NH6300 DCG II

www.dmgmori.com

High-Precision Horizontal Machining Center

NH6300 DCG II
Horizontal machining center answering a wide range of requirements from heavy-duty cutting to high-speed cutting

Equipped with 630-mm-square pallets, the NH6300 DCG II offers a generous work envelope of \(1,050 \text{ mm} \times 1,300 \text{ mm} (\approx 41.3 \text{ in.} \times 51.1 \text{ in.})\) while achieving space savings.

The rate of acceleration on all axes has been increased by 30% or more, substantially shortening machining times and further increasing productivity. This is a high-speed, high-precision horizontal machining center perfect for machining medium and large sized workpieces and difficult-to-cut materials, for example in the automobile, construction machinery and aircraft fields.
NH6300 DCG II offers a generous work envelope of \( A_1,050 \text{ mm} \times 1,300 \text{ mm} (A_41.3 \text{ in.} \times 51.1 \text{ in.}) \) while achieving space savings. The rate of acceleration on all axes has been increased by 30% or more, substantially shortening machining times and further increasing productivity. This is a high-speed, high-precision horizontal machining center perfect for machining medium and large sized workpieces and difficult-to-cut materials, for example in the automobile, construction machinery and aircraft fields.
Our DCG (Driven at the Center of Gravity) 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. 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.

### Features of DCG

- Improved surface quality
- Improved roundness
- Outstanding acceleration
- Longer tool life
Space-saving design
Customers can choose a magazine with the ideal number of tools to suit their needs, while keeping the machine width as it is.

<table>
<thead>
<tr>
<th>Machine height</th>
<th>3,414 mm (134.4 in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(chain-type: 60 tools)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Machine width × machine depth</th>
<th>3,370 × 5,957 mm (132.7 × 234.5 in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(chain-type: 60 tools)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Machine width</th>
<th>3,370 mm (132.7 in.)</th>
<th>4,098 mm (161.3 in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60, 80, 100, 120 tools</td>
<td>(chain-type)</td>
<td>180, 240, 330 tools</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Max. workpiece swing diameter</th>
<th>1,050 mm (41.3 in.)</th>
<th>1,300 mm (51.1 in.)</th>
<th>1,500 kg (3,300 lb.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. workpiece height</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Travel <X, Y and Z axes>

<table>
<thead>
<tr>
<th>X-axis</th>
<th>Y-axis</th>
<th>Z-axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,050 mm (41.3 in.)</td>
<td>900 mm (35.4 in.)</td>
<td>980 mm (38.6 in.)</td>
</tr>
</tbody>
</table>

Working area
Principal mechanisms

**Spindle**

For the spindle drive, we use the high-efficiency DDS (Direct Drive Spindle) motor which extracts full power over a wide range, from high-speed machining to heavy-duty cutting. This machine handles all types of materials from steel to aluminum and other non-ferrous metals.

<table>
<thead>
<tr>
<th>Max. spindle speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>10,000 min⁻¹</td>
</tr>
<tr>
<td>15,000 min⁻¹ (HP)</td>
</tr>
<tr>
<td>8,000 min⁻¹ (HP)</td>
</tr>
<tr>
<td>6,000 min⁻¹ (HP)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spindle acceleration time/Spindle deceleration time (0→10,000 min⁻¹/10,000 min⁻¹→0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.90 sec./2.90 sec.</td>
</tr>
</tbody>
</table>

**Tool clamp power**

Using the newly developed collet, clamping power on the tool has been increased. The ability to control vibration during spindle rotation ensures high-accuracy machining.

24,000 N (5,395.1 lbf)

*Please use a two-face contact tool when cutting at higher than 10,000 min⁻¹.

**Spindle cooling**

Stator coil in DDS motor: the coolant supplied by the oil chiller minimizes heat diffusion by circulating through an oil jacket, which is placed around the stator coil.

**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.

**BT specifications**

**HSK specifications**

*All DMG MORI spindles are made in-house to better meet our customer needs. For details, please consult with our sales representative.*

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

**Tool, Boring**

The maximum tool length is the same as the pallet size. Deep hole boring up to the maximum tool length can be done without turning the table around, reducing cutting time and achieving high-precision machining.

**Max. tool length**: same size as the pallet

630 mm (24.8 in.)

**Pallet working surface**

630×630 mm (24.8×24.8 in.)

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

**Previous model**

Concentric drilling can be done on both sides by flipping the table.
It uses a front 2-station turn-type APC. This APC offers high-speed pallet change that reduces non-cutting time.

### Pallet changing time (2-station turn-type APC)*
15.0 sec.

* Excluding clamping and unclamping time.
When equipped with the auto-coupler, time taken to shut off / supply hydraulic pressure to the fixture is not included.

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**Table**

A one-degree indexing table is standard, and a full indexing table equipped with DDM is available as an option. These have significant advantages for machining of workpieces that require high speed and high positioning accuracy.

#### Selection of tables

<table>
<thead>
<tr>
<th>Table type</th>
<th>1° indexing table</th>
<th>Full 4th axis rotary table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum pallet indexing angle</td>
<td>1°</td>
<td>0.001°</td>
</tr>
<tr>
<td>Pallet indexing time (90°) (excluding clamping and unclamping time)</td>
<td>2.0 sec.</td>
<td>1.8 sec.</td>
</tr>
</tbody>
</table>

---

**Direct Drive Motor**

Original technology

The world’s fastest rotary axis drive system, which achieves zero backlash.

Until now, gears have been used to transmit the drive power to the rotary axes, but this drive system had a negative effect on drive speed and precision. By transmitting the drive power to the rotary axes directly without using gears, DDM offers outstanding transmission efficiency and high-speed feed. DDM also achieves zero backlash.

#### Features of DDM

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

#### B-axis max. rotational speed

<table>
<thead>
<tr>
<th>Previous model (worm gear system)</th>
<th>NH6300 DCG II (DDM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.7 min⁻¹</td>
<td>100 min⁻¹</td>
</tr>
</tbody>
</table>

Approx. 6.0 times faster

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**APC**

This APC offers high-speed pallet change that reduces non-cutting time.

#### Pallet changing time (2-station turn-type APC)*
15.0 sec.

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

### Tool changing time

**Cut-to-cut (chip-to-chip) <60 tools>**

<table>
<thead>
<tr>
<th>Max. &lt;ISO&gt;</th>
<th>Min. &lt;ISO&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.6 sec.</td>
<td>4.5 sec.</td>
</tr>
</tbody>
</table>


*The time differences are caused by the different conditions (travel distances, etc) for each standard.*

**Tool-to-tool**

1.7 sec.

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**ATC**

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**Magazine**

We prepared two types of magazine: a chain type and a rack type. Customers can choose either a chain type or rack type to suit their production needs.

### Chain-type magazine

#### Tool storage capacity

<table>
<thead>
<tr>
<th>60 tools</th>
<th>80 tools</th>
<th>100 tools</th>
<th>120 tools</th>
</tr>
</thead>
</table>

### Rack-type magazine

#### Tool storage capacity

<table>
<thead>
<tr>
<th>180 tools</th>
<th>240 tools</th>
<th>330 tools</th>
</tr>
</thead>
</table>

#### Separation of magazine unit

*The static precision of the main body is unaffected*

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

#### Unaffected by magazine vibration

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

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**180 tools Magazine**

#### Setting tools

- **IN**
- **OUT (Tool attachment)**
- **OUT (Tool detachment)**

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**Magazine capacity**

<table>
<thead>
<tr>
<th>180 tools</th>
<th>240 tools</th>
<th>330 tools</th>
</tr>
</thead>
</table>

#### Max. tool length

- 630 mm (24.8 in.)
- 30 kg (66 lb.)
- 110 mm (4.3 in.)
- 320 mm (12.5 in.)

#### Max. tool mass moment (from spindle gauge line)

- 29.4 N·m (21.6 in.)

* 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.

* The maximum tool diameter is limited to 255 mm (10.0 in.) or less when using the spindle at 10,000 min⁻¹ or higher.
High-precision equipment

**Full closed loop control (Scale feedback)**

- Superior precision with full closed loop control (Scale feedback)
- Magnetic measuring system with a high resolution of 0.01 μm
- Resistance to oil and condensation due to a magnetic detection principle

**Coolant chiller (separate type) <option>**

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 or a high-pressure coolant system, please be sure to consult our sales representative.

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

**Ball screw center cooling**

In order to control thermal displacement and to keep high-accuracy positioning, the ball screw core cooling system in which cooling oil circulates through the support bearings is used.

**Pallet clamp system**

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

**High-accuracy data**

**X, Y, Z-axes thermal displacement**

We measured the thermal displacement on each axis when changing the spindle speed.

- **Displacement amount**: 7 μm (actual result)
- **Thermal displacement (when changing the spindle speed)**

*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.*
High precision  
Machining ability

High-accuracy data

**Circularity**

During circle cutting, the vibration is caused due to changes in direction at the time of moving from one quadrant to the next. By using DCG, the NH6300 DCG II minimizes the vibration, and improves contouring accuracy.

<table>
<thead>
<tr>
<th>Circularity</th>
<th>1.90 μm (actual result)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>A5052 - outer diameter 130 mm (5.1 in.)</td>
</tr>
<tr>
<td>Tool</td>
<td>Ø 16 mm (Ø 0.6 in.) Carbide end mill &lt;4 flutes&gt;</td>
</tr>
<tr>
<td>Spindle speed</td>
<td>8,000 min⁻¹</td>
</tr>
<tr>
<td>Cutting feedrate</td>
<td>2,000 mm/min (78.7 ipm)</td>
</tr>
</tbody>
</table>

Filter: 1—15

- 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.
- A5052: Aluminum  
- JIS: Japanese Industrial Standard

**Cutting test**

The NH6300 DCG II dramatically improves the machining ability compared with the conventional machines. The NH6300 DCG II is ideal for heavy-duty cutting of cast iron workpieces for construction machinery parts and automobile parts as well as high-speed machining of aluminum workpieces for aircraft parts and automobile test parts.

- **100 mm (3.9 in.) Face mill <9 flutes>**
  - Material: JIS - A5052
  - Material removal rate: 2,560 mL/min (156.2 in³/min)
  - Width of cut: 80 mm (3.1 in.)
  - Depth of cut: 2.0 mm (0.08 in.)
  - Spindle speed: 10,000 min⁻¹
  - Feedrate: 16,000 mm/min (629.9 ipm)

- **125 mm (4.9 in.) Face mill <6 flutes>**
  - Material: JIS - S50C
  - Material removal rate: 560 mL/min (34.2 in³/min)
  - Width of cut: 100 mm (3.9 in.)
  - Depth of cut: 5 mm (0.2 in.)
  - Spindle speed: 600 min⁻¹
  - Feedrate: 1,120 mm/min (44.1 ipm)

- **25 mm (1.0 in.) Throw-away end mill**
  - Material: JIS - S50C
  - Material removal rate: 178.2 mL/min (10.9 in³/min)
  - Width of cut: 25 mm (1.0 in.)
  - Depth of cut: 14 mm (0.6 in.)
  - Spindle speed: 2,546 min⁻¹
  - Feedrate: 509 mm/min (20.0 ipm)

- **50 mm (2.0 in.) Roughing end mill <6 flutes>**
  - Material: JIS - S50C
  - Material removal rate: 120.8 mL/min (7.4 in³/min)
  - Width of cut: 50 mm (2.0 in.)
  - Depth of cut: 35 mm (1.4 in.)
  - Spindle speed: 190 min⁻¹
  - Feedrate: 69 mm/min (2.7 ipm)

- **65 mm (2.6 in.) Drill**
  - Material: JIS - S50C
  - Material removal rate: 173 mL/min (10.6 in³/min)
  - Spindle speed: 227 min⁻¹
  - Feedrate: 52 mm/min (2.0 ipm)

- **1049 (ANSI), C50, C50E, C50R (BS, DIN), 50 (GB)**

- A5052: Aluminum  
- S50C: 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.

NH6300 DCG II
The NH6300 DCG II has realized even higher productivity by increasing the speed of each structure.

### Data for comparison

**NH6300 DCG II**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. spindle speed</td>
<td>10,000 min</td>
</tr>
<tr>
<td>Max. acceleration</td>
<td>X-axis: 0.71 G (7.0 m/s² (23.0 ft/s²))</td>
</tr>
<tr>
<td></td>
<td>Y-axis: 1.00 G (9.8 m/s² (32.2 ft/s²))</td>
</tr>
<tr>
<td></td>
<td>Z-axis: 0.76 G (7.5 m/s² (24.6 ft/s²))</td>
</tr>
<tr>
<td>Rapid traverse rate &lt;X, Y and Z axes&gt;</td>
<td>50 m/min (1,968.5 ipm)</td>
</tr>
<tr>
<td>Tool changing time</td>
<td>Cut-to-cut &lt;chip-to-chip&gt; 4.4 sec. &lt;MAS&gt;</td>
</tr>
<tr>
<td>Pallet changing time</td>
<td>15.0 sec.</td>
</tr>
<tr>
<td>Pallet indexing time</td>
<td>Including clamping and unclamping time: 2.0 sec. (90°)</td>
</tr>
</tbody>
</table>

**Previous model (1995 year—)**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. spindle speed</td>
<td>10,000 min</td>
</tr>
<tr>
<td>Max. acceleration</td>
<td>X-axis: 0.39 G (3.8 m/s² (12.5 ft/s²))</td>
</tr>
<tr>
<td></td>
<td>Y-axis: 0.59 G (5.8 m/s² (19.0 ft/s²))</td>
</tr>
<tr>
<td></td>
<td>Z-axis: 0.46 G (4.5 m/s² (14.8 ft/s²))</td>
</tr>
<tr>
<td>Rapid traverse rate &lt;X, Y and Z axes&gt;</td>
<td>32 m/min (1,259.8 ipm)</td>
</tr>
<tr>
<td>Tool changing time</td>
<td>Cut-to-cut &lt;chip-to-chip&gt; 4.6 sec. &lt;MAS&gt;</td>
</tr>
<tr>
<td>Pallet changing time</td>
<td>15.0 sec.</td>
</tr>
<tr>
<td>Pallet indexing time</td>
<td>Including clamping and unclamping time: 3.1 sec. (90°)</td>
</tr>
</tbody>
</table>

### Workpiece

- **Number of tools used**: 19 tools

### Cycle time comparison

<table>
<thead>
<tr>
<th>Cycle time (sec.)</th>
<th>Previous model</th>
<th>NH6300 DCG II</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,676 sec.</td>
<td>1,257 sec.</td>
<td>419 sec.</td>
</tr>
</tbody>
</table>

**Approx. 3/4**

### Comparison of production volume and sales

- **Running time (one day)**: 8 hours × 85% × 3,600 sec. × 8 × 0.85 × 24,480 sec.
- **Production volume (pcs./day)**: 24,480 sec. × Cycle time (sec.)
- **Number of days operating in 1 year**: 21 days × 12 months = 252 days

### 5-year sales simulation (30 USD/EUR per work)

- **Difference from previous model**: 150 USD/EUR per day
  - Approx. 1.4 times increase
  - 3,150 USD/EUR per month
  - 37,800 USD/EUR per year
  - 189,000 USD/EUR per 5 years

- **Productivity**

- **NH6300 DCG II**
  - 1st year: 105,840
  - 2nd year: 143,640
  - 3rd year: 211,680
  - 4th year: 287,280
  - 5th year: 317,520

- **Previous model**
  - 1st year: 105,840
  - 2nd year: 143,640
  - 3rd year: 211,680
  - 4th year: 287,280
  - 5th year: 317,520
Improved workability

For the NH6300 DCG II, we have installed features throughout the machines to improve the operability based on the complete operator-centered concept.

- Swivel-type operation panel
  - Swivel range: 90°

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

- Setup station button
  - Redesigning the machine, we have placed the setup button at the ideal height so that an operator can use the machine comfortably.

- Setup station
  - The open/close ceiling for easier loading/unloading of large workpieces and the wide door opening offer excellent operability.

- Door opening
  - 1,060 mm (41.7 in.)

- Distance from floor surface to pallet surface
  - 1,250 mm (49.2 in.)

- Centralized layout of devices

Maintenance

For the NH6300 DCG II, the maintenance is improved by placing the oil chiller, hydraulic unit, and pneumatic instruments all in one place and offering better accessibility for operators.

- Replacement of spindle unit
  - By changing the spindle unit to a cartridge, which even includes the rear bearings, we have dramatically reduced replacement time.
Peripheral equipment

**Chip conveyor outside machine (Hinge type+drum filter type)**

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

- Regardless of shapes or materials, any types of chips including long/short chips can be transferred on one conveyor.
- Suitable for discharging various types of chips on multi-axis machines.
- Regardless of water-soluble or water-insoluble, any types of coolant can be used.
- The built-in tank drum filter greatly reduces efforts and times for cleaning the inside of the tank.

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Steel</th>
<th>Cast iron</th>
<th>Aluminum/non-ferrous metal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hinge type+drum filter type</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Scraper type+drum filter type</td>
<td>×</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

- Chip size guidelines
  - Short: chips 50 mm (2.0 in.) or less in length, bundles of chips ≤ 40 mm (≤ 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.
- Chip conveyors are available in various types for handling chips of different shape and material. For details, please consult our sales representative.

**Chip conveyor inside machine (spiral type)**

Chips under the table, which cannot be completely eliminated by coolant, are forcibly discharged using a spiral conveyor. This contributes to long-term, unmanned operation. It is also suitable for dry machining, when coolant is not used.

- Regardless of shapes or materials, any types of chips including long/short chips can be transferred on one conveyor.
- Suitable for discharging various types of chips on multi-axis machines.
- Regardless of water-soluble or water-insoluble, any types of coolant can be used.
- The built-in tank drum filter greatly reduces efforts and times for cleaning the inside of the tank.

**Slanted cover**

The center trough structure with greater cover inclined angle than the previous machine improves the chip disposal capacity.
Peripheral equipment

**Shower coolant**
As well as preventing chips from scattering during machining, this allows them to fall smoothly into the center conveyor.

**Semi dry unit**
Supplies air and oil mist to the cutting tip. An environmentally friendly device which reduces oil consumption. We recommend using this unit together with a mist collector.

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

<table>
<thead>
<tr>
<th></th>
<th>Unit on coolant tank</th>
<th>Separate type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge pressure</td>
<td>1.5 MPa (217.5 psi)</td>
<td>1.5/3.5/7.0 MPa (217.5/507.5/1,015 psi)</td>
</tr>
<tr>
<td>Installation space</td>
<td>—</td>
<td>820×1,120 mm (32.3×44.1 in.)</td>
</tr>
<tr>
<td>Water-soluble coolant</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Coolant filtration accuracy</td>
<td>40 μm</td>
<td>20 μm</td>
</tr>
</tbody>
</table>

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 be sure to consult our sales representative.

**Automatic measurement**

**In-machine measuring system (spindle)**

**In-machine measuring system (table)**

**Automatic measurement+Manual measurement functions**
Manual measurement applications can be added to the automatic measurement function.
Fixture interface

Auto-coupler fixture interface

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

Compressed air is supplied to the setup station. Hydraulic fluid is supplied to both the setup station and the machining table.

Hydraulic fluid is supplied to the machining table through two ports that diverge from one circuit.

Interface specified for supply on the upper part of the coupler

Supplying from above the machine allows more ports to be added as needed by your fixture.

Check list (for hydraulic/pneumatic fixtures)

- Pressure source
  - Hydraulic
  - Pneumatic
- Supplied pressure ___ MPa
- No. of circuits
  - Hydraulic ___
  - Pneumatic ___
- For workpiece holding detection ___
- Others
  - Clamp check system
  - Fixture washing coolant system
  - Fixture air blow system

Separate hydraulic unit for the auto coupler

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

Reduction in environmental burden

Eco-friendly design

Reduced consumption of lubricating oil

- Oil-bath ATC
  An oil-bath design has been integrated into the ATC unit design. Compared with conventional oil drip designs, the amount of lubricating oil used has been radically reduced.

Power-saving function

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

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

Energy-saving settings screen

Option

15

NH300 DCG II
The versatile systems resolve production issues.

CPP system (Carrier Pallet Pool System)
With its simple construction provided in predefined packages, this system is easy to introduce. For the system configuration, the customer can select from 8 packages to provide the optimum specifications for their needs.

Controller
Handy controller (Standard features)

- MCC-LPS II is available as an option.
- When the number of machines or workpiece setup stations is two or more, the MCC-LPS II is required.
- For models and systems, please consult with our sales representative.

LPP system (Linear Pallet Pool System)
This system can be equipped with multi-level pallet racks, providing a high level of automation. The system construction can also be customized however you wish, achieving the optimum productivity and operation rate.

Controller
MCC-LPS II (Standard features)

Applications
Linear Pallet Pool Control System
MCC-LPS III
- Easy operation / management of the pallet transfer system.
- Machining programs can be managed and automatically downloaded.
- Able to flexibly change production priority in response to urgent requests.

The Tool Management System
MCC-TMS
- Improves the system operating rate through highly efficient, centralized tool management.
- Compatible with ID tags.
- Compatible with tool presetter interface.

- MCC-LPS II is installed in the specialized cell controller and MCC-TMS can be installed in the controller and your PC.
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.

Examples of qualified products (NH6300 DCG II)

☐ Through-spindle coolant system
  Coolant is supplied to the tool tip through the center of the tool and spindle.

☐ Coolant chiller
  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.

☐ Electrical cabinet chiller
  This prevents temperature rise and dew condensation inside the electrical cabinet.

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

☐ 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.

☐ Tool wagon

☐ Tool cabinet

☐ Basic tooling kit

DMQP (DMG MORI Qualified Products)

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)

For more details on DMQP items, please consult our sales representative.
MAPPS IV: Mori Advanced Programming Production System
for Machining Centers

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]

**Vertical soft-keys**
Vertical soft-keys are arranged on the left and right sides of the screen. The vertical soft-keys can be used as option buttons or shortcut keys to which you can assign your desired screens and functions, allowing you to quickly display the screen you want.

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

**Advanced hardware**

**Reduction of drawing time**
Shorter drawing time was achieved thanks to increased CPU performance.

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

* The reduction rate differs depending on the program.

**Main specifications**

Main memory 2 GB
User area 6 GB

Interface
- USB 2.0 3 ports
- LAN 1 port (1000BASE-T)
- RS-232-C port

Soft-keys: Left/right 12 keys Bottom 12 keys

**Improved ease of setup**

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

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

**Improved work efficiency**

**Fixed-point in-machine camera**
Images taken by cameras installed inside/outside the machine can be viewed on the programming screen. This function is useful for maintenance.

**Examples of camera locations**
- Inside machine (to check machining)
- Tool magazine (to check cutting tools)
- Chip bucket (to check chip accumulation)

**MAPPS: Mori Advanced Programming Production System**

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NH6300 DCgII
**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.

1. **Simple programming**
   
   **[Conversational automatic programming]**
   
   Easy operation by simply inputting product shapes according to the screen guidance.

2. **Reduce programming time**
   
   **[Supporting complicated programming]**
   
   Simply enter the machining shape using conversational automatic programming and the machine automatically selects the necessary tools and cutting conditions.

3. **Save costs**
   
   **[Compatibility with the MAPPS conversational function]**
   
   Prepared conversational programs can be converted into NC programs with MAPPS. Cutting conditions can also be changed on MAPPS.

---

**Application System**

**MORI Automatic Programming System for Machining Center**

**MORI-APM**

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

- **1. Simple programming**
- **2. Reduce programming time**
- **3. Save costs**

- The photo shown may differ from actual machine.
- Information about the screen is current as of November 2018.
This is an application which allows you to remotely operate and view the MAPPS screens from your office computer.

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

For shorter total production time for all our customers

DMG MORI’s software Line-up

Remote Maintenance/Machine Operation Monitoring Service

MORI-NET Global Edition Advance

- 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

DMG MORI MESSENGER

- 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

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

Industrial Network for Peripheral Equipment Control

**MAPPS EtherNet/IP I/F**

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

- **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.

- **System examples**

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

Diagrams

**Plan view**

![Plan view diagram](image)

**Front view**

![Front view diagram](image)

**Depth**

<table>
<thead>
<tr>
<th>Tool</th>
<th>60 (standard)</th>
<th>80</th>
<th>100, 120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth mm (in.)</td>
<td>4,850 (190.9)</td>
<td>6,000 (236.2)</td>
<td>6,400 (252.0)</td>
</tr>
</tbody>
</table>

**A (chain-type)**

**B (rack-type)**

See the table shown below.

**Tool restrictions**

<table>
<thead>
<tr>
<th>Tool restrictions</th>
<th>BT50</th>
<th>CAT50</th>
<th>DIN50</th>
<th>HSK-A100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. tool length L mm (in.)</td>
<td>630 (24.8)</td>
<td>630 (24.8)</td>
<td>630 (24.8)</td>
<td>630 (24.8)</td>
</tr>
<tr>
<td>Max. tool diameter mm (in.)</td>
<td>110 (4.3)</td>
<td>110 (4.3)</td>
<td>110 (4.3)</td>
<td>110 (4.3)</td>
</tr>
<tr>
<td>Tool limitation A mm (in.)</td>
<td>38 (1.5)</td>
<td>38 (1.5)</td>
<td>38 (1.5)</td>
<td>38 (1.5)</td>
</tr>
<tr>
<td>Tool limitation B mm (in.)</td>
<td>100 (3.9)</td>
<td>69.85 (2.75)</td>
<td>69.85 (2.75)</td>
<td>69.85 (2.75)</td>
</tr>
<tr>
<td>Max. tool mass kg (lb.)</td>
<td>30 (66)</td>
<td>30 (66)</td>
<td>30 (66)</td>
<td>30 (66)</td>
</tr>
<tr>
<td>Max. tool mass moment N-m (R-lbf)</td>
<td>29.4 (21.6)</td>
<td>29.4 (21.6)</td>
<td>29.4 (21.6)</td>
<td>29.4 (21.6)</td>
</tr>
</tbody>
</table>

*The chip conveyor (hinge type+drum filter type) is equipped as standard.*

- Do not use the pots marked with “×”, because they cause interference.

---

**60-tool specifications (chain-type)**

With adjacent tools <max. tool diameter: 110 (4.3)>.

Without adjacent tools <max. tool diameter: 220 (8.6)>.

Without adjacent tools <max. tool diameter: 320 (12.5)>.

---

**80-tool specifications (chain-type)**

With adjacent tools <max. tool diameter: 110 (4.3)>.

Without adjacent tools <max. tool diameter: 220 (8.6), 320 (12.5)>.

---

**100-tool specifications (chain-type)**

With adjacent tools <max. tool diameter: 110 (4.3)>.

Without adjacent tools <max. tool diameter: 220 (8.6), 320 (12.5)>.

---

**120-tool specifications (chain-type)**

With adjacent tools <max. tool diameter: 110 (4.3)>.

Without adjacent tools <max. tool diameter: 220 (8.6), 320 (12.5)>.
Tool restrictions

**100-tool specifications (chain-type) [OP]/120-tool specifications (chain-type) [OP]**

With adjacent tools <max. tool diameter: 110 (4.3)>

Without adjacent tools <max. tool diameter: 220 (8.6)>

Without adjacent tools <max. tool diameter: 320 (12.5)>

Do not use the pots marked with "×", because they cause interference.

**180-tool specifications (rack-type) [OP]**

Column 1–12
<the tool of the 110 mm (4.3 in.) or less can be stored>

Column 2
<six tool of the 150 mm (5.9 in.) or less can be stored>

Column 1
<eight tool of the 200 mm (7.8 in.) or less can be stored>

Column 11, 12
<nine tool of the 320 mm (12.5 in.) or less can be stored>

Do not use the pots marked with "×", because they cause interference.

**Tool restrictions**

<table>
<thead>
<tr>
<th>Type of tool shank</th>
<th>BT50</th>
<th>CAT50</th>
<th>DIN50</th>
<th>HSK-A100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. tool length L</td>
<td>630</td>
<td>630</td>
<td>630</td>
<td>630</td>
</tr>
<tr>
<td>Max. tool diameter</td>
<td>mm (in.)</td>
<td>With adjacent tools: 110 (4.3)</td>
<td>Without adjacent tools: 220 (8.6), 320 (12.5)</td>
<td></td>
</tr>
<tr>
<td>Tool limitation A</td>
<td>mm (in.)</td>
<td>38 (1.5)</td>
<td>38 (1.5)</td>
<td>38 (1.5)</td>
</tr>
<tr>
<td>Tool limitation B</td>
<td>mm (in.)</td>
<td>100 (3.9)</td>
<td>69.85 (2.75)</td>
<td>69.85 (2.75)</td>
</tr>
<tr>
<td>Max. tool mass</td>
<td>kg (lb.)</td>
<td>30 (66)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. tool mass moment</td>
<td>N·m (ft·lbf)</td>
<td>29.4 (21.6)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you attach a tool with a diameter larger than 110 mm (4.3 in.) in the 1st, 2nd, 11th or 12th column in the rack, you may not be able to attach tools to the adjacent tool pots.
### Tool restrictions

#### 240-tool specifications (rack-type) [OP]

**Column 1–16**
- The tool of the \( \phi \) 110 mm (\( \phi \) 4.3 in.) or less can be stored.

**Column 2**
- Six tool of the \( \phi \) 150 mm (\( \phi \) 5.9 in.) or less can be stored.

**Column 1**
- Eight tool of the \( \phi \) 200 mm (\( \phi \) 7.8 in.) or less can be stored.

**Column 15, 16**
- Nine tool of the \( \phi \) 320 mm (\( \phi \) 12.5 in.) or less can be stored.

#### 330-tool specifications (rack-type) [OP]

**Column 1–22**
- The tool of the \( \phi \) 110 mm (\( \phi \) 4.3 in.) or less can be stored.

**Column 2**
- Six tool of the \( \phi \) 150 mm (\( \phi \) 5.9 in.) or less can be stored.

**Column 21, 22**
- Nine tool of the \( \phi \) 320 mm (\( \phi \) 12.5 in.) or less can be stored.

---

**Diagrams**

**Mano tool exchange**

**Tool restrictions**

<table>
<thead>
<tr>
<th>Type of tool shank</th>
<th>BT50</th>
<th>CAT50</th>
<th>DIN50</th>
<th>HSK-A100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. tool length ( L ) mm (in.)</td>
<td>630 (24.8)</td>
<td>320 (12.5)</td>
<td>320 (12.5)</td>
<td>320 (12.5)</td>
</tr>
<tr>
<td>Max. tool diameter mm (in.)</td>
<td>38 (1.5)</td>
<td>38 (1.5)</td>
<td>38 (1.5)</td>
<td>38 (1.5)</td>
</tr>
<tr>
<td>Tool limitation A mm (in.)</td>
<td>100 (3.9)</td>
<td>69.85 (2.75)</td>
<td>69.85 (2.75)</td>
<td>69.85 (2.75)</td>
</tr>
<tr>
<td>Tool limitation B mm (in.)</td>
<td>30 (1.2)</td>
<td>30 (1.2)</td>
<td>30 (1.2)</td>
<td>30 (1.2)</td>
</tr>
<tr>
<td>Max. tool mass kg (lb.)</td>
<td>30 (66)</td>
<td>30 (66)</td>
<td>30 (66)</td>
<td>30 (66)</td>
</tr>
</tbody>
</table>

**Column 1–16**
- A tool of the \( \phi \) 110 mm (\( \phi \) 4.3 in.) or less can be stored.

**Column 1–22**
- A tool of the \( \phi \) 110 mm (\( \phi \) 4.3 in.) or less can be stored.

**Column 2**
- A tool of the \( \phi \) 150 mm (\( \phi \) 5.9 in.) or less can be stored.

**Column 21, 22**
- A tool of the \( \phi \) 320 mm (\( \phi \) 12.5 in.) or less can be stored.

- If you attach a tool with a diameter larger than \( \phi \) 110 mm (\( \phi \) 4.3 in.) in the 1st, 2nd, 15th or 16th column in the rack, you may not be able to attach tools to the adjacent tool pots.

- If you attach a tool with a diameter larger than \( \phi \) 110 mm (\( \phi \) 4.3 in.) in the 1st, 2nd, 21st or 22nd column in the rack, you may not be able to attach tools to the adjacent tool pots.
### Spindle speed torque/output diagrams

**[High output]**
- Max. spindle speed: 10,000 min⁻¹
- Spindle drive motor: 30/25 kW (40/33.3 HP) <30 min/cont>
- Max. spindle torque: 600 N·m (442.5 ft-lbf) <15%ED>

**[High torque]**
- Max. spindle speed: 6,000 min⁻¹
- Spindle drive motor: 55/45/37 kW (75/60/50 HP) <25%ED/30 min/cont>
- Max. spindle torque: 1,399 N·m (965.5 ft-lbf) <15%ED>

**[Standard]**
- Max. spindle speed: 10,000 min⁻¹
- Spindle drive motor: 40/30/25 kW (53.3/40/33.3 HP) <15%ED/30 min/cont>
- Max. spindle torque: 525 N·m (387.2 ft-lbf) <15%ED>

**[High speed]**
- Max. spindle speed: 15,000 min⁻¹
- Spindle drive motor: 30/25 kW (40/33.3 HP) <30 min/cont>
- Max. spindle torque: 512 N·m (387.2 ft-lbf) <15%ED>
Spindle

<table>
<thead>
<tr>
<th>Type of tool shank</th>
<th>BT50</th>
<th>CAT50</th>
<th>DGN60</th>
<th>DK9</th>
<th>HSK-A100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of retention knob</td>
<td>DMC MORI 90° type</td>
<td>4° (MAR-1)</td>
<td>6° (MAS-1)</td>
<td>DIN</td>
<td>HSK-A100 Special (center)</td>
</tr>
</tbody>
</table>

Magnet/Fixture/Steady rest

<table>
<thead>
<tr>
<th>Pallet/APC</th>
<th>Two-face contact</th>
<th>Two-face contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>BT50</td>
<td></td>
<td>HSK-A100</td>
</tr>
</tbody>
</table>

Pallet/APC

<table>
<thead>
<tr>
<th>2-station turn-type APC</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pallet</td>
<td>Tap (mm, in.)</td>
</tr>
</tbody>
</table>

Changing to T-slot pallets

<table>
<thead>
<tr>
<th>2 pallets</th>
<th>4 pallets</th>
</tr>
</thead>
</table>

Automation

<table>
<thead>
<tr>
<th>Setup station</th>
<th>T-slot</th>
</tr>
</thead>
</table>

Coolant

<table>
<thead>
<tr>
<th>Coolant system</th>
<th>●</th>
</tr>
</thead>
</table>

Chilled coolant (used at the same time as spindle coolant)

<table>
<thead>
<tr>
<th>Coolant float switch</th>
<th>Lower limit detection</th>
</tr>
</thead>
</table>

Coolant gun

<table>
<thead>
<tr>
<th>Machining side</th>
<th>Setup station</th>
<th>Machining side</th>
</tr>
</thead>
</table>

Coolant line coolant/air (switching specifications) (through spindle coolant system is necessary required separately)

Oil mist system

<table>
<thead>
<tr>
<th>Through-spindle coolant system (separate type)</th>
<th>1.5 MPa (217.5 psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(unit on coolant tank)</td>
<td>1.5 MPa (217.5 psi)</td>
</tr>
</tbody>
</table>

Coolant chiller

<table>
<thead>
<tr>
<th>Coolant chiller (separate type)</th>
<th>Option when using water-soluble coolant</th>
</tr>
</thead>
</table>

Oil mist coolant system

<table>
<thead>
<tr>
<th>Through-spindle coolant system (separate type)</th>
<th>Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>(center through)</td>
<td>Interface &lt;0.0 MPa (0.105 psi), KWDL &gt;</td>
</tr>
<tr>
<td>(side through)</td>
<td>Interface &lt;0.0 MPa (0.105 psi), Chip breaker</td>
</tr>
</tbody>
</table>

Coolant discharge system

<table>
<thead>
<tr>
<th>Discharge pressure (MPa psi)</th>
<th>Side through</th>
<th>Center through (special retention knobs are required)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5 (217.5)</td>
<td></td>
<td>● ○*</td>
</tr>
<tr>
<td>3.5 (500.5)</td>
<td>● ○</td>
<td>○*</td>
</tr>
<tr>
<td>7.0 (1,015)</td>
<td>● ○</td>
<td>○*</td>
</tr>
</tbody>
</table>

Smartly cooled 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 be sure to consult our sales representative.
### Numerical control unit specifications F31iB, F31iB5

#### Controlled axes
- X (X2), Y, Z, B, R

- Simultaneously controlled axes: F31iB: 4 axes, F31iB5: 5 axes

- Least input increment: 0.001 mm (0.0001 in.)

- Max. command value: 9,999.999 in (99,999.999 mm)

- Stroke limit check before movement

- Software damper: Abnormal load detection function

- Load monitor function C: Soft key type

- Programming resolution multiplied by 1/10: 0.0001 mm (0.00001 in.)

#### Operation
- Distance number comparison and stop
- Program restart
- Tool retract and recover
- Manual handle interruption

#### Interpolation functions
- Nano interpolation
- Helical interpolation: Optional 2 axes and other 1 axis
- External high-speed skip (installation of high-speed skip terminal)
- Polar coordinate interpolation G12.1, G13.1
- Spherical interpolation
- Smooth interpolation
- Tangential axes: simultaneous asynchronous cutting/Feed per revolution
- 4th reference position return

- Tool spindle Cs control (consultation is required if burnishing or hole machining needs to be performed)

- NURBS interpolation

#### Feed functions
- Rapid traverse override: F0 to 10/25/100%
- Tapered screw constant control
- Feedrate override: 0 to 250 (10% increments)
- Override cancel
- All contour control I
- All contour control II
- One-digit F code feed: F1 to F9
- Small hole peak drilling cycle (the cycle with the overload torque detection function must be attached)

- 1 Lock-ahead blocks are up to 30 blocks.
- 2 1,000 look-ahead blocks + high-speed processing.

#### Tools function/Tool offset function
- Tool function (T function): 8-digit T code

- Number of tool offsets: 64 sets (diameter + length: set, number of offsets indicates that diameter and length are displayed separately)

- Tool offset memory C: G61 code, geometry, tilt

- Tool length compensation: G43, G44, G49

- Cutter radius offset: G40 to G42

- Tool length measurement

- 2D tool compensation

- Additional number of tool offsets (the number of selectable tool offsets depends on the tool storage capacity)

- Tool position offset

- Tool life management

- Additional number of tools to be controlled by the tool life management function: 1,024 sets

#### Editing
- Expanded program editing (A limitation in the copy buffer: 10 KB)
- Background editing
- Playback
- Machining time stamp
- Undo/Redo function <MAPPS>
- Line number display <MAPPS>

#### Display
- Static display
- Clock function
- Current position display
- Program comment display: 191 characters (4-digit 0 code) + 187 characters (8-digit 0 code)

#### Parameter setting display
- Alarm display
- Alarm history display
- Teacher's message history display
- Operation history display
- Running time/Parts count display
- Actual cutting speed display

#### Self-diagnosis
- Includes alarm display, I/O signal diagnosis, and ladder diagram

#### Operation panel:
- Display section: 19-inch TFT color LCD

#### Multi-counter display <MAPPS>

#### Data input/output
- I/O interface: USB

#### Ethernet
- 10/100/1000BASE-T (access to user memory area by Ethernet function with NORD-Server Software)

#### Memory card for MAPPS
- CF card (4 GB/8/12/16 MB) +

- ATA adaptor

#### 64 GB Program storage area (for MAPPS-DNC operation function, for data back-up) <MAPPS>
- Files up to 10 MB in size can be edited

#### CNC operation using external memory (front USB port)

- * CF card 1 GB + ATA adaptor

* The information in this catalog is valid as of November 2018.

---

#### Reducible programs <in total>

<table>
<thead>
<tr>
<th>Part program storage length &lt;in total&gt;</th>
<th>Without expansion &lt;programs&gt;</th>
<th>Expansion &lt;programs&gt;</th>
<th>Expansion 2 &lt;programs&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 KB &lt;320 m (1,000 ft)&gt;</td>
<td>63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 KB &lt;320 m (1,000 ft)&gt;</td>
<td>25</td>
<td>500</td>
<td>1,000</td>
</tr>
<tr>
<td>1 MB &lt;2,560 m (8,400 ft)&gt;</td>
<td>1,000</td>
<td>4,000</td>
<td>4,000</td>
</tr>
<tr>
<td>2 MB &lt;512 m (16,800 ft)&gt;</td>
<td>1,000</td>
<td>4,000</td>
<td>4,000</td>
</tr>
<tr>
<td>4 MB &lt;1,248 m (43,600 ft)&gt;</td>
<td>1,000</td>
<td>4,000</td>
<td>4,000</td>
</tr>
<tr>
<td>8 MB &lt;2,480 m (87,200 ft)&gt;</td>
<td>1,000</td>
<td>4,000</td>
<td>4,000</td>
</tr>
</tbody>
</table>

#### Items suitable for each numerical control unit

<table>
<thead>
<tr>
<th>Simultaneously controlled axes</th>
<th>4 axes</th>
<th>5 axes</th>
<th>6 axes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpolation functions</td>
<td>Nano smoothing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feed functions</td>
<td>All contour control I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program input</td>
<td>Tilting working plane command</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tool function/Tool offset function</td>
<td>Tool center point control</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-D cutter compensation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data input/output</td>
<td>Memory card for data server</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fast data server</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* CF card 1 GB + ATA adaptor

---

### Program input

- Program number: 4 digits
- 8 digits
- Absolute/incremental programming G90/G91
- Decimal point programming: Decimal point programming or electronic calculator type
- Diameter/radius programming
- Parameter selection
- Programmable data input G10
- Sub-program call
- up to 10 nestings
- Custom macro
- System common macro variables: #1 to #49, #50 to #549
- Rate machining cycled G80/G89
- F155 format
- Additional workspace coordinate systems: 48 sets
- Additional of optional block skip: Soft key type (2–9)
- Optional chamfer/center R
- Automatic feed override
- Circular cutting
- Coordinate system rotation
- 3-D coordinate conversion
- Programmable mirror image
- 3D graphic copy G72, G72, G72, G72, G72
- NURBS interpolation
- Includes Cs control contour and Normal direction control

- Spiral interpolation
- Graphic copy G72, G72, G72, G72, G72
- NURBS interpolation
- Includes Cs control contour and Normal direction control

- Scaling
- Linear interpolation
- Nonlinear interpolation
- Implicit interpolation
- Tool compensation G40, G41, G42, G43, G44, G45, G46, G47, G48, G49
- Tool offset data memory C/D/H code, radius, and length
- Tool length measurement
- Tool life management
- Additional number of tools to be controlled by the tool life management function: 1,024 sets

- Tool offset memory G: G61 code, geometry, tilt
- Tool length compensation: G43, G44, G49
- Cutter radius offset: G40 to G42
- Tool length measurement
- 2D tool compensation
- Additional number of tool offsets (the number of selectable tool offsets depends on the tool storage capacity)

- Tool function (T function): 8-digit T code
- Number of tool offsets: 64 sets (diameter + length: set, number of offsets indicates that diameter and length are displayed separately)

- Tool offset memory C: G61 code, geometry, tilt
- Tool length compensation: G43, G44, G49
- Cutter radius offset: G40 to G42
- Tool length measurement
- 2D tool compensation
- Additional number of tool offsets (the number of selectable tool offsets depends on the tool storage capacity)

- Tool function (T function): 8-digit T code
- Number of tool offsets: 64 sets (diameter + length: set, number of offsets indicates that diameter and length are displayed separately)

- Tool offset memory C: G61 code, geometry, tilt
- Tool length compensation: G43, G44, G49
- Cutter radius offset: G40 to G42
- Tool length measurement
- 2D tool compensation
- Additional number of tool offsets (the number of selectable tool offsets depends on the tool storage capacity)

- Tool function (T function): 8-digit T code
- Number of tool offsets: 64 sets (diameter + length: set, number of offsets indicates that diameter and length are displayed separately)

- Tool offset memory C: G61 code, geometry, tilt
- Tool length compensation: G43, G44, G49
- Cutter radius offset: G40 to G42
- Tool length measurement
- 2D tool compensation
- Additional number of tool offsets (the number of selectable tool offsets depends on the tool storage capacity)
## Machine specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>NH6300 DCG II</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Travel</strong></td>
<td></td>
</tr>
<tr>
<td>X-axis travel (longitudinal movement of saddle)</td>
<td>mm (in.)</td>
</tr>
<tr>
<td>Y-axis travel (vertical movement of spindle head)</td>
<td>1,050 (41.3)</td>
</tr>
<tr>
<td>Z-axis travel (cross movement of pallet)</td>
<td>900 (35.4)</td>
</tr>
<tr>
<td>Distance from pallet surface to spindle center</td>
<td>900 (35.4)</td>
</tr>
<tr>
<td>Distance from pallet center to spindle gauge plane</td>
<td>100 (3.9)</td>
</tr>
<tr>
<td>Distance from floor surface to pallet surface</td>
<td>1,250 (49.2)</td>
</tr>
<tr>
<td>Pallet working surface</td>
<td>630 × 630 (24.8 × 24.8)</td>
</tr>
<tr>
<td>Pallet loading capacity</td>
<td>1,500 (3,300)</td>
</tr>
<tr>
<td>Max. workpiece swing diameter</td>
<td>1,050 (41.3)</td>
</tr>
<tr>
<td>Max. workpiece height</td>
<td>1,300 (51.1)</td>
</tr>
<tr>
<td><strong>Pallet</strong></td>
<td></td>
</tr>
<tr>
<td>Pallet surface configuration</td>
<td>M16 (ISO-13 URC) Tap: 24 Holes. Pitch 125 mm (5 in.)</td>
</tr>
<tr>
<td>Minimum pallet indexing angle</td>
<td></td>
</tr>
<tr>
<td>Pallet indexing time (including clamping and unclamping time)</td>
<td>s</td>
</tr>
<tr>
<td><strong>Spindle</strong></td>
<td></td>
</tr>
<tr>
<td>Max. spindle speed</td>
<td>min⁻¹</td>
</tr>
<tr>
<td>Number of spindle speed ranges</td>
<td>10,000 [10,000 &lt;chip output&gt;], [15,000] [8,000] [6,000]</td>
</tr>
<tr>
<td>Type of spindle taper hole</td>
<td>No. 50 (HSK-A100)</td>
</tr>
<tr>
<td>Spindle bearing inner diameter</td>
<td>mm (in.)</td>
</tr>
<tr>
<td>Rapid traverse rate</td>
<td>mm/min (ipm)</td>
</tr>
<tr>
<td>Max. feedrate</td>
<td>mm/min (ipm)</td>
</tr>
<tr>
<td>Max. rotational speed</td>
<td>min⁻¹</td>
</tr>
<tr>
<td>Jog feedrate</td>
<td>mm/min (ipm)</td>
</tr>
<tr>
<td><strong>ATC</strong></td>
<td></td>
</tr>
<tr>
<td>Tool storage capacity (including one tool at the spindle side)</td>
<td>s</td>
</tr>
<tr>
<td>Type of tool shank</td>
<td>BT50 [DIN650] [CAT50] [HSK-A100]</td>
</tr>
<tr>
<td>Type of retention knob</td>
<td>DMG MORI 90° type [45°(MAS-I)], 60°(MAS-II) [HSK-A100] [DIN]</td>
</tr>
<tr>
<td>Tool storage capacity</td>
<td>s</td>
</tr>
<tr>
<td>Max. tool diameter</td>
<td>mm (in.)</td>
</tr>
<tr>
<td>Max. tool mass</td>
<td>kg (lb.)</td>
</tr>
<tr>
<td>Max. spindle taper hole</td>
<td>No. 50 (HSK-A100)</td>
</tr>
<tr>
<td>Rapid traverse rate</td>
<td>X, Z: 50,000 (1,968.5) + 50,000 (1,968.5) [40,000 (1,574.8)] [6,000 min⁻¹]</td>
</tr>
<tr>
<td>Max. tool mass moment</td>
<td>N-m (ft-lbf)</td>
</tr>
<tr>
<td>Method of tool selection</td>
<td>Fixed address, shorter route access</td>
</tr>
<tr>
<td>Tool changing time</td>
<td>s</td>
</tr>
<tr>
<td>The time differences are caused by the different conditions (travel distances, etc) for each standard.</td>
<td></td>
</tr>
<tr>
<td>Tool-to-tool</td>
<td>1.7</td>
</tr>
<tr>
<td>Cut-to-cut (Chip-to-chip) &lt;chip-to-chip specifications&gt;</td>
<td>s</td>
</tr>
<tr>
<td>100 [120] [240] [330] [500] [600] [900] [900] [1,000] [1,500]</td>
<td>s</td>
</tr>
<tr>
<td>Spindle drive motor</td>
<td>kW (HP)</td>
</tr>
<tr>
<td>10,000 min⁻¹</td>
<td>40/30/25 (53.4/30.3/20.8) min/cont [30/25 (40/33.3) &lt;30 min/cont&gt;]</td>
</tr>
<tr>
<td>15,000 min⁻¹</td>
<td>30/25 (40/33.3) &lt;30 min/cont&gt;</td>
</tr>
<tr>
<td>8,000 min⁻¹</td>
<td>37/30 (50/40) &lt;30 min/cont&gt;</td>
</tr>
<tr>
<td>6,000 min⁻¹</td>
<td>55/45/37 (75/60/50) [25%ED 30 min/cont &gt;]</td>
</tr>
<tr>
<td>Feed motor</td>
<td>kW (HP)</td>
</tr>
<tr>
<td>X/Y/Z axes</td>
<td>4.5 × 2.5 × 2.5 (7.5/5.5 × 2.5 × 7.5/2.5)</td>
</tr>
<tr>
<td>B axis</td>
<td>kW (HP)</td>
</tr>
<tr>
<td>Coolant pump motor</td>
<td>kW (HP)</td>
</tr>
<tr>
<td>1,1 (1.5) &lt;spindle&gt; 1.1 (1.5) &lt;chip removal&gt; 2.2 (3) &lt;chip remover&gt;</td>
<td>s</td>
</tr>
<tr>
<td><strong>Motor</strong></td>
<td></td>
</tr>
<tr>
<td>Number of pallets</td>
<td>2</td>
</tr>
<tr>
<td>Method of pallet change</td>
<td>Turn-type</td>
</tr>
<tr>
<td>Pallet changing time (excluding clamping and unclamping time)</td>
<td>s</td>
</tr>
<tr>
<td>Spindle drive motor</td>
<td>kW (HP)</td>
</tr>
<tr>
<td>10,000 min⁻¹</td>
<td>40/30/25 (53.4/30.3/20.8) min/cont [30/25 (40/33.3) &lt;30 min/cont&gt;]</td>
</tr>
<tr>
<td>15,000 min⁻¹</td>
<td>30/25 (40/33.3) &lt;30 min/cont&gt;</td>
</tr>
<tr>
<td>8,000 min⁻¹</td>
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<tr>
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</tr>
<tr>
<td>Feed motor</td>
<td>kW (HP)</td>
</tr>
<tr>
<td>X/Y/Z axes</td>
<td>4.5 × 2.5 × 2.5 (7.5/5.5 × 2.5 × 7.5/2.5)</td>
</tr>
<tr>
<td>B axis</td>
<td>kW (HP)</td>
</tr>
<tr>
<td><strong>Power source &lt;standard&gt;</strong></td>
<td></td>
</tr>
<tr>
<td>Compressed air supply</td>
<td>MPa (psi), L/min (gpm)</td>
</tr>
<tr>
<td>0.5 (72.5), 600 (158.4) when the tool tip air blow is regularly used, air supply of more than 300 L/min (79.2 gpm) is separately required [ANR]</td>
<td></td>
</tr>
<tr>
<td><strong>Tank capacity</strong></td>
<td></td>
</tr>
<tr>
<td>Coolant tank capacity</td>
<td>L (gal.)</td>
</tr>
<tr>
<td>Machine height (from floor) (no tool specifications)</td>
<td>mm (in.)</td>
</tr>
<tr>
<td>Floor space (with depth) (no tool specifications)</td>
<td>3,414 (134.4)</td>
</tr>
<tr>
<td>Mass of machine (no tool specifications)</td>
<td>kg (lb.)</td>
</tr>
<tr>
<td>19,000 (41.800)</td>
<td></td>
</tr>
<tr>
<td><strong>Noise data</strong></td>
<td></td>
</tr>
<tr>
<td>A-weighted, time-average sound pressure level</td>
<td>dB</td>
</tr>
<tr>
<td>60 to 75 (Measurement uncertainty is 4 dB)</td>
<td></td>
</tr>
</tbody>
</table>

### Notes
- Option ISO: International Organization for Standardization JIS: Japanese Industrial Standard
- When equipped with the auto-coupler, time taken to shut off / supply hydraulic pressure to the fixture is not included.
- Max. spindle speed: depending on restrictions imposed by the workpiece clamping device, fixture and tool used, it may not be possible to rotate at the maximum spindle speed.
- Please use a two-face contact tool when cutting at higher than 10,000 min⁻¹.
- Max. tool diameter: the maximum tool diameter is limited to 255 mm (10.0 in.) or less when using the spindle at 10,000 min⁻¹ or higher.
- ANR: ANR refers to a standard atmospheric state; i.e., temperature at 20 °C (68 °F), absolute pressure at 101.3 kPa (14.7 psi) and relative humidity at 65%.
- Power sources, machine size: the actual values may differ from those specified in the catalogue, depending on the optional features and peripheral equipment.
- Compressed air supply: please be sure to supply clean compressed air: air pressure, 0.7 MPa (101.3 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.
- Machine size: please see the machine diagram on page 22 for a machine with an optional tool storage capacity.
- Noise data: the measurement was performed at the front of the machine with a maximum spindle speed of 15,000 min⁻¹. Please contact our sales representative for details.
- The information in this catalog is valid as of November 2018.
<Precautions for Machine Relocation>

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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 December 2018. 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.