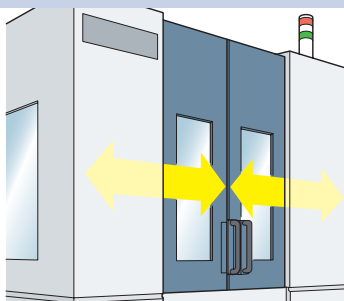
OP



Detects the presence of broken tools and automatically stops the machine if any are found.

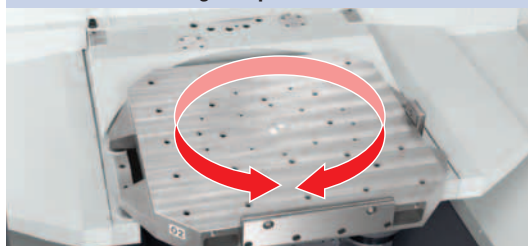
Automatic door

OP



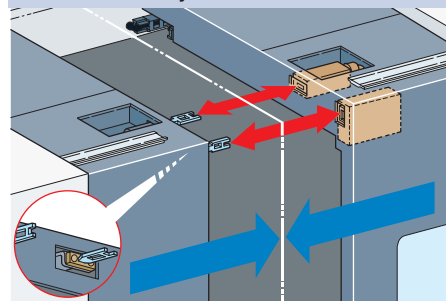
Automatic indexing setup station

OP



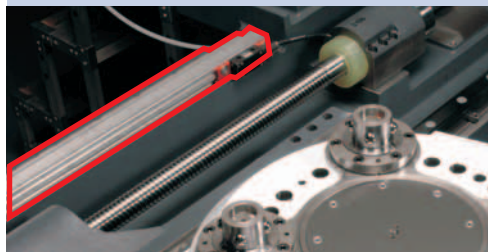
Automatic indexing makes the NH8000 DCG ideal for use with robots

Door interlock system



Direct scale feedback

OP



The absolute positioning optical scale demonstrates unequalled positioning accuracy and can be used for the X, Y, and Z axes.

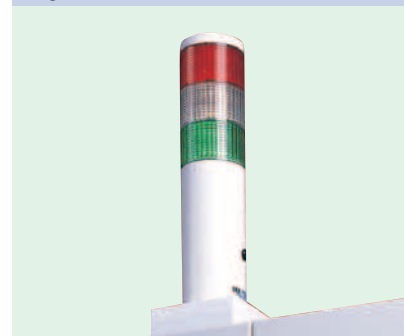
● The photo shows NH6300 DCG

Low air pressure detecting switch



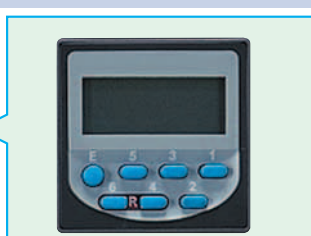
This alarm occurs when the dropping air pressure activates the switch.

Signal tower



Counter

OP



Work counter



Total counter

Weekly timer

OP



A new high-performance operating system

MAPPS II for Machining Center



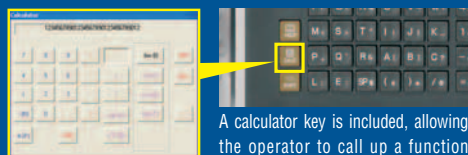
15-inch operation panel

A large user memory area



Standard **50 MB**
<Tape memory length equivalent to
127,000 m (416,687 ft)>
Option **500 MB**

A handy calculator function



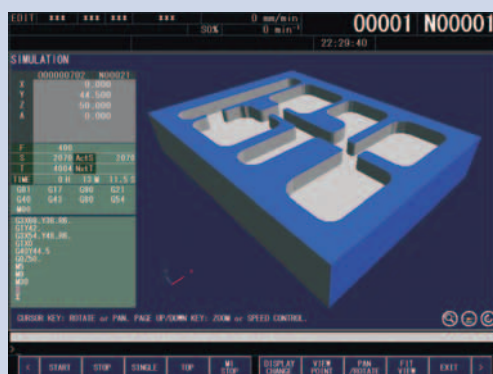
A calculator key is included, allowing the operator to call up a function calculator from any screen.

A global model in 13 languages

Japanese, English, German, French, Italian,
Spanish, Portuguese, Dutch,
Swedish, Turkish, Korean,
Chinese (simplified), Chinese (traditional)

Faster creation of programs

Conversational automatic programming



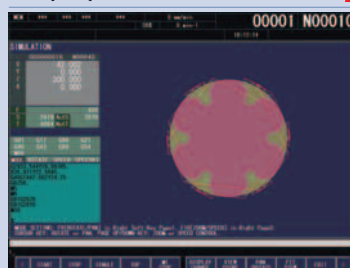
Inlet shape

You can create an unlimited number of inlet shapes.

Number of inlets
Unlimited

Open pocket

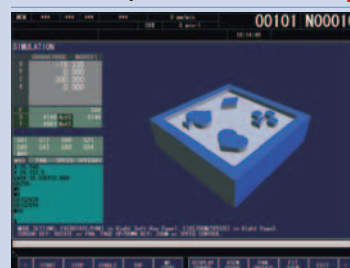
OP



Machining time is greatly reduced by the optimized path generation function for open pockets.

Island shape

OP



Up to 127 islands can be defined.

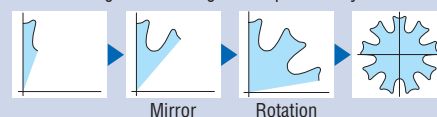
Contour input

A versatile feature for computing intersections makes drawing easy.

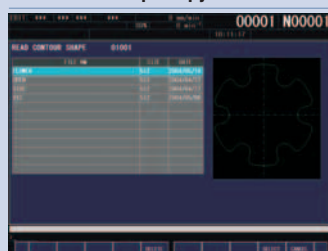


Automatic cross-point calculation function

By simply entering the final shape of the workpiece, intersections and coordinates are computed automatically. Circles and lines can be drawn as an extension of shapes, while rotating and inverting the shape are easy.



Contour shape copy



Profile shape data can be saved using another filename and used in other programs and processes.

Process copy



A process in a program can be copied and used in another program.

Program Editing Function

Creating programs

Program Editing Function

Extended editing

A large number of sub-menus is available.

- Search • Replace • Top • End • Select • Copy • Cut • Paste • Insert row
- Edit two programs simultaneously

Rapid registration

A program can be pasted in a single operation using rapid registration.



Editing line number display/Undo function

This allows for mistakes to be corrected when creating a program.

- Displays line number being edited • Edited line numbers displayed in red
- Actions can be undone any number of times (up to 400 kB)
- Batch replaces can also be undone or redone in a single step

Help

When you get stuck, a G code guidance and PLC message details function are useful.

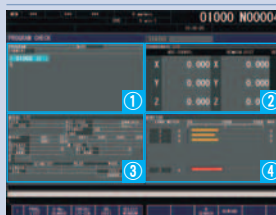
High-speed fixed cycle Number of patterns **16**

OP

1. High speed side milling cycle
2. Z Feeding groove cycle
3. Trochoid cycle
4. Helical hole cycle
5. Surface cutting cycle
6. Square pocket cycle
7. Corner pocket cycle
8. Spherical milling cycle
9. Thread milling cycle
10. Elliptical milling cycle
11. Polygon milling cycle
12. Bolt-hole cycle
13. True circle cutting cycle
14. Pocket cutting cycle
15. Keyslot chamfer cycle
16. Flat beveling chamfer cycle

Program check

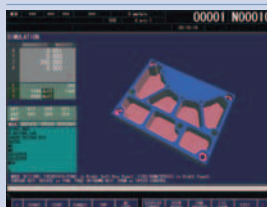
Simultaneous 4-way split display



Four different screens can be displayed at once. The screens can be switched easily using the soft keys.

- Program (1) • Coordinate display (2)
- Tool info (3) • Load monitor (4)

3-D cutting simulation



It is possible to zoom and to rotate while simulating it. The display of the tool path is possible.

Program management

Group management

Programs can be managed in groups for easier searching.

Status display

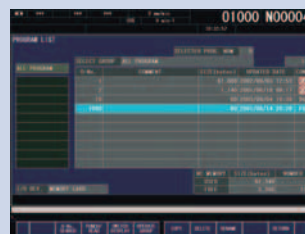
The status of the program - No Editing, Foreground, and Background - is displayed.

Sorting

Data can be sorted according to different criteria.

Custom display

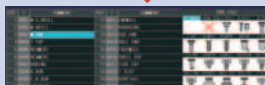
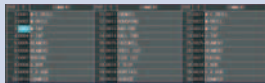
Choose which information you want displayed.



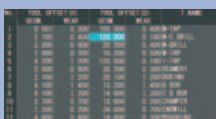
Faster setup

Register any tool name you want

You can register any tool name you want for each T number in the tool number registration screen.

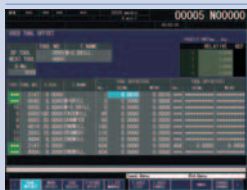


You can then allocate these tool names to the offset numbers in the tool offset.



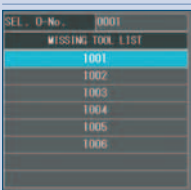
Prevent incorrect input of offset

Current tool offset



Operators can display only the tools used in the current program. Work offsets can also be displayed.

Insufficiency check



This function searches for tools used in the program that are not in the magazine, eliminating mistakes due to visual checks.

Minimizing machine down time

Limit switch guidance function



The status (on/off) of the limit switch can be checked along with the layout diagram without having to look at the strong electric diagram, shortening the time it takes to perform maintenance.

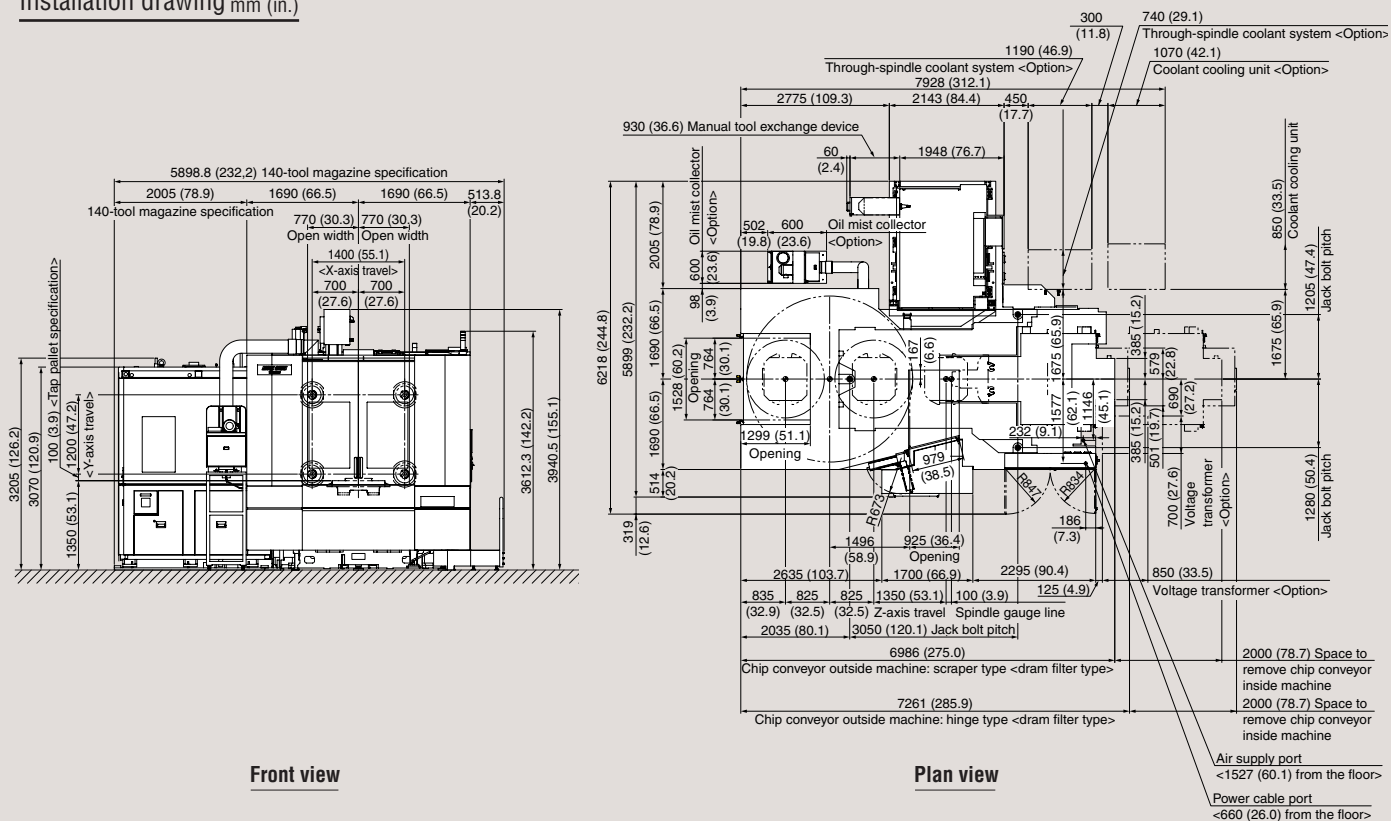
Regular maintenance function



Once a predetermined amount of time has passed, the screen automatically jumps to maintenance items that need attention.

Drawing

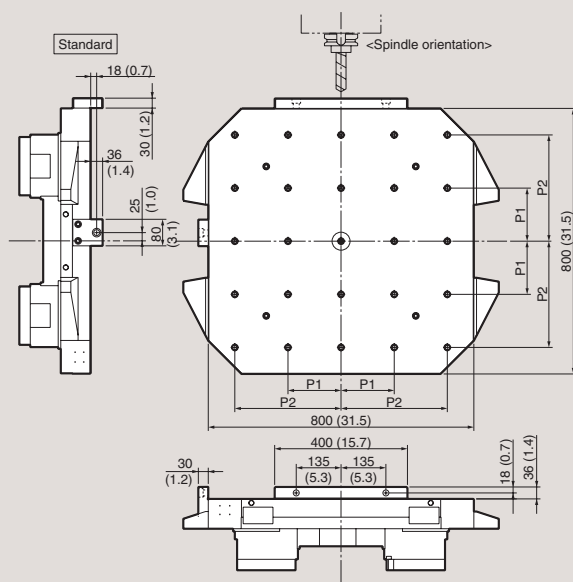
Installation drawing mm (in.)



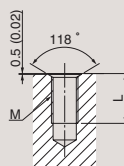
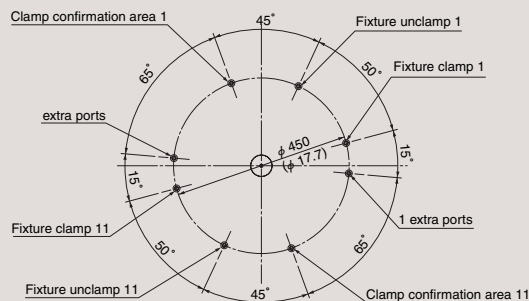
● The drawing shows the 140-tool magazine specification. **OP**

Q51681A02 Q51679A02

Pallet dimension mm (in.)



Auto-coupler specification



Fixture-side port: $\phi 11$ ($\phi 0.4$) or smaller

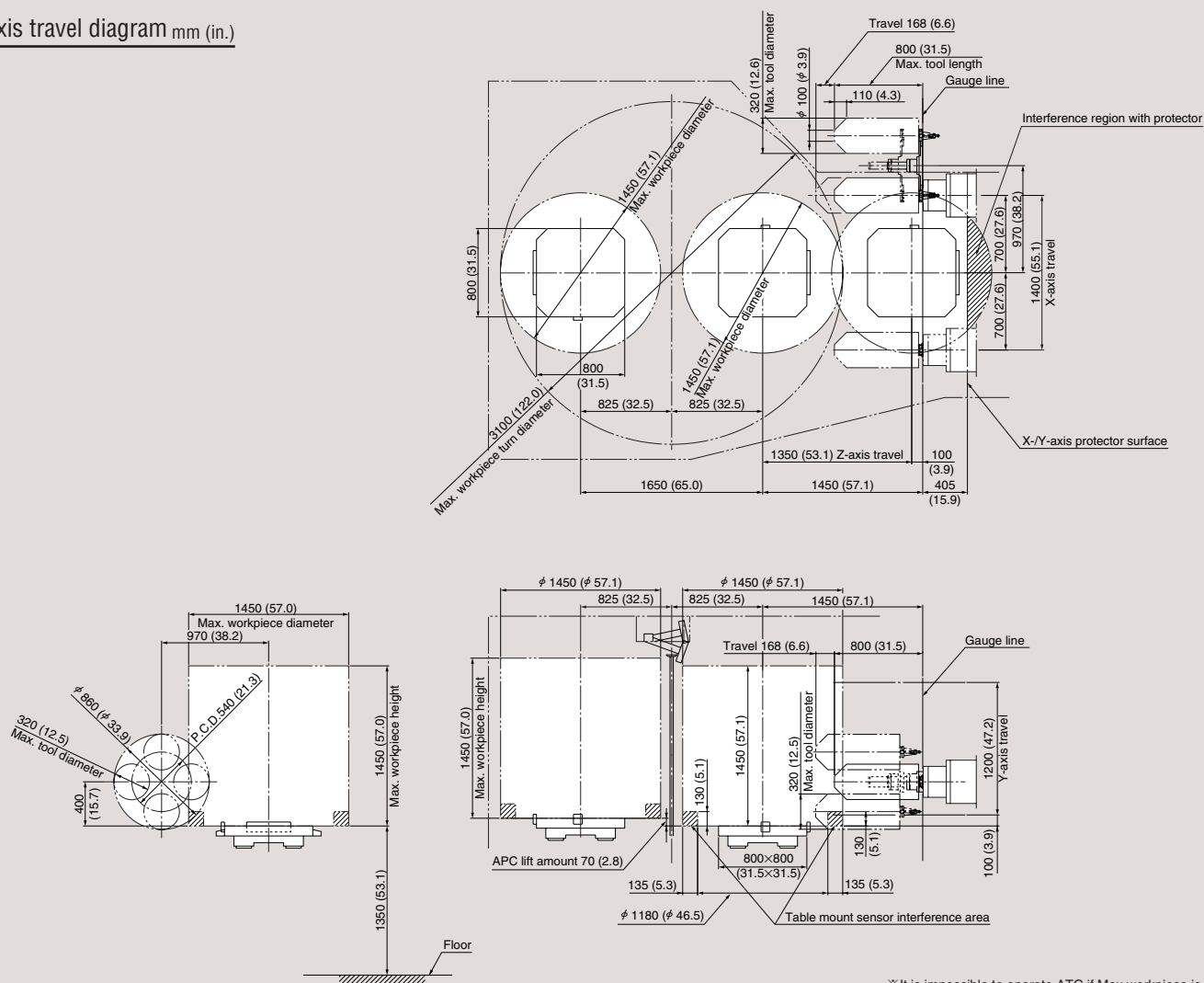
Detail of fixture port

Pallet	P1	P2	M	L
mm	160	320	M16	30
inch	6 $\frac{1}{4}$	12 $\frac{1}{2}$	$\frac{3}{4}$ -10 UNC	35 mm

Q51672A01

Drawing

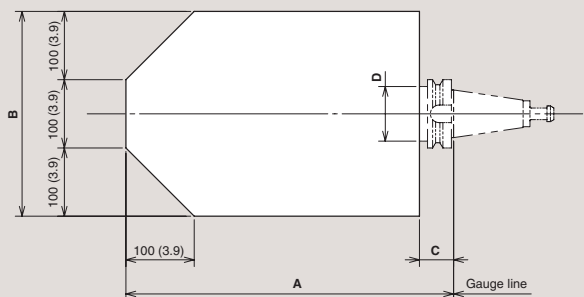
Axis travel diagram mm (in.)



※ It is impossible to operate ATC if Max workpiece is set.

Q53317A01

Tool restriction mm (in.)



Tool restriction				
		MAS	DIN	HSK A100
Max. tool length A	mm (in.)	800 (31.4)		
Max. tool dia. B <without adjacent tools>	mm (in.)	110 (4.3) <320 (12.5)>		
Standard dimension C	mm (in.)	38 (1.5)	35 (1.4)	45 (1.8)
Standard dimension D	mm (in.)	100 (3.9)	80 (3.1)	85 (3.3)
Max. tool mass	kg (lb.)	30 (66.0)		
Max. moment <from spindle gauge line>	N·m (ft·lbf)	29.4 (21.6)		

- Tool storage capacity is limited for the tools larger than $\phi 110$ mm. The tool with max. $\phi 300$ mm can be stored up to 7.
- Measurements for C and D of the 240 and 330-tool specifications are different. For details on storage and position capabilities of wide-diameter tools, talk to your Mori Seiki representative.

Q81070A02

Package Plan

	Table Two types of table indexing are available.		Tool storage capacity The magazine capacity can be selected to match the production type.		Chip conveyor A chip conveyor placed outside the machine depending on the length of the chips.		Through-spindle coolant A mid-pressure or high-pressure type can be selected.			
	1° Index table	Full 4th axis rotary table	60-tool *	140-tool *	Scraper type with drum filter (Chip length 50 mm or shorter)	Hinge type with drum filter (Chip length 50 mm or longer)	None	Interface	1.5 MPa	7.0 MPa
PACKAGE 1	●		●		●		●			
PACKAGE 2	●		●		●			●		
PACKAGE 3	●		●		●				●	
PACKAGE 4	●		●		●					●
PACKAGE 5	●		●			●	●			
PACKAGE 6	●		●			●		●		
PACKAGE 7	●		●			●			●	
PACKAGE 8	●		●			●				●
PACKAGE 9	●			●	●		●			
PACKAGE 10	●			●	●			●		
PACKAGE 11	●			●	●				●	
PACKAGE 12	●			●	●					●
PACKAGE 13	●			●		●	●			
PACKAGE 14	●			●		●		●		
PACKAGE 15	●			●		●			●	
PACKAGE 16	●			●		●				●
PACKAGE 17		●	●		●		●			
PACKAGE 18		●	●		●			●		
PACKAGE 19		●	●		●				●	
PACKAGE 20		●	●		●					●
PACKAGE 21		●	●			●	●			
PACKAGE 22		●	●			●		●		
PACKAGE 23		●	●			●			●	
PACKAGE 24		●	●			●				●
PACKAGE 25		●		●	●		●			
PACKAGE 26		●		●	●			●		
PACKAGE 27		●		●	●				●	
PACKAGE 28		●		●	●					●
PACKAGE 29		●		●		●	●			
PACKAGE 30		●		●		●		●		
PACKAGE 31		●		●		●			●	
PACKAGE 32		●		●		●				●

* Including a dummy tool.

Standard & optional features

●: Standard features

○: Options

☆: Please contact Mori Seiki

Spindle

Max. spindle speed	10,000 min ⁻¹ <30/25 kW (40/33.3 HP)>* ¹	●
	10,000 min ⁻¹ * ² <30/25 kW (40/33.3 HP)>* ¹	○
	15,000 min ⁻¹ * ³ <30/22 kW (40/30 HP)>* ¹	○
	8,000 min ⁻¹ * ⁴ <37/30 kW (50/40 HP)>* ¹	○
Oil cooler		●
Flange contact specification	BT50, HSK A100	○

Tool magazine

Tool storage capacity	40-tool <chain-type>	○
	60-tool <rack-type>	●
	140-tool <rack-type>	○
	180-tool <rack-type>	○
	240-tool <rack-type>	○
	330-tool <rack-type>	○

ATC

Type of tool shank	BT50	●
	DIN50	○
	CAT50	○
	HSK A100	○
Type of retention knob	MORI SEIKI 90° type	●
	45°	○
	60°	○
	DIN	○
	HSK A100	○
	Special <center>	○

Table/Pallet

Pallet	Tap <metric, inch>	●
	T-slot	○
1° indexing table	1°	●
Full 4th axis rotary table	0.001°	○
Auto-coupler for fixture clamp	Two hydraulic circuits+two clamp circuits	○
	One hydraulic circuit+one clamp circuit	○
	16 ports	○
Angle plate	One-sided	○
	Two-sided	○
	Four-sided	○
Sub-table	Without tap holes and T-slots	○
	T-slot	○

APC

2-station turn-type APC		●
CPP <carrier pallet pool>	Horizontal, vertical	○
LPP <linear pallet pool>		○

Coolant

Coolant system		●
Shower coolant		●
Through-spindle coolant system** ⁵ <1.5 MPa, (217.5 psi), 3.5 MPa (507.5 psi), 7.0 MPa (1,015 psi)>	Side	○
	Center** ⁶	○
Through-spindle coolant system	Interface	○
Oil-hole drill coolant system		○
Oil skimmer		○
Oil shot system		○
Oil mist system		○
Coolant cooling unit		○
Coolant cooling unit <through-spindle coolant system>		○
Coolant float switch		●
Semi-dry unit		○

Chip disposal

Tool tip air blow system		●
Chip conveyor <single construction>	Scraper type <with drum filter>	●
	Hinge type <with drum filter>	○
Chip bucket		○
Coolant gun		○
Oil mist collector		☆

Measurement

Contact type sensor <probe sensor>	Optical type	Automatic alignment	○
		Automatic measurement	○
Contact type sensor <table mount sensor>		Automatic tool length measurement	○
		Automatic tool breakage detection	○
Contact type sensor <magazine>		Automatic tool breakage system	○

Operation support device/function

Automatic power off system		●
Weekly timer		○
Work counter		○
Total counter		○
Automatic door		○
Automatic indexing setup station		○
Multi counter		○
External M-code	2, 5, 10	○

Improved accuracy

Direct scale feedback	X-axis	○
	Y-axis	○
	Z-axis	○

Safety features

Full cover		●
Door interlock system <incl. mechanical lock>	Front door	●
	Setup station door	●
	Electrical cabinet door	●
Door interlock system		●
Low air pressure detecting switch** ⁷		●
Low hydraulic pressure detecting switch		●
Danger sensing device interface** ⁸		☆
Earth leakage breaker		○

Others

Built-in worklight		●
Leveling block		●
Hand tools		●
Signal tower	3 steps	●

* 1 30 min/cont

* 2 High output

* 3 High speed

* 4 Low speed

* 5 High-pressure coolant system is attached.

* 6 Special retention knobs are required.

* 7 Only detects the main spindle oil air circuit.

* 8 Recommended when oil-based coolant is used or during unmanned operation.

● The details given above and the specifications are subject to change without notice.

● Specifications, accessories, safety device, and function are available upon request.

● Some options are not available in particular regions. For details contact Mori Seiki.

NC unit specifications (MSX-501)

Standard

Controlled axes

Controlled axes	X, Y, Z, B
Simultaneously controllable axes	Positioning/linear interpolation/ circular interpolation (3/3/2)

Programmable methods

Least input increment	0.001 mm (0.0001 in.)
Least command increment	0.001 mm (0.0001 in.)
Max. command value	±99,999.999 mm (9,999.9999 in.)
Absolute/incremental programming	G90/G91
Decimal point programming	
Inch/metric conversion	G20/G21
Tape code	EIA RS244/ISO 840 code automatic discrimination

Interpolation

Positioning	G00
Linear interpolation	G01
Circular interpolation	G02/G03
Helical interpolation	
Linear acceleration /deceleration after cutting feed interpolation	
Linear acceleration /deceleration before cutting feed interpolation*1	
Bell-shaped acceleration/deceleration for rapid traverse	

Feed

Cutting feedrate	1—50,000 mm/min (0.01—1,968.5 ipm)*2
Dwell	G04
Pulse handle feed	Manual pulse generator: 1 unit ×1, ×10, ×100 (per pulse)
Automatic acceleration/ deceleration	Bell type (rapid traverse)/ Linear type (cutting feed)
Rapid traverse rate override	F0 (forward feed stop), 25/100 %
Feedrate override	0—150 % (10 % increments)
Feedrate override cancel	M48, M49
Spindle orientation	
Manual jog feed	0—1,260 mm/min (0—50.0 ipm) <15 steps>
Feed per minute	
Simplified synchronized control	

Program storage and editing

Part program storage	320 m (1,050 ft) <4 kB≈10 m (33 ft) in tape length>
Part program edit	Deletion, insertion, and alteration
Search function	Sequence number search, Program number search, Address search
Number of stored programs	125 programs
Program number/program name	4 digits/48 characters

Operation and display

Operation panel: Display section	15-inch TFT color LCD
----------------------------------	-----------------------

I/O Functions and units

I/O interface	RS-232-C/PCMCIA (type I, II)
Tape operation with RS-232-C*3	

STM functions

Spindle speed function (S function)	5-digit S code
Spindle speed override	50—120 % (10 % increments)
Tool function (T function)	8-digit T code*4
Miscellaneous function (M function)	4-digit M code
High speed M/S/T/B interface	

Tool offset

Tool length offset	G43, G44, G49
Cutter radius offset C	G40—G42
Number of tool offsets	64 sets
Tool offset data memory C	D/H code, geometry and wear offset data
Offset amount program input	G10

Coordinate system

Manual zero return	
Automatic zero return	G28
2nd zero return*5	G30
Zero return check	G27
Return from zero point	G29
Automatic coordinate system setting	
Coordinate system setting	G92
Work coordinate system selection	G54—G59
Local coordinate system setting/ machine coordinate system	G52/53

Operation support functions

Label skip	
Single block	
Optional stop	
Optional block skip	
Dry run	
Machine lock	
Auxiliary function lock	
Mirror image	
Manual absolute	PC parameter
Z-axis neglect	
Set zero	
Running time display/ No. of parts display	
Expanded tape editing	
Background editing	
Directory display/ punch classified by groups	
Load meter display	
Clock function	Screen display
Tool length measurement	
Load monitoring function C	Excepting adaptive control function

Programming support function

Circular arc radius command	
Canned cycle	G73, G74, G76, G80—G89, G98, G99
Sub-program	Up to 4 nestings
Custom macro B	
Exact stop check	G09
Exact stop check mode	G61/G64
F15 format	
Pattern data input	
Synchronized tapping	
Automatic corner deceleration	
Feed speed clamp by circular radius	
NC statement output*6	Conversational automatic programming function
Look-ahead control function	
Conversational automatic programming	

Mechanical accuracy compensation

Backlash compensation	±9,999 pulses
Pitch error compensation	
Uni-directional positioning	
Follow-up	
Rapid traverse/ cutting feed backlash compensation	

Machine control support functions

Built-in type PC	
Axis interlock	By external input: option
External deceleration	
CNC window	

Automatic support functions

Skip function	G31
---------------	-----

Safety and maintenance

Emergency stop	
Soft-ware overtravel	
Stored stroke limit 1	
Self-diagnosis	Includes alarm display, I/O signal diagnosis and ladder diagram
Door interlock	
Stroke check before movement	
Alarm history display	NC and PC alarm
Help function	
Operation history display	
Operator's message history display	
Software damper	Abnormal load detection function

Option

Additional part program storage capacity <in total>	640/1,280/2,560 m (2,100/4,200/8,400 ft)
Additional number of stored programs <in total>	200/400/1,000 programs
Additional number of tool offsets <in total>*7	99/200/400/499/999 sets
<input type="checkbox"/> Programming resolution multiplied by 1/10 <least input increment 0.0001 mm (0.00001 in.) / least command increment 0.0001 mm (0.00001 in.)>*8	
<input type="checkbox"/> Hypothetical axis interpolation <input type="checkbox"/> Polar coordinate interpolation <input type="checkbox"/> Cylindrical interpolation <input type="checkbox"/> Exponential function interpolation <input type="checkbox"/> Involute interpolation <input type="checkbox"/> Bell-shaped acceleration/deceleration after cutting feed interpolation <input type="checkbox"/> C-axis contouring interpolation <input type="checkbox"/> Whirlpool interpolation <input type="checkbox"/> F1-digit feed (F1—F9) <input type="checkbox"/> Inverse time feed <input type="checkbox"/> Feed stop <input type="checkbox"/> Manual pulse handle control(2/3 handles) <input type="checkbox"/> Feed per revolution <input type="checkbox"/> Remote buffer (DNC)*3	
<input type="checkbox"/> High-speed remote buffer (A: Binary input, B: NC statement input)*9 <input type="checkbox"/> Fast data sever (100BASE-TX) <input type="checkbox"/> Constant surface speed control <input type="checkbox"/> Tool position offset (G45—G48) <input type="checkbox"/> 3-D tool offset <input type="checkbox"/> Straightness offset <input type="checkbox"/> Cutter radius offset B <input type="checkbox"/> 3-D coordinate conversion <input type="checkbox"/> 3rd and 4th zero return <input type="checkbox"/> Additional number of work coordinate systems <in total> (48 sets, 300 sets) <input type="checkbox"/> Floating zero return <input type="checkbox"/> Handle feed interruption <input type="checkbox"/> Program restart <input type="checkbox"/> Sequence number collation and stop <input type="checkbox"/> Addition of optional block skip functions (BDT2 to BDT9) <input type="checkbox"/> Machine time stamp function <input type="checkbox"/> Tool escape and return <input type="checkbox"/> Removal of controlled axes (Parameter) <input type="checkbox"/> Arbitrary angle, chamfer, corner R designation <input type="checkbox"/> Interruption type custom macro <input type="checkbox"/> Programmable mirror image <input type="checkbox"/> Automatic corner override <input type="checkbox"/> Playback <input type="checkbox"/> Additional custom macro common variables <in total> (600 variables) <input type="checkbox"/> Scaling <input type="checkbox"/> Coordinate system rotation <input type="checkbox"/> Polar coordinate command <input type="checkbox"/> Multiple M commands in a block <input type="checkbox"/> AI contour control <input type="checkbox"/> AI nano contour control <input type="checkbox"/> AI high precision contour control <input type="checkbox"/> AI nano high precision contour control <input type="checkbox"/> Small diameter deep hole drilling cycle <input type="checkbox"/> High-speed skip*9 <input type="checkbox"/> Tool life management <input type="checkbox"/> Additional number of tool life management functions <in total> (512 sets) <input type="checkbox"/> Stored stroke limit 2, 3 <input type="checkbox"/> Rotary table dynamic fixture offset	

*1 For look-ahead control.

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*2 For look-ahead control.

5,000 mm/min (196.9 ipm) in non-look-ahead control.

Maximum feedrate will vary depending on cutting conditions.

*3 For the machine equipped with APC and if work number search function is required, consultation is necessary for details.

*4 Conversational automatic programming, Tool file: 4-digit.

*5 Used with ATC/APC.

*6 Output to NC memory is possible.

Output to an external device is not possible.

*7 The number selectable tool offsets on the tool storage capacity.

*8 Max. command value ±9,999.9999 mm (±999.9999 in.)

*9 Standard for the machine equipped with sensor.

Machine specifications

Item			NH8000 DCG
Travel	X-axis travel <longitudinal movement of saddle>	mm (in.)	1,400 (55.1)
	Y-axis travel <vertical movement of spindle head>	mm (in.)	1,200 (47.2)
	Z-axis travel <cross movement of table>	mm (in.)	1,350 (53.1)
	Distance from pallet surface to spindle center	mm (in.)	100—1,300 (3.9—51.2)
	Distance from table center to spindle gauge plane	mm (in.)	100—1,450 (3.9—57.1)
Table	Pallet working surface	mm (in.)	800×800 (31.5×31.5)
	Pallet loading capacity	kg (lb.)	2,000 (78.7)
	Max. workpiece swing diameter	mm (in.)	1,450 (57.1)
	Max. workpiece height	mm (in.)	1,450 (57.1)
	Pallet surface configuration		M16 (3/4-10 UNC) Tap: 24 Holes. Pitch 160 mm (6 1/4 in.)
	Minimum table indexing angle		1°*2 [0.001°*3]
	Table indexing time*1	s	2.1*2 [1.7*3] (90°)
Spindle	Max. spindle speed*4	min ⁻¹	10,000 [10,000*5] [15,000*6] [8,000*7]
	Number of spindle speed ranges		1
	Type of spindle taper hole		No. 50
	Spindle bearing inner diameter	mm (in.)	100 [120*7]
	Rapid traverse rate	mm/min (ipm)	X, Y, Z: 50,000 (1,968.5)
Feedrate	Jog feedrate	mm/min (ipm)	0—1,260 (0—49.6) <15 steps>
	Feedrate	mm/min (ipm)	1—50,000 (1—1,968.5)*8
ATC	Type of tool shank		BT50 [CAT 50]
	Type of retention knob		MORI SEIKI 90° type [45°] [60°]
	Tool storage capacity*9		Rack-type: 60 [140] [180] [240] [330] Chain-type: [40]
	Max. tool diameter <without adjacent tools>	mm (in.)	110 (4.3) <320 (12.6)>
	Max. tool length	mm (in.)	800 (31.4)
	Max. tool mass	kg (lb.)	30 (66)
	Max. tool mass moment <from spindle gauge line>	N·m (ft·lbf)	29.4 (21.7)
	Method of tool selection		Rack-type: Fixed address Chain-type: Fixed address, shorter route access
	Tool changing time <tool-to-tool>*10	s	2.1
	Tool changing time <chip-to-chip>*10	s	5.5
APC	Number of pallets		2
	Method of pallet change		Turn-type
	Pallet changing time	s	14
Motor	Spindle drive motor <30 min/cont>	kW (HP)	30/25 [30/25*11] [30/25*12] [37/30*13] (40/33.3 [40/33.3*11] [40/33.3*12] [50/40*13])
	Feed motor <X/Y/Z/B>	kW (HP)	7.0×2/7.0×2/7.0×2/3.0 [10/21.5*14] (9.3×2/9.3×2/9.3×2/4.0 [13.3/28.7*14])
	Coolant pump motor	kW (HP)	2.2 (3)*15
Power source	Electrical power supply <cont>	kVA	83.7
	Compressed air supply	MPa (psi), L/min (gpm)	0.5 (72.5), 600 (158.4) <ANR*16>
Tank capacity	Coolant tank capacity	L (gal.)	1,230 (324.7)
Machine size	Machine height <from floor>	mm (in.)	3,683 (145.0)
	Floor space	mm (in.)	4,984×6,986 (196.2×275.0)
	Mass of machine	kg (lb.)	30,000 (66,000)*17

[] Option

*1 Including clamping and unclamping time.

*2 1° indexing table.

*3 Full 4th axis rotary table.

*4 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.

*5 High output

*6 High speed

*7 High torque

*8 With look-ahead control

*9 Including a dummy tool.

*10 At 60 Hz

*11 10,000 min⁻¹

*12 15,000 min⁻¹

*13 8,000 min⁻¹

*14 Full 4th axis rotary table <cont/max.>

*15 Spindle, Shower coolant

*16 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 %.

*17 Including mass of 60-tool magazine unit <3,200 kg (7,040 lb.)>.

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NH8000 DCG

OP: Option

Service support

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Mori Seiki's Global Service

Overseas countries

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Parts Locations

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Dallas Technical Center
Stuttgart Technical Center
Singapore Technical Center

Service System

Service Center (Iga, Chiba)

24 hours
365 Operating 365 days a year

Parts Center

24 Shipped within 24 hours

Service Personnel

24 Delivered within 24 hours

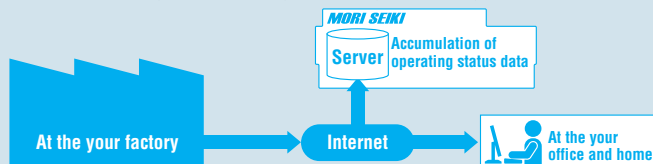
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CAPS-NET Global Edition

OP

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