

# DMG MORI

## NVD5000 $\alpha$ 1 HSC

Machining Center



High-Precision Vertical Machining Center for Die & Mold Manufacturers

# NVD5000 $\alpha$ 1 HSC

HSC: High Speed Cutting



**NVD5000  $\alpha$  1A/40 HSC**



**NVD5000  $\alpha$  1B/40 HSC**

● The photo shows the machine equipped with options.

# The standard for die and mold machining that brings you rapid delivery and high quality.

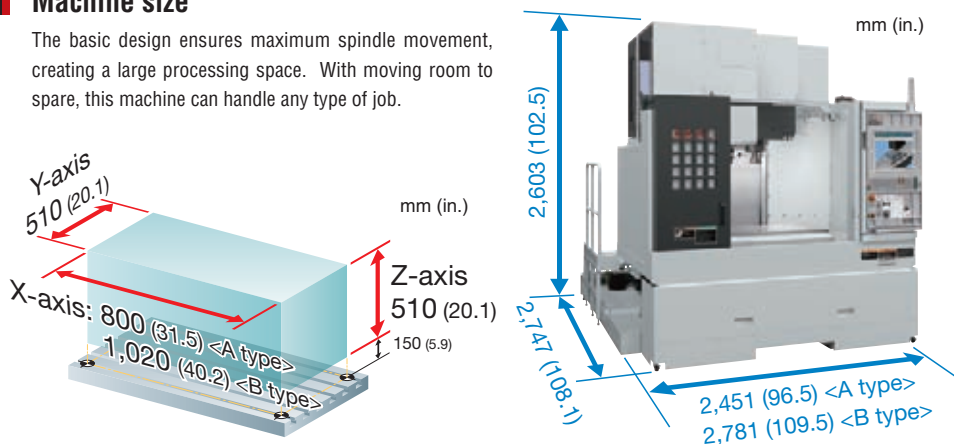
Amid increased global competition in the die and mold machining field, both rapid delivery and high quality are essential to make sure orders keep coming in. The NVD5000  $\alpha$ 1 HSC clears both these hurdles because it is specifically designed to handle dies and molds for manufacturers whose goal is delivering high added value. The NVD5000  $\alpha$ 1 HSC will be an indispensable tool in raising your competitiveness.

High-Precision Vertical Machining Center for Die & Mold Manufacturers

## NVD5000 $\alpha$ 1 HSC

### Machine size

The basic design ensures maximum spindle movement, creating a large processing space. With moving room to spare, this machine can handle any type of job.



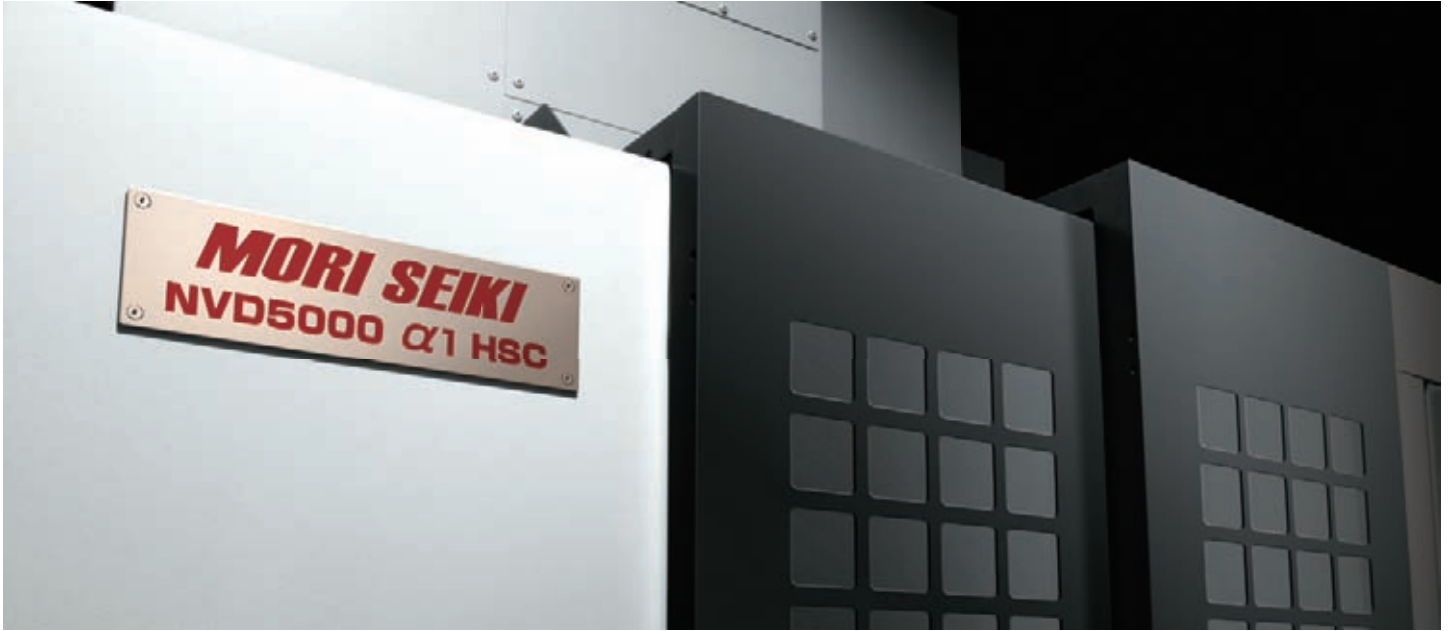
### CONTENTS

- 4 High precision
- 5 Die & Mold Specifications/  
Sample workpieces
- 6 Precision
- 7 Spindle
- 8 Improved workability
- 9 Peripheral equipment
- 11 MAPPS IV
- 12 Diagrams
- 13 Standard & optional features
- 14 Numerical control unit specifications
- 15 Machine specifications

# High precision

Equipped with standard functions for supporting high-quality machining of dies and molds.

The NVD5000  $\alpha$ 1 HSC focuses on advanced CNC control, high-precision positioning, and measures against heat displacement. A higher level of standard features has been selected in order to ensure high added-value die and mold machining.



## High-precision machining features

### Direct scale feedback (X, Y and Z axes)

An absolute magnetic linear scale (full closed-loop control) made by Magnescale is equipped as standard to offer high-precision positioning.



### Resolution (X, Y and Z axes)

**0.01**  $\mu\text{m}$

**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

### Oil cooler (separate type)

An energy-saving oil cooler is used that delivers very little temperature fluctuation.



### High-precision equipment

#### Coolant cooling unit (separate type)

OP

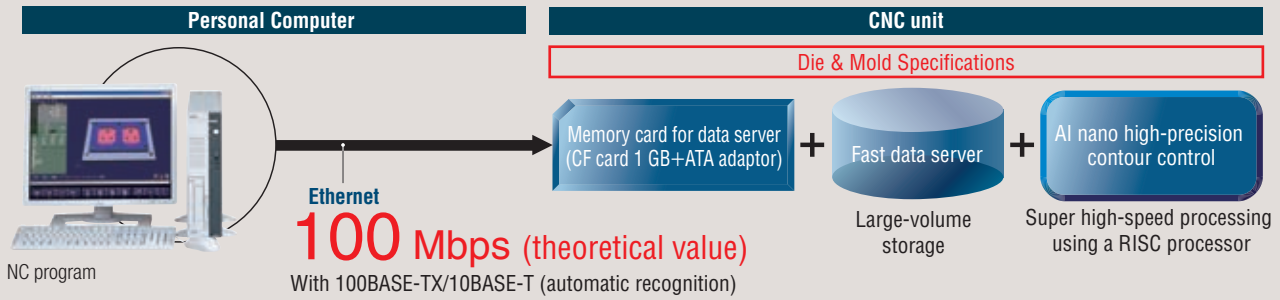
Raised coolant temperature causes thermal displacement in the fixtures and workpiece, affecting the machining accuracy of the workpiece. Use this unit to prevent the coolant from heating up. **When using oil-based coolant**, the coolant temperature can become extremely high even with the standard coolant pump, so please be sure to select this unit.

When using oil-based coolant,  
please be sure to consult with  
our sales representative.

- 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.



## Die & Mold Specifications (standard feature)



● **AI nano high-precision contour control** This speeds up program processing, makes machine movement smoother and raises machining precision.

With AI nano high-precision contour control

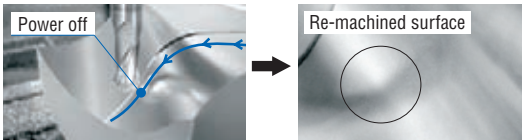
Without AI nano high-precision contour control

### Cutting mode selection function

- **Time priority mode**  
Top priority at cutting time. Use when required accuracy is in low level like roughness cutting etc.. The cutting time is the shortest.
- **Middle mode**  
Middle mode in time priority mode and accuracy priority mode.
- **Accuracy priority mode (the standard setting)**  
The mode which prioritizes the cutting accuracy. Recommendation mode.
- **Custom mode**  
The mode which prioritizes the cutting accuracy further. This mode produces the longest machining time of all four modes.

## Z-axis drop prevention function ideal for blackouts

Raising the spindle slightly during blackouts prevents any contact between the tool and the workpiece caused by the spindle dropping.



※The Z-axis drop prevention function is not available in the following situations.

1. When the feed axis servo alarm has gone off.
  2. When the power supply module alarm has gone off.
  3. When the communication alarm between the CNC and the amp has gone off.
- Depending on how voltage drops (slowly or suddenly), it may not always be possible to detect a blackout.

# Spindle

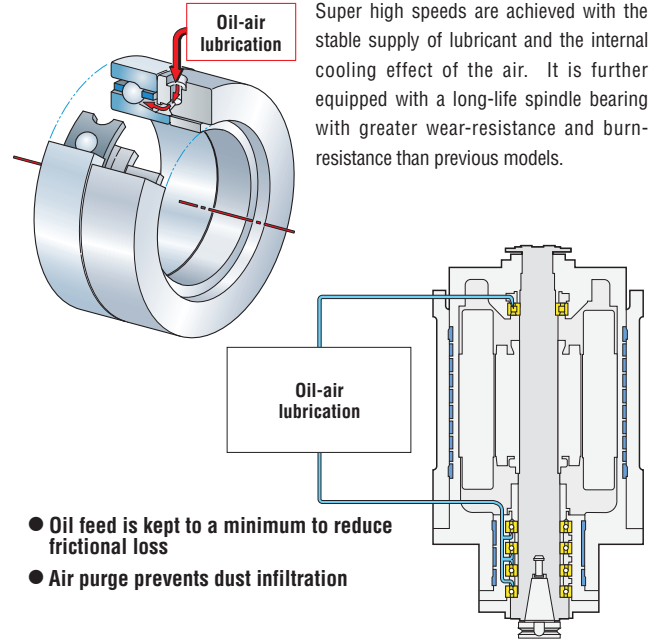


High-speed, high-power DDS motor.

DDS: Direct Drive Spindle

## High-speed spindle bearing

### Spindle bearing design



Super high speeds are achieved with the stable supply of lubricant and the internal cooling effect of the air. It is further equipped with a long-life spindle bearing with greater wear-resistance and burn-resistance than previous models.

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

### Spindle bearing roller life

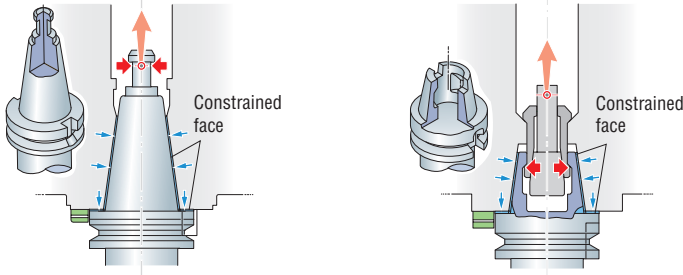
Compared with previous model

Approximately **70%** longer

## Dual contact specifications

### BT40 (standard)

### HSK-A63 (option)



● Please use a dual contact tool when cutting at 15,000 min<sup>-1</sup> or higher.

## Spindle acceleration/deceleration time

### Spindle acceleration time

Previous model **5.32 sec.** **NVD5000 α1 HSC** **2.68 sec.** Reduced by **50%**

### Spindle deceleration time

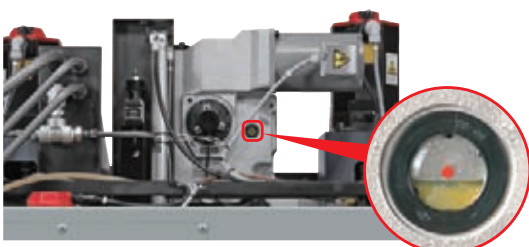
Previous model **5.48 sec.** **NVD5000 α1 HSC** **2.56 sec.** Reduced by **53%**

## 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.



### Reduced consumption of electricity



Energy-saving settings screen

#### Automatic sleep function

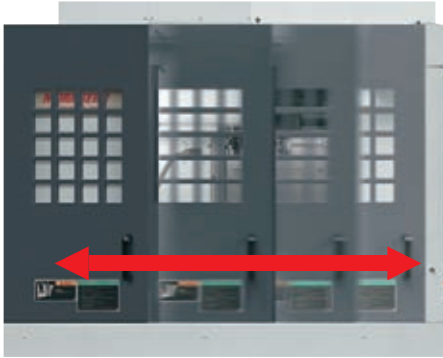
If the keyboard is not touched for a certain amount of time and NC operation is not being performed, power is cut off to the servo motor, the spindle, the coolant pump and the chip conveyor, thereby saving energy.

#### Automatic machine light function

If the 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.

# Improved workability

## Working environment



Door opening

**NVD5000 α1A HSC:** 1,032 mm (40.6 in.)

**NVD5000 α1B HSC:** 1,386 mm (54.6 in.)

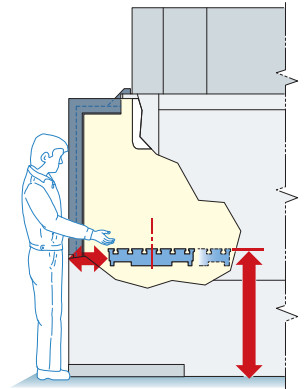
### Easy access to the machine's table

The table is located in front of the operator to make work inside the machine easier. The distance from the front of the machine to the table has been shortened.



Distance from the front of the machine to the table

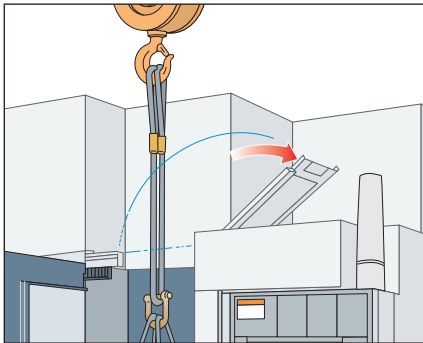
**262 mm (10.3 in.)**



Height from the floor to the upper face of the table

**900 mm (35.4 in.)**

## Improved ease of setup

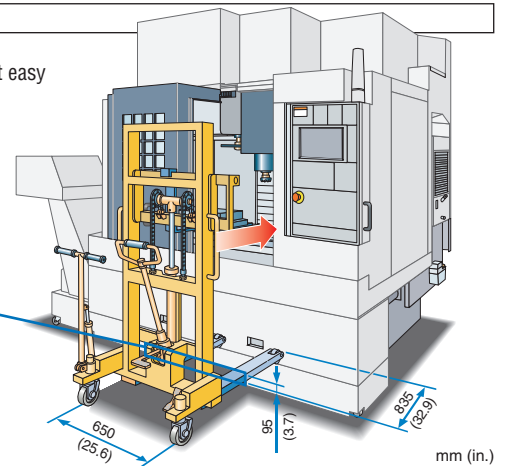


The top panel can be opened and closed, making crane accessibility quick and easy.

Handlifts approach close to the setup station making it easy to load and unload heavy workpieces.

There is an area that has been designed into the bottom of the machine to make moving workpieces easier during set-up.

- The illustration shows the NVD5000 α1A HSC.
- Except for chip conveyor outside machine (scraper type+drum filter type and hinge type+drum filter type) specifications.



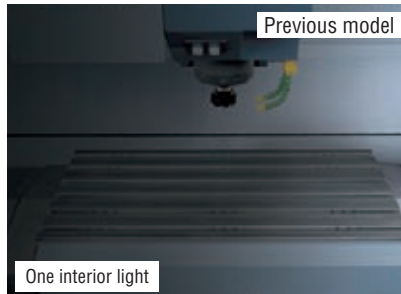
mm (in.)

## Easy tool switching



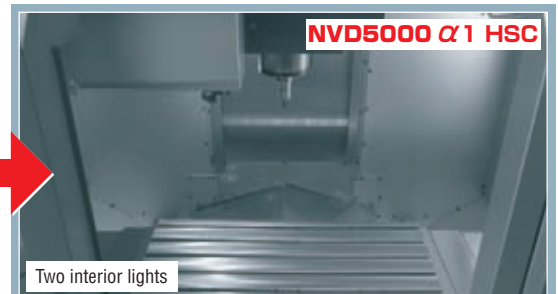
The large magazine door allows replacement of several tools at once.

## Interior brightness



Brightness at tool tip position compared with previous model

**x2**



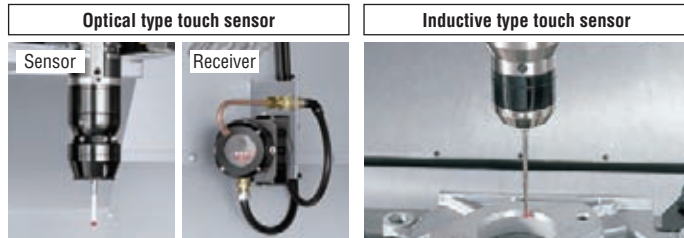
## Automatic measurement

OP

For the measuring devices, an automatic measuring function can be selected alone or in combination with manual measuring functions. Select the right devices for your use.

### In-machine measuring system (spindle)

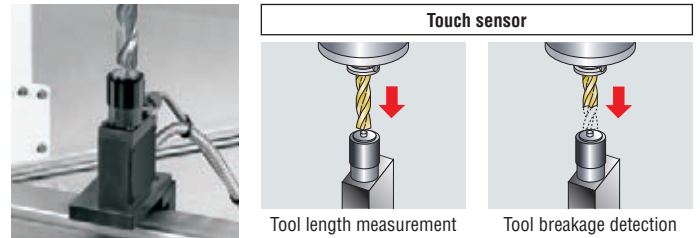
- Automatic centering and automatic measurement are possible.
- Automatic measurement applications are included.



Automatic	<input checked="" type="checkbox"/> Centering <input checked="" type="checkbox"/> Measurement
Manual	The workpiece setter function can be added
Workpiece zero point setting and centering are possible	

### In-machine measuring system (table)

- Automatic tool length measurement and automatic breakage detection are possible.
- Automatic measurement applications are included.

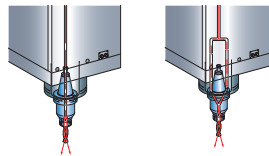


Automatic	<input checked="" type="checkbox"/> Tool length measurement <input checked="" type="checkbox"/> Tool breakage detection
Manual	The tool setter function can be added
Tool length offset is possible	

## Through-spindle coolant system

OP

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



Center through Side through



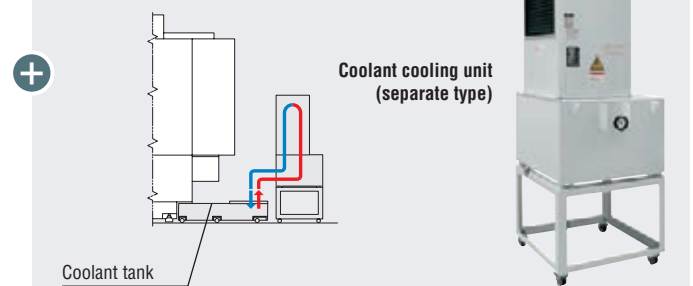
High-pressure coolant system (separate type)

		Unit on coolant tank	Separate type
Discharge pressure	MPa (psi)	1.5 (217.5)	1.5/3.5/7.0 (217.5/507.5/1,015)
Installation space <width><depth>	mm (in.)	360×360 (14.2×14.2) <line filter unit>	780×1,085 (30.7×42.7) <high-pressure coolant system>
Water-soluble coolant		○	○
Oil-based coolant		×	○*
Coolant filtration accuracy		40 μm	20 μm

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

### Recommended equipment

The high-pressure coolant unit generates a lot of heat because it discharges coolant at high pressure. The coolant cooling unit controls the temperature of the coolant and suppresses temperature increases in the workpiece, tools and table, ensuring stable machining accuracy. This is essential equipment when using high-pressure coolant. A unit with a heater will be customized.



**⚠** Do not use a flammable coolant or oil-based coolant because it may ignite and cause fire or machine breakage. If you have to use a flammable coolant for any reason, please consult with our sales representative.

## Through-spindle air specifications (for air only)

OP



- When the tool tip air blow is regularly used, air supply of more than 300 L/min (79.2 gpm) is separately required.

## Shower coolant

OP

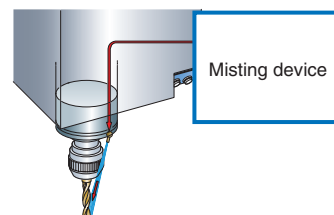
Prevents chips from accumulating by releasing coolant from the nozzles.



## Semi-dry unit

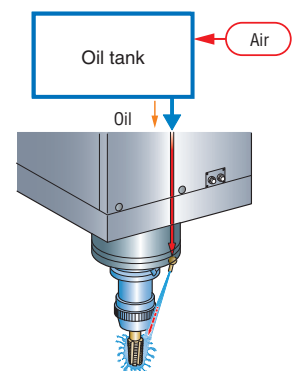
OP

Supplies air and oil mist to the cutting tip. This unit is also eco-friendly.



## Oil shot system

OP



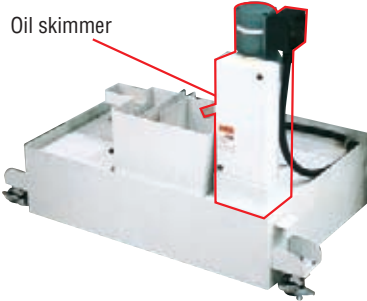
● The colors and configurations shown in the photographs or illustrations may differ from those of the actual product.



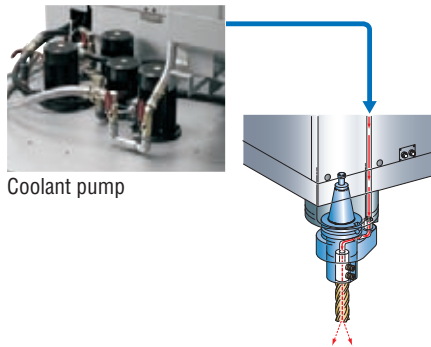
# Peripheral equipment

## Oil skimmer OP

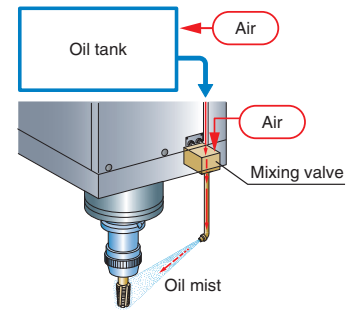
Efficiently separates coolant and lubricating oils.



## Oil-hole drill coolant system OP



## Oil mist system OP



## Chip conveyor (outside machine) OP

Scraper type+drum filter type OP



Hinge type (left discharge, right discharge) OP



Hinge type (rear discharge) OP



Specifications	Workpiece material and chip size				
	Steel		Cast iron	Aluminum/non-ferrous metal	
	Long	Short	Short	Long	Short
Hinge type+drum filter type <small>&lt;Consultation is required&gt;</small>	○	○	○	○	○
Hinge type	○	○	×	○	×
Scraper type+drum filter type	×	○	○	×	○
Magnet scraper type <small>&lt;Consultation is required&gt;</small>	×	○	○	×	×

● Chip size guidelines

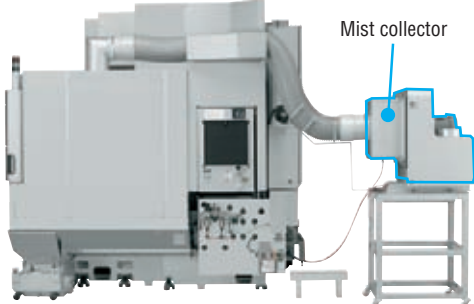
Short: chips 50 mm (2.0 in.) or less in length, bundles of chips  $\phi$  40 mm ( $\phi$  1.6 in.) or less  
 Long: bigger than the above

○: Suitable ×: Not suitable  
 ● 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.

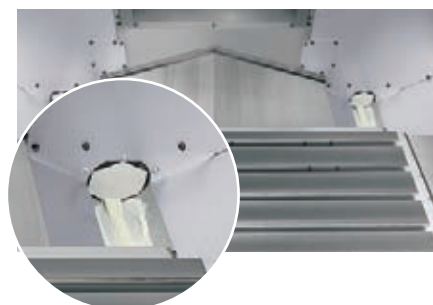
## Mist collector OP

Powerful vacuum sucks out chips and oil mist that accumulate inside the machine.



## Chip flow coolant (NVD5000 Q1A HSC) OP

Using chip flow coolant allows smooth output of chips.



## Coolant gun OP

The high-pressure coolant flushes out all the chips that accumulate throughout the machine.



● The colors and configurations shown in the photographs or illustrations may differ from those of the actual product.



● 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.	<b>Approx. Reduced by 33%</b>
MAPPS IV	45 sec.	

#### Main specifications

Main memory	3 GB
User area	Standard: <b>6 GB</b> Option: <b>20 GB</b>
Interface	<ul style="list-style-type: none"> <li>• USB 2.0 3 ports (Screen side: 1, Bottom and back of operation panel: each 1)</li> <li>• LAN 2 ports (1000BASE-T)</li> <li>• RS-232-C port</li> <li>• Memory card slot</li> </ul>
Soft-keys	Left/right 12 keys Bottom 12 keys

### Improved ease of maintenance

#### Alarm help function

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



### Faster creation of programs

#### CAM software **ESPRIT**

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)

\* Applicable Operating Systems: Windows® Vista Business / Ultimate, Windows® 7 Professional / Ultimate

● A PC is required to use ESPRIT®. Please prepare PCs by yourself.

### 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)

# Machine specifications

Item			NVD5000 $\alpha$ 1 A/40 HSC	NVD5000 $\alpha$ 1 B/40 HSC	
Travel	X-axis <longitudinal movement of table>	mm (in.)	800 (31.5)	1,020 (40.2)	
	Y-axis <cross movement of saddle>	mm (in.)	510 (20.1)		
	Z-axis <vertical movement of spindle head>	mm (in.)	510 (20.1)		
	Distance from table surface to spindle gauge plane	mm (in.)	150–660 (5.9–26.0)		
Table	Working surface	mm (in.)	1,100×600 (43.3×23.6)	1,320×600 (52.0×23.6)	
	Table loading capacity	kg (lb.)	1,000 (2,200)	1,200 (2,640)	
	Table surface configuration <T slots width×pitch×No. of T slots>		18 mm×100 mm×6 (0.7 in.×3.9 in.×6)		
Spindle	Max. spindle speed	min <sup>-1</sup>	20,000		
	Number of spindle speed ranges		1		
	Type of spindle taper hole		No. 40		
	Spindle bearing inner diameter	mm (in.)	65 (2.6)		
Feedrate	Rapid traverse rate	mm/min (ipm)	X, Y, Z: 20,000 (787.4)		
	Cutting feedrate	mm/min (ipm)	1–20,000 (0.04–787.4) <when using look-ahead control>		
	Jog feedrate	mm/min (ipm)	0–5,000 (0–197.0) <20 steps>		
ATC	Type of tool shank		BT40 [CAT40] [DIN40] [HSK-A63]		
	Type of retention knob		DMG MORI SEIKI 90° type [45° <MAS-I>] [60° <MAS-II>] [HSK-A63]		
	Tool storage capacity		30 [60] [90]		
	Max. tool diameter <without adjacent tools>	mm (in.)	80 (3.1) <125 (4.9)>		
	Max. tool length	mm (in.)	300 (11.8)		
	Max. tool mass	kg (lb.)	8 (17.6) [12 (26.4)]		
	Max. tool mass moment <from spindle gauge line>	N·m (ft·lbf)	11 (8.1) <60, 90-tool specifications> (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		Technical memory random		
	Tool changing time	Tool-to-tool	s	1.0/1.5 <using a tool weighting over 8 kg (17.6 lb.) in case of 12 kg (26.4 lb.) tool mass specifications>	
				Cut-to-cut (chip-to-chip) <without ATC shutter>	30 tools
		MAS011	2.6		
		VDI2852	2.6		
		[60 tools]	ISO 10791-9 JIS B6336-9		
MAS011			3.7		
VDI2852			3.7 <adjacent> 6.8 <farthest>		
[90 tools]		ISO 10791-9 JIS B6336-9	Max. tool changing time: 21.7 Min. tool changing time: 4.5		
		MAS011	3.7		
		VDI2852	3.7 <adjacent> 13.0 <farthest>		
<ul style="list-style-type: none"> <li>Depending on the arrangement of tools in the magazine, the Cut-to-cut (chip-to-chip) time may be longer.</li> <li>The time differences are caused by the different conditions (travel distances, etc.) for each standard.</li> <li>For heavy tool specifications &lt;8 kg (17.6 lb.) or more&gt;, the values may be bigger than those above.</li> </ul>					
Motor	Spindle drive motor <10 min/30 min/cont>	kW (HP)	18.5/15/11 (24.7/20/15)		
	Feed motor	kW (HP)	X, Y: 3.0 (4) Z: 5.5 (7.5)	X, Y: 4.0 (5.3) Z: 5.5 (7.5)	
	Coolant pump motor <50 Hz/60 Hz>	kW (HP)	0.635+0.73 (0.84+0.97)/1.04+1.21 (1.39+1.61)	0.635 (0.84)/1.04 (1.39)	
Power source (standard)	Electrical power supply <cont>	194317A01 kVA	32.7	32.8	
	Compressed air supply	MPa (psi), L/min (gpm)	0.5 (72.5), 200 (52.8) (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.)	230 (60.7)	275 (72.6)	
Machine size	Machine height	mm (in.)	2,603 (102.5)		
	Floor space <width×depth> (machine body only)	mm (in.)	2,451×2,747 (96.5×108.1)	2,781×2,747 (109.5×108.1)	
	Mass of machine	kg (lb.)	7,450 (16,390)	8,060 (17,732)	
Noise data	A-weighted, time-average radiated sound	dB	60–77 (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.

● Please use a dual contact tool when cutting at 15,000 min<sup>-1</sup> or higher.

● ANR: ANR refers to a standard atmospheric state; i.e., temperature at 20 °C (68 °F), absolute pressure at 101.3 kPa (14.7 psi) and relative humidity at 65%.

● Power sources, machine size: the actual values may differ from those specified in the catalogue, depending on the optional features and peripheral equipment.

● Compressed air supply: please be sure to supply clean compressed air <air pressure: 0.7 MPa (101.5 psi), pressure dew point: 10 °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 values were measured at the front of the NV5000  $\alpha$  1 with a maximum spindle speed of 14,000 min<sup>-1</sup>. Please contact our sales representative for details.

● The information in this catalog is valid as of December 2011.

HSC: High Speed Cutting

# DMG MORI

**2-year warranty, twice the peace of mind.**

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



## <Precautions for Machine Relocation>

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

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