NHM series
Heavy-Duty Horizontal Machining Center
The New Generation World-Class NHM series of Heavy-Duty Horizontal Machining Centers

The NHM series combines the heavy-duty cutting, unsurpassed machining capacity and productivity to meet your various production requirements. The optimally integrated structure of box guideways assures higher rigidity required for heavy-duty cutting of titanium. A variety of NHM series - NHM5000, NHM6300 and NHM8000 are available to produce workpieces of various shapes and sizes. Additionally servo-driven tool changing and pallet changing are designed to improve reliability and productivity by reducing idle time.
New Features

The NHM series offers the largest machining capacity and higher productivity by applying the latest design technologies.

1 Integrated structure

The optimally integrated structure has been applied to the design of machine frame with box guideways for all axes in order to raise the rigidity for heavy-duty cutting.

2 The largest machining capacity

meeting the best at global standard in every aspect with the integrated structure

3 Servo-driven tool changing and pallet changing

offer more reliability by simplifying parts and easy maintenance, and higher productivity by high-speed pallet changing.
Integrated Structure

The optimum integration and design of bed and column structure extend the travel range even under similar machine size to the previous models and improve rapid traverse by 125% from the previous models.

Highly rigid bed, made from top-grade cast iron, maintains high stability and everlasting durability of the machine

The NHM series bed is designed with using FEM analysis technology for the purpose of the high rigidity to support the moving units. NHM series structure based on bed with new M and W-shaped ribs ensures consistent heavy-duty cutting.

Static rigidity

The high-rigid structure of NHM series has raised the static rigidity up more than previous models through FEM analysis.

Dynamic stiffness

Dynamic analysis was used in simulations of actual cutting to improve dynamic stiffness and dampen vibration during design stage.
Extended box guideway

Extended cross-section of box guideway for all axes provides higher rigidity. With optimized dynamic rigidity of main sliding parts, the heavy-duty cutting has also been improved.

- **Section area the guideway**

  Previous model
  
  90 cm² (35.4 inch²)

  NHM 5000 / 6300 / 8000
  
  115 cm² (45.2 inch²) 28% ▲

New structure with dual wall

Designed to prevent any coolant leakage for easy maintenance.

- New structure for preventing leakage of coolant
Enhanced High Power Spindle

NHM series’ gear-driven spindle with high torque and power demonstrates superb performance in powerful cutting across a wide range of materials.

Improved spindle

The reliability of NHM series spindle is based on an improved gear train and bearings of upgraded design. These heavy-duty, 50 tapered spindles are supported by a row of permanently lubricated angular-contact bearings, precision class P4.

The spindle’s rigidity is improved by adapting larger bearings. The two-speed gear-driven spindle provides a broad spectrum of spindle speed for heavy-duty cutting with high torque and power.

Spindle variation

<table>
<thead>
<tr>
<th>Spindle variation</th>
<th>Max. spindle speed</th>
<th>Motor power</th>
<th>Max. spindle torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHM 5000</td>
<td>6000 r/min</td>
<td>15 / 25 kW (20.1 / 33.5 Hp)</td>
<td>1034 N·m (763.1 ft-lbf)</td>
</tr>
<tr>
<td></td>
<td>6000 r/min</td>
<td>22 / 35 kW (29.5 / 46.9 Hp)</td>
<td>1732 N·m (1278.2 ft-lbf)</td>
</tr>
<tr>
<td></td>
<td>6000 r/min</td>
<td>30 / 37 kW (40.2 / 49.6 Hp)</td>
<td>1991 N·m (1469.4 ft-lbf)</td>
</tr>
<tr>
<td></td>
<td>8000 r/min</td>
<td>22 / 35 kW (29.5 / 46.9 Hp)</td>
<td>1444 N·m (1065.7 ft-lbf)</td>
</tr>
<tr>
<td>NHM 6300 / 8000</td>
<td>6000 r/min</td>
<td>22 / 35 kW (29.5 / 46.9 Hp)</td>
<td>1732 N·m (1278.2 ft-lbf)</td>
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</table>
### Max. spindle torque

<table>
<thead>
<tr>
<th>Previous Model</th>
<th>NHM 5000</th>
<th>NHM 6300 / 8000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1034 N·m (763.1 ft-lbf)</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>813 N·m (600.0 ft-lbf)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Motor power

<table>
<thead>
<tr>
<th>Previous Model</th>
<th>NHM 5000</th>
<th>NHM 6300 / 8000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15 / 25 kW (20.1 / 33.5 Hp)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>11 / 15 kW (14.8 / 20.1 Hp)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Previous Model</th>
<th>NHM 5000</th>
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<tbody>
<tr>
<td></td>
<td>22 / 35 kW (29.5 / 46.9 Hp)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>59%</td>
<td></td>
</tr>
<tr>
<td>18.5 / 22 kW (24.8 / 29.5 Hp)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Highly efficient gear-driven transmission

Applying a gear-driven transmission provides higher torque to perform heavy-duty cutting of difficult-to-cut materials such as titanium.

### 2-Face locking tool system

The 2-face locking tool system offers longer tool life, higher power and more precise machining by the dual contact to both of the spindle surface and toolholder flange surface, as well as both the spindle taper and toolholder taper shank. This system is based on the most currently available standards of BT, DIN, CAT and HSK flange tooling.

- Higher rigidity
- Improved ATC repeatability, surface finish and higher precision
- Extending tool life

### HSK spindle

The HSK shank system with two restrained faces simultaneously couples the tapered portion of the shank and the flange end face. The hollow 1 / 10 taper changes flexibly while the flange end face fits tightly to the spindle nose.

### Improved thrusting force

<table>
<thead>
<tr>
<th>Previous model</th>
<th>NHM 5000</th>
<th>NHM 6300 / 8000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13800 N (3102.2 lbf)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>22%</td>
<td></td>
</tr>
<tr>
<td>11500 N (2585.2 lbf)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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<th>Previous model</th>
<th>NHM 6300 / 8000</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>18800 N (4226.2 lbf)</td>
</tr>
<tr>
<td></td>
<td>20%</td>
</tr>
<tr>
<td>16000 N (3596.8 lbf)</td>
<td></td>
</tr>
</tbody>
</table>
**Improved Machining Performance**

**Productivity**

Productivity of NHM 6300 is increased by 10% compared to the previous model.

- Automotive part: Carrier middle
- Material: Casting iron
- Number of tools used: 21 tools

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<tr>
<td><strong>Face mill</strong></td>
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<tr>
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<td>Machining rate</td>
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High Precision Equipment

NHM series machining accuracy can be further improved with high precision equipment.

Air semi-floating device for guideway

To reduce the friction of X-axis. Moreover, by balancing the center of gravity, the stability of the column can be maintained. It enables the machine to achieve high positioning accuracy and repeatability.

- Air consume
  30 L/min  (7.9 gal/min)

Minimum thermal displacement for high accuracy

Main units of the X, Y and Z axes are designed to minimize the thermal displacement by applying cooling jackets to ball screw nut and ball screw shaft cooling.

Spindle head cooling system

The refrigerated cooling system maintains a uniform spindle temperature required for more stable accuracy. Thermo sensors regulate the temperature of the oil circulating through oil jackets around the spindle, as well as the spindle bearings, gears, and motor flanges.

Air consume

09 L/min  (2.4 gal/min)

Applying rigid coupling and 3 row bearing supporting for all axes, guaranteeing high accuracy and rigidity for all axes system

Coolant chiller

Machine accuracy is stabilized by the coolant chiller that controls heat transfer from coolant to a workpiece, tool, fixture and table.

Linear scale feedback system

Linear scale feedback system is available to the X, Y, and Z axes to provide high positioning accuracy.
ATC and Tool Magazine with Reliability and Efficiency

Servo-driven ATC & tool magazine improves reliability and reduces tool change time. NHM series offers the bigger tool capacity.

Servo-driven ATC & tool magazine

NHM series servo-driven automatic tool changer allows within 2.0 seconds tool change time, thus ensuring higher productivity. Rapid magazine indexing and spindle positioning allows for high speed tool change and minimizes chip-to-chip time.

Machining with shorter tools

The Z-axis travel from the spindle gauge line to the center of pallet allows for high rigidity machining by using shorter tools.

Previous model

<table>
<thead>
<tr>
<th>Tool Length</th>
<th>NHM 5000 / 6300</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 mm</td>
<td>100 mm</td>
</tr>
<tr>
<td>(5.9 inch)</td>
<td>(3.9 inch)</td>
</tr>
<tr>
<td>200 mm</td>
<td>150 mm</td>
</tr>
<tr>
<td>(7.8 inch)</td>
<td>(5.9 inch)</td>
</tr>
</tbody>
</table>

Previous model

<table>
<thead>
<tr>
<th>Tool Length</th>
<th>NHM 8000</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 mm</td>
<td>150 mm</td>
</tr>
<tr>
<td>(7.8 inch)</td>
<td>(5.9 inch)</td>
</tr>
</tbody>
</table>
Standard tool capacity increased

The NHM Series has expanded tool storage capacity to 60 tools standard or 376 tools as option.

<table>
<thead>
<tr>
<th>Tool Type</th>
<th>Previous Model</th>
<th>NHM 5000 / 6300 / 8000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chain type magazine</td>
<td>40 ea</td>
<td>60 ea</td>
</tr>
<tr>
<td></td>
<td>60/90/120 ea</td>
<td>90/120/150 ea</td>
</tr>
<tr>
<td>Matrix type magazine</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>196/256/324 ea</td>
<td>196/256/316/376 ea</td>
</tr>
</tbody>
</table>

Operation panel for ATC & tool magazine

This panel enables the manual operations and data input of tool offset, displays the magazine status (in/out signals and issued alarms).
Improved Pallet & APC System

NHM series’ integrated structure can handle larger and heavier workpieces, providing maximum work capacity. The servo-driven APC is more stable and accurate. It improves durability by reducing defect rate.

Servo-driven APC

NHM series’ servo-driven automatic pallet changer offers high productivity by fast pallet changing. The improved APC’s pallet changing time is 200% faster compared to previous models. It offers high reliability and has a wide access space for the operator.

Pallet change time

<table>
<thead>
<tr>
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<th>NHM 5000</th>
<th>NHM 6300</th>
<th>NHM 8000</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 s</td>
<td>8.5 s</td>
<td>12 s</td>
<td>16 s</td>
</tr>
<tr>
<td>25 s</td>
<td></td>
<td>3.7 s</td>
<td>2.4 s</td>
</tr>
<tr>
<td>29 s</td>
<td></td>
<td></td>
<td>3.2 s</td>
</tr>
</tbody>
</table>

Minimum index degree for pallet (optimum: 0.001 deg)

Pallet indexing

Pallet indexing time (0° → 90°)

<table>
<thead>
<tr>
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<th>NHM 5000</th>
<th>NHM 6300</th>
<th>NHM 8000</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2 s</td>
<td>1.7 s</td>
<td>2.4 s</td>
<td>3.2 s</td>
</tr>
<tr>
<td>3.7 s</td>
<td></td>
<td>3.2 s</td>
<td></td>
</tr>
<tr>
<td>3.9 s</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Accurate pallet positioning

As machining rates become faster, there is an increased risk of contamination of the pallet location caused by ingress of chips. A high pressure air blast is used to clean the taper cone location surfaces during the pallet change cycle.

Fixture features

Hydraulic supply to fixtures remains permanently connected even during pallet changing and table indexing.

Fixture variation
(for hydraulic / pneumatic fixtures)

- Number of ports
  - A / B Line : 2, 4, 6, 8 Pairs (Including solenoid valve)
  - P / T Line : 2, 4, 6, 8 Pairs (Excluding solenoid valve)
- Hydraulic power unit for fixture
  - 2.2 kW / 7MPa
  - 3.7 kW / 15MPa
  - 5.5 kW / 21MPa
- Contact Doosan for more information

Max. workpiece size (D x H)

<table>
<thead>
<tr>
<th>Previous model</th>
<th>NHM 5000</th>
<th>850 x 1100 mm (33.4 x 43.3 inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>800 x 800 mm</td>
<td>55%</td>
<td>▲</td>
</tr>
<tr>
<td>(31.5 x 31.5 inch)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Previous model</th>
<th>NHM 6300</th>
<th>1050 x 1350 mm (41.3 x 53.1 inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 x 1000 mm</td>
<td>49%</td>
<td>▲</td>
</tr>
<tr>
<td>(39.3 x 39.3 inch)</td>
<td></td>
<td></td>
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<table>
<thead>
<tr>
<th>Previous model</th>
<th>NHM 8000</th>
<th>1450 x 1550 mm (57.0 x 61.0 inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1310 x 1200 mm</td>
<td>58%</td>
<td>▲</td>
</tr>
<tr>
<td>(51.5 x 47.2 inch)</td>
<td></td>
<td></td>
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</table>

Max. allowed weight (W)

<table>
<thead>
<tr>
<th>Previous model</th>
<th>NHM 8000</th>
<th>2000 kg (4409.2 lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1600 kg (3527.4 lb)</td>
<td>25%</td>
<td>▲</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
LPS is designed to provide the most optimized system for the customer. The customer can choose the most suitable package solution to their output and workspace. System expansion and changes in layout are easy. Two setup stations and 36 pallet storage racks can have up to three horizontal machining centers attached.

- Easily extendable up to 3 HMCs
- High efficiency of workpiece load space
- Quick installation
- Easy extension of system by modulized storage rack
- Auto-operation control by PC based OS
- Consistent with LPS provided by package
- Clear and simple status display
- Easy retrofitting to older HMC models

### System variation

#### LPS 500 (Model: NHM 5000)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of machines</td>
<td>ea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of pallets</td>
<td>ea</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Number of setup station</td>
<td>ea</td>
<td>1</td>
<td>1</td>
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</table>

#### LPS 630 (Model: NHM 6300)

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Number of machines</td>
<td>ea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of pallets</td>
<td>ea</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Number of setup station</td>
<td>ea</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

#### LPS 800 (Model: NHM 8000)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of machines</td>
<td>ea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of pallets</td>
<td>ea</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Number of setup station</td>
<td>ea</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Compared to a standard twin-pallet machine, the MPS offers a long period of unmanned operation and flexibility to produce many different workpieces using the work scheduling function. This system can be easily retrofitted to existing machines in the field.

7 MPS

9 MPS

System variation

<table>
<thead>
<tr>
<th>Model</th>
<th>NHM 5000</th>
<th>NHM 6300</th>
<th>NHM 8000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7-MPS</td>
<td>7-MPS</td>
<td>7-MPS</td>
</tr>
<tr>
<td>Number of pallets</td>
<td>ea</td>
<td>ea</td>
<td>ea</td>
</tr>
<tr>
<td>Length (L) mm (inch)</td>
<td>9490(373.6)</td>
<td>10140(399.2)</td>
<td>10560(415.7)</td>
</tr>
<tr>
<td>Width (W) mm (inch)</td>
<td>4220(166.1)</td>
<td>4430(174.4)</td>
<td>4780(188.1)</td>
</tr>
</tbody>
</table>

LPS standard management software

- Easy way to register basic information for flexible manufacturing
- Platform management software for prompt production and quantity change
- LPS Management solution for flexible manufacturing & prompt production and quantity change

System Configuration

DPMS (Doosan Production Management System)

DPMS is an operating system which controls and manages LPS. The main window gives a solution to correspond flexibly and quickly in case of output change.

DMPS (Doosan Multi Pallet Station)

DMPS is an operating system which controls and manages MPS. DMPS provides functions such as scheduled operation, input and adjust set-up data and so on.
Extended Equipment

Easy chip-removal structure

Separate chip conveyor and coolant tank provide for easy cleaning and maintenance. The completely enclosed NHM series guarantees to keep the chips and coolant inside of the machining area. Heavy-duty screw conveyors remove chips to the rear of the machine. This provides a cleaner working area for the operator.

Chip conveyor & coolant tank

Scaper type

Drum filter type

Hinge type

Previous model

620 L
(163.8 galon)

NHM 5000

825 L
(218.0 galon)

33 %

550 L
(145.3 galon)

Previous model

NHM 6300 / 8000

925 L
(244.4 galon)

68 %

- Coolant tank capacity is increased

Chip removal equipment

Flushing coolant (Slide cover, Splash guard)

Flood coolant

Flushing for the top of the spindle

Screw conveyor

Shower coolant

Coolant gun

(163.8 galon)

(145.3 galon)
Chip removal equipment

Through spindle coolant
Semi permanent TSC pump unit
MQL system

Eco-friendly equipment

Oil skimmer
Oil mist collector

Measurement

Auto. tool breakage detection I
Auto. tool breakage detection II
Automatic tool measurement

U-axis tool application

Maintenance

Centralized air service unit
A centralized air service unit located near the operation door for maintenance convenience.
Easy Operation

User-Friendly Operation Panel

Consolidate a variety of control panel into unified concept design to provide convenience of operation as user-friendly design.

Button for customized functions can be placed, for example fixture clamp / unclamp button, counter, timer or special optional buttons.

Partitions are placed between all buttons to prevent pushing an unintended button.

Swivelling operating console

The operator control panel is mounted on an adjustable pendant for easy view and accessibility during set-up and operation. The layout and location of the panel is ergonomically designed to be efficient and convenient for the operator.

Portable MPG

Application suitable for CNC machines by providing home mode, stop adjustment and interruption signal.

PCMCIA card

PCMCIA card is for downloading programs and is using the slot of the CNC Control. This offers added convenience to the user.

USB port

It’s easy to input or output machining program or CNC data by USB.

- NC program, NC parameter, tool data and ladder program
- Input / output on Easy Guide

In addition, it’s possible to back up and restore CNC data by USB memory in the market. DNC machining is not supported in USB memory but PCMCIA card can be always used as more of high capacity program memory than input-output memory.
Easy Operation Package

The Doosan Easy Operation Package has been specially customized to provide user-friendly functions and control the magazine for tools and pallets.

### Tool management

**Tool management I**
- 4 Digits tool numbers
- Display tool status
- Fastems MMS I / F (Tool Add / Remove Function)

**Tool management II**
- Use balluff tool ID
- Tool life for each tool
- Life warning
- Display status & offset

**Tool load monitor**
- Detect abnormal load
- Detect air cutting
- Auto teaching

**ATC / APC panel**
- ATC manual operation
- APC manual operation

### Help

**Easy NC parameter**
- Display user parameters with comment

**Calculator**
- Calculator functions
- Hole / arc / factor / angle

**M code list**
- M code list for HMC

**G code list**
- G code list for HMC

### Operation

**Operation rate**
- Operation rate for 3 workers
- Manager password keep
- Data for one month

**PMC switch**
- Optional toggle switch

**Multi-pallet station**
- MPS control software
- Easy operation
- Setting pallet schedule

**APC setting**
- 2 pallets APC setting
Spindle Power-Torque Diagram

Providing high productivity and heavy-duty cutting for a variety of machining operations

**NHM 5000**
Spindle: 6000 r/min
Motor: 15 / 25 kW (20.1 / 33.5 Hp)

**NHM 5000 opt., NHM 6300 / 8000 std**
Spindle: 6000 r/min
Motor: 22 / 35 kW (29.5 / 46.9 Hp)

**NHM 5000 / 6300 / 8000 opt.**
Spindle: 6000 r/min
Motor: 30 / 37 kW (40.2 / 49.6 Hp)

**NHM 5000 / 6300 / 8000 opt.**
Spindle: 8000 r/min
Motor: 22 / 35 kW (29.5 / 46.9 Hp)
External Dimensions

NHM 5000 / 6300 / 8000

In case of side type chip conveyor is available an optional features.

<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>O</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHM5000</td>
<td>3670</td>
<td>6830</td>
<td>560</td>
<td>5100</td>
<td>755</td>
<td>975</td>
<td>660</td>
<td>745</td>
<td>4675</td>
<td>5725</td>
<td>6535</td>
<td>7305</td>
<td>3330</td>
<td>2732</td>
<td>1270</td>
<td>1085</td>
</tr>
<tr>
<td></td>
<td>(144.5)</td>
<td>(268.9)</td>
<td>(22.0)</td>
<td>(200.8)</td>
<td>(29.7)</td>
<td>(38.4)</td>
<td>(26.0)</td>
<td>(29.3)</td>
<td>(184.1)</td>
<td>(225.4)</td>
<td>(257.3)</td>
<td>(287.6)</td>
<td>(131.1)</td>
<td>(107.6)</td>
<td>(50.0)</td>
<td>(42.7)</td>
</tr>
<tr>
<td>NHM6300</td>
<td>3930</td>
<td>7300</td>
<td>560</td>
<td>5570</td>
<td>755</td>
<td>975</td>
<td>660</td>
<td>745</td>
<td>5165</td>
<td>6195</td>
<td>6980</td>
<td>7745</td>
<td>3495</td>
<td>2929</td>
<td>1285</td>
<td>1085</td>
</tr>
<tr>
<td></td>
<td>(154.7)</td>
<td>(287.4)</td>
<td>(22.0)</td>
<td>(219.3)</td>
<td>(29.7)</td>
<td>(38.4)</td>
<td>(26.0)</td>
<td>(29.3)</td>
<td>(202.6)</td>
<td>(243.9)</td>
<td>(274.8)</td>
<td>(304.9)</td>
<td>(137.6)</td>
<td>(115.3)</td>
<td>(50.6)</td>
<td>(42.7)</td>
</tr>
<tr>
<td>NHM8000</td>
<td>4325</td>
<td>8265</td>
<td>560</td>
<td>6425</td>
<td>770</td>
<td>1070</td>
<td>660</td>
<td>745</td>
<td>6000</td>
<td>7050</td>
<td>7860</td>
<td>8630</td>
<td>3760</td>
<td>3193</td>
<td>1350</td>
<td>1085</td>
</tr>
<tr>
<td></td>
<td>(170.3)</td>
<td>(325.4)</td>
<td>(22.0)</td>
<td>(253.0)</td>
<td>(30.3)</td>
<td>(42.1)</td>
<td>(26.0)</td>
<td>(29.3)</td>
<td>(236.2)</td>
<td>(277.6)</td>
<td>(309.4)</td>
<td>(339.8)</td>
<td>(148.0)</td>
<td>(125.7)</td>
<td>(53.1)</td>
<td>(42.7)</td>
</tr>
</tbody>
</table>
Table Dimensions

NHM 5000

Unit: mm (inch)

NHM 6300

Unit: mm (inch)
Table Dimensions/Tool Dimensions

NHM 8000

Tool Shank

BT50

CAT50

DIN50

Boring bar Size

Unit: mm (inch)

Unit: mm (inch)

Unit: inch

Unit: inch
# Machine Specifications

## Features

<table>
<thead>
<tr>
<th>Features</th>
<th>Unit</th>
<th>NHM 5000</th>
<th>NHM 6300</th>
<th>NHM 8000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tool Travel (X/Y/Z)</strong></td>
<td>mm (inch)</td>
<td>800 / 700 / 850 (31.5 / 27.6 / 33.5)</td>
<td>1050 / 850 / 1000 (41.3 / 33.5 / 39.4)</td>
<td>1400 / 1050 / 1200 (55.1 / 41.3 / 47.2)</td>
</tr>
<tr>
<td><strong>Distance from spindle nose to table center</strong></td>
<td>mm (inch)</td>
<td>100 ~ 950 (3.9 ~ 3.7)</td>
<td>100 ~ 1100 (3.9 ~ 4.3)</td>
<td>150 ~ 1350 (5.9 ~ 53.1)</td>
</tr>
<tr>
<td><strong>Distance from spindle center to pallet top</strong></td>
<td>mm (inch)</td>
<td>75 ~ 775 (3.0 ~ 30.5)</td>
<td>75 ~ 925 (3.0 ~ 36.4)</td>
<td>75 ~ 1125 (3.0 ~ 44.3)</td>
</tr>
</tbody>
</table>

## Table

<table>
<thead>
<tr>
<th>Table</th>
<th>Type</th>
<th>Unit</th>
<th>NHM 5000</th>
<th>NHM 6300</th>
<th>NHM 8000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pallet Type</strong></td>
<td>-</td>
<td>Index (Rotary)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pallet Indexing Degree</strong></td>
<td>deg.</td>
<td>1 (0.001)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Max. Workpiece Size (ø x h)</strong></td>
<td>mm (inch)</td>
<td>850 x 1100 (33.5 x 43.3)</td>
<td>1050 x 1350 (41.3 x 53.1)</td>
<td>1450 x 1550 (57.1 x 61.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Pallet Size</strong></td>
<td>mm (inch)</td>
<td>500 x 500 (19.7 x 19.7)</td>
<td>630 x 630 (24.8 x 24.8)</td>
<td>800 x 800 (31.5 x 31.5)</td>
<td></td>
</tr>
</tbody>
</table>

## Spindle

<table>
<thead>
<tr>
<th>Spindle</th>
<th>Unit</th>
<th>NHM 5000</th>
<th>NHM 6300</th>
<th>NHM 8000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Max. Spindle Speed</strong></td>
<td>r/min</td>
<td>6000</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Spindle Taper</strong></td>
<td>ISO#50, 7/24 Taper</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Max. Spindle Power</strong></td>
<td>kW (Hp)</td>
<td>15 / 22 (20.1 / 29.5)</td>
<td>22 / 35 (29.5 / 46.9)</td>
<td></td>
</tr>
<tr>
<td><strong>Max. Spindle Torque</strong></td>
<td>N·m (ft·lb)</td>
<td>1034 (763)</td>
<td>1732 (1277)</td>
<td></td>
</tr>
<tr>
<td><strong>Rapid Traverse Rate (X/Y/Z)</strong></td>
<td>m/min (ipm)</td>
<td>30 / 30 / 30 (1181.1 / 1181.1 / 1181.1)</td>
<td>24 / 24 / 24 (944.9 / 944.9 / 944.9)</td>
<td></td>
</tr>
<tr>
<td><strong>Cutting Feedrate</strong></td>
<td>mm/min (ipm)</td>
<td>15000 (590.6)</td>
<td>12000 (472.4)</td>
<td></td>
</tr>
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</table>

## Automatic Pallet Changer

<table>
<thead>
<tr>
<th>Feature</th>
<th>NHM 5000</th>
<th>NHM 6300</th>
<th>NHM 8000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Pallet</strong></td>
<td>ea</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Change Type</strong></td>
<td>-</td>
<td>Rotary Shuttles</td>
<td></td>
</tr>
<tr>
<td><strong>Pallet Change Time</strong></td>
<td>s</td>
<td>8.5</td>
<td>12</td>
</tr>
<tr>
<td><strong>Driving Type of Pallet Change</strong></td>
<td>-</td>
<td>Servo Motor</td>
<td></td>
</tr>
</tbody>
</table>

## Automatic Tool Changer

<table>
<thead>
<tr>
<th>Feature</th>
<th>NHM 5000</th>
<th>NHM 6300</th>
<th>NHM 8000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Tool Shank</strong></td>
<td>-</td>
<td>BT / CAT / DIN, HSK</td>
<td></td>
</tr>
<tr>
<td><strong>Tool Storage Capacity</strong></td>
<td>Chain Type</td>
<td>ea</td>
<td>60 (90 / 120 / 150)</td>
</tr>
<tr>
<td><strong>Matrix Type</strong></td>
<td>ea</td>
<td>196 / 256 / 316 / 376</td>
<td></td>
</tr>
<tr>
<td><strong>Max. Tool Diameter</strong></td>
<td>mm (inch)</td>
<td>130 (5.1)</td>
<td>145 / 180 / 220</td>
</tr>
<tr>
<td><strong>Max. Tool Diameter Without Adj. Tools</strong></td>
<td>mm (inch)</td>
<td>320 (12.6)</td>
<td>340 / 400 / 460</td>
</tr>
<tr>
<td><strong>Max. Tool Length</strong></td>
<td>mm (inch)</td>
<td>530 (HSK: 600) / 20.9 (HSK: 23.6)</td>
<td>630 (HSK: 700) / 24.8 (HSK: 27.6)</td>
</tr>
<tr>
<td><strong>Max. Tool Weight</strong></td>
<td>kg (lb)</td>
<td>30 (66.1)</td>
<td>40 (88.2)</td>
</tr>
<tr>
<td><strong>Tool Change Method</strong></td>
<td>-</td>
<td>Servo Motor</td>
<td></td>
</tr>
<tr>
<td><strong>Tool Change Time (tool-to-tool)</strong></td>
<td>s</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>

## Tank Capacity

<table>
<thead>
<tr>
<th>Feature</th>
<th>NHM 5000</th>
<th>NHM 6300</th>
<th>NHM 8000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coolant Tank Capacity</strong></td>
<td>L (gallon)</td>
<td>825 (218.0)</td>
<td>925 (244.4)</td>
</tr>
</tbody>
</table>

## Machine Size

<table>
<thead>
<tr>
<th>Feature</th>
<th>NHM 5000</th>
<th>NHM 6300</th>
<th>NHM 8000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Machine Height</strong></td>
<td>mm (inch)</td>
<td>3330 / 131.1</td>
<td>3495 (137.6)</td>
</tr>
<tr>
<td><strong>Machine Dimension 60 Tool (Width x Length)</strong></td>
<td>mm (inch)</td>
<td>3670 / 6830 (144.5 x 268.9)</td>
<td>3930 / 7300 (154.7 x 287.4)</td>
</tr>
<tr>
<td><strong>Machine Weight</strong></td>
<td>kg (lb)</td>
<td>18500 (40784.9)</td>
<td>20500 (45194.1)</td>
</tr>
</tbody>
</table>

### Standard Feature

- Coolant tank
- Machine installation parts
- Oil skimmer
- Screw conveyor
- Signal tower (yellow / red / green)
- Spindle head cooling system
- Work light

### Optional Feature

- 5axis preparation
- Air gun
- Auto. workpiece measurement
- Automatic power off
- Automatic tool measurement
- Chip conveyor / Bucket
- Coolant chiller
- Coolant gun
- Hyd. fixture interface
- Linear scale
- Min. index degree for pallet
- Shower coolant
- Test bar
- Through spindle coolant
  (In case of water soluble)

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency (HZ)</th>
<th>Max. Pressure (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Middle Pressure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSC 1</td>
<td>50</td>
<td>1.9</td>
</tr>
<tr>
<td>TSC 8</td>
<td>60</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>High Pressure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSC 1</td>
<td>50</td>
<td>7.0</td>
</tr>
<tr>
<td>TSC 8</td>
<td>60</td>
<td>7.0</td>
</tr>
</tbody>
</table>

* *Matrix Magazine is option.
Note: { } are optional.
NC Unit Specifications

FANUC 31i

**Axes control**
- Controlled axes: 4 (X, Y, Z, B)
- Simultaneously controllable axes: 4 axes
- Backlash compensation
- Emergency stop / overtravel
- Follow up
- Least command increment: 0.001mm / 0.0001"
- Least input increment: 0.001mm / 0.0001"
- Machine lock: all axes / 2 axes
- Mirror image: Reverse axis movement
- Stored pitch error compensation
- Overtravel controlled by software

**Interpolation & Feed function**
- Positioning: G00
- Linear interpolation: G01
- Circular interpolation: G02, G03
- 2nd reference point return: G30
- Dwel: G64
- Exact stop check: G00, G61 (mode)
- Skip function: G31
- Reference point return: G27, G28
- 2nd reference point return: G30
- Feed per minute: mm/min / ipm
- Rapid traverse override: F0 (Fine feed), 25 / 50 / 100%
- Feedrate override: 10% increments: 0 - 200%
- Ovendize cancel: M48 / M69
- Manual handle feed / I (unit)
- Manual handle feedrate: 0.1 / 0.01 / 0.001mm
- Automatic acceleration / deceleration
- Helical interpolation
- DSQ1 (AICC II + Machine condition selection function): 200 block preview
- Thread cutting, synchronous cutting
- Program restart
- Automatic corner deceleration
- Feedrate clamp by circular deceleration
- Linear ACC/DEC before interpolation
- Linear ACC/DEC after interpolation
- Rapid traverse bell-shaped acceleration

**Spindle & M-code function**
- M-code function: M3 digits
- Spindle orientation
- Spindle serial output
- Spindle speed command: 55 digits
- Spindle speed override (10% increments): 10 - 150%
- Spindle output switching
- Retraction for rigid tapping
- Rapid tapping: G64, G74

**Tool function**
- Tool nose radius compensation: G40, G41, G42
- Number of tool offsets: 200 ea
- Tool length compensation: G43, G44, G49
- Tool number command: T5 digits
- Tool life management: Geometry / Wear and Length / Radius offset memory
- Tool offset memory C
- Tool length measurement

**Programming & Editing function**
- Absolute / Incremental programming: G90 / G91
- Auto. Coordinate system setting
- Background editing
- Canned cycle: G73, G74, G76, G80 - G89, G99
- Circular interpolation by radius programming
- Custom macro B
- Custom size: 2MB
- Addition of custom macro common variables
- Decimal point input
  - I / O interface: RS-232C
  - Inch / metric conversion: G20 / G21
- Label skip
- Local / Machine-coordinate system: G53 / G54
- Maximum commandable value: 999999.999mm / 999999.9999 inch
- No. of Registered programs: 500 ea
- Optional block skip
- Optional stop: M01
- Part program storage: 256kb (640m)
- Program number: 04-digits
- Program protect
- Program stop / end: M00 / M02, M30
- Programmable data input
- Tool offset and work offset are entered by G50, G51
- Sub program
  - Up to 10 nesting
- Tape code
  - ISO / EIA: Automatic discrimination
- Work coordinate system: G54 - G59

**Others function** (Operation, Setting & Display, etc.)
- Alarm display
- Alarm history display
- Clock function
- Cycle start / Feed hold
- Display of PMC alarm message
  - Message display when PMC alarm occurred
- Dry run
- Ethernet function (Embedded)
- Graphic display
  - Tool path drawing
  - Help function
  - Loadmeter display
  - MDI / DISPLAY unit
  - 10.4” color LCD, Keyboard for data input, soft-keys
  - Memory card interface
  - Operation functions
  - Tape / Memory / MDI / Manual
  - Operation history display
- Program restart
- Run hour and part number display
- Search function
  - Sequence NO. / Program NO.
- Self - diagnostic function
- Sensor setting screen
- Single block
- External data input
- Multi language display

**Optional specifications**
- 3-dimensional coordinate conversion
- 3-dimensional tool compensation
- 3rd / 4th reference return
- Addition of tool pairs for tool life management: 1024 pairs
- Additional controlled axes: max. 12 axes per 1path
- Additional work coordinate system: 5G41.PC / 300 (750 pairs)
- Part Program Storage: 512kb / 3MB / 8MB / 16MB / 32MB
- DSQ2: (AICC II + Machine condition selection function + Data server + 1GB)
- DSQ3: (AICC II + High speed processing + Machine condition selection function + Data server + 1GB)
- Automatic corner override: G62
- Chopping function: G81.1
- Cylindrical interpolation: G90.1
- Dynamic graphic display
- Machining profile drawing
- Interpolation type pitch error compensation
- EZ Guide i (Doosan Infracore Conversational Programming Solution) with 10.4” Color TFT

Note: { } are optional.
### NC Unit Specifications

**SIEMENS 840D SL NCU710.2**

#### Axes control
- **Controlled axes**: 4 axes (X, Y, Z, B)
- **Simultaneously controllable axes**: Max. 5 axes
- **Backlash compensation**
- **Emergency stop / Overtravel**
- **Follow up**
- **Least command increment**: 0.001mm (inch) / 0.001°
- **Least input increment**: 0.001mm (inch) / 0.001°
- **Machine lock (PRT)**: all axes
- **Minor image**
- **Pitch error compensation**: Pitch error offset compensation for each axis
- **Overtravel controlled by software**

#### Interpolation & Feed function
- **Positioning**: G00
- **Linear Interpolation**: G01
- **Circular interpolation**: G02, G03
- **Reference point select (1st ~ 4th)**: G75 F = 1, 2, 3, 4 (*G28, *G30)
- **Dwell**: G04
- **Exists stop check**: G09, G60 (*G61)
- **Feedrate override**: M05, M06 (*G63)
- **Feedsate override**: OVR, OVRAP, OVRB
- **Manual handle feed (1 unit)**
- **Automatic acceleration / deceleration**

#### Spindle & M-code function
- **M-code function**: M 3 digits
- **Spindle orientation**
- **Spindle speed command**: 5 S digits
- **Spindle speed override (%)**: 50 ~ 120%
- **Spindle output switching**
- **Rapid tapping**: G33, G332

#### Tool function
- **Tool nose radius compensation**: G40, G41, G42
- **Number of tool offsets**: 600 ea
- **Tool length compensation**
- **Toolnumber command**: T3 digits
- **Tool life management**: Geometry / Wear and Length / Radius offset memory
- **Tool length measurement**: Manual 64 (Auto. opt.)

#### Programming & Editing function
- **Absolute / Incremental programming**: G90 / G91
- **Auto. Coordinate system setting**
- **Background editing**
- **Dual editor**
- **Canned cycle**: Drilling cycles, Milling cycles, Contour Milling cycles
- **Circular interpolation by radius programming**
- **Decimal point input**
- **I/O Interface**: RS-232C, USB
- **Inch / metric conversion**: G70 / G71
- **Label skip**
- **Local / Machine coordinate system**
- **Automatic corner override**: *G62
- **Maximum commandable value**: ±999999.999mm (999999.9999 inch)
- **No. of Registered programs**: 500 ea
- **Optional block skip**: 8 ea
- **Optional stop**: M01
- **Part program storage size**: Max. 3 MB

#### Programmable data input
- **Program name**: 24 characters
- **Program protect**
- **Program stop / end**: M00 / M02, M30
- **Programmable data input**
- **Sub-program**: Up to 15 nesting
- **Tape code**: Punched tape, Binary format
- **Work coordinate system**: G54~G59, G605~G619
- **Shopmill**

#### Others function (Operation, Setting & Display, etc.)
- **Alarm display**
- **Alarm history display**
- **Clock function**
- **Cycle start / Feed hold**
- **Display of PLC alarm message**: Message display when PLC alarm occurred
- **Dry run**
- **Ethernet function**
- **Graphic display**: Tool path drawing
- **Help function**
- **Loadmeter display**
- **MDI / DISPLAY unit**: 10.4" color LCD, keyboard for data input, softkey
- **memory card interface**
- **Operation functions**: Auto / MDI / JOG
- **Repositioning**: REPOS, REPOS
- **Operation history save**
- **Program restart**: Sequence no. / Program no.
- **Run hour and part number display**
- **Self-diagnostic function**
- **Single block**
- **External data input**
- **Multi-language display**
- **Screen saver**
- **Dynamic graphic display (Simulation)**

#### Optional specifications
- **3-dimensional coordinate conversion**
- **3-dimensional tool compensation**
- **Additional controlled axes**: max. 6 axes per 1path (NCU710.2)
- **max. 31 axes per 1path (NCU720.2)**
- **max. 31 axes per 1path (NCU730.2)**
- **Chopping function**
- **Cylindrical Interpolation**

*: Be only available in ISO-mode (G291)