

# NT-Flex

NAKAMURA-TOME  
PRECISION INDUSTRY CO.,LTD.

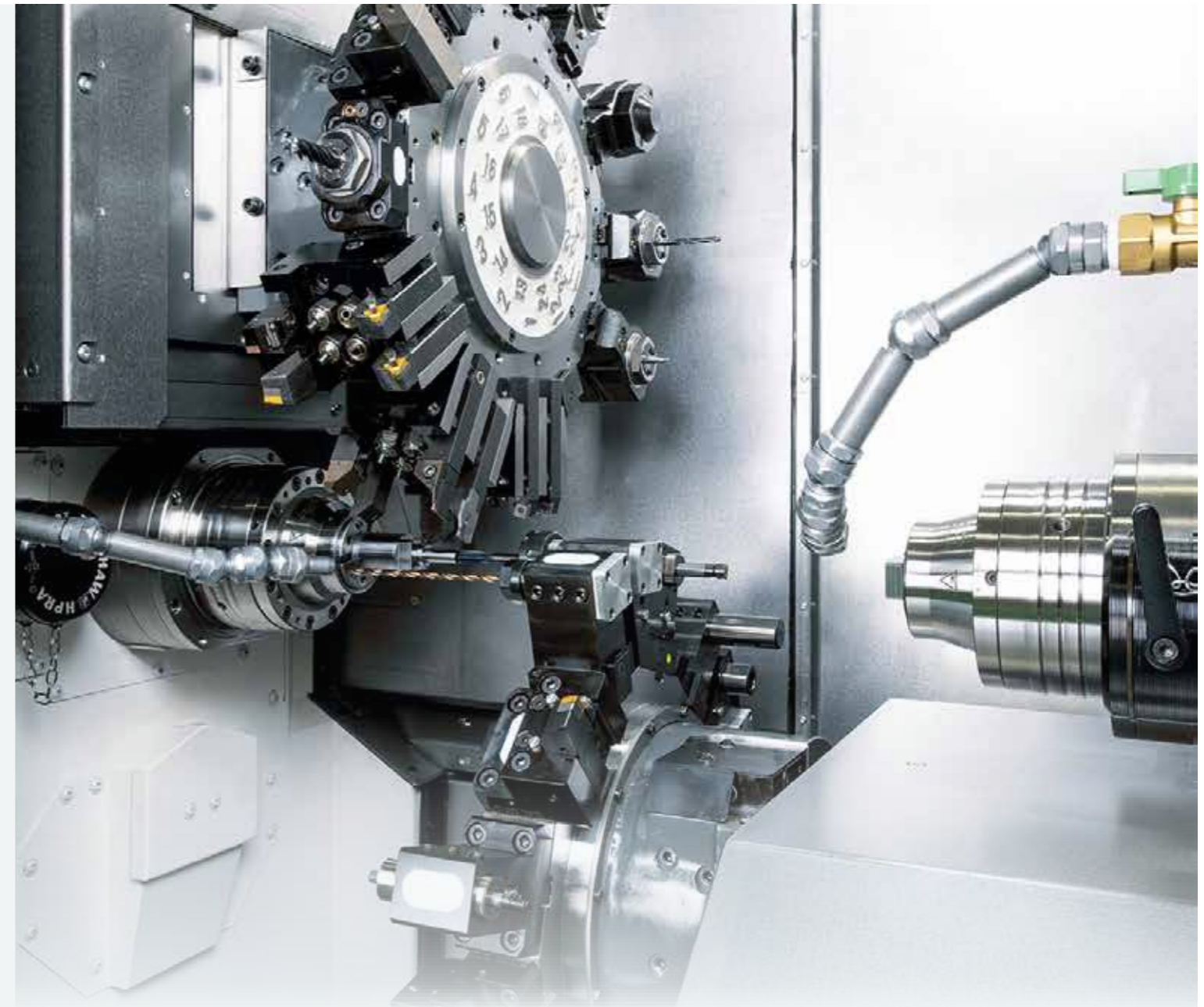
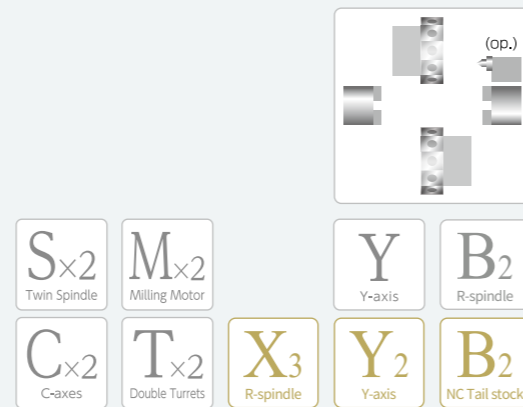
## Compact Meets Flexibility

Innovative Technology

~Creating new values~

# NT-Flex

Packed with exceptional value in a single CNC lathe. The 2-spindle, 2-turret precision CNC multitasking lathe "NT-Flex" makes its debut. This compact machine, equipped with flexible machining capabilities and a wide range of software, will turn your demands into reality.

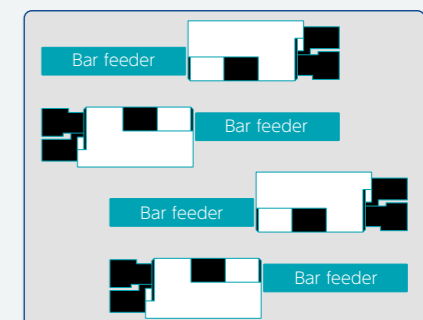


## Compact

Surprisingly compact with a depth of just 1.38m! It allows you to position the machine neatly in limited space without wasting any area.



## Factory



## Flexible

The NT-Flex is versatile and works with a wide range of materials. It processes everything from bar stock and cut materials to black iron, castings, and forgings.



It is compact yet accommodates 24-station turrets in both the upper and lower areas. By utilizing quadruple tool holders, you can set up a maximum of 96 tools, ensuring the completion of all processes, including turning, milling, and gear machining.

We offer a variety of automation systems, providing optimal automation solutions tailored to meet users' production demands.



Bar feeder



Parts catcher type G

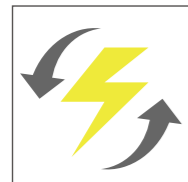


Chip conveyor

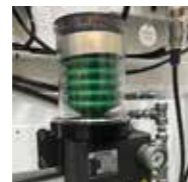
The discharge position can be selected from the following three options.

- Side
- Right side & Rear

Bar remnant parts catcher



Use of regenerative energy



Grease lubrication for all liner axes

\* Oil mist is used for milling



Inverter-Driven Hydraulic Power Unit

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

### L-spindle

#### Standard

Bar capacity  $\phi 32\text{mm}$   
Spindle speed  $8,000\text{min}^{-1}$   
Spindle motor 7.5/5.5kW

#### Option

Bar capacity  $\phi 38\text{mm}$   
Spindle speed  $8,000\text{min}^{-1}$   
Spindle motor 7.5/5.5kW

### Upper turret

Y-axis slide travel  $\pm 25\text{mm}$   
Number of milling stations / Number of indexing positions 12 / 24

#### Standard

Milling speed  $8,000\text{min}^{-1}$   
Milling motor 7.1/2.8kW

#### Option

Milling speed  $10,000\text{min}^{-1}$   
Milling motor 7.5/2.2kW

### Lower turret

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

#### Standard

Milling speed  $8,000\text{min}^{-1}$   
Milling motor 7.1/2.8kW

#### Option

Milling speed  $10,000\text{min}^{-1}$   
Milling motor 7.5/2.2kW

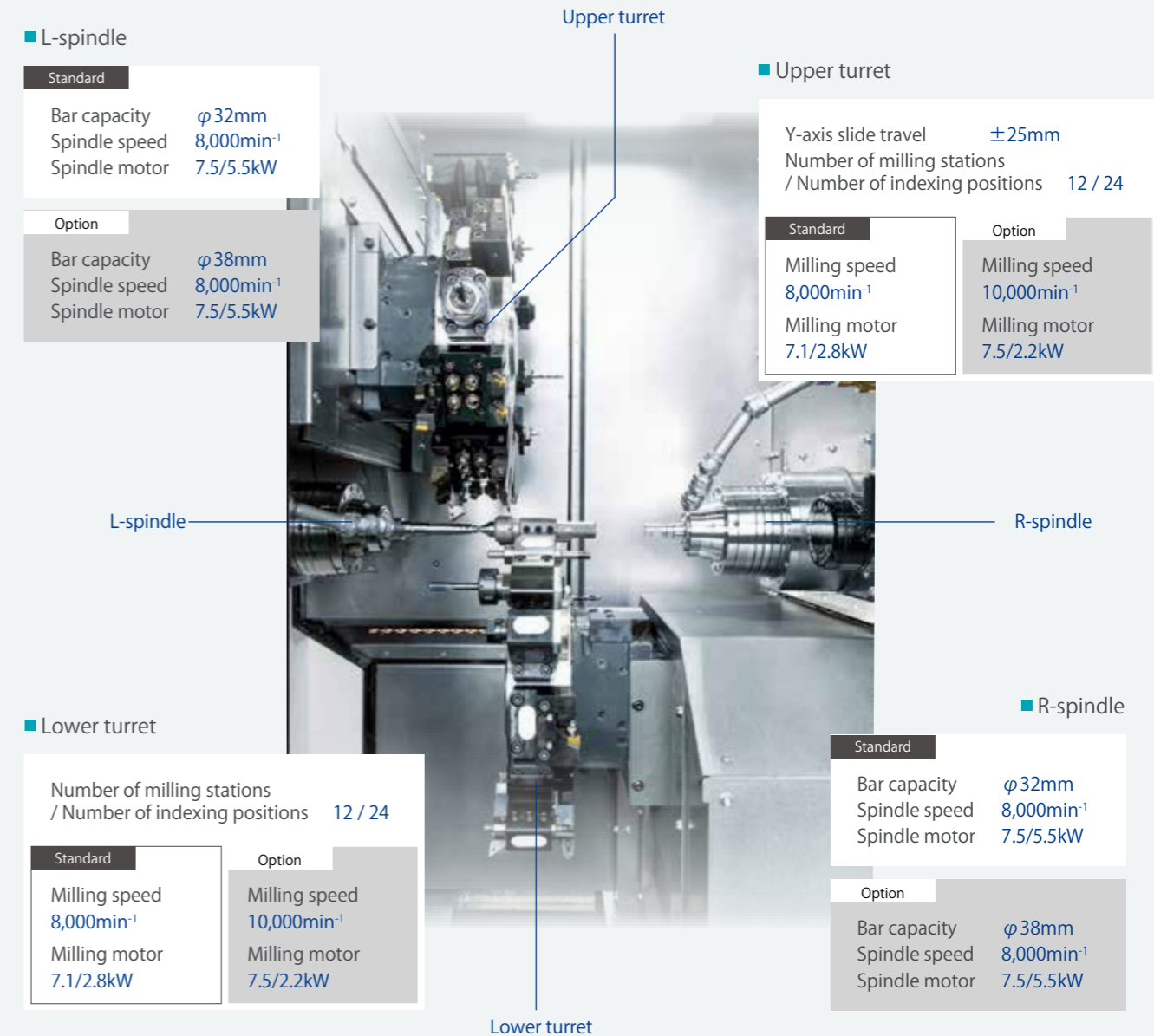
### R-spindle

#### Standard

Bar capacity  $\phi 32\text{mm}$   
Spindle speed  $8,000\text{min}^{-1}$   
Spindle motor 7.5/5.5kW

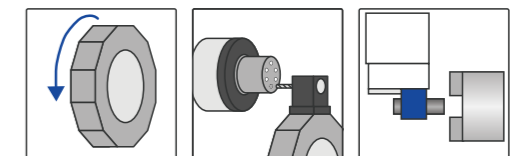
#### Option

Bar capacity  $\phi 38\text{mm}$   
Spindle speed  $8,000\text{min}^{-1}$   
Spindle motor 7.5/5.5kW



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.



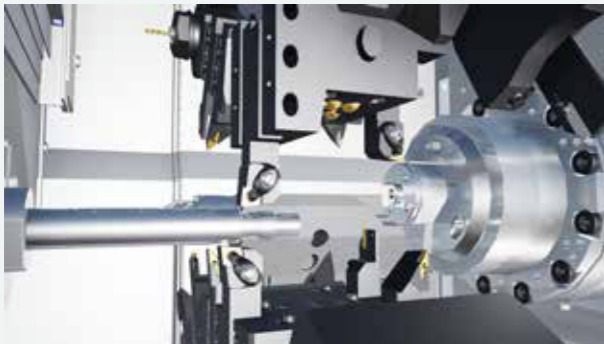
# NT-Flex+



## What?

“NT-Flex+” introduces an enhanced configuration of the NT-Flex, featuring an X-axis on the R-spindle and dual Y-axes on the upper and lower turrets, providing greater flexibility for complex machining operations.

### Three Tools in One Cut



Superimposed machining enables simultaneous machining with three tools.

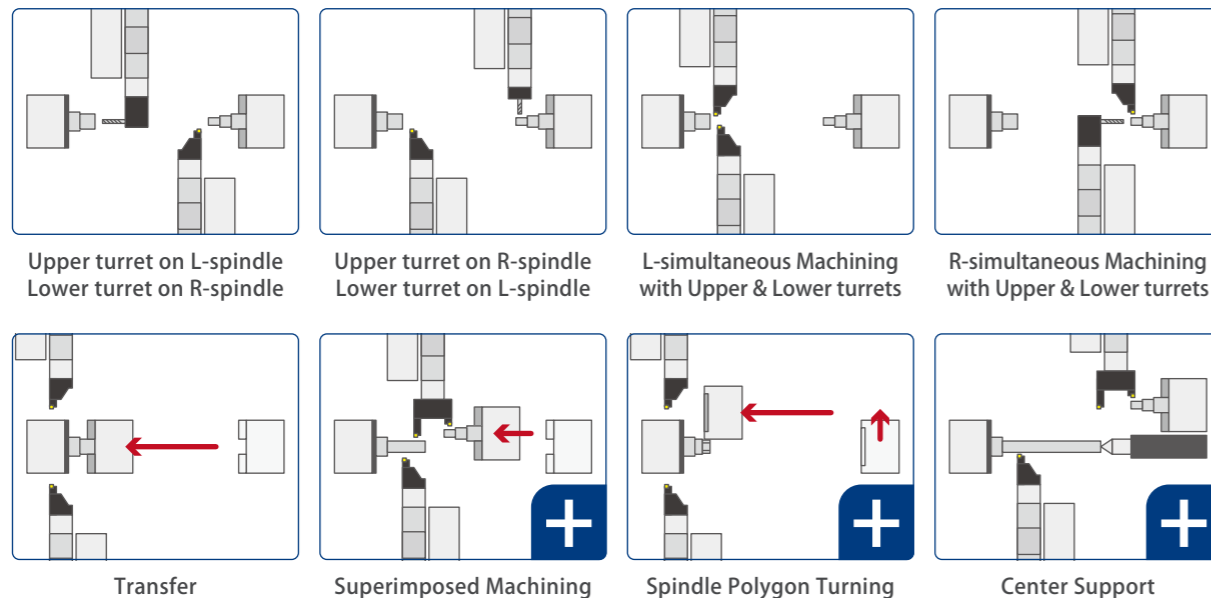
### Spacious Machining Area with No Interference



With the X-axis on the R-spindle, the machine’s internal space can be used more efficiently without interference, allowing for a wider range of machining operations.

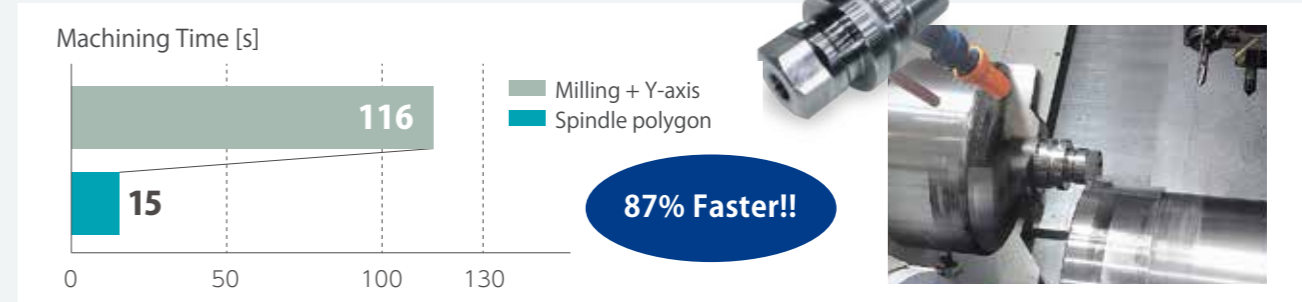
### Machining capability

With the addition of new features such as the X-axis travel on the R-spindle, the machine can perform various operations.



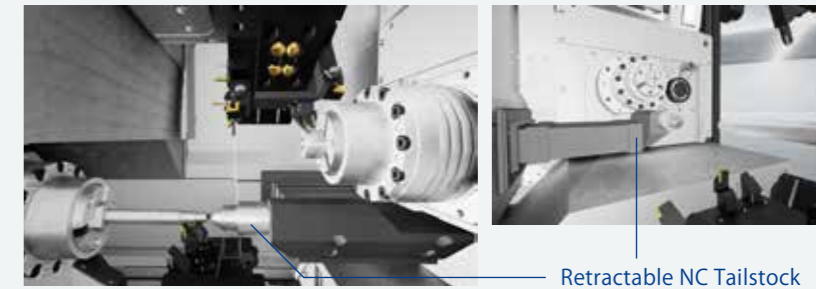
### Spindle Polygon Turning (op. for +specification)

Faster than machining with milling and Y-axis!



### Retractable NC Tailstock (op. for +specification)

The NC tailstock is normally retracted behind the R-spindle, but can be freely used when needed by moving the R-spindle in the +X direction. This enables simultaneous machining on the upper and lower turrets while supporting the workpiece on the L-spindle.



### 10,000 min<sup>-1</sup> High Speed Milling (op.)

Reduce cycle time by high speed milling with 10,000 min<sup>-1</sup>.



### Machining Examples

Type of industry	Aerospace
Part name	Housing
Material	X10CrNiS 18-9   φ32mm bar
Machining Time	3 min 20 sec.

Type of industry	Machine Part
Part name	Motor Shaft
Material	X10CrNiS 18-9   φ32mm bar
Machining Time	7 min 30 sec.

Type of industry	Semiconductor
Part name	Case
Material	X5CrNi 18-10   φ32mm bar
Machining Time	3 min 46 sec.



Advanced Production System  
**NT SmartXs**



- 15 inch color LCD touch panel
- USB port x2
- QWERTY keyboard



■ ChronoCut  
Full version included as standard

<b>Setup Support</b> <ul style="list-style-type: none"> <li>● Setup Screen</li> <li>● Simple Call</li> <li>● Automatic Geometry Offset Setting Function (op.)</li> <li>● One Touch Production (op.)</li> <li>● Digital Chuck Interlock</li> </ul>
<b>Programming Support</b> <ul style="list-style-type: none"> <li>● Smart Support</li> <li>● 3D Smart Pro AI</li> <li>● 3D Smart Pro</li> <li>● NT Manual Guide i</li> <li>● Drop Converter</li> <li>● Protona</li> </ul>
<b>Machining Support</b> <ul style="list-style-type: none"> <li>● NT Thermo Navigator AI</li> <li>● Warm-Up Function</li> <li>● NT NURSE</li> <li>● Program Optimizer</li> <li>● Chatter Canceller</li> <li>● Oscillation Cutting (op.)</li> <li>● Smart Tuning (op.)</li> <li>● NT WORK NAVIGATOR</li> </ul>
<b>Dual Safety</b> <ul style="list-style-type: none"> <li>● Airbag</li> </ul>
<b>Maintenance</b> <ul style="list-style-type: none"> <li>● Trouble Guidance</li> <li>● Regular Maintenance Function</li> <li>● Productivity Monitoring Function</li> <li>● Operation Level Management Function</li> <li>● Drive Recorder</li> </ul>
<b>Customer Support</b> <ul style="list-style-type: none"> <li>● NT Update</li> </ul>

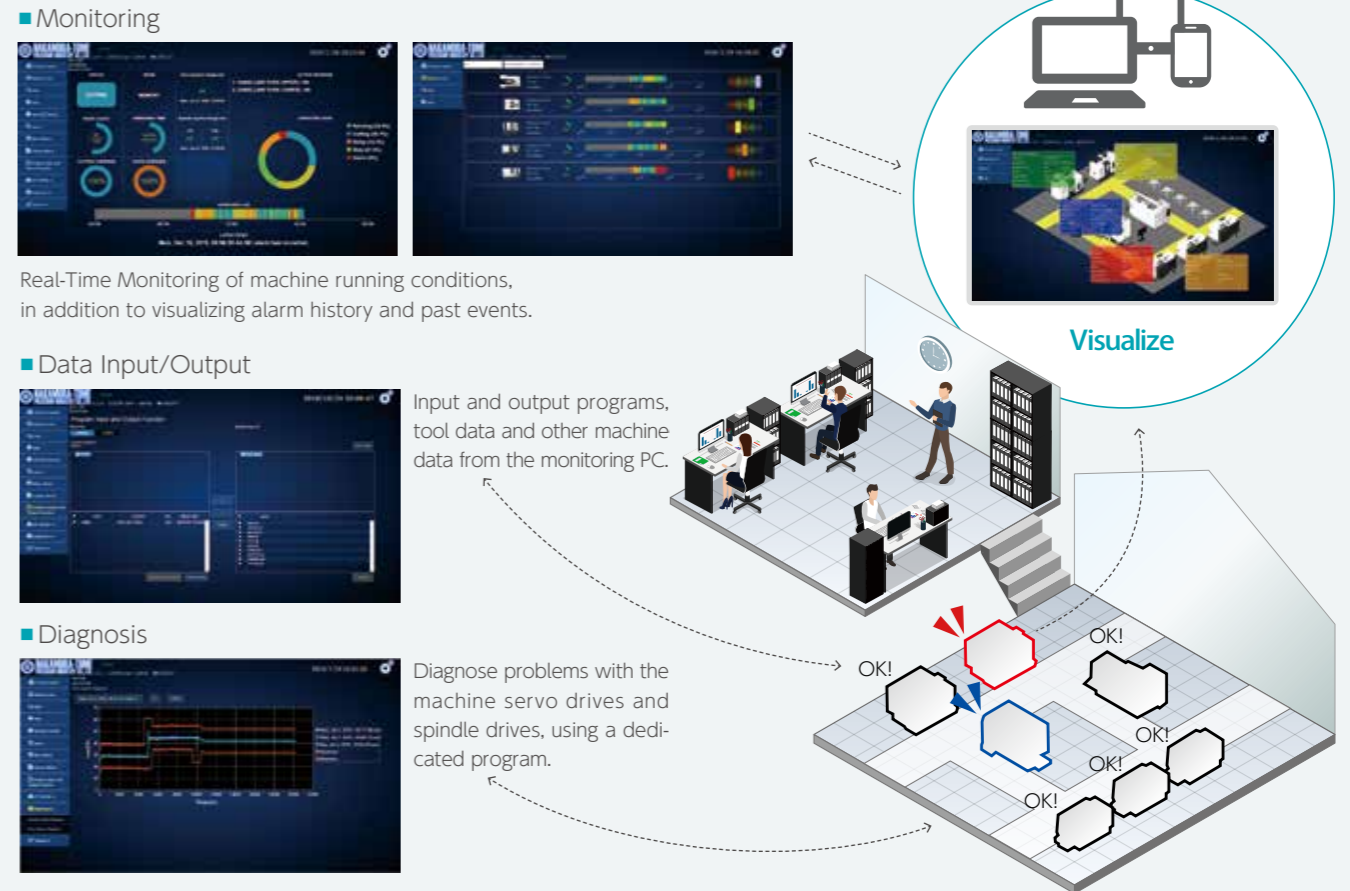


**Digital Chuck Interlock**  
Set the Chuck Open and Close detection position easily. The chuck open/close position is set up on the NT SmartXs screen. Setup time and machining cycle time are reduced.

**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



**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

Standard for NT SmartX

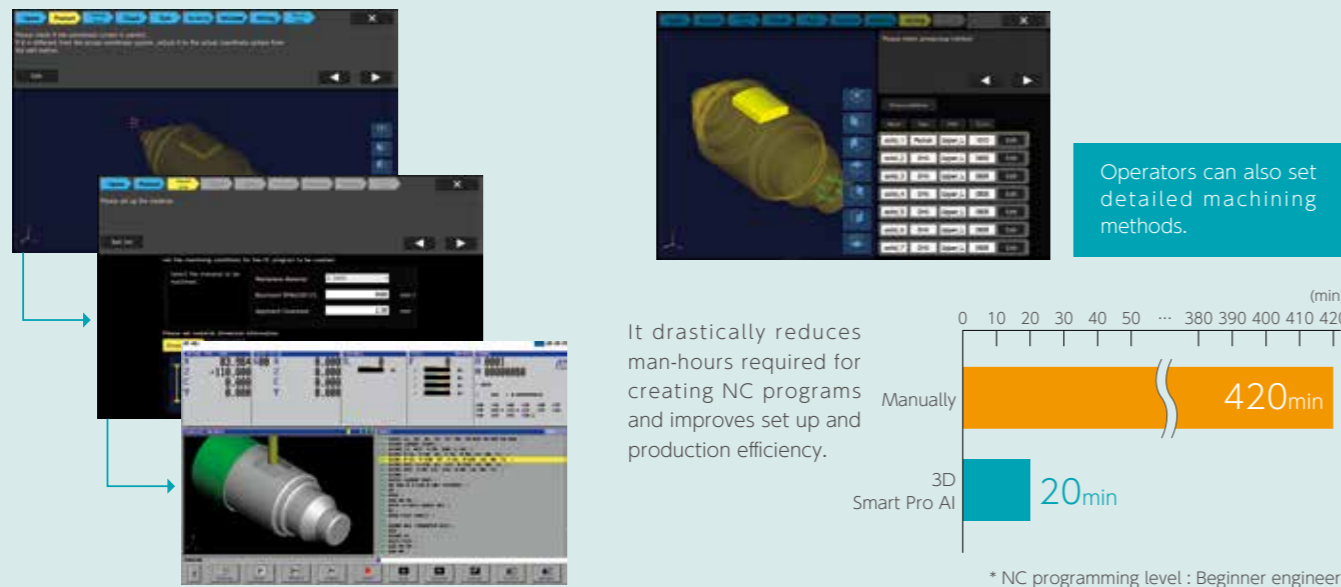
**Powered by AI**  
Compensation model built using AI machine learning. Time and measured dimension data are input into a dedicated AI Learning software, to build an optimized thermal growth compensation model.

**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.

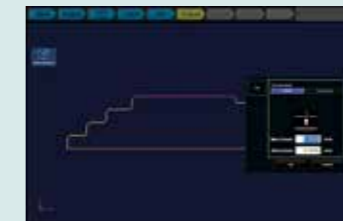
It drastically reduces man-hours required for creating NC programs and improves set up and production efficiency.

Method	Time (min)
Manually	420min
3D Smart Pro AI	20min

\* NC programming level : Beginner engineer



**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.



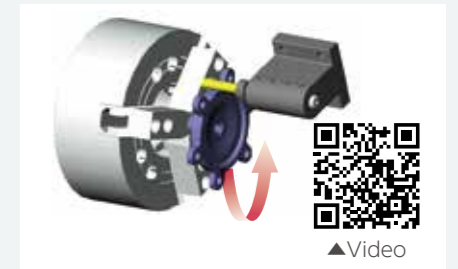
**Tool Guide**  
If the tool configuration is incomplete, the AI analyzes the CAD model data and provide the necessary tool information.

## NT WORK NAVIGATOR



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.



## Automatic Geometry Offset Setting Function (op.)

**Linked with the Tool setter! Automatically Acquire Tool Geometry Offsets.**

This function automatically measures the geometry offsets for tools set on the machine using a tool setter. By configuring the tool holder, mounting direction, and protrusion amount for each tool on a dedicated setting screen, an NC program for automatic measurement is generated.

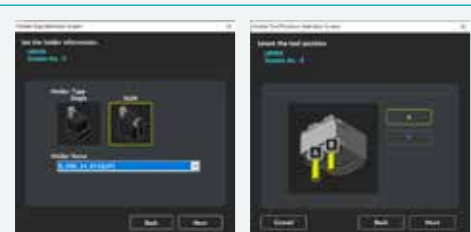
While the NC program is running, the following steps are automatically carried out: ① Tool indexing → ② Geometry measurement (X/Z axis) by the tool setter → ③ Indexing to the next tool. During this process, the operator can step away from the machine.

Supports multi-holders! Up to 4 tools can be set per station.

Up to 100 setups can be registered.

Toggle ON/OFF for all measurements

Not only You can measure all tools at once, but you can also select specific tools for measurement.

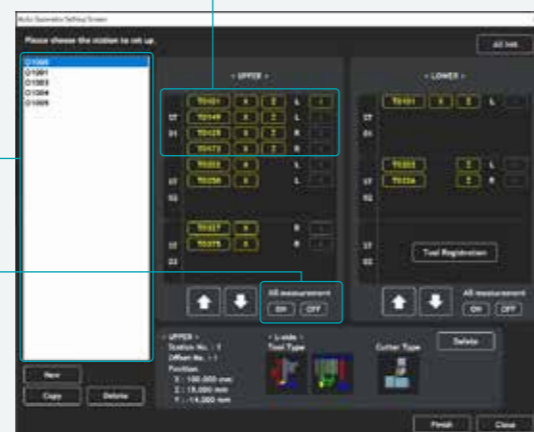


Automatic measurements can also be performed for multi-holders and tools with Y-axis offsets.



Tool setter (left figure)

When acquiring the tool geometry offset value, this function automatically inputs that value simply by making contact with the sensor. Geometry Navigator automates the acquisition of offset values and turret indexing operations using a tool setter.



## 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.

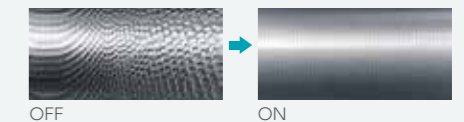
Barrier? Even with barrier function, machine collisions may occur



\* 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.



\* 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

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

## Protona Conversational NC Programming Software



Protona - Become a "Pro" in NC Programming with Ease, Reliable, and Fast.

Compared to conventional conversational NC programming tools, Protona offers a simpler and more intuitive user experience. Even beginners can create professional-quality NC programs while keeping learning time to a minimum.

### Guided Interface

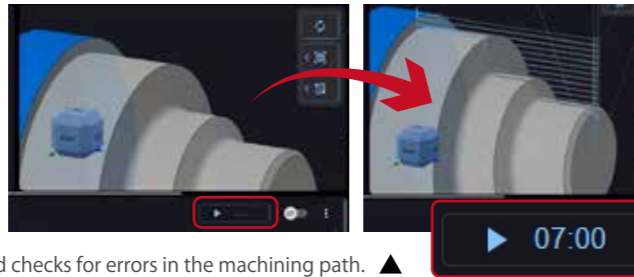
Create NC programs step by step through a guided workflow. Clear visuals and text explanations make it easy to follow—even for users with no prior experience.

▼ Guidance appear when hovering over input fields.



### Estimated Machining Time

Click the ▶ (Play) button to run a simulation and view the estimated machining time ideal for layout planning and quoting.



Displays estimated machining time and checks for errors in the machining path. ▲

### Easy Process Editing

Each machining process can be easily rearranged via drag and drop. The machining time for each process is displayed, allowing you to fine-tune the time balance and create programs just the way you want.

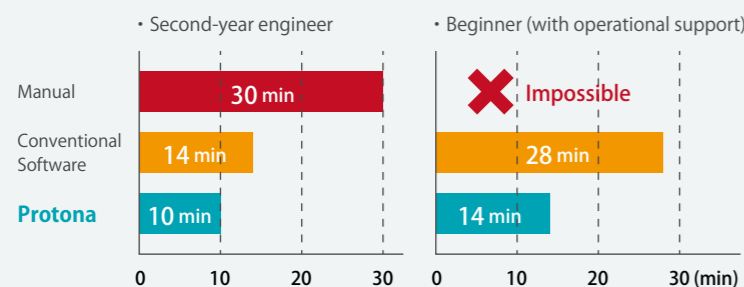
G-codes and M-codes are automatically updated when process are moved between channels.



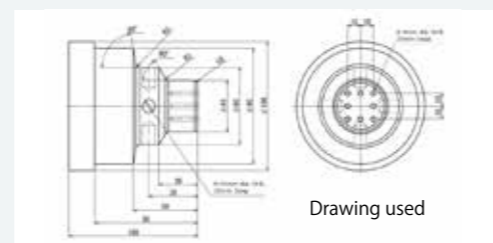
A feature unique to multitasking machines!

## 10 Points

- 1 Intuitive Programming
- 2 Guided Interface
- 3 Automatic Cutting Conditions
- 4 Automatic Coordinate Calculation
- 5 Automatic Approach Generation
- 6 Real-Time Geometry and Toolpath Display
- 7 Estimated Machining Time
- 8 Easy Process Editing
- 9 No NC Code Conversion Required
- 10 Built-In Tutorials



Both were able to complete their programs faster using Protona.

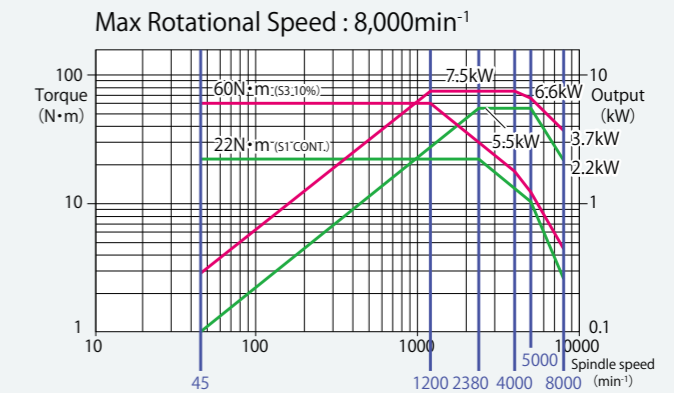


## Torque/Output Chart

### L/R spindle motor

Bar capacity  $\phi 32 / \phi 38$ (op.)  
7.5/5.5kW

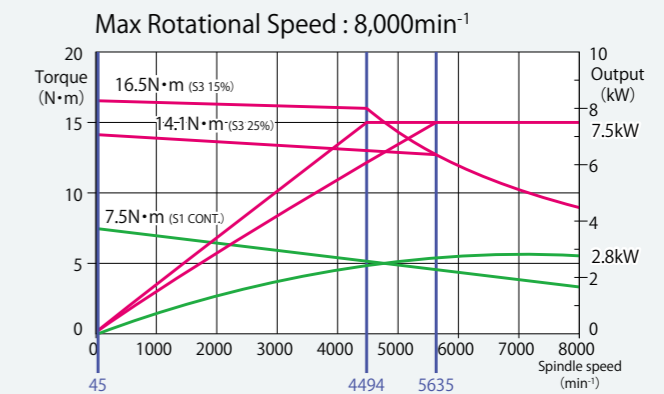
Standard



### Milling motor

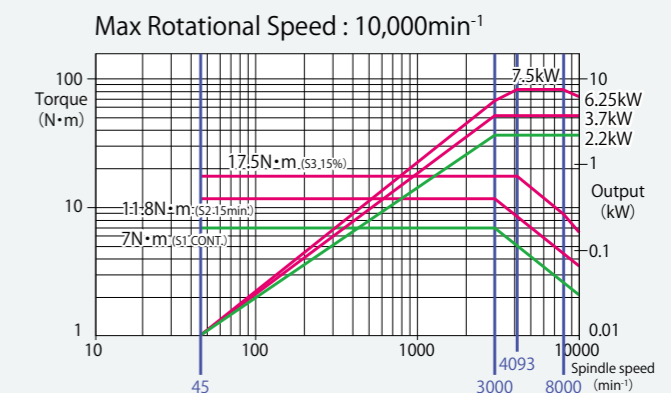
Milling speed 8,000min<sup>-1</sup>  
7.5/2.8kW

Standard



Milling speed 10,000min<sup>-1</sup>  
7.5/2.2kW

Option







Capacity	φ32	φ38(op.)
Max. turning diameter	φ150mm	
Distance between spindles	max. 655mm / min. 200mm	
Max. turning length	405mm	
Bar capacity	φ32mm	φ38mm
Chuck size	5"	

Axis travel	
X1-axis slide travel	110.5mm / 150.5mm (op. + spec.)
X2-axis slide travel	110.5mm
X3-axis slide travel	110mm (op. + spec.)
Z1-axis slide travel	455mm
Z2-axis slide travel	455mm
Y1-axis slide travel	±25mm
Y2-axis slide travel	±25mm (op. + spec.)
B2-axis slide travel	455mm

Rapid feed	
X-axis rapid feed rate	24m/min
Z-axis rapid feed rate	32m/min
Y1-axis rapid feed rate	20m/min
Y2-axis rapid feed rate	6m/min (op. + spec.)
B2-axis rapid feed rate	32m/min

L/R spindle		
Spindle speed	8,000min <sup>-1</sup>	
Spindle speed range	Stepless	
Spindle nose	A2-5	
Hole through spindle	47mm	
I.D. of front bearing	70mm	
Hole through draw tube	33mm	39mm

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

Upper/Lower turret	φ32	φ38(op.)
Type of turret head	Dodecagonal drum turret	
Number of indexing positions	24	
Tool size (square shank)	□20mm / □16mm(24st)	
Tool size (round shank)	φ20mm / φ25	

Milling	
Rotary system	Individual rotation
Milling spindle speed	8,000min <sup>-1</sup> / 10,000min <sup>-1</sup> (op.)
Spindle speed range	Stepless
Number of milling stations	12 × 2
Holder type and Tool size	Straight holder φ1mm - φ13mm Cross holder φ1mm - φ13mm

Drive motor		
L-spindle	7.5/5.5kW	
R-spindle	7.5/5.5kW	
Milling	8,000min <sup>-1</sup>	7.5/2.8kW (16.5N·m)
	10,000min <sup>-1</sup> (op.)	7.5/2.2kW (17.5N·m)

General	
Height	1,965mm
Floor space (W × D)	3,500mm × 1,380mm
Machine weight (incl. control)	6,500kg / 7,000kg (op. + spec.)

Power supply	
Power supply	31.3kVA

● 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 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	Standard	FANUC 0i-TF Plus (2-PATH)
	+ spec.	FANUC 31i-B Plus (3-PATH)

Controlled axes			
Controlled axes	Standard	8 axes	
	+ spec.	10 axes	
Simultaneously controlled axes	Standard	Upper	4 axes (X1, Z1, C1(C2), Y1 axis)
		Lower	4 axes (X2, Z2, C2(C1), B2 axis)
	+ spec.	Upper	4 axes (X1, Z1, C1(C2), Y1 axis)
		Lower	4 axes (X2, Z2, C2(C1), Y2, B2 axis)
		R-spindle	2 axes (X3, Z3(B2) axis)

Input command	
Least input increment	0.001mm/0.0001in (diameter for X-axis), 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 X, Z, Y1, B2	1-8000mm/min, 0.01-315in/min (1-4800mm/min, 0.01-188in/min)
	feed/min Y2	1-6000mm/min, 0.01-315in/min (1-4800mm/min, 0.01-188in/min)
	feed/min C	1-4800° /min
	feed/rev	0.0001-8000.0000mm/rev (0.0001-4800.0000mm/rev) 0.000001-50.00000in/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	Standard	8Mbyte Total 20480m	1000
	+ spec.	4Mbyte Total 10240m	1000
		8Mbyte Total 20480m(op.)	4000(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 SmartXs
Operation panel : Display	15-inch color 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
Superimposed control	Standard
Sub program	Standard
Custom macro	Standard (common variables #100-#149, #500-#549)
Additional customer macro variables	Standard (After addition, #100-#199, #500-#999)
Protona	Standard
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
Polygon function	Standard
Spindle synchronised control	Standard
C axis synchronised control	Standard(G496 C1. rapid feed positioning)
Spindle orientation	Standard



<https://www.nakamura-tome.com>



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