Mazak

# HCN-4000 NEO
# HCN-5000 NEO

[ High-speed, high-accuracy horizontal machining centers ]

# HCN-4000 NEO
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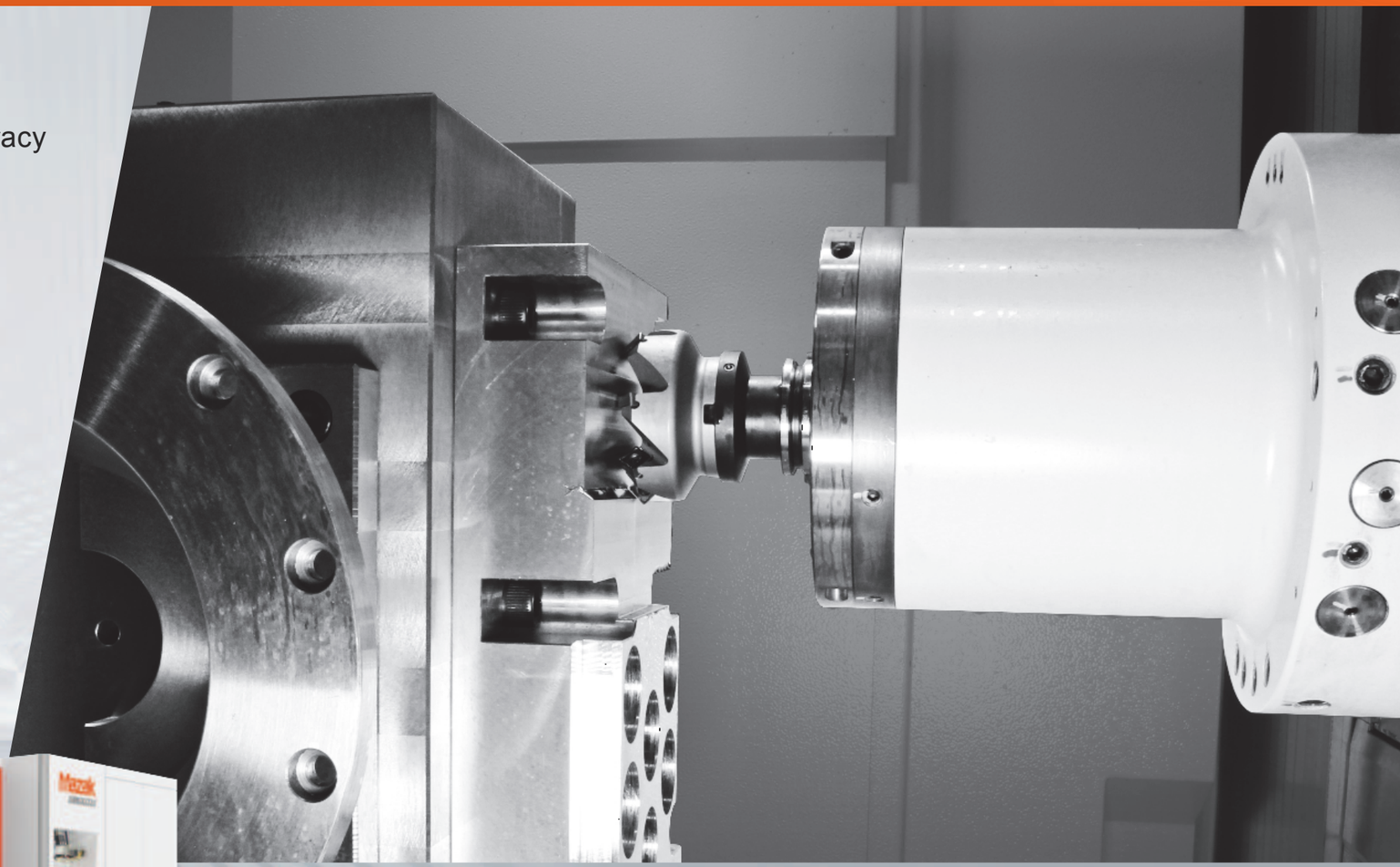
Exceptional machine construction and a wide variety of spindle specifications ensure higher productivity as well as higher accuracy

- Spindle specifications to meet a wide variety of machining requirements
- Standard NC rotary table reduces non-cut time to enhance productivity
- High-rigidity machine construction and compensation ensure high-accuracy machining over extended periods of time
- Wide variety of available automation equipment, including a modular PALLETECH flexible manufacturing system, MPP (MULTI PALLET POOL), 6-pallet changer and a robot system
- Improved environmental performance with energy-saving equipment



HCN-4000 NEO

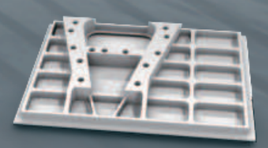


HCN-5000 NEO

## Applicable to various workpiece materials

Aerospace component
Rib (aluminum)

Aerospace component
Frame (aluminum alloy)



Construction machinery component
Mount (stainless)

Aerospace component
Cylinder block (cast iron)

# Higher Productivity

## Spindle specifications to meet a wide variety of machining requirements

The high-rigidity spindle can perform heavy-duty machining of challenging materials and steel, and high-speed machining of non-ferrous materials such as aluminum. High-speed and high-torque specifications are optionally available.

## Standard 18000 rpm

### Designed for versatile performance

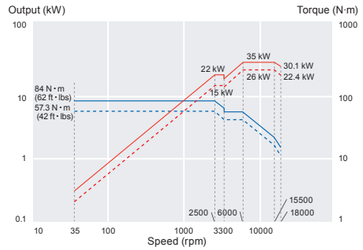
Integral spindle/motor accelerates to top speed in 1.8 seconds to perform high-efficiency machining of various workpieces.

No. 40, BBT-40, HSK-A63
Integral spindle/motor
Oil and air lubrication

| | |
|---|---|
| Speed | 18000 rpm |
| Output | 35 kW (47 HP) [40% ED (30-min.rating)] |
| | 26 kW (35 HP) [cont. rating] |
| Max. torque | 84 N•m (62 ft•lbs) [40% ED (30-min.rating)] |

Torque (N•m) 40% ED (30-min. rating)
Torque (N•m) Cont. rating
Output (kW) 40% ED (30-min. rating)
Output (kW) Cont. rating

Spindle output/torque diagram




## General machining 12000 rpm OPTION

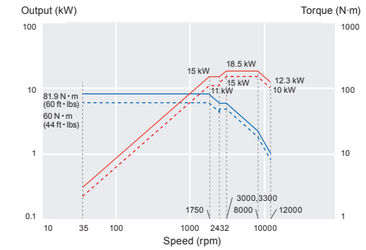
### For general-purpose machining of a variety of materials

Integral spindle/motor with No. 40 taper to machine a wide variety of workpiece materials.

No. 40, BBT-40, HSK-A63
Integral spindle/motor
Grease lubrication

| | |
|---|---|
| Speed | 12000 rpm |
| Output | 18.5 kW (25 HP) [40% ED (30-min.rating)] |
| | 15 kW (20 HP) [cont. rating] |
| Max. torque | 81.9 N•m (60 ft•lbs) [40% ED (30-min.rating)] |

Spindle output/torque diagram




## High torque 15000 rpm OPTION

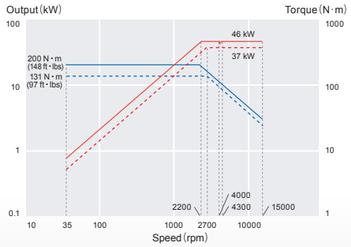
### Heavy-duty machining of difficult-to-cut materials, steel and cast iron

High-torque integral spindle/motor with No. 40 spindle taper designed for heavy-duty machining of steel. Integral spindle/motor with minimal vibration for fine surface finishes.

No. 40, BBT-40, HSK-A63
Integral spindle/motor
Oil and air lubrication

| | |
|---|---|
| Speed | 15000 rpm |
| Output | 46 kW (62 HP) [40% ED (30-min. rating) ] |
| | 37 kW (50 HP) [cont. rating] |
| Max. torque | 200 N•m (148 ft•lbs) [40% ED (30-min. rating) ] |

Spindle output/torque diagram




**High torque**
**15000 rpm spindle machining example**

**Machining conditions**
- Material: C45
- Cutting speed: 300 m/min (984 SFM)
- Feed per tooth: 0.25 mm (0.01")
- Depth of cut: 5.5 mm (0.22")
- ø80 mm (ø3.15") facemill (6 teeth)
- Spindle speed: 1194 rpm
- Cutting width: 60 mm (2.36")

**ø80 mm (ø3.15") facemill**

| Spindle speed | Feedrate | Cutting width | Depth of cut | Material removal rate |
|---|---|---|---|---|
| 1194 rpm | 1.5 (0.06")/rev | 60 mm (2.36") | 5.5 mm (0.22") | 591 cm³ (36 in.³)/min |

## High speed, high output 20000 rpm OPTION

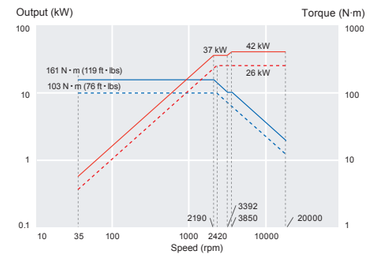
### High speed machining with small diameter tool as well as machining of aluminum

High-speed, high-output integral spindle/motor can perform high speed machining with small diameter tool.

No. 40, BBT-40, HSK-A63
Integral spindle/motor
Oil and air lubrication

| | |
|---|---|
| Speed | 20000 rpm |
| Output | 42 kW (56 HP) [40% ED (30-min. rating) ] |
| | 26 kW (35 HP) [cont. rating] |
| Max. torque | 161 N•m (119 ft•lbs) [40% ED (30-min. rating) ] |

Spindle output/torque diagram




**High speed, high output**
**20000 rpm spindle machining example**

**Machining conditions**
- Material: aluminum (A5052)
- Cutting speed: 3000 m/min (9842 SFM)
- Feed per tooth: 0.25 mm (0.01")
- Depth of cut: 5 mm (0.20")
- ø80 mm (ø3.15") facemill (5 teeth)
- Spindle speed: 11943 rpm
- Cutting width: 60 mm (2.36")

**ø80 mm (ø3.15") facemill**

| Spindle speed | Feedrate | Cutting width | Depth of cut | Material removal rate |
|---|---|---|---|---|
| 11943 rpm | 1.25 (0.05")/rev | 60 mm (2.36") | 5 mm (0.20") | 4479 cm³ (273 in.³)/min |

## High speed 25000 rpm OPTION

### High-speed machining of precision aerospace components, die-cast components

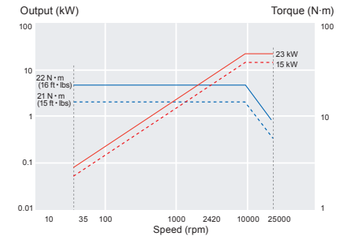
Because the spindle unit is combined with the high-output, high-speed motor, the integral spindle/motor structure enables high acceleration to ensure high-speed machining for a wide range of workpieces.

Note: Coolant through spindle is not available.

HSK-A63
Integral spindle/motor
Oil and air lubrication

| | |
|---|---|
| Speed | 25000 rpm |
| Output | 23 kW (31 HP) [40% ED (30-min.rating)] |
| | 15 kW (20 HP) [cont. rating] |
| Max. torque | 22 N•m (16 ft•lbs) [40% ED (30-min.rating)] |

Spindle output/torque diagram



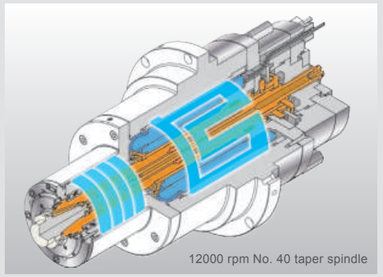

## Spindle

### Integral spindle/motor

The integral spindle/motor design minimizes vibration during high-speed operation to ensure exceptional surface finishes and maximize tool life.

### Spindle temperature control

For high-accuracy machining, temperature-controlled cooling oil circulates around the spindle bearings and headstock to minimize any thermal change to the spindle.



12000 rpm No. 40 taper spindle

# Higher Productivity

## Wide variety of tables available

0.0001° × 3600000 NC rotary table is standard equipment. DDM rotary table is an available option.

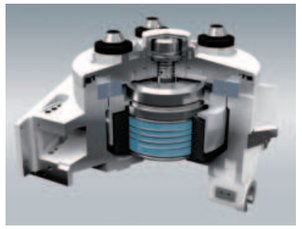
### 0.0001° × 3600000 NC rotary table

The NC rotary table uses a backlash-free rotary gear cam to ensure high accuracy as well as long service life.

| | HCN-4000 NEO | HCN-5000 NEO |
|---|---|---|
| **Index increment** | 0.0001° × 3600000 | 0.0001° × 3600000 |
| **Clamping torque** | 2450 N•m (1807 ft•lbs) | 4740 N•m (3496 ft•lbs) |
| **Table rotation speed** | 50 rpm | 50 rpm |
| **Contouring torque (cont. rating)** | 490 N•m (361 ft•lbs) | 490 N•m (361 ft•lbs) |
| **Indexing time (90°)** | 1.0 sec. | 1.2 sec. (standard)/<br>1.3 sec. (optional 700 kg (1543 lbs) load capacity) |

### DDM rotary table OPTION

For efficient high-speed operation, direct transmission of driving power to the rotary table axis eliminates power transmission components such as the worm shaft and the worm gear.



**Inertia Auto Tuning**

Supports inertia adjustment on the screen

- Generate estimated programs
- Visualize estimated results
- Adjust programs

### SMOOTH MACHINING CONFIGURATION

Adjust machining features including cycle time, finished surface and machining shape with slider switches on the display to match material requirements and machining methods. This is especially effective for complex workpiece contours defined in small program increments. Newly added "2X-R" function reduces rough machining time (standard equipment).

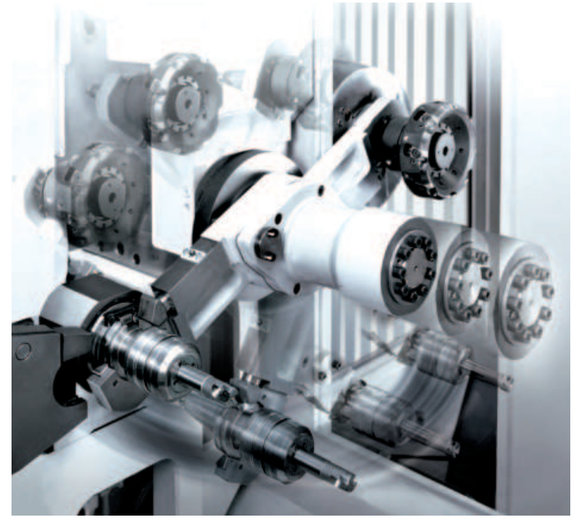

## Tool magazine range to meet variety machining requirements

The simple, reliable cam-driven automatic tool changer performs fast tool changes over extended periods of operation.

■ **Max. tool diameter** — 4000 NEO: **420 mm** (16.54")
5000 NEO: **510 mm** (20.08")

■ **Max. moment** — **5.9 N•m** (4 ft•lbs)

■ **Tool change time** — 4000 NEO: Min. **2.4** sec.
5000 NEO: Min. **2.6** sec.



### Available tool magazine specifications

**Drum-type tool magazine**

Drum-type tool magazine with high-speed tool index positions tools at an angle to store long tools in a reduced machine width.

**Chain-type tool magazine** OPTION

Chain-type tool magazine for high-mix, low-volume production, with random shortest path tool selection (fixed pocket assignment).

**TOOL HIVE** OPTION

Store a large number of tools in a small space. To reduce tool setup time, edit operations and tool data on the TOOL HIVE TERMINAL control panel.

●: Standard ○: Option -: N/A

| Tool storage capacity | 40 | 60 | 80 | 120 | 160 | 240 | 348 |
|---|---|---|---|---|---|---|---|
| Drum-type tool magazine | ● | ○ | - | - | - | - | - |
| Chain-type tool magazine OPTION | - | - | ○ | ○ | ○ | - | - |
| TOOL HIVE OPTION | - | - | - | - | - | ○ | ○ |

### Tool ID

For networked machines, Tool ID allows for automatic input and update of tool data into the CNC. It eliminates tool-loading and data-entry mistakes to reduce setup time.

# Higher Accuracy

## High positioning accuracy

### 3 times better than ISO standard

Unit: µm (inch)

| Bidirectional positioning accuracy | X axis | Y axis | Z axis |
|---|---|---|---|
| ISO | 25 µm (0.000984") | 25 µm (0.000984") | 25 µm (0.000984") |
| Tolerance | 9 µm (0.000354") | 9 µm (0.000354") | 9 µm (0.000354") |
| Results | 2.8 µm (0.00011") | 2.3 µm (0.000091") | 2.4 µm (0.000094") |

| Unidirectional positioning repeatability | X axis | Y axis | Z axis |
|---|---|---|---|
| ISO | 8 µm (0.000315") | 8 µm (0.000315") | 8 µm (0.000315") |
| Tolerance | 3 µm (0.000118") | 3 µm (0.000118") | 3 µm (0.000118") |
| Results | 0.6 µm (0.000024") | 1 µm (0.000039") | 0.9 µm (0.000035") |

Note: The inspection is conducted according to ISO 230 and ISO 10791 on a recommended foundation with room temperature controlled to 22°C±1°C after the machine has reached operating temperature. Sample results for reference only.

## Continuous inverted boring accuracy

### Test results

Perform continuous machining from a cold start for stable high accuracy. Special tools and compensation with touch sensor are not required for improved productivity.

| | |
|---|---|
| Concentricity (max.) | 11.6 µm (0.00046") |

Note: The inspection is conducted on a recommended foundation with room temperature controlled to 22°C±0.5°C after machine has reached operating temperature. Example results for reference only.

## X, Y, Z-axis ball screw core cooling

Temperature-controlled cooling oil circulates through the ball screw cores to ensure stable machining accuracy over extended periods of high-speed operation.

## Heat displacement control

### Ai Thermal Shield

New algorithms automatically determine and apply compensation according to temperature changes to ensure even higher machining accuracy.


## Tool measurement

### Tool length measurement and tool breakage detection

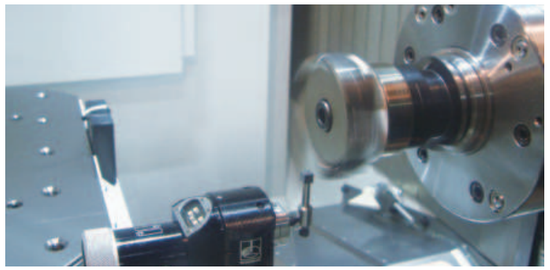
Tool length is measured and registered in CNC system automatically. Tool breakage can be detected during automatic operation.

### NC4 high-accuracy laser tool measurement system OPTION

Designed for tool-length measurement and tool-breakage detection with small-diameter tools. Non-contact NC4 measures tool length and diameter with laser at production speeds for stable machining accuracy.

### OTS 3D touch trigger tool setter OPTION

OTS performs tool length and diameter measurement and detects tool breakage. Tool diameter can be measured down to ø1 mm (ø0.04"). Compact design with optical signal transmission mounts/dismounts OTS without limiting machine movement to ensure easy operation.



## Coordinate value/workpiece measurement

### SMOOTH OMM (on machine measurement software) OPTION

Move the touch probe manually to a measurement point and create a measurement program after the point is registered. Automatically update work coordinates and tool compensation using measurement results, and measure geometric tolerances of workpiece features.


Note: The user must prepare the touch probe and reference sphere for on-machine measurement. Additional purchases may be necessary depending on the customer environment. For further details, please contact your nearest Mazak office.

### SMOOTH Set and Inspect (on-machine measurement software) OPTION

Make inspection programs easily. Automatically update work coordinates and tool compensation using measurement results.


Note: The user must prepare the touch probe and reference sphere for on-machine measurement. Additional purchases may be necessary depending on the customer environment. For further details, please contact your nearest Mazak office.

### Mazak monitoring system B OPTION

Coordinate values automatically shift based on workpiece probing results from a touch sensor mounted in the machine spindle.

# High Rigidity

## High-rigidity machine construction for stable machining performance

### Table coupling

The table and pallet are clamped on 4 taper cones by 73.2 kN (16456 lbs) of force for stable heavy-duty machining.

### X-axis slanted design

The mounting surfaces of the X-axis linear guide rails are at different heights to ensure high rigidity for high-speed and high-accuracy positioning.




### Three-point leveling bed

Three-point leveling bed simplifies machine installation.

### High-speed acceleration/deceleration on X, Y, Z axis

| Rapid traverse rate | Maximum feedrate | Acceleration/deceleration |
|---|---|---|
| 60 m/min (2362 ipm) (X, Y, Z axes) | 60 m/min (2362 ipm) (X, Y, Z axes) | 1.0 G (X, Y, Z axes) |

### High-rigidity bed

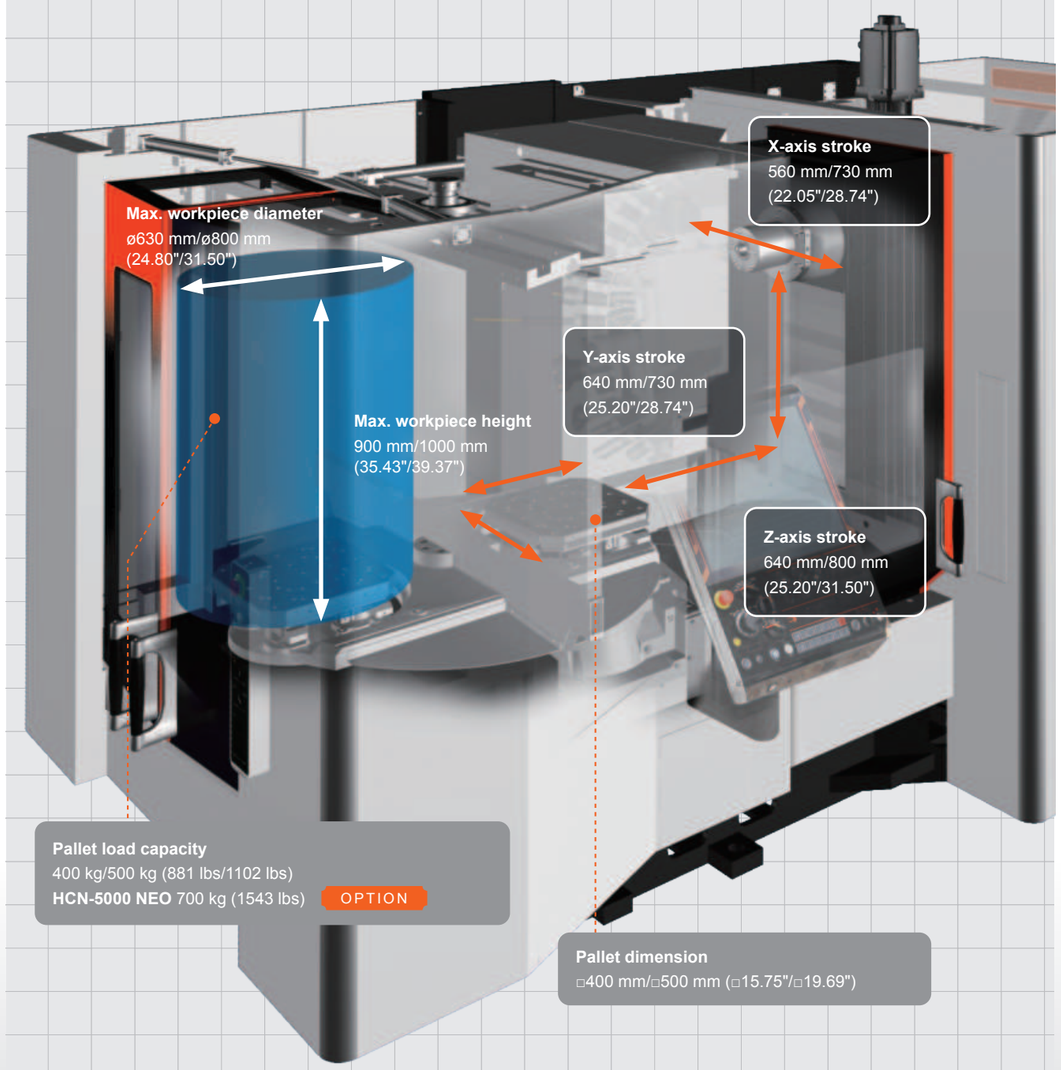
The high-rigidity bed is reinforced with strategically located ribs to ensure stability during X and Z-axis travel.

### Linear roller guides utilized on the X, Y and Z axes

The HCN series uses linear roller guides on the X, Y and Z axes for high accuracy and heavy-duty machining.

**# 40 taper spindle**
**□400mm (□15.75" )/□500mm (□19.69") pallet size**
Largest axis strokes and workpiece sizes for this class of horizontal machining center

**HCN-4000 NEO/HCN-5000 NEO mm (inch)**



# Automation

## PALLETECH SYSTEM

Integrate horizontal machining centers, 5-axis machining centers, multi-tasking machines and turning centers to create a system with unsurpassed versatility. After initial installation, the modular PALLETECH design enables shops to add more machines and increase pallet storage capacity in response to changing production requirements.

PALLETECH HIGH-RISE SYSTEM + Horizontal Machining Center

| | | Minimum | Maximum |
|---|---|---|---|
| Machine(s) | | 1 | 15 |
| Number of pallets | 1 level | 6 | 240 |
| | 2 levels | 12 | 240 |
| | 3 levels | 18 | 240 |
| Loading station(s) | | 1 | 8 |
| Loading robot | | 1 | 1 |

SMOOTH PMC

**FMS control/management software**

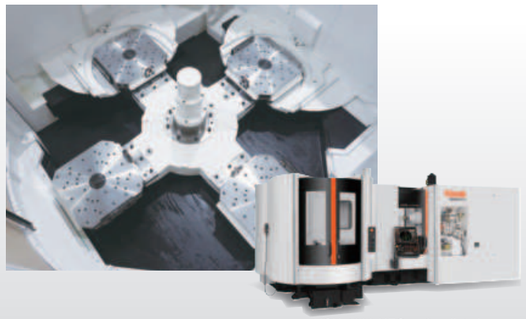
Meet sudden schedule changes with unsurpassed ease of system operation.

## Pallet changer

For higher productivity, set up the next workpiece during machining of the current workpiece.

### 6-pallet changer OPTION

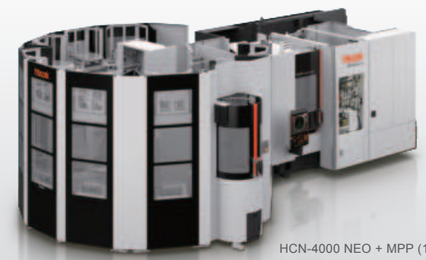
Set up multiple workpieces for automatic operation over extended periods of time.



HCN-4000 NEO + 6-pallet changer

### MPP (MULTI PALLET POOL) OPTION

Compact multi-pallet stocker system stores a maximum of 16 pallets in its pallet stocker.



HCN-4000 NEO + MPP (16 PC)

## Hydraulic fixtures for higher productivity

Optional hydraulic fixtures provide multiple ports with pneumatic seating detection to increase workpiece loading/unloading efficiency and improve productivity even further with workpiece transfer units such as robots.

### Hydraulic power supply A (supply from machine top) OPTION

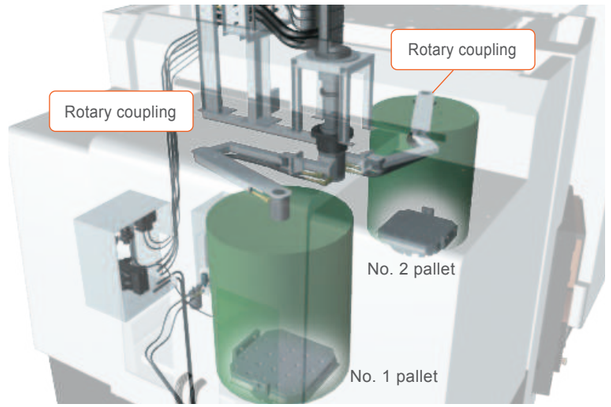
Hydraulic hoses supply hydraulic power from the top part of the pallet changer to fixtures mounted on each pallet. Arrange up to 12 ports. High-power hydraulic supply with 21 MPa (3046 psi) is available.

### Hydraulic power supply B (supply through pallet) OPTION

A leak-free coupling system supplies hydraulic power to the supply port on the bottom of the pallet. Unlike hydraulic power supply from machine top, this system requires no hydraulic hose or hydraulic rotary coupling. This minimizes interference for easy fixture design and workpiece machining. High-power hydraulic supply with 21 MPa (3046 psi) is available.

| | |
|---|---|
| Loading station | Hydraulic power supply: 8 ports |
| Inside machine | Hydraulic power supply: 4 ports |

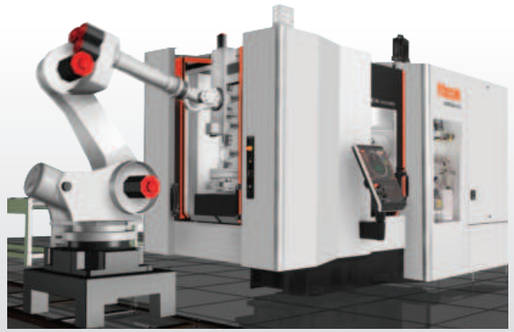
Hydraulic power supply from top




### Robot system

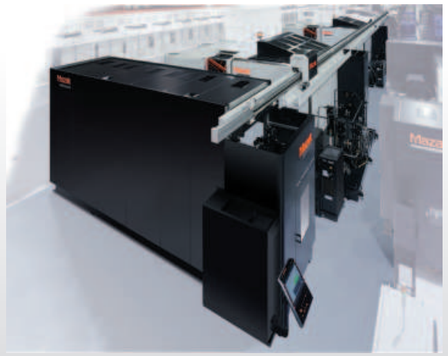
Interface for connecting an external robot for workpiece loading/unloading to/from automatic hydraulic fixtures is optionally available.

•Field network available



### Tool transport system

Automatic tool transportation minimizes number of stored tools in the machine magazine and enables sharing of special tools among machines.



# Ergonomics

## Ease of operation

### Design focus on ergonomics provides unsurpassed ease of operation


**1 Large window (2-pallet changer)**

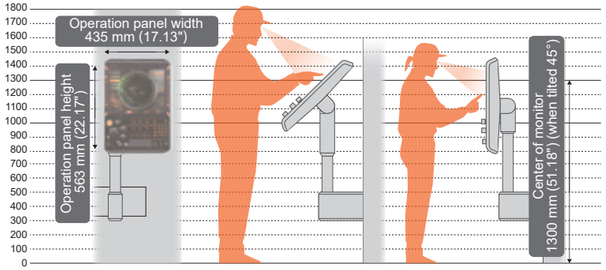
Large windows on the 2-pallet changer cover door give the operator a clear view of workpiece status in the setup station.

**2 Convenient workpiece loading/unloading**

Easily load/unload heavy workpieces and fixtures with an overhead crane.


**3 Adjustable CNC touch panel**

Tilt the operation touch panel to the optimum position for any operator's height to ensure ease of operation.



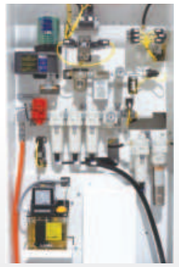

**4 Convenient setup**

Excellent accessibility provides convenient setup, with a short distance from ground to pallet surface. Index the setup station by 90° for easy workpiece loading/unloading and setup.



**5 Maintenance area**

Simplify machine maintenance with convenient central location of items that require frequent access, such as hydraulic and air pressure inlets, lubrication reservoirs and more.



**6 Large operation window**

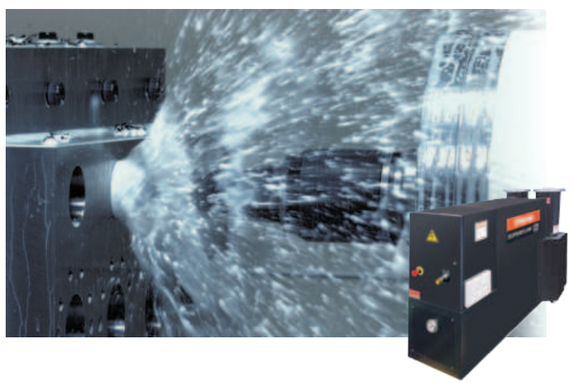
Operators can monitor workpiece machining easily.

## Coolant

### SUPERFLOW coolant system OPTION

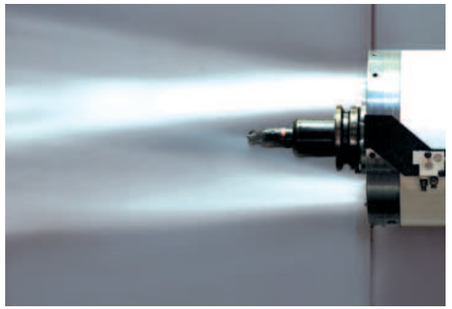
The SUPERFLOW coolant system supplies a maximum 7.0 MPa (1015 psi) coolant pressure to lower tool tip temperatures, improve coolant lubrication and chip disposal.

- Adjustable coolant pressure
- High performance cyclone filter with minimum maintenance requirements to reduce running cost



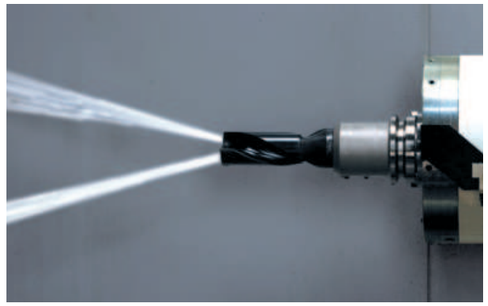
### Flood coolant

Coolant discharges from nozzles on the spindle housing to cool workpieces and remove chips.



### Coolant through spindle OPTION

Coolant feeds to the tool tip through passages in the tool. 0.8 MPa (116 psi) and 1.5 MPa (218 psi) pump pressure specifications are available as options.



### Quick coolant stop

Quick coolant stop prevents leakage of residual coolant in the tool magazine area during tool exchange to improve the working environment.

### Niagara coolant OPTION

Nozzles mounted on the machine top cover discharge a large volume of coolant to flush chips from the workpiece to conveyors on both sides of the table.

### Mist collector OPTION

To maintain a safe, clean working environment, the mist collector removes coolant mist generated during machining.

### Coolant temperature control OPTION

Maintains coolant temperature at room temperature to prevent thermal displacement that can affect machining accuracy.

# MAZATROL SMOOTH G

4-axis simultaneous CNC

## Unprecedented speed and precision

Latest hardware and software for unparalleled speed and precision.

## Smooth graphical user interface

MAZATROL Smooth graphical user interface for unsurpassed ease of operation. Touch screen operates like a smartphone/tablet.

## Ease of operation

Designed with advanced functions for unequalled ease of operation.

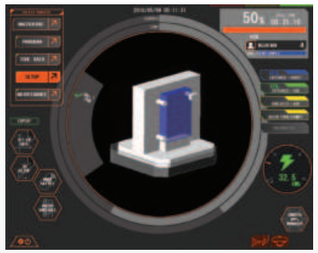
Shown with optional dual monitor

### Process home screens

Five home process screens display the appropriate data in an easy-to-understand manner. Touch icons in each process display to reach additional screens.

Programming

Tool data



Setup

Machining

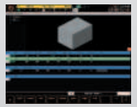
Maintenance

**Programming screen links tool path, workpiece shape and programming to reduce programming time.**

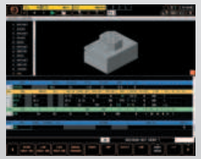
## QUICK MAZATROL

### Reduced time for conversational programming

MAZATROL program, unit list and 3D workpiece shape are linked to each other. After defining a machining unit in a MAZATROL program, the 3D shape is displayed immediately to check for any programming errors easily and quickly.



Touch a feature in the 3D model to move quickly to the corresponding section in the MAZATROL program



Real-time display of 3D model in the process list with updated programming

## 3D ASSIST

### Make a program directly from 3D CAD data

Import workpiece and coordinate data from 3D CAD data to a MAZATROL program with no coordinate value inputs. Reduce input errors and shten program checking time.

Import CAD model

Select shape

Automatic input to MAZATROL program

## Cutting adviser

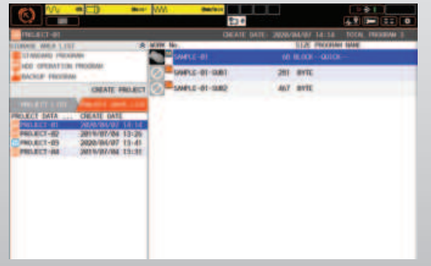
### Simulation, test cutting (machining analysis, optimization)

Cutting adviser optimizes machining conditions with MAZATROL SmoothG CNC and Smooth CAM Ai simulation (optional software).

## Project function

### Setup

Data required to execute machining is managed as project data, which can be exported to the machine for drastic reduction of data-input time. Additionally, optional Smooth Project Manager software can manage project data for an entire factory.



# Environmentally Friendly

Mazak Go GREEN

## Decarbonization-related technology for Mazak products

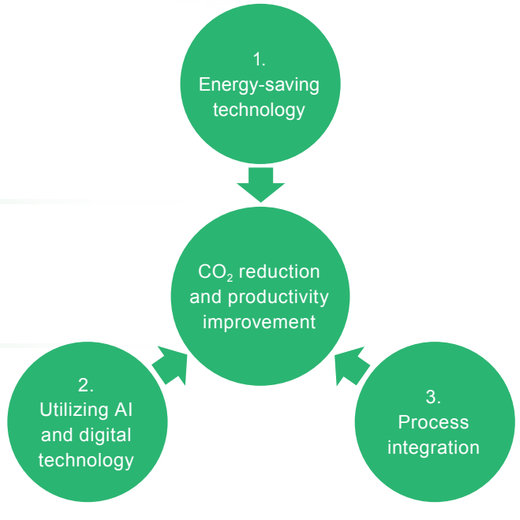
We are committed to developing technology for decarbonization through productivity improvements. Mazak promotes the following comprehensive three approaches to reduce our environmental impact and move toward achieving a sustainable society.

### Three approaches to reducing $CO_2$ emissions

**1 Energy-saving technology**
Equipped with energy-saving equipment and the visualization of emissions, saving resources and reducing waste

**2 Utilizing AI and digital technology**
Equipped with Ai Thermal Shield and Digital Twin technology to reduce setup times

**3 Process integration**
Development of HYBRID Multi-Tasking machines and automation systems




## Smooth Energy Dashboard to manage the power consumption of machine tools

OPTION

SMOOTH ENERGY DASHBOARD

The Smooth Energy Dashboard provides convenient visual monitoring of energy consumption, with real-time display of electrical power consumption and consumption history. This software analyzes the data corresponding to programs and tool data to suggest improvements in electrical power consumption, management and reduction.

### Energy consumption on process screen

- Total energy consumption (of workpiece in operation)
- Current energy consumption


### Convenient visual monitoring


## Significantly reduced $CO_2$ emissions during machining

Hydraulic unit uses an accumulator as well as an inverter-type chiller unit for considerable reduction of energy consumption during operation.

## Standard Machine Specifications

| | | HCN-4000 NEO | HCN-5000 NEO |
|---|---|---|---|
| Stroke | X axis (column right/left) | 560 mm (22.05") | 730 mm (28.74") |
| | Y axis (spindle up/down) | 640 mm (25.20") | 730 mm (28.74") |
| | Z axis (table back/forth) | 640 mm (25.20") | 800 mm (31.50") |
| | Distance from table top to spindle nose | 70 mm ~ 710 mm (2.76" ~ 27.95") | 70 mm ~ 870 mm (2.76" ~ 34.25") |
| | Distance from pallet to spindle center | 80 mm ~ 720 mm (3.15" ~ 28.35") | 100 mm ~ 830 mm (3.94" ~ 32.68") |
| Pallet | Pallet size | 400 mm × 400 mm (15.75" × 15.75") | 500 mm × 500 mm (19.69" × 19.69") |
| | Maximum workpiece dimensions | ø630 mm × 900 mm (ø24.80" × 35.43") | ø800 mm × 1000 mm (ø31.5" × 39.37") |
| | Pallet load capacity (evenly distributed) | 400 kg (881 lbs) | 500 kg (1102 lbs) |
| | Pallet top surface | M16 (5/8-11 UNC) tapped holes<br>25 places, 80 mm (3.15") pitch | M16 (5/8-11 UNC) tapped holes<br>25 places, 100 mm (3.94") pitch |
| Table | Minimum indexing angle increment | 0.0001° | |
| | Indexing time | 1.0 sec./90° | 1.2 sec./90° |
| Spindle | Maximum spindle speed | 18000 rpm | |
| | Spindle speed range | 2-step (electric) | |
| | Spindle taper | 7/24 taper No. 40 | |
| | Spindle bearing ID | ø70 mm (ø2.76") | |
| | Spindle acceleration | 1.8 sec. (0 → 18000 rpm) | |
| Feedrate | Rapid traverse rate (X, Y, Z axis)*1 | 60000 mm/min (2362 Ipm) | |
| | Cutting feedrate (X, Y, Z axis)*1 | 1 mm ~ 60000 mm/min (0.04 ~ 2362 Ipm) | |
| | Axis acceleration/deceleration | 1.0 G | |
| Automatic tool changer | Tool shank | No. 40 | |
| | Tool storage capacity | 40 | |
| | Maximum tool diameter | ø95 mm (ø3.74") | |
| | Maximum tool diameter with adjacent pockets empty | ø170 mm (ø6.69") | |
| | Maximum tool length (from gauge line) | 420 mm (16.54") | 510 mm (20.08") |
| | Maximum tool weight | 12 kg (26 lbs) (max. moment: 5.9 N·m (4 ft·lbs)) | |
| | Tool selection method | MAZATROL random memory (random pocket assignment) | |
| | Tool change time (chip-to-chip) | 2.4 sec. | 2.6 sec. |
| Automatic pallet changer | Number of pallets | 2 | |
| | Changing system | Rotary type | |
| | Pallet change time | 7.0 sec. | 8.0 sec. |
| Motors | Spindle motor (40% ED (30-min. rating)/cont. rating) | 18.5 kW/15 kW (25 HP/20 HP) | |
| | Flood coolant pump motor | 750 W/1100 W (50 Hz/60 Hz) | |
| Power requirement | Electrical power supply (40% ED (30-min. rating)/cont. rating) | 38.21 kVA/33.24 kVA (50Hz)<br>41.32 kVA/36.34 kVA (60Hz) | 38.64 kVA/33.64 kVA (50Hz)<br>41.74 kVA/36.76 kVA (60Hz) |
| | Air supply (pressure) | 0.5 MPa ~ 0.9 MPa (70 ~ 130 psi) | |
| | Air supply (flow rate) | 240 L/min (8.48 $ft^3$/min) | |
| Machine size | Machine height | 2713 mm (106.81") | 2813 mm (110.75") |
| | Machine width*2 | 2400 mm (94.49") | 2623 mm (103.27") |
| | Machine length*2 | 5429 mm (213.74") | 5744 mm (226.14") |
| | Machine weight *2 | 10770 kg (23743 lbs) | 12150 kg (26786 lbs) |

*1 Limited feedrate with continuous axis movement
*2 Including rear coolant tank and chip conveyor (ConSep2000)

## Standard and Optional Equipment

●: Standard ○: Option - : N/A

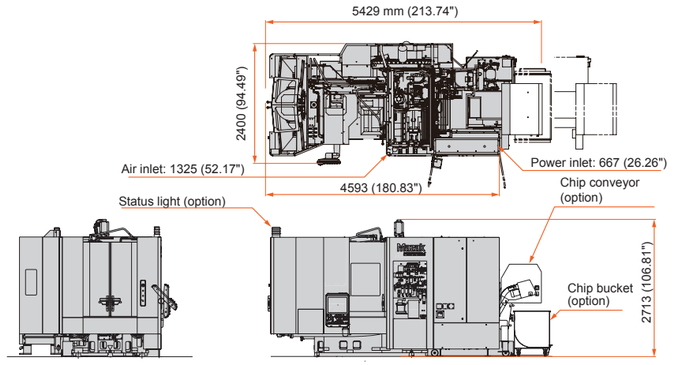
| | | HCN-4000 NEO | HCN-5000 NEO |
|---|---|---|---|
| Spindle | 18000 rpm (No. 40) | ● | ● |
| | 18000 rpm (BBT-40, HSK-A63) | ○ | ○ |
| | 12000 rpm (No. 40, BBT-40, HSK-A63) | ○ | ○ |
| | 15000 rpm (No. 40, BBT-40, HSK-A63) | ○ | ○ |
| | 20000 rpm (No. 40, BBT-40, HSK-A63) | ○ | ○ |
| | 25000 rpm (HSK-A63) | ○ | ○ |
| Tool magazine | 40-tool drum type magazine | ● | ● |
| | 60-tool drum type magazine | ○ | ○ |
| | Chain type tool magazine (80, 120, 160 tools) | ○ | ○ |
| | TOOL HIVE tool rack magazine (240, 348 tools) | ○ | ○ |
| Table | 0.0001°× 3600000 NC rotary table | ● | ● |
| | 0.0001°× 3600000 NC rotary table (with scale) | ○ | ○ |
| | 0.0001°× 3600000 DDM table | ○ | ○ |
| | Table load capacity 400 kg (882 lbs)*1 | ● | — |
| | Table load capacity 500 kg (1102 lbs)*1 | — | ● |
| | Table load capacity 700 kg (1543 lbs)*1 | — | ○ |
| Pallet | □400 mm (□15.75") tapped pallet without edge locator | ● | — |
| | □400 mm (□15.75") tapped pallet with edge locator | ○ | — |
| | □400 mm (□15.75") tapped pallet with edge locator and center bore | ○ | — |
| | □500 mm (□19.69" ) tapped pallet without edge locator | ○ | ● |
| | □500 mm (□19.69" ) tapped pallet with edge locator | ○ | ○ |
| | □500 mm (□19.69" ) tapped pallet with edge locator and center bore | ○ | ○ |
| | 500 mm × 400 mm (19.69" × 15.75") tapped pallet with edge locator | ○ | — |
| | 500 mm × 400 mm (19.69" × 15.75") tapped pallet with edge locator and center bore | ○ | — |
| | □630 mm (□24.80" ) tapped pallet with edge locator | — | ○ |
| | □630 mm (□24.80" ) tapped pallet with edge locator and center bore | — | ○ |
| | 630 mm × 500 mm (24.80" × 19.69") tapped pallet with edge locator | — | ○ |
| | 630 mm × 500 mm (24.80" × 19.69") tapped pallet with edge locator and center bore | — | ○ |
| Automation | 2-pallet changer | ● | ● |
| | 6-pallet changer/pallet changer management/hand held coolant nozzle | ○ | ○ |
| | Hydraulic power supply A (supply from machine top) 3 ports × 2 | ○ | ○ |
| | Hydraulic power supply A (supply from machine top) 12 ports × 2 | ○ | ○ |
| | Hydraulic power supply B (supply through pallet) loading station: 3 ports; inside the machine: 3 ports | ○ | ○ |
| | Hydraulic power supply B (supply through pallet) loading station: 8 ports; inside the machine: 4 ports | ○ | ○ |
| | Workpiece seating detection, ON/OFF switch (requires hydraulic fixture) | ○ | ○ |
| | Automatic loading station rotation (90°index, 4 positions) | ○ | ○ |
| | Automatic front door | ○ | ○ |
| | Robot interface | ○ | ○ |
| | PMC application | ○ | ○ |
| | Automatic power ON/OFF + warm-up operation | ● | ● |
| Setup | SmoothAi spindle | ○ | ○ |
| | Remote manual pulse generator (wired) | ● | ● |
| | Remote manual pulse generator (wireless) | ○ | ○ |
| | Magazine operation panel for tool ID | ● | ● |
| | Mazak monitoring system B (optical) OMP60 | ○ | ○ |
| | SMOOTH OMM (on machine measurement software) | ○ | ○ |
| | SMOOTH Set and Inspect (on machine measurement software) | ○ | ○ |
| | Automatic tool length measurement & tool breakage detection | ● | ● |
| | OTS tool length measurement | ○ | ○ |
| | RENISHAW NC 4 laser tool length measurement*2 | ○ | ○ |
| | Tool breakage detection (detection in ATC area/up to standard tool length) | ○ | ○ |
| Safety equipment | Tool runout detection (from chip contamination between spindle and tool holder) | ○ | ○ |
| | Operator door interlock | ● | ● |
| High accuracy | Scale feedback (X, Y, Z axis) | ○ | ○ |
| | Chiller unit | ● | ● |
| | Coolant temperature control | ○ | ○ |
| | Ball screw core cooling (X, Y, Z axis) | ● | ● |
| Coolant/chip disposal | Flood coolant | ● | ● |
| | Niagara coolant | ○ | ○ |
| | Coolant through spindle 0.8 MPa (116 psi) , 1.5 MPa (218 psi) | ○ | ○ |
| | SUPERFLOW coolant system 7.0 MPa (1015 psi) | ○ | ○ |
| | Secondary coolant filter for aluminum | ○ | ○ |
| | Hand held coolant nozzle (for workpiece washing on pallet changer) | ○ | ○ |
| | Oil skimmer (RB-200) | ○ | ○ |
| | Mist collector | ○ | ○ |
| | Magnetic separator for cast iron | ○ | ○ |
| | Preparation for chip conveyor (rear discharge, ConSep2000) | ● | ● |
| | Chip conveyor (rear discharge, ConSep2000) | ○ | ○ |
| | Chip conveyor (rear discharge, hinge) | ○ | ○ |
| Miscellaneous | Dual monitor for MAZATROL SmoothG CNC | ○ | ○ |

*1 Without pallet weight
*2 Not available with automatic tool length measurement

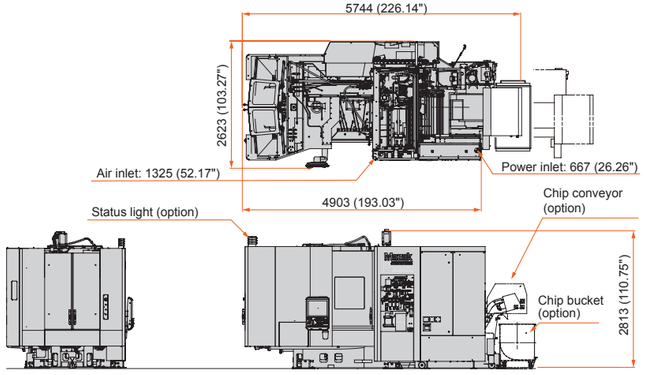
## Machine Dimensions

Unit: mm (inch)

### HCN-4000 NEO




### HCN-5000 NEO

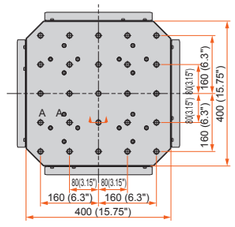



## Pallet Dimensions

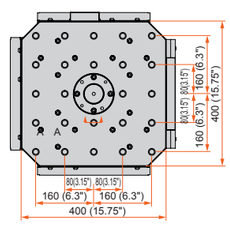
Unit: mm (inch)

### HCN-4000 NEO

400 mm × 400 mm (15.75" × 15.75") tapped pallet

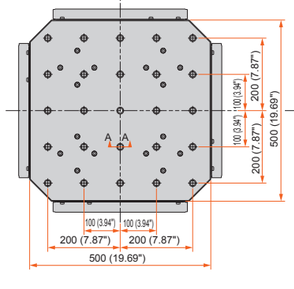



400 mm × 400 mm (15.75" × 15.75") tapped pallet with edge locator and center bore (option)

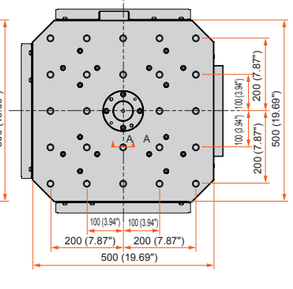



### HCN-5000 NEO

500 mm × 500 mm (19.69" × 19.69") tapped pallet




500 mm × 500 mm (19.69" × 19.69") tapped pallet with edge locator and center bore (option)






## MAZATROL SmoothG Specifications

| | MAZATROL | EIA |
|---|---|---|
| Number of controlled axes | Simultaneous 2 ~ 4 axes | |
| Minimum input increment | 0.0001 mm, 0.00001 inch, 0.0001 deg | |
| High-speed, high-precision control | Shape compensation, Smooth corner control, Rapid traverse overlap, Rotary axis shape compensation | Shape compensation, Smooth corner control, Rapid traverse overlap, Rotary axis shape compensation, High-speed machining mode, High-speed smoothing control |
| Interpolation | Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Synchronous tapping* | Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Spiral interpolation, Helical interpolation, Cylindrical interpolation*, Fine spline interpolation*, NURBS interpolation*, Polar coordinate interpolation*, Synchronous tapping* |
| Feedrate | Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Dwell (time/rotation), Rapid traverse override, Cutting feed override, G0 speed variable control, Feedrate limitation, Variable acceleration control, G0 slope constant* | Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Inverse time feed, Dwell (time/rotation), Rapid traverse override, Cutting feed override, G0 speed variable control, Feedrate limitation, Time constant changing for G1, Variable acceleration control, G0 slope constant* |
| Program registration | Number of programs: 256 (Standard)/960 (Max.), Program memory: 2MB, Program memory expansion: 8MB*, Program memory expansion: 32MB* | |
| Control display | Display: 19" touch panel, Resolution: SXGA | |
| Spindle functions | S code output, Spindle speed limitation, Spindle speed override, Spindle speed reaching detection, Multiple position orient*, Constant surface speed, Spindle speed command with decimal digits, Synchronized spindle control, Spindle speed range setting | |
| Tool functions | Number of tool offset: 4000, T code output for tool number, Tool life monitoring (time), Tool life monitoring (number of machined workpieces) | Number of tool offset: 4000, T code output for tool number, T code output for group number, Tool life monitoring (time), Tool life monitoring (number of machined workpieces) |
| Miscellaneous functions | M code output, Simultaneous output of multiple M codes | |
| Tool offset functions | Tool position offset, Tool length offset, Tool diameter/tool nose R offset, Tool wear offset | |
| Coordinate system | Machine coordinate system, Work coordinate system, Local coordinate system, Additional work coordinates (300 set) | |
| Machine functions | — | Tilted working plane**, Shaping function*, Dynamic compensation II*, Tool center point control*,**, Workpiece positioning error compensation*,** |
| Machine compensation | Backlash compensation, Pitch error compensation, Ai Thermal shield, Volumetric compensation* | |
| Protection functions | Emergency stop, Interlock, Pre-move stroke check, SAFETY SHIELD (manual mode), SAFETY SHIELD (automatic mode)*, VOICE ADVISER | |
| Automatic operation mode | Memory operation | Memory operation, Tape operation, MDI operation, Ethernet operation* |
| Automatic operation control | Optional stop, Dry run, Manual handle interruption, MDI interruption, TPS, Restart, Single process, Machine lock | Optional block skip, Optional stop, Dry run, Manual handle interruption, MDI interruption, TPS, Restart, Restart 2, Collation stop, Machine lock |
| Manual measuring functions | Tool length teach, Touch sensor coordinates measurement, Workpiece offset measurement, WPC coordinate measurement, Measurement on machine | Tool length teach, Tool offset teach, Touch sensor coordinates measurement, Workpiece offset measurement, Measurement on machine |
| Automatic measuring functions | WPC coordinate measurement, Automatic tool length measurement, Sensor calibration, Tool breakage detection, External tool breakage detection* | Automatic tool length measurement, Sensor calibration, Tool breakage detection, External tool breakage detection* |
| MDI measurement | Semi-automatic tool-length measurement, Full-automatic tool-length measurement, Coordinate measurement | |
| Peripheral network | PROFIBUS-DP*, Ethernet/IP*, CC-Link*, CC-Link IE Field Basic | |
| Interface | SD card interface, USB | |
| Ethernet | 10M/100M/1Gbps | |
| Security function | Security software* | |

* Option

** Simultaneous 4-axis control

HCN-4000 NEO
HCN-5000 NEO

Mazak

### Production Support Software Free Trial

The "Mazak Software" folder in the CNC control contains free trial versions of production support software.

Install these programs on your computer and try them.

| Production Support Software | Overview |
|---|---|
| SMOOTH Monitor AX | Monitor and analyze machine status |
| SMOOTH Scheduler | Create production schedules |
| SMOOTH Tool Management | Centralize tool data management |
| SMOOTH Link | View and edit tool data and programs on mobile devices |
| SMOOTH Project Manager | Manage program and setup information |
| SMOOTH CAM Ai | Efficient digital setup on an office PC |

For details of the production support software, please visit the Yamazaki Mazak website.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EA


HCN-4000 NEO, HCN-5000 NEO 22.08. 0 G 99J343922E0