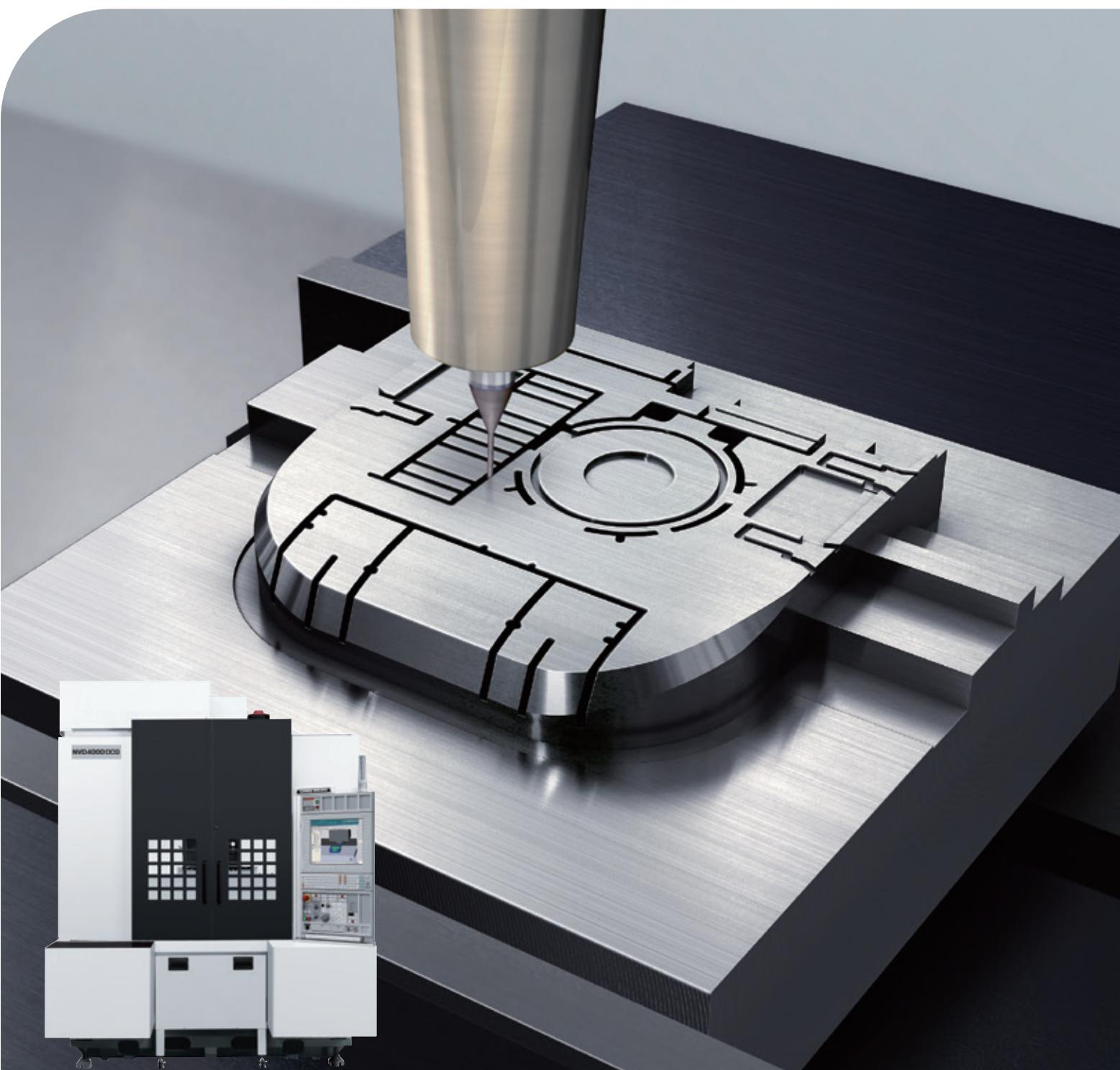


High-Precision Vertical Machining Center for Die & Mold Manufacturers

NVD4000 DCG

NVD4000 DCG

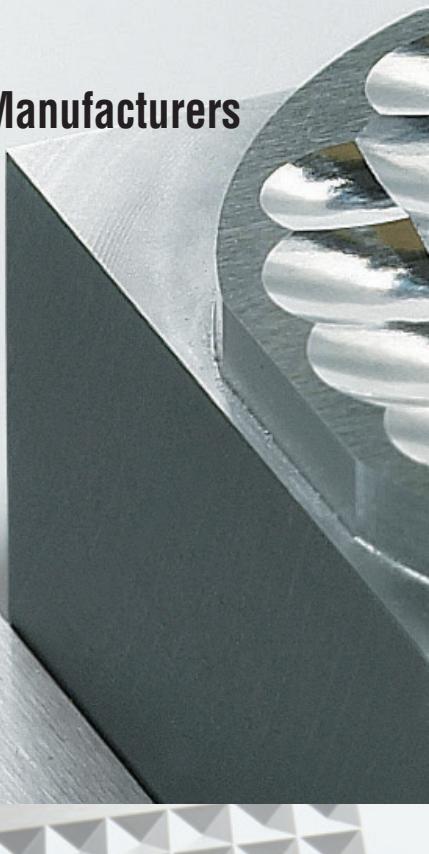




DCG
Driven at the Center of Gravity

High-Precision Vertical Machining Center for Die & Mold Manufacturers

NVD4000 DCG

The ultimate result in surface
finish made possible by
“DCG (Driven at the Center of Gravity)”.




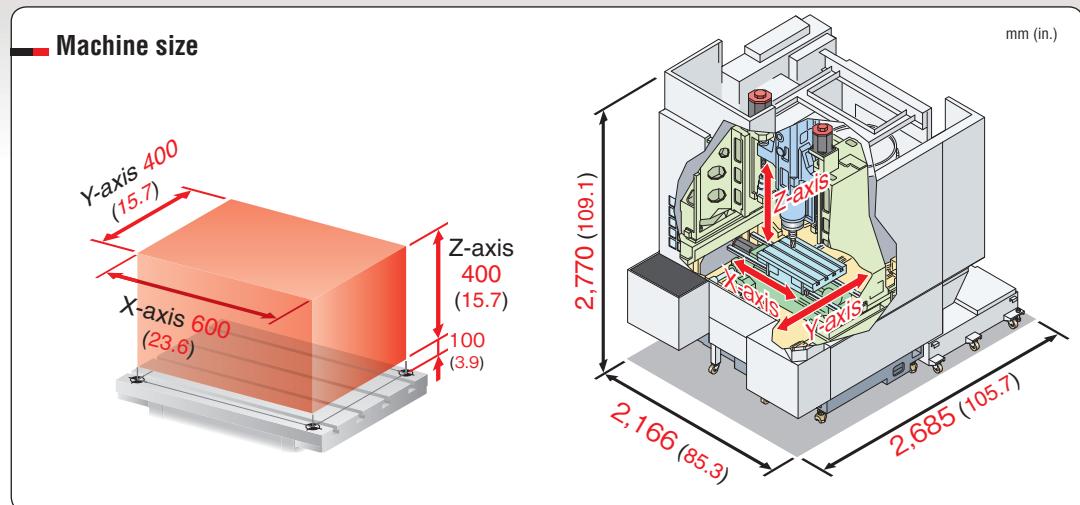
The DCG design minimizes vibration.
This technology was built specifically for high-precision machining.
DMG MORI's NVD4000 DCG is a machine
designed for die and mold machining, capable of giving you
overwhelming competitiveness.



CONTENTS

- 4 DCG (Driven at the Center of Gravity)
- 5 Sample workpieces
- 6 High precision
- 8 High speed
- 10 Peripheral equipment
- 12 MAPPS IV
- 13 Diagrams
- 14 Standard & optional features
- 15 Numerical control unit specifications
- 16 Machine specifications

Machine size



MAPPS: Mori Advanced Programming Production System
• Figures in inches were converted from metric measurements.

Driven at the Center of Gravity



Technology to minimize vibration.

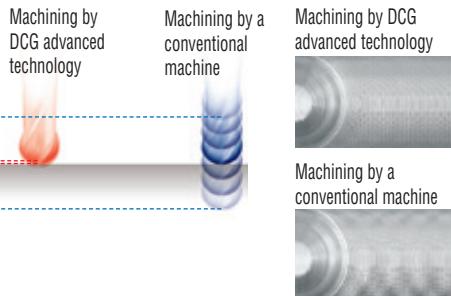
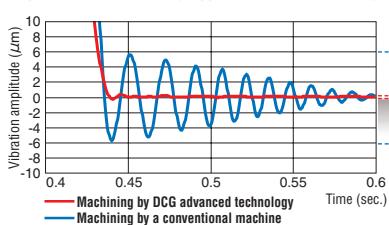
The vibration occurs when the rotational moment is generated from the moving machine structural parts, and it has had a negative effect on surface quality and machining accuracy. Our DCG technology, which drives the moving structural parts at their center of gravity, controls residual tool tip vibration, improves accuracy and acceleration, and extends tool life.

Vibration controlled

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

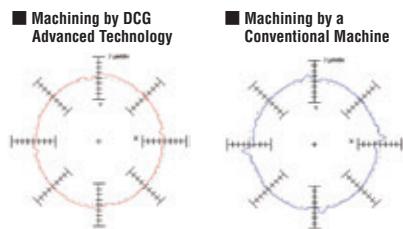
Residual vibration comparison

Rapid traverse rate 100% (stopped in the Z-axis direction)



Improved roundness

During circle cutting on conventional machines, vibration is generated by changes in direction when moving from one quadrant to the next (at the 0°, 90°, 180° and 270° positions). With DCG technology, which minimizes vibration, roundness is significantly improved.



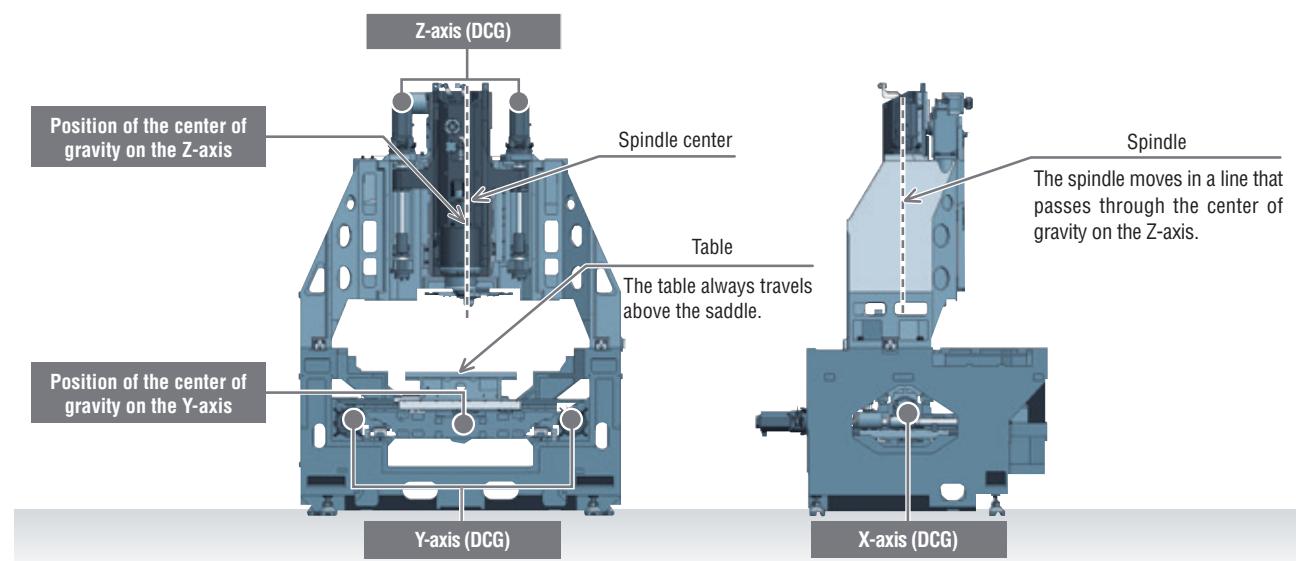
DCG effect

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

Structure

The machine incorporates DCG on all axes.

Also, DMG MORI's original structure made it possible to eliminate spindle and table overhang.



Sample workpieces

Motor cover die



Material: NAK55 (40 HRC)

	Rough machining	Finishing
Tools	High feed radius cutter <Φ 25×R 3 mm (Φ 1.0×R 0.12 in.)>	Ball end mill <R 6 mm (R 0.24 in.)>
Spindle speed	1,270 min ⁻¹	10,000 min ⁻¹
Cutting feedrate	3,820 mm/min (150.4 ipm)	2,000 mm/min (78.7 ipm)

Gear die



Material: SKH51 (60 HRC)

	Finishing	Finishing
Tools	Ball end mill <R 1×12 mm (R 0.04×0.5 in.)>	Ball end mill <R 0.4×8 mm (R 0.016×0.31 in.)>
Spindle speed	12,000 min ⁻¹	12,000 min ⁻¹
Cutting feedrate	1,200 mm/min (47.2 ipm)	1,200 mm/min (47.2 ipm)

Small-diameter pin



Material: NAK55 (40 HRC)

	Finishing	Finishing
Tools	Ball end mill <R 2×20 mm (R 0.08×0.8 in.)>	Ball end mill <R 1.0 mm (R 0.04 in.)>
Spindle speed	18,000 min ⁻¹	20,000 min ⁻¹
Cutting feedrate	2,500 mm/min (98.4 ipm)	600 mm/min (23.6 ipm)

Automobile parts



Material: NAK80 (40 HRC)

	Roughing	Finishing
Tools	Ball end mill <R 3.0 mm (R 0.12 in.)>	Ball end mill <R 1.0 mm (R 0.04 in.)>
Spindle speed	12,000 min ⁻¹	20,000 min ⁻¹
Cutting feedrate	3,600–6,000 mm/min (141.7–236.2 ipm)	600 mm/min (23.6 ipm)

Plastic model die



Material: NAK80 (40 HRC)

	Roughing	Finishing
Tools	Ball end mill <R 3.0 mm (R 0.12 in.)>	Ball end mill <R 0.3 mm (R 0.012 in.)>
Spindle speed	9,500 min ⁻¹	10,600 min ⁻¹
Cutting feedrate	2,500 mm/min (98.4 ipm)	640 mm/min (25.2 ipm)

Button die



Material: NAK55 (40 HRC)

	Roughing	Finishing
Tools	Ball end mill <R 0.5 mm (R 0.020 in.)>	Ball end mill <R 0.2 mm (R 0.008 in.)>
Spindle speed	12,000 min ⁻¹	12,000 min ⁻¹
Cutting feedrate	1,000 mm/min (39.4 ipm)	300/400 mm/min (11.8/15.7 ipm)

Speaker die



Material: NAK55 (40 HRC)

	Roughing	Finishing
Tools	Ball end mill <Φ 0.75×4 mm (R 0.03×0.16 in.)>	Ball end mill <R 5 mm (R 0.20 in.)>
Spindle speed	20,000 min ⁻¹	8,000 min ⁻¹
Cutting feedrate	5,000 mm/min (196.8 ipm)	1,800 mm/min (70.9 ipm)

Wheel die



Material: SKD61 (48 HRC)

	Roughing	Finishing
Tools	Ball end mill <Φ 5 mm (R 0.20 in.)>	Ball end mill <R 5 mm (R 0.20 in.)>
Spindle speed	5,200 min ⁻¹	8,000 min ⁻¹
Cutting feedrate	1,800 mm/min (70.9 ipm)	2,400 mm/min (94.5 ipm)

High precision

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

The NVD4000 DCG 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 for X, Y, Z-axis

Standard features

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-axis)**
0.01 μm
Magnescale
High accuracy absolute scale

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

Oil chiller (separate type)

Standard features

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



Coolant chiller (separate type)

OP

Increased coolant temperature causes thermal displacement in the fixtures and workpiece, affecting the machining accuracy of the workpiece. Use this unit to prevent the cutting 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.

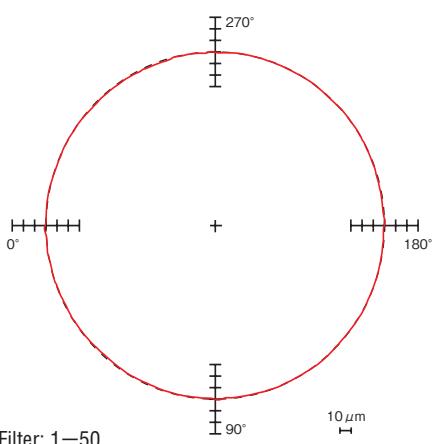
When using oil-based coolant, please be sure to consult with our sales representative.

• We cannot guarantee that this unit will completely control the coolant temperature. It is designed to help prevent oil temperature increases.



High-accuracy data

Circularity



Material <JIS> : A5052*
<outer diameter:
96 mm (3.8 in.)>
Tool : ϕ 16 mm (ϕ 0.6 in.)
Carbide end mill
<4 flutes>
Spindle speed : 5,000 min⁻¹
Cutting feedrate : 300 mm/min
(11.8 ipm)
Depth of cut : 0.1 mm (0.004 in.)

1.8 μm
(actual result)

A5052: Aluminum
* 5052 (ANSI), NS4 (BS), AlMg2.5 (DIN), 5A02 (GB)

Surface roughness



Material <JIS> : S45C*
Tool : 10 mm (0.4 in.) End mill
Spindle speed : 10,000 min⁻¹
Cutting feedrate : 5,000 mm/min (196.9 ipm)
Depth of cut : 0.2 mm (0.008 in.)

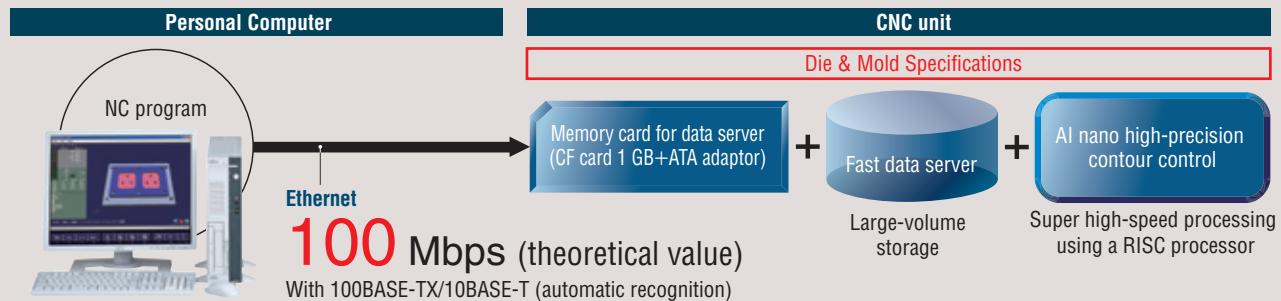
2.3 μm Ry
(actual result)

S45C: Carbon steel

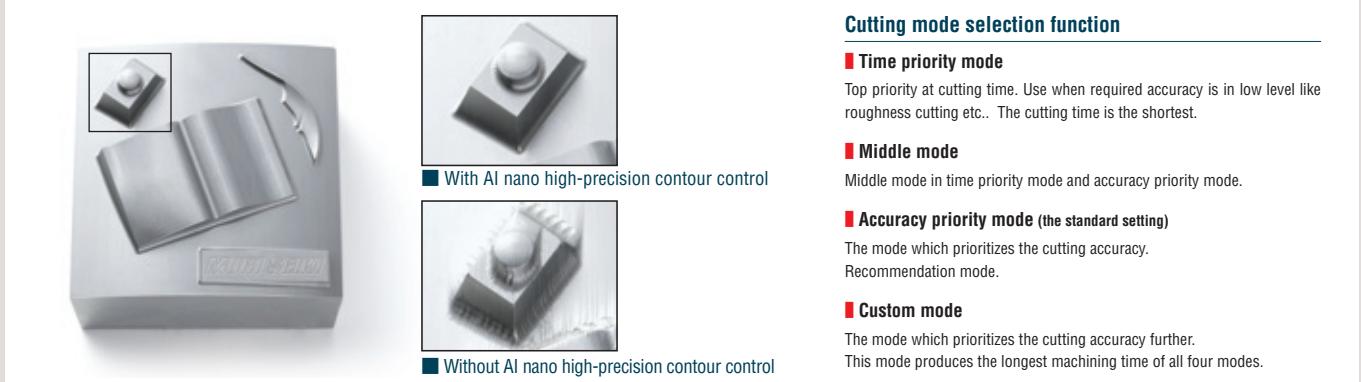
JIS: Japanese Industrial Standard

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

Die & Mold Specifications (standard features)

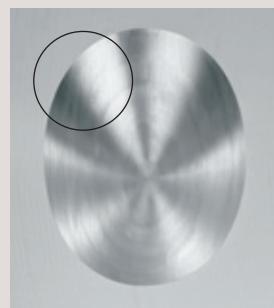


- **AI nano high-precision contour control** This speeds up program processing, makes machine movement smoother, and raises machining precision.



Surface roughness

X : Y is 2 : 1 taper machining



Previous model

Calculates the least command increment in 1 μm units.

Feed command 1.0 μm

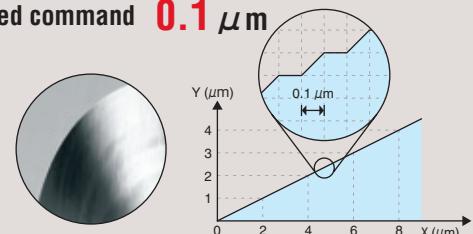
► 10 times better



NVD4000 DCG

Improves surface roughness using smooth interpolation in nanometer increments.

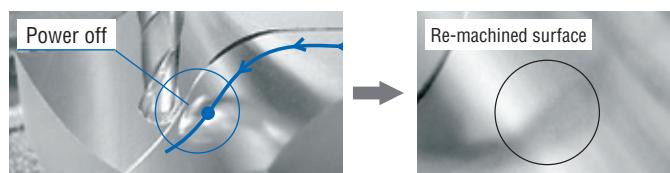
Feed command 0.1 μm



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

Z-axis drop prevention function ideal for blackouts

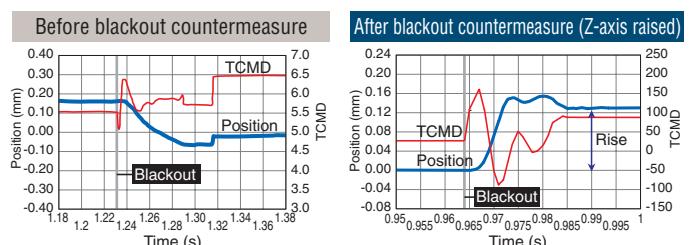
Raising the spindle slightly during blackouts prevents any contact between the tool and the workpiece caused by the spindle dropping.



※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.

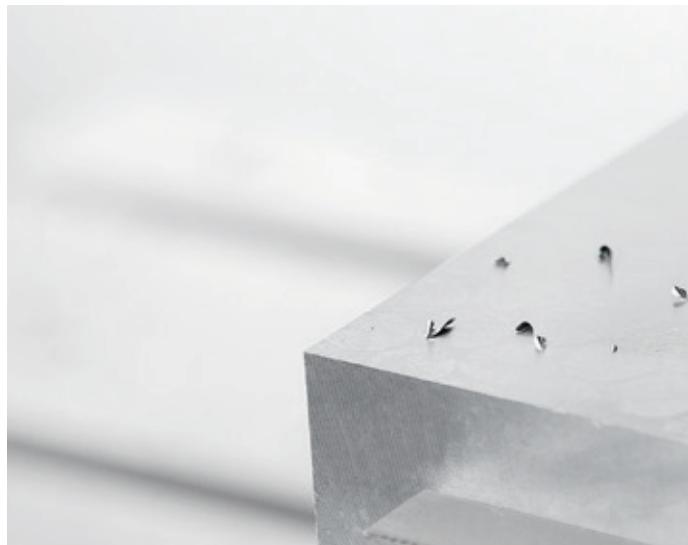
- Depending on how voltage drops (slowly or suddenly), it may not always be possible to detect a blackout.



High speed

Unrivaled speed to meet your delivery schedules.

A high-speed spindle, combined with other mechanisms' greater speeds, greatly reduces both cutting and non-cutting times. This cuts down on lead times for machining dies and molds, meeting even the tightest of delivery schedules.



Spindle



High speed, high power DDS (Direct Drive Spindle) motor.

Max. spindle speed

NVD4000 DCG
12,000 min⁻¹
20,000 min⁻¹ **OP**
30,000 min⁻¹ **OP**

Spindle acceleration time (0→12,000 min⁻¹)

NVD4000 DCG **1.30** sec.

Spindle deceleration time (12,000 min⁻¹→0)

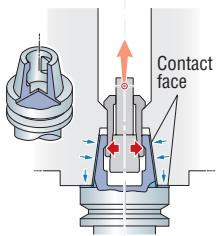
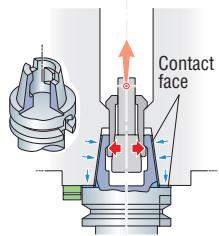
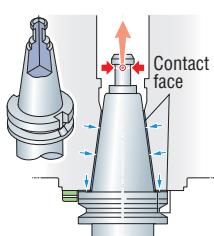
NVD4000 DCG **1.17** sec.

Two-face contact specifications

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



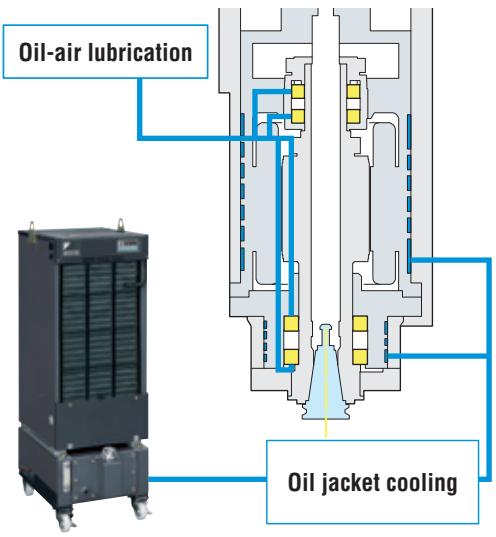
HSK-F63
(30,000 min⁻¹ specifications)



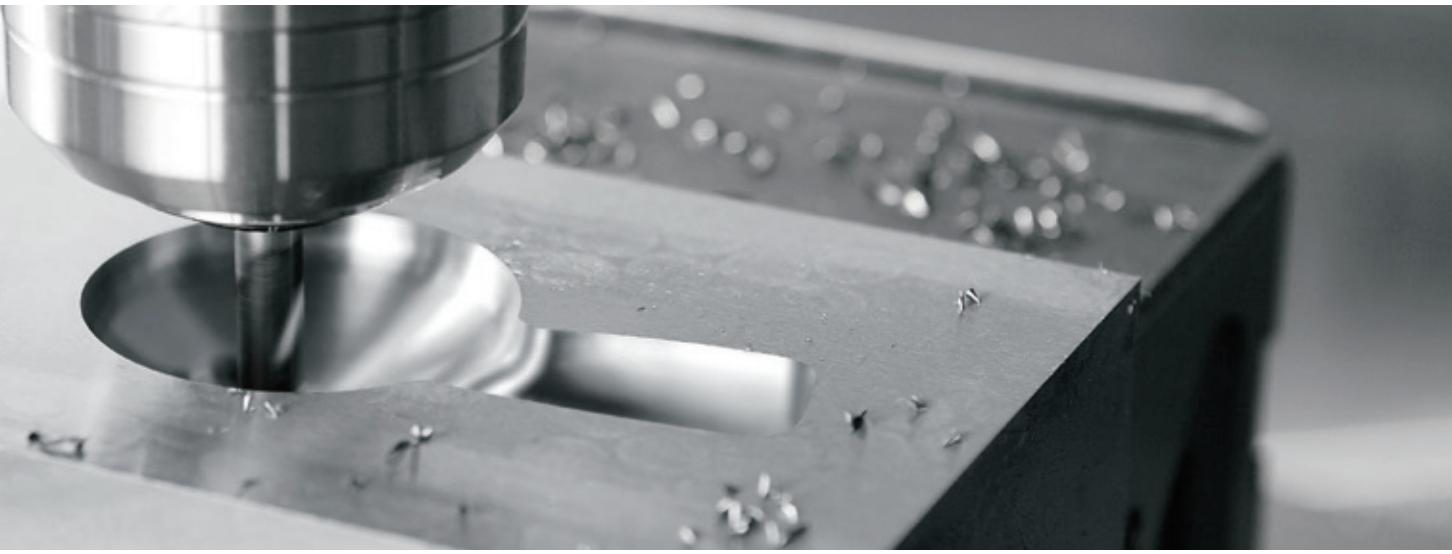
Spindle lubrication

The spiral oil jacket around the spindle controls temperature increases in the spindle. The amount of lubricating oil is minimized, so friction loss due to lubricating oil is reduced.

Oil-air lubrication



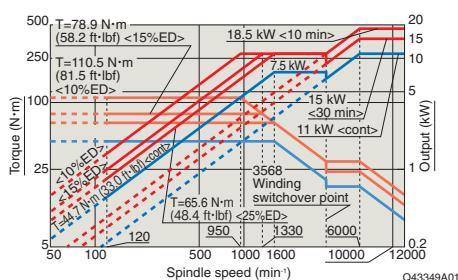
* When the two-face contact specification is selected, a two-face contact tool and other tools cannot be used together.



Spindle speed torque/output diagrams

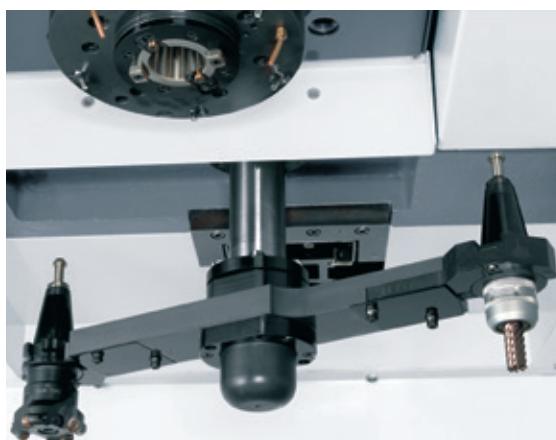
NVD4000 DCG

- Spindle drive motor: 18.5/15/11 kW (24.7/20/15 HP) <10 min/30 min/cont> (high-speed winding side)
- Max. spindle speed: 12,000 min⁻¹



ATC, Magazine

ATC tool changing time



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

<without ATC shutter>

Max. tool changing time:

5.5 sec.

Min. tool changing time:

3.6 sec.

(20-tool specifications)
<ISO 10791-9, JIS B6336-9>

- Depending on the arrangement of tools in the magazine, the cut-to-cut (chip-to-chip) time may be longer.

Tool-to-tool

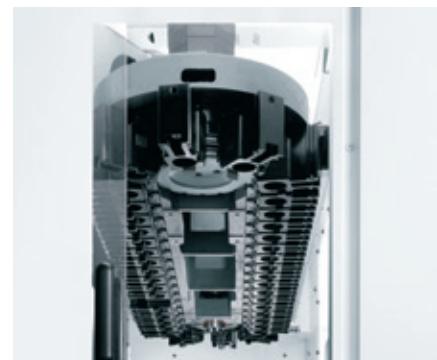
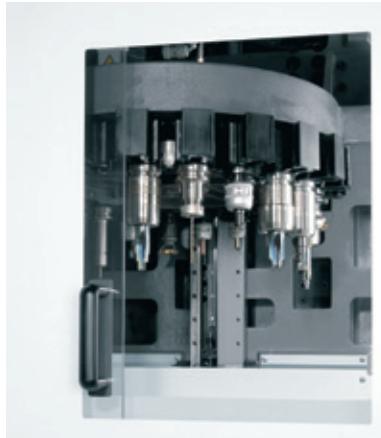
1.0 sec.

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

ISO: International Organization for Standardization JIS: Japanese Industrial Standard

Tool storage capacity

The tool magazine has been specially designed for space, fitting in the standard installation space even if options or more tools are added.



20 tools

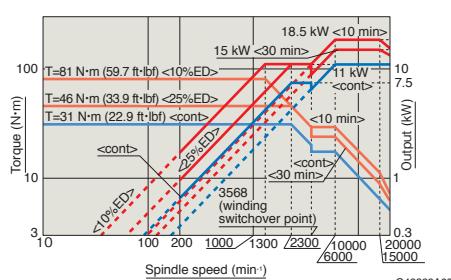
40 tools

60 tools

(for more than 60 tools, see one of our representatives)

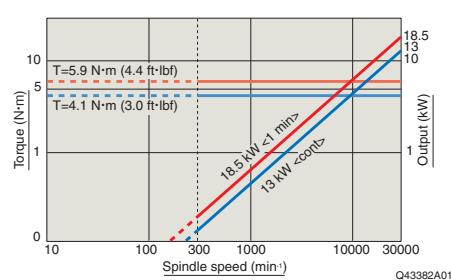
High speed [OP]

- Spindle drive motor: 18.5/13 kW (24.7/17.3 HP) <1 min/cont>
- Max. spindle speed: 30,000 min⁻¹



High speed [OP]

- Spindle drive motor: 18.5/13 kW (24.7/17.3 HP) <1 min/cont>
- Max. spindle speed: 30,000 min⁻¹

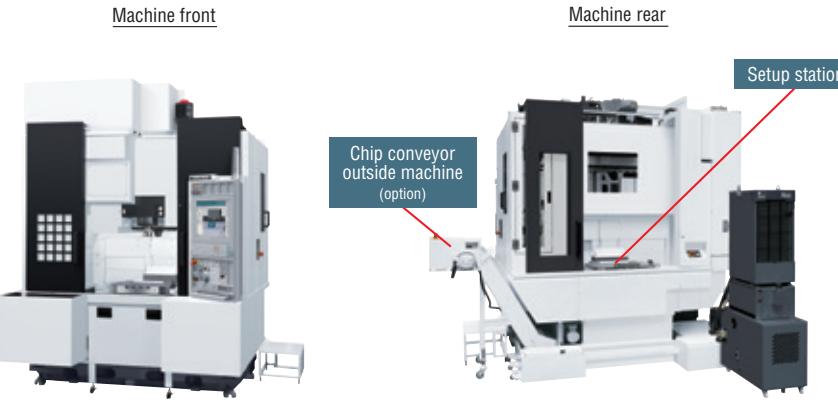


- With the APC specifications, a dummy tool to be mounted on the spindle during APC operation will be included.

Peripheral equipment

Automatic operation support

2-station turn-type APC



Tool storage capacity

40 tools/60 tools

(including a dummy tool)

[OP]

Pallet changing time

13 sec.

(to prevent APC interference, this specification includes time required for the spindle protection tool to be moved until after the APC turning is complete)

Pallet size

**600×400 mm
(23.6×15.7 in.)**

A new design allows access from the back of the machine when setting up the APC. This contributes to space savings.

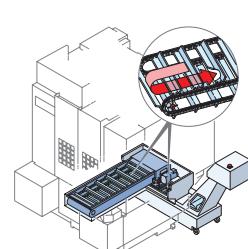
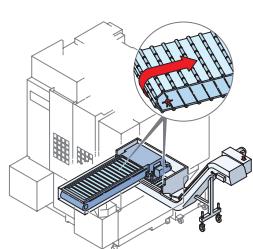
- When APC is selected, raised column specifications <100 mm (3.9 in.) or 200 mm (7.9 in.)> are required.

Chip strategy

Chips that fall from the Y-axis tilted panel down into the center trough are automatically discharged out of the machine by the chip conveyor. This design prevents chips from accumulating.

Chip conveyor (hinge type)

[OP]



Chip conveyor (scraper type+drum filter type)

[OP]

Specifications	Workpiece material and chip size					○: Suitable	✗: Not suitable		
	Steel		Cast iron	Aluminum/non-ferrous metal					
	Long	Short	Short	Long	Short				
Hinge type+drum filter type <small>[Consultation is required]</small>	○	○	○	○	○	○	○		
Hinge type	○	○	✗	○	○	○	✗		
Scraper type + drum filter type	✗	○	○	✗	○	○	○		
Magnet scraper type <small>[Consultation is required]</small>	✗	○	○	✗	○	✗	✗		

- Chip size guidelines

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

The options table shows the general options when using coolant. Changes may be necessary if you are not using coolant, or depending on the amount of coolant, compatibility with machines, or the specifications required.

Please select a chip conveyor to suit the shape of your chips. When using special or difficult-to-cut material (chip hardness HRC45 or higher), please consult with our sales representative.

Chip conveyors are available in various types for handling chips of different shape and material. For details, please consult with our sales representative.

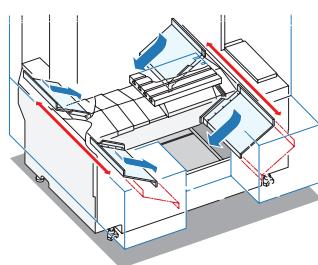
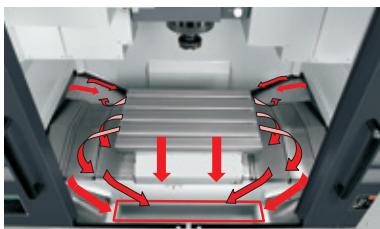
Chip receiver

The chip bucket can be pulled forward, minimizing the maintenance space for the operator.



Center trough construction

Using a center trough allows for a greater tilt angle towards the center, thereby improving chip disposal performance.



Y-axis single cover

A fixed cover is placed to protect the Y-axis, thus raising reliability.

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

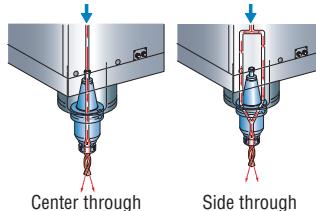
Coolant-related

Through-spindle coolant system

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

	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>	820×1,120 (32.3×44.1) <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.



High-pressure coolant system
(separate type)

Recommended equipment

The high-pressure coolant unit generates a lot of heat because it discharges coolant at high pressure. The coolant chiller 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.



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

Coolant tank

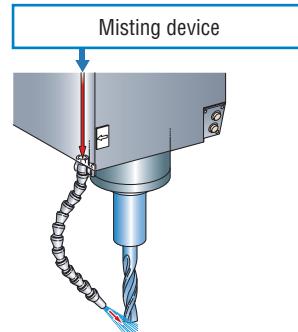
A high capacity coolant tank comes as a standard feature.



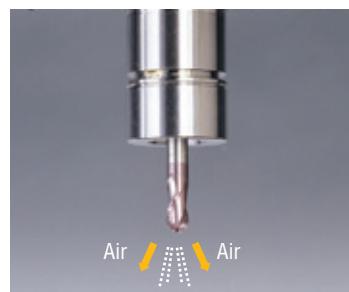
Tank capacity
340 L
(89.8 gal.)

Semi-dry unit

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



Through-spindle air specifications (for air only)



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

Oil mist collector

[Consultation is required] [OP]

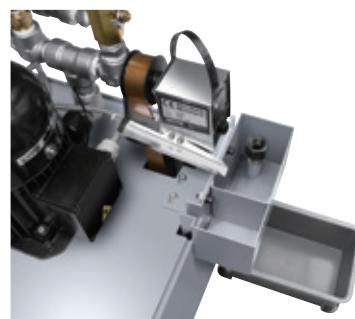
Powerful vacuum sucks out chips and oil mist that accumulate inside the machine.



Oil skimmer

[OP]

Efficiently separates coolant and lubricating oils.



Coolant gun

[OP]

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



• The photo shows the NHX4000.

MAPPS IV

High-Performance Operation System
for Machining Centers



• 19-inch operation panel

High-performance operation 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
- ▶ Cutting-edge 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's remote maintenance service solves it smoothly **MORI-NET Global Edition Advance** [OP](#)

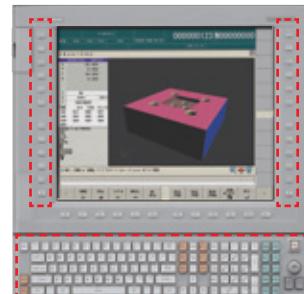
Outstanding operability

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^{*1}

Shorter drawing time was achieved thanks to increased CPU performance.

MAPPS III	68 sec.	Approx.
MAPPS IV	45 sec.	Reduced by 33%

*1 The reduction rate differs depending on the program.

Main specifications

Main memory	2 GB
User area	6 GB
Interface	<ul style="list-style-type: none">• USB 2.0 3 ports (Screen side: 2, Bottom of operation panel: 1^{*2})• LAN 1 port (1000BASE-T)• RS-232-C port
Soft-keys	Left/right 12 keys Bottom 12 keys

*2 Option

Improved ease of maintenance

Alarm help function

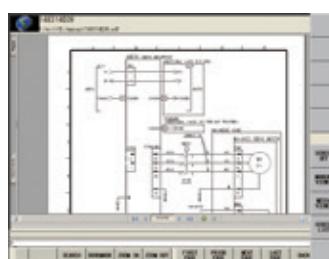
When an alarm occurs, MAPPS identifies the cause of the trouble and provides solutions.



Improved ease of setup

File display and Memo function

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



Viewable file types

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

Improved 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.



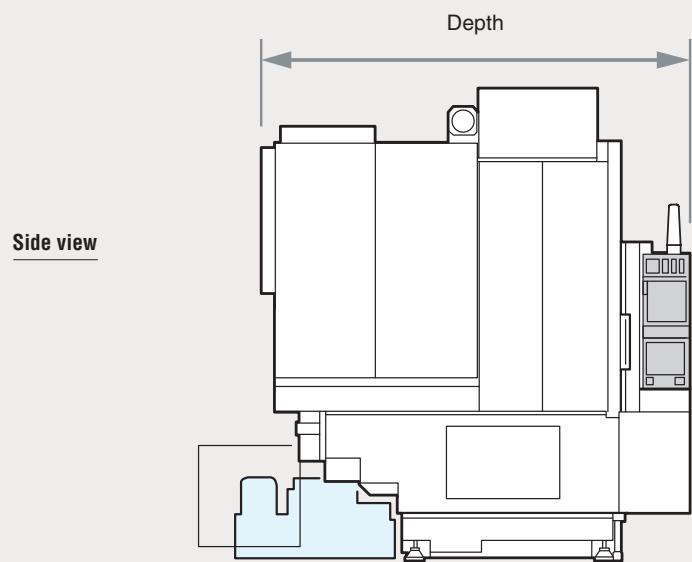
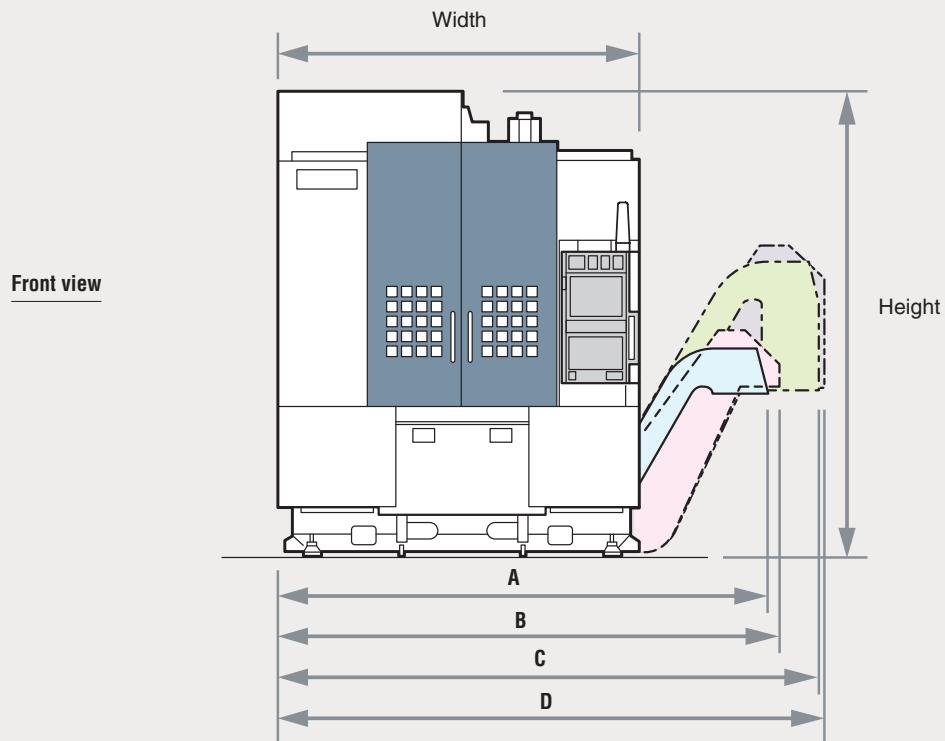
Examples of camera locations

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

Diagrams

OP Option

General view



Machine only	Width					Depth	Height	mm (in.)
	A	B	C <EN Standards>	D <EN Standards>				
2,166 (85.3)	Hinge type (right disposal) 2,934 (115.5) OP	Scraper type+ drum filter type (right disposal) 3,001 (118.1) OP	Hinge type (right disposal) 3,234 (127.3) OP	Scraper type+ drum filter type (right disposal) 3,244 (127.7) OP	2,685 (105.7)	2,770 (109.1) 2,870 (113.0) <raised column 100 (3.9)> OP 2,970 (116.9) <raised column 200 (7.9)> OP		

Q56044A01

Standard & optional features

●: Standard features ○: Options ☆: Consultation is required

Spindle

	BT40*	●
Type of tool shank	DIN40	○
	CAT40	○
	HSK-A63	○
	HSK-F63 (30,000 min ⁻¹ specifications)	○
	DMG MORI 90° type	●
Type of retention knob	45° (MAS-I)	○
	60° (MAS-II)	○
	HSK-A63	○
	HSK-F63 (30,000 min ⁻¹ specifications)	○
BT40*	12,000 min ⁻¹ : two-face contact	●
	20,000 min ⁻¹ : two-face contact	○
HSK-A63	12,000 min ⁻¹ : two-face contact	○
HSK-F63	20,000 min ⁻¹ : two-face contact	○
	30,000 min ⁻¹ : two-face contact	○
	12,000 min ⁻¹ : 18.5/15/11 kW (24.7/20/15 HP) <10 min/30 min/cont>	●
	20,000 min ⁻¹ : 18.5/15/11 kW (24.7/20/15 HP) <10 min/30 min/cont>	○
	30,000 min ⁻¹ : 18.5/13 kW (24.7/17.3 HP) <1 min/cont> (high speed)	○
	Carbon specifications (oil/air lubrication) <this is only available for BT40 (12,000/20,000 min ⁻¹)>	☆
	Positioning block for angle head tool	○

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

Table

Table	T-slot	●
Sub-table	T-slot	○
	Solid	○

Pallet/APC

Auto-coupler spec. (with pallets)	Hydraulic 2 circuits+workpiece seating detection 2 circuits (for 2-station APC <with pallets>)	○
	Hydraulic 1 circuit+workpiece seating detection 1 circuit (for 2-station APC <with pallets>)	○
2-station turn-type APC	Available only for 40/60-tool magazine specifications	○
One additional pallet	T-slot Tap	○

● When APC is selected, raised column specifications <100 mm (3.9 in.) or 200 mm (7.9 in.)> are required.

Fixture/Steady rest

Additional 1-axis interface	○
Index table interface (M signal output from terminal block)	○
Pneumatic fixture interface	1 circuit

Magazine

	20 tools	●
Tool storage capacity	40 tools	○
	60 tools	○

ATC shutter

● 40-/60-tool: with the APC specifications, a dummy tool to be mounted on the spindle during APC operation will be included.

Coolant

Coolant system	●
Additional coolant system for tool tip	○
Oil mist system	○
Semi dry unit	Tanaka Import
Semi dry unit button	○
Coolant gun	Machining side Setup station side Setup station side and machining side
Shower coolant	Essential for chips that easily accumulate (Aluminum, etc.)
Through-spindle air specifications (only for air)	○
Through-spindle coolant/air (switching specifications)	○
<through-spindle coolant system is necessary required separating>	
Oil shot system	○
Through-spindle coolant system <unit on coolant tank, 1.5 MPa (217.5 psi)> center through	○*
Oil-hole drill coolant system	○
Oil-hole drill coolant/air switching specifications <oil-hole drill coolant system is necessary required separating>	○
Through-spindle coolant system (separate type) Interface	○
Through-spindle coolant system <unit on coolant tank, 1.5 MPa (217.5 psi)> side through	○*
Coolant chiller (separate type)	Optional when using water-soluble coolant Essential when using oil-based coolant
Coolant chiller	For standard coolant system+ for through-spindle coolant system
Mist collector HVS-150	Including stand
Mist collector interface HVS-150	Electric parts only
Mist collector interface (duct only)	φ 125 mm (φ 4.9 in.) φ 150 mm (φ 5.9 in.) φ 200 mm (φ 7.9 in.)
Oil skimmer	○

* DMQP (DMG MORI Qualified Products)

● The information in this catalog is valid as of November 2020.

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

● Some options are not available in particular regions. Please contact our sales representative for details.

Chip disposal

Air blow for tool tip <when the tool tip air blow is regularly used, air supply of more than 300 L/min (79.2 gpm) is separately required>	●
Additional air blow for tool tip	○
Air blow button	○
Air gun	○
	Right discharge, hinge type
Chip conveyor (external+internal)	○
	Right discharge, scraper type+drum filter type
	Hinge type+drum filter type
	☆
	Magnet scraper type
	☆
Chip bucket	Interface
	254 L (67.1 gal.)
	○*

Measurement

Touch sensor	(M)	○
Touch sensor + tool setter function (tool length only)	(M)	○
In-machine measuring system (table)	Touch sensor	(R)
	Touch sensor + tool setter function (tool length + diameter)	(R)
	Laser sensor	(B)
	Laser sensor interface	(B)
	Touch sensor (optical signal transmission type)	(R)
In-machine measuring system (spindle)	Touch sensor (optical signal transmission type) + workpiece setter function	(R)
	Inductive type touch sensor	(D)
	Inductive type touch sensor + workpiece setter function	(D)

● The specifications vary depending on the manufacturers.

(M): Made by Magnescale (R): Made by RENISHAW (B): Made by BLUM (D): Made by BIG DAISHOWA

Improved accuracy

Direct scale feedback for X-, Y-, Z-axis	●
Oil chiller (separate type)	●

Automation

Auto power off	●
EtherNet/IP interface	○
Robot interface (EtherNet/IP) <EtherNet/IP interface is necessary required separating>	○
Automatic door	○

Pallet pools

CPP (Carrier Pallet Pool)	☆
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Other

• Full cover		
• Door interlock system (incl. mechanical lock): front door/setup station door (for APC)		
• Door interlock system: electrical cabinet door/magazine door		
• Low air pressure detecting switch		
• Residual pressure relief valve		
• Built-in worklight	• T-nuts for table slots	• Leveling block
• Signal light 3 layers (LED type: red, yellow, green)		• Hand tools
Dry anchor		○
Raised column	100 mm (3.9 in.)	○
	200 mm (7.9 in.)	○
Earth leakage breaker		
Danger sensing device interface (recommended when oil-based coolant is used or during unmanned operation)		
Refrigerating type air dryer		○*
Tool wagon		○*
Tool cabinet		○*
Basic tooling kit		○*
Weekly timer		○
Workpiece counter		○
Total counter		○
Manual pulse generator (separate type)		○

Through-spindle coolant system (separate type) <high-pressure coolant system is attached>

Discharge pressure MPa (psi)	Side through	Center through (special retention knobs are required)
1.5 (217.5)	○*	○*
3.5 (507.5)	○*	○*
7.0 (1,015)	○*	○*

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

Numerical control unit specifications F31iB, F31iB5

●: Standard ○: Option

Controlled axes		Feed functions		Tool function/Tool offset function	
Controlled axes	X, Y, Z, MG	Feedrate override	0–200% (10% increments)	Tool function (T function)	4-digit T code
Simultaneously controlled axes	3 axes	Override cancel	—	32 sets	
Least input increment	0.0001 mm (0.00001 in.)	Linear acceleration/deceleration after cutting feed interpolation	—	Number of tool offsets	(diameter + length=1 set, number of offsets indicates that diameter and length are displayed separately)
Least command increment	0.0001 mm (0.00001 in.)	AI contour control II+ Fast data server (1,000 look-ahead blocks, high-speed processing)	—	Tool offset memory C	D/H code, geometry/wear
Max. command value	±99,999.999 mm (±9,999.9999 in.)	One-digit F code feed	F1 to F9	Tool length offset	G43, G44, G49
Inch/metric conversion	G20/G21	Small-hole peck drilling cycle (the arbor with the overload torque detection function must be attached)	—	Cutter radius offset	G40–G42
Machine lock	—	—	—	Tool length measurement	—
Overtavel	—	—	—	—	64 sets
Door interlock	—	—	—	Number of tool offsets	99 sets
Stroke limit check before movement	—	—	—	<in total>	200 sets
Mirror image	—	—	—	(the number of selectable tool offsets depends on the tool storage capacity)	400 sets
Software damper	Abnormal load detection	Max. command value	±9 digits (R, I, J, K is ±12 digits)	499 sets	499 sets
Load monitor function C	Soft key type	Program number/ program name	4 digits 8 digits	Tool offset	G45–G48
Operation		Absolute/incremental programming	G90/G91	Rotary table dynamic fixture offset	—
Dry run	—	—	—	Tool life management	—
Single block	—	Decimal point programming or electronic calculator type decimal point programming can be set using parameters	—	Tool pair in total for tool life management	1,024 sets
Jog feed	0–5,000 mm/min (0–197.0 ipm) <20 steps>	Decimal point programming	—	MAPPS tool management system*	—
Manual reference position return	Manual pulse generator: 1 unit ×1, ×10, ×100, ×1,000 (per pulse)	Diameter/radius programming	—	MAPPS tool management system*+ Tool IC (MAPPS software only)**	—
Manual pulse handle feed	—	Plane selection	G17, G18, G19	MAPPS tool management system*+ Tool ID (MAPPS software only)**	—
Sequence number comparison and stop	—	Rotary axis designation	—		
Program restart	—	Rotary axis roll-over	—		
Tool retract and recover	—	Coordinate system setting	G92		
Manual handle interruption	—	Automatic coordinate system setting	—		
Interpolation functions		Workpiece coordinate system	G52–G59		
Nano interpolation	—	Programmable data input	G10		
Positioning	G00	Sub-program call	Up to 10 nestings		
Single direction positioning	—	Custom macro	—		
Exact stop mode	G61	Hole machining canned cycle	G80–G89		
Tapping mode	G63	F15 format	—		
Cutting mode	G64	Programming resolution multiplied by 1/10 (least input increment C)	—		
Exact stop	G09	Additional workpiece coordinate systems	48 sets 300 sets		
Helical interpolation	Optional 2 axes and other 1 axis	Addition of optional block skip	Soft key type (2–9)		
Reference position return	G28	Optional chamfering/corner R	—		
Reference position return check	G27	Additional custom macro common variables	#100 to #199, #500 to #999		
Return from reference position	G29	Interruption type custom macro	—		
2nd reference position return	G30 (used for ATC)	Automatic corner override	—		
Cylindrical interpolation	G7.1	Scaling	—		
Involute interpolation	G2.2/G3.2	Coordinate system rotation	—		
Spiral/conical interpolation	—	Programmable mirror image	—		
Smooth interpolation	—	Graphic copy	G72.1/G72.2		
Nano smoothing	—	High-speed canned cycle* <MAPPS>	—		
External high-speed skip (installation of high-speed skip terminal)	—	MORI-POST advanced mode <MAPPS>	—		
3rd, 4th reference position return	Standard with APC specifications	DXF import function <MAPPS>	—		
Tool spindle Cs control	—	Islands, open pockets* <MAPPS>	—		
(Cs contour control+normal direction control)	—	Text engraving function <MAPPS>	—		
<consultation is required if orbit machining or hole machining needs to be performed>	—	* For Europe, this specification is provided as standard.	—		
NURBS interpolation	—	Miscellaneous function/Spindle speed function	—		
Feed functions		Miscellaneous function (M function)	4-digit M code		
Rapid traverse rate	Max. 20,000 mm/min (787.4 ipm)	Auxiliary function lock	—		
Cutting feedrate	1–20,000 mm/min (0.04–787.4 ipm) <with look-ahead control and AI nano high-precision contour control>	Multiple miscellaneous function commands	3 commands		
Rapid traverse override	F0/10/25/100%	Spindle speed function (S function)	5-digit S code		
Feed per minute	—	Spindle speed override	50–150% (10% increments)		
Tangential speed constant control	—	Spindle orientation	—		
Cutting feedrate clamp	—	Synchronous tapping	—		
Automatic acceleration/ deceleration	Linear type (rapid traverse)/ Linear type (cutting feed)	Multiple M cords in single block (Multi M code function)	—		
Rapid traverse bell-shaped acceleration/deceleration	—	<incl. M code group check>	—		

■ Program storage length and registerable programs

Part program storage length <in total>	Registerable programs <in total>		
	Without expansion (programs)	Expansion 1 (programs)	Expansion 2 (programs)
128 KB <320 m (1,050 ft)>	63	63	●
128 KB <320 m (1,050 ft)>		250	—
256 KB <640 m (2,100 ft)>		500	—
512 KB <1,280 m (4,200 ft)>		1,000	—
1 MB <2,560 m (8,400 ft)>		1,000	2,000
2 MB <5,120 m (16,800 ft)>		1,000	4,000
4 MB <10,240 m (33,600 ft)>		1,000	4,000
8 MB <20,480 m (67,200 ft)>		1,000	4,000

● The information in this catalog is valid as of November 2020.

Machine specifications

Item		NVD4000 DCG	
Travel	X-axis travel <longitudinal movement of table>	mm (in.)	600 (23.6)
	Y-axis travel <cross movement of saddle>	mm (in.)	400 (15.7)
	Z-axis travel <vertical movement of spindle head>	mm (in.)	400 (15.7)
	Distance from table surface to spindle gauge plane	mm (in.)	100–500 (3.9–19.7) [150–550 (5.9–21.7) (APC <raised column 100 (3.9)> specifications)]
Table	Distance from floor surface to table surface	mm (in.)	900 (35.4) [950 (37.4) <APC specifications>]
	Working surface	mm (in.)	700×450 (27.6×17.7) <for APC specifications, please check the pallet configuration diagrams>
	Table loading capacity	kg (lb.)	350 (770) [250 (550) <APC specifications>]
Table surface configuration <T slots width×pitch×No. of T slots>		18 mm×100 mm×4 (0.7 in.×3.9 in.×4)	
Spindle	Max. spindle speed	min⁻¹	12,000 [20,000] [30,000]
	Number of spindle speed ranges		1
	Type of spindle taper hole		No. 40 [HSK-F63*¹]
Feedrate	Spindle bearing inner diameter	mm (in.)	70 (2.8) [60 (2.4)*¹]
	Rapid traverse rate	mm/min (ipm)	X, Y, Z: 20,000 (787.4)
	Cutting feedrate	mm/min (ipm)	X, Y, Z: 1–20,000 (0.04–787.4) <with look-ahead control and AI nano high-precision contour control>
Feedrate	Jog feedrate	mm/min (ipm)	0–5,000 (0–197.0) <20 steps>
	Type of tool shank		BT40*² [DIN40] [CAT40] [HSK-A63] [HSK-F63*¹]
	Type of retention knob		DMG MORI 90° type [45°(MAS-I)] [60°(MAS-II)] [HSK-A63] [HSK-F63*¹]
ATC	Tool storage capacity		20 [40] [60]
	Max. tool diameter	With adjacent tools mm (in.)	80 (3.1) [70 (2.7) <with the 40- and 60-tool specified tool magazine>]
		Without adjacent tools mm (in.)	125 (4.9)
	Max. tool length	mm (in.)	250 (9.8)
	Max. tool mass	kg (lb.)	8 (17.6) [3 (6.6)*¹]
	Max. tool mass moment <from spindle gauge line>	N·m (ft·lbf)	11 (8.1) <a tool with a mass moment greater than the maximum tool mass moment may cause problems during ATC operations even if it satisfies other conditions.>
	Method of tool selection		Fixed address, shorter route access
	Tool changing time	Tool-to-tool s	1.0
Motor		MAS s	2.8
	● The time differences are caused by the different conditions <travel distances, etc> for each standard.	Cut-to-cut (chip-to-chip) ISO 10791-9 s	20-tool specifications: 5.5 (max.)/ 3.6 (min.)
	● Depending on the arrangement of tools in the magazine, the cut-to-cut (chip-to-chip) time may be longer.	● Without ATC shutter JIS B6336-9 s	[40-tool specifications: 10.9 (max.)/ 3.6 (min.)]
Power sources <standard>	Spindle drive motor	kW (HP)	18.5/15/11 (24.7/20/15) <10 min/30 min/cont> [high-speed winding side] [18.5/13 (24.7/17.3) <1 min/cont*&�]
	Feed motor	kW (HP)	X: 1.6 (2.1), Y: 1.6 (2.1)×2, Z: 3.0 (4)×2
	Coolant pump motor <50/60 Hz>	kW (HP)	0.6 (0.8)/1.02 (1.37)
Power sources <standard>	Electrical power supply <cont>	I94314001 (kVA)	27.0 [29.3*¹]
	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.)	340 (89.8) [375 (99.0) <APC specifications>]
	Machine height	mm (in.)	2,770 (109.1) [2,870 (113.0) <APC specifications>]
Machine size	Floor space <width×depth>	mm (in.)	2,571×2,715 (101.2×106.9) <APC specifications> ● Separate space is needed for the oil chiller. Depth×width=843×400 mm (33.2×15.7 in.) [on electrical cabinet side of machine rear]
	Mass of machine	kg (lb.)	6,740 (14,828) [7,450 (16,390) <APC specifications>]
Noise data	A-weighted, time-average radiated sound pressure level	dB	58–77 (Measurement uncertainty is 4 dB)

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

*1 30,000 min⁻¹ specifications

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

● 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.

● Tool storage capacity (40 tools, 60 tools): with the APC specifications, a dummy tool to be mounted on the spindle during APC operation will be included.

● 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 <at 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 NV4000 DCG with a maximum spindle speed of 12,000 min⁻¹. Please contact our sales representative for details.

● The information in this catalog is valid as of November 2020.

<Precautions for Machine Relocation>

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

This product detects machine relocation. Once the machine is relocated, it is not operable unless its legitimate relocation is confirmed by DMG MORI or its distributor representative.

If the restart of the machine can result in unauthorized export of cargo or technology or will violate legitimate export controls, DMG MORI and its distributor representative can refuse to restart the machine. In that case, DMG MORI and its distributor representative do not assume any loss due to the inability to operate the machine or any liability during the warranty period.

+ DCG, DDM, ORC, speedMASTER, powerMASTER, 5X-torqueMASTER, DMQP, DDRT, MATRIS, Robo2Go, Zero sludge coolant tank, ZEROCHIP, CELOS, ERGOTLINE, SLIMLINE, COMPACTLINE, DMG MORI SMARTkey and names of each Technology Cycle are trademarks or registered trademarks of DMG MORI CO., LTD. in Japan, the USA and other countries.

+ If you have any questions regarding the content, please consult our sales representative.

+ The information in this catalog is valid as of January 2021. Designs and specifications are subject to changes without notice.

+ The machines shown in the catalog may differ from the actual machines. The location and the size of the nameplates may also differ from the actual machines, or the nameplates may not be attached to some machines.

+ DMG MORI is not responsible for differences between the information in the catalog and the actual machine.

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