Niigata’s reputation for superior machine rigidity and excellent cutting capability is widely accepted in the market place. All major components, such as the spindle, bed and column were redesigned, and new HN63E machine has been engineered to maximize metal cutting efficiency. Solid and well-balanced components satisfy wide variety of production needs.

- 33% increase in the column rigidity
- 21% increase in the bed thickness
- 59% increase in span of Z axis slide ways
- 12% increase in length of the column
- 23% increase in diameter of B axis slideway (NC table)

Note: These figures compare new HN63E machine to previous model.

Accuracy and heavy duty machining demand a sturdy massive frame to fully utilize its capability. Structural strength of each component has been maximized by thick-walled castings together with extensive use of ribs.
OUTSTANDING CHIP REMOVAL PROVES SUBSTANTIAL MACHINE RIGIDITY

HIGH TORQUE HEAVY DUTY SPINDLE

The spindle head stock is mono-cast (single piece) castings to achieve heavy and powerful milling capability and greater accuracy than bolt-together type spindle heads. This high performance spindle, power, and torque complements the extremely rigid machine frame.

The variety of high performance spindles are also available such as 8000min\(^{-1}\) (rpm) High Power Spec. 12000min\(^{-1}\) (rpm) High Speed Spec. to meet all kinds of the production needs.

GEARED SPINDLE HIGH STIFFNESS VERSION (Optional)

Niigata’s constant research and development produces newly engineered geared spindle for new HN63E to enhance its capability of hard metal machining. It employs wide-spaced, super precision tapered roller and angular contact bearings. New geared spindle high stiffness version is one of key criteria Niigata would like to offer "Ti PRO PACKAGE" to challenge "Difficult Material to CUT". See P14-P15 for more information.

EXAMPLE OF HN63E’S MACHINING PERFORMANCE

Milling

- Material: S45C
- Tool: Ø160-8T
- Cutting Volume: 570cm\(^3\)/min (34.8 inch\(^3\)/min)
- Cutting Depth: 9.0mm (0.35’’)
- Cutting Width: 120mm (4.72’’)
- Feedrate: 275mm/min (275 rpm)
- Surface Speed: 138m/min (453 SFM)

End Milling

- Material: S45C
- Tool: Ø63-4T
- Cutting Volume: 484cm\(^3\)/min (29.5 inch\(^3\)/min)
- Cutting Depth: 10mm (0.39’’)
- Cutting Width: 40mm (1.57’’)
- Feedrate: 1212mm/min (47.7 ipm)
- Surface Speed: 150m/min (492 SFM)

Drilling

- Material: S45C
- Tool: Ø60 drill
- Cutting Volume: 217cm\(^3\)/min (13.2 inch\(^3\)/min)
- Tool Length: 300mm (11.81’’)
- Spindle Load: 50%
- Spindle Speed: 769rpm (769 rpm)
- Surface Speed: 145m/min (476 SFM)

Niigata’s constant research and development produces high torque geared spindle for new HN63E to enhance its capability of hard metal machining. It employs wide-spaced, super precision tapered roller and angular contact bearings. New geared spindle high stiffness version is one of key criteria Niigata would like to offer "Ti PRO PACKAGE" to challenge "Difficult Material to CUT". See P14-P15 for more information.

Power generation as well as aircraft industries in the field of "Turbine Blades" machining is one of referenced supply industries. Niigata’s heavy duty box way style horizontal machining centers have been well accepted and have been improving the capability of the profitable machining together with these industries world wide.

Niigata HN-SERIES REFERENCED SUPPLY INDUSTRIES
**SUPERIOR CAPABILITY OF LOW FREQUENCY MACHINING**

"Low Frequency Machining" is one key criteria to achieve high efficient machining with heavy duty and hard metal material. As Niigata’s tradition, the guide ways, X, Y, Z, are a combination of hardened and ground ways and hand-scraped tucrite ways provides superior stability and vibration dampening characteristics as well as long life cycle. The guide ways inside the NC table (option) also employs the guideway built by hand-scraped finish process which might suffer heavy load of the machining and the cutting vibration.

Well balanced and well engineer machine components lead to a new generation of the cutting technology.

---

**STURDY PALLET CLAMPING SYSTEM WITH PRECISION PALLET POSITIONING**

Pallets are located with precision accuracy by (4) sets of cone-shaped tapered pins and bushings. The precision cone positioning system insures long-term accuracy and reliability. The pallet clamping system adopts a sturdy clamer plate that provides super sturdy of the pallet during heavy duty machining.

Jets of air discharge from the tapered cones when the pallet is changed. This assures proper clamping and helps to clean the bottom of the bushing and the tapered surfaces.

The large diameter curvic coupling provides extremely accurate positioning of the table (one degree table as standard).

---

**NIIGATA’S UNIQUE SPINDLE HEAD COOLING TECHNOLOGY**

Niigata’s unique cooling system minimizes thermal distortion during heavy load on the spindle.

A large volume of temperature controlled spindle cooling oil circulated around the spindle bearings and gear box. Thermo-couple temperature sensors are embedded into the machine base to control oil temperature to coordinate with temperature of the base of the machine.

---

**ACCURACY DATA**

<table>
<thead>
<tr>
<th>Position Accuracy (μm) (Boring)</th>
<th>Position Error (O) 3.1 (0.00012&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position Error (O) 3 (0.00012&quot;)</td>
<td></td>
</tr>
<tr>
<td>Position Error (O) 4.4 (0.00017&quot;)</td>
<td></td>
</tr>
<tr>
<td>Position Error (O) 6.8 (0.00027&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

Material: Aluminum

Hole to Hole: 200mm (7.9")

Hole Diameter: 45mm (1.8")

Variation from O

---

**Machining Performance of Milling**

Table Vibration Data: Y axis direction

-60%

Reduced table vibration.

Note: The data compares new HN63E to the previous model.
HN63E’s APC is capable of indexing every 90 degree with foot pedal, so that multiple work piece can easily mounted on each position.

**EXCELLENT ACCESSIBILITY TO THE WORK ZONE**

Large sliding operator door allows easy and safe access to the machining area. A slanted ceiling of the enclosure minimizes coolant dropping on the operator.

**PALLET CHANGER**

HN63E’s APC is capable of indexing every 90 degree with foot pedal, so that multiple work piece can easily mounted on each position.

**CENTRALIZED OPERATOR CONSOLE**

The control panel is strategically located at the most convenient position so that the operator can easily monitor the workpiece and machining operations, while utilizing the control functions. Hand held manual pulse generator is compact and light for operator-friendly handling.

**SAFE AND CONVENIENT SETUP OF TOOLING**

The tool magazine is on the side of the machine, outside the chip enclosure, and away from the cutting area. This design permits easy accessibility for tool inspection and replacement. Jog rotation of the tool magazine during automatic cycles facilitates tool inspection and changeover to maximize utilization. The load/ unload station is located at a comfortable height for operator safety and ease.

**EXCELLENT CHIP REMOVAL**

Roof type X axis cover and slanted Z axis cover make chips drop into large coil augers equipped on column both sides and X axis base. Those augers remove chips outside the machine.

**OIL–AIR LUBRICATION SYSTEM**

This system automatically assures constant lubrication to the spindle bearings to prevent premature failure (versus grease packed bearings which require periodic repacking).

**QUICK & EASY INSPECTION**

Machine maintenance items such as a lubrication control unit are all centrally located at the rear of the machine for quick and easy inspection.

**FAST AND RELIABLE TOOL CHANGE SYSTEM**

Tool magazine is driven by a servo motor for fast and reliable indexing. An electric servo motor positions the tool loader, ensuring fast, smooth motion during a tool change. The tool inspection and loading/unloading during automatic operation are standard features. The tool magazine and the changer are free standing and are covered with a full enclosure. The ATC system is field expandable.
MACHINE DIMENSIONS

HN63E General View

Coolant tank & chip conveyor for the rear discharge

Maximum Workpiece Envelope

Center of gravity

Unit: mm (inch)

HN63E
HEAVY DUTY MACHINING CENTER

Standard Pallet Top Surface

Spindle side at table 0°

Unit: mm (inch)

MACHINE DIMENSIONS

HN63E
HN63E

**EXAMPLE OF AUTO TOOL CHANGE SYSTEM (Chain Type)**

- Tool Change System: 62 Tools
- Tool Magazine System: 265 Tools (128+128)

**ADVANCED UNMANNED MONITORING SYSTEM**

- Niigata NM24 Monitor Ace
- Monitoring System

**MACHINE SPECIFICATIONS**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Metric</th>
<th>Inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOOL CHANGER (ATC) SYSTEM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AUTOMATIC TOOL CHANGER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tool magazine capacity (chain)</td>
<td>[88/128]</td>
<td>62</td>
</tr>
<tr>
<td>Tool magazine capacity (MATRIX)</td>
<td>[126/178/230]</td>
<td>126</td>
</tr>
<tr>
<td>Maximum tool mass (weight)</td>
<td>30 kg</td>
<td>66 lbs</td>
</tr>
<tr>
<td>Maximum boring dia.</td>
<td>110 mm</td>
<td>4.33</td>
</tr>
<tr>
<td>Spindle drive motor</td>
<td>AC 26 kW</td>
<td>35 HP</td>
</tr>
<tr>
<td>Spindle speed</td>
<td>20 ~ 6000 min⁻¹</td>
<td>20 ~ 6000 rpm</td>
</tr>
<tr>
<td>Spindle taper</td>
<td>No. 50</td>
<td>No. 50</td>
</tr>
<tr>
<td>Tool magazine capacity (chain)</td>
<td>62</td>
<td>62</td>
</tr>
<tr>
<td>Tool magazine capacity (MATRIX)</td>
<td>126/178/230</td>
<td>126/178/230</td>
</tr>
<tr>
<td>Maximum tool mass (weight)</td>
<td>50 kg</td>
<td>110 lbs</td>
</tr>
<tr>
<td>Number of pallets</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Positioning / full stroke X-Y-Z</td>
<td>± 0.004 mm</td>
<td>± 0.00016</td>
</tr>
<tr>
<td>Positioning with scales</td>
<td>± 0.003 mm</td>
<td>± 0.00012</td>
</tr>
<tr>
<td>Repeatability with scales</td>
<td>± 0.0015 mm</td>
<td>± 0.00006</td>
</tr>
<tr>
<td>Table index</td>
<td>± 0°</td>
<td>± 0°</td>
</tr>
</tbody>
</table>
| Machine working area | 2100 x 1200 x 1000 mm | 83 x 47 x 39"
| Machine space W x D x H | 3940 x 973 x 355 mm | 155.5 x 38.3 x 13.9"
| Machine column area | 3470 x 3470 mm | 137 x 137"
| Floodable surface area | 1330 x 1330 mm | 52.4 x 52.4"
| Power | 83 kVA | 83 kW |

**OPTIONAL FEATURES**

- Tool Shanks: BT 50 CT 50
- Tool Magazine Capacity (MATRIX) [126/178/230] [126/178/230]
- Tool Magazine Capacity (Chain) 62 [88/128] 62 [88/128]
- Maximum Milling Cutter Dia. | Ø 120 mm | Ø 4.7"
- Maximum Boring Dia. | Ø 410 mm | 16.1"
- Maximum Tool Mass (Weight) | 50 kg | 110 lbs
- Number of Pallets | 2 | 2
- Positioning / Full stroke X-Y-Z | ± 0.004 mm | ± 0.00016
- Positioning with Scales | ± 0.003 mm | ± 0.00012
- Repeatability with Scales | ± 0.0015 mm | ± 0.00006
- Table Index | ± 0° | ± 0°
- Machine Working Area | 2100 x 1200 x 1000 mm | 83 x 47 x 39"
- Machine Space W x D x H | 3940 x 973 x 355 mm | 155.5 x 38.3 x 13.9"
- Machine Column Area | 3470 x 3470 mm | 137 x 137"
- Floodable Surface Area | 1330 x 1330 mm | 52.4 x 52.4"
- Power | 83 kVA | 83 kW

**STANDARD EQUIPMENT**

- 6000min⁻¹ (rpm) 26kW (35HP) Two Geared Spindle
- Shuttle Type Twin Pallets Automatic Pallet Changer (APC)
- Idle Self Rotation on 2APC System
- Two Pallets with Tap and Holes as per Niigata Standard Configuration
- Automatic Tool Changer with 62 Tools Capacity (ATC)
- 1 Degree Indexing Table with Curvic Coupling
- Spindle Cooling Unit Controlled by a Thermal Sensor in the Machine Base
- Full Enclosure Type Splash and Chip Guarding System with Fluorescent Work Light (UDP)
- Front and Rear Spiral Chip Augers Built into the Machine Bed
- Rigid Tapping
- Manual Pulse Generator with the XYZ axes
- Spindle Speed/load Meter with Override on NC Control Display
- Flood Coolant System
- Coolant Tank
- Work Completion and Emergency Lamp
- Automatic Power Off Device
- Door Interlock (at 2APC, SPG, ATC and Electrical Cabinet)
- Self Diagnostic Function
- 2APC Program Number Search Function (with APC)
- Fanuc CNC System with 10.4" Color LCD
- One set of Machine and Fanuc Manuals (1 Printed, and 1 CD)
- Installation Parts

**OPTIONAL FEATURES**

- ATC Magazine (Field Expandable)
  - 88 Tools Magazine
  - 175 Tools Magazine (88 + 88 Tools)
  - 265 Tools Magazine (128 + 128 Tools)

- Matrix Style ATC System (178/230 Tools)
- 12000min⁻¹ (rpm) 26kW (35HP) Two Geared Spindle
- 6000min⁻¹ High Speed Spec. Spindle (26/22kW) (35/30HP)
- 6000min⁻¹ High Power Spec. Spindle (37/30kW) (50/30HP)
- 12000min⁻¹ High Speed Spec. Spindle (30/25kW) (40/30HP)

**OThERS**

- Scale Feedback
- Dandrea Programmable U-head
- Advanced Thermal Displacement Compensation
- Ti Pro Package
- Green Package

**WIDE RANGE OF OPTIONS TO ANSWER YOUR INDIVIDUAL MACHINING REQUIREMENTS**

- Niigata HS6 Module Design Concept Field Expandable ATC Magazine
- Niigata ICC System Controller
- Linear Pallet Magazine System with Tool Change System
- Lift-Up External Chip Conveyor
- Coolant System
- Tool Breakage Detector System LS-Z Type
- Table Probing System
- Spindle Probing System
- Advanced Unmanned Monitoring System: Chip Bucket with Caster and Handles
- Lift-Up External Conveyor with Filtration
- Lift-Up External Conveyor Hinge-Pan Type
- Shower Coolant System
- Coolant Low Level Sensing Device
- Oversized Coolant Tank
- Spindle Center Through Coolant Device
- Spindle Cooling Unit Controlled by a Thermal Sensor in the Machine Base
- Full Enclosure Type Splash and Chip Guarding System with Fluorescent Work Light (UDP)
- Front and Rear Spiral Chip Augers Built into the Machine Bed
- Rigid Tapping
- Manual Pulse Generator with the XYZ axes
- Spindle Speed/load Meter with Override on NC Control Display
- Flood Coolant System
- Coolant Tank
- Work Completion and Emergency Lamp
- Automatic Power Off Device
- Door Interlock (at 2APC, SPG, ATC and Electrical Cabinet)
- Self Diagnostic Function
- 2APC Program Number Search Function (with APC)
- Fanuc CNC System with 10.4" Color LCD
- One set of Machine and Fanuc Manuals (1 Printed, and 1 CD)
- Installation Parts

- Multiple Pallet Magazine
- Carousel Type APC System
- Optional Features
  - ATC Magazine (Field Expandable)
  - 88 Tools Magazine
  - 175 Tools Magazine (88 + 88 Tools)
  - 265 Tools Magazine (128 + 128 Tools)

- Matrix Style ATC System (178/230 Tools)
- 12000min⁻¹ (rpm) 26kW (35HP) Two Geared Spindle
- 6000min⁻¹ High Speed Spec. Spindle (26/22kW) (35/30HP)
- 6000min⁻¹ High Power Spec. Spindle (37/30kW) (50/30HP)
- 12000min⁻¹ High Speed Spec. Spindle (30/25kW) (40/30HP)

- OTHERS
  - Scale Feedback
  - Dandrea Programmable U-head
  - Advanced Thermal Displacement Compensation
  - Ti Pro Package
  - Green Package
Global industrial demand to machine hard metals has been drastically increased based upon historical material innovation for the production industries. Niigata has classified the materials as "Difficult material to cut" such as Titanium, Inconel and Hastelloy, etc. Niigata’s constant research and development achieved the solution for high efficient and profitable parts machining for these hard materials.

As a world leader of the horizontal machining center, NIIGATA is proud to declare that new HN63E Ti PRO Package will satisfy all requirements of your production needs with "Difficult material to cut".

EFFICIENT MACHINING OF "DIFFICULT MATERIAL TO CUT":

One of remarkable hard material on high demand is Titanium generally called 64Ti, 5553Ti, etc. Niigata has been focusing on Ti material as one of most demandable material in the market. Extensive know how through the test cut done by Niigata engineering team is ready to support your production challenge.

TITANIUM MACHINING:

Niigata’s tradition, true Heavy Duty BOX WAY style Horizontal Machining Center model HN-series are highly regarded worldwide as most capable hard metal cutting HMC in the industry. The fundamental of the machine design have been proved already for hard metal machining. Key development criteria for Ti PRO Package is to enhance and up-grade key machine components to achieve the following machine capabilities.

THE MACHINE DESIGN CRITERIA:

1. Low frequency machining
2. Superior rigidity and stiffness of the machine
3. Greater axes thrust
4. High torque geared spindle with the interface with tool
5. Longevity of the tool life