TRUE HEAVY DUTY HARD METAL CUTTING HORIZONTAL MACHINING CENTER
WORLD CLASS PRODUCTIVITY — NEW NIIGATA MODEL HN63E

NEWLY ENGINEERED MACHINE RIGIDITY

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)

FULL RIB CONSTRUCTION MAXIMIZES RIGIDITY

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

<table>
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<tr>
<th>POWER</th>
<th>26 kW (35 HP)</th>
</tr>
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<tbody>
<tr>
<td>TORQUE</td>
<td>901 Nm (665 ft.lbs)</td>
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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.

POWERFUL GEARED SPINDLE

Full 26kW (35HP) cuts are achieved through an advanced two(2) range head stock. With only three(3) rotating components, maximum power is transmitted simply and efficiently to the cutting tool.

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

END MILLING

<table>
<thead>
<tr>
<th>Material</th>
<th>S45C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool</td>
<td>ø63-4T</td>
</tr>
<tr>
<td>Cutting Volume</td>
<td>484cm³/ min (29.5 inch³/min)</td>
</tr>
<tr>
<td>Cutting Depth</td>
<td>10mm (0.39”)</td>
</tr>
<tr>
<td>Cutting Width</td>
<td>40mm (1.57”)</td>
</tr>
<tr>
<td>Feedrate</td>
<td>1212mm/min (47.7 ipm)</td>
</tr>
<tr>
<td>Spindle Speed</td>
<td>275min⁻¹ (275 rpm)</td>
</tr>
<tr>
<td>Surface Speed</td>
<td>150m/min (492 SFM)</td>
</tr>
</tbody>
</table>

DRILLING

<table>
<thead>
<tr>
<th>Material</th>
<th>S45C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool</td>
<td>ø60 drill</td>
</tr>
<tr>
<td>Cutting Volume</td>
<td>217cm³/ min (13.2 inch³/min)</td>
</tr>
<tr>
<td>Tool Length</td>
<td>300mm (11.81”)</td>
</tr>
<tr>
<td>Spindle Load</td>
<td>50%</td>
</tr>
<tr>
<td>Spindle Speed</td>
<td>769mm⁻¹ (769 rpm)</td>
</tr>
<tr>
<td>Surface Speed</td>
<td>145m/min (476 SFM)</td>
</tr>
</tbody>
</table>

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’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.
DESIGNED AND BUILT FOR FINE PRECISION ACCURACY

Craftsmanship - Hand Made Finish Process

SUPERIOR CAPABILITY OF LOW FREQUENCY MACHINING

Table Vibration Data: Y axis direction

-60% Reduced table vibration.

Note: The data compares new HN63E to the previous model.

"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 turcite 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 clamper plate that provides super sturdiness of the pallet during heavy duty machining. Jests 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

Circular Interpolation (End Milling)

Roundness (Tolerance) 0.010mm (0.00039’’)
(Actual Record) 0.0035mm (0.00014’’)
Material: A5052 (Alminium)
Processing Dia: ф218 {8.58’’}
V = 300m/min {984 SFM}
F = 1194mm/min {47 ipm}
t = 0.2mm {0.008’’}

Position Accuracy (μm) (Boring)

1  Position Error (O) 3.1 (0.00012’’)
2  Position Error (O) 3 (0.00012’’)
3  Position Error (O) 4.4 (0.00017’’)
4  Position Error (O) 6.8 (0.00027’’)

Material: Aluminum
Hole to Hole: 200mm (7.9’’)
Hole Diameter: 45mm (1.8’’)
Variation from O
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.

**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.

**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.

**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.

**OPERATOR FRIENDLINESS & EASE OF MAINTENANCE**

**HIGH RELIABILITY AND EASE OF MAINTENANCE**

**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.

**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).

**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, insuring 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

Standard Pallet Top Surface

Maximum Workpiece Envelope

Unit: mm (inch)
**WIDE RANGE OF OPTIONS TO ANSWER YOUR INDIVIDUAL MACHINING REQUIREMENTS**

**FIELD EXPANDABLE ATC MAGAZINE**
- Carousel Type APC System
- Multiple Pallet Magazine
- Niigata ICC System Controller

**OPTIONAL FEATURES**
- Linear Pallet Magazine System with Niigata ICC System Controller
- Lift-Up External Chip Conveyor
- 88 Tools (62 Tools + 26 Tools)
- 128 Tools (88 Tools + 40 Tools)

**MACHINE SPECIFICATIONS**

**HNG63E SPECIFICATIONS**

**ITEM**
- **TRAVEL:**
  - X axis travel travel: 1080 mm (42.5")
  - Y axis vertical head travel: 930 mm (36.6")
  - Z axis column travel: 1630 mm (64.2")
- **WORLD-WIDE Accurate Workpiece Pallet System**
  - Lincoln Pallet Magazine System
  - Eight Tool Pallet System with 2 Tool Pallet System
  - Spindle nose to table center line: 200 ~ 1030 mm (7.9 ~ 40.6")
  - Spindle taper: No.50 R8-50
- **FEEDRATE**
  - Rapid traverse X axis: 30 m/min (1181 ipm)
  - Rapid traverse Y axis: 30 m/min (1181 ipm)
  - Z axis: 30 m/min (1181 ipm)
- **AUTOMATIC PALLET CHANGER (APC) SYSTEM**
  - Tool magazine capacity (chain): 62 (30/25kW) {40/34HP}
  - Tool magazine capacity (MATRIX): [126/178/230] [126/178/230]
  - Automatic Tool Changer with 62 Tools
  - Two Pallets with Tap and Holes as per Niigata Standard Configuration
  - Automatic Tool Changer with 62 Tools
- **TOOL CHANGING FUNCTION**
  - Chip Bucket with Caster and Handles
  - Lift-Up External Conveyor Hinge-Pan Type
  - Automatic Tool Changer with 62 Tools
- **COOLANT SYSTEM**
  - Spindle, Spindle Head, and Spindle Motor
  - Flood Coolant System
  - Spindle, Spindle Head, and Spindle Motor
  - Spindle, Spindle Head, and Spindle Motor
  - Flood Coolant System
- **SPOOL HEAD**
  - Big-Plus Spindle
  - HSK Spindle
  - 6000rpm / High Power Spec. Spindle
  - 6000rpm / High Power Spec. Spindle
  - 6000rpm / High Power Spec. Spindle
  - 6000rpm / High Power Spec. Spindle
- **OTHERS**
  - Scale Feedback
  - Standard Programmable U-head

**STANDARD EQUIPMENT**
- 6000mm “Y”pin 260W (35HP) Two Geared Spindle
- Spindle Type Twin Pallets Automatic Pallet Changer (APC)
- 6000rpm / High Power Spec. Spindle
- Spindle, Spindle Head, and Spindle Motor
- 6000rpm / High Power Spec. Spindle

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

**ADVANCED UNMANNED MONITORING SYSTEM**

**NIIGATA NM24 MONITOR ACE**

**KEY FEATURES**
- Display on Machine Operational Screen:
  - All Main Features Shown on Machine Operational Screen (Fanuc CNC Control)
  - All Main Features Shown on Machine Operational Screen:
- Spindle Flange Through Type
- Coolant Low Level Sensing Device
- Oversized Coolant Tank
- Chip Remover
- Green Package
- Ti Pro Package
- Standard Configuration
- Advanced Thermal Displacement Compensation
- Scale Feedback
- 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)**
- 60 Tools Magazine
- 128 Tools Magazine
- 175 Tools Magazine (68 + 88 Tools)
- 255 Tools Magazine (128 + 128 Tools)
- Matrix Style ATC System (128 + 128 Tools)
- Max Tool Weight 35kg (77lbs) Capability

**PRODUCT SPECIFICATIONS**

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<thead>
<tr>
<th>ITEM</th>
<th>Metric</th>
<th>Inch</th>
</tr>
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<tr>
<td>Power</td>
<td>83 kVA</td>
<td>83 kVA</td>
</tr>
<tr>
<td>Floor to table surface</td>
<td>1330 mm</td>
<td>52.4&quot;</td>
</tr>
<tr>
<td>Machine space H</td>
<td>3470 mm</td>
<td>137&quot;</td>
</tr>
<tr>
<td>Machine space W / D</td>
<td>3940 × 5735 mm</td>
<td>155 “ × 226”</td>
</tr>
<tr>
<td>GENERAL Machine weight</td>
<td>approx. 21500 kg</td>
<td>47300 lbs</td>
</tr>
<tr>
<td>Repeatability with scales</td>
<td>± 0.001 mm</td>
<td>± 0.00004 “</td>
</tr>
<tr>
<td>Repeatability X-Y-Z</td>
<td>± 0.0015 mm</td>
<td>± 0.00006 “</td>
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**OPTIONAL FEATURES**

- Advanced Thermal Displacement Compensation
- Scale Feedback
- Standard 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":**

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.

- Low frequency machining
- Superior rigidity and stiffness of the machine
- Greater axes thrust
- High torque geared spindle with the interface with tool
- Longevity of the tool life

**TITANIUM MACHINING:**

One of remarkable hard material on high demand is Titanium generally called 64Ti, S553Ti, 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.