

WY-250 / 250L

NAKAMURA-TOME
PRECISION INDUSTRY CO.,LTD.

WY-250 / 250L

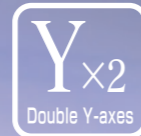
High Productivity Multitasking Machine

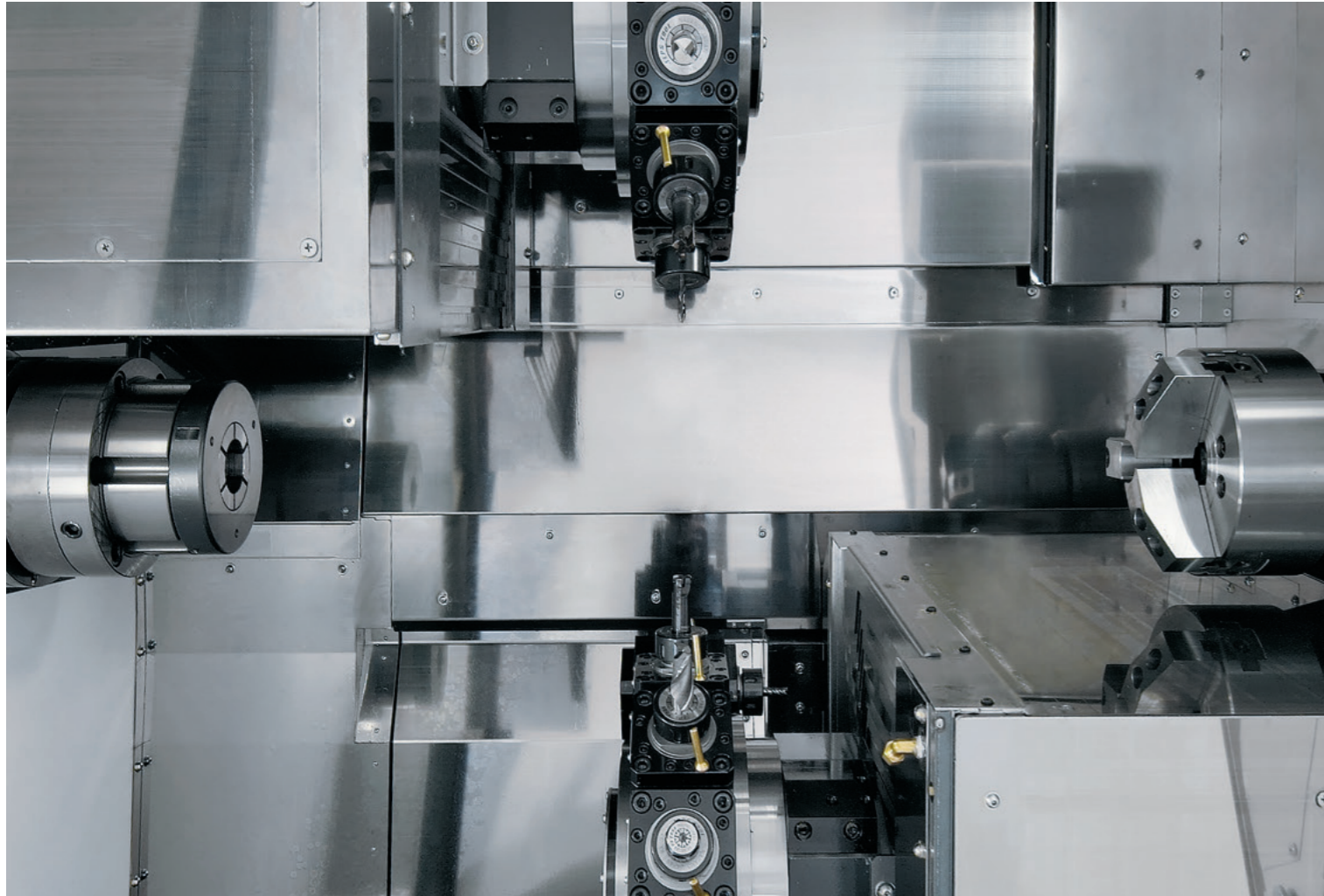
From diversified small-lot production to mass production

Large Work Envelope and Y-Axis for Upper and Lower Turrets

One Hit Machining

Finished parts, complete in one set up





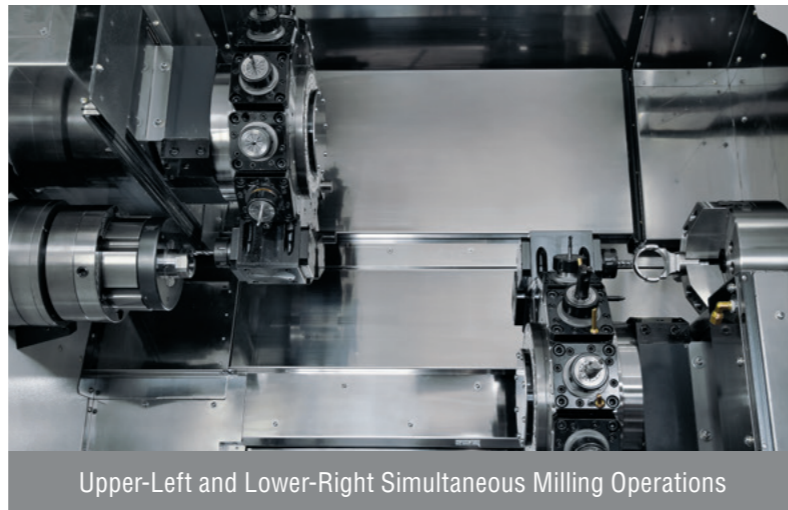
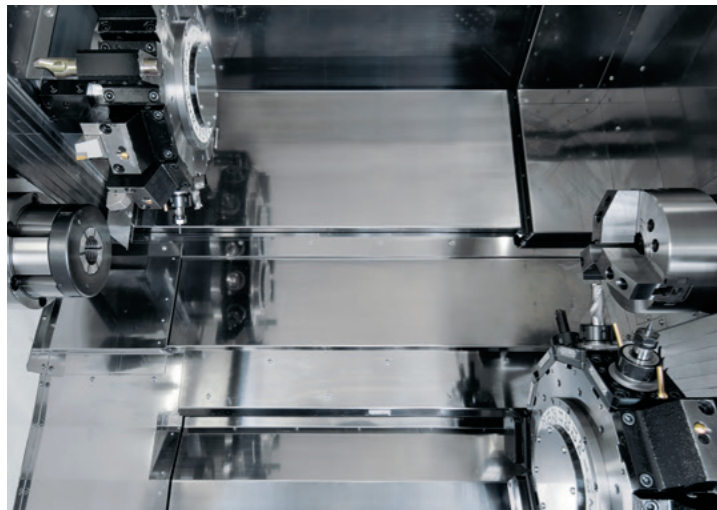
48
 Dodecagonal drum
 turrets 24-st
24 + 24
 Tooling capacity up to 48
 tools: Permanent tooling
 and less lead times.

High power motors on
 upper and lower turrets
M_x2
 Milling motor
 5.5/3.7kW x 2

Y-axis on each
 turret!
Y_x2
 Y-Axis travel
 Upper : ±50mm
 Lower : -50, +20mm



High Productivity
 Integrate machining processes and
 reduce WIP! (Work in Progress)
 First Part is a Finished Part!
 Zero Setup time!



Upper-Left and Lower-Right Simultaneous Milling Operations



Simultaneous Milling with Upper and Lower Y-axes on Left spindle



Simultaneous Milling with Upper and Lower Y-axes on Right spindle

Powerful High-Torque Motors

Ensure Phenomenal Machining Capabilities



19"
Color LCD
Touch Panel

NT
Smart
X

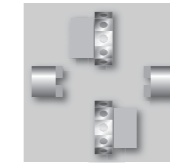
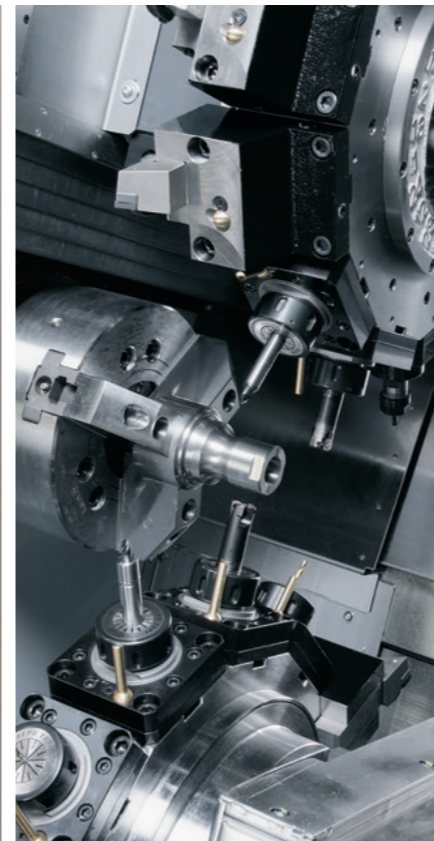
WY-250



19"
Color LCD
Touch Panel

NT
Smart
X

WY-250L



T_{x2}
Double turret

M_{x2}
Double Milling Motor

Y_{x2}
Double Y-axes

S_{x2}
Twin-Spindle

C_{x2}
C-axes

B₂
B-axis

Capacity

		WY-250	WY-250L
Max. turning diameter	mm	225	225
Max. turning length	mm	580	910
Distance between spindles [max. / min.]	mm	870 / 255	1,200 / 255
Bar capacity	L	φ 65	φ 65 φ 71 (op.)
	R	φ 51	φ 51
Chuck size	mm	L : 210(8") R : 165(6")	

Axis travel

Slide travel Y1 / Y2	mm	±50 / -50, +20	
Slide travel B2	mm	620	945

Spindle L, R

Spindle speed	L	min ⁻¹	4,500	4,500	4,000
	R		5,000	5,000	
Spindle motor	L	kW	18.5/11 (op. 26/22)		
	R		15/11 (op. 18.5/15)		

Upper & Lower turrets

Number of turrets Upper / Lower	—	1 / 1		
Driven-tool spindle speed	min ⁻¹	6,000		
Milling motor	kW	5.5/3.7		
	N·m	24/16		
Type of turret head / number of indexing positions	—	Dodecagonal drum turret / 24		
Drive system / Number of tool stations	—	Individual rotation / 12		

General

Floor space	H	mm	2,395	2,395
	L		4,436	4,620
	W		2,674	2,593
Machine Weight (incl.control)	kg	12,000		13,000

48 stations
High rigid turrets



WY-250/250L

Bar capacity $\phi 65\text{mm}$

Spindle motor

18.5 / 11kW
4,500min⁻¹

Standard

C axis

Spindle · C axis high accuracy synchronization

Standard

WY-250

Bar capacity $\phi 65\text{mm}$

Spindle motor

26.5 / 22kW
4,500min⁻¹

Option

WY-250L

Bar capacity $\phi 71\text{mm}$

Spindle motor

18.5 / 11kW
4,000min⁻¹

Option

WY-250/250L

Dodecagonal drum turret / 24 station turret

- ◆ Number of driven-tool stations : 12
- ◆ Index mechanism by electrical control equipped

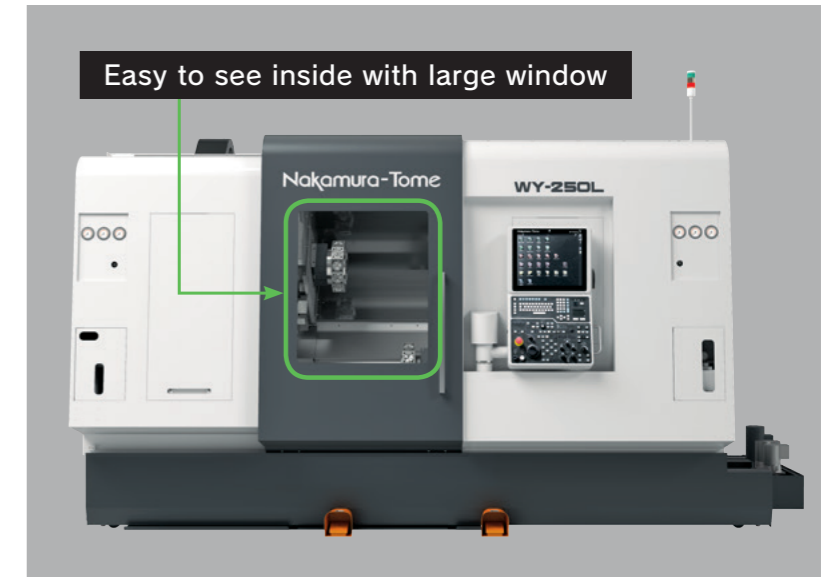
Milling motor

5.5/3.7kW
24/16N·m
6000min⁻¹

Standard

Slide travel Y $\pm 50\text{mm}$

Standard



L-Spindle

Upper turret

Lower turret

R-spindle

WY-250/250L

Dodecagonal drum turret / 24 station turret

- ◆ Number of driven-tool stations : 12
- ◆ Index mechanism by electrical control equipped

Milling motor

5.5/3.7kW
24/16N·m
6,000min⁻¹

Standard

Slide travel Y -50mm, +20mm

Standard

WY-250/250L

Bar capacity $\phi 51\text{mm}$

Spindle motor

15 / 11kW
5,000min⁻¹

Standard

C axis

Spindle · C axis high accuracy synchronization

Standard

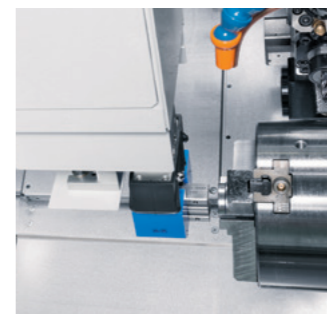
WY-250/250L

Bar capacity $\phi 51\text{mm}$

Spindle motor

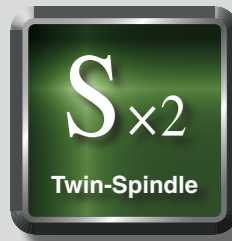
18.5 / 15kW
5,000min⁻¹

Option



Parts Catcher Type G Option

System	Swing / Hand type	
Work size	Diameter (mm)	$\phi 12 \sim 65$
	Length (mm)	15~150
	Weight (kg)	3
Work discharge unit	Belt conveyor & chute	



WY-250 / 250L

Simultaneous machining on left and right spindles contributes to faster cycle times.

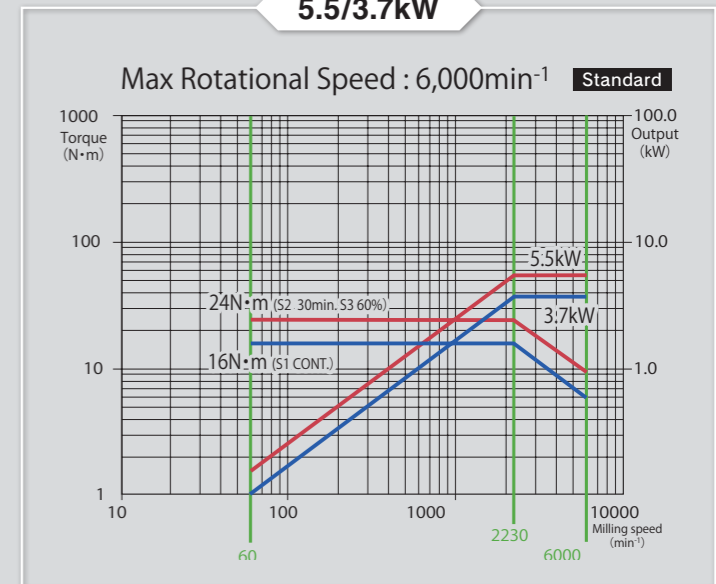
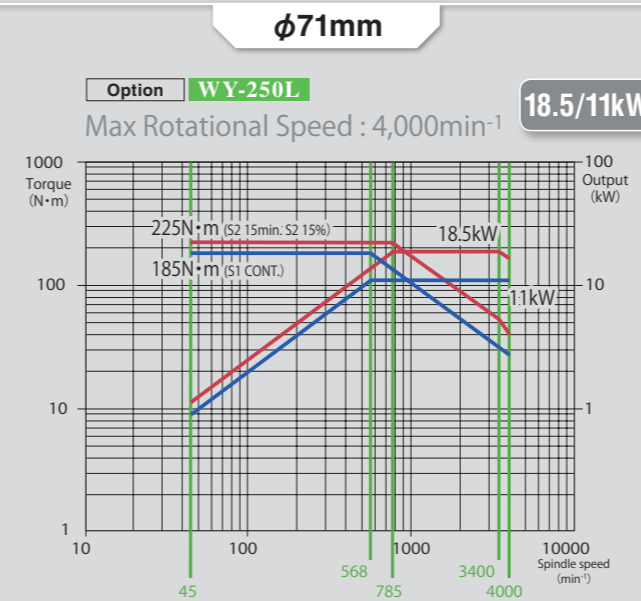
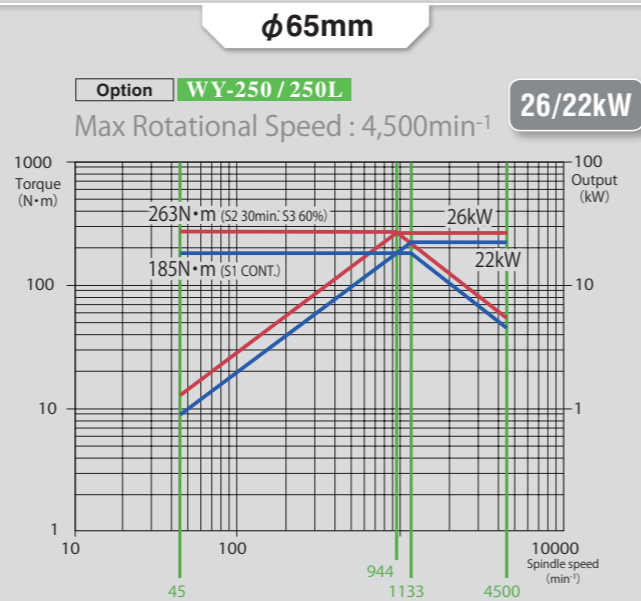
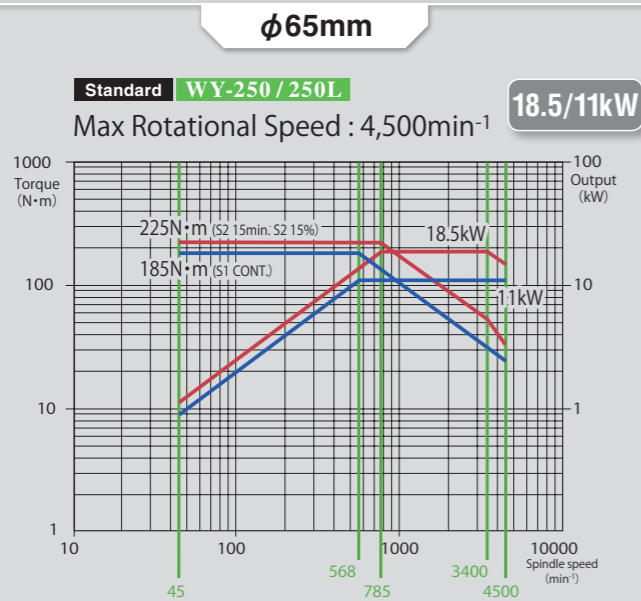


WY-250 / 250L

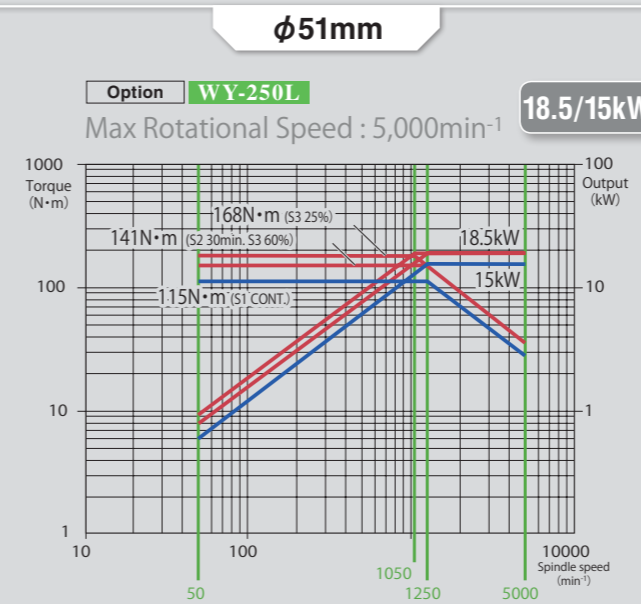
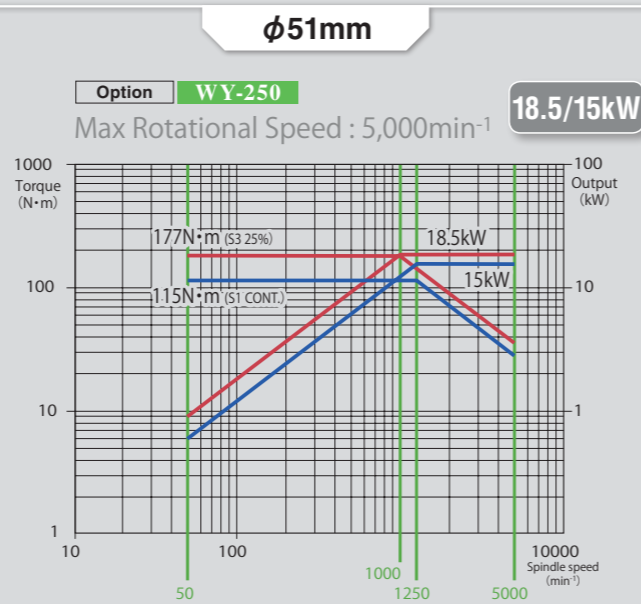
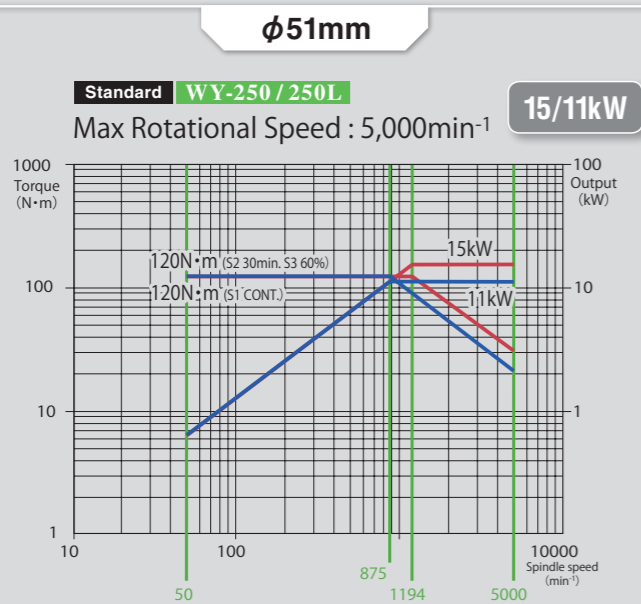
In addition to milling or drilling simultaneously with upper and lower turrets, improved chip-removal capabilities contribute to remarkably faster cycle times.

Milling motor for Upper and Lower

L
spindle motor



R
spindle motor



NT Smart X

Full Operator Support from Ease of Use to Reliability.

3D Smart PRO
Original Menu screen
Voice Guidance
Multiple-Touch screen
Windows 8.1

Main features of NT SmartX

Standard

- NT Work Navigator
- Airbag (Overload detection)
- NT Nurse function
- Status Display Function
- Setup Display
- Trouble Guidance
- Productivity Function
- Warm up Function
- Tool spindle loading Operation function
- Parts Catcher G Operation Function
- NT Machine Simulation
- NT Collision Guard
- NT Multitasking Office (op.)
- NT Thermo Navigator AI
- NT Smart Sign
- Digital Chuck interlock
- One touch MDI function



- 19 inch color LCD touch panel
- PC memory 8 GB
- QWERTY keyboard
- Windows 8.1
- Touch pad
- USB 2.0 Port x 2



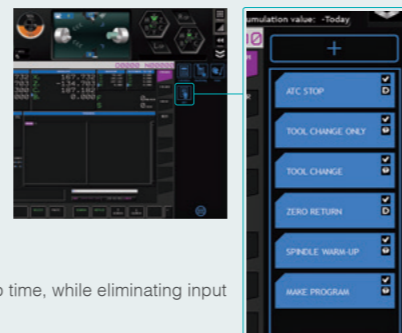
Digital Chuck Interlock

Set the detection position of open end and closed end of chuck arbitrarily. The chuck open / close position is set on the NT Smart X screen. Setup time and machining cycle time are reduced.

One Touch MDI

This function is to register in advance frequently used cycle programs such as home position return and tool exchange, and call with one touch.

Reduce programming and setup time, while eliminating input errors.



NT Smart Sign

Nakamura-Tome IoT software

※Please refer to the NT Smart Sign exclusive catalog for details.

Monitoring



Real Time Monitoring of machine running conditions, in addition to visualizing alarm history and past events.

Data Input / Output

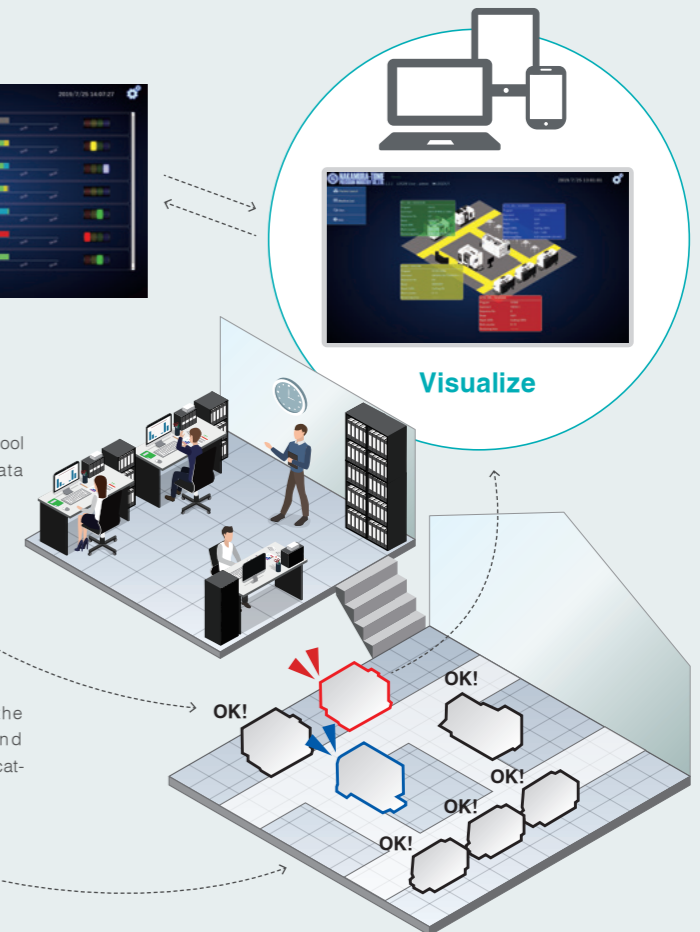


Input and output programs, tool data and other machine data from the monitoring PC.

Diagnosis



Diagnose problems with the machine servo drives and spindle drives, using a dedicated program.



NT Thermo Navigator AI

Thermal Growth Compensation using AI.

Compensation model built using AI machine learning.

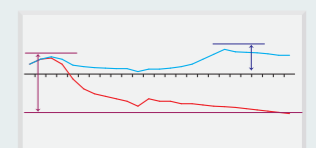
Powered by AI

Time and measured dimension data are input into a dedicated AI Learning software, to build an optimized thermal growth compensation model.



High Precision Thermal Growth Compensation

The compensation value is calculated from acquired data. The more data is input, the more accurate is the compensation value.



— Pre-correction thermal displacement data
— Thermal displacement data after correction

- ① Time
- ② Measured Dimensions
- ③ Retrieval of Wear Offset Data



Acquired Data analyzed with NT Thermo Navi AI

Feedback



Standard for NT Smart X

Double safety features for maximum protection

NT Machine Simulation / NT Collision Guard + Airbag

The machine is protected with dual safety features: "NT Machine Simulation / NT Collision Guard" prevent collision beforehand, and the "Airbag Function" minimize damage to the machine in case of collision.

NT Machine Simulation

NT Machine Simulation is for Virtual Collision Checking of NC Programs without axis movement.



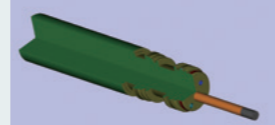
By checking in advance the chuck and the tool, the tool and the cover, etc. and checking the machining process etc., the risk of a machine collision when actually moving the machine can be reduced.

It can simulate while checking the remaining movement amount and modal information

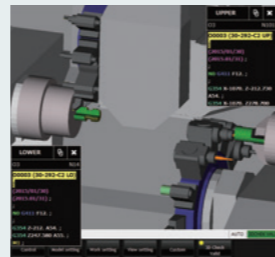
It can override the settings for fast feed and cutting feed individually. Simulation by process, single feed is possible.

By process
Single feed

Image shown here is of a 2-turret machine



During part simulation, several display screens are available, such as tool view, turret view or machine view.



It can show or hide the machining program. In addition, the display of the program is color-coded for each word, and this color scheme can be set arbitrarily from the option setting screen.

NT Collision Guard

Preventive safety technology - Machine collisions are avoidable!



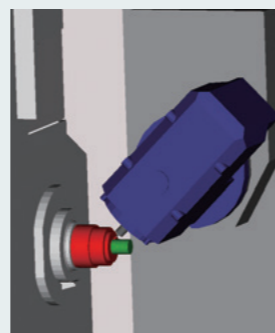
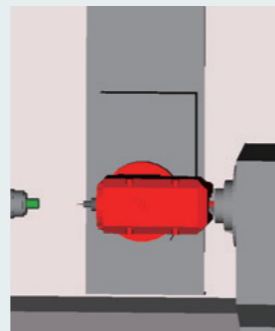
Available in automatic mode or in manual mode. Using registered 3D models of machine, chucks, tools, holders and parts, machine collisions can be monitored and prevented in real time during automatic, manual or jog movements.

Even turret indexing is monitored to prevent collisions, drastically reducing collision risks, especially during machine setup.

Tool 3D Model setup was simplified.

After turret rotation, the tool being indexed is read from the program, and the corresponding tool 3D model is automatically displayed, or can be changed from a pre-registered tool 3D Model list if necessary.

Image shown here is of a Tool spindle machine



Airbag (Overload detection)

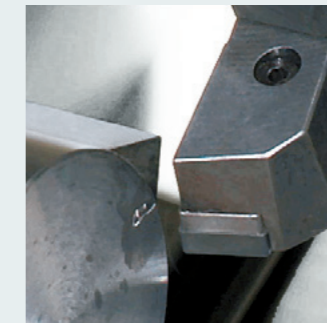
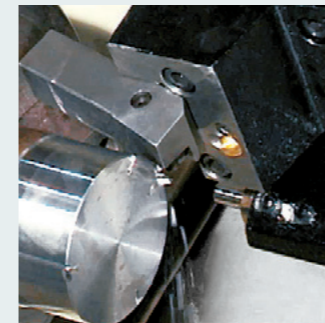
Compared to other machines, Nakamura-Tome machine will not break after the slightest collision. The "Airbag Function" minimizes the damage that may occur during a collision.

If a machine collision occurs, there is good reason to be assured: Airbag !

Barrier?
Even with barrier function, machine collisions may occur

When the machine collision, there is no reason to panic. Nakamura-Tome is...

The Airbag (Overload detection) of the machine tool greatly reduces the impact of a collision, and protects the machine.



Without Airbag

Machine will not be stop immediately. The slide continues to move even after collision.

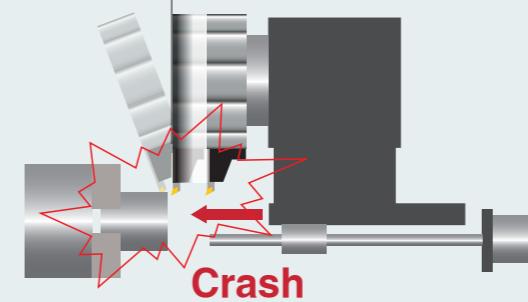
With Airbag

Retraction within 0.001 sec

Crash !
Within 1 millisecond after the crash, servo motor-feeding direction is reversed and the machine stops in EMG mode.



▲Video



* This feature does not mean zero impact

NT Work Navigator

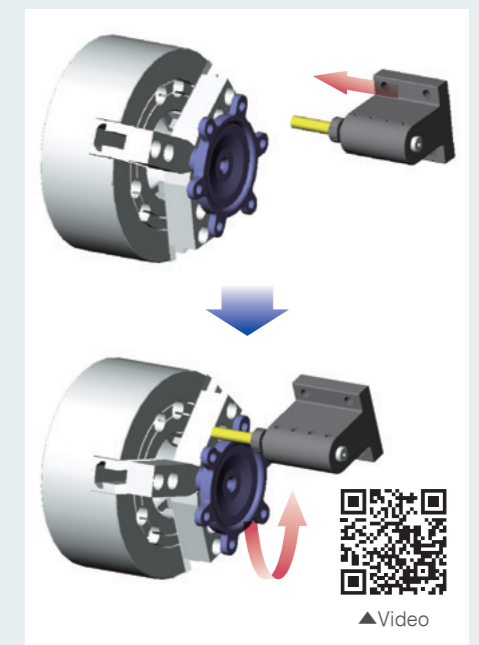
X Y Z B C

A new upgrade makes it possible to navigate with the X and Y-axes. Many parts with irregular outer surfaces, requiring coordinate recognition with X or Y-Axis, become within the range of NT Work Navigator.

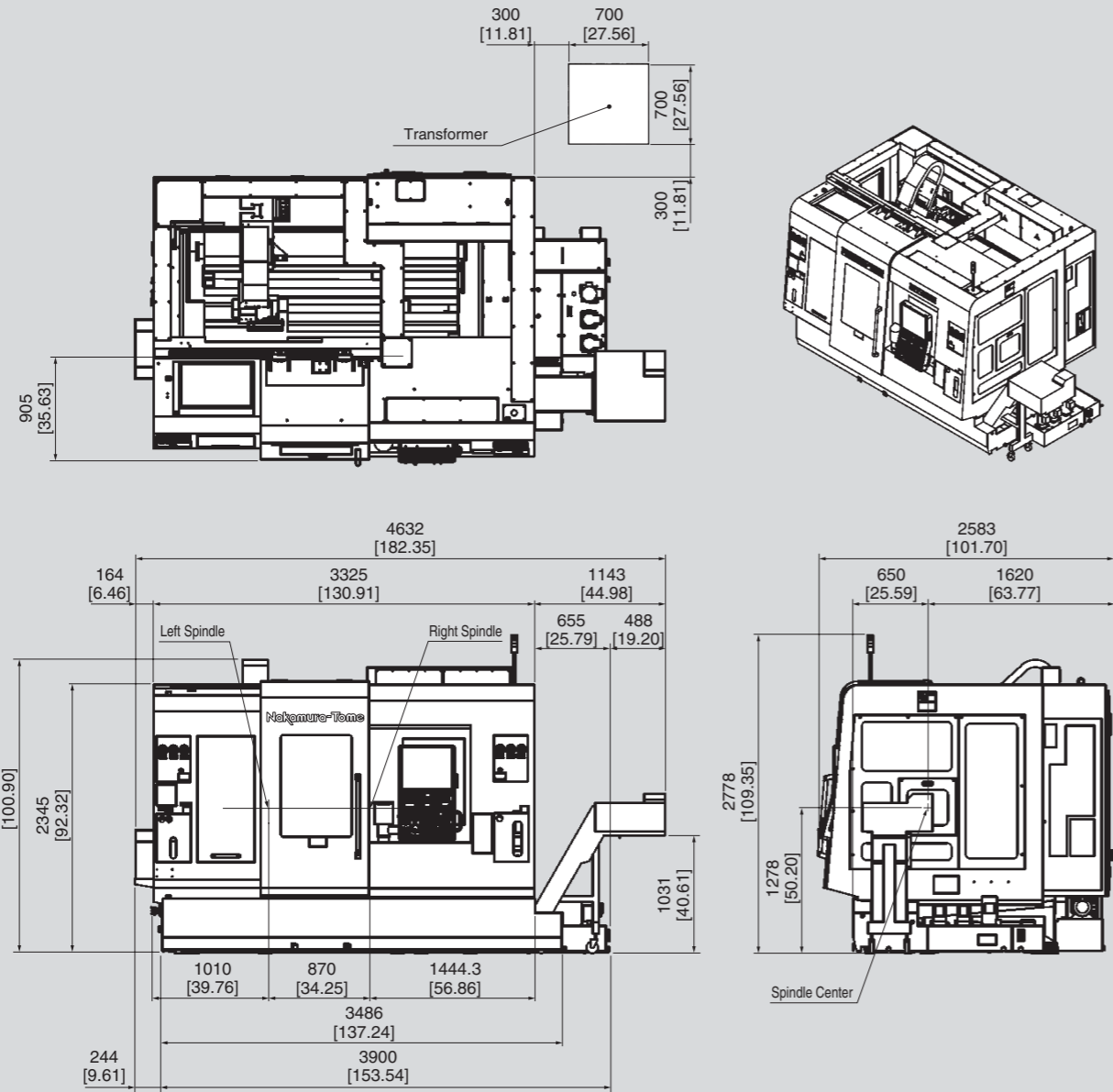
Advanced NT Work Navigator !

No fixtures required

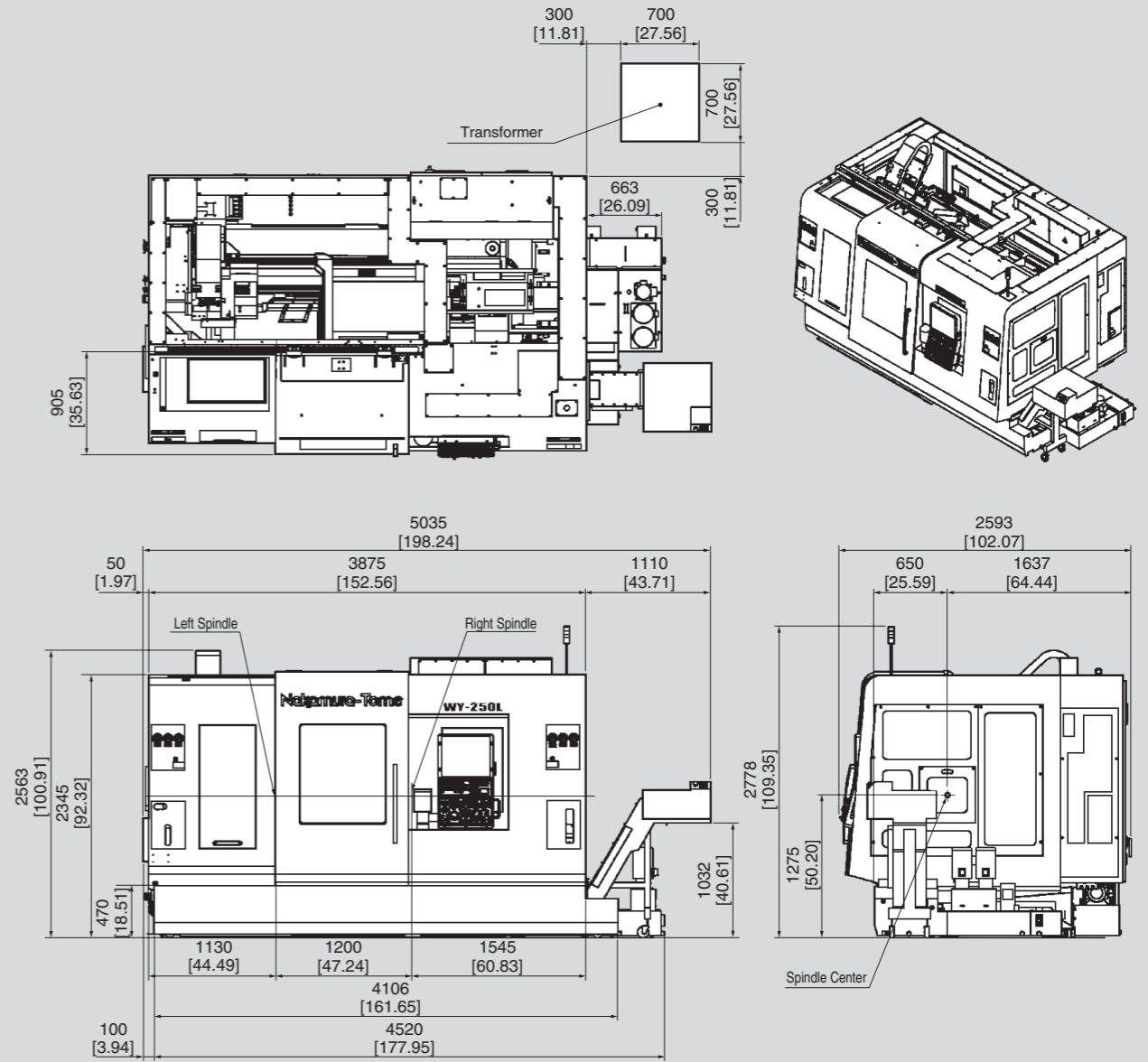
Machining parts with non-round shapes, such as forgings or castings requires that the raw part coordinates be recognized by the CNC control. In order to achieve this without requiring extra cost or additional options, the NT Navigator is used. It works just by touching the part with a simple inexpensive probe (mostly round bar mounted on a tool holder) and using the torque control feature of the servo-motor, which is to record required coordinates in the CNC. The NT Navigator is a cost cutting feature in multitasking machines, eliminating the need for positioning fixtures and special clamping devices.



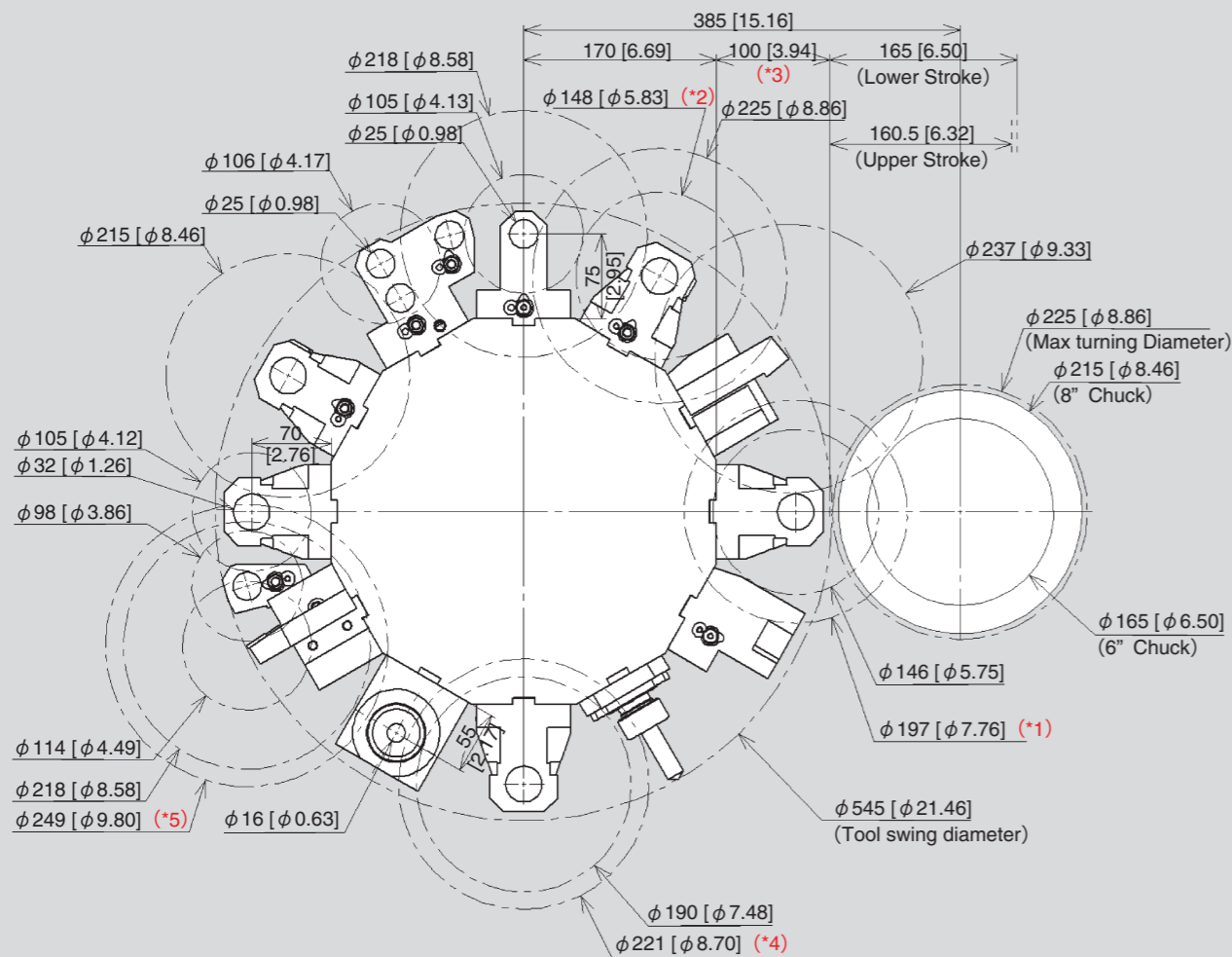
▲Video



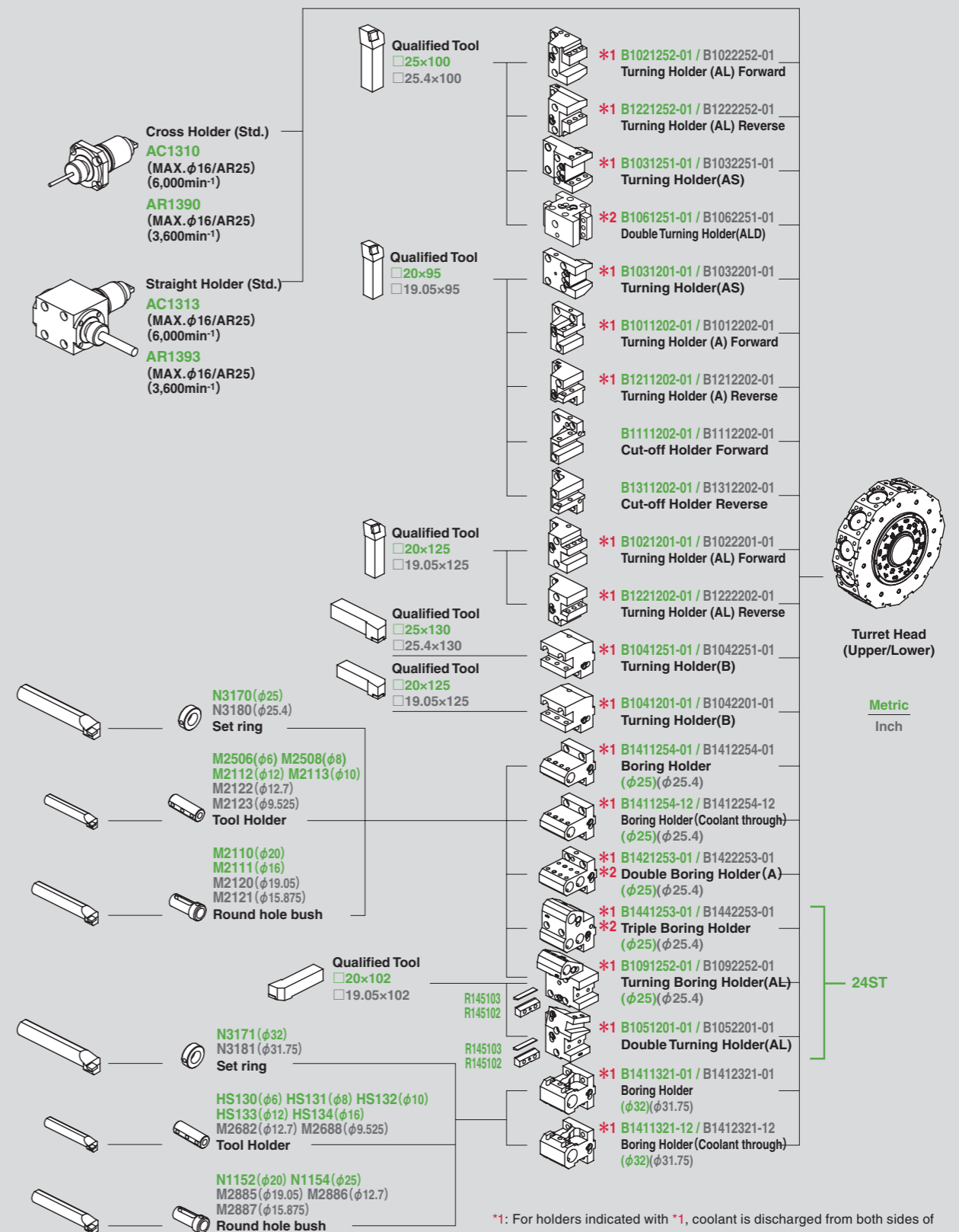
Unit mm[inch]



Unit mm[inch]



- *1) Dia.146mm up to 26mm from the turret face when turning holder (A) is used.
Dia.146mm up to 10mm from the turret face when turning holder (B) is used. Beyond that range, Dia.197mm.
- *2) Dia.148mm up to 26mm from the turret face when turning holder (A) is used.
- *3) 100mm for square shank tool.
- *4) Dia. 190mm up to 70mm from the turret face when straight holder is used. Beyond that range, Dia. 221mm.
- *5) Dia. 218mm up to 70mm from the turret face when straight holder is used. Beyond that range, Dia. 249mm.
- *6) In case of double boring holders (B1421253-010,B1422253-01), the holder height is 115.5 mm, exceeding the allowable 102.5 mm (Tool swing diameter φ545), so it will interfere with the right spindle during part transfer.



*1: For holders indicated with *1, coolant is discharged from both sides of the holder when machining is performed on L or R spindle.
For other holders, coolant is discharged from one side of the holder, or from turret face if necessary.

*2: Holders indicated with *2 are available with restrictions.

	WY-250		WY-250L		
	φ65mm	φ51mm	φ65mm	φ71mm (op.)	φ51mm

Capacity

Max. turning diameter	225mm		225mm		
Standard turning diameter	150mm		150mm		
Distance between spindles	max.870mm / min.255mm		max.1,200mm / min.255mm		
Max. turning length	580mm		910mm		
Bar capacity	L	φ65mm	—	φ65mm	φ71mm
	R	—	φ51mm	—	φ51mm
Chuck size	L : 210mm (8") R : 165mm (6")		L : 210mm (8") R : 165mm (6")		

Axis travel

X1 / X2 -axis travel	160.5mm / 165mm		160.5mm / 165mm		
Z1 / Z2 -axis travel	580mm / 580mm		910mm / 910mm		
Y1 / Y2 -axis travel	±50mm / -50mm, +20mm		±50mm / -50mm, +20mm		
B2 -axis travel	620mm		945mm		
Rapid feed X1 / X2	18m/min ⁻¹ / 18m/min ⁻¹		18m/min ⁻¹ / 18m/min ⁻¹		
Rapid feed Z1 / Z2	36m/min ⁻¹ / 36m/min ⁻¹		40m/min ⁻¹ / 40m/min ⁻¹		
Rapid feed B axis	36m/min ⁻¹		40m/min ⁻¹		
Rapid feed Y1 / Y2	10m/min ⁻¹ / 10m/min ⁻¹		10m/min ⁻¹ / 10m/min ⁻¹		

Left and right spindles

Spindle speed	4,500min ⁻¹	5,000min ⁻¹	4,500min ⁻¹	4,000min ⁻¹	5,000min ⁻¹
Spindle speed range	Stepless		Stepless		
Spindle nose	A2-6	A2-5	A2-6	A2-5	
Hole through spindle	80mm	63mm	80mm	63mm	
I.D. of front bearing	110mm	90mm	110mm	90mm	
Hole through draw tube	66mm	52mm	66mm	72mm	52mm

C-axis

Least input increment / Least command increment	0.001°		0.001°		
Rapid index speed	600min ⁻¹		600min ⁻¹		
Cutting feed rate	1~4800°/min		1~4800°/min		
C-axis clamp	Disk clamp		Disk clamp		
C-axis connecting time	1.5sec.		1.5sec.		

Upper & Lower turrets

Type of turret head	Dodecagonal drum turret		Dodecagonal drum turret		
Number of tool stations	24 stations		24 stations		
Number of index positions	24		24		
Tool size (square shank)	□25mm		□25mm		
Tool size (round shank)	φ32mm		φ32mm		

Rotating tool

Rotary system / Spindle speed range	Individual rotation / Stepless		Individual rotation / Stepless		
Spindle speed	6,000min ⁻¹		6,000min ⁻¹		
Number of driven-tool stations	12x2		12x2		
Tool shank / Collet size	φ1mm~φ16mm / AR25		φ1mm~φ16mm / AR25		

Drive motor

L-spindle	18.5/11kW 225/185N·m (op. 26/22kW 263/185N)	18.5/11kW 225/185N·m (op. 26/22kW 263/185N)
R-spindle	15/11kW 120/120N·m (op. 18.5/15kW 177/115N)	15/11kW 120/120N·m (op. 18.5/15kW 168/141/115N·m)
Milling	5.5/3.7kW 24/16N·m	5.5/3.7kW 24/16N·m

General

Height	2,345mm		2,345mm		
Floor space (LxW)	4,144mm x 2,583mm		4,620mm x 2,593mm		
Machine weight (incl. control)	12,000kg		13,000kg		

Power requirements

Power supply	52.9kVA		52.9kVA		
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Items

Control type	FANUC 32i-B 2-PATH
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Controlled axes

Controlled axes	9axes
Least command increment	Upper: 4axes (X1, Z1, C1, Y1) Lower: 4axes (X2, Z2, C2, Y2, B2)

Input command

Least input increment	0.001mm/0.0001in (X in diameter), 0.001°
Least command increment	X : 0.0005mm, Z : 0.001mm, C : 0.001°, B2 : 0.001mm, Y : 0.001mm
Max. programmable dimension	±999999.999mm / ±39370.0787in, ±999999.999°
Absolute / incremental programming	X, Z, Y, C, B2 (absolute only for B2) / U, W, V, H
Decimal input	Standard
Inch / Metric conversion	G20 / G21
Programmable data input	G10

Feed function

Cutting feed	feed / min X : 1-8000mm/min, 0.01-315inch/min (1-4800mm/min, 0.01-188inch/min) Z : 1-8000mm/min, 0.01-315inch/min (1-4800mm/min, 0.01-188inch/min) C : 1-4800°/min Y : 1-8000mm/min, 0.01-315inch/min (1-4800mm/min, 0.01-188inch/min) B2 : 1-8000mm/min, 0.01-315inch/min (1-4800mm/min, 0.01-188inch/min)
	feed / rev : 0.0001-8000.0000mm/rev (0.0001-4800.0000mm/rev) 0.000001-50.00000inch/rev The maximum cutting feed rate is the value in AI contour control mode. It is also on with G316 command. The values in parentheses are normal values.
Dwell	G04
Feed per minute / Feed per revolution	G98 / G99
Thread cutting	G32
Thread cutting retract	Standard
Continuous thread cutting	Standard
Variable lead threading	G34
Handle feed	Manual pulse generator 0.001 / 0.01 / 0.1mm, °(per pulse)
Automatic acceleration / deceleration	Standard
Linear accel. / decel. After cutting feed interpolation	Standard
Rapid feed override	F0 / 25 / 100% (changeable to every 10% by switch)
Cutting feedrate override	0 - 150% (each 10%)

Safety quality specifications

Various interlocks, such as safety fences, auto extinguisher devices, and other safety related equipment may be required. These have to be selected during the configuration of the machine.

① Safety devices include electromagnetic door lock, chuck interlock, hydraulic pressure switch, air pressure switch, short circuit breaker and quill interlock. (Door interlock and chuck interlock are standard equipment.)

② In case of automation, various safety fences may be required, such as work stocker safety fences, robot safety fences, ...etc.

During the configuration of machine specifications, please discuss these requirements with the Nakamura-Tome machine sales representative.

Precautions on the use of cutting fluids and lubricating oils

Some types of cutting fluids (coolant) are harmful to machine components, causing damages such as peeling of paint, racking of resin, expanding of rubber, corrosion and rust build up on aluminum and copper. To avoid causing damage to the machine, never use synthetic coolants, or any coolants containing chlorine. In addition, never use coolants and lubricating oils which contain organic solvents such as butane, pentane, hexane and octane.

Machine warranty terms are void for any claims or damage arising from the use of inappropriate cutting fluids or lubricating oils.

Program memory

Part program storage length	Total 640m (256kbyte) Total 1280m, 2560m, 5120m, 10240m, 20480m(op.)
Part program editing	delete, insert, change
Program number search	Standard
Sequence number search	Standard
Address search	Standard
	500
Number of registerable programs	1000 (1280m, 2560m, 5120m, 10240m, 20480m)(op.) 2000 (2560m)(op.) 4000 (5120m, 10240m, 20480m)(op.)
Tool offset pairs	99 + 99
Program storage memory	Backed up by battery
Multiple program simultaneous editing	Standard
DNC operation through memory card	Standard (Only one turret can access memory card at a time)(not including memory card)
Extended part program editing	Standard

Operation and display

HMI (Human Machine Interface)	NT Smart X
Operation panel : Display	19" color LCD
Operation panel : keyboard	QWERTY keyboard

Programming assist function

Circular interpolation R programming	Standard
Direct drawing dimension programming or Chamfering / Corner R	Standard (Direct drawing dimension programming is standard)
Canned cycle	G90, G92, G94
Multiple repetitive canned cycle	G70-G76
Multiple repetitive canned cycle II	G71, G72
Canned cycle for drilling	G80-G89
Axis recomposition	Standard (used for R side C axis control from Upper and L side C axis control from Lower)
Sub program	Standard
Balance cut	G68, G69
Custom macro	Standard (#100-#149, #500-#549)
Addition to custom macro common variables	Standard (After addition, #100-#199, #500-#999)
FS15 tape format	Standard
Luck-bei II NT Manual Guide i	Standard
Abnormal load detection function	Standard (Z)
NT Work Navigator	Standard (not including contact bar)
NT NURSE	Standard
NT Collision Guard	Standard

Mechanical support

Rigid type	Standard
Spindle synchronised control	Standard
C axis synchronised control	Standard
Spindle orientation	Standard (Any angle is available within 360°, Control unit : 0.088°)

NT Smart X

O/S	Windows Embedded 8.1 Industry Pro
Pointing device	Touch pad
PC memory	8GB



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