NIIGATA A World Leader of Horizontal Machining Centers

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NIIGATA UNMANNED SYSTEM

LRQA CERTIFIED ISO 9001 UKAS MANAGEMENT SYSTEMS 0001

NORTH AMERICA SITE
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2022.8.2000.SAN

NIIGATA
HN-5X SERIES

HN-5X

HN50E-5X / HN63E-5X / HN80E-5X

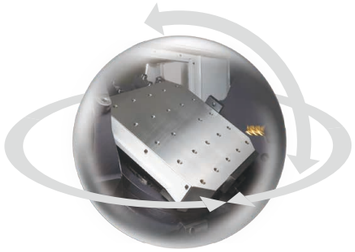
5-AXIS TRUNNION—HEAVY DUTY BOXWAY STYLE
HORIZONTAL MACHINING CENTER

NIIGATA MACHINE TECHNO CO., LTD.
Niigata, Japan

HIGH RIGIDITY TRUNION TABLE 5-AXIS HORIZONTAL MACHINING CENTER—*NIIGATA NEW MODEL HN-5X SERIES*

Niigata's 5-Axis Horizontal Machining Center HN80E-5X DESIGNED FOR COMPLEX, LARGE PART MACHINING

The Model HN-5X is the result of NIIGATA's constant research and development to support profitable machining of complex, large parts. Key development criteria for the "HN-5X" series were: large capacity, higher productivity, and increased accuracies. Niigata world leader of horizontal machining centers, is proud to declare that the model HN-5X, design achieved significant performance advances, to meet or exceed requirements of your production needs. Niigata has developed a new BOX way machine HN-5X series equipped with a high-rigidity trunnion 5-axis table. The trunnion 5-axis table is a one piece casting, both ends are supported by high-rigidity roller bearings, and worm and wheel drives. The mechanical structure emphasizes rigidity and maintains stable machining accuracy.



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

HN50E-5X

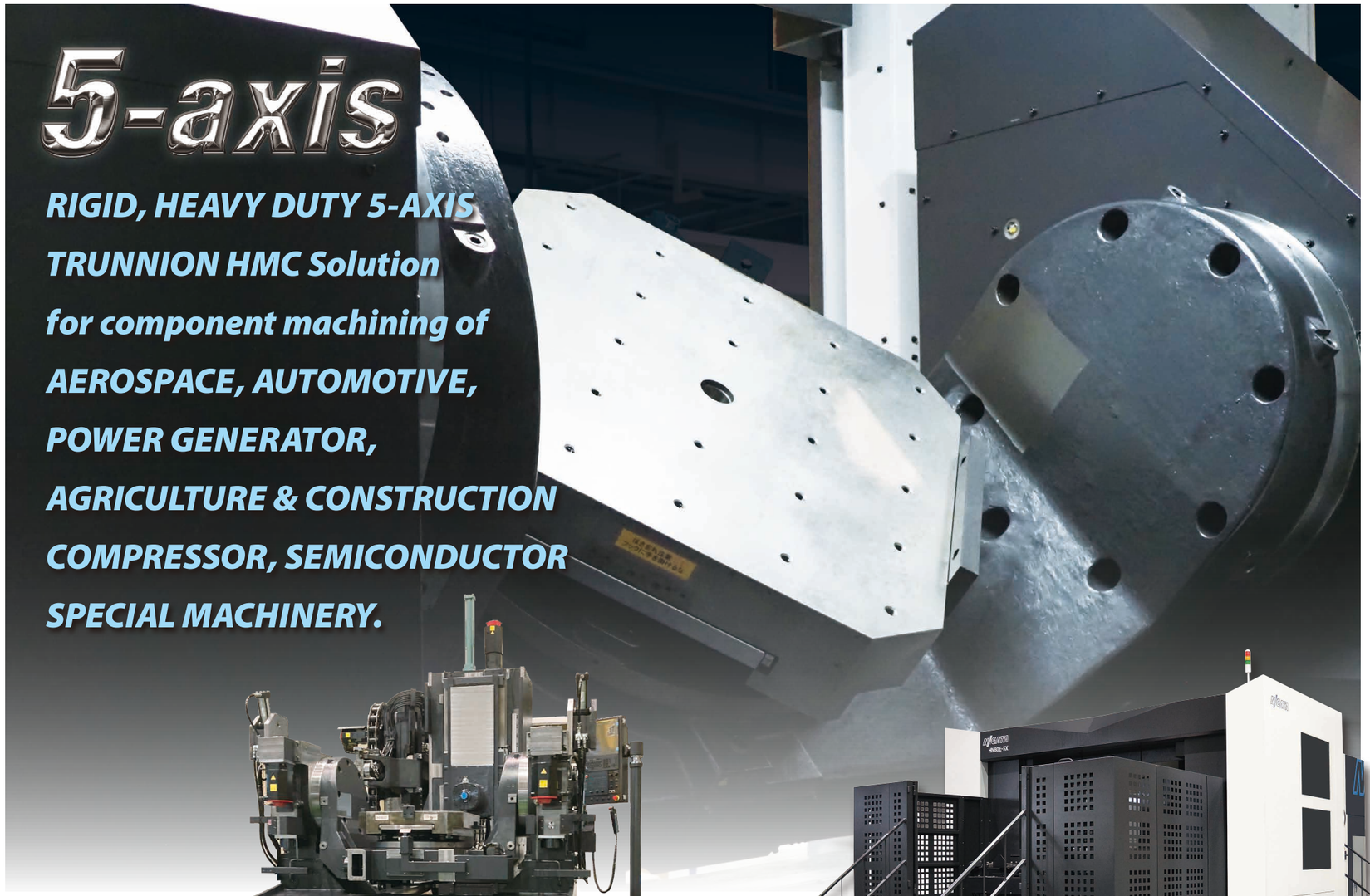
TRAVEL	X-axis	800mm (31.5″)
	Y-axis	930mm (36.6″)
	Z-axis	830mm (32.7″)
Max Workpiece Swing Diameter		750mm (29.5″)
Height		700mm (27.6″)
Weight		600kg (1320 lbs)

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)

HN80E-5X

TRAVEL	X-axis	1250mm (49.2″)
	Y-axis	1230mm (48.4″)
	Z-axis	1200mm (47.2″)
Max Workpiece Swing Diameter		1250mm (49.2″)
Height		1000mm (39.3″)
Weight		1500kg (3300 lbs)



HN80E-5X Machine Structure

Photo: HN80E-5X

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 PROCESS INTEGRATION

If the workpiece has a complicated shape and has a wide variety of machining points, the workpiece may be machined on multiple machines or the setup may be changed multiple times. The HN-5X series cutting tool moves in X, Y, Z linear axis and rotation A & B axis. It is capable of processing five sides of a part in a single set up.

HIGH OUTPUT SOLUTION

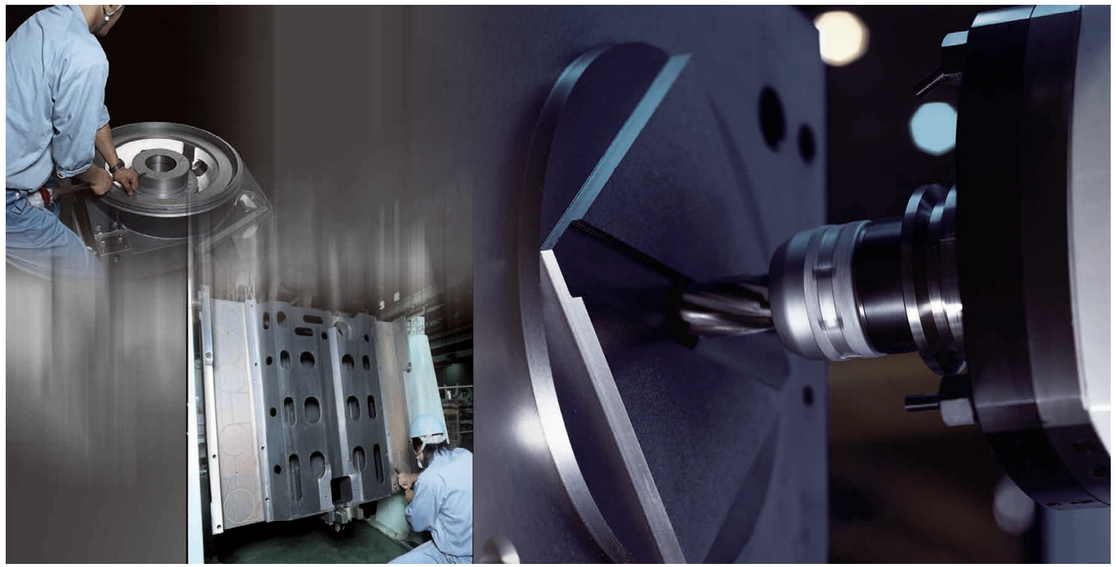
High horse power and torque allow you to take full advantage of the rigid machine frame.

SUPER HIGH TORQUE HEAVY DUTY SPINDLE

6000min^{-1} (rpm), 1948 N·m (1438 ft·lbs) Super High Torque Spindle is available (option) for cutting of "DIFFICULT-TO-MACHINE" material. (HN80E-5X)

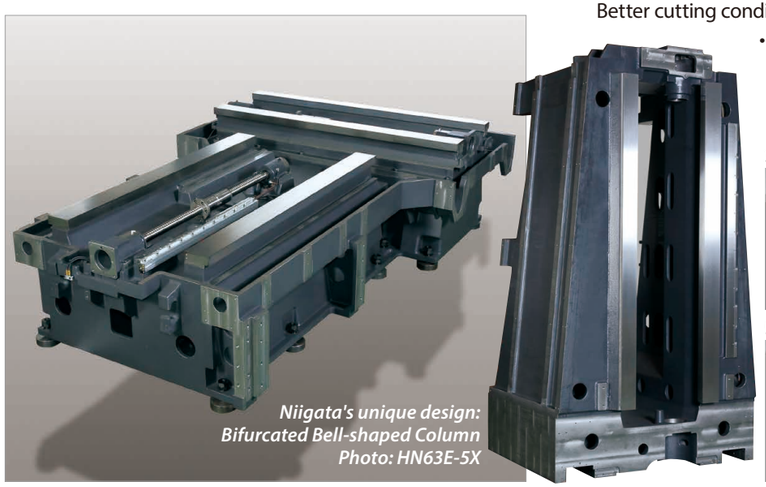
DESIGNED AND BUILT FOR ACCURACY, HEAVY DUTY METAL CUTTING

NIIGATA
HN-5X SERIES



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 a wide variety of production needs.

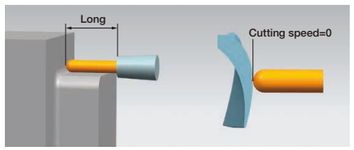


Niigata's unique design:
Bifurcated Bell-shaped Column
Photo: HN63E-5X

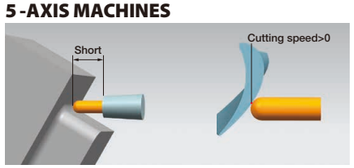
SUPERIOR FEATURES OVER THE 3 -AXIS AND 4 -AXIS MACHINES

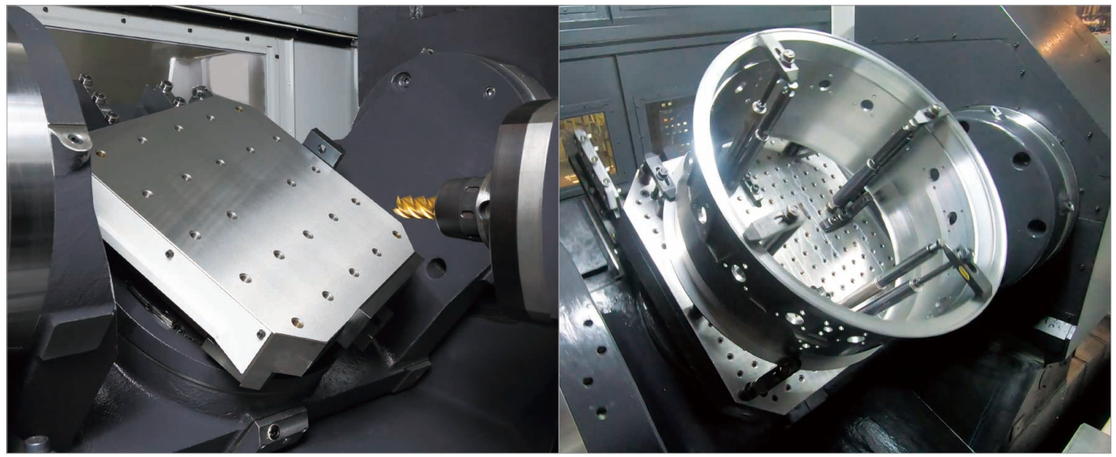
- Efficient Machining
  Complicated-form components such as Impellers and Turbine blade.
  3 D curved components such as dies and molds.
- Greater machining accuracy
  Better cutting conditions.
- Process integration
  Reduced number of setups.
  Simplified fixtures.

3 -AXIS AND 4 -AXIS MACHINES



5 -AXIS MACHINES





NIIGATA's OWN DESIGN HEAVY DUTY 5 -AXIS TRUNNION TABLE

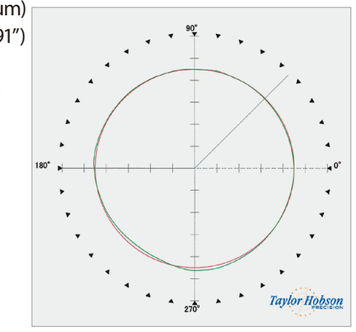
Both ends are supported by High Load Type Roller BRG and Double-Lead Worm Gear system to achieve heavy duty machining capability.

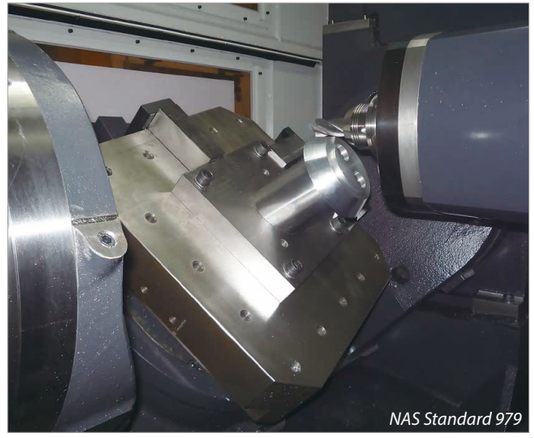
SCALE FEEDBACK SYSTEM AS STANDARD

HN-5 X 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 (HN63E-5X)

ALUMINUM CONE ONE CUTTING (End Milling)
Roundness: 0.0076mm (0.000299")
Tolerance: 0.020mm (0.000787")
Material: A5052 (Aluminum)
Processing Dia.: Φ150 (5.91")
V= 300m/min (984 SFM)
F= 640mm/min (25 ipm)
T= 0.1mm/min (0.004")





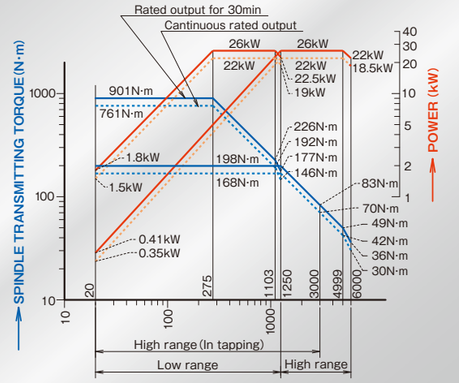
NAS Standard 979

OUTSTANDING CHIP REMOVAL PROVES SUBSTANTIAL MACHINE RIGIDITY

HIGH TORQUE HEAVY DUTY SPINDLE

HN50E-5X/63E-5X	6000 min^{-1} (rpm) Standard
POWER	26 kW (35 HP)
TORQUE	901 N•m (665 ft•lbs)

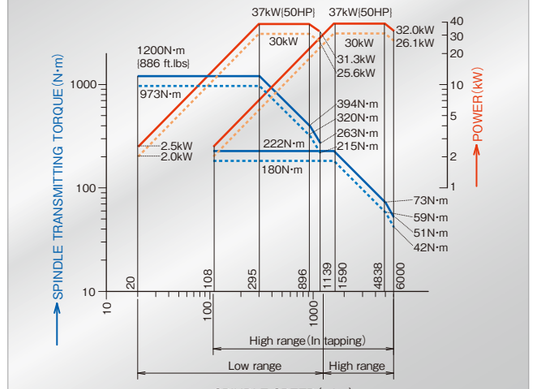
SPINDLE SPEED AND TORQUE DIAGRAM (HN50E-5X / HN63E-5X) 6000min^{-1} SPINDLE (Standard)



HIGH TORQUE HEAVY DUTY SPINDLE

HN80E-5X	6000 min^{-1} (rpm) Standard
POWER	37 kW (50 HP)
TORQUE	1200 N•m (886 ft•lbs)

SPINDLE SPEED AND TORQUE DIAGRAM (HN80E-5X) 6000min^{-1} SPINDLE (Standard)



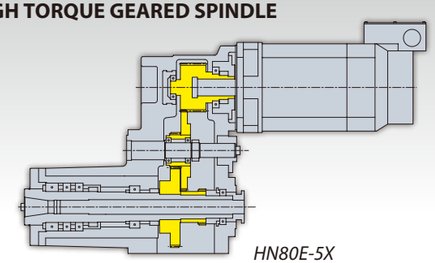
The spindle head stock is a monocast (single piece) casting to achieve heavy powerful milling capability and greater accuracy than bolt-together type spindle head. This high-performance spindle, power, and torque is available in optional high-speed spec. to meet your production needs.

HN50E-5X / HN63E-5X	12000 min^{-1} (rpm)
HN80E-5X	15000 min^{-1} (rpm)

POWERFUL GEARED SPINDLE

The spindle drive system with motor provides a wide range of speed for high torque, heavy duty machining. The spindle speed range is 20 to 6000 min^{-1} for maximum torque.

HIGH TORQUE GEARED SPINDLE



HN80E-5X

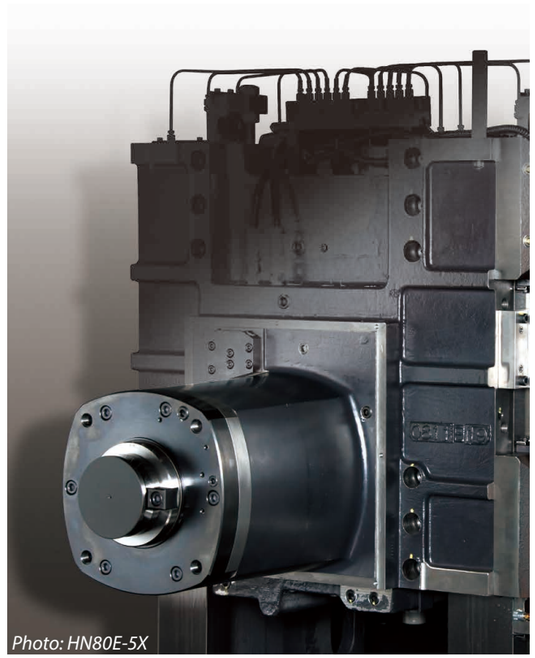
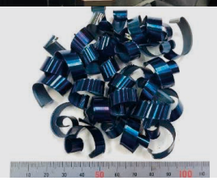
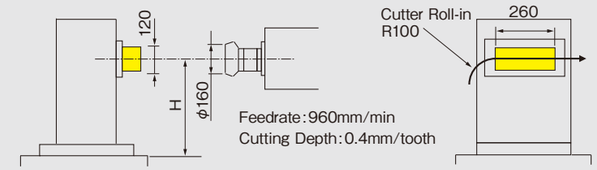


Photo: HN80E-5X

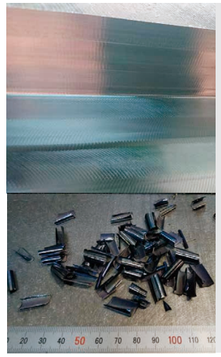
EXAMPLE OF MACHINING PERFORMANCE

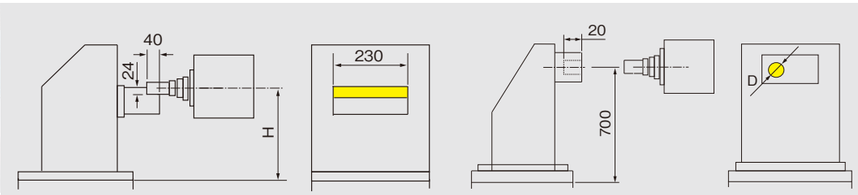




Heavy duty cutting : S48C milling φ160-8T

	Cutting Depth (t)	Hight (H)	Volume
	mm	mm	cm^3/min
HN80E-5X	5	700	576
	8	200	922
	8	350	922



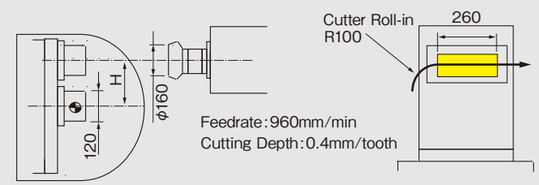


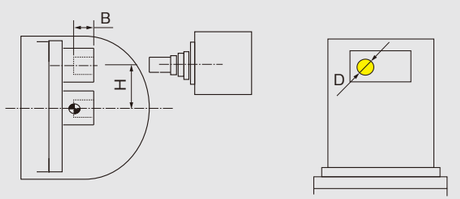
Heavy duty cutting : S48C End mill φ63-T4

	End mill	Radial Depth	Axial Depth	Hight (H)	Volume
	mm	mm	mm	mm	cm^3/min
HN80E-5X	63	24	40	700	873

Heavy duty cutting : S48C Throw away φ60

	Drill (D)	Depth (B)	Hight (H)	Volume
	mm	mm	mm	cm^3/min
HN80E-5X	60	20	700	270





Heavy duty cutting : S48C milling φ160-8T A-axis 90°

	Cutting Depth (t)	Hight (H)	Volume
	mm	mm	cm^3/min
HN80E-5X	8	0	922
	7	300	806
HN63E-5X	8	0	507
	7	150	444
HN50E-5X	6	0	380
	6	150	380

Heavy duty cutting : S48C Throw away φ60

	Drill (D)	Axial Depth (B)	Hight (H)	Volume
	mm	mm	mm	cm^3/min
HN80E-5X	80	20	0	505.9
	80	20	300	505.9
HN63E-5X	40	20	0	144.5
HN50E-5X	40	20	0	144.5
	29	20	150	105.0

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.
Photo: HN65 E-5 X

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 position.

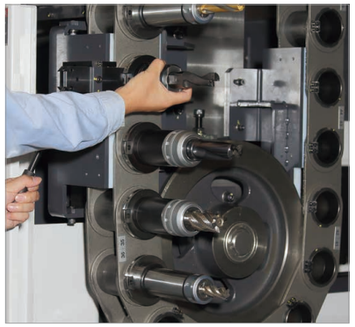
Photo: HN63E-5X

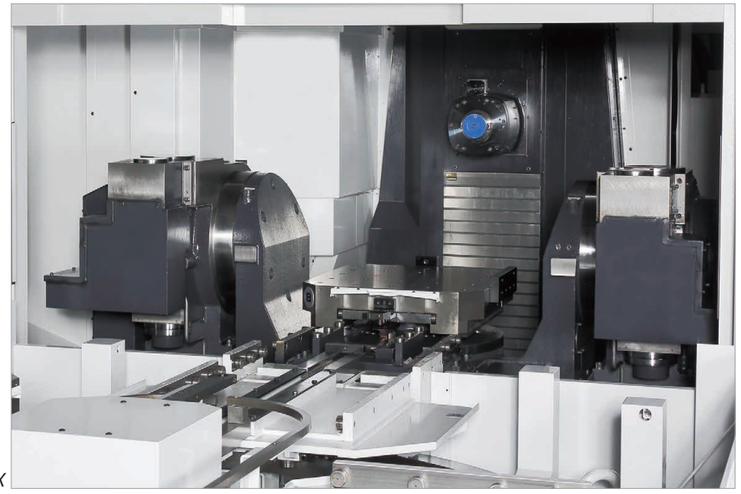
NEW GENERATION OPERATION PANEL WITH 15" COLOR LCD

HN-5 X series is equipped with pendant style NEW generation 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

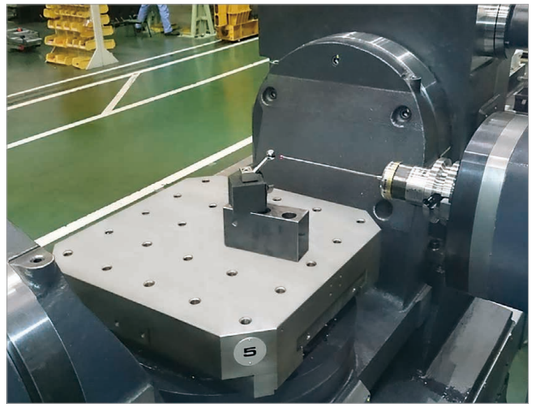
The tool magazine is located on the side of the machine, outside the chip enclosure, and away from the cutting area. This design permits easy accessibility for visual tool inspection and replacement.
Jog rotation of the tool magazine during automatic cycles facilitates tool visual inspection and changeover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

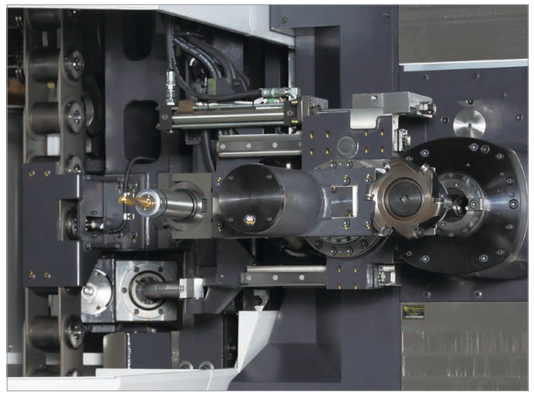




HIGH RELIABILITY AND EASE OF MAINTENANCE

NIGATA HN-5X SERIES





QUICK AND EASY 5-AXIS COMPENSATION FUNCTION

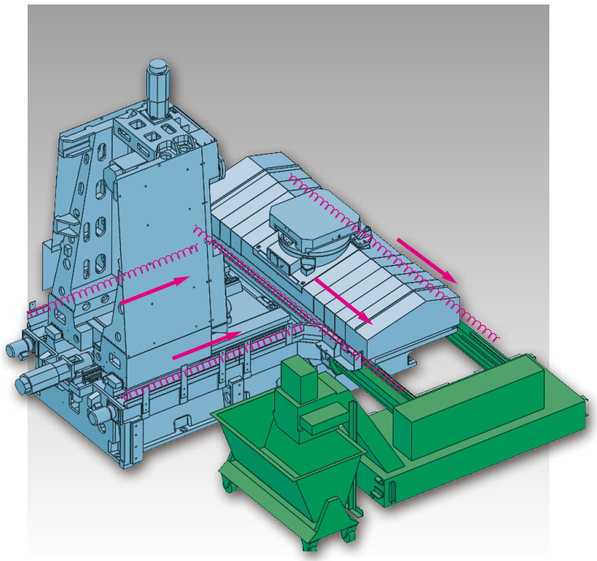
Probe and a true sphere search the center of A, B-axis rotation.
Compensate for gap of A, B-axis rotation center.
To maintain high accuracy over long periods. (By AxiSet™ Optional)

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 tool verification loading/unloading in automatic operation are standard features. The tool magazine and the changer as 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. The augers remove chips from the machine to the conveyor.



MACHINE SPECIFICATIONS

NIIGATA HN-5X SERIES

STANDARD EQUIPMENT

- 6000min⁻¹ (rpm) 37kW Two Geared Spindle (HN80E-5X)
- 6000min⁻¹ (rpm) 26kW Two Geared Spindle (HN50E/63E-5X)
- Scale Feedback System X, Y, Z, A, B axes
- Idle Self Rotation on 2APC System (HN50E/63E-5X)
- Shuttle Type Twin Pallets Automatic Pallet Changer (2APC) (HN50E/63E-5X)
- Pallet Changer with Safety Work-around Platform (2APC) (HN80E-5X)
- Two Pallets with Threaded holes are Niigata's Standard Configuration
- Automatic Tool Change with 62 Tools capacity (ATC)
- Spindle Cooling Unit Controlled by Thermal Sensor in the Machine Base
- Full Enclosure-Type Splash and Chip Guarding with LED Work Light (SPG)
- Front and Rear Spiral Chip Augers Built into the Machine Bed
- Rigid Tapping
- Manual Pulse Generator with X, Y, Z, A, B
- 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 (1 printed, 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)
- Max. Tool Moment 50N·m (36.8 fb·lbs) Capability

PALLET and PALLET CHANGER SYSTEM
- Pallet Changer HN50E / 63E (Safety Guard Light Curtains)
- 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

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

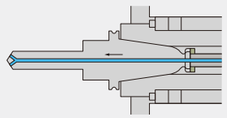
CUTTING MONITORING FUNCTION
- Advanced Unmanned Monitoring System: Niigata NM24 Monitor Ace
- Tool Breakage Detector System LS-Z Type
- Four Face Part Program Control Function

SPINDLE
- BIG-PLUS Spindle
- HSK-A100 Spindle
- 6000min⁻¹ High Stiffness Spindle Version

OPTIONAL FEATURES

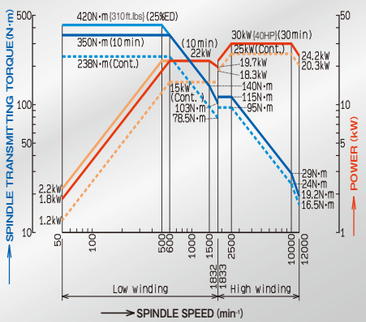
HIGH PRESSURE COOLANT THROUGH SPINDLE

Spindle Center Through Type

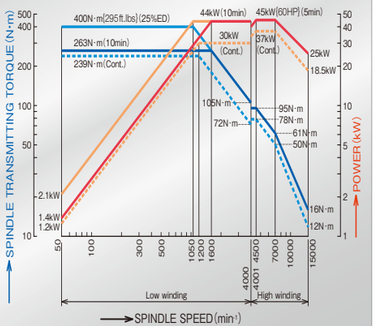


LIFT-UP EXTERNAL CONVEYOR AND COOLANT TANK

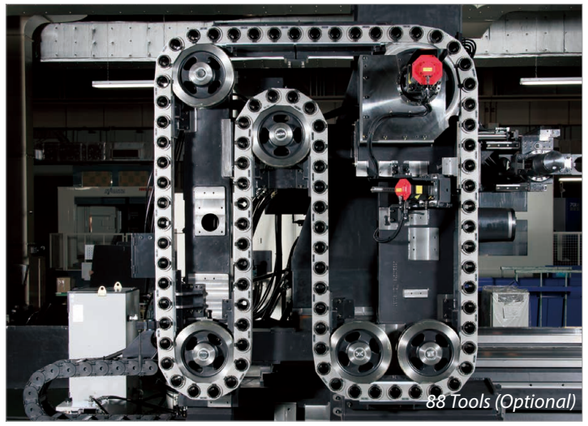
SPINDLE SPEED AND TORQUE DIAGRAM
HIGH SPEED 12000min⁻¹ SPINDLE (Option) / Spindle torque 420N·m



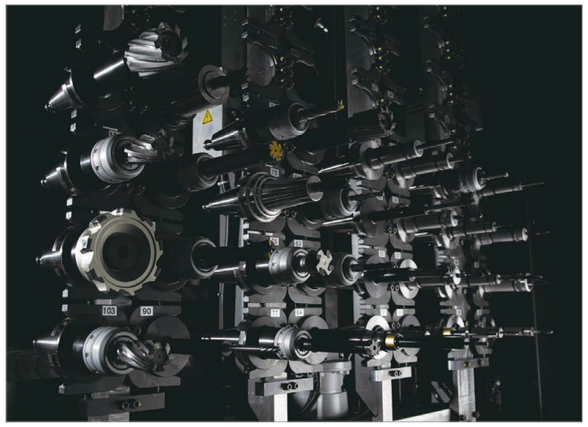
15000 min⁻¹ SPINDLE High Power Spec. (Option)



NIIGATA HN-SERIES MODULAR DESIGN FIELD EXPANDABLE ATC MAGAZINE



MATRIX TYPE AUTOMATIC TOOL CHANGE SYSTEM

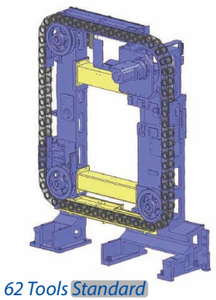


MULTIPLE PALLET MAGAZINE

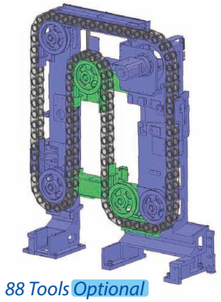
Carousel Type APC System

Shown without safety fence

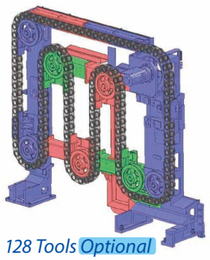
LINEAR PALLET MAGAZINE SYSTEM WITH NIIGATA ICC SYSTEM CONTROLLER



62 Tools Standard

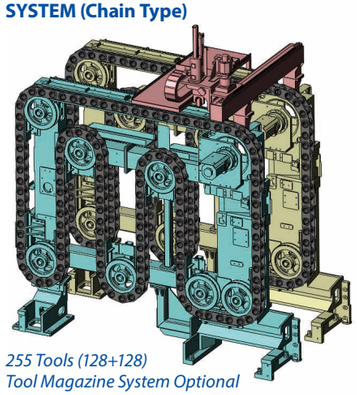


88 Tools Optional



128 Tools Optional

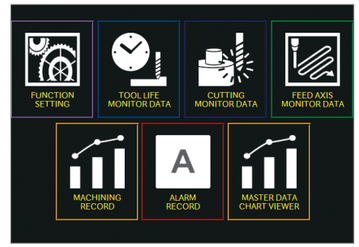
EXAMPLE OF AUTO TOOL CHANGE SYSTEM (Chain Type)



255 Tools (128+128) Tool Magazine System Optional

ADVANCED UNMANNED MONITORING SYSTEM NIIGATA NM24 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

MACHINE SPECIFICATIONS

NIGATA
HN-5X SERIES

ITEM		HN50E-5X		HN63E-5X		HN80E-5X	
		Metric	Inch	Metric	Inch	Metric	Inch
TRAVEL	X axis travel (longitudinal table)	800 mm	31.5 "	900 mm	35.4 "	1250 mm	49.2 "
	Y axis travel (vertical head)	930 mm	36.6 "	930 mm	36.6 "	1230 mm	48.4 "
	Pallet horizontal : Distance from pallet surface to spindle center	(-190 ~ 740) mm	(-7.5 ~ 29.1) "	(-270 ~ 660) mm	(-10.6 ~ 26) "	(-340 ~ 890) mm	(-13.4 ~ 35.0) "
	Pallet vertical : Distance from pallet center to spindle center	(-240 ~ 690) mm	(-9.4 ~ 27.1) "	(-470 ~ 460) mm	(-18.5 ~ 18.1) "	(-640 ~ 590) mm	(-25.2 ~ 23.2) "
	Z axis travel (column in & out)	830 mm	32.7 "	830 mm	32.7 "	1200 mm	47.2 "
	Pallet horizontal : Distance from pallet center to spindle gauge plane	(200 ~ 1030) mm	(7.8 ~ 40.5) "	(200 ~ 1030) mm	(7.8 ~ 40.5) "	(-280 ~ 1480) mm	(-11.0 ~ 58.26) "
	Pallet vertical : Distance from pallet surface to spindle gauge plane	(250 ~ 1080) mm	(9.8 ~ 42.5) "	(200 ~ 1030) mm	(7.8 ~ 40.5) "	(-280 ~ 1480) mm	(-11.0 ~ 58.26) "
	A axis travel (Trunnion rotation)	10° ~ -100°	10° ~ -100°	10° ~ -100°	10° ~ -100°	10° ~ -100°	10° ~ -100°
	B axis trabel (Pallet rotation)	360°	360°	360°	360°	360°	360°
TABLE	Table working surface	500 × 500 mm	19.7 " × 19.7 "	630 × 630 mm	24.8 " × 24.8 "	800 × 800 mm	31.5 " × 31.5 "
	Table increments	0.001°	0.001°	0.001°	0.001°	0.001°	0.001°
	Maximum mass on pallet	600 kg	1320 lbs	1000 kg	2200 lbs	1500 kg	3300 lbs
SPINDLE	Spindle drive motor 30min./continuous	AC 26 kW / 22 kW	AC 35 HP / 29 HP	AC 26 kW / 22 kW	AC 35 HP / 29 HP	AC 30 kW / 22 kW [37 kW / 30 kW]	AC 40 HP / 29 HP [50 HP / 40 HP]
	Spindle speeds	20 ~ 6000 min^{-1}	20 ~ 6000 rpm	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	1200 N·m	886 ft.lbs
	Spindle taper	No.50 [HSK-A100]	No.50 [HSK-A100]	No.50 [HSK-A100]	No.50 [HSK-A100]	No.50 [HSK-A100]	No.50 [HSK-A100]
FEEDRATE	Rapid traverse X, Y, Z axes	30 m/min	1181 ipm	30 m/min	1181 ipm	30 m/min	1181 ipm
	Rapid traverse A axis	8 min^{-1}	8 rpm	6 min^{-1}	6 rpm	6 min^{-1}	6 rpm
	Rapid traverse B axis	20 min^{-1}	20 rpm	15 min^{-1}	15 rpm	11.1 min^{-1}	11.1 rpm
	Cutting X, Y, Z axes	15 m/min	591 ipm	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}	720°/ min^{-1}	720°/ min^{-1}
	Cutting B axis	720°/ min^{-1}	720°/ min^{-1}	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]	62 [88/128]	62 [88/128]
	Tool magazine capacity (MATRIX)	[126/178/230]	[126/178/230]	[126/178/230]	[126/178/230]	[126/178/230]	[126/178/230]
	Tool shank	BT 50 [HSK-A100]	CT 50 [HSK-A100]	BT 50 [HSK-A100]	CT 50 [HSK-A100]	BT 50 [HSK-A100]	CT 50 [HSK-A100]
	Maximum tool length	550 mm	21.7 "	550 mm	21.7 "	610 mm	24.0 "
	Maximum milling cutter dia.	Φ 120 mm	Φ 4.7 "	Φ 120 mm	Φ 4.7 "	Φ 120 mm	Φ 4.7 "
	Adjacent pockets empty	Φ 230 mm	Φ 9.1 "	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 "	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	Side by side shuttle	Side by side shuttle
	Number of pallets	2	2	2	2	2	2
ACCURACY	Positioning / full stroke X-Y-Z	± 0.003 mm	± 0.00012 "	± 0.003 mm	± 0.00012 "	± 0.003 mm	± 0.00012 "
	Repeatability X-Y-Z	± 0.001 mm	± 0.00004 "	± 0.001 mm	± 0.00004 "	± 0.001 mm	± 0.00004 "
	Positioning A	± 5 "	± 5 "	± 5 "	± 5 "	± 5 "	± 5 "
	Repeatability A	± 3 "	± 3 "	± 3 "	± 3 "	± 3 "	± 3 "
	Positioning B	± 5 "	± 5 "	± 5 "	± 5 "	± 5 "	± 5 "
	Repeatability B	± 3 "	± 3 "	± 3 "	± 3 "	± 3 "	± 3 "
GENERAL	Machine weight approx.	19700 kg	43431 lbs	22200 kg	48942 lbs	33400 kg	73634 lbs
	Machine space W / D	4340 × 5500 mm	170 " × 216 "	4648 × 5831 mm	183 " × 230 "	6060 × 8500 mm	239 " × 335 "
	Machine space H	3485 mm	137 "	3485 mm	137 "	4180 mm	165 "
	Power	71 kVA	71 kVA	76 kVA	76 kVA	80.4 kVA	80.4 kVA

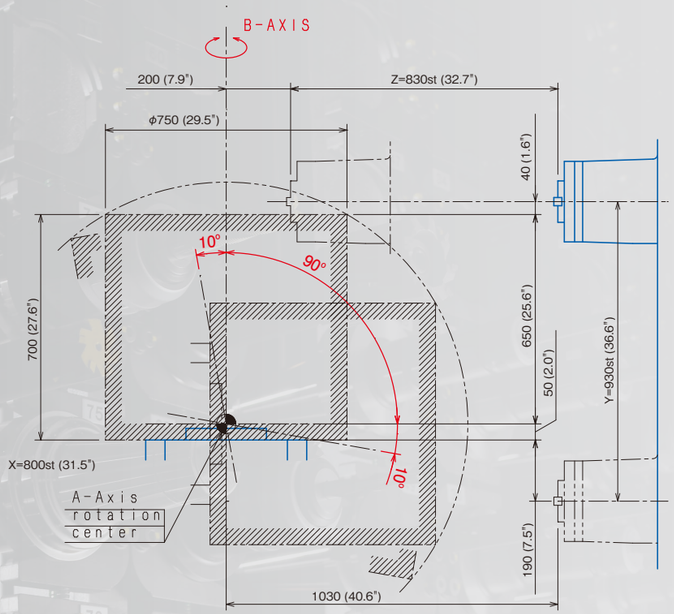
Figures in [ ] indicate optional features.

MACHINE DIMENSIONS
—HN50E-5X

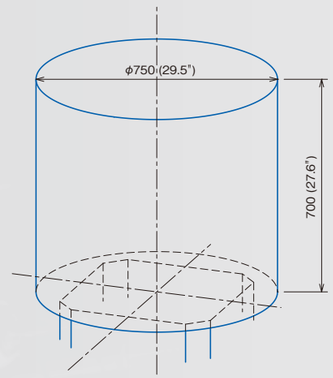
HN-5X SERIES

Unit : mm(inch)

Axis Travels

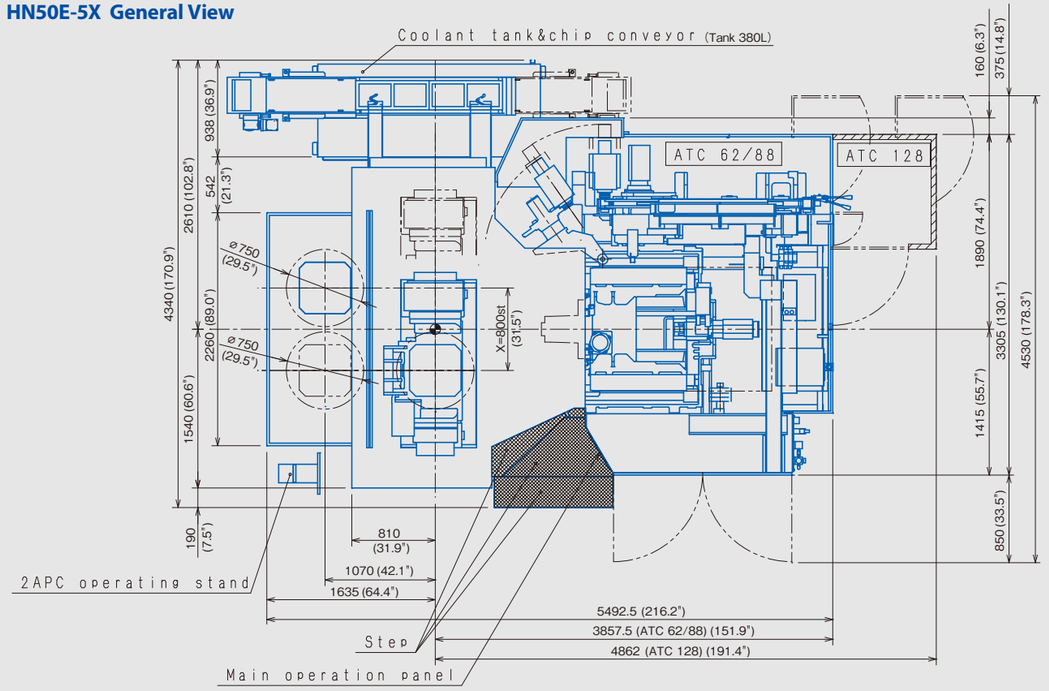


Maximum Workpiece Envelope

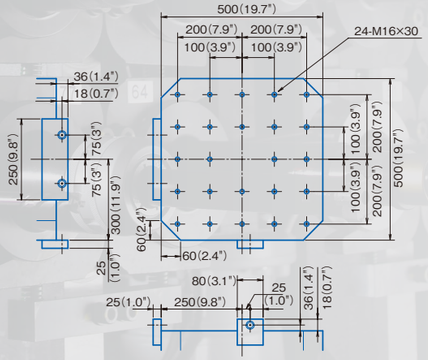


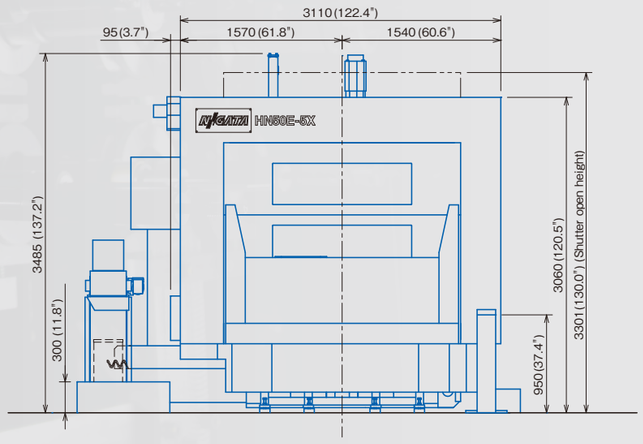
Unit : mm(inch)

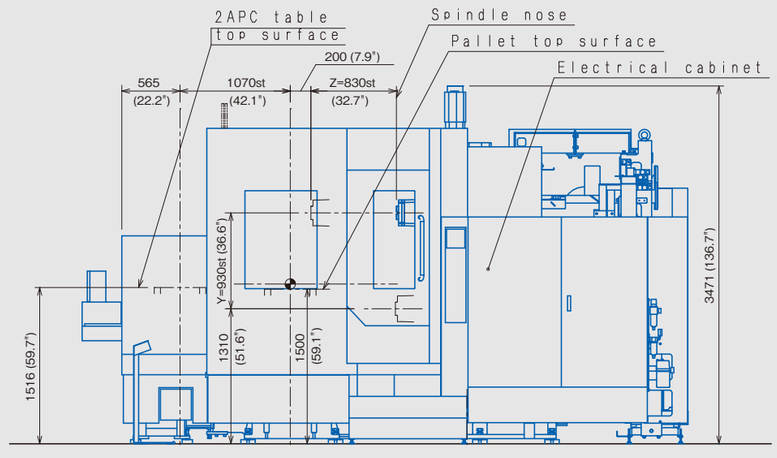
HN50E-5X General View



Standard Pallet Top Surface





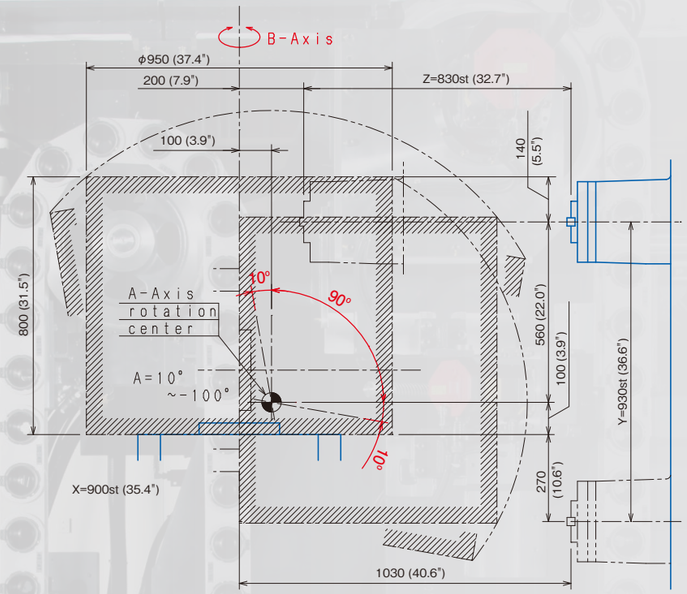


MACHINE DIMENSIONS
—*HN63E-5X*

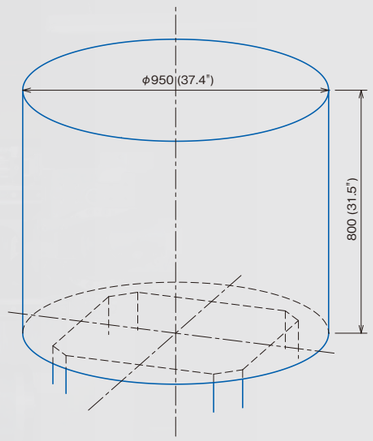
HN-5X SERIES

Unit : mm(inch)

Axis Travels

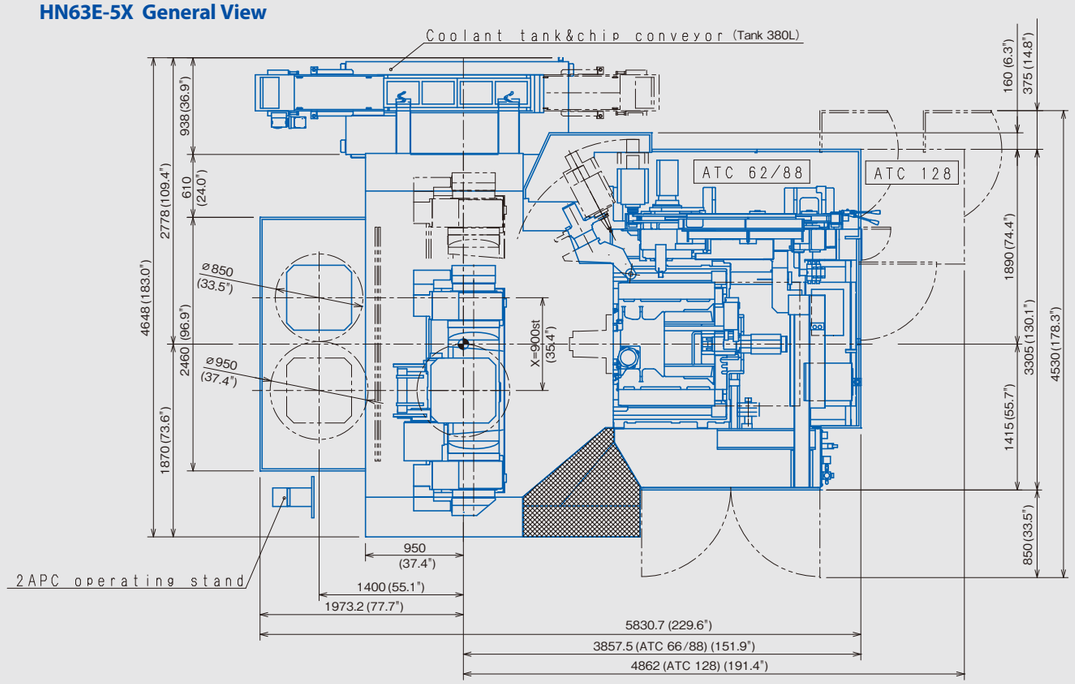


Maximum Workpiece Envelope

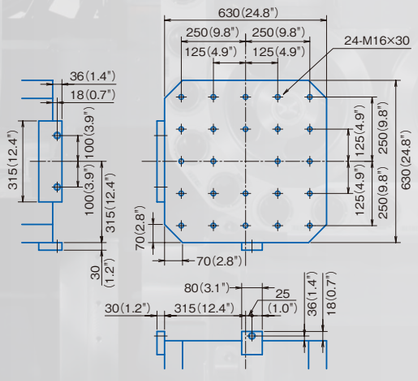


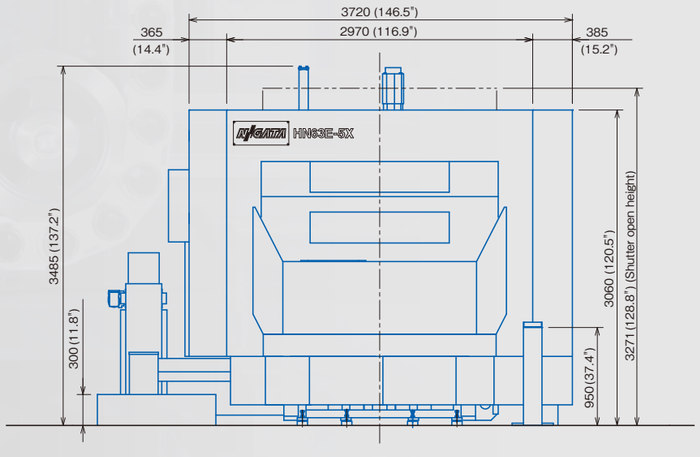
Unit : mm(inch)

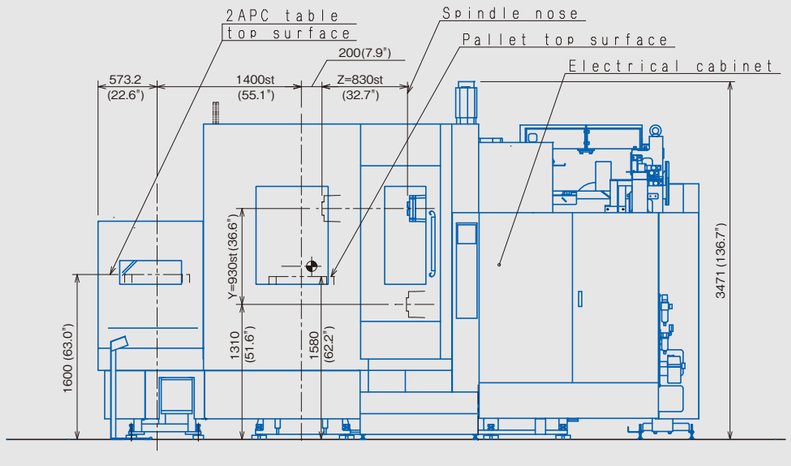
HN63E-5X General View



Standard Pallet Top Surface





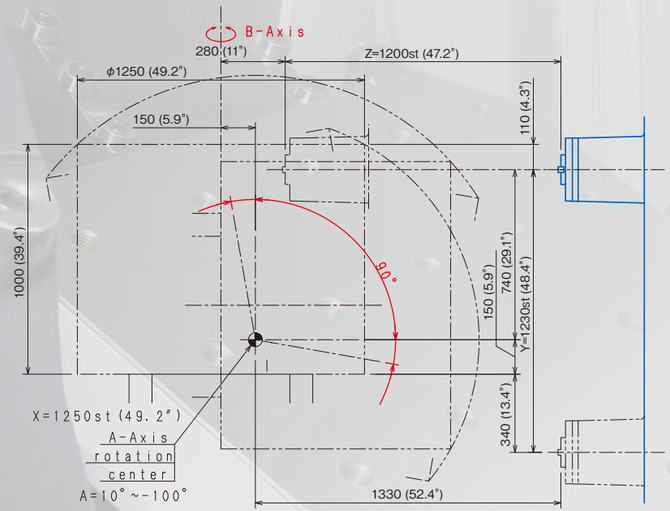


MACHINE DIMENSIONS
—HN80E-5X

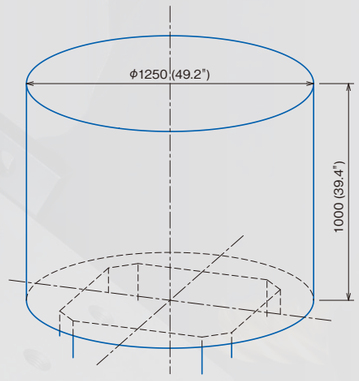
HN-5X SERIES

Unit : mm(inch)

Axis Travels

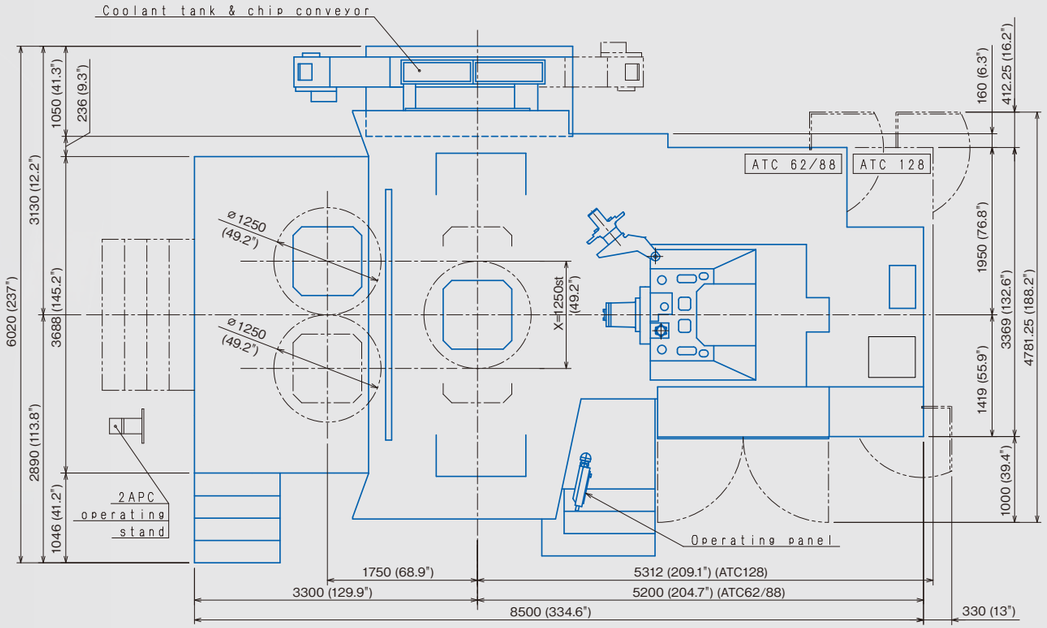


Maximum Workpiece Envelope



Unit : mm(inch)

HN80E-5X General View



Standard Pallet Top Surface