

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.

S×2
Twin Spindle

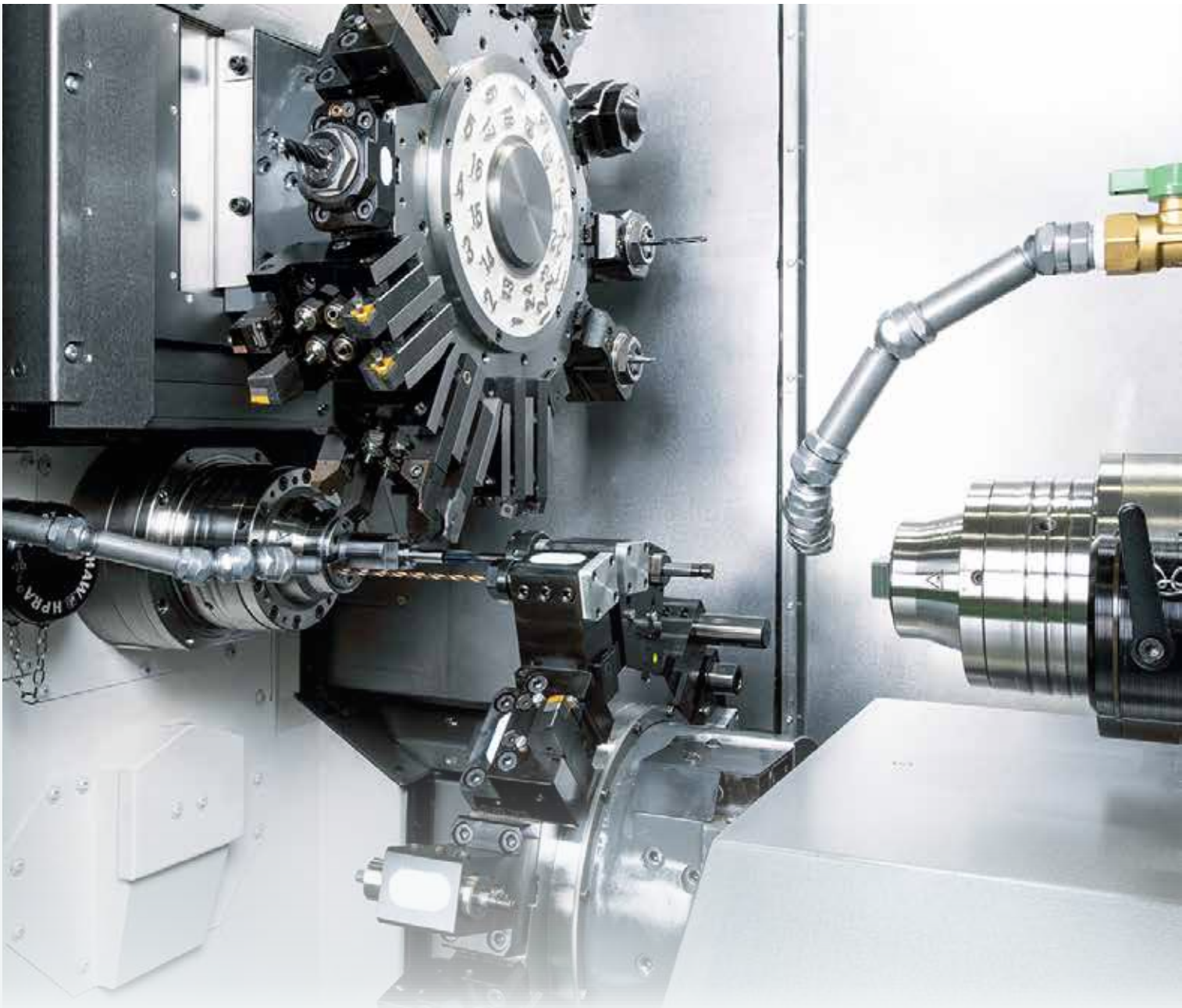
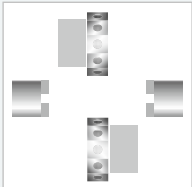
M×2
Milling Motor

B
R-spindle

C×2
C-axes

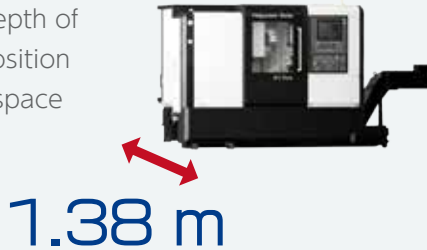
Y
Y-axis

T×2
Double Turrets

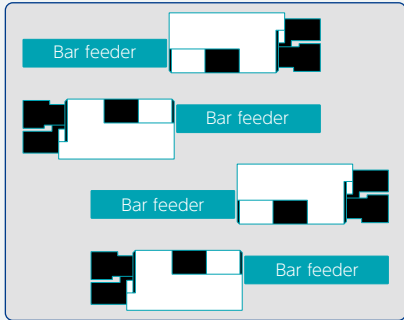


Compact

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 A



Parts catcher type G



Chip conveyor

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

- Side
- Right side & Rear



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

L-spindle

Standard	
Bar capacity	φ 32mm
Spindle speed	8,000min ⁻¹
Spindle motor	7.5/5.5kW

Option	
Bar capacity	φ 38mm
Spindle speed	8,000min ⁻¹
Spindle motor	7.5/5.5kW

Upper turret

Y-axis slide travel	±25mm
Number of milling stations / Number of indexing positions	12 / 24

Standard	
Milling speed	8,000min ⁻¹
Milling motor	7.1/2.8kW

Option	
Milling speed	10,000min ⁻¹
Milling motor	7.5/2.2kW

L-spindle

Upper turret

R-spindle

Lower turret

Number of milling stations / Number of indexing positions	12 / 24
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Standard	
Milling speed	8,000min ⁻¹
Milling motor	7.1/2.8kW

Option	
Milling speed	10,000min ⁻¹
Milling motor	7.5/2.2kW

Lower turret

R-spindle

Standard	
Bar capacity	φ 32mm
Spindle speed	8,000min ⁻¹
Spindle motor	7.5/5.5kW

Option	
Bar capacity	φ 38mm
Spindle speed	8,000min ⁻¹
Spindle motor	7.5/5.5kW

Advanced Production System
NT SmartXs



- Setup Support**
 - Status Screen
 - Setup Screen
 - Geometry Navigator (op.)
 - 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
- Maintenance**
 - Trouble Guidance
 - Regular Maintenance Function
 - Productivity Monitoring Function
 - Operation Level Management Function
 - Drive Recorder
- Customer Support**
 - NT Update



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

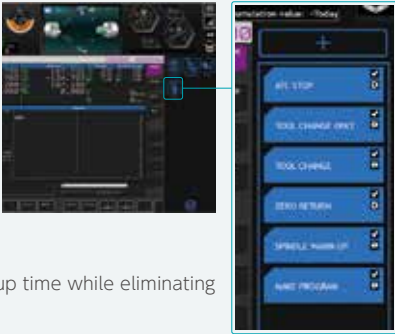


Digital Chuck Interlock

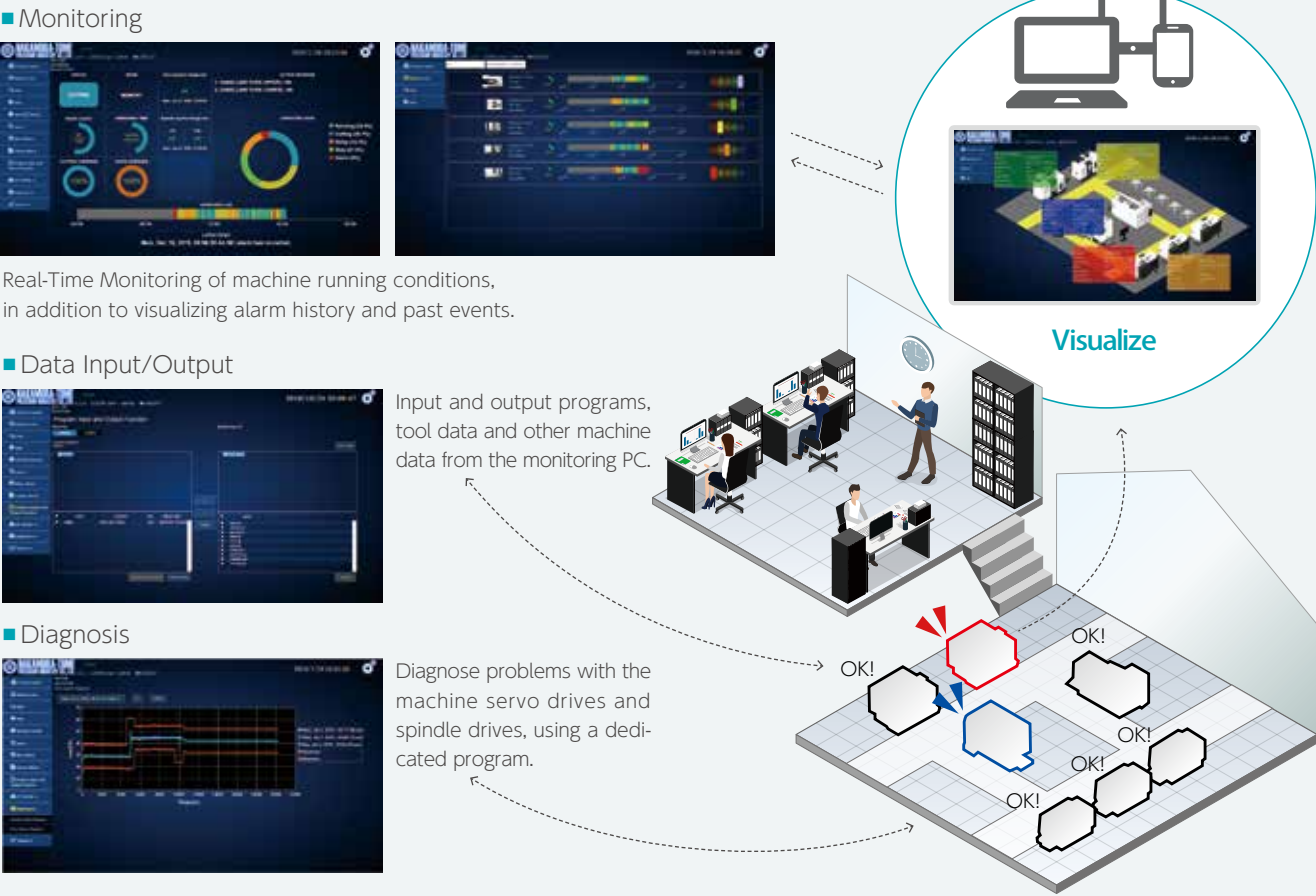
Set the Chuck Open and Close detection position easily. The chuck open/close position is set up on the NT SmartX screen. Setup time and machining cycle time are reduced.

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



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.



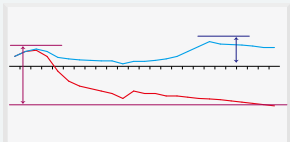
Powered by AI

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

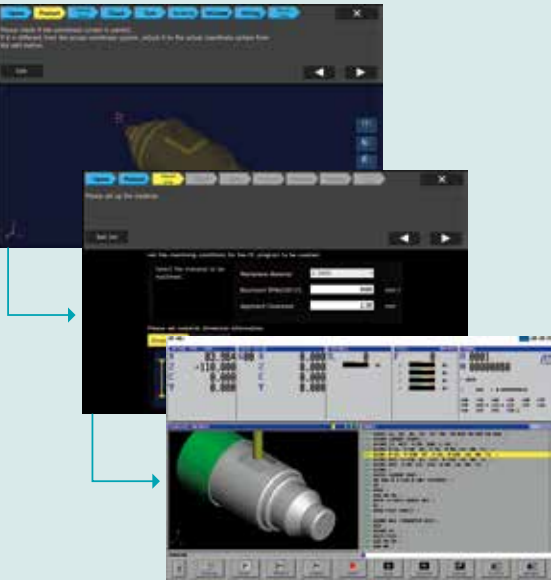
The compensation value is calculated from acquired data. The more data is input, the more accurate is the compensation value.

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



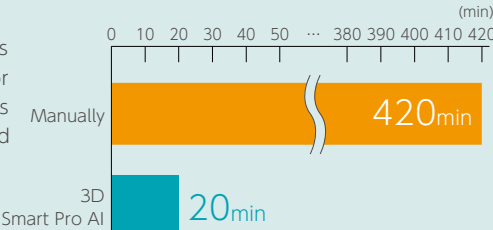
3D Smart Pro AI AI Analysis NC Programming Support Function

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



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.

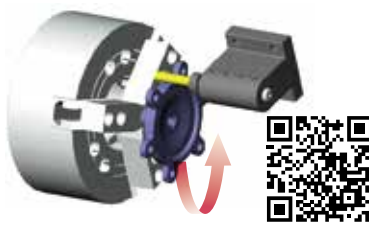


Tool Guide
If the tool configuration is incomplete, the AI analyzes the CAD model data and provide the necessary tool information.

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. No fixtures required. 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.



▲Video

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.



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.



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.

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



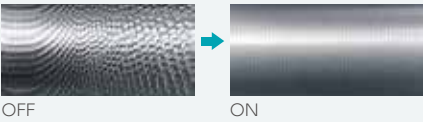
▲Video



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

Chatter Celler

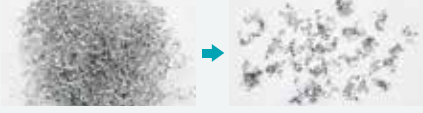
Reduce the chatter and vibration by changing the spindle speed up/down continuously during cutting. This function can be turned ON/OFF simply by M-code.



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

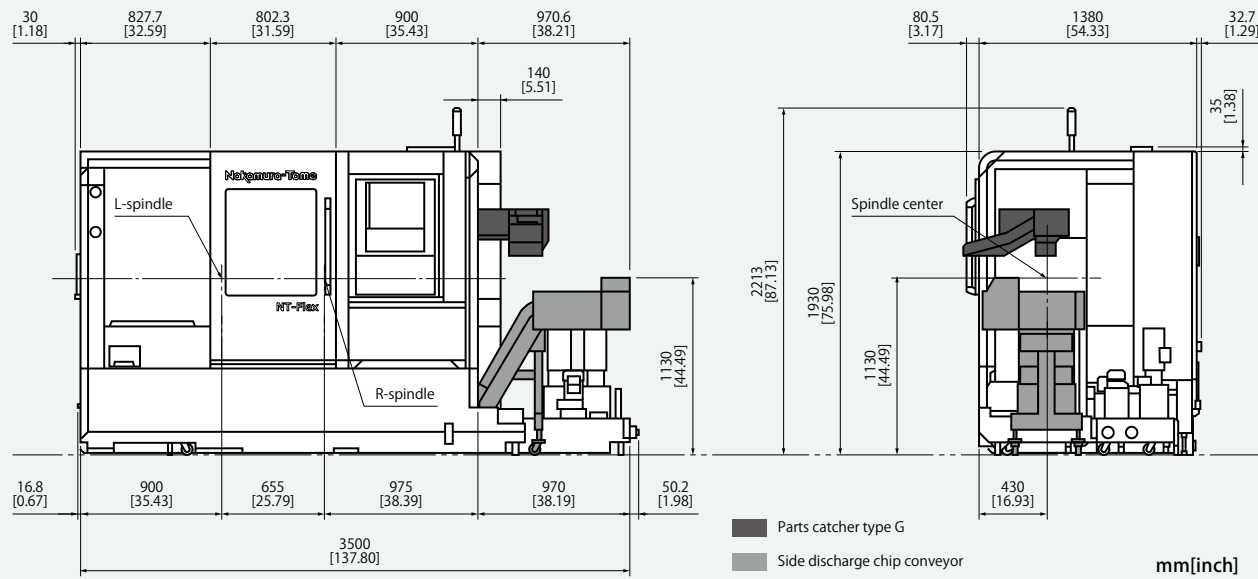
Oscillation cutting (op.)

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.

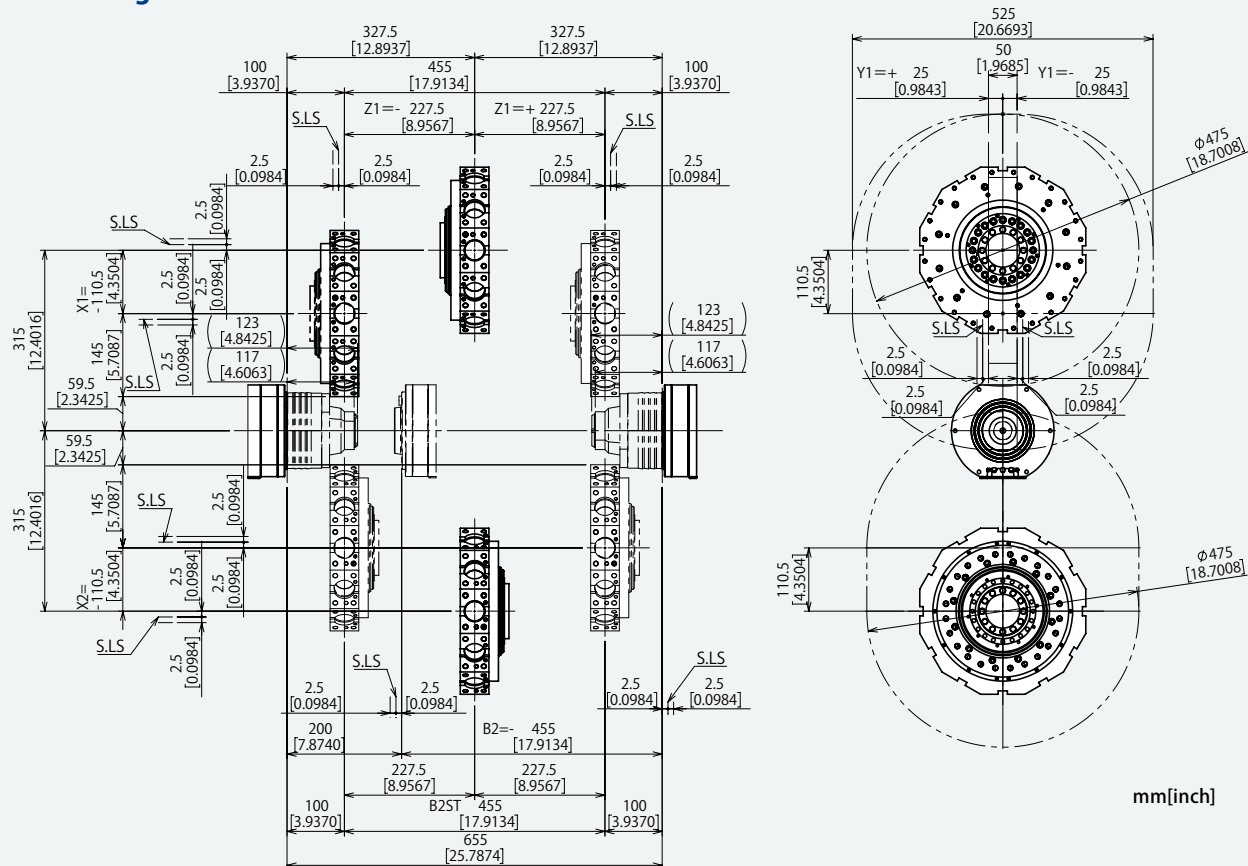


Material : Aluminum
Cutting speed : 200mm/min
Cutting feed : 0.1mm/rev
Cutting depth : 1.0mm

Machine Dimensions



Travel Range



■ Capacity	$\varphi 32$	$\varphi 38(\text{op.})$
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Max. turning diameter	φ150mm	
Distance between spindles	max. 655mm / min. 200mm	
Max. turning length	250mm	
Bar capacity	φ32mm	φ38mm
Chuck size	5"	

- Axis travel

X1 / X2axis slide travel	110.5mm
Z1 / Z2 axis slide travel	455mm
Y1-axis slide travel	±25mm
B2-axis slide travel	455mm

- Rapid feed

X-axis rapid feed rate	24m/min
Z-axis rapid feed rate	32m/min
Y-axis rapid feed rate	20m/min
B2-axis rapid feed rate	32m/min

- L / R spindle

Spindle speed	8,000min ⁻¹	
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 ⁻¹
Cutting feed rate	1-4,800° /min
C-axis clamp	Disk clamp
C-axis connecting time	1.5s

- Upper/Lower turret

Type of turret head	Dodecagonal drum turret
Number of indexing positions	24
Tool size (square shank)	□20mm / □16mm(24st)
Tool size (round shank)	φ20mm

- Milling

Rotary system	Individual rotation
Milling spindle speed	8,000min ⁻¹ / 10,000min ⁻¹ (op.)
Spindle speed range	Stepless
Number of milling stations	12 × 2
Holder type and Tool size	Straight holder $\varnothing 1\text{mm} - \varnothing 14\text{mm}$
	Cross holder $\varnothing 1\text{mm} - \varnothing 14\text{mm}$

- Drive motor

L-spindle		7.5/5.5kW
R-spindle		7.5/5.5kW
Milling	8,000min ⁻¹	7.1/2.8kW (16.5N·m)
	10,000min ⁻¹ (op.)	7.5/2.2kW (17.5N·m)

- General

Height	2,010mm
Floor space (W × D)	3,500mm × 1,380mm
Machine weight (incl. control)	6,500kg

- Power supply

Power supply	31.3kVA
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- Items

Control type	FANUC 0i-TF Plus (2-PATH)
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■ Controlled axes

Controlled axes	8 axes	
Simultaneously controlled axes	Upper	4 axes (X1, Z1, C1(C2), Y1 axis)
	Lower	4axes (X2, Z2, C2(C1), B2 axis)

- Program memory

Part program storage length / Number of registrable programs	4Mbyte Total 10240m / 1000
	8Mbyte Total 20480m / 4000(op.)

- 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
Axis recombination	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

- 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.



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