
NT4200

NT4250

NT4300

NT5400

High-Precision, High-Efficiency Integrated Mill Turn Center

NT Series



Machining centers and lathes- the fusion of two cutting-edge technologies leads us into a new era of multi-axis machines

What customers want from a multi-axis machine is simple: increased productivity from basic cutting processes.

DMG MORI has thoroughly examined market needs, and arrived at one main conclusion: the market requires a multi-axis machine that possesses machining abilities beyond those offered by machining centers and lathes individually.

By combining DMG MORI's original, cutting-edge technologies, the milling ability of the NH Series horizontal machine centers and the turning ability of the NL Series CNC lathes, the NT Series, the ultimate integrated mill turn center, becomes a reality.

With greater productivity than all other machine tools, the NT Series is leading the industry to a new era of multi-axis machines.



NT4250/1500

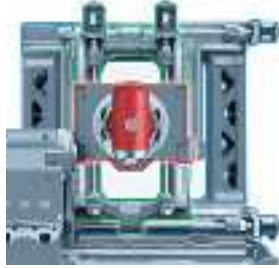


Main features

Basic structure

■ Box-in-Box Construction

The Box-in-Box Construction supports the saddle at both ends, guiding the axes at the centers of gravity, creating a balanced environment for unprecedented high-speed acceleration.



■ Flat bed design

A flat bed evenly disperses and absorbs reaction forces during machining, without any distortion. The advantage of this is that the rigidity of Spindle 1 has been greatly improved.



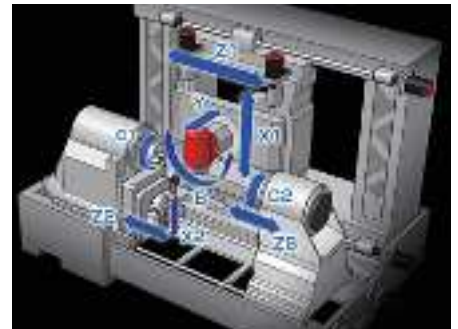
Travel

		NT4200 DCG NT4250 DCG NT4300 DCG		NT5400 DCG
		/1000	/1500	/1800
Tool spindle	X1-axis	750 mm (29.5 in.)		1,040 mm (40.9 in.)
	Y-axis	±210 mm (±8.3 in.)		±255 mm (±10.0 in.)
	Z1-axis	1,120+100*1 mm (44.1+3.9*1 in.)	1,550+100*1 mm (61.0+3.9*1 in.)	1,940 mm (76.4 in.)
	B-axis	±120°		
Turret 2	X2-axis	195 mm (7.7 in.)		267 mm (10.5 in.)
	Z2-axis	1,010 mm (39.8 in.)	1,525 mm (60.0 in.)	1,830 mm (72.0 in.)

*1 For ATC

Rapid traverse rate

		NT4200 DCG NT4250 DCG NT4300 DCG	NT5400 DCG
Tool spindle	X1-axis	50 m/min (164.1 fpm)	40 m/min (131.2 fpm)
	Y-axis	30 m/min (98.4 fpm)	
	Z1-axis	50 m/min (164.1 fpm)	40 m/min (131.2 fpm)
Turret 2	X2-axis	30 m/min (98.4 fpm)	
	Z2-axis	30 m/min (98.4 fpm)	
Spindle 2	ZS-axis	30 m/min (98.4 fpm)	24 m/min (78.7 fpm)



Driven at the Center of Gravity



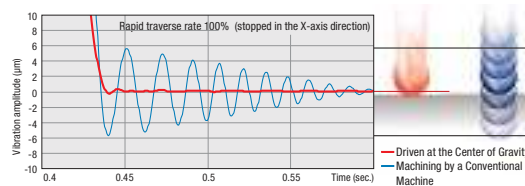
Original technology

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

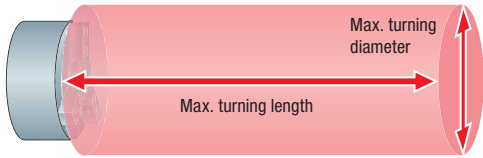
■ Effects of DCG

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

■ Residual vibration comparison



Workpiece size



	NT4200 DCG			
	/1000, /1000Z	/1000S, /1000SZ	/1500, /1500Z	/1500S, /1500SZ
Max. turning diameter	Tool spindle: Capto C6 ϕ 660 mm (ϕ 25.9 in.) Turret 2 ϕ 350 mm (ϕ 13.7 in.)			
Max. turning length	1,081 mm (42.5 in.)	1,061 mm (41.7 in.)	1,596 mm (62.8 in.)	1,576 mm (62.0 in.)
Bar work capacity	65 mm (2.5 in.)	65 mm (2.5 in.)/65 mm (2.5 in.) ^{*2}	65 mm (2.5 in.)	65 mm (2.5 in.)/65 mm (2.5 in.) ^{*2}

	NT4250 DCG			
	/1000, /1000Z	/1000S, /1000SZ	/1500, /1500Z	/1500S, /1500SZ
Max. turning diameter	Tool spindle: Capto C6 ϕ 660 mm (ϕ 25.9 in.) Turret 2 ϕ 350 mm (ϕ 13.7 in.)			
Max. turning length	1,047 mm (41.2 in.)	1,027 mm (40.4 in.)	1,562 mm (61.4 in.)	1,542 mm (60.7 in.)
Bar work capacity	80 mm (3.1 in.)	80 mm (3.1 in.)/80 mm (3.1 in.) ^{*2}	80 mm (3.1 in.)	80 mm (3.1 in.)/80 mm (3.1 in.) ^{*2}

	NT4300 DCG			
	/1000, /1000Z	/1000S, /1000SZ	/1500, /1500Z	/1500S, /1500SZ
Max. turning diameter	Tool spindle: Capto C6 ϕ 660 mm (ϕ 25.9 in.) Turret 2 ϕ 350 mm (ϕ 13.7 in.)			
Max. turning length	1,003 mm (39.4 in.)	983 mm (38.7 in.)	1,518 mm (59.7 in.)	1,498 mm (58.9 in.)
Bar work capacity	90 mm (3.5 in.)	90 mm (3.5 in.)/90 mm (3.5 in.) ^{*2}	90 mm (3.5 in.)	90 mm (3.5 in.)/90 mm (3.5 in.) ^{*2}

	NT5400 DCG	
	/1800, /1800Z	/1800S, /1800SZ
Max. turning diameter	Tool spindle ϕ 920 mm (ϕ 36.2 in.) Turret 2 ϕ 470 mm (ϕ 18.5 in.)	
Max. turning length	1,921 mm (75.6 in.)	
Bar work capacity	103 mm (4.0 in.)	

*2 Spindle 2



Main features

Tool spindle

DDS (Direct Drive Spindle) rotate the spindle directly without the need for gears or belts. By placing the spindle motor in the headstock, the size and weight of the entire spindle is reduced, limiting vibration and achieving high output.

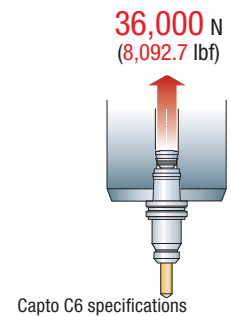
Max. tool spindle speed

NT4200 DCG, NT4250 DCG, NT4300 DCG	NT5400 DCG
12,000 min ⁻¹	8,000 min ⁻¹

* High output
 ● Please use a two-face contact tool when using a BT40 taper spindle at 15,000 min⁻¹ or higher.

Tool clamp

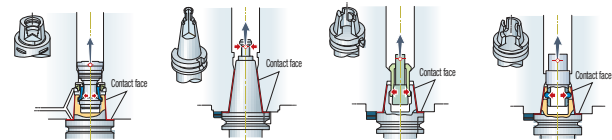
Tools must be firmly secured when conducting heavy-duty cutting. The NT Series' Tool spindle employs a newly-developed collet. It possesses strong tool clamping force, capable of 36,000 N (8,092.7 lbf) <Capto C6>, curbing vibration during cutting and making high-precision machining possible.



Two-face contact specification

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.

Capto Specifications BT specifications* **OP** HSK Specifications **OP** KM Specifications **OP**



* When selecting the two-face contact tool specification, be sure to use a two-face contact tool.
 ● For NT5000 Series KM specifications, please consult with our sales representative.

Direct Drive Motor

OP



Transmitting the drive power directly to the rotary axes without using gears eliminates backlash. Compared with conventional worm gear systems, this dramatically improves transmission efficiency and offers high-speed feed. DDM (Direct Drive Motor) is adopted for the full B-axis specifications.

B-axis indexing time (90°)

NT4000 SERIES

0.4 sec.

● Indexing time: Excluding clamping and unclamping time

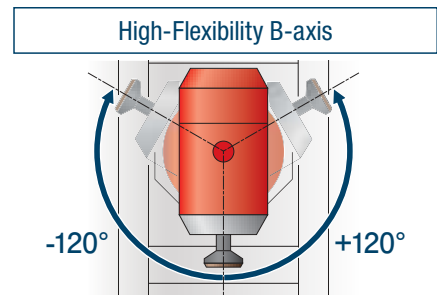
B-axis rotation range

±120°

B-axis specifications

Effects of DDM

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



	1° indexing specifications	Full indexing specifications OP
Clamp type	Coupling clamp	Coupling clamp & brake clamp
Indexing range	1°	1° (Coupling clamp) + 0.0001° (Brake clamp)
Drive mechanism	Speed reducer & servo motor	DDM (Direct Drive Motor)
Rotation speed	40 min ⁻¹ (NT4000 Series)	100 min ⁻¹ (NT4000 Series)
	23.8 min ⁻¹ (NT5000 Series)	80 min ⁻¹ (NT5000 Series)

● Full indexing specification B-axis: with the F31A, up to four axes can be controlled simultaneously. For simultaneous 5-axis control, please use the F31A5.
 ● B-axis direct scale feedback will be supplied for the full indexing specifications.

Octagonal Ram Construction

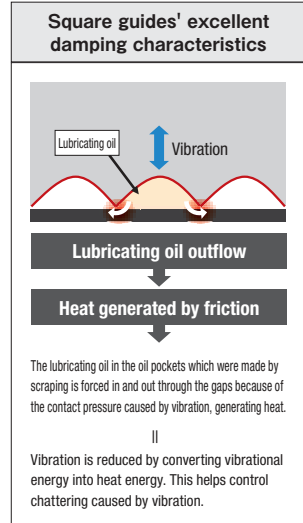
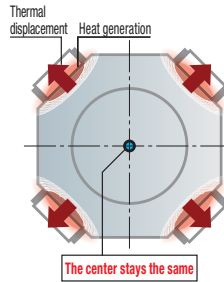


Original technology

The ORC preserves the advantage of conventional square guides, their superior damping characteristics, while overcoming their disadvantage, the heat generated in high-speed travel, by maintaining the center of the ram at the same position through symmetrical displacement of four sliding faces against the opposing one, allowing high-speed and high-precision feed.

Effects of ORC

- Superior damping characteristics
- Controls thermal displacement
- Achieves high-speed, high-precision feed



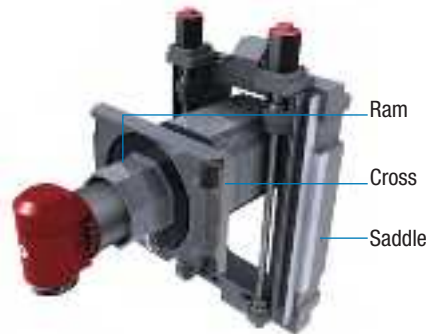
Largest opposite side distance in its class

To retain the ram's maximum rigidity in the restricted amount of space, ORC has been developed. The opposite side length of 400 mm (15.7 in.) surpasses bridge-type machining centers. This means that even when using the maximum Y-axis travel, the center of gravity does not protrude over the supported section, avoiding deformation and enabling high-precision machining. In addition, by making the ram a perfect octagonal shape, a V-shaped guideway produces superior straightness.



One-piece construction

A special type of machining is used to build the saddle supporting the huge ram, and the one-piece construction allows high rigidity.



B-axis unitization

The B-axis, which supports the Tool spindle, has been completely unitized, allowing quick and easy removal and replacement.



• Illustration shows full indexing specifications (Option)

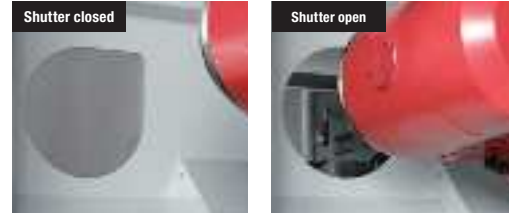
Tool spindle replacement

We have enhanced the labyrinth structure, taking the frequent use of high-pressure coolant into the tool spindle and improves tool spindle durability. In addition, the wiring has been simplified to enable quick replacement to spindles.

Main features

ATC/Tool magazine

We used a cam type ATC, made the ATC shutter as small as possible, and designed it so that tool change is done outside the machining chamber. In this way we have prevented problems such as chips jamming in the spindle during ATC or infiltrating inside the ATC magazine, and ensured sufficient durability and reliability for continuous, long-term operation.



Tool-to-tool

NT4200 DCG, NT4250 DCG, NT4300 DCG	NT5400 DCG
1.25 sec.	2.4 sec. <Less than 15 kg (33 lb.)>

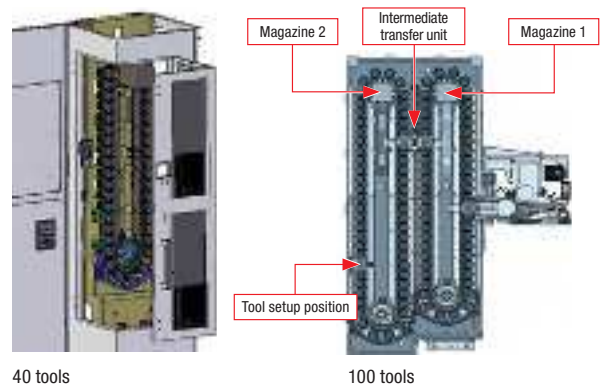
Tool storage capacity

NT4200 DCG, NT4250 DCG, NT4300 DCG	NT5400 DCG
20 tools 40, 100, 179, 239 tools OP	20 tools 40, 80, 139, 179 tools OP

Tool magazine

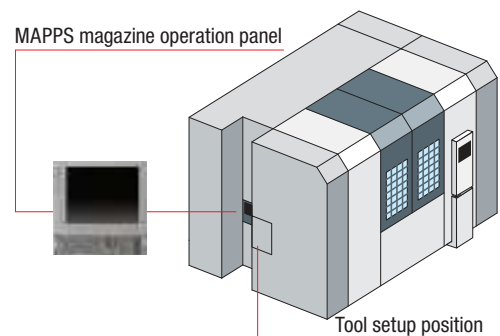
The most important benefit provided by integrated mill turn centers is process integration, and when you are even one tool short of the number required for machining, this benefit is lost. For the NT Series, you can choose the ideal one from a wide variety of tool magazine.

	Tool storage capacity
Chain type	40, 80, 100 tools
Rack type	139, 179, 239 tools



MAPPS magazine operation panel **OP** Consultation is required

Tool information can be viewed/edited at the tool setup position. This means that you don't have to move back and forth from the machine's operation panel to the tool setup position, improving operability. Also, since it is possible to do regular tool replacement while the machine is running, the operating rate will also increase.



●The tool management function option is required.

Spindle

Spindle 1

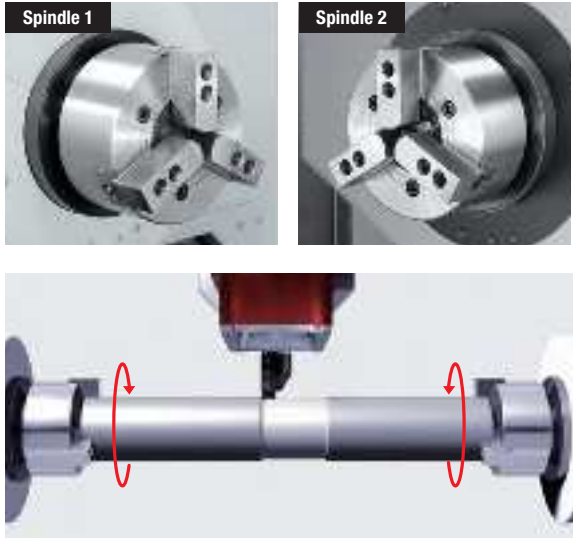
The Series boasts maximum torque standard specifications of 358 N·m (264.0 ft-lbf) <rated for 20 min> and high-output specifications of 456 N·m (336.3 ft-lbf) <25%ED>. Its maximum spindle speed of 5,000 min⁻¹ significantly surpasses acceleration/deceleration rates for conventional models, meaning that the Series in fact possesses spindle motor capabilities similar to machines one class higher.

Spindle 2 <S, SZ specifications>

The maximum torque is a high 358 N·m (264.0 ft-lbf) <rated for 20 min> for the standard specifications (NT4200 DCG) and 456 N·m (336.3 ft-lbf) <25%ED> for the high-output specifications, and exactly the same powerful drive as with spindle 1 is achieved, with a maximum speed of 5,000 min⁻¹.

Simultaneous operation of Spindle 1 and Spindle 2 <S, SZ specifications>

Milling and turning are possible through simultaneous operation of Spindle 1 and Spindle 2, enabling high-precision machining of long, thin workpieces. In addition, both spindles are able to receive workpieces, improving machining efficiency as delivery to subsequent processes becomes simpler.



	NT4200 DCG	NT4250 DCG	NT4300 DCG	NT5400 DCG
Chuck size	8-inch	10-inch	12-inch	15-inch
Max. spindle speed	5,000 min ⁻¹ 5,000 min ⁻¹ [OP]*	4,000 min ⁻¹ 4,000 min ⁻¹ [OP]*	3,000 min ⁻¹ 3,000 min ⁻¹ [OP]*	2,400 min ⁻¹ 2,400 min ⁻¹ [OP]*

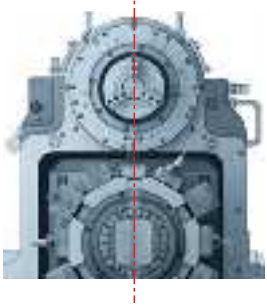
* High output

Min. indexing increment

0.0001°

Symmetrical headstock construction

The high-speed Spindle 1 is aligned with the rotary tool spindle, dissipating heat in all directions. While retaining its original rigidity thanks to its cast iron construction, thermal displacement has been reduced to a minimum, maintaining high-precision cutting.



Tailstock

Digital tailstock

A high-rigidity digital tailstock, driving the tailstock with the servo motor, is equipped as standard in the NT Series (excluding S, SZ specifications). This allows a significant reduction in setup time.

Thrust

NT4200 DCG NT4250 DCG NT4300 DCG	NT5400 DCG
9,800 N (2,203.0 lbf)	9,800 N (2,203.0 lbf) 19,600 N (4,406.0 lbf) [OP] [Built-in center (MT5)]



●Photo: NT4250 DCG/1500

[] Option

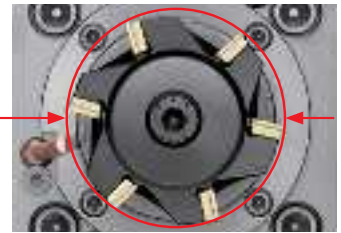
Main features

Turret 2 <Z, SZ>

■ Milling capability

Turret 2 has improved rigidity, with a coupling diameter of $\phi 250$ mm ($\phi 9.8$ in.), handling face milling of up to $\phi 80$ mm ($\phi 3.1$ in.). It boasts milling capabilities virtually indistinguishable from those of No. 40 taper machining centers. When milling with Turret 2, the Tool spindle does not lose power even during heavy-duty cutting, improving productivity and achieving integration of processes.

Face mill
 $\phi 80$ mm
($\phi 3.1$ in.)



■ Rotary tool spindle OP

The rotary tool spindles also employ the DDS (Direct Drive Spindle), which does not require gears or belts, making high-speed and high-efficiency machining possible. A maximum spindle speed of $6,000 \text{ min}^{-1}$ significantly surpasses that of conventional models, and spindle acceleration time is 0 to $6,000 \text{ min}^{-1}$ in 0.23 seconds, greatly reducing non-cutting time.



	NT4200 DCG NT4250 DCG	NT4300 DCG	NT5400 DCG
Number of tool stations	12 tools	10 tools	
Max. rotary tool spindle speed	6,000 min^{-1}		
Turret indexing time (1-station)	0.28 sec.		0.31 sec.

Built-in Motor Turret <Z, SZ>

OP



Original technology

The built-in structure, in which the motor is placed inside the turret, minimizes heat generation and vibration, improves transmission efficiency and significantly increases cutting power, speed and accuracy.

■ Turret temperature increases

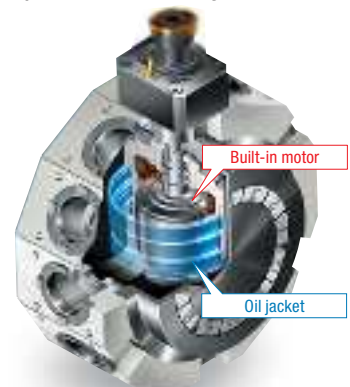
Compared with conventional machine **1/10 or less**

■ Vibration amplitude

Compared with conventional machine **1/3 or less**

■ Effects of the BMT

- Improved milling power
- Improved milling accuracy
- Controls the turret's heat and vibration
- Reduced energy loss

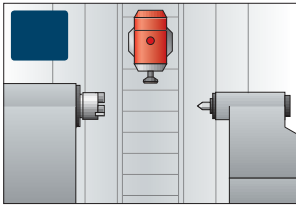


■ Use of a Turret with a built-in milling motor reduces the number of covers

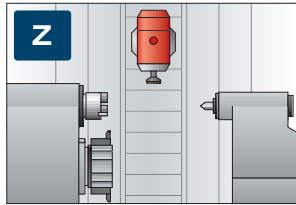
Through adoption of BMT for Turret 2, bearing seizure and belt breakage in the rotary tool drive transmission, often seen in conventional machines, do not occur. In addition, the number of covers required has been reduced to allow easy repairs if they happen to be required.

Variations

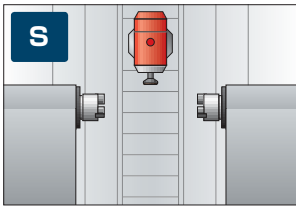
An extensive line-up to handle a wide range of workpiece sizes. DMG MORI responds comprehensively to a variety of needs.



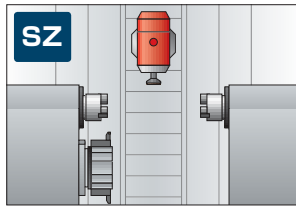
Spindle 1+Tailstock
Offers stable machining even for long workpieces.



Spindle 1+Tailstock +Turret 2
Handles balance cuts during complex machining and turning, achieving significant process integration.



Spindle 1+Spindle 2
After completion of the first process, the workpiece is swiftly delivered to Spindle 2, making high-speed and high-precision continuous machining possible.



Spindle 1+Spindle 2 +Turret 2
Machining can be conducted simultaneously on both sides, allowing an ideal balance of processes.

Y-axis travel **±210 mm (±8.3 in.)**



NT4250 DCG/1500SZ

NT4200 DCG

Chuck size **8**-inch

NT4200 DCG/1000
NT4200 DCG/1500



NT4250 DCG

Chuck size **10**-inch

NT4250 DCG/1000
NT4250 DCG/1500



NT4300 DCG

Chuck size **12**-inch

NT4300 DCG/1000
NT4300 DCG/1500



Y-axis travel **±255 mm (±10.0 in.)**



NT5400 DCG/1800SZ

NT5400 DCG

Chuck size **15**-inch

NT5400 DCG/1800



Main features

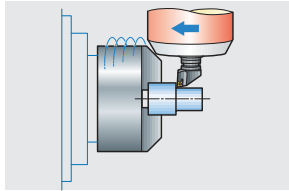
Machining variations

A wide range of machining variations can be performed with one setup, from raw material to completion, dramatically improving productivity.

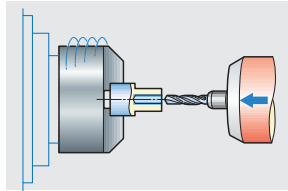
Turning

Machining possible with the Tool spindle and Turret 2

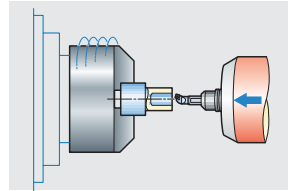
Machining possible only with Tool spindle



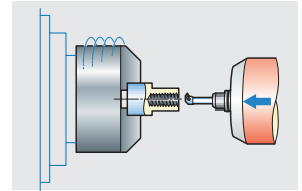
O. D. cutting



Drilling

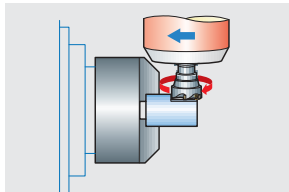


I. D. cutting

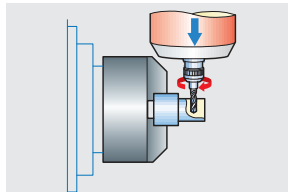


I. D. threading

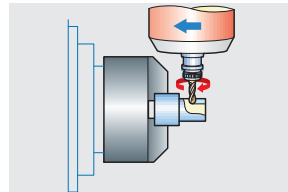
Milling



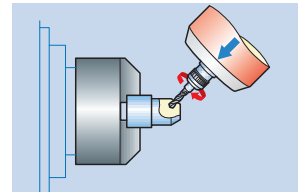
O. D. milling



O. D. hole machining

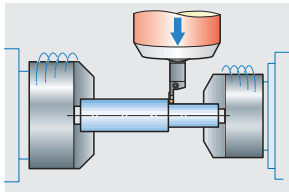


Ball-end milling

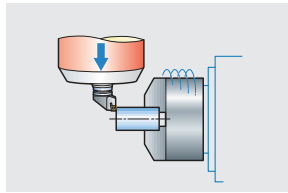


Angular machining

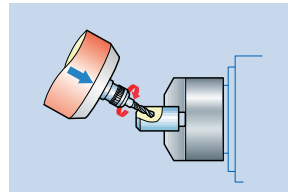
Spindle 2



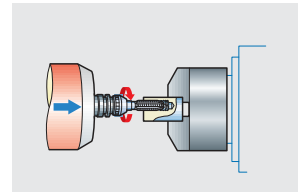
Cut-off



Face cutting

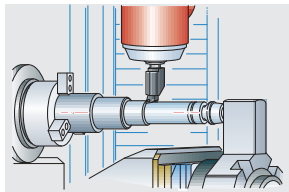


Angular machining

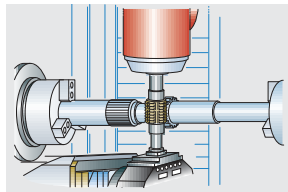


End face hole machining and tapping

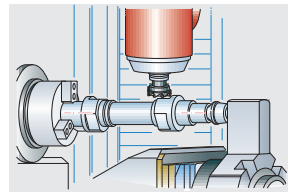
Turret 2 machining examples



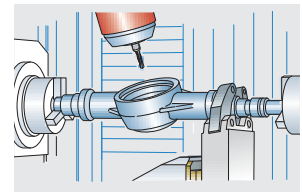
O.D. machining using the center



Hobbing using the tool spindle and Turret 2



Face milling using the center



Drilling using a hydraulic steady rest



Simultaneous milling



Simultaneous turning



Hob cutting

High-precision equipment

Heat shielding

Spindle cooling

A spiral-shaped oil jacket completely encloses the spindle unit, controlling the spindle temperature.



BMT (Built-in Motor Turret) OP

The motor is located inside the turret, eliminating heat-transmitting structures. With a decrease in sources of heat, together with the cooling jacket inside the built-in milling motor, thermal effects are practically eliminated. (When the rotary tool specifications <option> are chosen for the Z or SZ specifications, we will use BMT.)



Heat-control measures for the turning spindle

Heat escapes equally to both sides because of the symmetrical construction of two sources of heat generation, Spindle 1 and Turret 2. Together with the spiral-shaped oil jacket enclosing the entire housing, this controls thermal displacement.

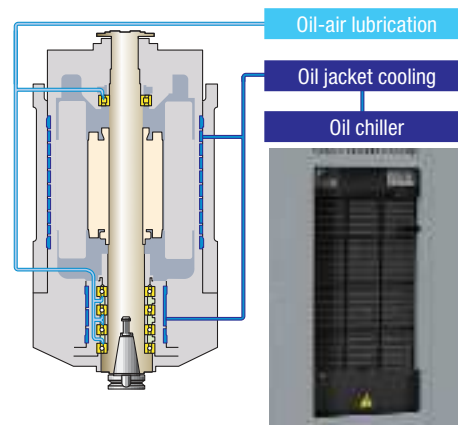


Ball screw core cooling

Through holes have been made in the core section of the ball screws, and a ball screw core cooling system using cooling oil to suppress thermal change has been adopted. While suppressing heat generation in the ball screws, this also circulates cooling oil around the entire support bearing, reducing generation of heat during high-speed rotation. In addition, cooling oil is circulated in the motor base, preventing heat from the motor being transmitted to the cast iron of the main body.

Spindle lubrication

An oil-air lubrication method is used for spindle lubrication. As well as minimizing the amount of lubricant used for reducing the resistance to stirring, this prevents dust infiltration by using the air purge. Also, the oil jacket cooling system controls thermal displacement.



High-precision equipment

Direct scale feedback

OP



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

Magnescale

Resolution

0.01 μm

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

Coolant chiller (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.

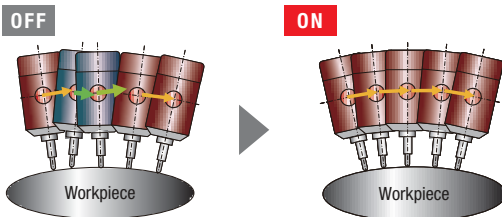
- We cannot guarantee that this unit will completely control the coolant temperature. It is designed to help prevent oil temperature increases.

SVC function

(Standard features for F31iA5)

The SVC function, in which the program commands for tool tip control are read in advance and compensation is automatically applied to achieve smooth tool feed, is equipped as standard. By combining this function with DDM (Direct Drive Motor), the machine offers greatly improved surface quality and reduced cycle time during 5-axis machining.

Motion of the SVC function

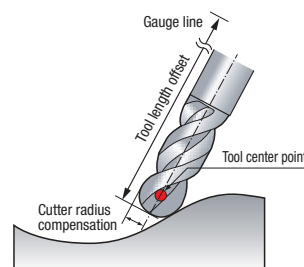


The SVC function includes the following functions:

- AI contour control II
- Nano smoothing II
- Smooth TCP
- Machining mode selection
- G332 tolerance command

Tool center point control/Cutting point command

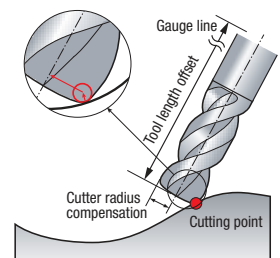
(Standard features for F31iA5)



Tool center point control

Main features

- The tool path can be controlled from the tool center point.
- No reprogramming is needed when the tool length and the tool diameter are changed.
- NC automatically calculates cutter radius compensation and tool length offsets based on the program commands for tool tip control.



Cutting point command

Main features

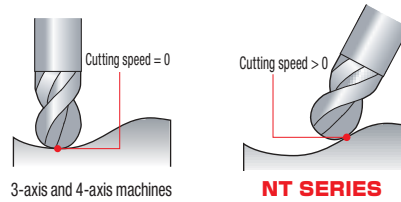
- The tool path can be controlled from the cutting point.
- By using cutting point commands, machining using radius end mills or square end mills can be performed without reprogramming when tool length, cutter radius or tool tip corner R are changed.

SVC: Smooth Velocity Control

The benefits of the NT Series

5-axis machining

By using the rotary axis, it is possible to machine in the ideal cutting speed range. This improves the surface quality of the workpiece.

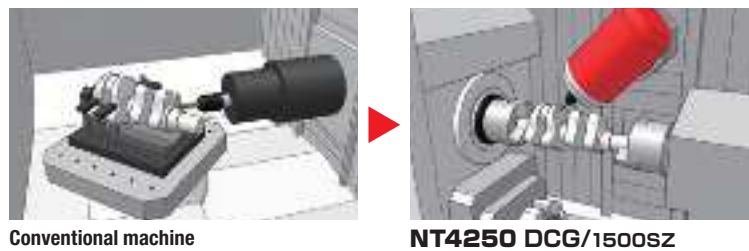


Reduces setup time

Since the NT Series, which is capable of many types of machining, can complete the whole process from raw material to the finished workpiece in one setup, idle time during setup changes is greatly reduced.

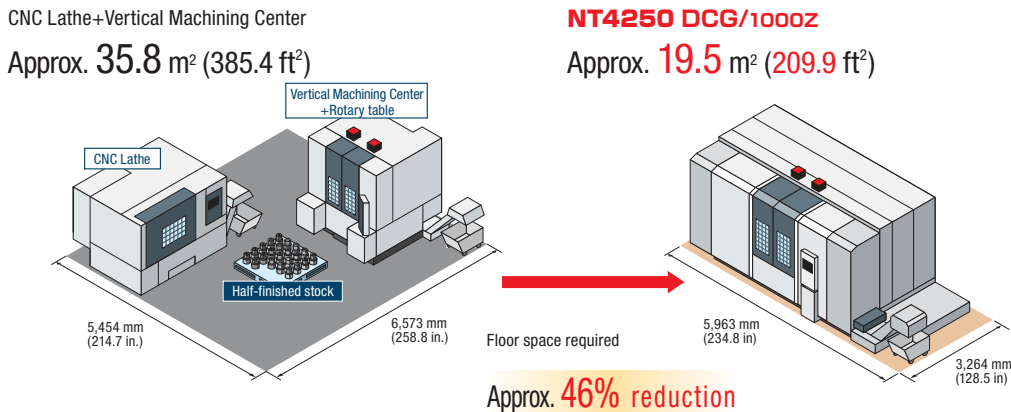
Reduces fixture manufacturing costs

In the past, machining of complex-shaped workpieces had to be divided into processes using lathes and processes using machining centers, so fixtures were needed for each process. Because the NT Series can do both lathe and MC machining, fixtures are not necessary. For this reason, as well as saving floor space as shown in the previous example, it is also possible to reduce the costs for making fixtures.



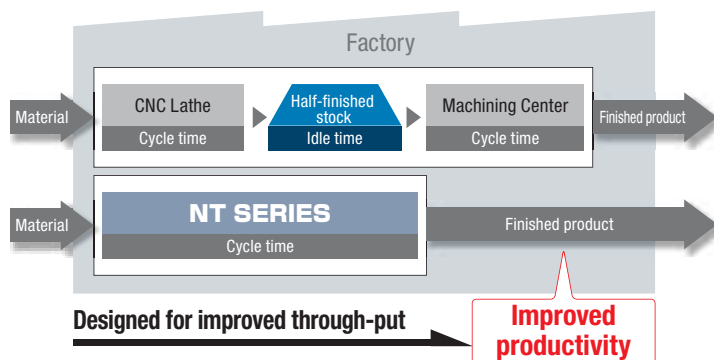
Reduces intermediate transport costs

Since the NT Series can do both lathe and MC machining, floor space can be reduced and productivity per unit area greatly increased.



Process integration with a multi-axis machine

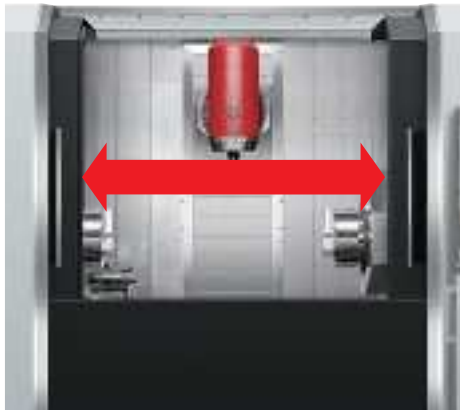
- Eliminates waiting time between processes
- Prevents deterioration in accuracy between processes
- Reduces setup time
- Reduces work in process inventory
- Shortens lead time
- Reduces fixture manufacturing costs
- Reduces intermediate transport costs



Improved workability

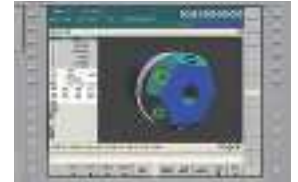
Wide door opening

The door opens wide, allowing easier loading and unloading of workpieces and maintenance inside the machine. The ceiling part of the front door also opens, improving access when loading and unloading large workpieces using a crane.



Operating panel

A 19-inch large screen LCD has been used for the display. To improve setup ease, the button layout on the operation panel has been revised, and frequently used buttons have been changed to rotary switches.



19-inch wide LCD



Button layout providing excellent operability

Movable + Swivel-type operation panel

The operation panel moves from side to side, so that it is always close to the operator during setup. For the NT4000 series/1000/1500, we have also installed a stopper every 15° on the easy-to-use, swivel-type operation panel to prevent it from turning while the operator is using it.



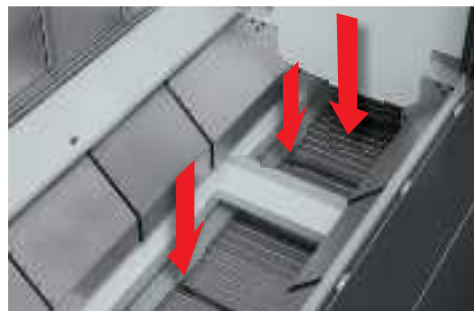
Tool detachment/attachment

With excellent access to the Tool spindle, tool detachment/attachment and maintenance can be conducted quickly and easily.



Construction with trough directly underneath

Employing a construction with a trough placed directly underneath to catch chips as they fall due to gravity allows for the smooth discharge of chips outside of the machine.



Maintenance

Fully opening cover

The covers to the left of the door are supported by hinges and open wide. Opening the left side cover gives direct access to the ATC unit, making maintenance operations easier.



Daily maintenance & inspection

To allow shorter maintenance and inspection times, components that require frequent inspection are grouped together in one place. Also, lubricating oil inlet ports have been located at the bottom of the machine, for easier oil supply.



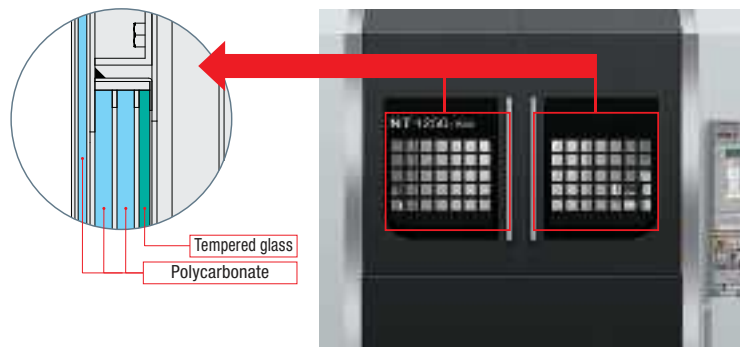
Z-axis protector

A Z-axis protector has been employed using a highly reliable design that is tough, hard to break and does not get stuck. By erecting the cover vertically, chips fall quickly to the chip conveyor. In addition, by placing a cover over the entire bed, transmission of heat from chips to the bed is prevented.



Highest level of safety in the world

We have used a multi-layered lattice window and PC panel to ensure the world's highest level of operator safety.



Peripheral equipment

We have prepared a wide range of highly reliable peripheral equipment to provide the ideal systems for the customer's production environment.

External chip conveyor

OP

Two types of chip conveyor have been made available for selection based upon chip shape and material. Please choose one suited to the type of machining you conduct.

Specifications	Workpiece material and chip size ○: Suitable —: Not suitable						
	Steel			Cast iron	Aluminum, non-ferrous metal		
	Long	Short	Powdery	Short	Long	Short	Powdery
Hinge type + Scraper type + Drum filter type	○	○	○	○	○	○	○
Hinge type	○	—	—	—	○	—	—

Chip size guidelines

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

- The chip conveyor is right disposal only.
- 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.
- We have prepared several options for different chip shapes and material. For details, please consult with our sales representative.



Through-spindle coolant system

Coolant is supplied to the tool tip via a path passing through the middle of the Tool spindle and tool. A reliable supply of coolant to the tool tip has a significant effect on cooling, lubrication and chip discharge.



Automatic in-machine tool presetter (Tool spindle)

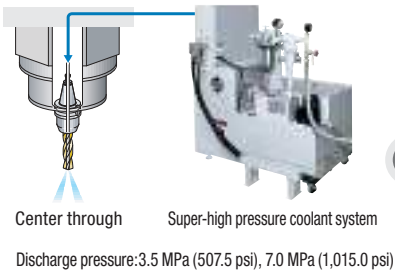
OP

Allows highly efficient tool measurement, improving ease of setup.



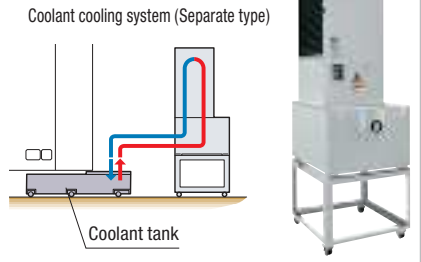
Through-spindle coolant system (Super-high pressure coolant system) OP

The through-spindle coolant system supplies coolant to the tool tip through the through-hole of the tool spindle and tool. It is effective in eliminating chips, cooling the machining point and lengthening the lives of your tools.



Recommended equipment Coolant chiller (separate type)

The high-pressure coolant system generates a lot of heat because it discharges coolant at high pressure. The coolant cooling system 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.



Spinning tool

OP Consultation is required



The Spinning Tool is an axially-loaded cutting tool that revolutionizes turning operation. It dramatically improves productivity and tool life for turning operation. Compared with conventional methods, the Spinning Tool significantly reduces tool temperature increases and wear, achieving new standards in high-precision, high-efficiency turning.

■ Features of Spinning Tool

- Improves productivity by 5 times*¹
- Extends tool life by 20 times*¹
- Dissipation of heat allows dry machining
- Synchronizes with the spindle, allowing elliptical machining
- Effective for machining difficult-to-cut material such as nickel alloy or heat-resistant alloy

* 1 It differs depending on conditions.

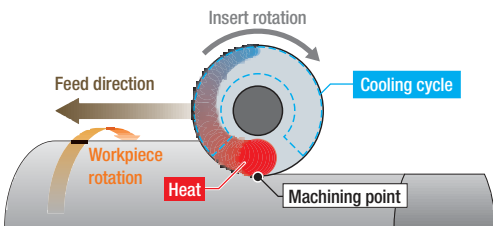
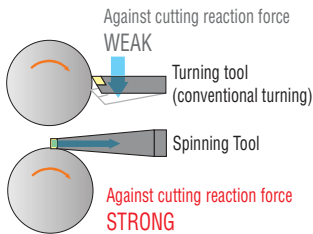
Comparison of material removal rate

	Conventional tool	Spinning tool
Material removal rate	6.0 mL/min (0.36 in ³ /min)	29.0 mL/min (1.8 in³/min)
Cutting speed	365 m/min (1,197.6 fpm)	914 m/min (2,998.8 fpm)

Material removal rate
Approx. **5 times greater**

● Material <JIS>: S45C*2 (Carbon steel)
*2 1045-1046 (ANSI), C45-C45E-C45R (BS, DIN), 45 (GB)

● The Spinning Tool was developed jointly with Kennametal Inc.



Transfer systems

Gantry-type loader system

OP Consultation is required

From supply of raw materials to discharge of completed product, processes are conducted automatically within the one machine. With a system designed for high-speed mass production, and a loader equipped with a number of devices to increase speed, non-cutting time has been reduced. Furthermore, the shutter opening and closing speed for the loader entry section has also been increased. In addition to reducing noise by employing a speed reducer with a helical gear in the loader drive section, maintainability has also been improved by inserting grease.

Standard features	
● 10-station rotary workstocker (LG-10)	● Chuck air-blow
● Hand airblow	● Workpiece counter (PC counter)
● Automatic power-off system	● Low air pressure detecting switch
● Spindle orientation	

Optional features	
● 20-station rotary workstocker	● Chip conveyor (Right discharge)
● Gantry-type loader for shaft workpieces	● Number of pallet guides: 4
● Turret-mounted workpiece-pusher	● Workpiece holding detector
● Double hand for $\phi 200$ mm ($\phi 7.9$ in.) workpiece	● External emergency stop button
● Mist collector	● Quality check chuter
● Signal light	● Hexagonal material specifications (Workpiece pallet)
● Center-guide specifications (Workpiece pallet)	

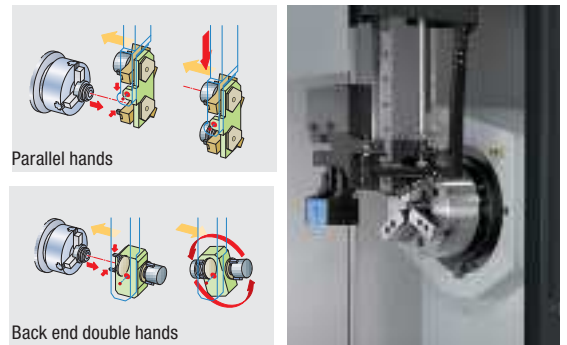


NT4250 DCG/1500SZ

For these models

NT4200 DCG NT4250 DCG NT4300 DCG

- The chip conveyor is right disposal only.
- The illustration may differ from the actual equipment.



				NT4000	
				LG-10 (machine travel type)	
Gantry loader	Max. travel speed	X-axis <Hand moves up and down>	m/min (fpm)	90 (295.3)	
		Z-axis <Loader moves right and left>	m/min (fpm)	120 (393.7)	
Work stocker	Applicable workpiece size	Outer diameter	mm (in.)	$\phi 40 - 200$ ($\phi 1.6 - 7.9$)	
	Number of pallet tables			10 [20]	
	Max. loading capacity		kg (lb.)/Pallet	75 (165)	
	Max. workpiece stacked height		mm (in.)	470 (18.5)	
Loader hand	Hand type			Back end hand	
	Applicable workpiece size	Outer diameter	mm (in.)	$\phi 40 - 200$ ($\phi 1.6 - 7.9$)	
		Length	mm (in.)	20 - 150 (0.8 - 5.9)	
		Max. mass	kg (lb.)	10 (22)	

[] Option

- Please consult with our sales representative in the case that a workpiece diameter is less than 40 mm (1.6 in.), or a workpiece length is less than 20 mm (0.8 in.).

Bar feeder system

OP Consultation is required

Complete bar machining is possible on a single machine when coupled with a workpiece unloader. You won't need a work loader/unloader or turnover unit.

Recommended accessories for bar feeder specification		
● Bar feeder	● Multi counter	● Signal light
● Guide bushing	● Work stopper	



Bar feeder (exclusively for the NT Series)
<Cover interlock available>

NT4250 DCG/1500SZ

- The chip conveyor is right disposal only.

DMQP (DMG MORI Qualified Products)

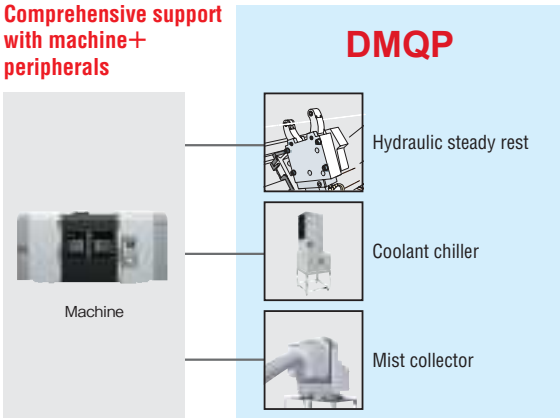
Selected peripherals with superior quality, performance and maintainability.

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

Comprehensive support with machine+peripherals

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

Comprehensive support with machine+peripherals




DMQP

Machine

Hydraulic steady rest

Coolant chiller

Mist collector



DMG MORI Service Center

■ Advantages of DMQP

- Qualified peripherals are arranged by DMG MORI
- Toll-free phone support is available 24 hours a day, 365 days a year (Japan only)

Examples of qualified products (NT4000 DCG/NT5000 DCG)

Hydraulic steady rest

This supports a shaft-like workpiece during machining, and minimizes run-out caused by rotation.

Super high-pressure coolant unit

This improves chip disposal capability and contributes to machining of difficult-to-cut material by minimizing heat generation at the tool tip.

Coolant chiller (separate type)

It cools down coolant to offer better cutting performance and minimize thermal displacement in the workpiece.

Mist collector

It removes mist, smoke, etc. generated inside the machine.

Chip bucket

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

Refrigerating type air dryer

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

Live center

Tool wagon

Tool cabinet

Basic tooling kit

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

MAPPS IV

High-Performance Operating System
for Integrated Mill Turn Centers



● 19-inch operation panel

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**
- ▶ **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'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

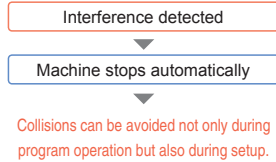
A PC-type keyboard is used as standard, making key input easy. A keyboard with a conventional key layout is also available as an option.



Functions for multi-axis machining

3D interference checking function

Interference between items such as the spindle, workpiece, soft jaw, tool, holder and turret can be checked in 3D. If interference is detected, the machine will stop operation regardless of whether it is in the automatic or manual mode, providing the highest level of protection against interference.



- The 3D interference checking function will check for interference accurately as long as the 3D model exactly matches the actual configuration of the spindles, workpieces, soft jaws, tools, holders and turrets.
- Customized design is required for special shape. For details, please refer to the description of "3D interference checking function" in the NC control unit specifications.
- A cutting simulation that shows how material is removed as machining proceeds cannot be carried out during a 3D interference check.

Improved ease of maintenance

Alarm help function

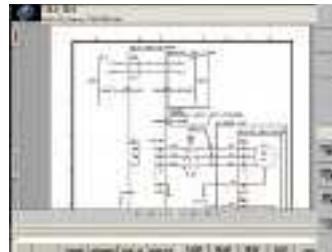
When an alarm occurs, MAPPS identifies the cause of the trouble and provides solutions.



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.



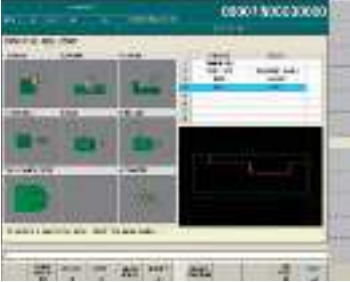
Examples of camera locations

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

Conversational automatic programming

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

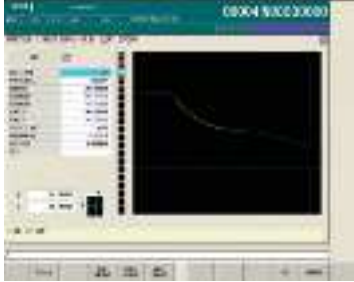
Machining menu



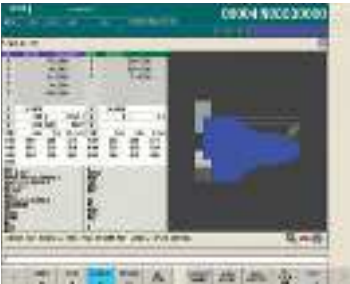
List display function



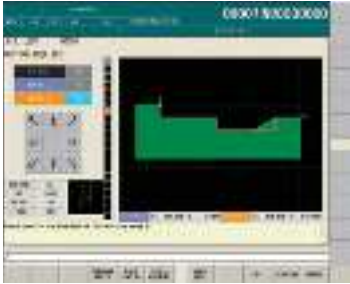
Contour input



B-axis command function



Relief machining OP



DXF import function OP



Application System

MORI Automatic Programming System for NT

MORI-APNT OP

MORI-APNT are application systems which let you create machining programs easily on your PC.

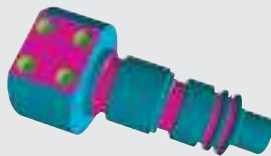


1. Simple programming



[Conversational automatic programming]

2. Reduce programming time



Simply enter the machining shape using conversational automatic programming and the machine automatically selects the necessary tools and cutting conditions.

3. Save costs



[On-line programming]

- Customers can easily convert conversational programs into NC programs.
- Cutting conditions can be changed on the MAPPs control.

• The photo shown may differ from actual machine.
 • Information about the screen is current as of August 2015.

For shorter total production time for all our customers

DMG MORI's software Line-up

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

— [Internet]
— [LAN]

Remote Maintenance/Machine Operation Monitoring Service

MORI-NET Global Edition Advance OP

■ Features

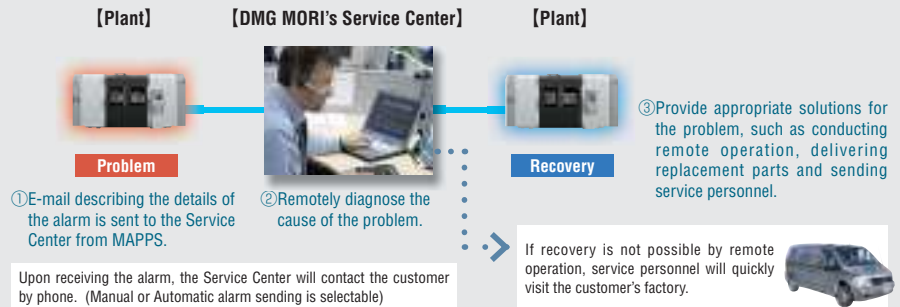
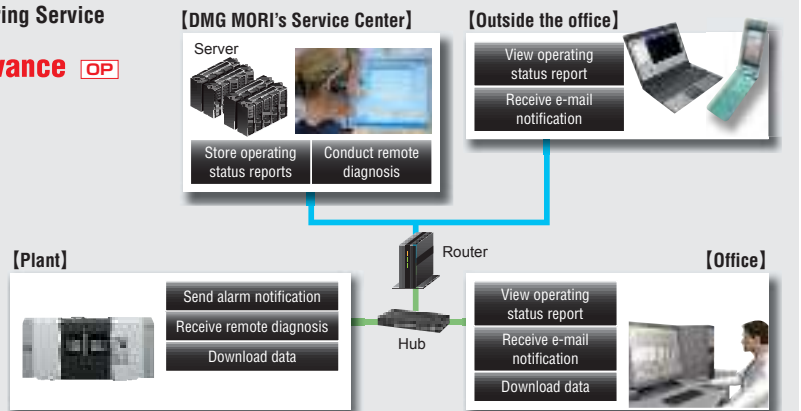
- Remote maintenance service by DMG MORI Service Center
- Internet-based, high speed (max. 1 Gbps), large capacity network
- No server installation is required — reduction in initial cost
- Download various data from the server located at DMG MORI

■ Remote alarm support

When an alarm goes off, an alarm notification will be sent to the DMG MORI Service Center simply by pressing the "Send e-mail" button on MAPPS.

DMG MORI service personnel will remotely diagnose the cause of the problem, and quickly provide solutions for machine recovery.

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

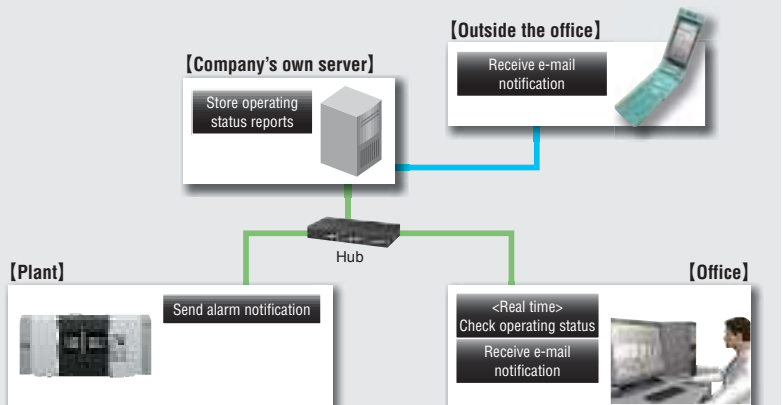


Machine Operation Monitoring System

MORI-NET LAN Edition OP

■ Features

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



Application for Data Transmission

MORI-SERVER [Standard features]

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

MAPPS Screen Remote Control and Browsing Application

MORI-MONITOR OP

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

AGT Advanced Communication Technology

Advanced Communication Technology

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

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

— [Internet]
— [LAN]

Industrial Network for Peripheral Equipment Control

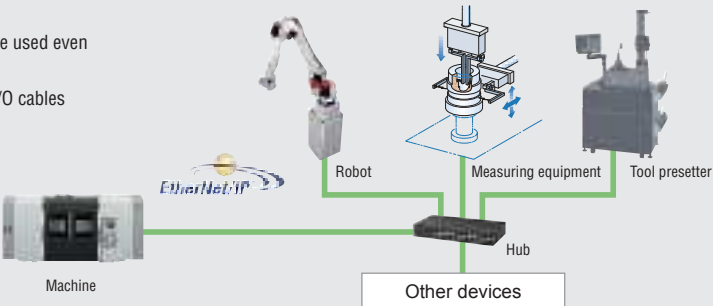
MAPPS EtherNet/IP I/F OP

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

■ Features

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

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



Communication Interface for Monitoring Machine Operation

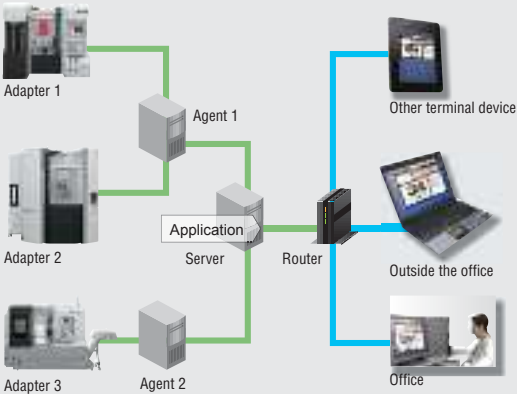
MAPPS MTConnect I/F

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

■ Features

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

■ System examples



■ Application examples



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



Operating status can be checked in real time.



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

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

Reduction in environmental burden

To conserve limited resources and protect global environment
The NT Series pursues a high "environmental performance" that is required of machine tools.



Power-saving function

Power consumption is reduced while operating the machine efficiently.



Automatic machine light function

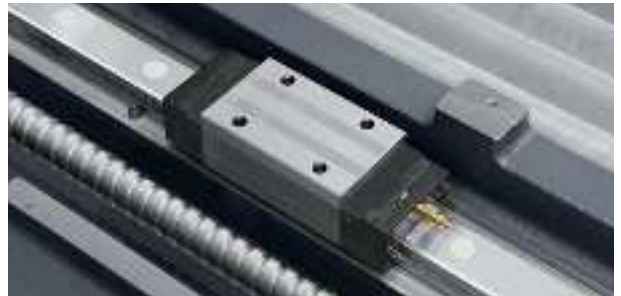
If the operation panel is not touched for a certain amount of time, the interior light automatically turns off. This saves energy and lengthens the life of the machine lights.

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.

Reduced consumption of lubricating oil

Non-lubricated type guideways have been employed, conserving energy. In addition, an oil bath has been used for the ATC unit, reducing consumption of lubricating oil. As a result, the amount of lubricating oil used has been greatly reduced compared with conventional machines.



<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 or its distributor representative. DMG MORI 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 and its distributor representative shall have no obligation to re-enable such Equipment. DMG MORI 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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+ If you have any questions regarding the content, please consult our sales representative.

+ The information in this catalog is valid as of August 2015. 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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The logo for DMG MORI, with "DMG" in green and "MORI" in red, both in a bold, sans-serif font.