A World Leader of Horizontal Machining Centers

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2014.4.2000.SAN

HN63E

HN63E

NEW MODEL — HEAVY DUTY BOX WAY 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

NIIGATA
HN63E

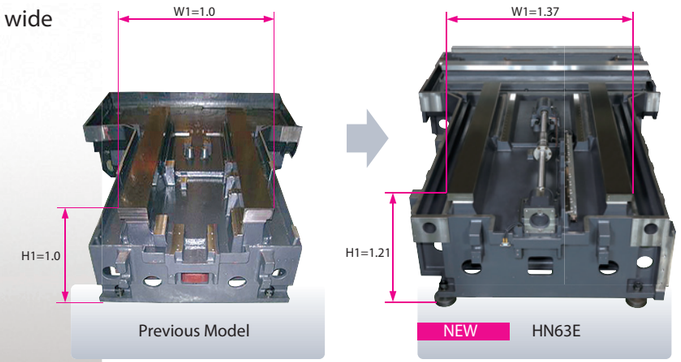
LARGEST WORK HEAVY DUTY MACHINE RIGIDITY

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")

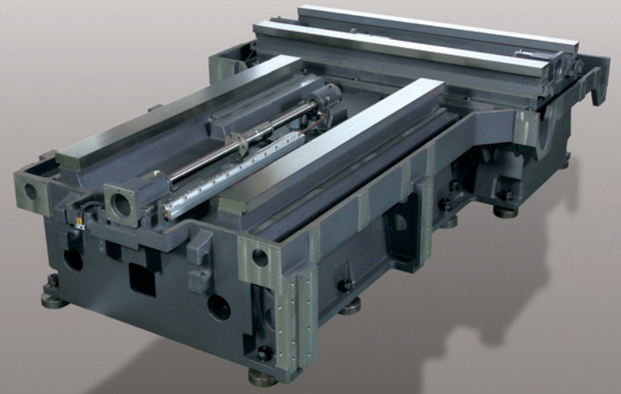
NEWLY ENGINEERED MACHINE RIGIDITY

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 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)



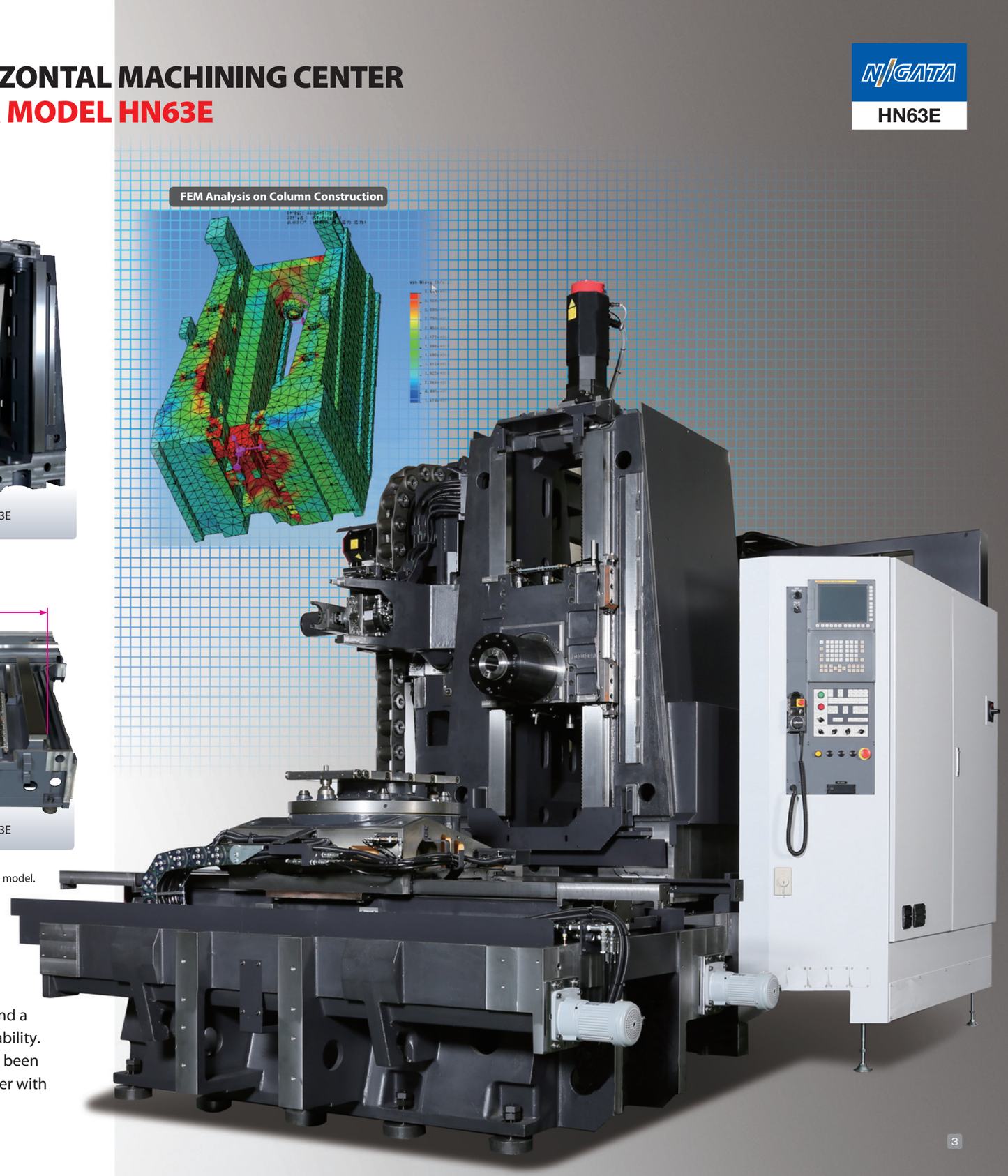
Note: These figures compare new HN63E machine to previous model.



RIGIDITY

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.



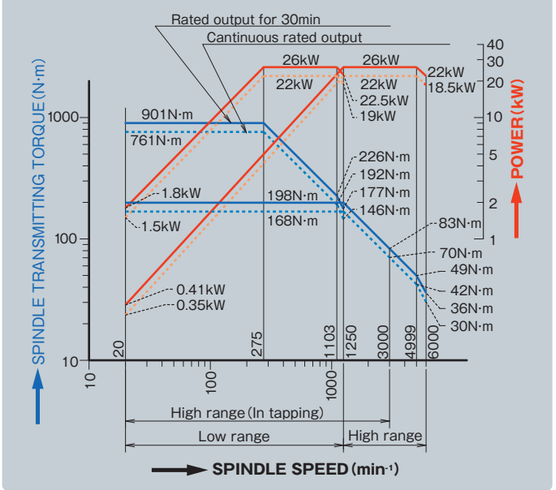
OUTSTANDING CHIP REMOVAL PROVES SUBSTANTIAL MACHINE RIGIDITY

HIGH TORQUE HEAVY DUTY SPINDLE

	6000min^{-1} (rpm) Standard
POWER	26 kW (35 HP)
TORQUE	901 N•m (665 ft.lbs)

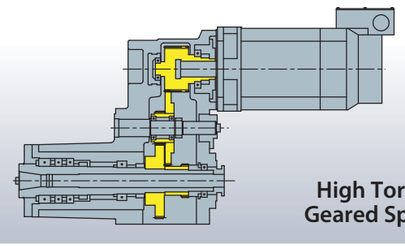
The spindle head stock is mono-cast (single piece) castings to achieve heavy and powerful milling capability and greater accuracy than bolt-together type spindle heads. This high performance spindle, power, and torque complements the extremely rigid machine frame.
The variety of high performance spindles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

SPINDLE SPEED AND TORQUE DIAGRAM
(6000min^{-1} SPINDLE)



POWERFUL GEARED SPINDLE

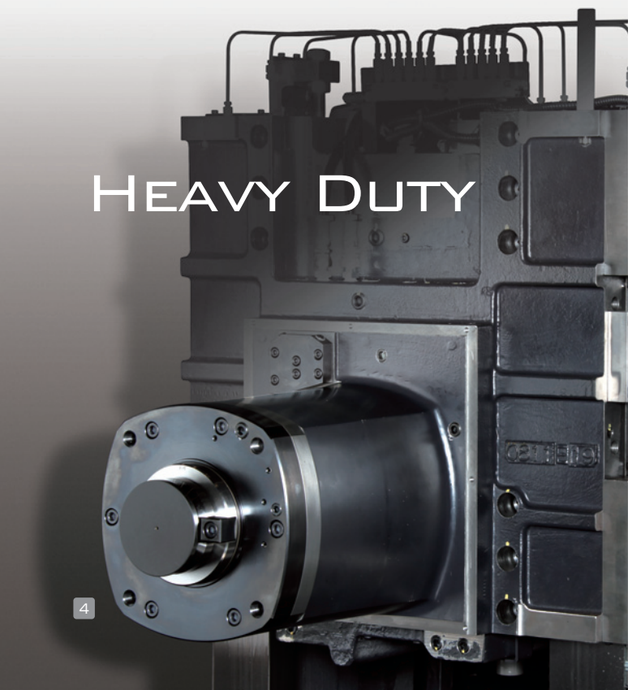
Full 26kW (35HP) cuts are achieved through an advanced two(2) range head stock. With only three(3) rotating components, maximum power is transmitted simply and efficiently to the cutting tool.



High Torque Geared Spindle

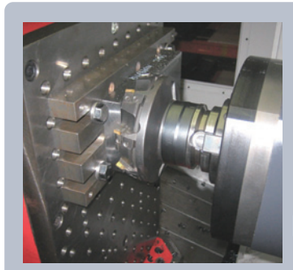
GEARED SPINDLE HIGH STIFFNESS VERSION (Optional)

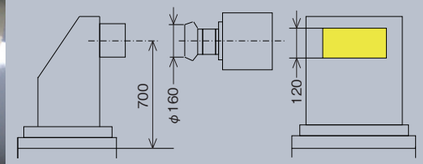
Niigata's constant research and development produces newly engineered geared spindle for new HN63E to enhance its capability of hard metal machining. It employs wide-spaced, super precision tapered roller and angular contact bearings. New geared spindle high stiffness version is one of key criteria Niigata 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

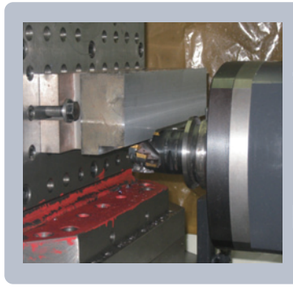
Milling

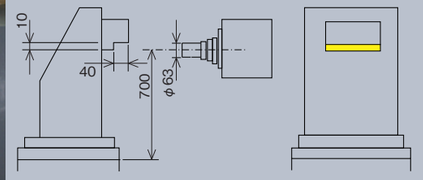




Material	: S45C
Tool	: ϕ160-8T
Cutting Volume	: 570cm^3/min (34.8 inch^3/min)
Cutting Depth	: 9.0mm (0.35")
Cutting Width	: 120mm (4.72")
Feedrate	: 528mm/min (20.79 ipm)
Spindle Speed	: 275mm^{-1} (275 rpm)
Surface Speed	: 138m/min (453 SFM)

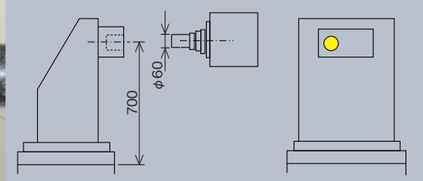
End Milling





Material	: S45C
Tool	: ϕ63-4T
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	: ϕ60 drill
Cutting Volume	: 217cm^3/min (13.2 inch^3/min)
Tool Length	: 300mm (11.81")
Spindle Load	: 50%
Spindle Speed	: 769mm^{-1} (769 rpm)
Surface Speed	: 145m/min (476 SFM)

NIIGATA HN-SERIES REFERENCED SUPPLY INDUSTRIES

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.

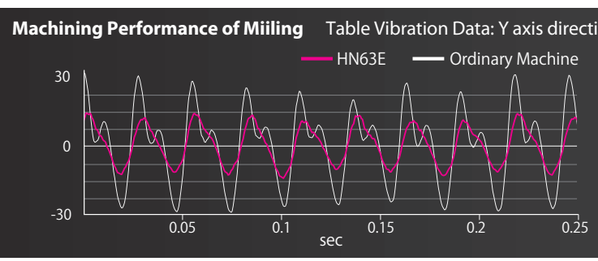
DESIGNED AND BUILT FOR FINE PRECISION ACCURACY

SUPERIOR CAPABILITY OF LOW FREQUENCY MACHINING

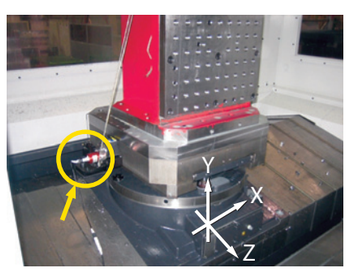
-60%

Reduced table vibration.

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

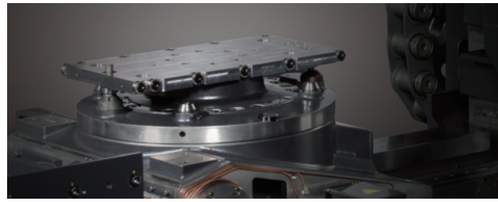


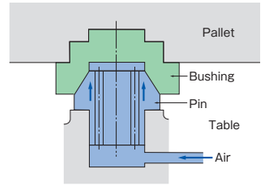
"Low Frequency Machining" is one key criteria to achieve high efficient machining with heavy duty and hard metal material. As Niigata's tradition, the guide ways, X,Y,Z, are a combination of hardened and ground ways and hand-scraped turcite ways provides superior stability and vibration dampening characteristics 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

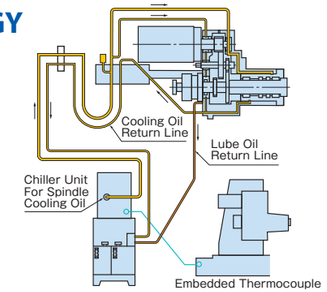
Pallets are located with precision accuracy by (4) sets of cone-shaped tapered pins and bushings.
The precision cone positioning system insures long-term accuracy and reliability. The pallet clamping system adopts a sturdy clamper plate that provides super sturdy of the pallet during heavy duty machining.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





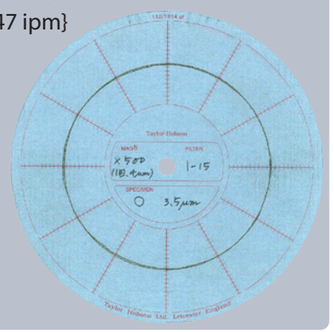
NIIGATA'S UNIQUE SPINDLE HEAD COOLING TECHNOLOGY

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.



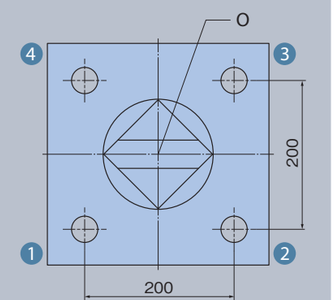
ACCURACY DATA

Circular Interpolation (End Milling)
Roundness (Tolerance) 0.010mm {0.00039"}
(Actual Record) 0.0035mm {0.00014"}
Material : A5052 (Alminium)
Processing Dia: ϕ 218 {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



DESIGN DETAILS FOCUSED ON OPERATOR FRIENDLINESS

EXCELLENT ACCESSIBILITY TO THE WORK ZONE

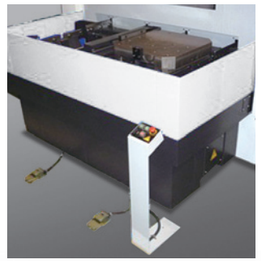
Large sliding operator door allows easy and safe access to the machining area.
A slanted ceiling of the enclosure minimizes coolant dropping on the operator.

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 postion.



SAFE AND CONVENIENT SETUP OF TOOLING

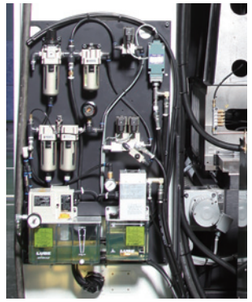
The tool magazine is on the side of the machine, outside the chip enclosure, and away from the cutting area. This design permits easy accessibility for tool inspection and replacement.
Jog rotation of the tool magazine during automatic cycles facilitates tool inspection and changeover to maximize utilization.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

HIGH RELIABILITY AND EASE OF MAINTENANCE

NIIGATA
HN63E

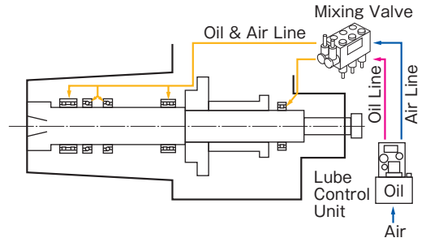
QUICK & EASY INSPECTION

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



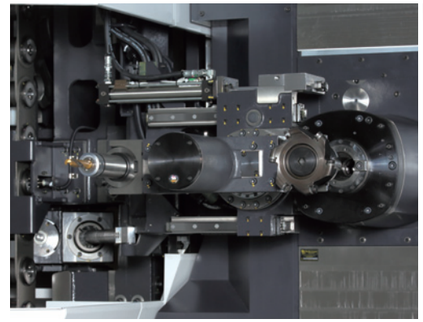
OIL–AIR LUBRICATION SYSTEM

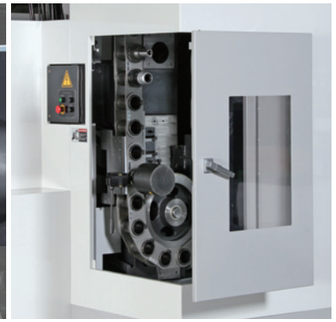
This system automatically assures constant lubrication to the spindle bearings to prevent premature failure (versus grease packed bearings which require periodic repacking).



FAST AND RELIABLE TOOL CHANGE SYSTEM

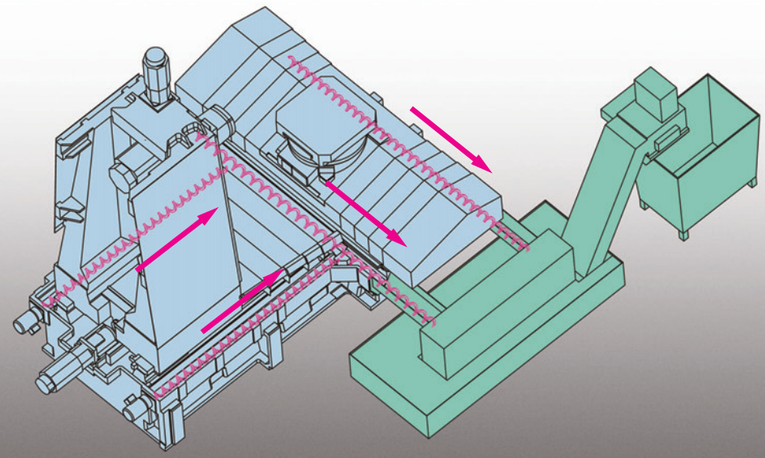
Tool magazine is driven by a servo motor for fast and reliable indexing.
An electric servo motor positions the tool loader, insuring fast, smooth motion during a tool change. The tool inspection and loading/unloading during automatic operation are standard features. The tool magazine and the changer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





EXCELLENTCHIP 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.

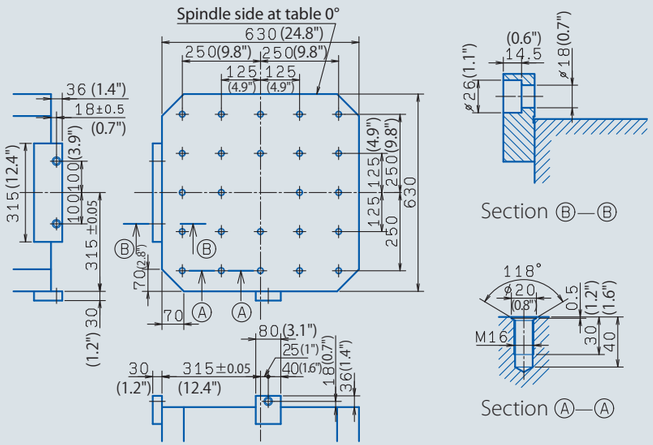


OPERATOR FRIENDLINESS & EASE OF MAINTENANCE

MACHINE DIMENSIONS

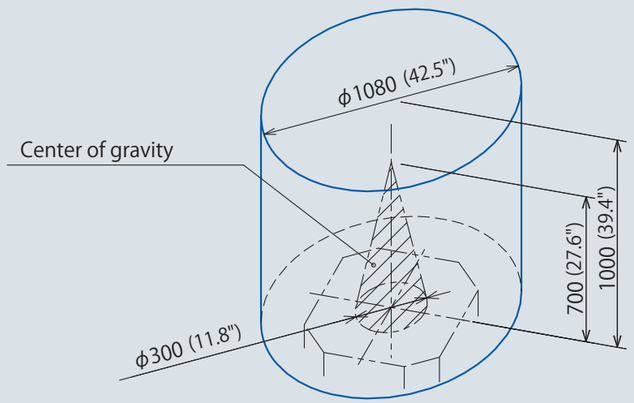
HN63E

Standard Pallet Top Surface



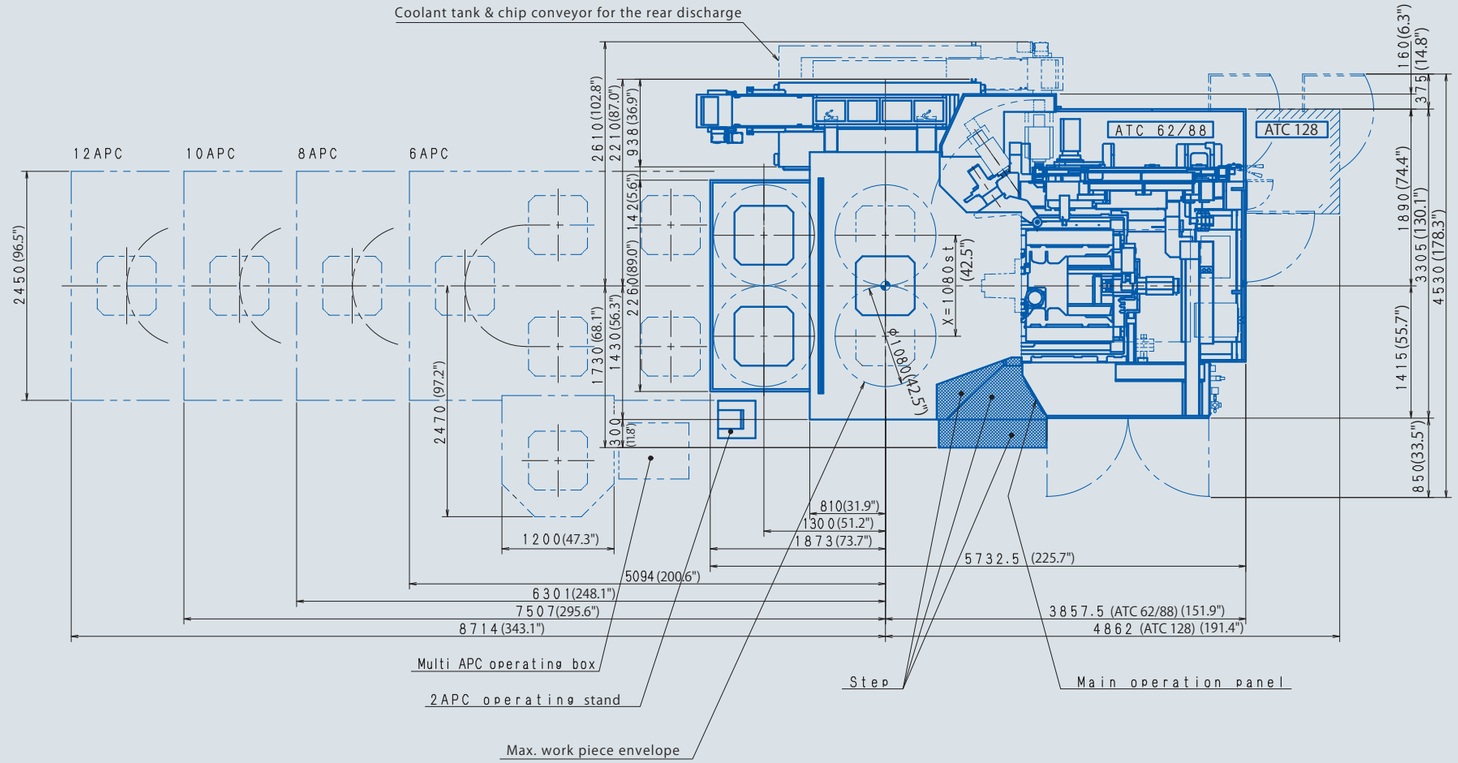
Unit : mm (inch)

Maximum Workpiece Envelope

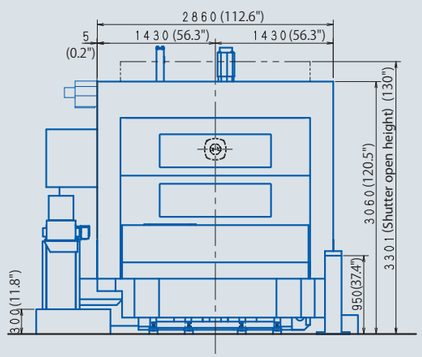


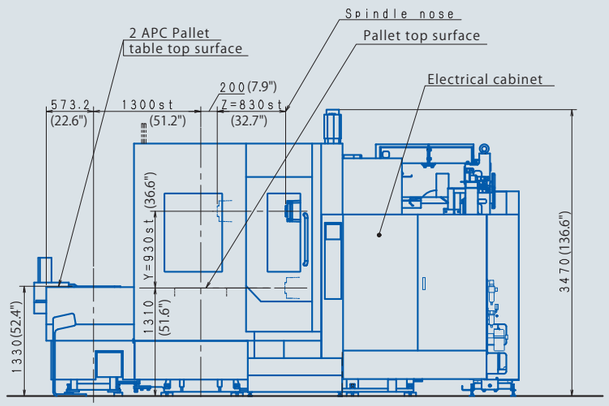
Unit : mm (inch)

HN63E General View



HN63E
HEAVY DUTY MACHINING CENTER

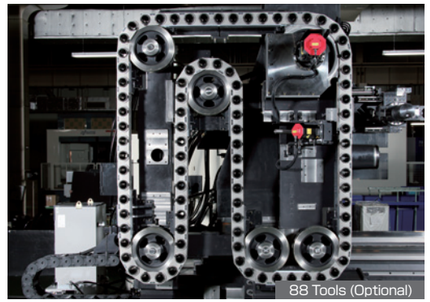


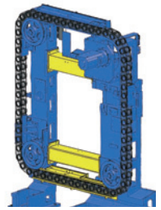


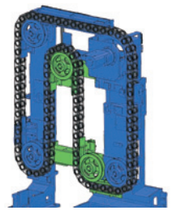
Unit : mm (inch)

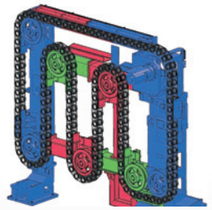
WIDE RANGE OF OPTIONS TO ANSWER YOUR INDIVIDUAL MACHINING REQUIREMENTS

NIIGATA HN-SERIES MODULAR DESIGN CONCEPT FIELD EXPANDABLE ATC MAGAZINE

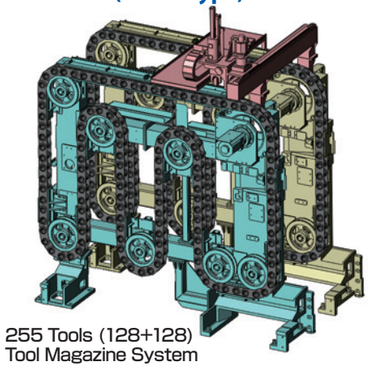



62 Tools Standard

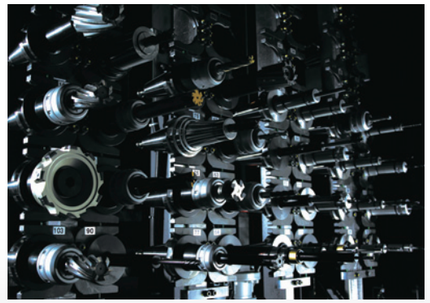

88 Tools Optional


128 Tools Optional

EXAMPLE OF AUTO TOOL CHANGE SYSTEM (Chain Type)


255 Tools (128+128)
Tool Magazine System

MATRIX TYPE AUTOMATIC TOOL CHANGE SYSTEM



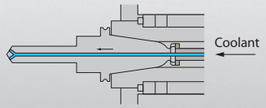
ADVANCED UNMANNED MONITORING SYSTEM NIIGATA NM24 MONITOR ACE

OPTIONAL FEATURES

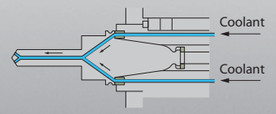
Multiple Pallet Magazine Carousel Type APC System

Linear Pallet Magazine System with Niigata ICC System Controller

Spindle Center Through Type



Spindle Flange Through Type



Lift-Up External Chip Conver

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

MACHINE SPECIFICATIONS

NIIGATA
HN63E

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 "
	Spindle nose to table center line	200 ~ 1030 mm	7.9 ~ 40.6 "
TABLE	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
		1500 kg (NC table)	3300 lbs
SPINDLE	Spindle drive motor	AC 26 kW	AC 35 HP
	Spindle speeds	20 ~ 6000 min^{-1}	20 ~ 6000 rpm
	Spindle max. torque	901 N·m	665 ft.lbs
	Spindle taper	No.50	No.50
FEEDRATE	Rapid traverse X axis	30 m/min	1181 ipm
	Y axis	30 m/min	1181 ipm
	Z axis	30 m/min	1181 ipm
	Cutting X - Y - Z	1 ~ 15000 mm/min	0.04 ~ 591 ipm
AUTOMATIC TOOL CHANGER (ATC)	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 "
	Ditto 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	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 "
	Floor to table surface	1330 mm	52.4 "
	Power	83 kVA	83 kVA

STANDARD EQUIPMENT

- 6000min^{-1}(rpm) 26kW (35HP) Two Geared Spindle
- Shattle Type Twin Pallets Automatic Pallet Changer (2APC)
- 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 (SPG)
- 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 Diagnostics Function
- 2APC Program Number Search Function (with 2APC)
- 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
- 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

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 Pachage

NIIGATA'S TECHNICAL SOLUTION FOR THE MACHINING OF "DIFFICULT MATERIAL TO CUT"
WORLD PRODUCTIVITY — NEW HN63E-Ti

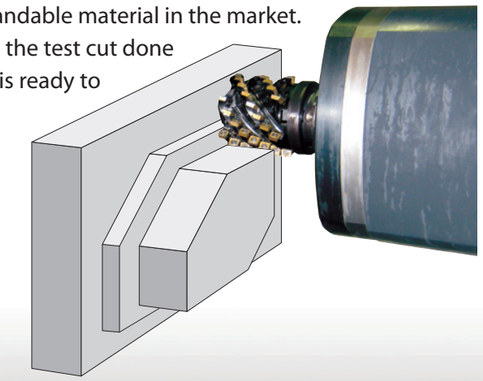
NIIGATA HN63E-Ti

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 new HN63E Ti PRO Package will satisfy all requirements of your production needs with "Difficult material to cut".

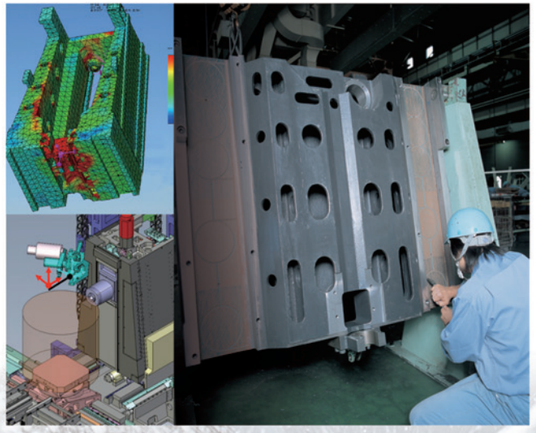
TITANIUM MACHINING:

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.



THE MACHINE DESIGN CRITERIA:

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**

HN63E
Ti PRO PACKAGE