

WY-150V

NAKAMURA-TOME
PRECISION INDUSTRY CO.,LTD.

Faster than
the fastest

Innovative
Technology

~Creating new values~

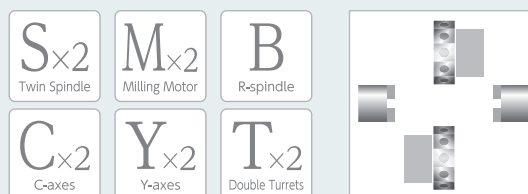
WY-150V

The third of the "V series" multitasking machines, with speed as the design concept behind it.

Y-axis on the upper/lower turret and opposed twin spindles are standard equipment.

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.



Both Turrets Equipped with Y-axis Two-spindle Two-turret CNC Multitasking Lathe



30% Reduction in Cycle Time

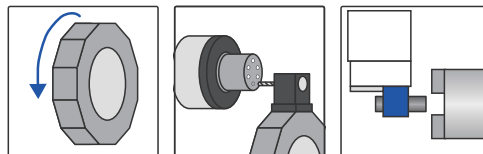
* Reduction time varies depending on the shape of the workpiece and cutting conditions.

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

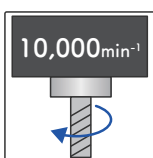


ChronoCut

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.

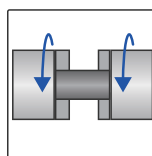


- High-speed indexing
- High-speed spindle synchronization
- Execution of multiple M-codes within the same block
- High-speed rigid tapping
- Reduction of PC-G unloading time, etc.



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.

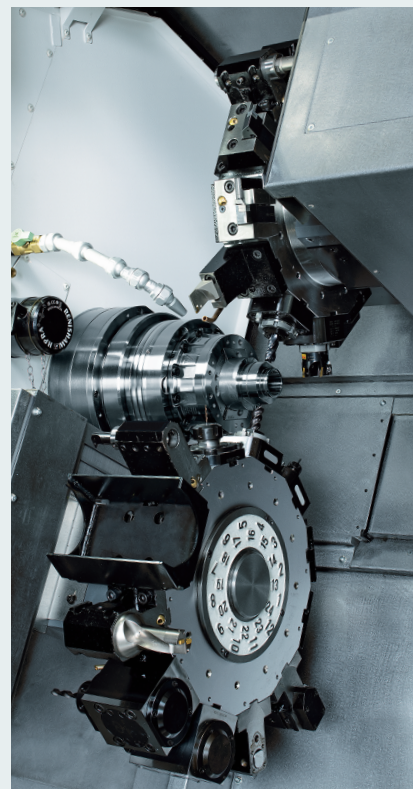
The combination of bar capacity and motor is available from following patterns.

Standard	
L-spindle	R-spindle
Bar capacity $\varnothing 51\text{mm}$ (A2-5)	Bar capacity $\varnothing 51\text{mm}$ (A2-5)
Spindle speed $6,000\text{min}^{-1}$	Spindle speed $6,000\text{min}^{-1}$
Spindle motor 15/11kW	Spindle motor 15/11kW

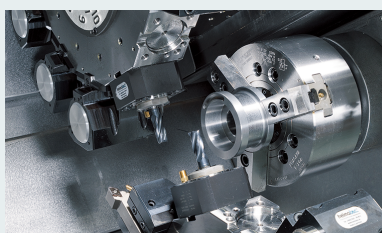
Option	
L-spindle	R-spindle
Bar capacity $\varnothing 65\text{mm}$ (A2-6)	Bar capacity $\varnothing 51\text{mm}$ (A2-5)
Spindle speed $5,000\text{min}^{-1}$	Spindle speed $6,000\text{min}^{-1}$
Spindle motor 18.5/11kW	Spindle motor 15/11kW

Option	
L-spindle	R-spindle
Bar capacity $\varnothing 65\text{mm}$ (A2-6)	Bar capacity $\varnothing 65\text{mm}$ (A2-6)
Spindle speed $5,000\text{min}^{-1}$	Spindle speed $5,000\text{min}^{-1}$
Spindle motor 18.5/11kW	Spindle motor 18.5/11kW

Option	
L-spindle	R-spindle
Bar capacity $\varnothing 80\text{mm}$ (A2-8)	Bar capacity $\varnothing 65\text{mm}$ (A2-6)
Spindle speed $4,000\text{min}^{-1}$	Spindle speed $5,000\text{min}^{-1}$
Spindle motor 28/15kW	Spindle motor 18.5/11kW



Y-axis and Milling are standard.

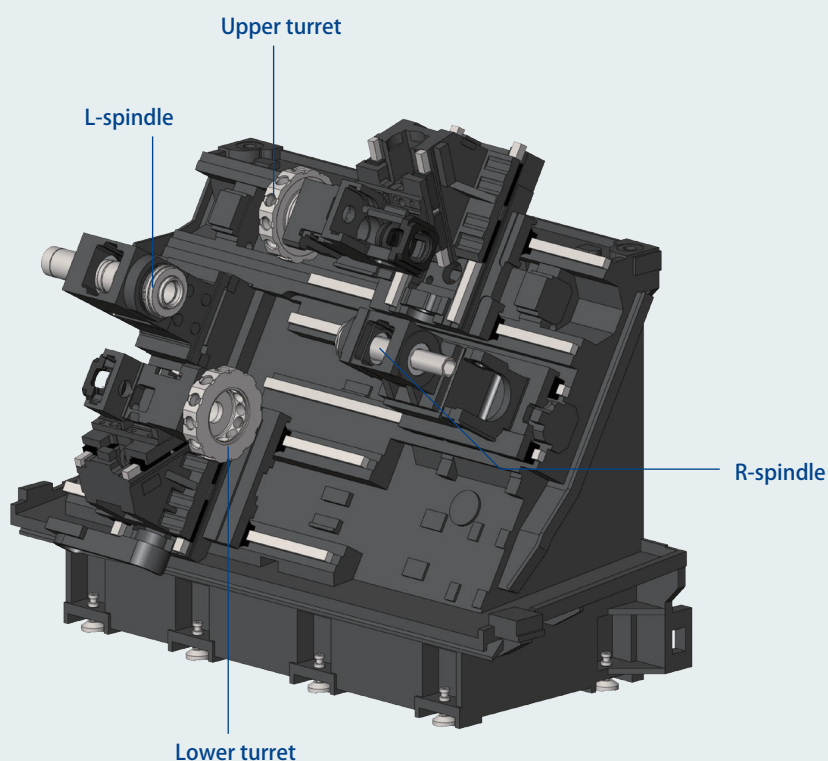


Upper/Lower turret

Y-axis slide travel Upper : $\pm 45\text{mm}$
 Lower : $\pm 35\text{mm}$

Number of milling stations
 / Number of indexing positions 12 / 24

Standard	
Milling speed	$10,000\text{min}^{-1}$
Milling motor	7.5/3.7kW



Machine Construction

GR-203 High-Speed(op.)

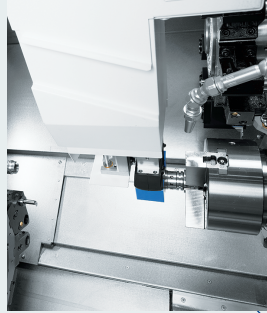
The entire process from loading the blank material, to unloading a finished part, can be automated.

* The image is of NTY3-100.



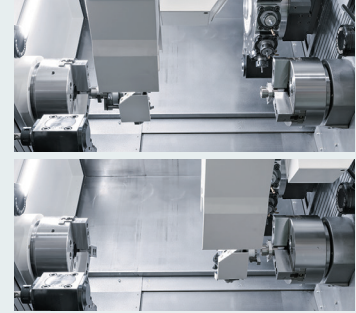
Parts catcher type G(op.)

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.



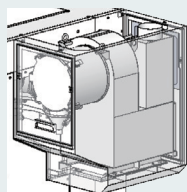
Chip conveyor(op.)

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

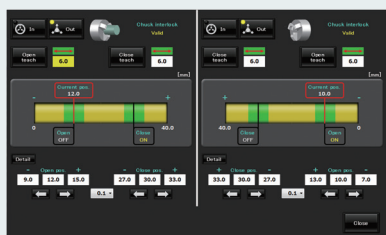
- Airbag
- NT Machine Simulation
- NT Collision Guard

Maintenance

- Trouble Guidance
- Regular Maintenance Function
- Productivity Monitoring Function
- Operation Level Management Function
- Drive Recorder

Customer Support

- NT Update



Digital Chuck Interlock

Set the Chuck Open and Close detection position easily.

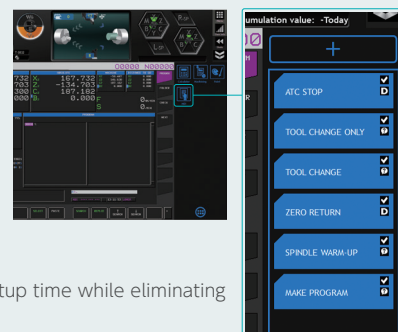
The chuck open / close position is set up on the NT SmartX screen.

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.



NT Smart Sign

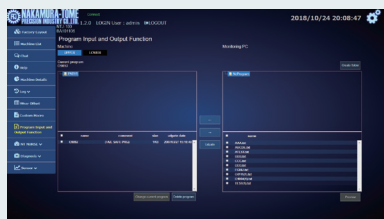
Nakamura-Tome IoT software

■ 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.

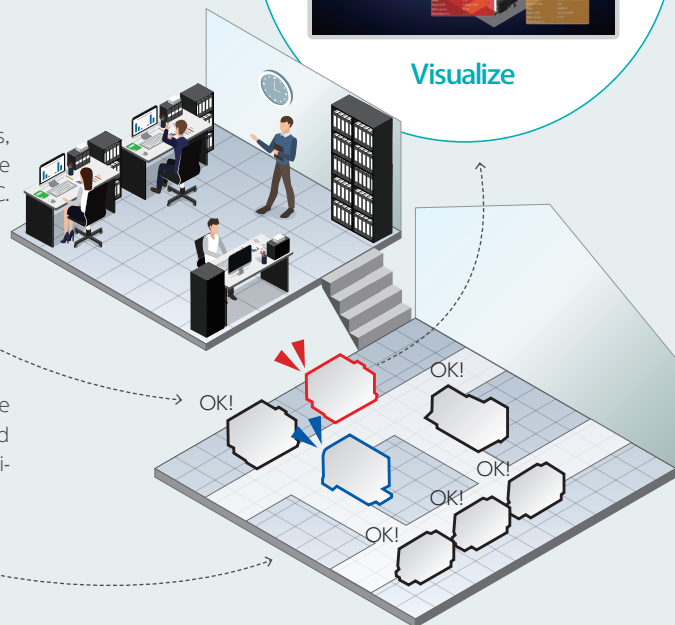
■ Diagnosis



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



Visualize



NT Thermo Navigator AI

Thermal Growth Compensation using AI.

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



Acquired Data analyzed with NT Thermo Navigator AI

Feedback

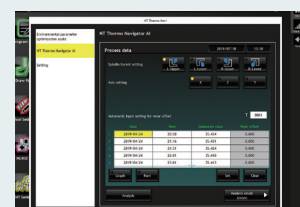
Compensation model built using AI machine learning.



Standard for NT SmartX

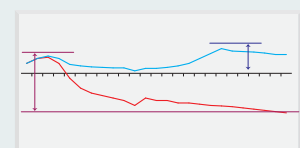
Powered by AI

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.

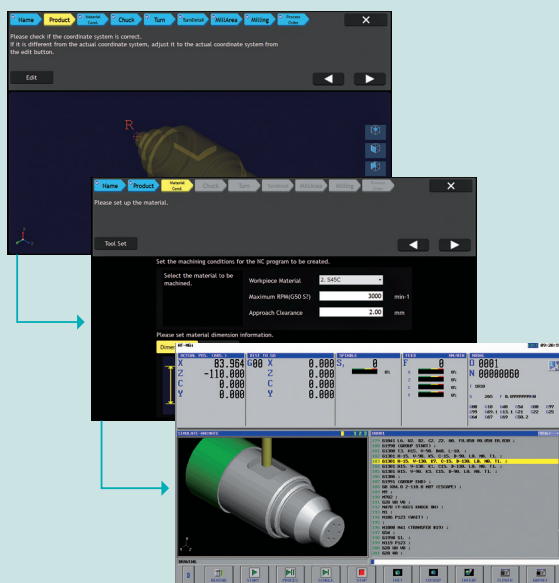


— Pre-correction thermal displacement data
— Thermal displacement data after correction

3D Smart Pro AI

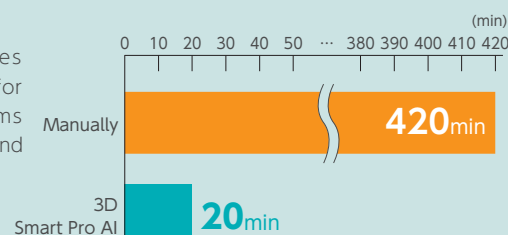
AI Analysis NC Programming Support Function

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.



* NC programming level : Beginner engineer

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.



Simulation is performed while checking the remaining movement amount and modal information.

It is possible to override the settings for rapid and cutting feed individually. Additionally, simulation by process or by single block is possible.

By process
Single feed

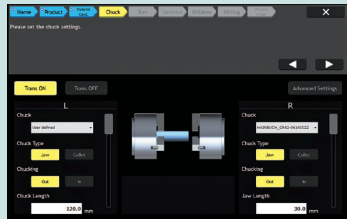
Image shown here is of a 2-turret machine

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.

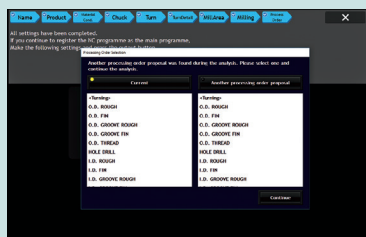


Image shown here is of a Tool spindle machine



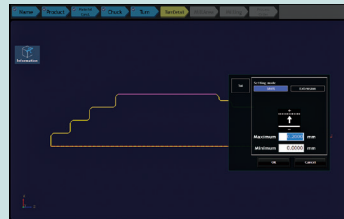
Transfer Setting

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



Optimization of Machining Processes

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



Tolerance Setting

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



Tool Guide

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

NT WORK NAVIGATOR

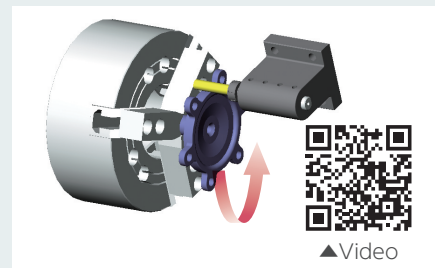


No fixtures required

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.

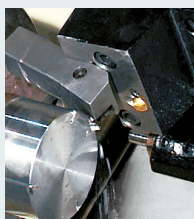


Airbag (Overload detection)

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.

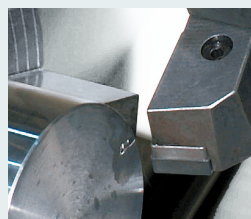
When the machine collides, there is no reason to panic.

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



Without Airbag

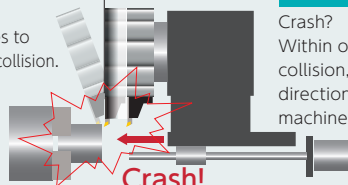
Machines will not stop immediately. The slide continues to move even after a collision.



With Airbag

Retraction within 0.001 sec

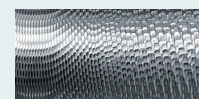
Crash? Within one millisecond after a collision, the servo motor direction is reversed, and the machine stops in EMG mode.



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

Chatter Canceller

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.



OFF



ON

* 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

Barrier?
Even with barrier function, machine collisions may occur

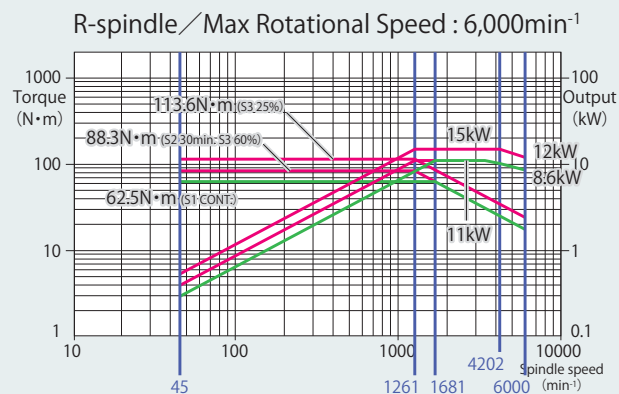
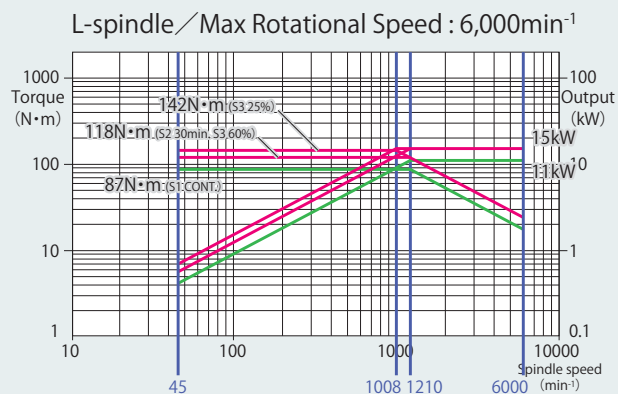


▲Video

Torque/Output Chart

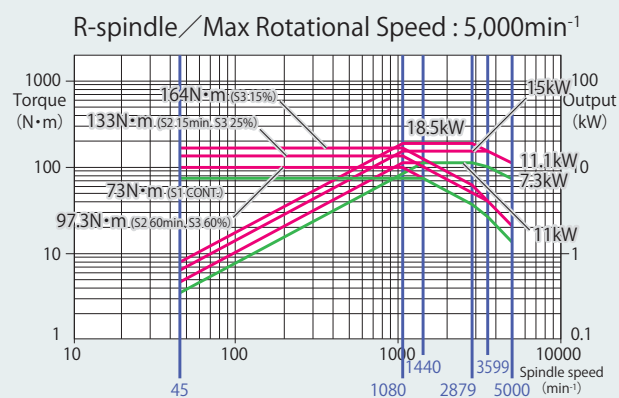
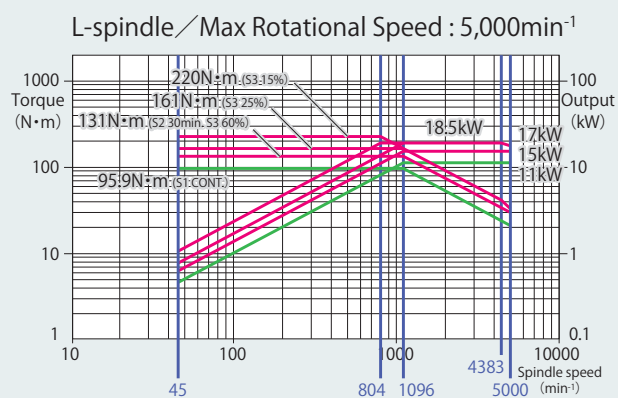
Bar capacity $\phi 51$ 15/11kW

Standard



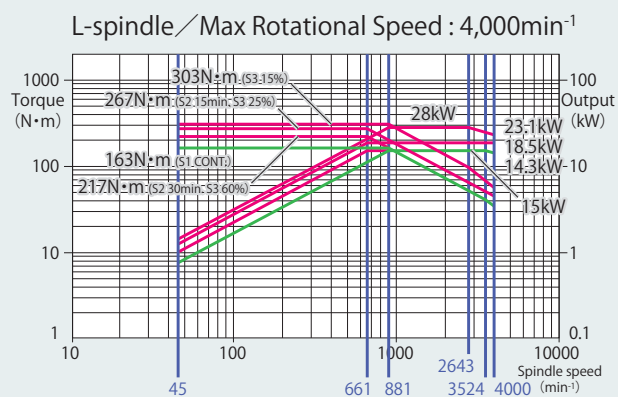
Bar capacity $\phi 65$ 18.5/11kW

Option



Bar capacity $\phi 80$ 28/15kW

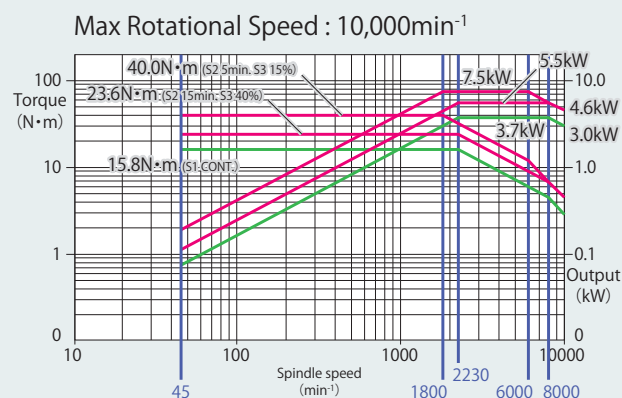
Option



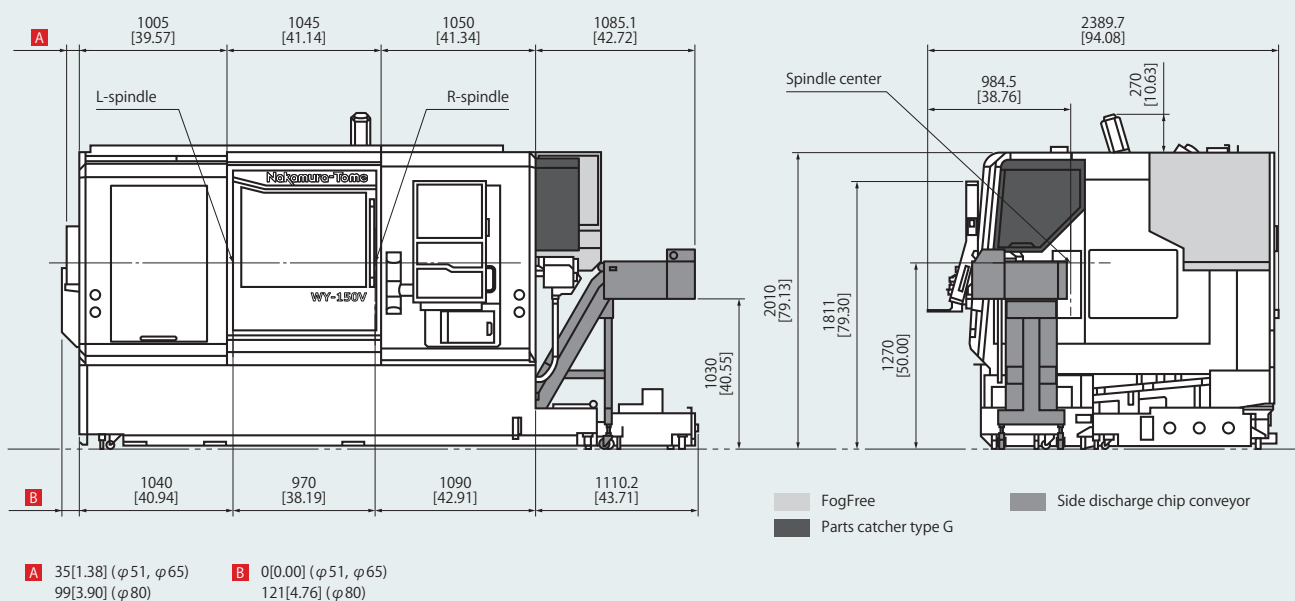
Torque/Output Chart / Machine Dimensions

Milling motor 7.5/3.7kW

Standard



Machine Dimensions

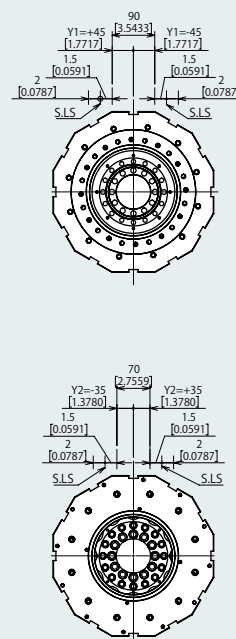
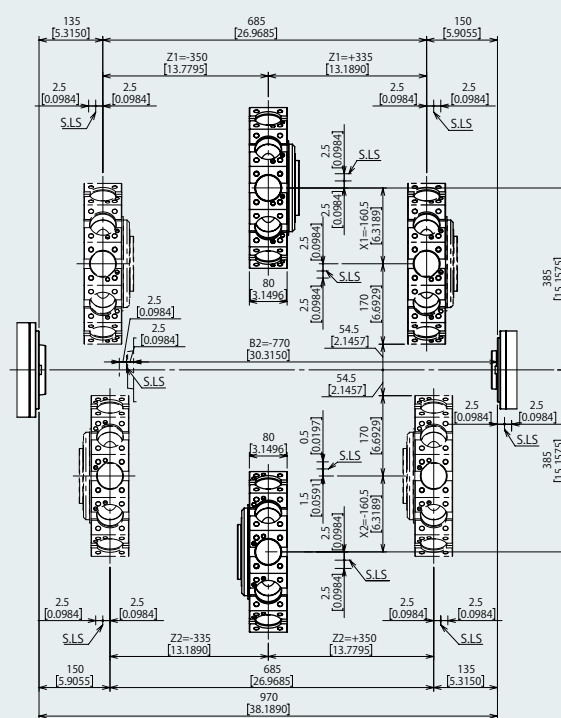


mm[inch]

Travel Range

L-spindle : $\phi 51$, $\phi 65$

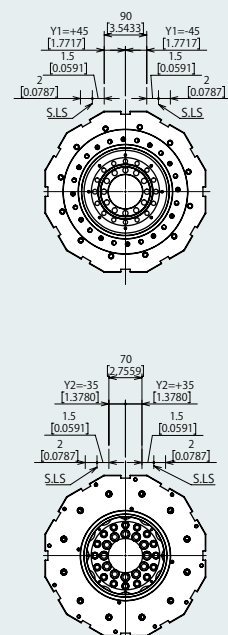
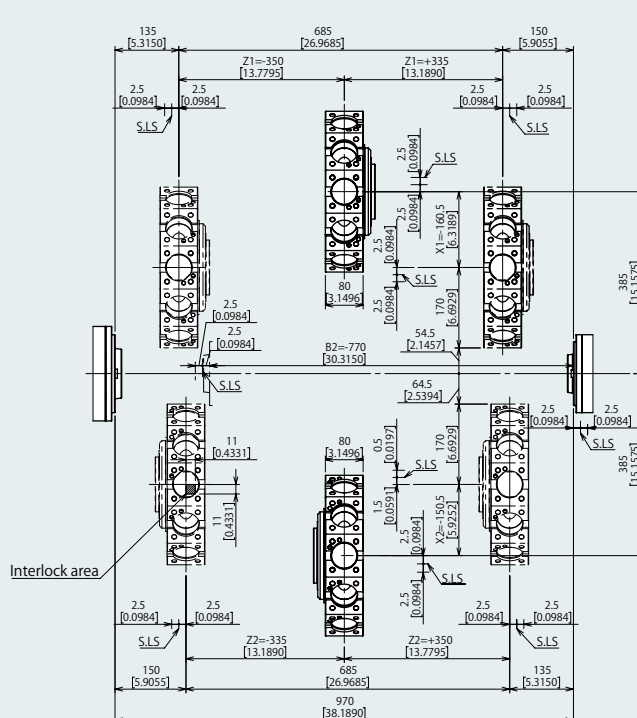
R-spindle : $\phi 51$, $\phi 65$



mm[inch]

L-spindle : $\phi 80$

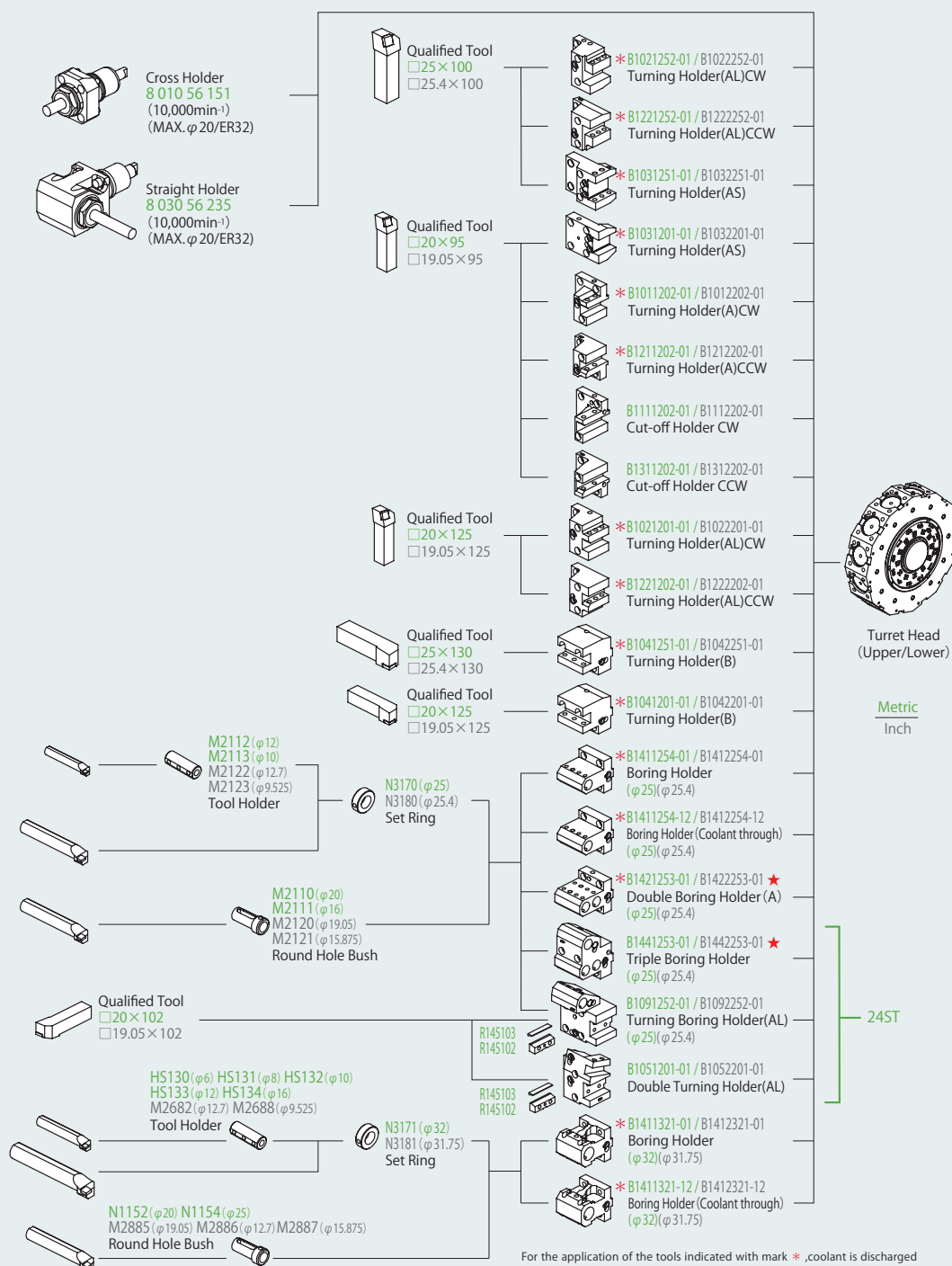
R-spindle : $\phi 65$



mm[inch]

Travel Range / Tooling System

Tooling System



For the application of the tools indicated with mark *, coolant is discharged from the holder for both main spindle machining and sub spindle machining. For the application of the tools other than the ones with mark *, coolant is discharged from the holder or turret end face through coolant piping.

Tools marked by ★ have a restriction to transfer workpieces. The center of the boring holder does not reach the spindle center due to stroke limitation when the 80mm bar capacity is selected.

■ Capacity		φ51	φ65(op.)	φ80(op.)
Max. turning diameter		225mm		
Distance between spindles		max. 970mm / min. 200mm		
Max. turning length		685mm		
Bar capacity	L-spindle	φ51mm	φ65mm	φ80mm
	R-spindle	φ51mm	φ65mm	-
Chuck size		6", 8"		8"

■ Axis travel

X1-axis slide travel	160.5mm		
X2-axis slide travel	160.5mm	150.5mm	
Z1 / Z2 axis slide travel	685mm		
Y1-axis slide travel	±45mm		
Y2-axis slide travel	±35mm		
B2-axis slide travel	770mm		

■ 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	5,000min ⁻¹	4,000min ⁻¹
Spindle speed range	Stepless	Stepless	Stepless
Spindle nose	A2-5	A2-6	A2-8
Hole through spindle	63mm	80mm	90mm
I.D. of front bearing	90mm	110mm	120mm
Hole through draw tube	52mm	66mm	81mm

■ R-spindle

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

■ 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

■ Upper/Lower turret		φ51	φ65(op.)	φ80(op.)
Type of turret head		Dodecagonal drum turret		
Number of indexing positions		24		
Tool size (square shank)		□25mm		
Tool size (round shank)		φ32mm		

■ Milling

Rotary system	Individual rotation		
Milling spindle speed	10,000min ⁻¹		
Spindle speed range	Stepless		
Number of milling stations	12		
Holder type and Tool size	Straight holder φ1mm - φ20mm		
	Cross holder φ1mm - φ20mm		

■ Drive motor

L-spindle	15/11kW	18.5/11kW	28/15kW
R-spindle	15/11kW	18.5/11kW	-
Milling	7.5/3.7kW (40.0N·m)		

■ General

Height		2,010mm
Max. height of movable part		2,280mm
Floor space (W × D)	L-spindle φ51, φ65	4,245.2mm × 2,389.7mm
	L-spindle φ80	4,331.2mm × 2,389.7mm
Machine weight (incl. control)		11,000kg

■ Power supply

Power supply	47.8kVA (L-spindle 15/11kW, R-spindle 15/11kW)
	47.8kVA (L-spindle 18.5/11kW, R-spindle 15/11kW)
	47.8kVA (L-spindle 18.5/11kW, R-spindle 18.5/11kW)
	51.3kVA (L-spindle 28/15kW, R-spindle 18.5/11kW)

● 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.

Machine•Control Specifications

■ Items

Control type	FANUC 32i-B Plus (2-PATH)
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■ Controlled axes

Controlled axes	9 axes
Simultaneously controlled axes	Upper 4 axes (X1, Z1, C1(C2), Y1 axis) Lower 4 axes (X2, Z2, C2(C1), Y2, 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
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	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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