



A World Leader of Horizontal Machining Centers



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NIIGATA UNMANNED SYSTEM



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2022.8.2000.SAN



HN63E

HN63E

UNRIVALED PERFORMANCE — HEAVY DUTY BOXWAY STYLE
HORIZONTAL MACHINING CENTER



NIIGATA MACHINE TECHNO CO., LTD.
Niigata, Japan

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

LARGEST WORK HEAVY DUTY MACHINE RIGIDITY

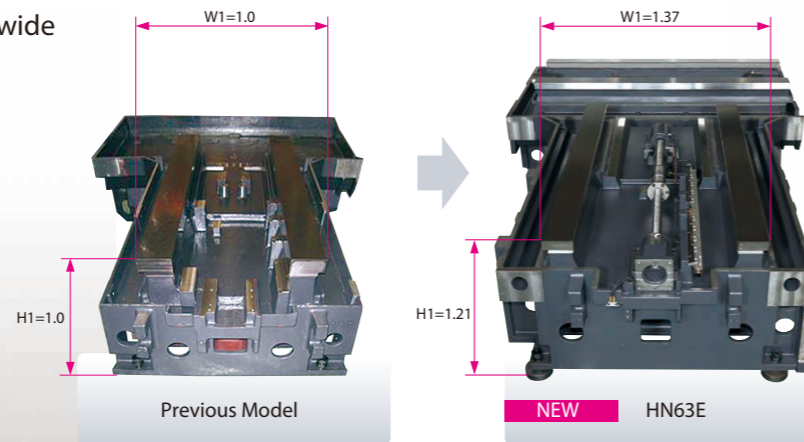
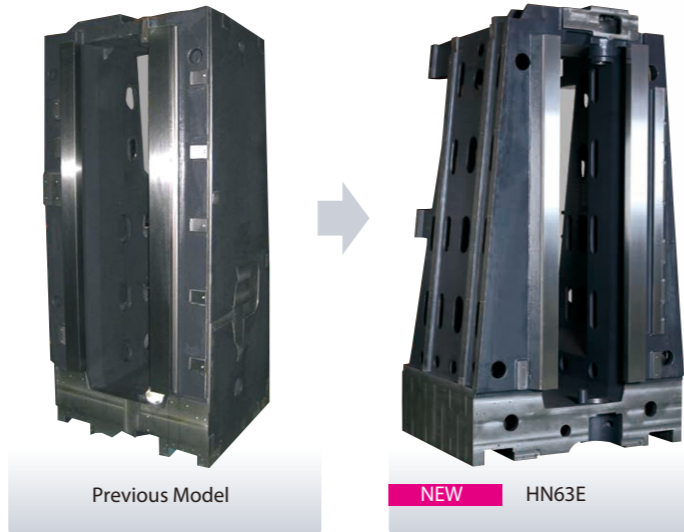
NEW HN63E

TRAVEL	X axis	1080mm (42.5")
	Y axis	930mm (36.6")
	Z axis	830mm (32.7")
Max Work Piece Swing Diameter		1080mm (42.5")
Max Work Piece Height		1000mm (39.4")

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 have 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)

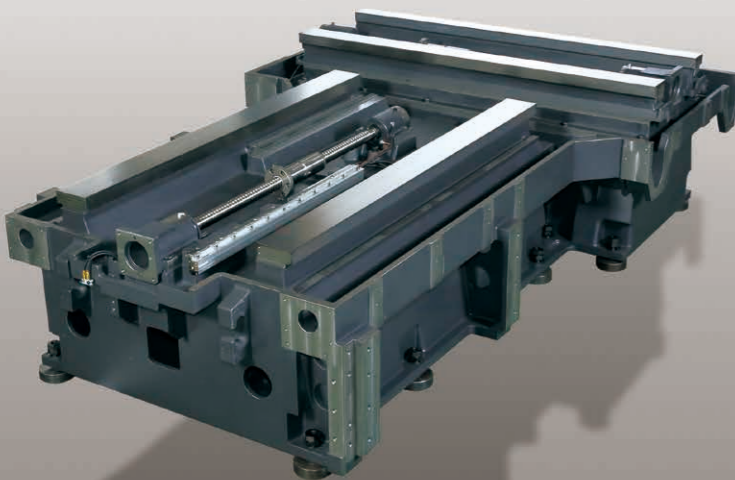
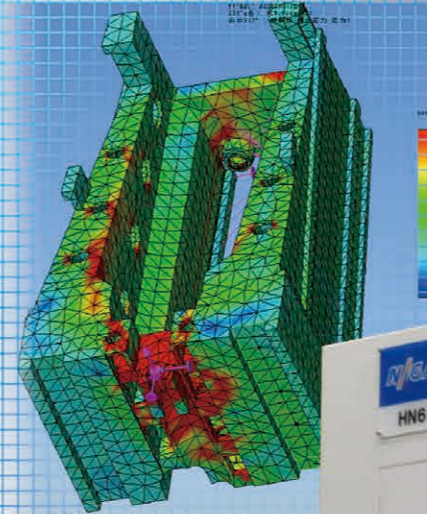


Note: These figures compare new HN63E machine to previous model.

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.

FEM Analysis on Column Construction



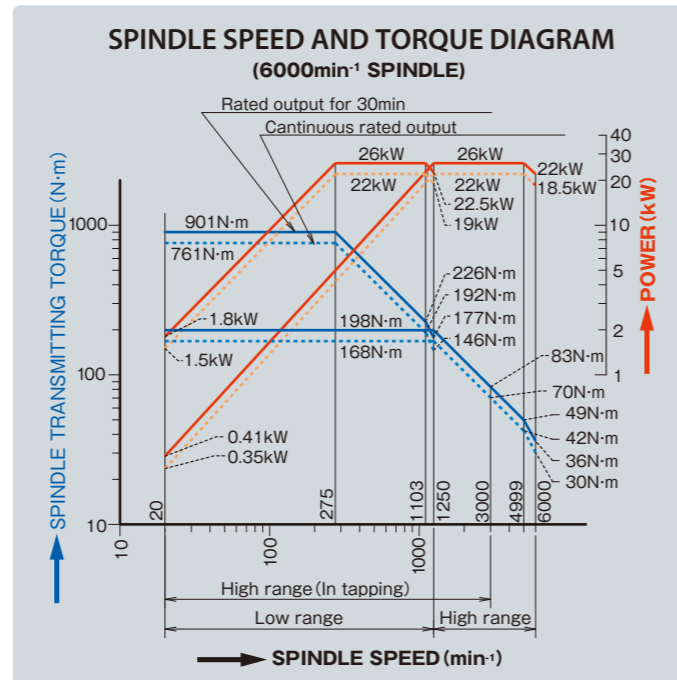
OUTSTANDING CHIP REMOVAL PROVES SUBSTANTIAL MACHINE RIGIDITY

HIGH TORQUE HEAVY DUTY SPINDLE

	6000min⁻¹ (rpm) Standard
POWER	26 kW (35 HP)
TORQUE	901 N·m (665 ft.lbs)

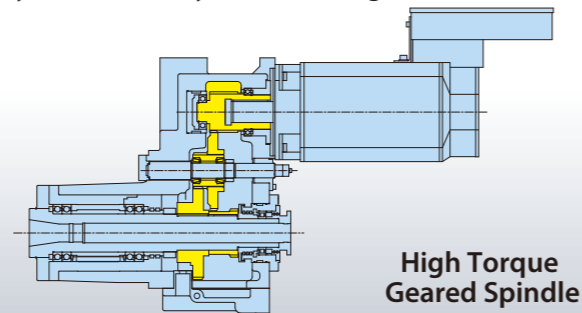
The spindle head stock is mono-cast (single piece) casting to achieve heavy and powerful milling capability and greater accuracy than bolt-together type spindle heads. This high performance spindle, power, and torque complements the extremely rigid machine frame.

A variety of high performance spindles are also available such as 8000min⁻¹(rpm) High Power Spec. 12000min⁻¹ (rpm) High Speed Spec. to meet your 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 has achieved significant performance advances with this newly engineered geared spindle for hard metal machining. It employs wide-spaced, super precision tapered roller and angular contact bearings. New geared spindle high stiffness version is one of the key criteria of this "Ti PRO PACKAGE" to challenge "Difficult Material CUTS". See P14-P15 for more information.

EXAMPLE OF HN63E'S MACHINING PERFORMANCE

	<h3>Milling</h3>	<p>Material : S45C Tool : ϕ 160-8T Cutting Volume : 570cm³/min (34.8 inch³/min) Cutting Depth : 9.0mm (0.35") Cutting Width : 120mm (4.72") Feedrate : 528mm/min (20.79 ipm) Spindle Speed : 275min⁻¹ (275 rpm) Surface Speed : 138m/min (453 SFM)</p>
	<h3>End Milling</h3>	<p>Material : S45C Tool : ϕ 63-4T Cutting Volume : 484cm³/min (29.5 inch³/min) Cutting Depth : 10mm (0.39") Cutting Width : 40mm (1.57") Feedrate : 1212mm/min (47.7 ipm) Surface Speed : 150m/min (492 SFM)</p>
	<h3>Drilling</h3>	<p>Material : S45C Tool : ϕ 60 drill Cutting Volume : 217cm³/min (13.2 inch³/min) Tool Length : 300mm (11.81") Spindle Load : 50% Spindle Speed : 769min⁻¹ (769 rpm) Surface Speed : 145m/min (476 SFM)</p>

HN-5X series 5-axis Heavy Duty Horizontal Machining Center NIIGATA's uniquely designed Trunnion Table driven by Worm & Wheel

NIIGATA's OWN DESIGN HEAVY DUTY 5 AXIS TRUNNION TABLE

Both ends supported by High Load Type Roller BRG and Double-Lead Worm Gear system to achieve heavy duty machining capability.



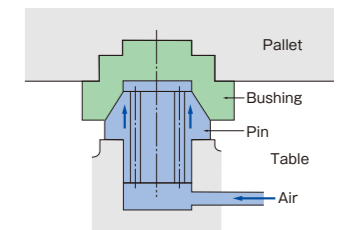
HEAVY DUTY

DESIGNED AND BUILT FOR FINE PRECISION ACCURACY



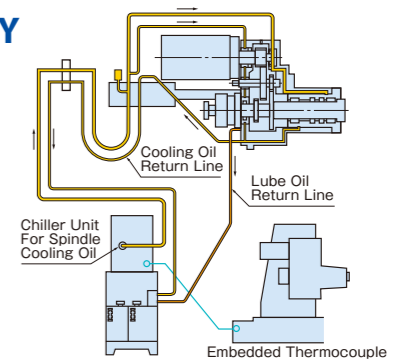
STURDY PALLET CLAMPING SYSTEM WITH PRECISION PALLET POSITIONING

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 clamping plate that provides superior stability 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).

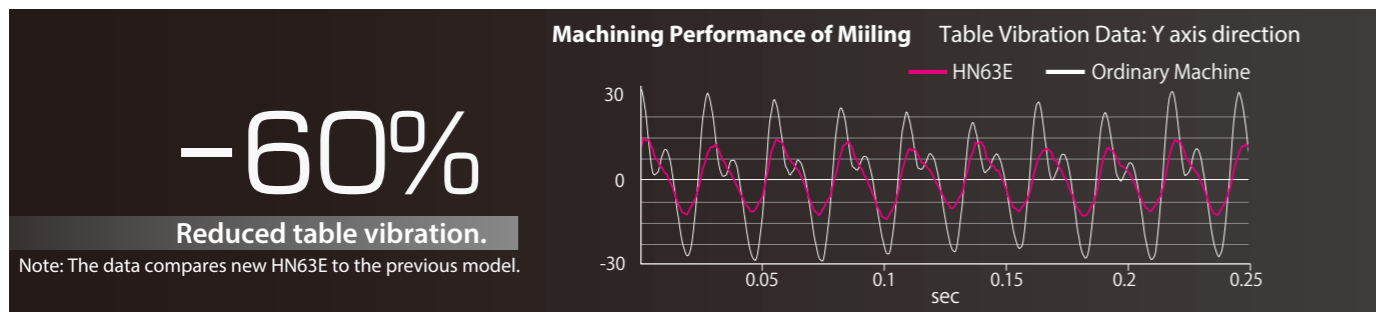


NIIGATA'S UNIQUE SPINDLE HEAD COOLING TECHNOLOGY

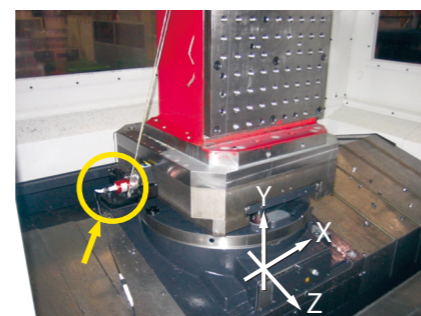
Niigata's unique cooling system minimizes thermal distortion during heavy load on the spindle. A large volume of temperature controlled spindle cooling oil is circulated around the spindle bearings and gear box. Thermo-couple temperature sensors are embedded into the machine base to control oil temperature to correlate with the temperature of the machine base.



SUPERIOR CAPABILITY OF LOW FREQUENCY MACHINING



"Low Frequency Machining" is one key criteria to achieve high efficiency heavy duty machining of hard metal materials. As Niigata's tradition, the guide ways, X,Y,Z, are a combination of hardened and ground ways and hand-scraped turcite ways to provide superior stability and vibration dampening characteristics as well as long life cycle. The guide ways inside the NC table (option) also employs the built by hand-scraped finish process to withstand heavy cutting forces and cutting vibration. Well balanced and well engineered machine components lead to a new generation of cutting technology.

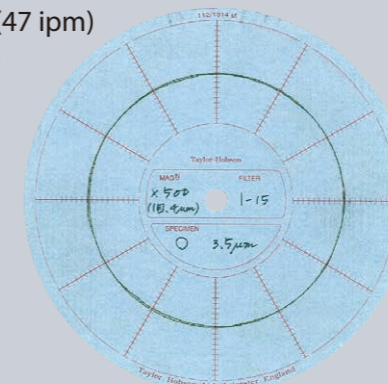


Accelerometer sensor used to measure mechanical vibration levels.

ACCURACY DATA

Circular Interpolation (End Milling)

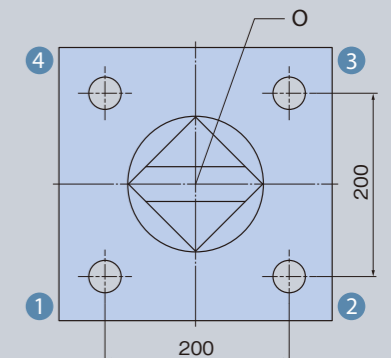
Roundness (Tolerance) 0.010mm (0.00039")
 (Actual Record) 0.0035mm (0.00014")
 Material : A5052 (Aluminum)
 Processing Dia: ϕ 218 (8.58")
 V = 300m/min (984 SFM)
 F = 1194mm/min (47 ipm)
 t = 0.2mm (0.008")



Position Accuracy (μ m) (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



DESIGN DETAILS FOCUSED ON OPERATOR FRIENDLINESS

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 at each pallet index position.



NEW GENERATION OPERATION PANEL WITH 15" COLOR LCD

HN series is equipped with pendant style NEW generation operation panel with 15" color LCD as standard. The control panel is strategically located at the most convenient position and the operator can easily monitor the workpiece and machining operations, while utilizing the control functions.



SAFE AND CONVENIENT SETUP OF TOOLING

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



HIGH RELIABILITY AND EASE OF MAINTENANCE

NIGATA

HN63E

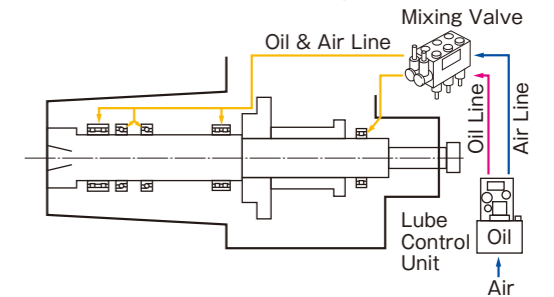
QUICK & EASY INSPECTION

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

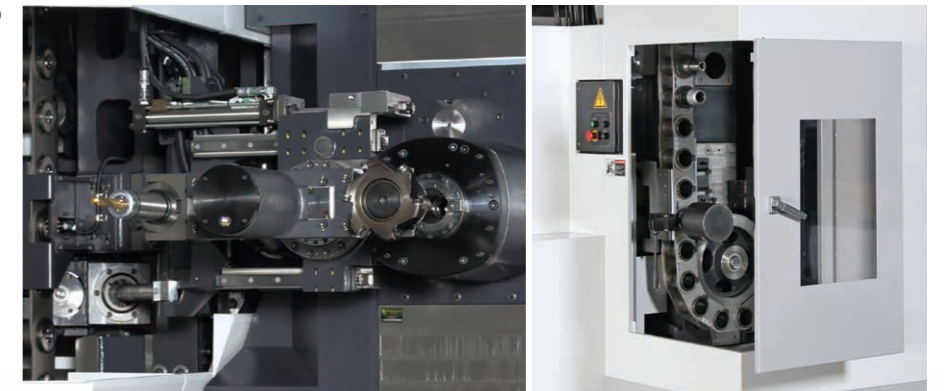
This system automatically assures constant lubrication to the spindle bearings to prevent premature failure (versus grease packed bearings which require periodic repacking).



FAST AND RELIABLE TOOL CHANGE SYSTEM

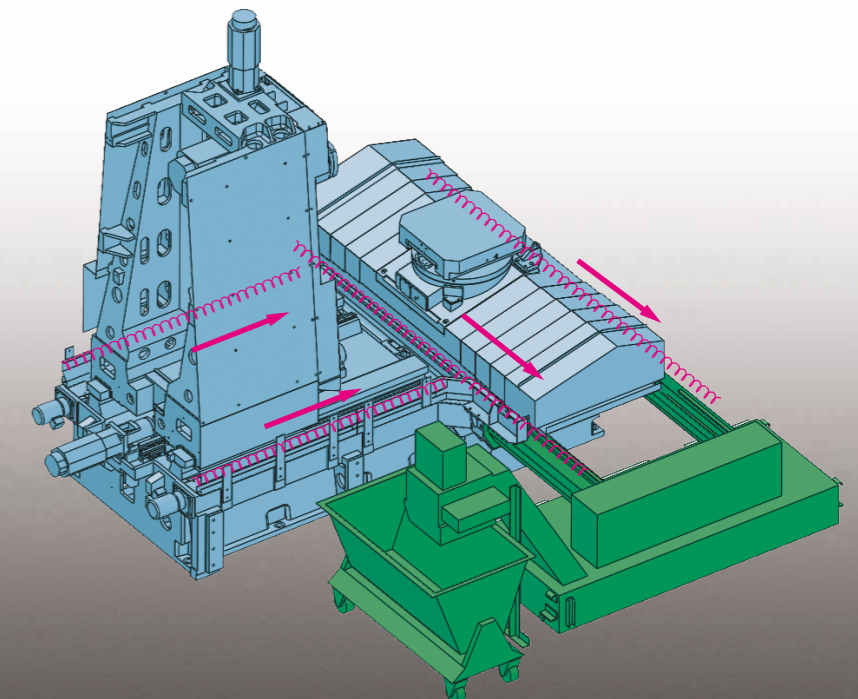
Tool magazine is driven by a servo motor for fast and reliable indexing.

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.



EXCELLENT CHIP REMOVAL

Roof type X axis cover and slanted Z axis cover facilitate chip flow into large coil augers equipped on column (both sides) and X axis base. Those augers remove chips from the machine to the conveyor.

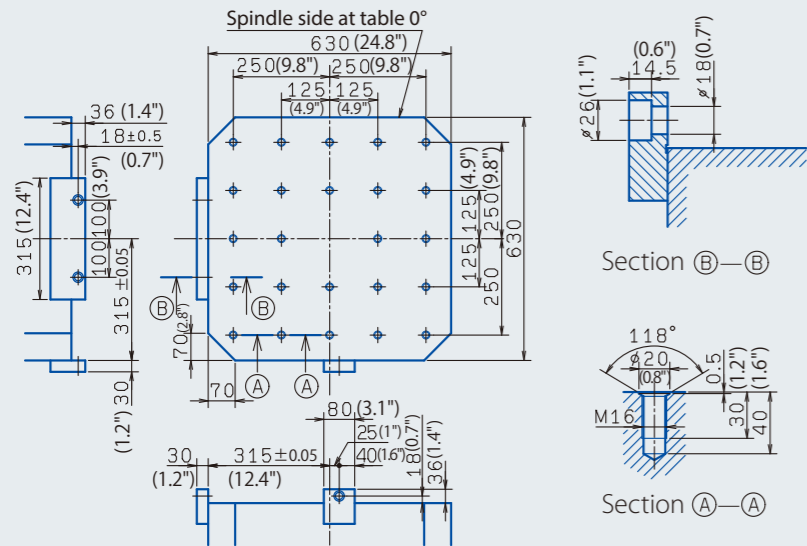


EASE OF OPERATION

&

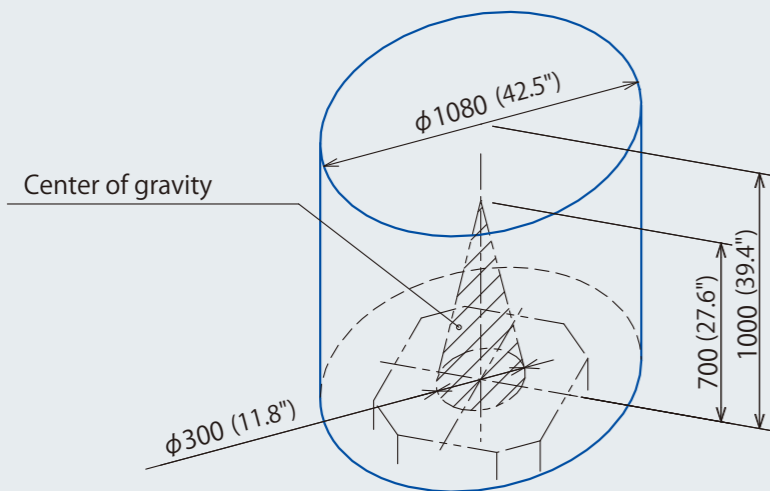
EASE OF MAINTENANCE

Standard Pallet Top Surface



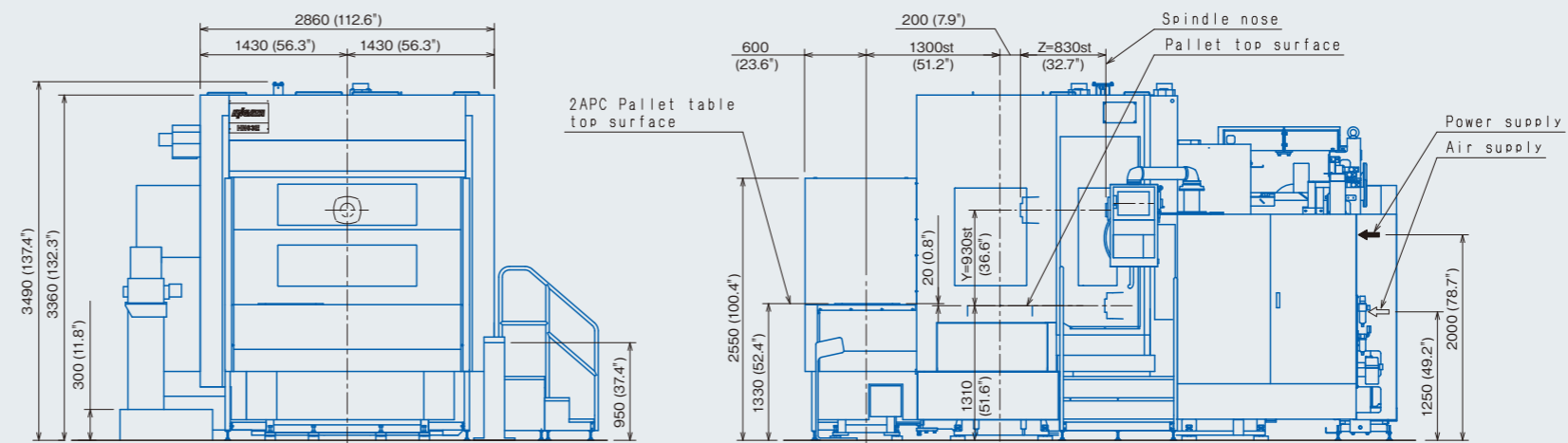
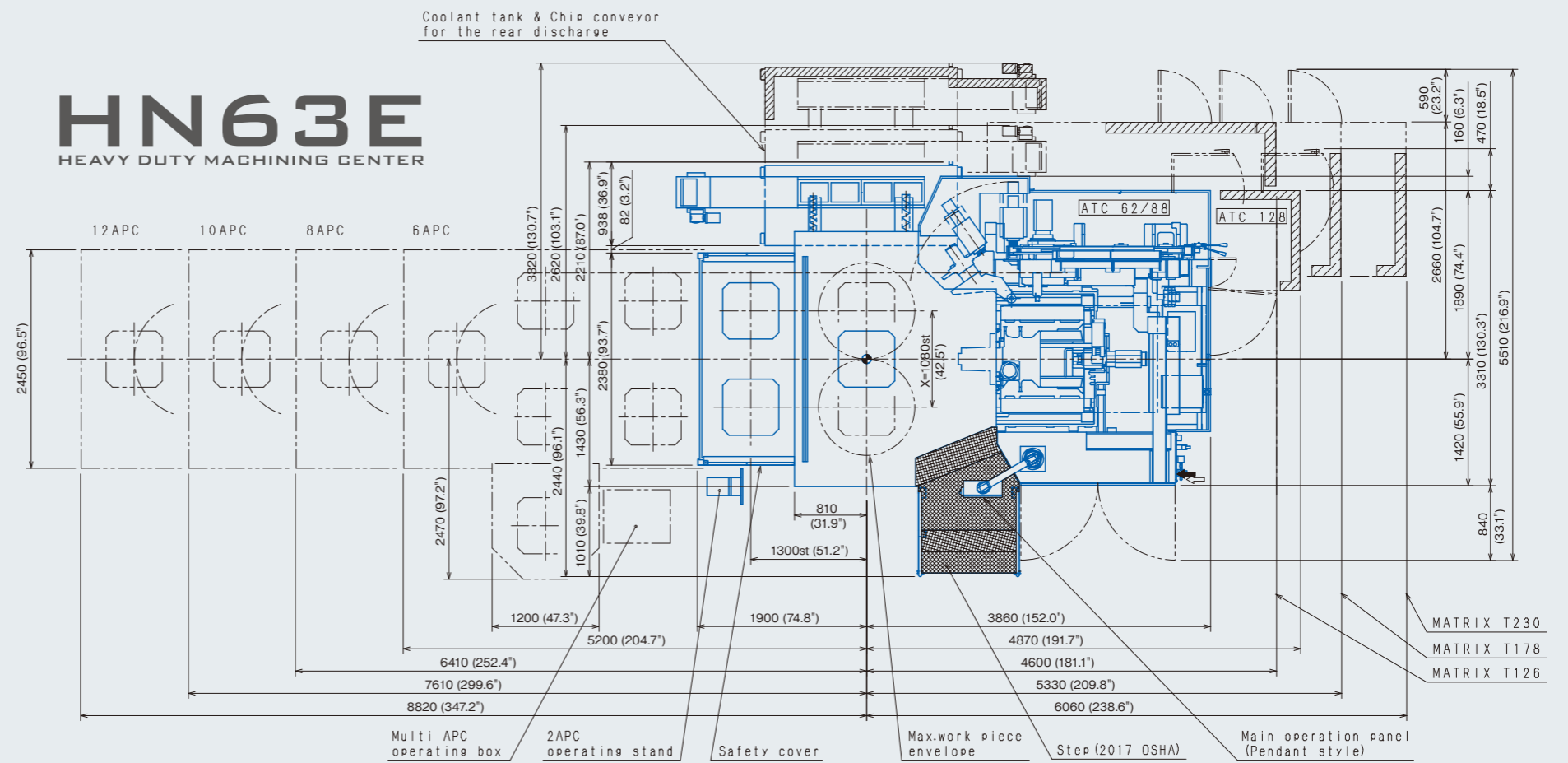
Unit : mm (inch)

Maximum Workpiece Envelope



Unit : mm (inch)

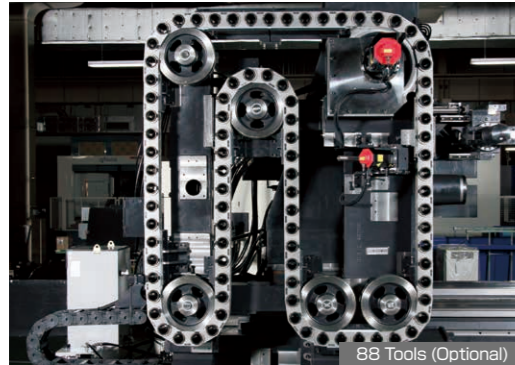
HN63E General View



Unit : mm (inch)

WIDE RANGE OF OPTIONS TO SUPPORT YOUR INDIVIDUAL MACHINING REQUIREMENTS

NIIGATA HN-SERIES MODULAR DESIGN FIELD EXPANDABLE ATC MAGAZINE



MATRIX TYPE AUTOMATIC TOOL CHANGE SYSTEM

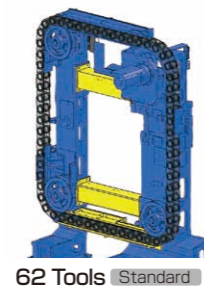


OPTIONAL FEATURES

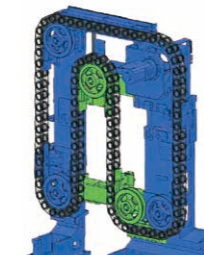
Multiple Pallet Magazine Carousel Type APC System



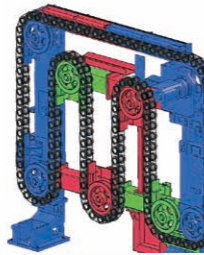
Linear Pallet Magazine System with Niigata ICC System Controller



62 Tools Standard

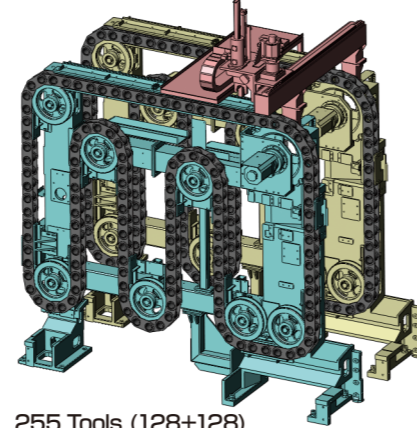


88 Tools Optional



128 Tools Optional

EXAMPLE OF AUTO TOOL CHANGE SYSTEM (Chain Type)



255 Tools (128+128) Tool Magazine System

ADVANCED UNMANNED MONITORING SYSTEM NIIGATA MONITOR ACE

Menu Screen



KEY FEATURES

Display on Machine Operational Screen:

All Main Features Shown on Machine Operational Screen (Fanuc CNC Control)

Cutting Monitor:

Max Spindle Load / Feed Axis Load / Adaptive Control / FN Adaptive Control

Tool Management:

Tool Life Monitor / Spare Tool Function / Tool Number Conversion

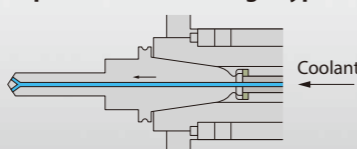
Automatic Continuous Machining:

Spare Tool Conversion / Pallet Skip

Operations Record Display:

Machining Record / Alarm Record / Tool Life

Spindle Center Through Type



Lift-Up External Chip Conveyor



MACHINE SPECIFICATIONS

HN63E SPECIFICATIONS

ITEM		Metric	Inch
TRAVEL	X axis table travel	1080 mm	42.5 "
	Y axis vertical head travel	930 mm	36.6 "
	Z axis column travel	830 mm	32.7 "
	Spindle center line to pallet surface	0 ~ 930 mm	0 ~ 36.6 "
TABLE	Spindle nose to table center line	200 ~ 1030 mm	7.9 ~ 40.6 "
	Table working surface	630 × 630 mm	24.8 × 24.8 "
	Table increments	1° [0.001°]	1° [0.001°]
	Maximum mass on pallet	1200 kg	2640 lbs
SPINDLE	Spindle drive motor	1500 kg (NC table)	3300 lbs
	Spindle speeds	AC 26 kW	AC 35 HP
	Spindle max. torque	20 ~ 6000 min ⁻¹	20 ~ 6000 rpm
	Spindle taper	901 N·m	665 ft.lbs
FEEDRATE	No.50	No.50	No.50
	Rapid traverse X axis	30 m/min	1181 ipm
	Y axis	30 m/min	1181 ipm
	Z axis	30 m/min	1181 ipm
AUTOMATIC TOOL CHANGER (ATC)	Cutting X - Y - Z	1 ~ 15000 mm/min	0.04 ~ 591 ipm
	Tool magazine capacity (chain)	62 [88/128]	62 [88/128]
	Tool magazine capacity (MATRIX)	[126/178/230]	[126/178/230]
	Tool shank	BT 50	CT 50
	Maximum tool length	550 mm	21.7 "
	Maximum milling cutter dia.	φ 120 mm	φ 4.7 "
	Adjacent pockets empty	φ 230 mm	φ 9.1 "
	Maximum boring dia.	φ 410 mm	φ 16.1 "
	Maximum tool mass (weight)	30 kg	66 lbs
	AUTOMATIC PALLET CHANGER (APC) SYSTEM	Type	Side by side shuttle
Number of pallets		2	2
ACCURACY	Positioning / full stroke X-Y-Z	± 0.004 mm	± 0.00016 "
	Positioning with scales	± 0.003 mm	± 0.00012 "
	Repeatability X-Y-Z	± 0.0015 mm	± 0.00006 "
	Repeatability with scales	± 0.001 mm	± 0.00004 "
	Table index	± 3 "	± 3 "
GENERAL	Machine weight approx.	21500 kg	47300 lbs
	Machine space W / D	3940 × 5735 mm	155 " × 226 "
	Machine space H	3470 mm	137.4 "
	Floor to table surface	1330 mm	52.4 "
	Power	65 kVA	65 kVA
Control	FANUC 30 iB (31 iB)	FANUC 30 iB (31 iB)	

STANDARD EQUIPMENT

- 6000min⁻¹(rpm) 26kW (35HP) Two Geared Spindle
- Shuttle Type Twin Pallet Automatic Pallet Changer (2APC) includes Safety Guard Light Curtains
- Idle Self Rotation on 2APC System
- Two Pallets with Threaded 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 LED Work Light (SPG)
- Front and Rear Spiral Chip Augers Built into the Machine Bed and column both side
- Rigid Tapping
- Manual Pulse Generator with the XYZ axes
- Spindle Speed/Load Meter with Override on NC Control Display
- Flood Coolant System
- Coolant Tank (380L)
- Work Completion and Emergency Lamp
- Automatic Power Off Device
- Door Interlock (at 2APC, SPG, ATC and Electrical Cabinet)
- Self Diagnostics Function
- 2APC Program Number Search Function (with 2APC)
- Fanuc CNC System with 15" 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
- 128 Tools Magazine
- 175 Tools Magazine (88 + 88 Tools)
- 255 Tools Magazine (128 + 128 Tools)
- Matrix Style ATC System (126/178/230 Tools)
- Max Tool Weight 35kg (77lbs) Capability
- Max Tool Moment 50N·m (36.8ft·lbs) Capability

TABLES

- 0.001°(NC Table) / 4th Axis Continuous
- 5 Axis Application (Table on Table)

PALLET and PALLET CHANGER SYSTEM

- Carousel Type Multiple Pallet Changer 6/8/10/12 APC System
- Linear Pallet Magazine (LPM) System with Niigata Intelligent Cell Controller (ICC)
- Extra Pallet
- T-slotted Pallet (Restriction of Max Load on the Pallet may Apply)

COOLANT SYSTEM

- Spindle Center Through Coolant Device
- Oversized Coolant Tank
- Coolant Low Level Sensing Device
- Shower Coolant system

CHIP REMOVAL

- Lift-Up External Conveyor Hinge-Pan Type
- Lift-Up External Conveyor with Filtration System
- Chip Bucket with Caster and Handles

CUTTING MONITORING FUNCTION

- Advanced Unmanned Monitoring System: Niigata NM24 Monitor Ace
- Spindle Probing System
- Table Probing System
- Tool Breakage Detector System LS-Z Type
- Four Face Part Program Control Function

SPINDLE

- BIG-PLUS Spindle
- HSK Spindle
- 6000min⁻¹ High Stiffness Spindle Version (26/22kW) {35/30HP}
- 8000min⁻¹ High Power Spec. Spindle (37/30kW) {50/40HP}
- 12000min⁻¹ High Speed Spec. Spindle (30/25kW) {40/34HP}

OTHERS

- Scale Feedback
- D'andrea Programmable U-head
- Advanced Thermal Displacement Compensation

Ti Pro Package
Green Package

NIIGATA'S TECHNICAL SOLUTION FOR THE MACHINING OF "DIFFICULT MATERIAL TO CUT" GLOBAL ALL-ENCOMASSING PRODUCTIVITY—HN63E-Ti

EFFICIENT MACHINING OF "DIFFICULT MATERIAL TO CUT":

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.

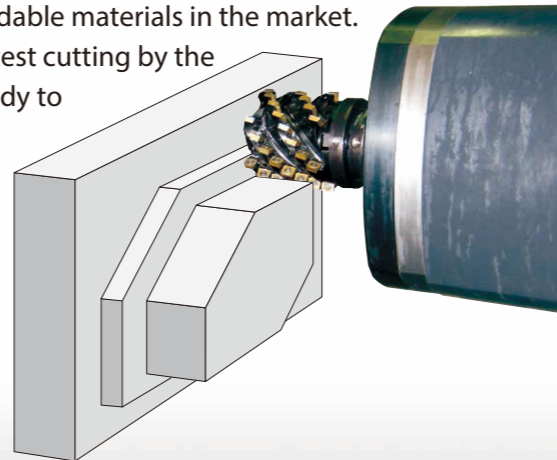
As a world leader of the horizontal machining center, NIIGATA is proud to declare that the new HN63E Ti PRO Package will satisfy requirements of your production needs with "Difficult material to cut".



TITANIUM MACHINING:

One of the 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 materials in the market.

Extensive knowledge through test cutting by the Niigata engineering team is ready to support your production challenge.



THE MACHINE DESIGN CRITERIA:

Niigata's tradition, true Heavy Duty BOX WAY style Horizontal Machining Center model HN-series are highly regarded worldwide as the most capable hard metal cutting HMC in the industry. The fundamentals of machine design have been proved already for hard metal machining. Key development criteria for Ti PRO Package was 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 interface with tool
- ✓ Longevity of tool life



HN63E

Ti PRO PACKAGE