

NTY³-100V

NAKAMURA-TOME
PRECISION INDUSTRY CO.,LTD.

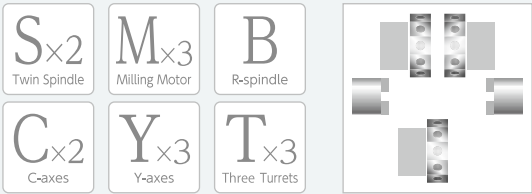
Faster than
the fastest

Innovative
Technology

~Creating new values~

NTY³-100V

The second machine in the 'V series' of multitasking machines prioritizes speed as its core design concept. Standard equipment includes Y-axis capabilities on all 3 turrets and opposed twin spindles. Enhanced processing capabilities and simultaneous left/right and upper/lower machining reinforce speedy production. Furthermore, we have made software improvements to reduce idle time. It strives to be faster than the fastest that customers have ever experienced.



30% Reduction in Cycle Time

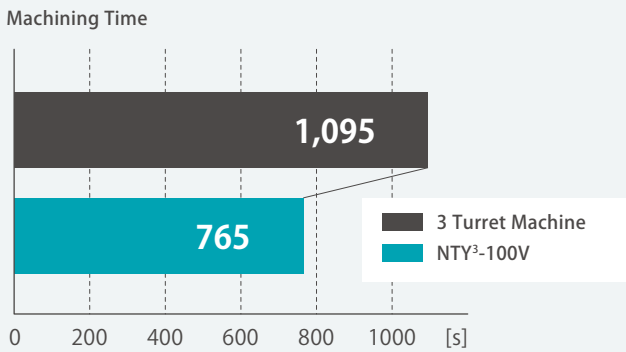
* Reduction time varies depending on the shape of the workpiece and cutting conditions.

Starting with the implementation of "ChronoCut" to reduce processing idle time, numerous new technologies have been incorporated to enhance production speed.



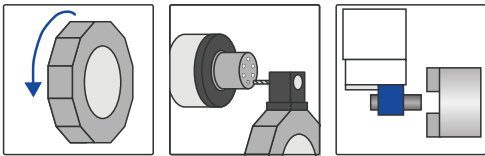
Semiconductor manufacturing equipment (sample)

Material	SUS303
Material Size	φ 50mm bar

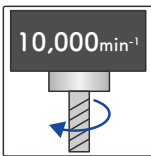


ChronoCut

A unique function by Nakamura-Tome designed to reduce idle time. This new software minimizes idle time during manufacturing without compromising accuracy, even without any changes to the cutting conditions.

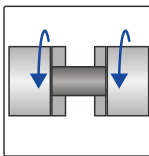


- High-speed indexing
- High-speed spindle synchronization
- Execution of multiple M-codes within the same block
- High-speed rigid tapping
- Reduction of PC-G unloading time, etc.



UP Machining conditions

By improving the machining capabilities of the milling speed, torque, and more, the machine achieves high performance under demanding conditions.



UP Acceleration / Deceleration

The acceleration and deceleration during starting and stopping have been improved, enabling quick attainment to the maximum speed.

Cycle Times are Faster Thanks to Simultaneous Machining with the L/R Spindles and Upper/Lower Turrets.

L-spindle

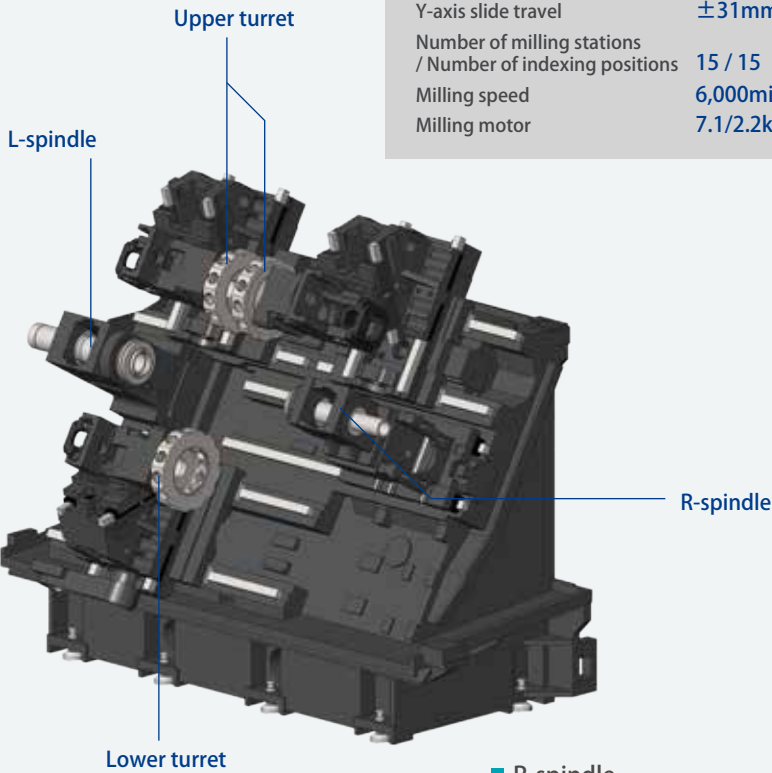
Standard	
Bar capacity	φ42mm
Spindle speed	6,000min ⁻¹
Spindle motor	11/7.5kW
Option	
Bar capacity	φ51mm
Spindle speed	6,000min ⁻¹
Option	Option
Spindle motor	Spindle motor
11/7.5kW	15/11kW
Option	
Bar capacity	φ65mm
Spindle speed	5,000min ⁻¹
Option	Option
Spindle motor	Spindle motor
11/7.5kW	15/11kW

Lower turret

Dodecagonal drum turret	
Y-axis slide travel	±32.5mm
Number of milling stations / Number of indexing positions	12 / 24
Standard	Option
Milling speed	Milling speed
6,000min ⁻¹	10,000min ⁻¹
Milling motor	Milling motor
7.1/2.2kW	7.5/2.2kW
15-station turret	
Y-axis slide travel	±31mm
Number of milling stations / Number of indexing positions	15 / 15
Milling speed	6,000min ⁻¹
Milling motor	7.1/2.2kW

Upper turret

Dodecagonal drum turret	
Y-axis slide travel	±42mm
Number of milling stations / Number of indexing positions	12 / 24
Standard	Option
Milling speed	Milling speed
6,000min ⁻¹	10,000min ⁻¹
Milling motor	Milling motor
7.1/2.2kW	7.5/2.2kW
15-station turret	
Y-axis slide travel	±31mm
Number of milling stations / Number of indexing positions	15 / 15
Milling speed	6,000min
Milling motor	7.1/2.2kW



Y-axis and Milling are standard.



R-spindle

Standard	
Bar capacity	φ42mm
Spindle speed	6,000min ⁻¹
Spindle motor	11/7.5kW
Option	
Bar capacity	φ51mm
Spindle speed	6,000min ⁻¹
Option	Option
Spindle motor	Spindle motor
11/7.5kW	15/11kW

GR-203 High-Speed(op.)

The entire process from loading the blank material, to unloading a finished part, can be automated.
* The image is of NTY³-100.



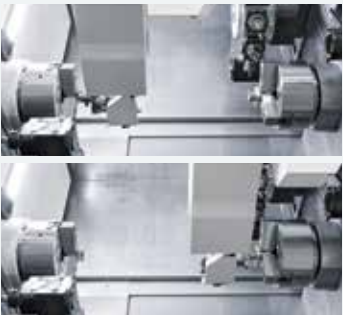
Parts catcher type G(op.)

Unloading a finished part can be automated.



Compact loader(op.)

The entire process from loading the blank material, to unloading a finished part, can be automated.



Large window for easy viewing of the machining area

The door windows are equipped with wipers that keep the windows clean.



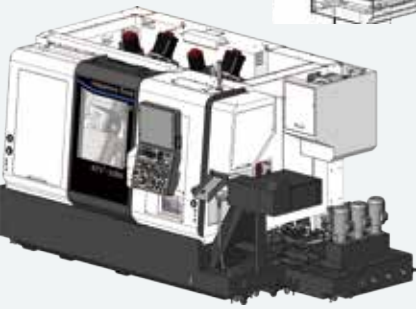
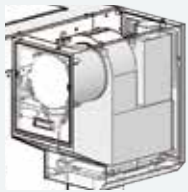
Chip conveyor(op.)

The discharge position can be selected from the following three options.
•Side
•Right side & Rear
•Left side & Rear



FogFree(op.)

"FogFree" is a built-in mist collector designed to prevent the deterioration of the work environment caused by mist.



Bar remnant parts catcher(op.)

The bar remnants can be collected from the chute in the lower right corner of the machine.



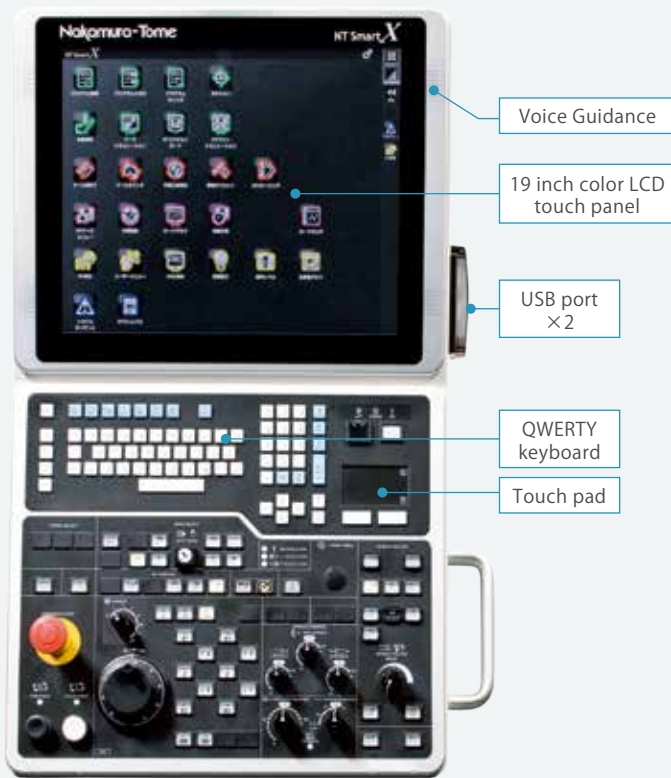
NT SmartX 19 inch touch screen

With a movable operation panel, the angle can now be adjusted by the operator.



Advanced Production System

NT SmartX



Voice Guidance

19 inch color LCD touch panel

USB port x2

QWERTY keyboard

Touch pad



- Powered by AI as standard equipment
 - NT Thermo Navigator AI
 - 3D Smart Pro AI

Setup Support

- Status Screen
- Setup Screen
- Geometry Navigator (op.)
- Path Checker
- Simple Call
- One Touch Production (op.)
- Digital Chuck Interlock

Programming Support

- Smart support
- 3D Smart Pro AI
- 3D Smart Pro
- NT Manual Guide i
- Drop Converter

Machining Support

- NT Thermo Navigator AI
- Warm-Up Function
- NT NURSE
- Program Optimizer
- Chatter Canceller
- Oscillation Cutting (op.)
- Smart Tuning (op.)
- NT WORK NAVIGATOR

Dual Safety

- Airbag
- NT Machine Simulation
- NT Collision Guard

Maintenance

- ATC Maintenance Navigator
- Regular Maintenance Function
- Productivity Monitoring Function
- Operation Level Management Function
- Trouble Guidance
- Drive recorder

Customer Support

- NT Update

NT Smart Sign

Nakamura-Tome IoT software

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

■ Monitoring



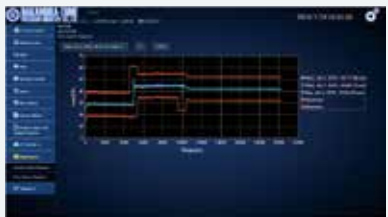
Real-Time Monitoring of machine running conditions, in addition to visualizing alarm history and past events.

■ Data Input / Output

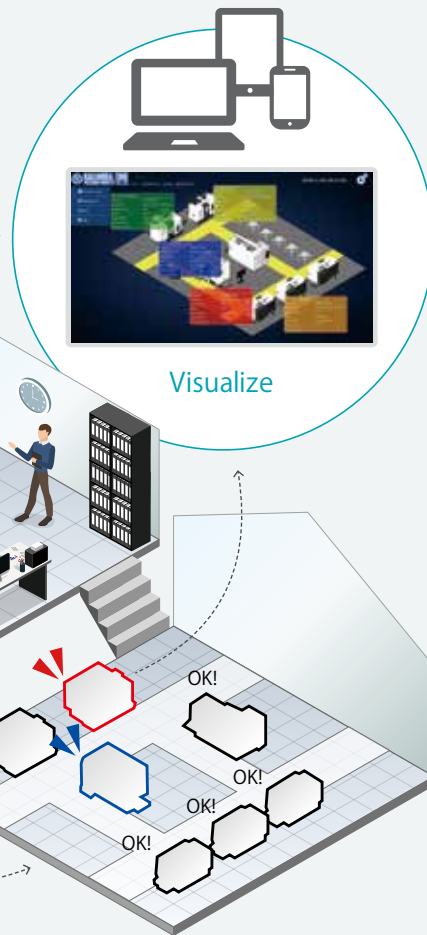


Input and output programs, tool data and other machine data from the monitoring PC.

■ 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.

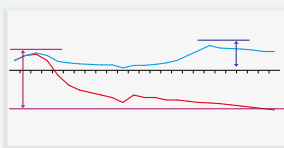
Powered by AI

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 Navigator AI

Feedback



Standard for NT Smart X



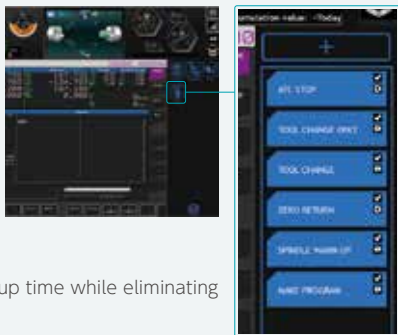
Digital Chuck Interlock

Set the Chuck Open and Close detection position easily. The chuck open / close position is set up on the NT SmartX screen. Setup time and machining cycle time are reduced.

One Touch MDI

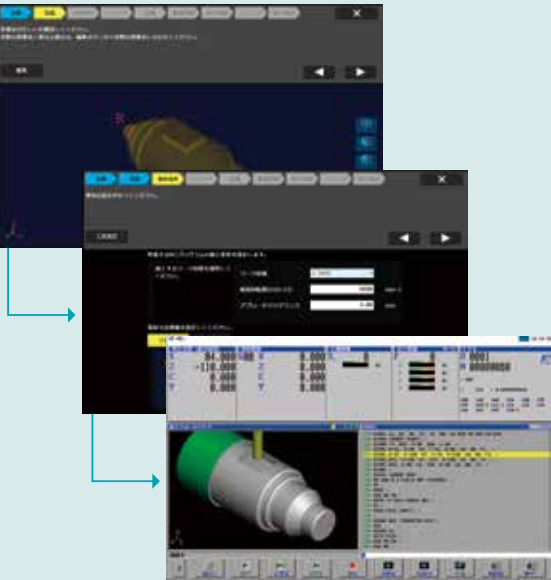
This function is to register frequently used program blocks or cycles, such as zero return or tool change, and call them again with one touch.

Reduce programming and setup time while eliminating input errors.



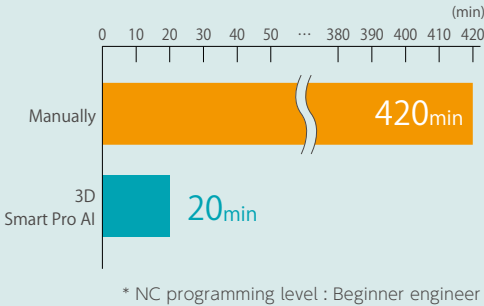
3D Smart Pro AI AI Analysis NC Programming Support Function

This function analyzes 3D CAD model data and generates an NC program for processing from blank to finished parts. Simply follow the displayed guidance and enter the required information to create the program.



Operators can also set detailed machining methods.

It drastically reduces man-hours required for creating NC programs and improves set up and production efficiency.



Transfer Setting
Once the transfer position is set, the machining area and transfer program are created.



Tolerance Setting
Once the tolerance value is input, the target value for machining can be set.



Optimization of Machining Processes
In addition to defining the required machining processes, AI proposes a suitable machining process sequence.



Tool Guide
If the tool configuration is incomplete, the AI analyzes the CAD model data and provide the necessary tool information.

NT WORK NAVIGATOR



Machining parts with non-round shapes, such as forgings or castings require that the raw part coordinates be recognized by the CNC control. It works just by touching the part with a simple inexpensive probe (mostly a 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 WORK NAVIGATOR is eliminating the need for positioning fixtures and special clamping devices.

No fixtures required



Double safety features for maximum protection

NT Machine Simulation / NT Collision Guard + Airbag (Overload detection)

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

NT Machine Simulation

Machine collisions are avoidable with Preventive safety technology! Interference checks can be carried out based on the machining paths obtained from the NC program. By simulating machine operations before starting machining, it is possible to reduce the risk of machining errors and interference.

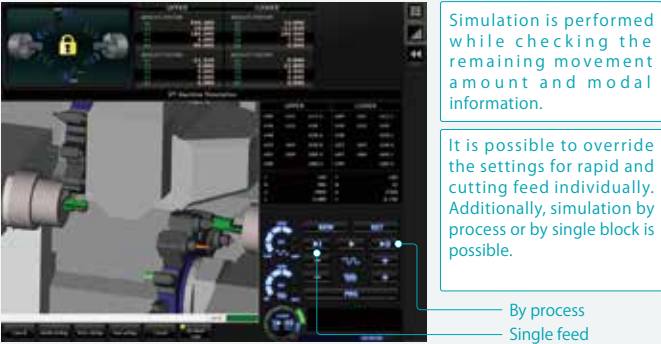


Image shown here is of a 2-turret machine

NT Collision Guard

NT Machine Simulation is synchronized with the machine operation, allowing the machine to be operated while performing interference checks. Available in automatic and manual mode. If interference is detected, the machine will stop just before the collision.



Image shown here is of a Tool spindle machine

Airbag (Overload detection)

The software's barrier system is not foolproof. Making a data input mistake will result in a machine collision. However, Nakamura-Tome machines will not break even after the machine collision.

When the machine collides, there is no reason to panic.

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



Without Airbag

Machines will not stop immediately. The slide continues to move even after a collision.



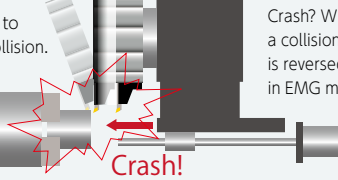
With Airbag

Retraction within 0.001 sec

Crash? Within one millisecond after a collision, the servo motor direction is reversed, and the machine stops in EMG mode.



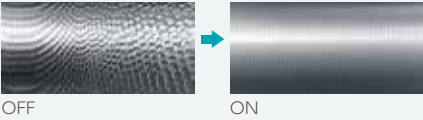
▲Video



* It is not a function that guarantees the prevention of machine break. This function does not eliminate the impact on the machine.

Chatter Cancellor

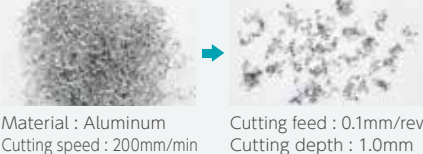
Reduce the chatter and vibration by changing the spindle speed up/down continuously during cutting. This function can be turned ON/OFF simply by M code.



* It does not guarantee that the function works without chatter and vibration. * Chatter and vibration reduction depend on the setup and the cutting condition.

Oscillation cutting (op.)

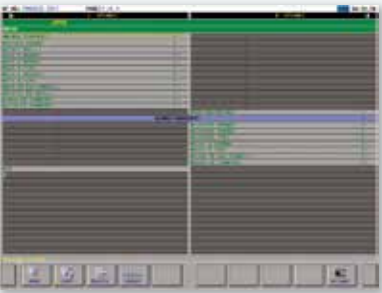
By oscillating the tool for a certain period, the chips are cut into small pieces. It can be activated easily by using a simple Fanuc G-code and resolve workpiece damage issues caused by chips twined around the part.



Material : Aluminum
Cutting speed : 200mm/min
Cutting feed : 0.1mm/rev
Cutting depth : 1.0mm

NT Manual Guide i (LUCK-BEI II)

A programming guidance system with the ability to generate NC programs (ISO/EIA G-code programs) easily. Processes created in conversational mode can be cut, copied or pasted ensuring flexibility. Additionally, several cycles such as part-transfer cycle, requiring waiting M-codes, are readily made with the "NC program editing support function". The "NC program simulation function" can be used to check created- programs by tool-path simulation or solid-model animation.



▲ Process Editing Function
NT Manual Guide i automatically recognizes each process and lists all processes. Operator can easily change and optimize the program by moving processes, copying processes or adding waiting-functions.

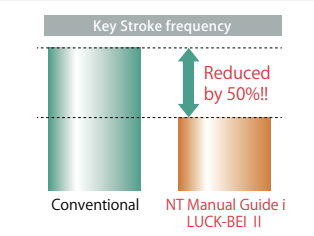


▲ Fixed-form sentence function
NT Manual Guide i contains more than 300 types of fixed form sentences. Operator can select these fixed form sentences for the program from a menu screen.



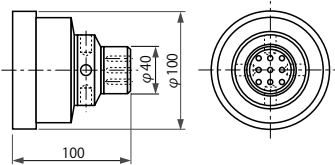
▲ Simulation
Accurate simulation of turning and milling operations using a 3D solid model.

By introducing the "automatic cutting condition setting function", the number of key strokes required to make a program were reduced by 50% reduced, compared with the previous NT-Manual guide version.



Automatic Cutting-Condition Setting Function

By setting the material type and required surface roughness, cutting conditions are automatically generated. These can be also changed depending on customer's experience.



By selecting the material, cutting conditions B are automatically input.

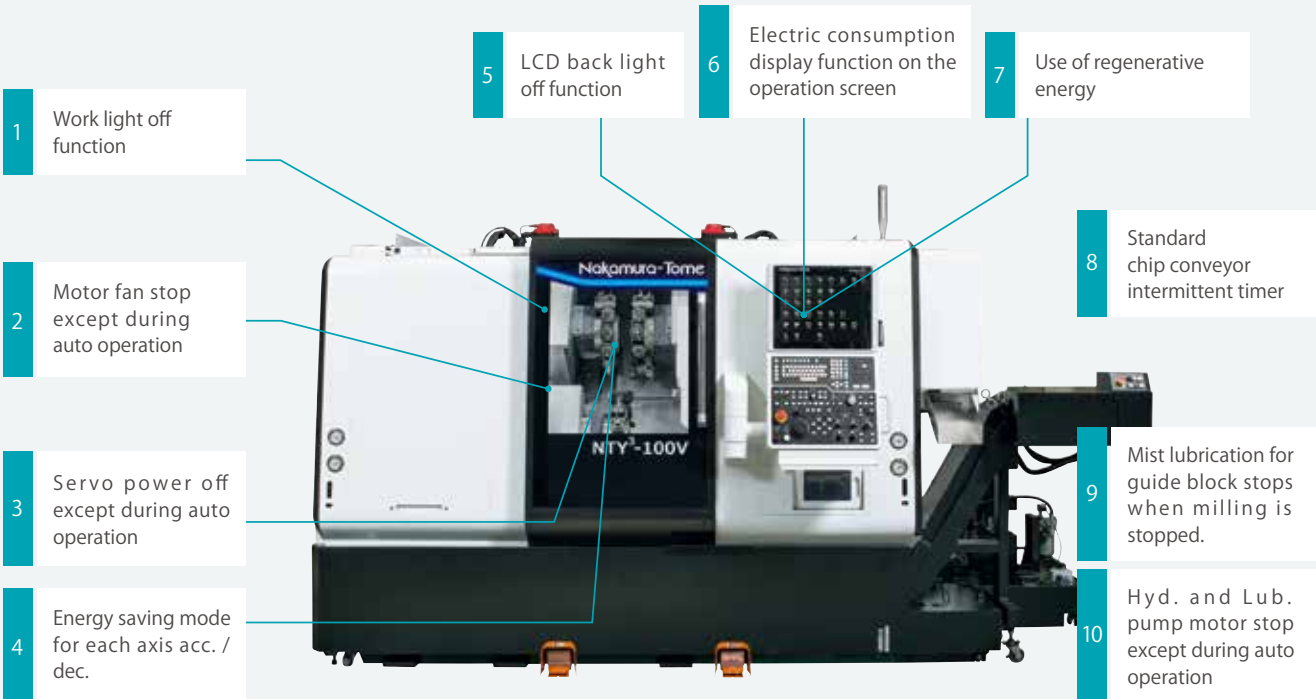


By setting the surface roughness, machining conditions are automatically input



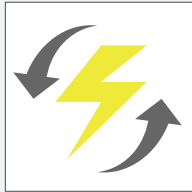
Cutting conditions. End mill

Nakamura-Tome is committed to the environment as an eco-friendly manufacturer.

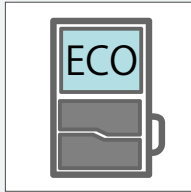


Power consumption monitoring screen
The monitor, lighting, and servo can be set to automatically turn off from the power saving setting screen. The amount of power consumption and the amount of power reduction by power saving settings are displayed.

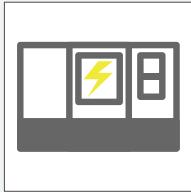
Use of regenerative energy



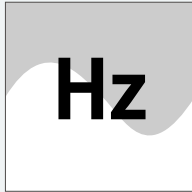
Addition of ECO mode function to NT SmartX



Improvement of power control system



Inverter-Driven Hydraulic Power Unit

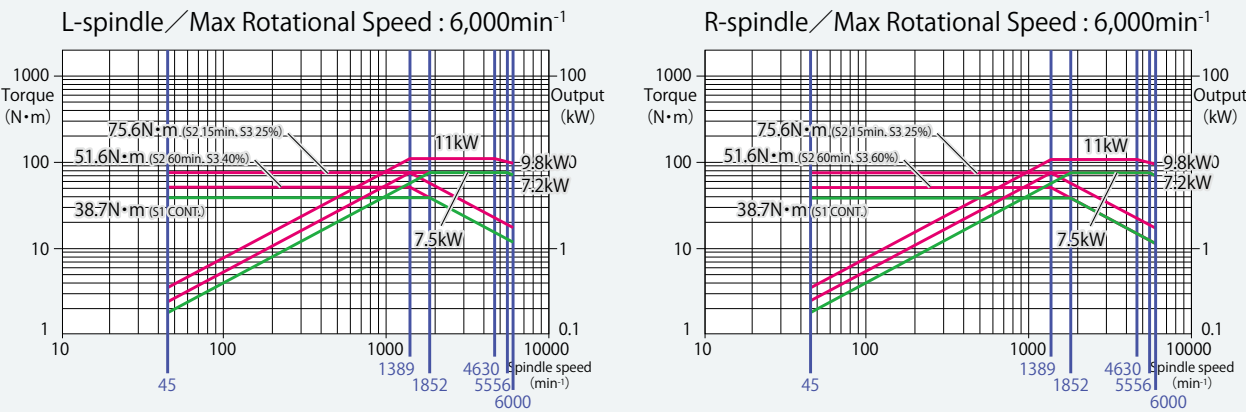


Grease lubrication for all liner axes

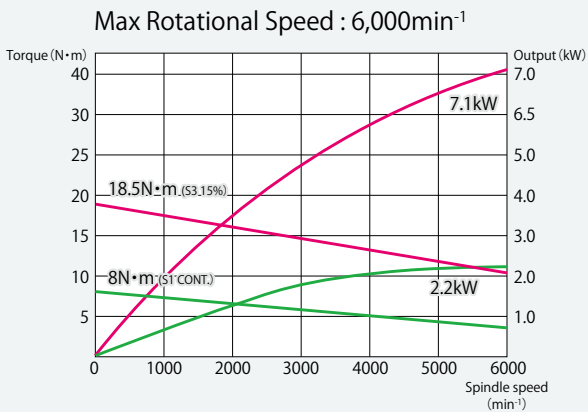


Torque/Output Chart

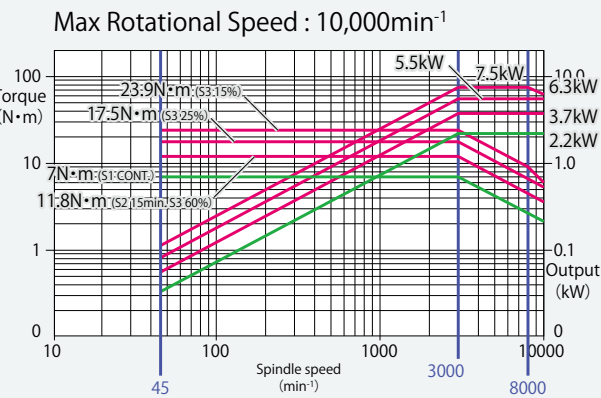
φ42 11/7.5kW Standard



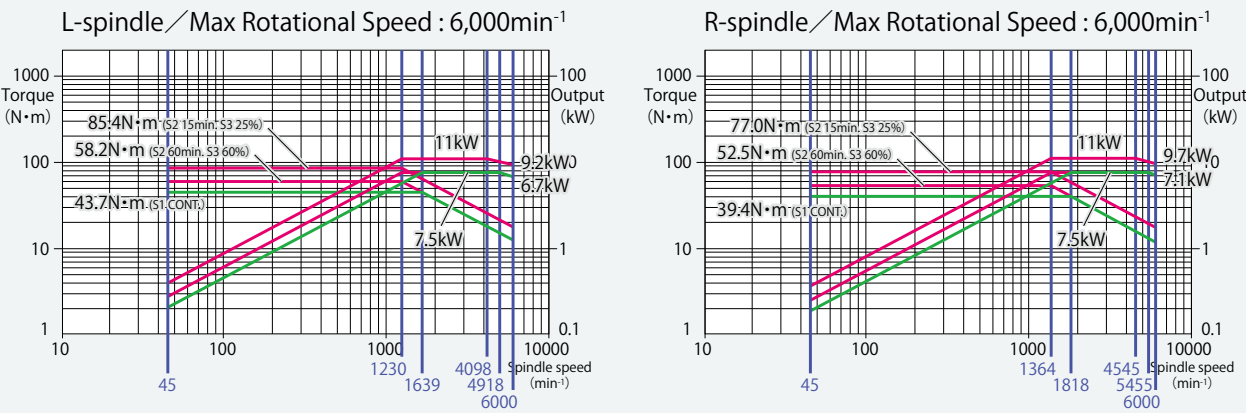
Milling motor 7.1/2.2kW Standard



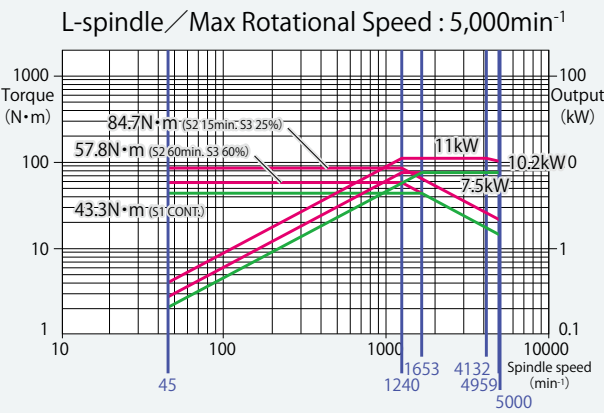
Milling motor 7.5/2.2kW Option



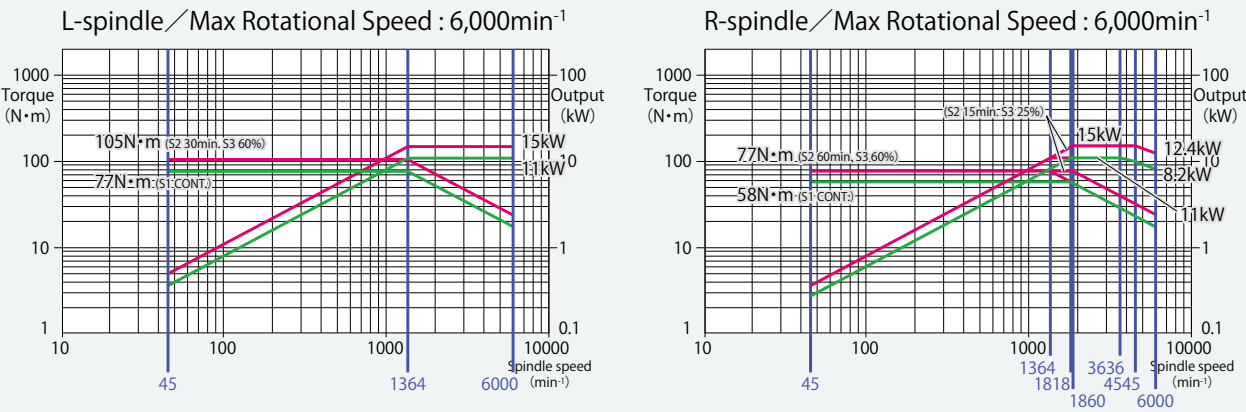
φ51 11/7.5kW Option



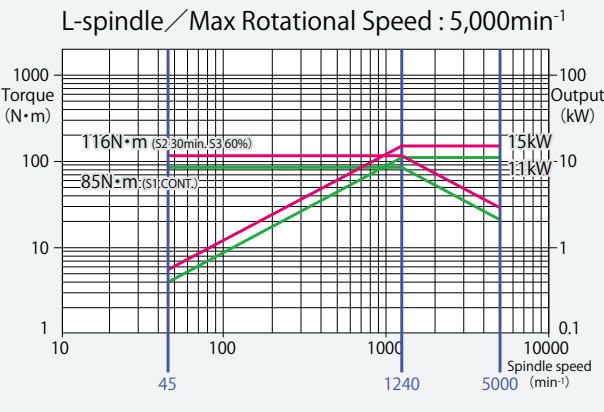
φ65 11/7.5kW Option



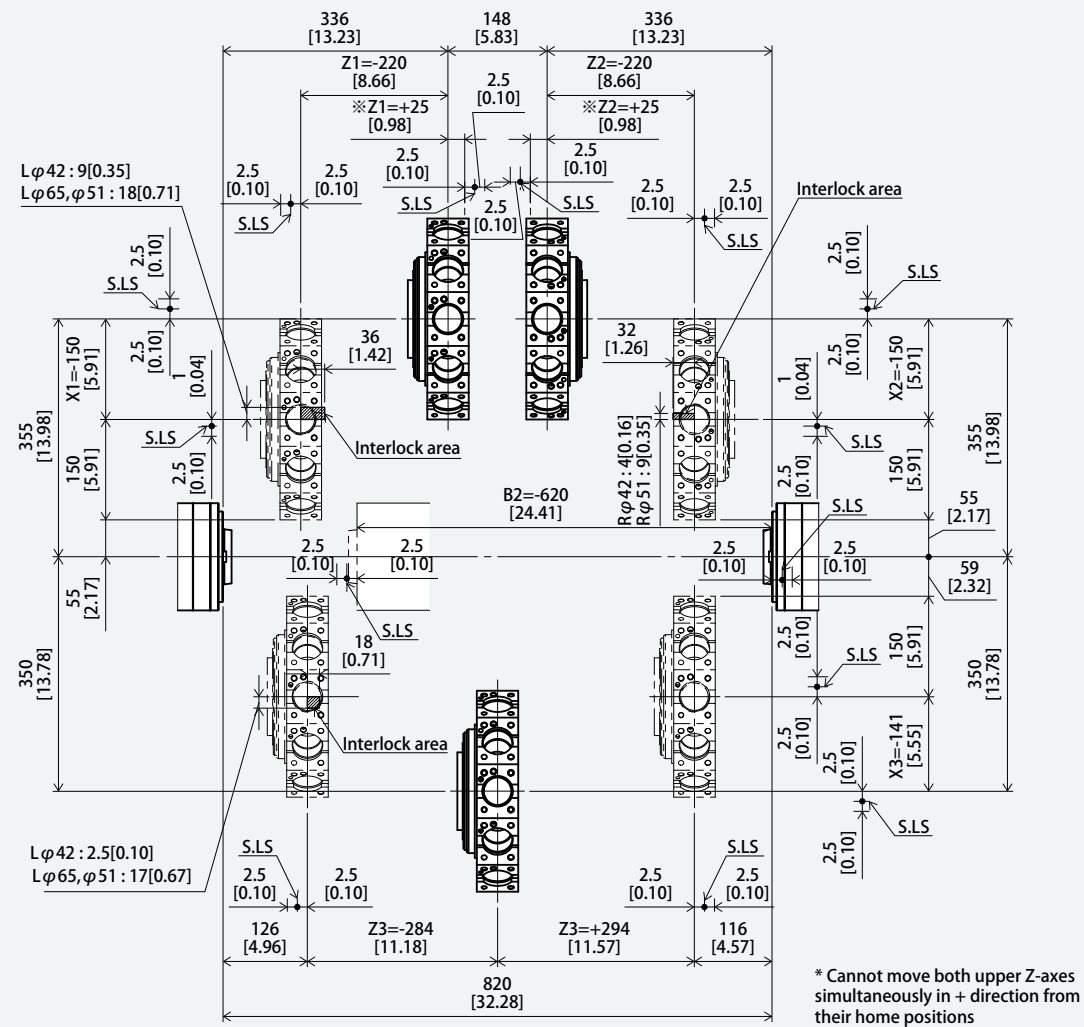
φ51 15/11kW Option



φ65 15/11kW Option



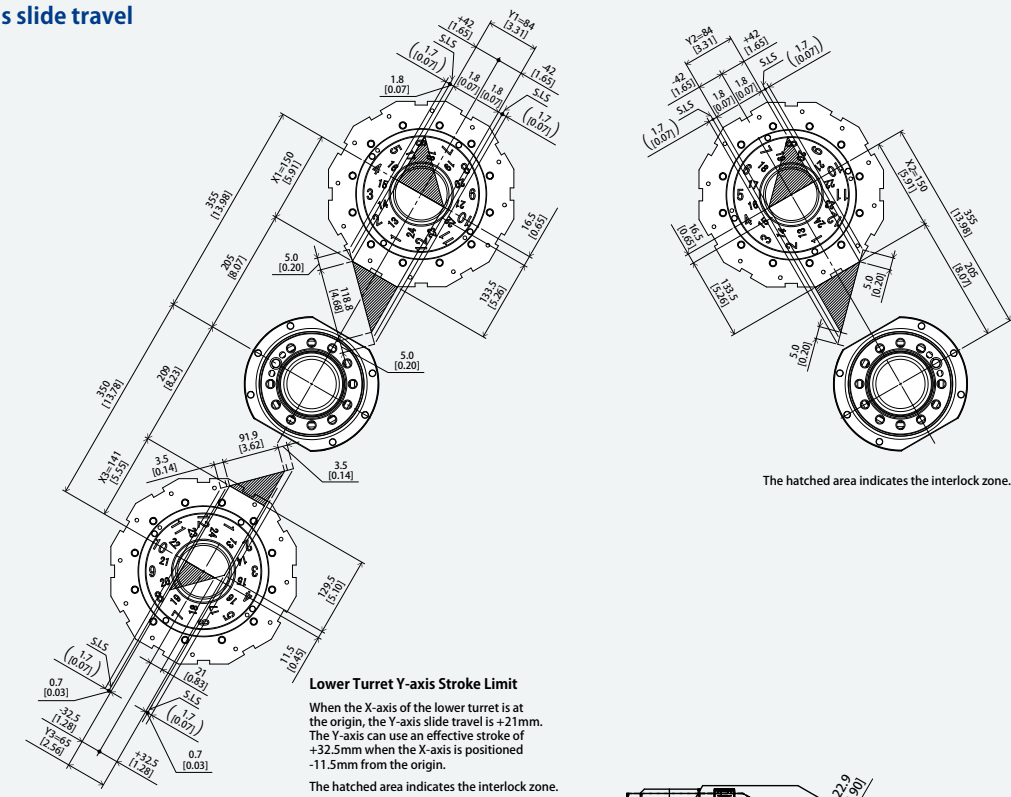
Travel Range



mm[inch]

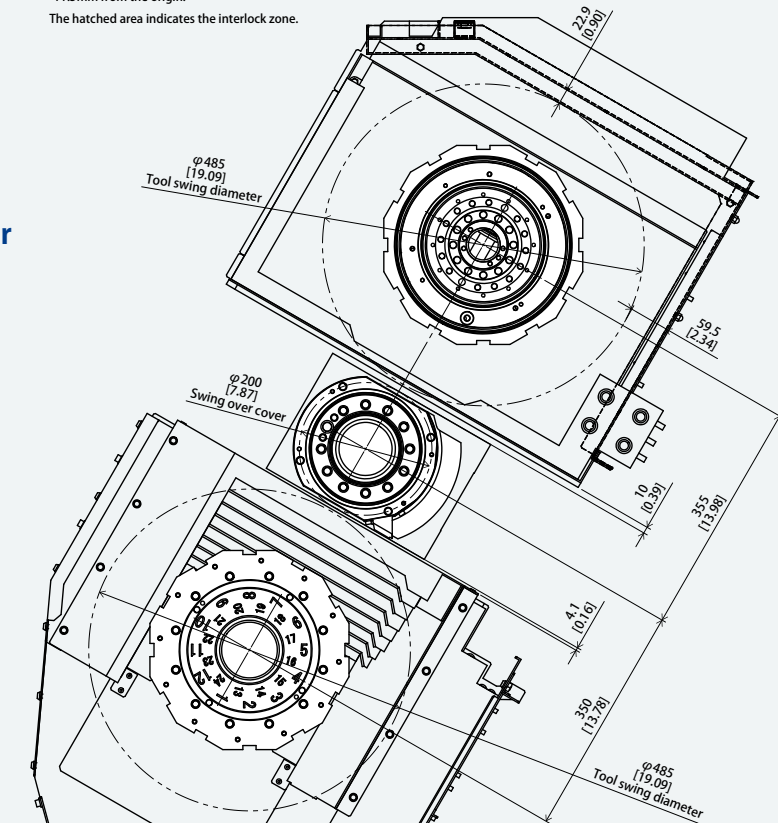
Travel Range

Y-axis slide travel



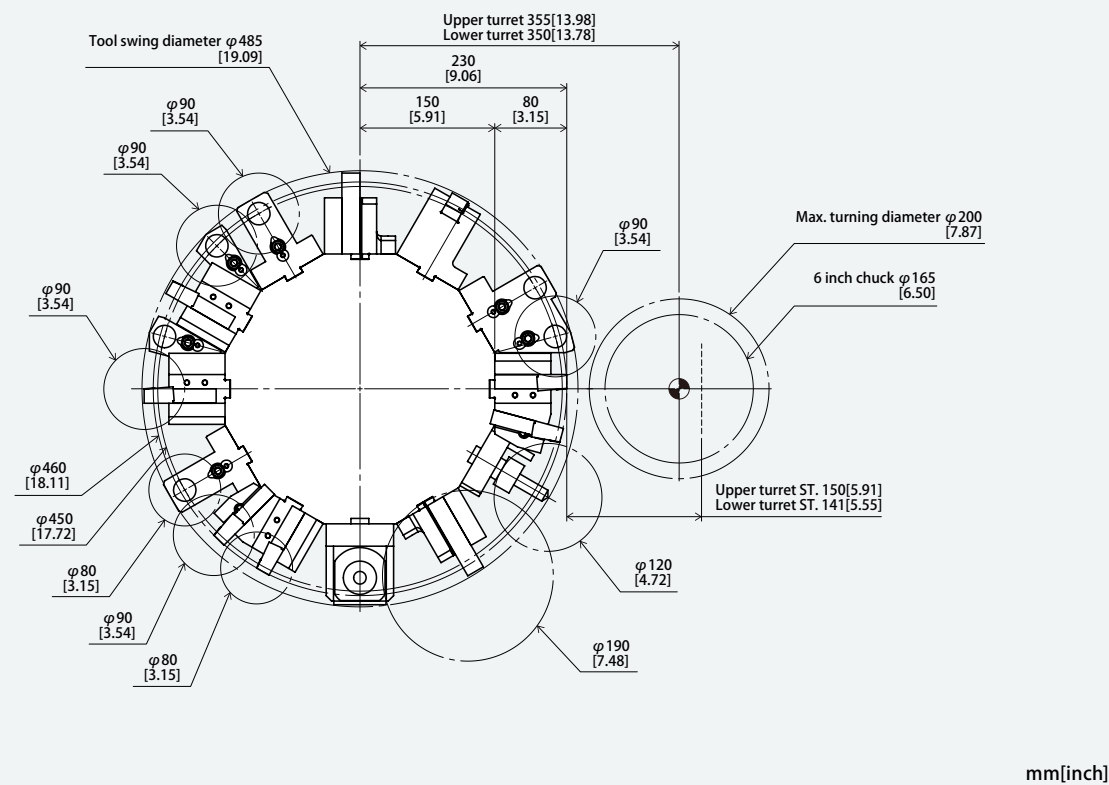
mm[inch]

Maximum Tool Diameter

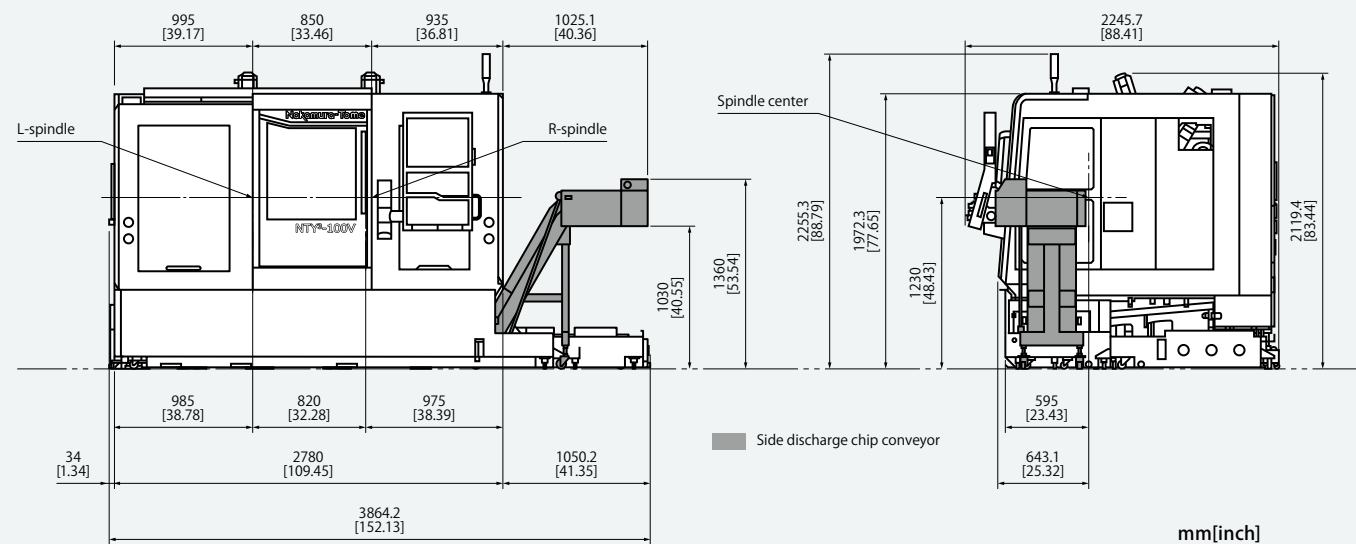


mm[inch]

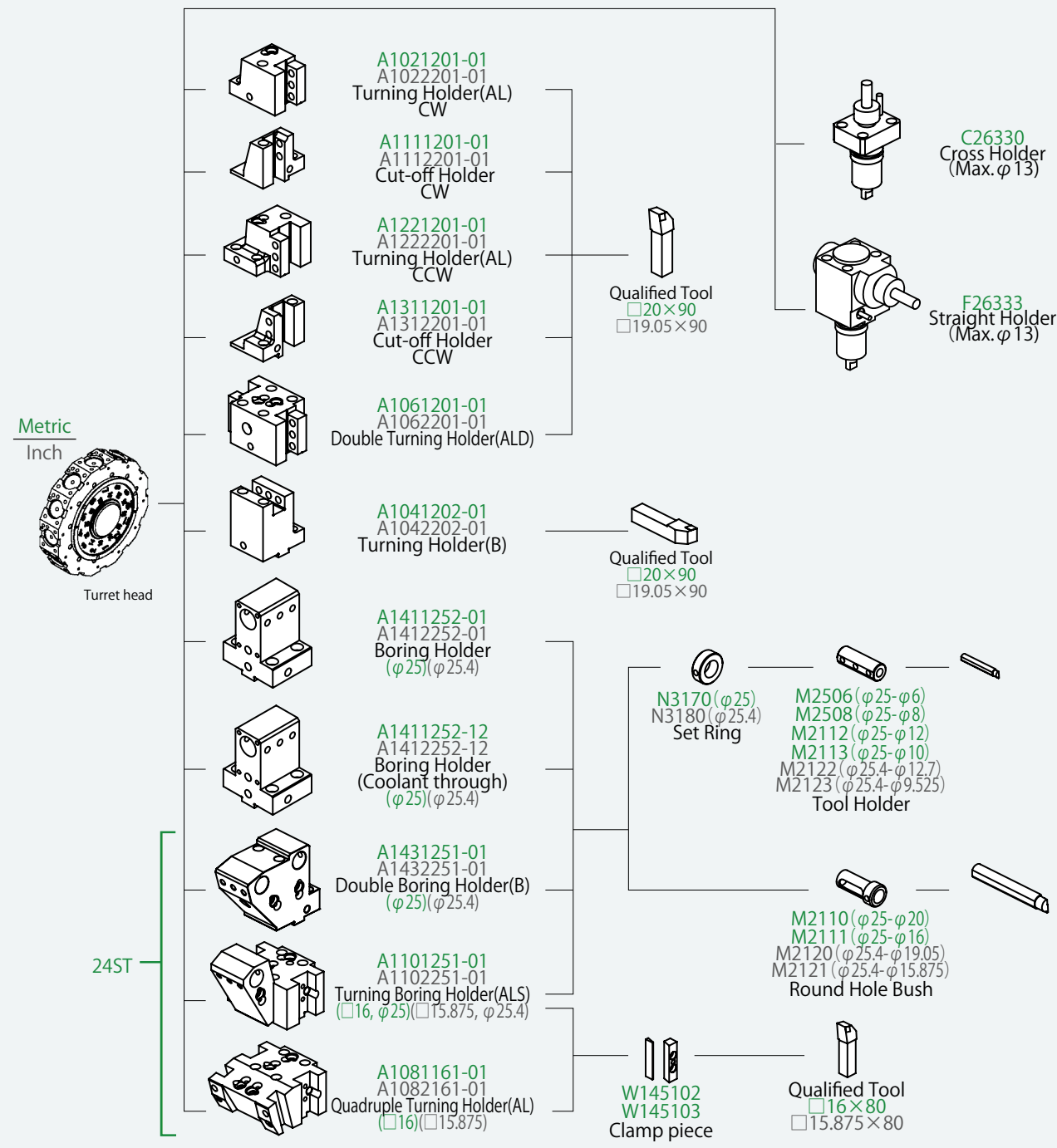
Tool Interference



Machine Dimensions



Tooling System



■ Capacity		φ42	φ51(op.)	φ65(op.)
Max. turning diameter	12st	200mm		
	15st(op.)	190mm		
Distance between spindles		max.820mm / min.200mm		
Max. turning length		588mm		
Bar capacity		φ42mm	φ51mm	φ65mm
Chuck size		6"		

■ Axis travel				
X1/X2/X3 axis slide travel	12st	150mm / 150mm / 141mm		
	15st(op.)	145mm / 145mm / 130mm		
Z1/Z2/Z3 axis slide travel	12st	245mm / 245mm / 578mm		
	15st(op.)	202mm / 202mm / 560mm		
Y1/Y2/Y3 axis slide travel	12st	±42mm / ±42mm / ±32.5mm		
	15st(op.)	±31mm / ±31mm / ±31mm		
B2-axis slide travel		620mm		

■ Rapid feed				
X-axis rapid feed rate		20m/min		
Z-axis rapid feed rate		40m/min		
Y-axis rapid feed rate		8m/min		
B2-axis rapid feed rate		40m/min		

■ L-spindle				
Spindle speed		6,000min ⁻¹	6,000min ⁻¹	5,000min ⁻¹
Spindle speed range		Stepless	Stepless	Stepless
Spindle nose		A2-5	A2-5	A2-6
Hole through spindle		56mm	63mm	80mm
I.D. of front bearing		80mm	90mm	110mm
Hole through draw tube		43mm	52mm	66mm

■ R-spindle				
Spindle speed		6,000min ⁻¹	6,000min ⁻¹	-
Spindle speed range		Stepless	Stepless	-
Spindle nose		A2-5	A2-5	-
Hole through spindle		56mm	63mm	-
I.D. of front bearing		80mm	90mm	-
Hole through draw tube		43mm	52mm	-

■ C-axis				
Least input increment		0.001°		
Least command increment		0.001°		
Rapid speed		600min ⁻¹		
Cutting feed rate		1~4,800° /min		
C-axis clamp		Disk clamp		
C-axis connecting time		1.5s		

*1 The maximum gripping diameter varies depending on the collet manufacturer.

■ Upper/Lower turret		φ42	φ51(op.)	φ65(op.)
Type of turret head	12st	Dodecagonal drum turret		
	15st(op.)	15-station turret		
Number of indexing positions	12st	24		
	15st(op.)	15		
Tool size (square shank)		□20mm / □16mm(24st)		
Tool size (round shank)		φ25mm		

■ Milling				
Rotary system		Individual rotation		
Milling spindle speed	12st	6,000min ⁻¹ / 10,000min ⁻¹ (op.)		
	15st(op.)	6,000min ⁻¹		
Spindle speed range		Stepless		
Number of milling stations	12st	12		
	15st(op.)	15		
Holder type and Tool size		Straight holder φ1mm - φ14mm *1		
		Crossholder φ1mm - φ14mm *1		

■ Drive motor				
L-spindle		11/7.5kW	11/7.5kW / 15/11kW(op.)	
R-spindle		11/7.5kW	11/7.5kW / 15/11kW(op.)	-
Milling	6,000min ⁻¹	7.1/2.2kW (18.5N·m)		
	10,000min ⁻¹ (op.)	7.5/2.2kW (23.9N·m)		

■ General				
Height		2,255.3mm		
Max. height of movable part		2,119.4mm		
Floor space (W × D)		3,864.2mm × 2,245.7mm		
Machine weight (incl. control)		10,000kg(Standard)		

■ Power supply				
Power supply		43.7kVA (L-spindle 11/7.5kW, R-spindle 11/7.5kW)		
		46.7kVA (L-spindle 15/11kW, R-spindle 11/7.5kW)		
		49.8kVA (L-spindle 15/11kW, R-spindle 15/11kW)		

- Safety quality specifications
- Various interlocks, such 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 the 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, cracking of resin, expansion 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.

■ Items				
Control type		FANUC 31i-B Plus(3-PATH)		
■ Controlled axes				
Controlled axes		13 axes		
Simultaneously controlled axes	L-upper	4 axes(X1, Z1, C1, Y1 axis)		
	R-upper	4 axes(X2, Z2, C2, Y2 axis)		
	Lower	4 axes(X3, Z3, C3(C1, C2), Y3, B2 axis)		

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

■ Feed function				
Cutting feed		feed/min 1-8000mm/min, 0.01-315inch/min X, Z : (1-4800mm/min, 0.01-188inch/min) Y : 1-8000mm/min, 0.01-315inch/min (1-4800mm/min 0.01-188inch/min) C : 1-4800° /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) 0.000001-50.000000inch/rev The maximum cutting feed rate is the value in AI contour control mode. In normal operation, It is enabled with G316 command. The values in parentheses are normal values.		
	Dwell	G04		
Feed per minute / Feed per revolution		G98 / G99		
Thread cutting		G32F designation		
Thread cutting retract		Standard		
Continuous thread cutting		Standard		
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		Low/25/50/100% (can be set from 0-100 in 10% intervals on NT Setting screen)		
Cutting feedrate override		0-150%, (each 10%)		
AI contouring control I		G5.1		
Spindle override		50%-120% Set every 10%		

■ Program memory		
Part program storage length / Number of registrable programs	4Mbyte Total 10240m	1000 4000(op.)
	8Mbyte Total 20480m(op.)	1000(op.) 4000(op.)
Part program editing	delete, insert, change	
Program number search	Standard	
Sequence number search	Standard	
Address search	Standard	
Program storage memory	Battery backup	
Background editing	Standard	
Call of sub-program in a memory card	Standard (Invoked by M200 / Not including memory card)	
Extended part program editing	Standard	

■ Operation and display				
HMI (Human Machine Interface)		NT SmartX		
Operation panel : Display		19-inch color SXGA LCD touch panel		
Operation panel : Keyboard		QWERTY keyboard		

■ Programming assist functions				
Circular interpolation R programming		Standard		
Direct drawing dimension programming or Chamfering/ Corner R		Standard (Direct drawing dimension programming is standard)		
Canned cycles		G90, G92, G94		
Multiple repetitive canned cycles		G70-G76		
Multiple repetitive canned cycles II		G71, G72		
Canned cycles for drilling		G80-G89		
Axis recomposition		Standard		
Sub program		Standard		
Custom macro		Standard(common variables #100-#149, #500-#549)		
Additional customer macro variables		Standard(After addition, #100-#199, #500-#999)		
Luck-bei II / NT Manual Guide i		Standard		
Abnormal load detection function		Standard		
NT WORK NAVIGATOR		Standard(not including contact bar)		
NT NURSE		Standard		

■ Machine support functions				
Rigid tapping		Standard		
Spindle synchronised control		Standard		
C axis synchronised control		Standard(G496 C1. rapid feed positioning)		
Spindle orientation		Standard		

■ ECO functions				
Servo motor power off		Standard (Switch on Power Saving Mode in NT Setting screen)		
Control of motor output during acceleration and deceleration		Standard (Switch on Power Saving Mode in NT Setting screen)		
G code for servo motor energy-saving during acceleration and deceleration		G356 / G357		
Automatic light off		Standard (Switch on Power Saving Mode in NT Setting screen)		
Automatic monitor off		Standard (Switch on Power Saving Mode in NT Setting screen)		



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