A World Leader of Horizontal Machining Centers

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2016.4.1000.SAN

HN-5X SERIES

HN-5X

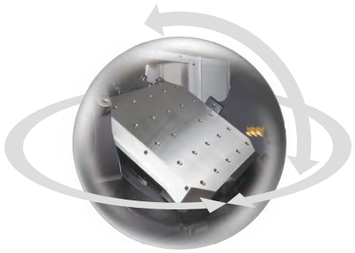
HN50E-5X / HN63E-5X

5-AXIS TRUNNION—HEAVY DUTY BOXWAY STYLE HORIZONTAL MACHINING CENTER

NIIGATA MACHINE TECHNO CO., LTD.
Niigata, Japan

5-AXIS TRUNNION HORIZONTAL MACHINING CENTER
WORLD CLASS PRODUCTIVITY
— *NIIGATA NEW MODEL HN-5X SERIES*

The Model HN-5X series is the result of NIIGATA's constant research and development for profitable machining of various components. Key development criteria for the "HN-5X" series were: higher productivity and increased accuracies. NIIGATA, a world leader of horizontal machining centers, is proud to declare that the model HN-5X series, a new design achieving significant performance advances, will satisfy all requirements of your machining needs.



☑ **LARGEST WORK**
☑ **HEAVY DUTY**
☑ **MACHINE RIGIDITY**

HN50E-5X

TRAVEL	X-axis	800mm (31.5″)
	Y-axis	930mm (36.6″)
	Z-axis	830mm (32.7″)
Max Workpiece Swing Diameter		750mm (29.5″)
Height		700mm (27.6″)
Weight		600kg (1320 lbs)

HN63E-5X

TRAVEL	X-axis	900mm (35.4″)
	Y-axis	930mm (36.6″)
	Z-axis	830mm (32.7″)
Max Workpiece Swing Diameter		950mm (37.4″)
Height		800mm (31.5″)
Weight		1000kg (2200 lbs)

HEAVY DUTY BOXWAY STYLE MACHINE CONSTRUCTION

As Niigata's tradition, guide ways are a combination of hardened and ground hand-scraped turcite ways that provide superior stability and vibration dampening characteristics as well as a long life. The cross section of the rectangular guide ways are thick and wide for maximum machine rigidity.

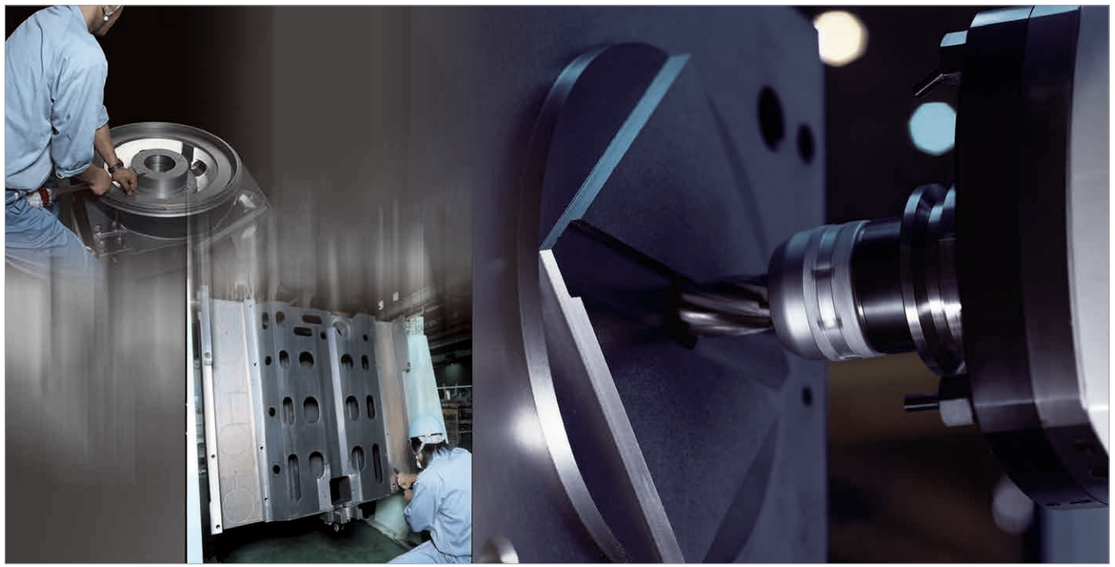
NIIGATA'S SOLUTION FOR EFFICIENT MACHINING OF COMPLICATED-FORM AND 3D CURVES COMPONENTS

Simultaneous 5-axis machining achieves improved cycle time and machined surface.

NIIGATA'S SOLUTION FOR PROCESS INTEGRATION

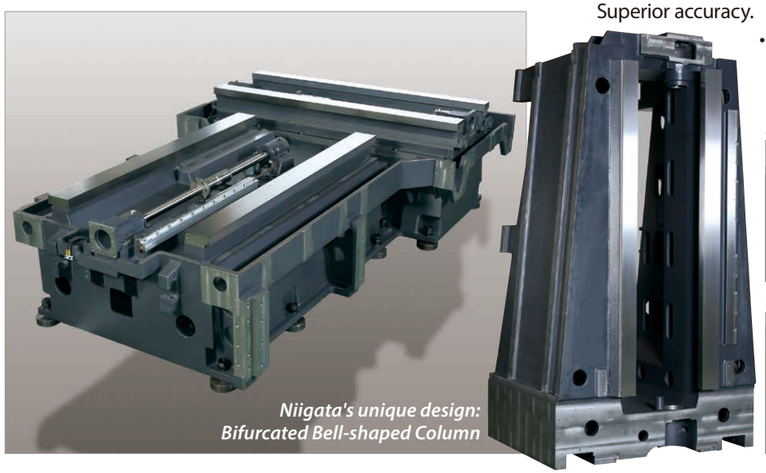
5-face machining achieves reduced number of setup and simplified fixtures for a significant reduced changeover time.

DESIGNED AND BUILT FOR ACCURACY, HEAVY DUTY METAL CUTTING



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 have been engineered to maximize metal cutting efficiency.
Solid and well-balanced components satisfy wide variety of production needs.

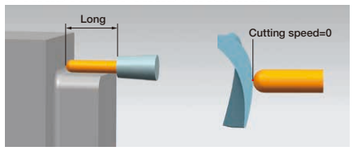


Niigata's unique design: Bifurcated Bell-shaped Column

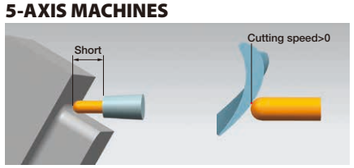
SUPERIOR FEATURES OVER THE 3-AXIS AND 4-AXIS MACHINES

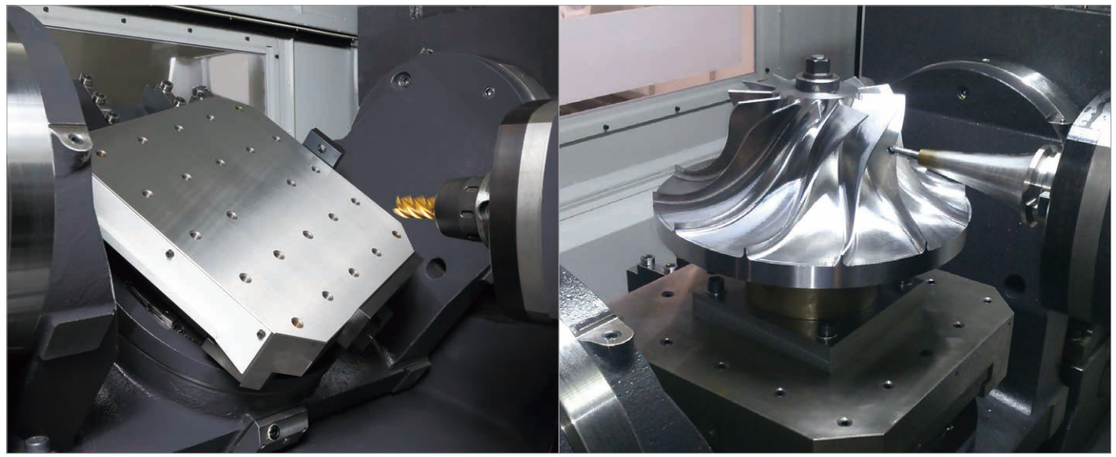
- Efficient Machining
  Complicated-form components such as Impellers and Turbine blade.
  3D curved components such as dies and molds.
- Improved machining accuracy
  Better cutting conditions.
  Superior accuracy.
- Process integration
  Reduced number of setup.
  Simplified fixtures.

3-AXIS AND 4-AXIS MACHINES



5-AXIS MACHINES





NIIGATA's OWN DESIGN HEAVY DUTY 5 AXIS TRUNNION TABLE

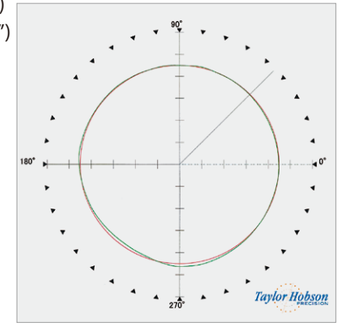
Both ends supported by High Load Type Roller BRG and Double-Lead Worm Gear system to achieve heavy duty machining capability.

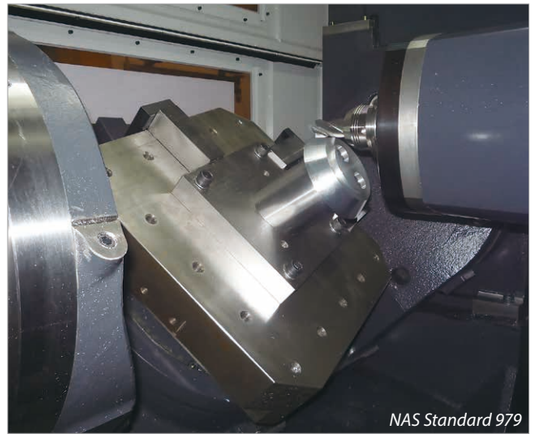
SCALE FEEDBACK SYSTEM AS STANDARD

HN-5X series is equipped with optical scale feedback system (on X, Y, Z axes) and inductive scale feedback system (on A, B axes) as standard. This feature provides consistent long life dynamic machine accuracy.

SIMULTANEOUS 5-AXIS MACHINING ACCURACY RESULTS (HN50E-5X)

ALUMINIUN CONE one cutting (End Milling)
Roundness: 0.0054mm {0.000213"}
Tolerance: 0.020mm {0.000787"}
Material: A5052 (Alminium)
Processing Dia.: Φ150 (5.91")
V= 300m/min {984 SFM}
F= 640mm/min {25 ipm}
t = 0.1mm/min {0.004"}





NAS Standard 979

OUTSTANDING CHIP REMOVAL PROVES SUBSTANTIAL MACHINE RIGIDITY

NIGATA
HN-5X SERIES

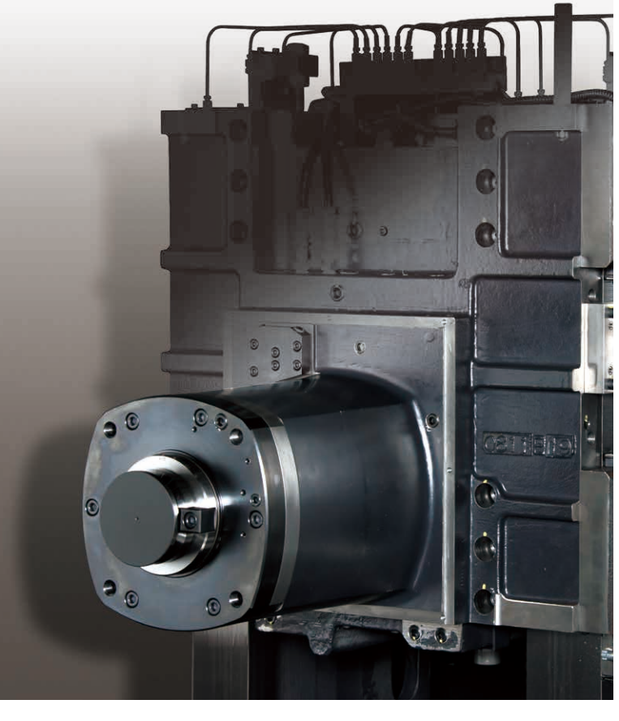
HIGH TORQUE HEAVY DUTY SPINDLE

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

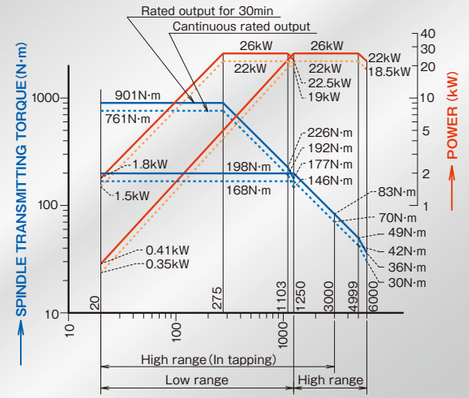
The spindle head stock is mono-cast (single piece) castings to achieve heavy and powerful milling capability and greater accuracy than bolt-together type spindle heads. This high performance spindle, power, and torque complements the extremely rigid machine frame.
A variety of high performance spindles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

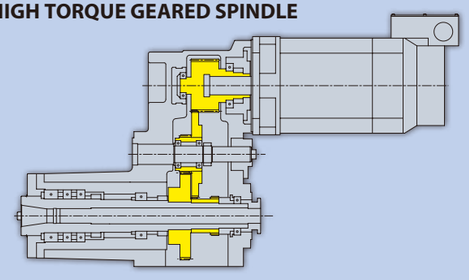
Full 26kW (35HP) cuts are achieved through an advanced two(2) range head stock. With only three(3) rotating components, maximum power is transmitted simply and efficiently to the cutting tool.



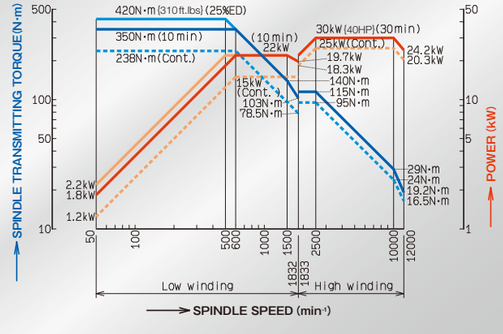
SPINDLE SPEED AND TORQUE DIAGRAM
6000min^{-1} SPINDLE (Standard)



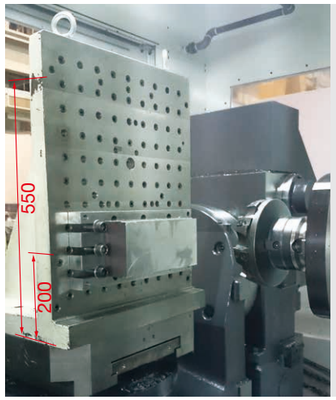
HIGH TORQUE GEARED SPINDLE



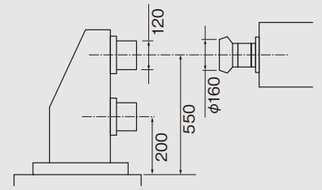
SPINDLE SPEED AND TORQUE DIAGRAM
HIGH SPEED 12000min^{-1} SPINDLE (Option)
/ Spindle torque 420N·m

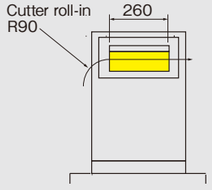


EXAMPLE OF MACHINING PERFORMANCE (HN50E-5X)



Milling



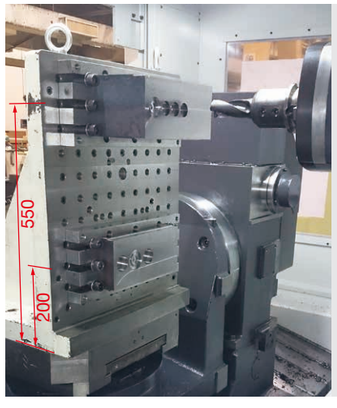


Y-axis Height H=200 mm (7.87")

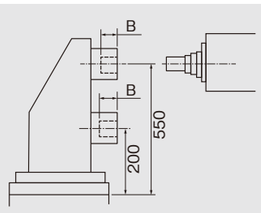
Material	: S48C
Tool	: Ø160-8T
Cutting Volume	: 518 cm^3/min (31.6 inch^3/min)
Cutting Depth	: 6 mm (0.236")
Cutting Width	: 120 mm (4.72")
Feedrate	: 720 mm/min (28.3 ipm)
Spindle Speed	: 300 min^{-1} (300 rpm)
Surface Speed	: 150 m/min (492 SFM)

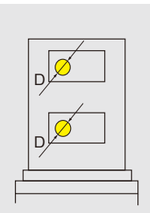
Y-axis Height H=550 mm (21.65")

Material	: S48C
Tool	: Ø160-8T
Cutting Volume	: 190 cm^3/min (11.6 inch^3/min)
Cutting Depth	: 3 mm (0.118")
Cutting Width	: 120 mm (4.72")
Feedrate	: 528 mm/min (20.8 ipm)
Spindle Speed	: 275 min^{-1} (275 rpm)
Surface Speed	: 138 m/min (453 SFM)



Drilling





Y-axis Height H=200 mm (7.87")

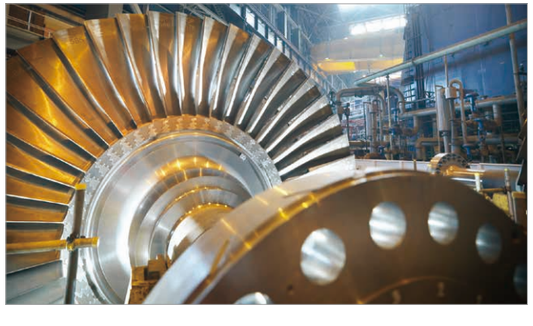
Material	: S48C
Tool	: Ø40 drill (1.57")
Cutting Volume	: 144 cm^3/min (8.7 inch^3/min)
Tool length	: 250 mm (9.84")
Spindle Load	: 44 %
Spindle Speed	: 1154 min^{-1} (1154 rpm)
Surface Speed	: 145 m/min (475 SFM)

Y-axis Height H=550 mm (21.65")

Material	: S48C
Tool	: Ø29 drill (1.14")
Cutting Volume	: 105 cm^3/min (6.4 inch^3/min)
Tool length	: 240 mm (9.44")
Spindle Load	: 26 %
Spindle Speed	: 1592 min^{-1} (1592 rpm)
Surface Speed	: 145 m/min (475 SFM)

NIIGATA HN-SERIES REFERENCED SUPPLY INDUSTRIES

Power generation as well as aircraft industries in the field of "Turbine Blades" machining is key industry. Niigata's heavy duty box way style horizontal machining centers have been well accepted and have been improving the capability of these industries world wide.



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.

PALLET CHANGER

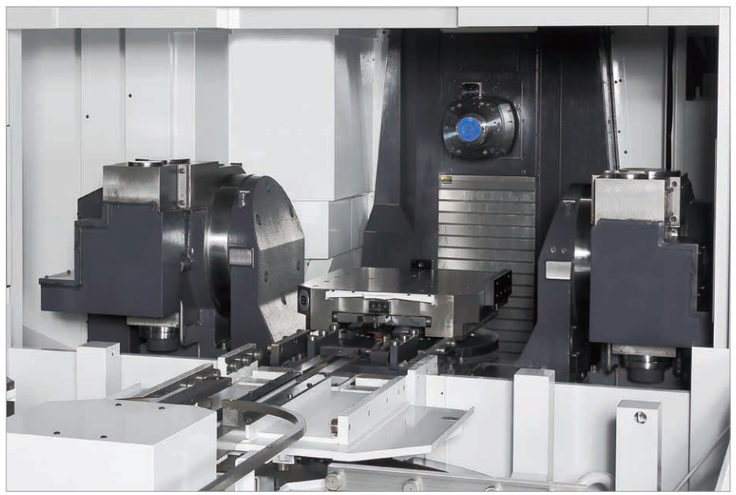
The APC is capable of indexing every 90 degree with foot pedal, so that multiple work piece can be easily mounted on each postion.

NEW GENERATION OPERATION PANEL WITH 15"COLOR LCD

HN-5X series is equipped with 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.

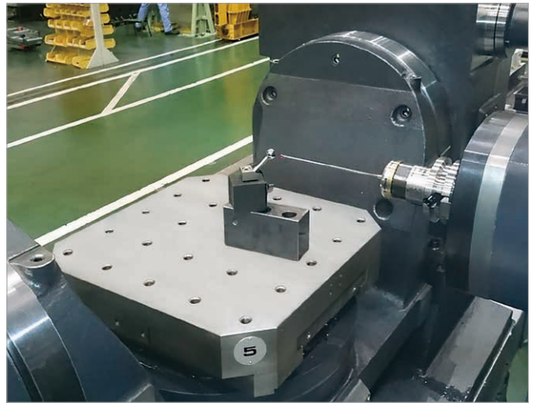
SAFE AND CONVENIENT SETUP OF TOOLING

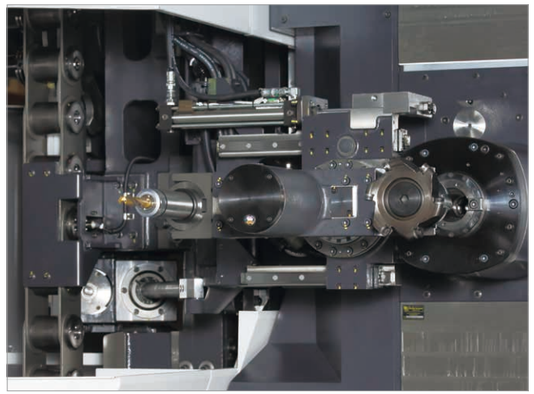
The tool magazine is on the side of the machine, outside the chip enclosure, and away from the cutting area. This design permits easy accessibility for tool inspection and replacement.
Jog rotation of the tool magazine during automatic cycles facilitates tool inspection and changeover to maximize utilization.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



HIGH RELIABILITY AND EASE OF MAINTENANCE

NIGATA HN-5X SERIES





QUICK AND EASY 5-AXIS COMPENSATION FUNCTION

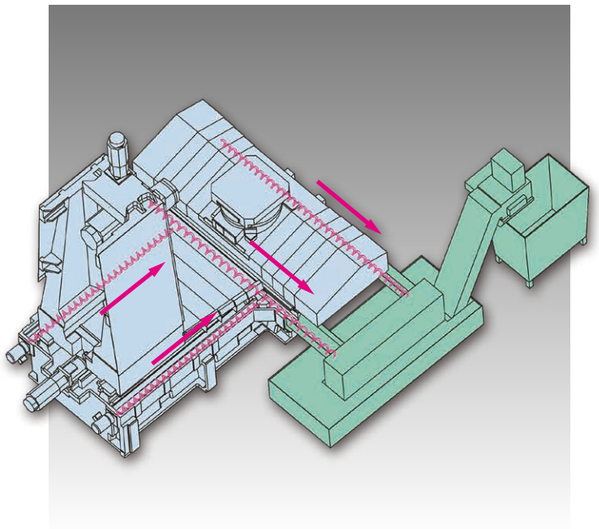
Probe and a true sphere search the center of A, B-axis rotation.
Compensate for gap of A, B-axis rotation center.
Maintain high accuracy over long periods.

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

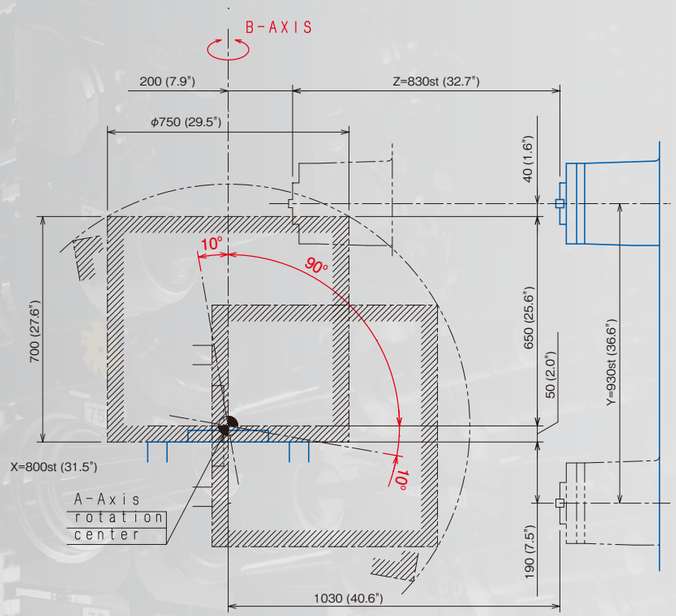


MACHINE DIMENSIONS
—HN50E-5X

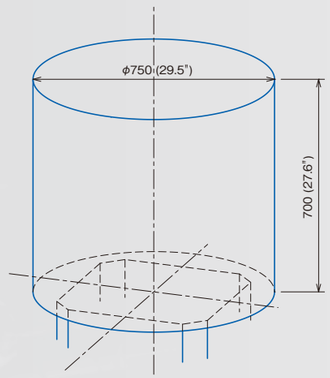
HN-5X SERIES

Unit : mm(inch)

Axis Travels

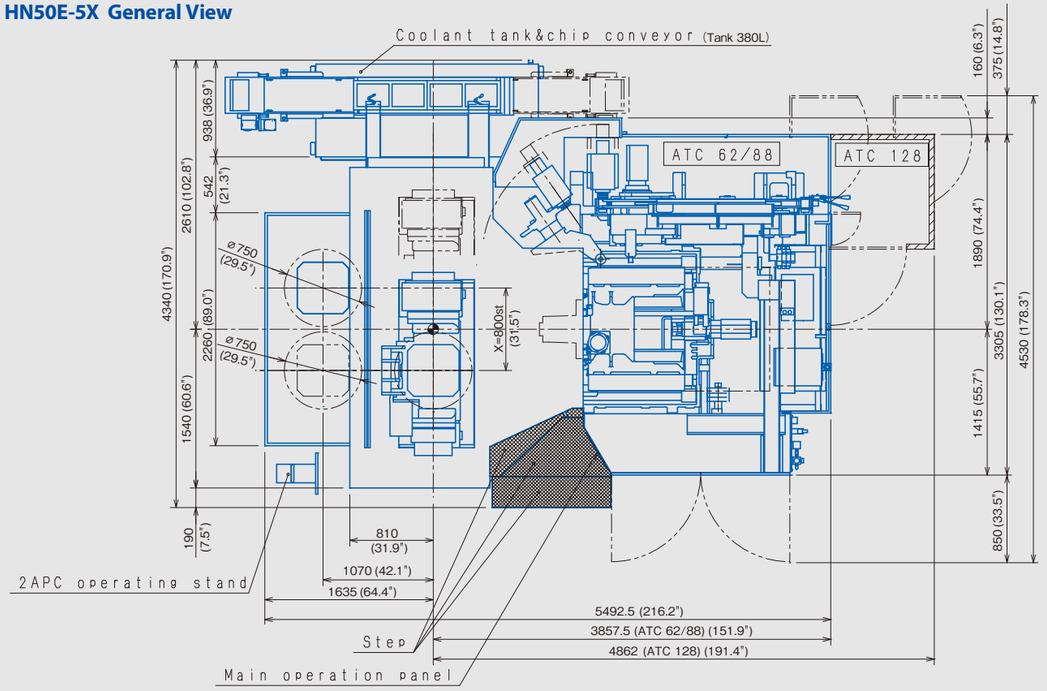


Maximum Workpiece Envelope

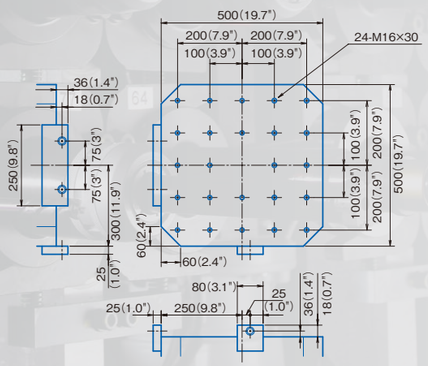


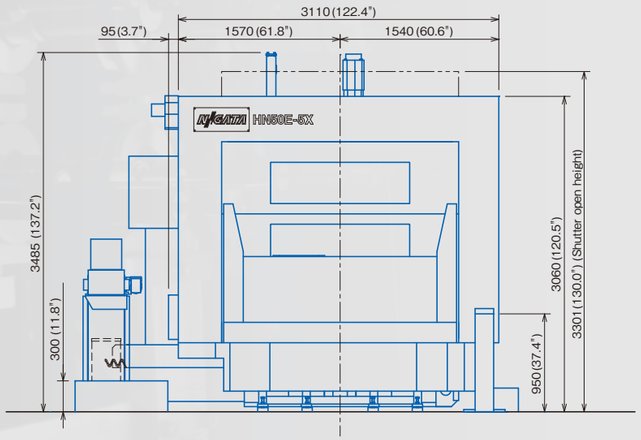
HN50E-5X General View

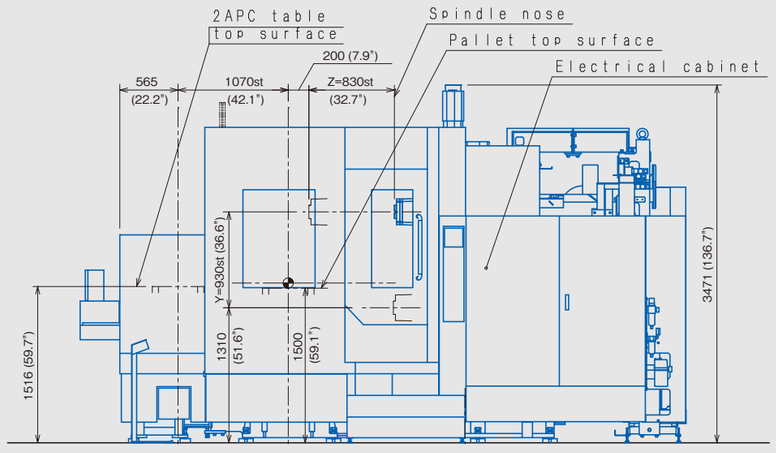
Unit : mm(inch)



Standard Pallet Top Surface





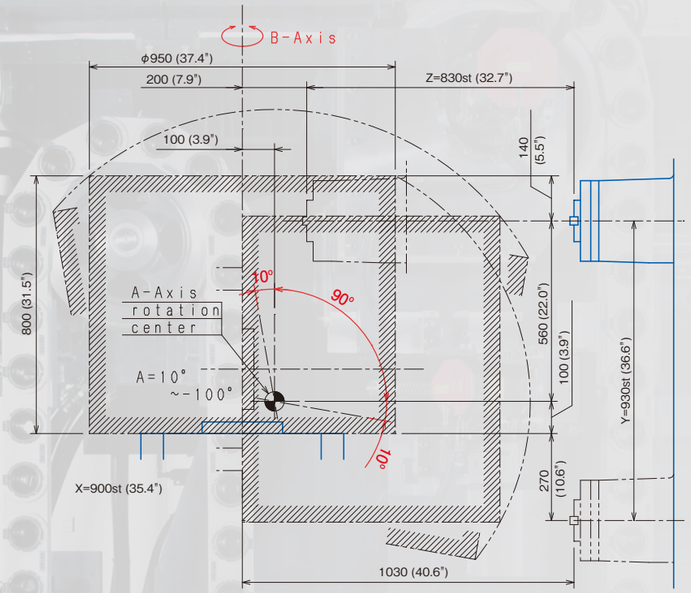


MACHINE DIMENSIONS
—HN63E-5X

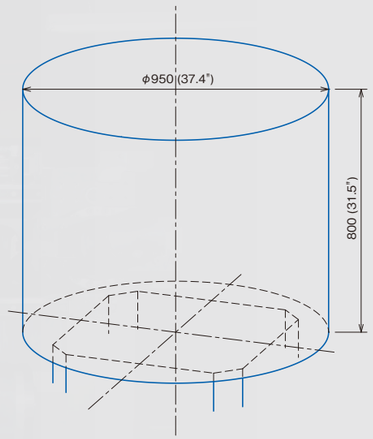
HN-5X SERIES

Unit : mm(inch)

Axis Travels

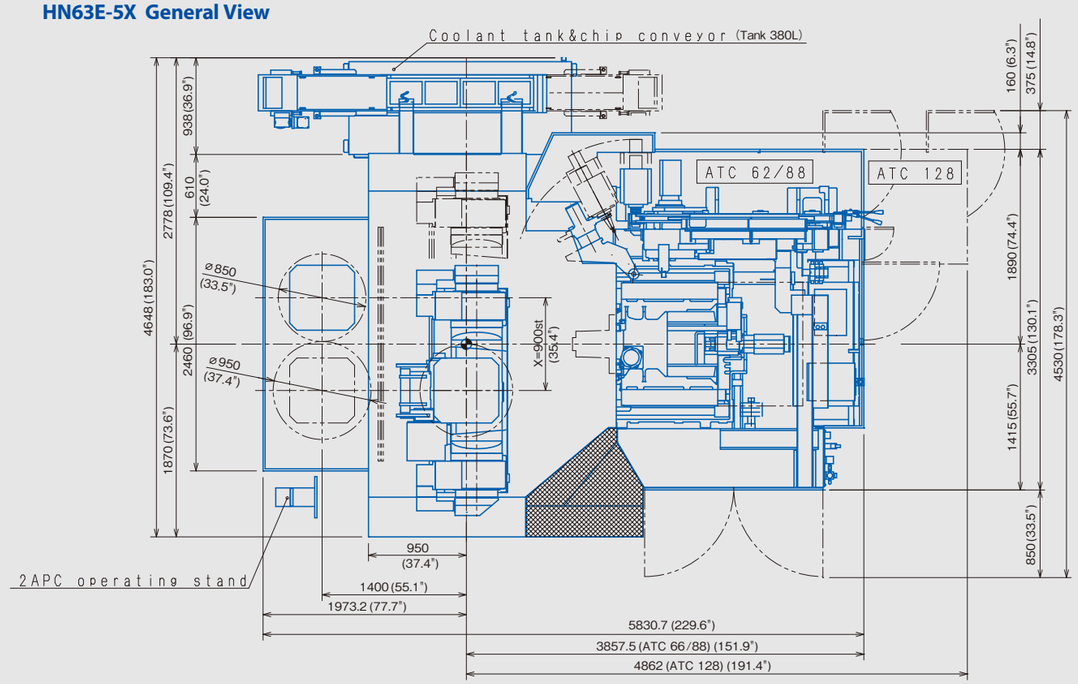


Maximum Workpiece Envelope

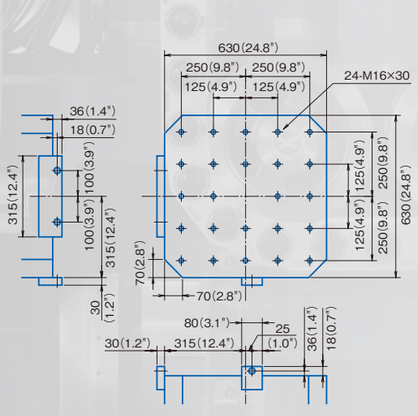


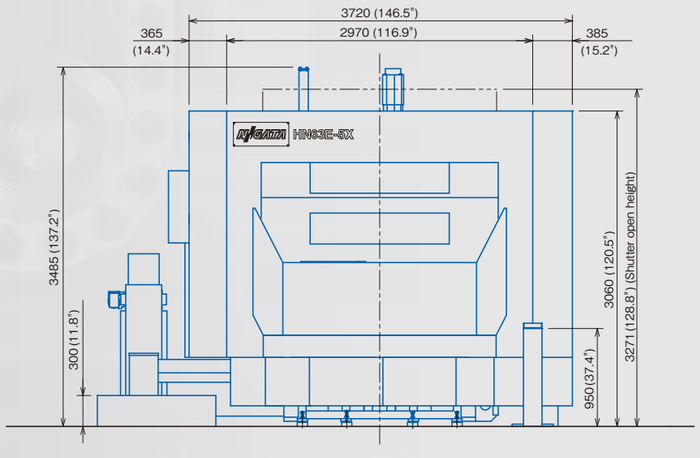
HN63E-5X General View

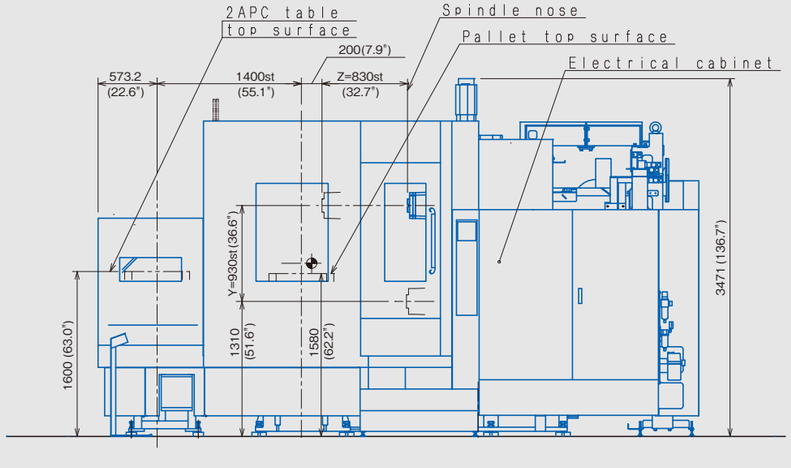
Unit : mm(inch)



Standard Pallet Top Surface

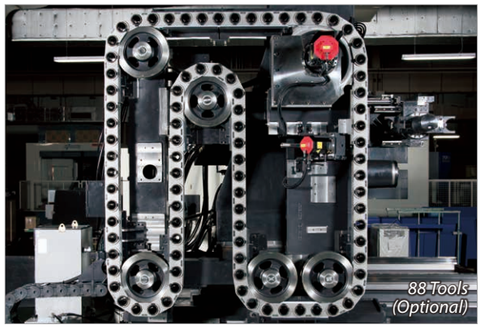


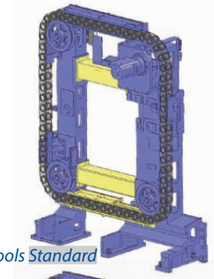


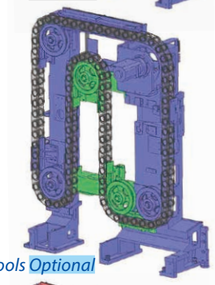


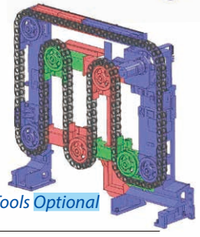
WIDE RANGE OF OPTIONS TO ANSWER YOUR INDIVIDUAL MACHINING REQUIREMENTS

NIIGATA HN-SERIES MODULAR DESIGN CONCEPT FIELD EXPANDABLE ATC MAGAZINE

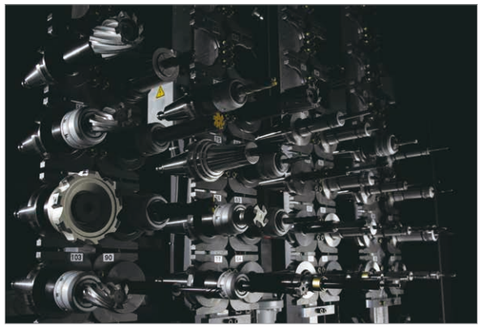



62 Tools Standard

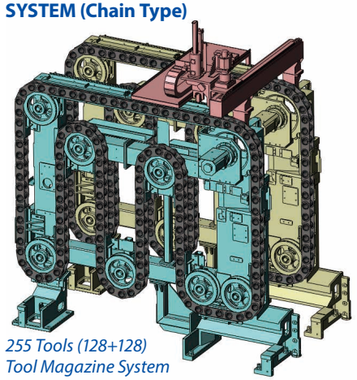

88 Tools Optional


128 Tools Optional

MATRIX TYPE AUTOMATIC TOOL CHANGE SYSTEM



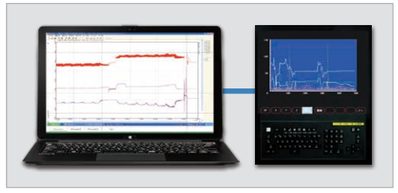
EXAMPLE OF AUTO TOOL CHANGE SYSTEM (Chain Type)

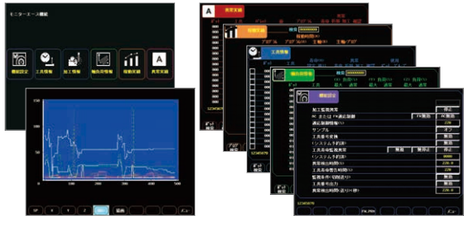

255 Tools (128+128)
Tool Magazine System

ADVANCED UNMANNED MONITORING SYSTEM NIIGATA NM24 MONITOR ACE

KEY FEATURES

- Graphical User Interface:
  Multi-Language / A Variety Of Icons
- Display on Machine Operational Screen:
  All Main Features Shown on Machine Operational Screen (Fanuc CNC Control) PC version (Optional)
- Cutting Monitor by High Speed Sampling:
  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



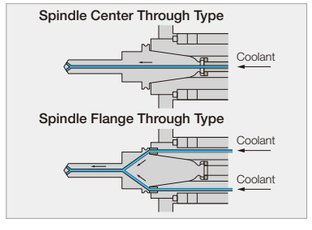


OPTIONAL FEATURES

Multiple Pallet Magazine Carousel Type APC System

Linear Pallet Magazine System with Niigata ICC System Controller

Lift-up External Conveyor and Coolant Tank



MACHINE SPECIFICATIONS

NIIGATA
HN-5X SERIES

ITEM		HN50E-5X		HN63E-5X	
		Metric	Inch	Metric	Inch
TRAVEL	X axis travel (longtitudinal table)	800 mm	31.5 "	900 mm	35.4 "
	Y axis travel (vertical head)	930 mm	36.6 "	930 mm	36.6 "
	Pallet horizontal : Distance from pallet surface to spindle center	(-190 ~ 740) mm	(-7.5 ~ 29.1) "	(-270 ~ 660) mm	(-10.6 ~ 25.9) "
	Pallet vertical : Distance from pallet center to spindle center	(-240 ~ 690) mm	(-9.4 ~ 27.1) "	(-470 ~ 460) mm	(-18.5 ~ 18.1) "
	Z axis travel (column in & out)	830 mm	32.7 "	830 mm	32.7 "
	Pallet horizontal : Distance from pallet center to spindle gauge plane	(200 ~ 1030) mm	(7.8 ~ 40.5) "	(200 ~ 1030) mm	(7.8 ~ 40.5) "
	Pallet vertical : Distance from pallet surface to spindle gauge plane	(250 ~ 1080) mm	(9.8 ~ 42.5) "	(200 ~ 1030) mm	(7.8 ~ 40.5) "
	A axis travel (Trunion rotation)	10° ~ -100°	10° ~ -100°	10° ~ -100°	10° ~ -100°
	B axis trabel (Pallet rotation)	360°	360°	360°	360°
TABLE	Table working surface	500 x 500 mm	19.7 " x 19.7 "	630 x 630 mm	24.8 " x 24.8 "
	Table increments	0.001°	0.001°	0.001°	0.001°
	Maximum mass on pallet	600 kg	1320 lbs	1000 kg	2200 lbs
SPINDLE	Spindle drive motor	AC 26 kW	AC 35 HP	AC 26 kW	AC 35 HP
	Spindle speeds	20 ~ 6000 min^{-1}	20 ~ 6000 rpm	20 ~ 6000 min^{-1}	20 ~ 6000 rpm
	Spindle max. torque	901 N·m	665 ft.lbs	901 N·m	665 ft.lbs
	Spindle taper	No.50	No.50	No.50	No.50
FEEDRATE	Rapid traverse X, Y, Z axes	30 m/min	1181 ipm	30 m/min	1181 ipm
	Rapid traverse A axis	8 min^{-1}	8 rpm	6 min^{-1}	6 rpm
	Rapid traverse B axis	20 min^{-1}	20 rpm	15 min^{-1}	15 rpm
	Cutting X, Y, Z axes	15 m/min	591 ipm	15 m/min	591 ipm
	Cutting A axis	720°/ min^{-1}	720°/ min^{-1}	720°/ min^{-1}	720°/ min^{-1}
	Cutting B axis	720°/ min^{-1}	720°/ min^{-1}	720°/ min^{-1}	720°/ min^{-1}
AUTOMATIC TOOL CHANGER (ATC)	Tool magazine capacity (Chain)	62 [88/128]	62 [88/128]	62 [88/128]	62 [88/128]
	Tool magazine capacity (MATRIX)	[126/178/230]	[126/178/230]	[126/178/230]	[126/178/230]
	Tool shank	BT 50	CT 50	BT 50	CT 50
	Maximum tool length	550 mm	21.7 "	550 mm	21.7 "
	Maximum milling cutter dia.	Φ 120 mm	Φ 4.7 "	Φ 120 mm	Φ 4.7 "
	Ditto adlacent pockets empty	Φ 230 mm	Φ 9.1 "	Φ 230 mm	Φ 9.1 "
	Maximum boring dia.	Φ 410 mm	Φ 16.1 "	Φ 410 mm	Φ 16.1 "
AUTOMATIC PALLET CHANGER (APC) SYSTEM	Type	Side by side shuttle	Side by side shuttle	Side by side shuttle	Side by side shuttle
	Number of pallets	2	2	2	2
ACCURACY	Positioning / full stroke X-Y-Z	± 0.003 mm	± 0.00012 "	± 0.003 mm	± 0.00012 "
	Repeatability X-Y-Z	± 0.001 mm	± 0.00004 "	± 0.001 mm	± 0.00004 "
	Positioning A	± 5 "	± 5 "	± 5 "	± 5 "
	Repeatability A	± 3 "	± 3 "	± 3 "	± 3 "
	Positioning B	± 5 "	± 5 "	± 5 "	± 5 "
	Repeatability B	± 3 "	± 3 "	± 3 "	± 3 "
GENERAL	Machine weight approx.	19700 kg	43431 lbs	22200 kg	48942 lbs
	Machine space W / D	4340 x 5500 mm	170 " x 216 "	4648 x 5831 mm	183 " x 230 "
	Machine space H	3485 mm	137 "	3485 mm	137 "
	Power	71 kVA	71 kVA	76 kVA	76 kVA

Figures in [ ] indicate optional features.

STANDARD EQUIPMENT

- 6000min^{-1} (rpm) 26kW Two Geared Spindle
- Scale Feedback System X, Y, Z, A, B axes
- 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 Change with 62 Tools capacity (ATC)
- 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
- Rigid Tapping
- Manual Pulse Generator with XYZAB 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 (with 2APC)
- Renishaw A,B-axis compensation function with probing function
- Fanuc CNC System with 15" Color LCD
- One set of Machine and Fanuc Manuals (1printed, and 1CD)
- 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)

PALLET and PALLET CHANGER SYSTEM
- Carousel Type Multipile 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

CUTTING MONITORING FUNCTION
- Advanced Unmanned Monitoring System: Niigata NM24 Monitor Ace
- Tool Breakage Detector System LS-Z Type

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

SPINDLE
- BIG-PLUS Spindle
- HSK-A100 Spindle
- 6000min^{-1} High Stiffness Spindle Version
- Four Face Part Program Control Function