

JX-50

NAKAMURA-TOME
PRECISION INDUSTRY CO.,LTD.

Compact Space.
Complete Capability.

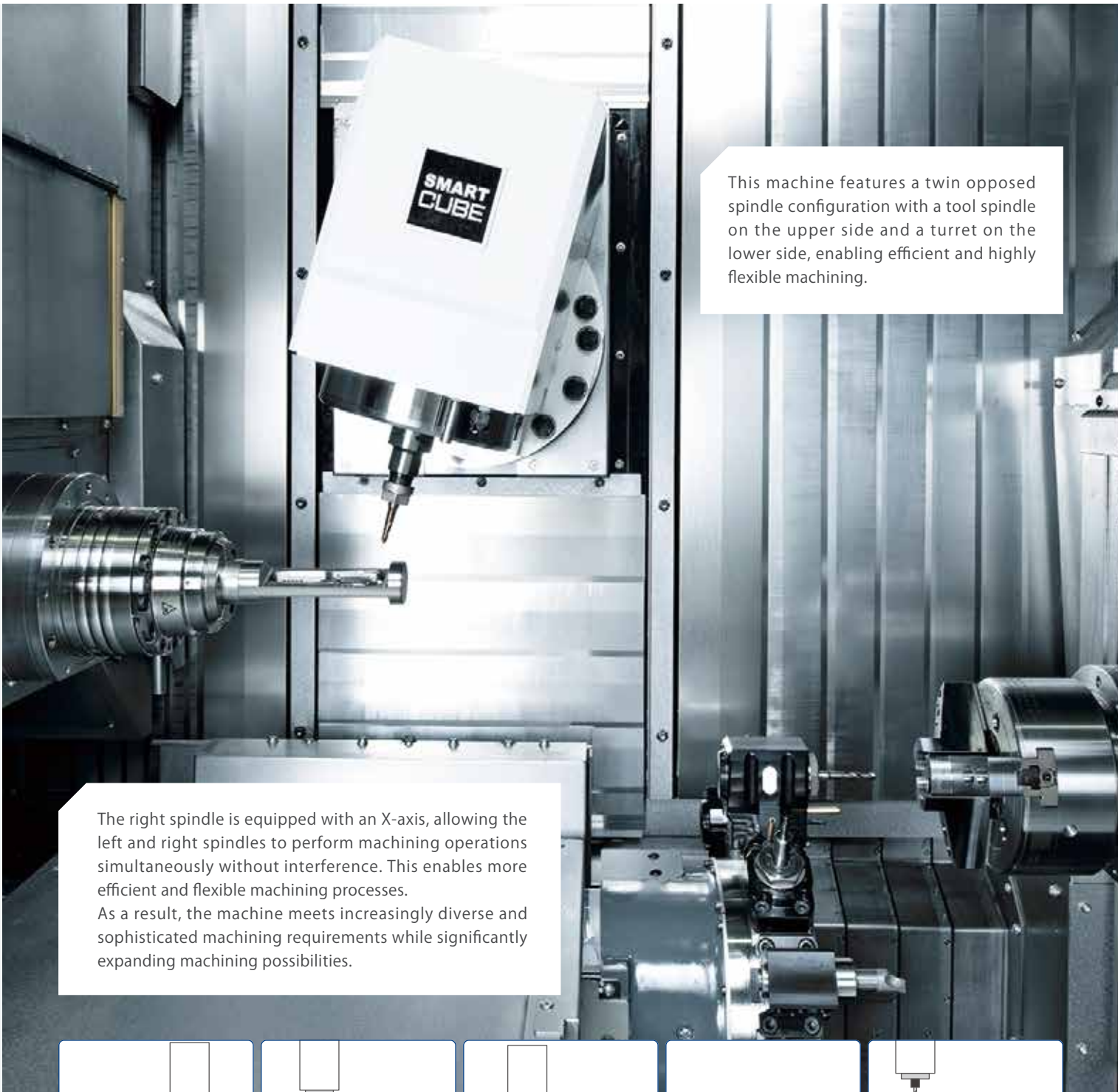
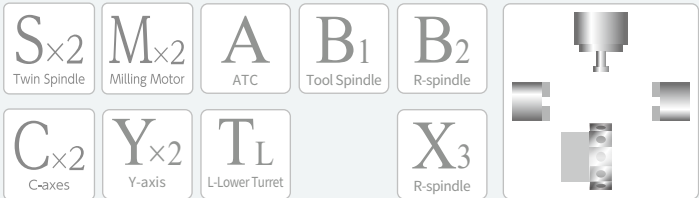
Innovative
Technology

~Creating new values~

JX-50

The JX-50 ATC Multitasking Machine is engineered for small, high-precision component manufacturing.

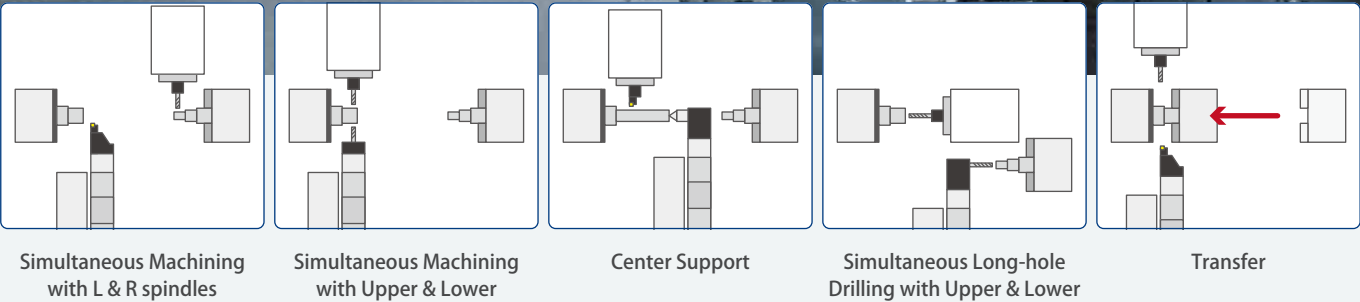
As production environments continue to shift toward high-mix, low-volume manufacturing, the JX-50 delivers the ideal combination of speed, flexibility, and user-friendly design, enabling a new level of productivity and manufacturing efficiency.



This machine features a twin opposed spindle configuration with a tool spindle on the upper side and a turret on the lower side, enabling efficient and highly flexible machining.

The right spindle is equipped with an X-axis, allowing the left and right spindles to perform machining operations simultaneously without interference. This enables more efficient and flexible machining processes.

As a result, the machine meets increasingly diverse and sophisticated machining requirements while significantly expanding machining possibilities.



Ideal for Small, High-Precision Machining

Demand for small, complex precision components is increasing across a wide range of industries, particularly in the medical sector. As a result, manufacturers are under growing pressure to achieve higher productivity while maximizing the use of limited floor space.

The JX-50 was developed to achieve both a compact footprint and high-speed performance, while offering a tool-spindle platform capable of simultaneous 5-axis machining—an essential requirement for precision manufacturing.



Machining Examples 1

Type of industry	Medical
Part name	Bone plate
Material	X10CrNiS 18-9 $\phi 40$ mm bar

Machining Examples 2

Type of industry	Medical
Part name	Femur support
Material	6-4Titan $\phi 16$ mm bar

Machining Examples 3

Type of industry	Medical
Part name	Hip cup
Material	β -Titan $\phi 45$ mm bar

Reliable cutting performance

Equipped as standard with the “NT Smart Cube,” a compact tool spindle that supports a wide range of machining—from roughing to high-precision finishing—while providing excellent flexibility in process planning.

The NT Smart Cube delivers outstanding performance in both milling and turning, ensuring the cutting capability required for demanding precision components.



Turning (Tool spindle)
Cutting cross section **1.32 mm²**

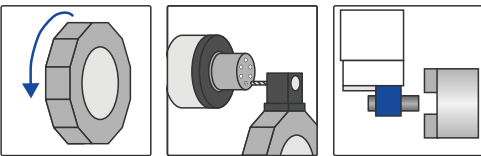
- Depth of cut(ap) **4 mm**
- Feed **0.33 mm/rev**
- Material **S45C**

Accelerated performance from both hardware and software

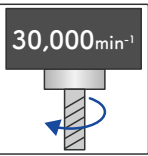


ChronoCut α

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.

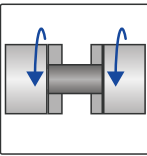


- High-speed indexing
- High-speed spindle synchronization
- Execution of multiple M-codes within the same block
- High-speed rigid tapping
- Reduction of PC-G unloading time, etc.



Machining conditions

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



Acceleration / Deceleration

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

Just 3.3 Seconds Chip-to-Chip*

The tool spindle is equipped with an Automatic Tool Changer (ATC), enabling efficient machining with a large number of tools.

With a chip-to-chip time of just 3.3 seconds*, idle time is significantly reduced, maximizing productivity. The benefits become even greater in applications requiring frequent tool changes and a high number of tools.

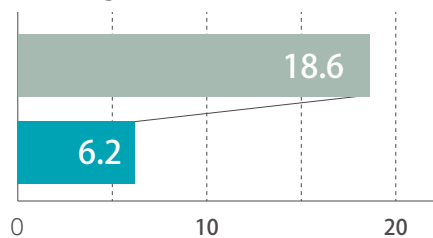
* Chip-to-chip time: The time required to move from one machining point to the next, including automatic tool exchange.



30,000 min⁻¹ High Speed Tool Spindle (Continuous use: 26,000min⁻¹)

Reduce cycle time by high speed milling with 30,000 min⁻¹.

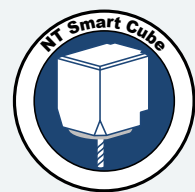
Machining Time [s]



67% Faster!

Chamfering



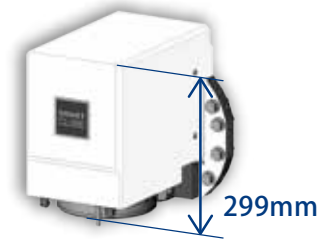


The world's shortest tool spindle
in its class*

NT Smart Cube

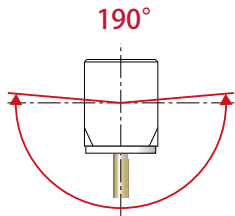
* Based on our survey in the multitasking machine market

■ Tool spindle NT Smart Cube



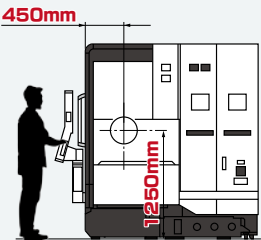
Length 299mm
Tool spindle speed 30,000min⁻¹
Tool spindle motor 38.7N·m (9kW)
Y-axis slide travel ±80mm

Max.tool diameter φ55mm
Max.tool diameter without adjacent tool φ60mm
Max.tool length 150mm



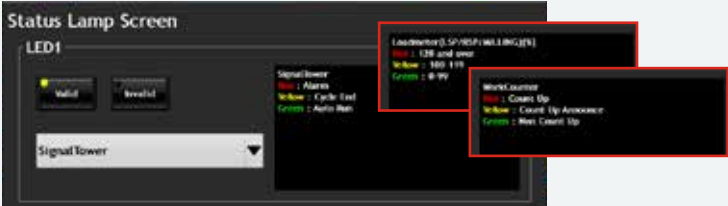
Stress-Free

Improved distance from the machine front to the spindle and optimized spindle height allow for comfortable operation with reduced operator strain.



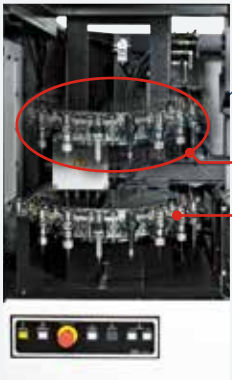
Status Lamp

The lamps on the front doors can be used as signal lights, changing color according to the machine's operating status. They can also display different colors based on the Loadmeter or Work Counter values, or be set to any custom color.



ATC Magazine: Up to 119 Tools

The ATC magazine accommodates 60 tools as standard, with expansion available up to **119 tools**. Additional magazine units are stacked vertically, enabling a significant increase in tool capacity while maintaining the machine's compact footprint.

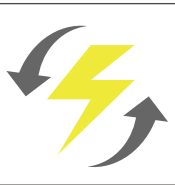


Large Window for Easy Viewing of the Machining Area

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

NT SmartX 19-inch Touch Panel

The control panel can be swiveled and repositioned, allowing operators to position it for maximum convenience. It can be moved close to the ATC magazine, making tool setup and adjustment quick and easy.



Use of regenerative energy



Grease lubrication for all liner axes
* Oil mist is used for milling



Inverter-Driven Hydraulic Power Unit

■ L-spindle

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

L-spindle

Lower turret

12

■ Lower turret

Standard
Y-axis slide travel ±32.5mm
Number of milling stations / Number of indexing positions 12 / 24
Milling speed 9,000min⁻¹
Milling motor 7.5/2.8kW

Tool spindle

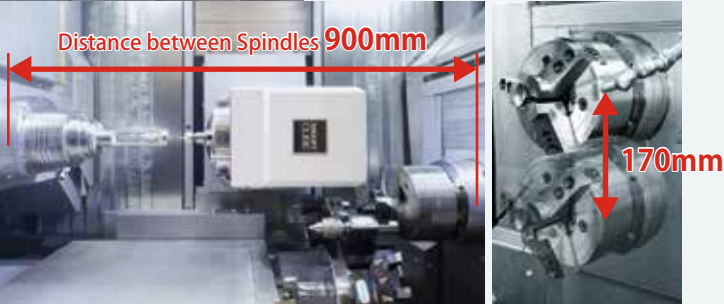
■ R-spindle

Standard
Bar capacity φ42mm
Spindle speed 6,000min⁻¹
Spindle motor 11/7.5kW
X-axis slide travel 170mm

R-spindle

Large Machining Area

The movable R-spindle shifts in the negative X-axis direction, allowing simultaneous machining on both spindles while maintaining ample clearance to avoid interference. This unique design helps maximize machine utilization and productivity.



Advanced Production System
NT SmartX



■ ChronoCut
α version included
as standard

Setup Support

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

Programming Support

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

Machining Support

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

Dual Safety

- Airbag
- NT Machine Simulation
- NT Collision Guard

Maintenance

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

Customer Support

- NT Update

* The function is limited.

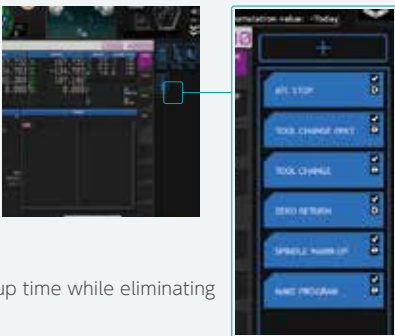


Digital Chuck Interlock

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



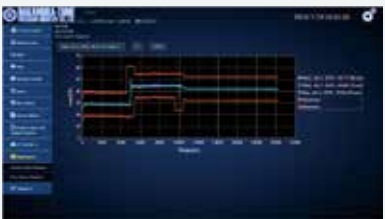
Real-Time Monitoring of machine running conditions, in addition to visualizing alarm history and past events.

■ 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.



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.



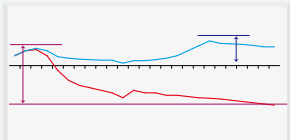
Standard for NT SmartX

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

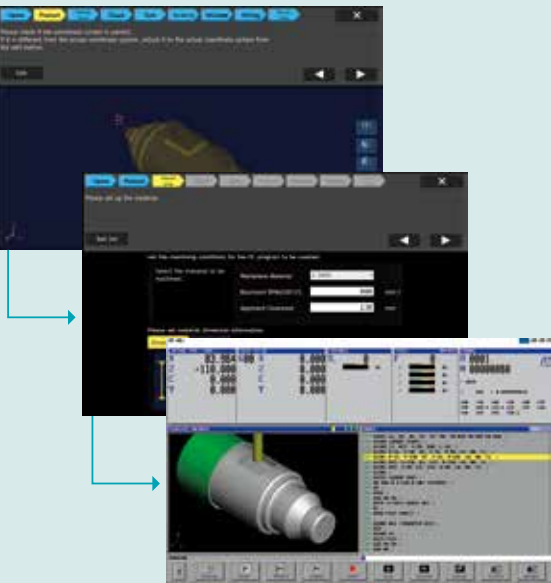
The compensation value is calculated from acquired data. The more data is input, the more accurate is the compensation value.



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

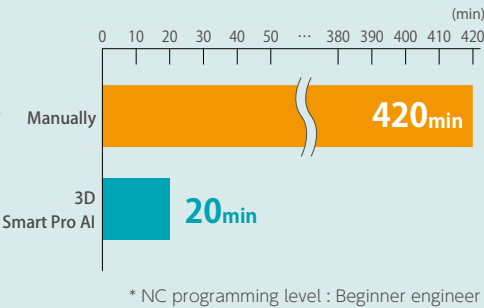
3D Smart Pro AI AI Analysis NC Programming Support Function

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.

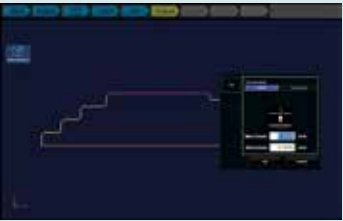


Operators can also set detailed machining methods.

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



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.



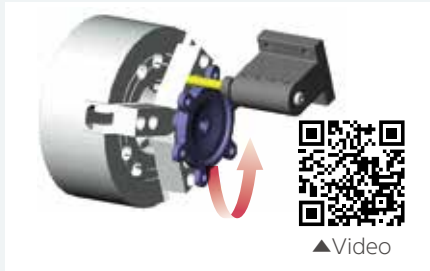
Tool Guide
If the tool configuration is incomplete, the AI analyzes the CAD model data and provide the necessary tool information.

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.



Double safety features for maximum protection

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

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.

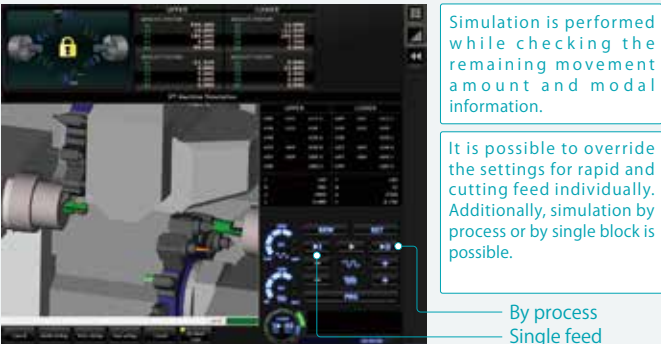


Image shown here is of a 2-turret machine

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.

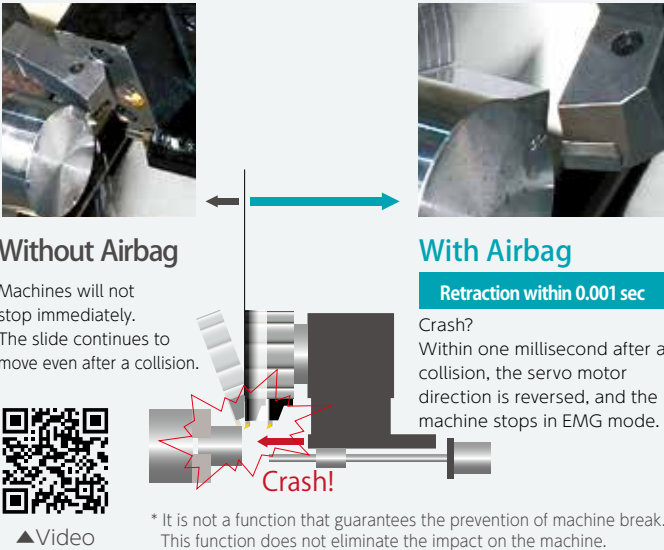
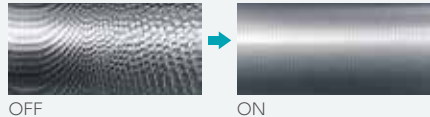


Image shown here is of a 2-turret machine

Chatter Canceller

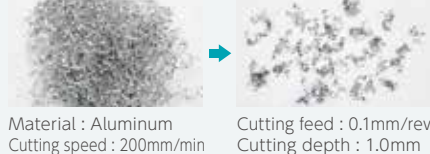
Reduce the chatter and vibration by changing the spindle speed up/down continuously during cutting. This function can be turned ON/OFF simply by M-code.



* 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.



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

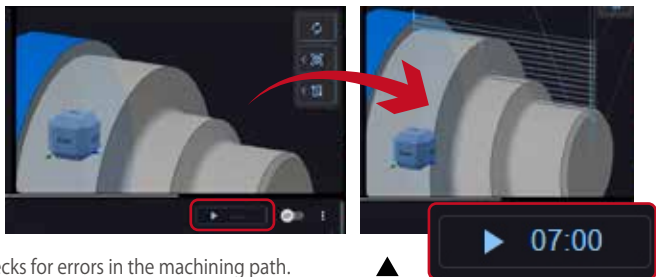
Create NC programs step by step through a guided workflow. Clear visuals and text explanations make it easy to follow—even for users with no prior experience.

▼ 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.



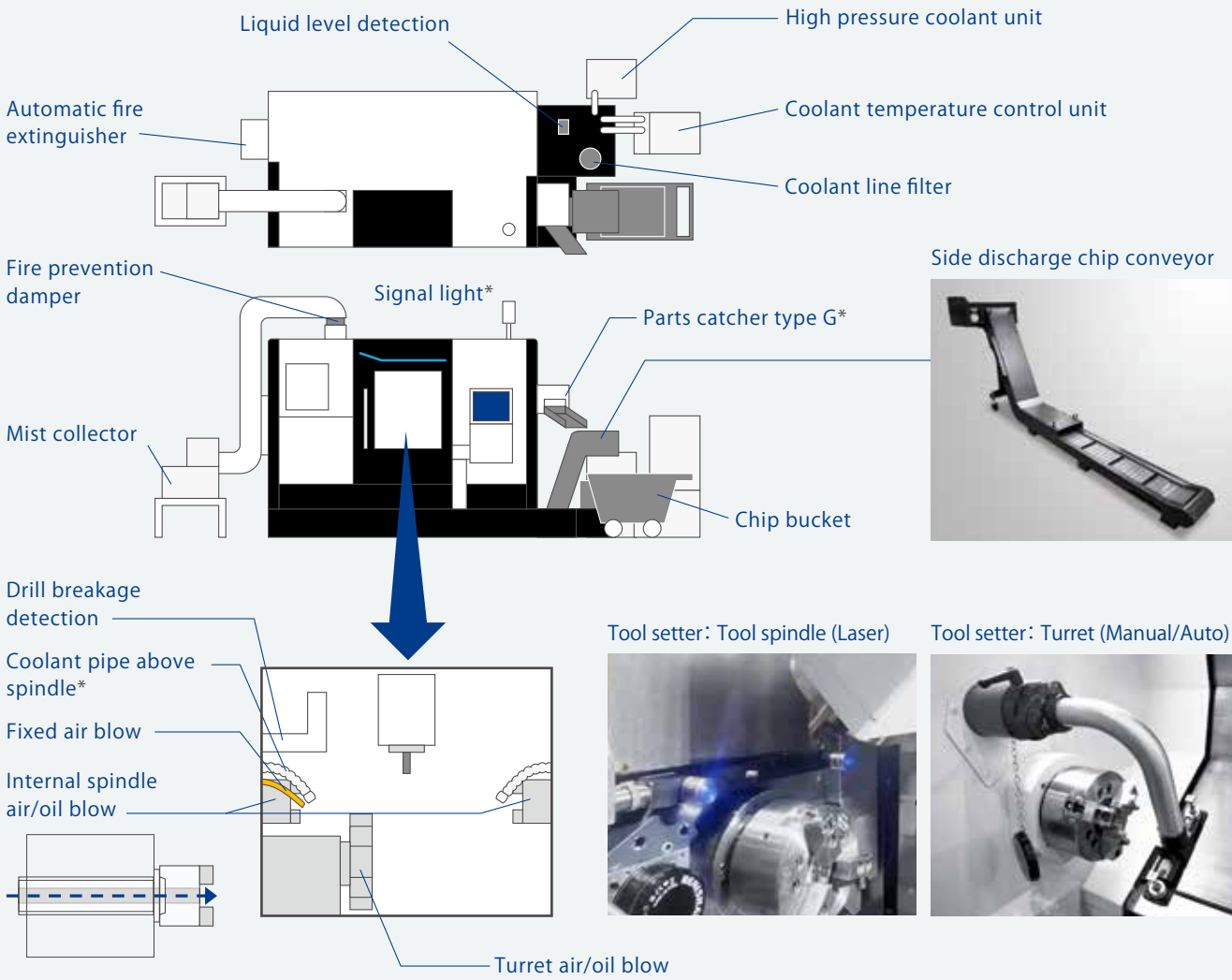
A feature unique to multitasking machines!

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

Various Options to Meet our Customer's Needs.

* This feature is included as standard.



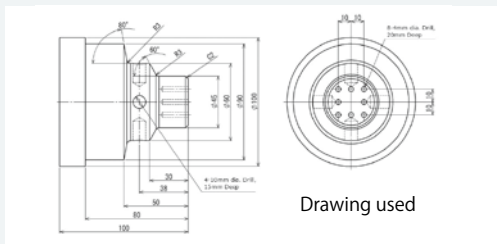
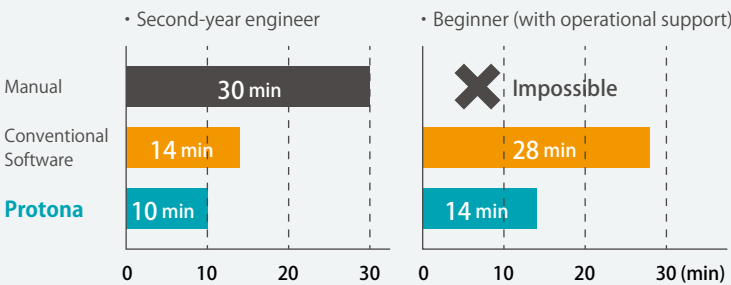
Bar remnant parts catcher*



HAN-BEI (in-process measuring system)



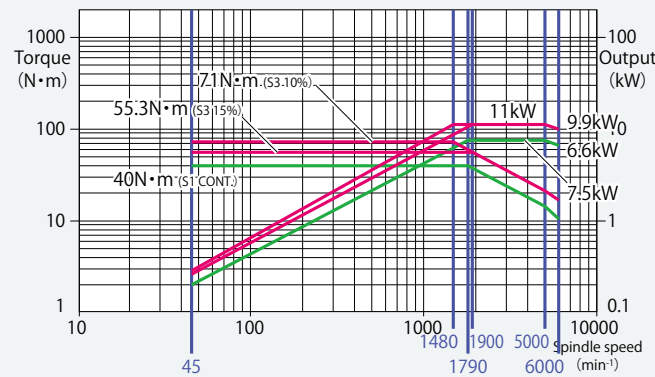
And many others.
For items not listed, please feel free to contact your Nakamura-Tome representative.



Drawing used

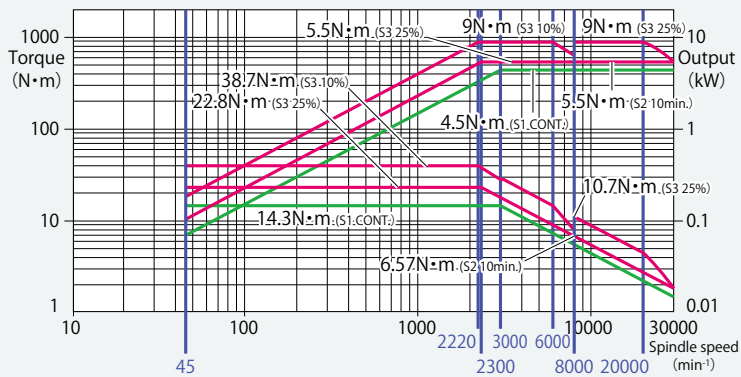
L/R spindle motor $\varphi 42$ 11/7.5kW

Max Rotational Speed : 6,000min⁻¹

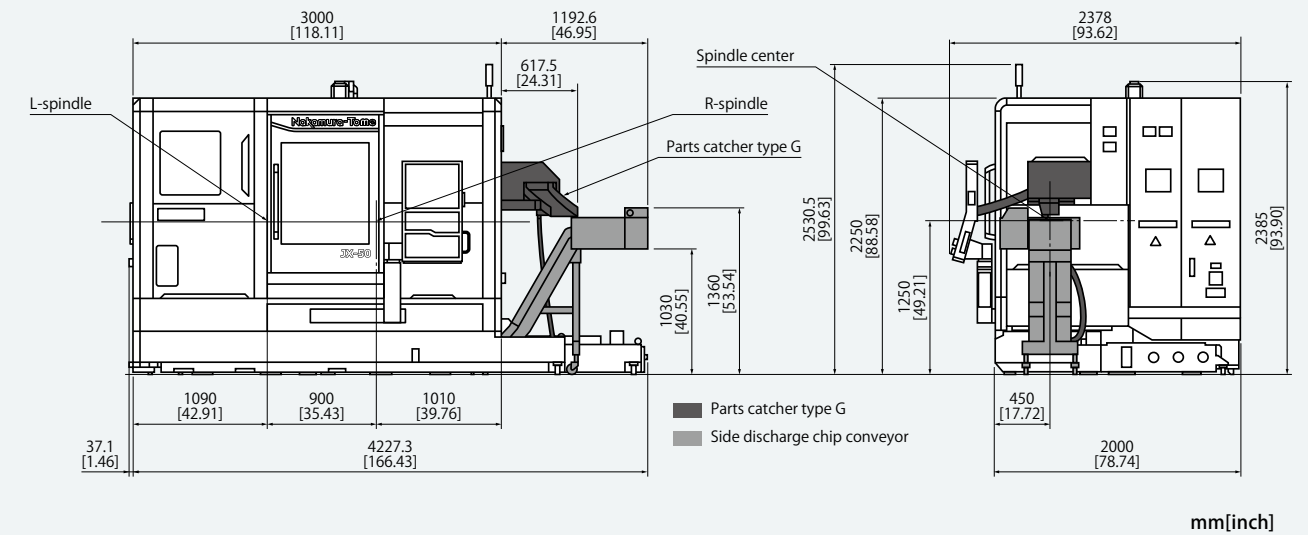


Tool spindle motor 9/3.7kW

Max Rotational Speed : 30,000min⁻¹

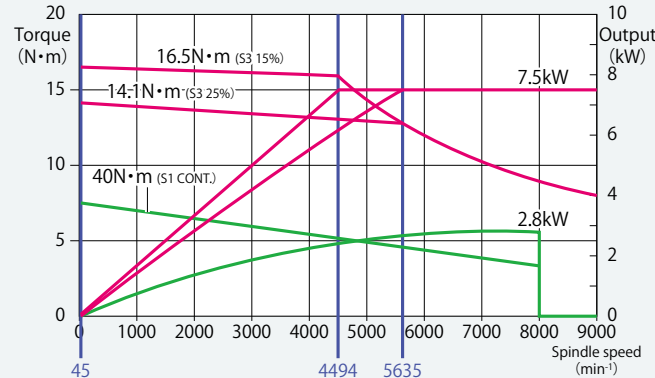


Machine Dimensions

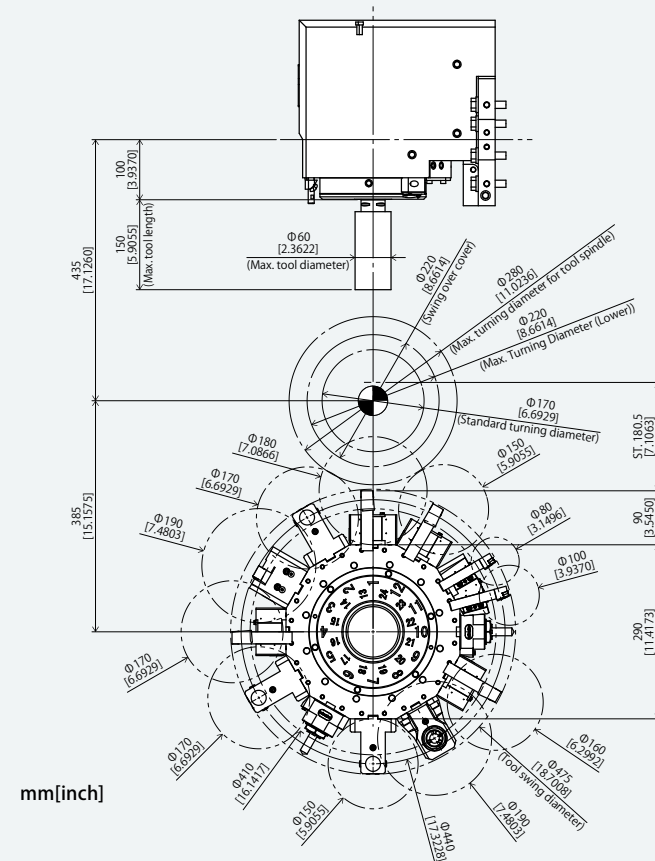


Milling motor 7.5/2.8kW

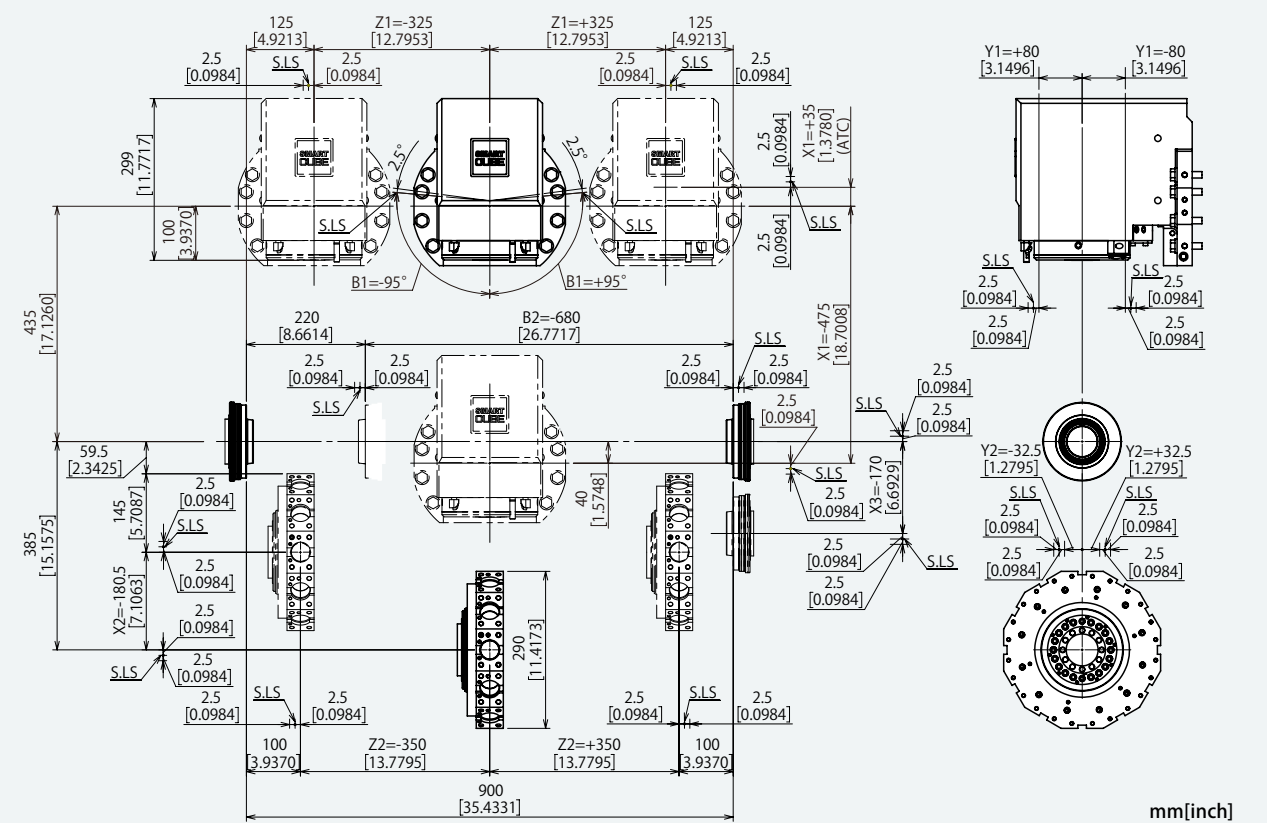
Max Rotational Speed : 9,000min⁻¹



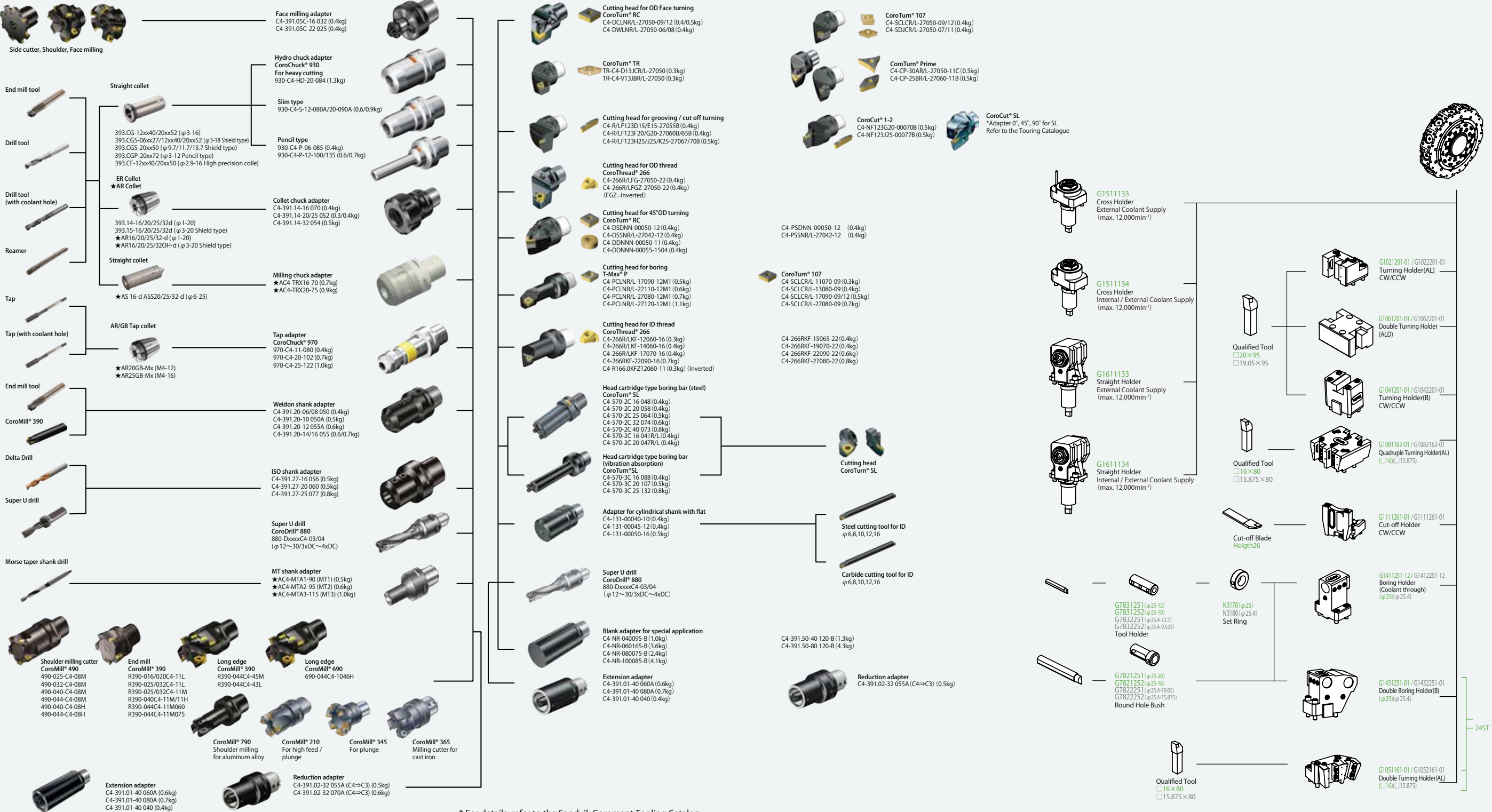
Tool Interference



Travel Range



★Alps tool type AC-AR-ASS



* For details, refer to the Sandvik Coromant Tooling Catalog.

Capacity

Max. turning diameter (Tool spindle / Lower turret)	280mm / 220mm
Distance between spindles	max. 900mm / min. 220mm
Max. turning length	650mm
Bar capacity	φ42mm
Chuck size	5", 6"

Axis travel

X1-axis slide travel	475mm
X2-axis slide travel	180.5mm
X3-axis slide travel	170mm
Z1-axis slide travel	650mm
Z2-axis slide travel	700mm
Y1-axis slide travel	±80mm
Y2-axis slide travel	±32.5mm
B2-axis slide travel	680mm

Rapid feed

X1-axis rapid feed rate	30m/min
X2/X3 axis rapid feed rate	24m/min
Z1/Z2 axis rapid feed rate	40m/min
Y1-axis rapid feed rate	16m/min
Y2-axis rapid feed rate	6m/min
B2-axis rapid feed rate	40m/min

L-spindle

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

R-spindle

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

ATC tool spindle

Tool spindle speed	Max. spindle speed: 30,000min ⁻¹ Continuous use: 26,000min ⁻¹
Swiveling range	190° (±95°)
Tool coupling type	CAPTO C4 / HSK-T40(op.)
Number of tools	60, 119(op.)
Max. tool diameter / Without adjacent tool	φ55mm / φ60mm
Max. tool length	150mm

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	9,000min ⁻¹
Spindle speed range	Stepless
Number of milling stations	12
Holder type and Tool size	Straight holder φ1mm - φ13mm Cross holder φ1mm - φ13mm

Drive motor

L-spindle	11/7.5kW
R-spindle	11/7.5kW
Tool spindle	38.7N·m (9kW)
Milling	7.5/2.8kW (16.5N·m)

General

Height	2,250mm (Including Signal light : 2,530.5mm)
Floor space (W × D)	4,264.4mm × 2,378mm
Machine weight (incl. control)	11,000kg

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-B5 Plus (2-PATH)
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Controlled axes

Controlled axes	11 axes	
Simultaneously controlled axes	Upper	5 axes (X1, Z1, C1(C2), Y1, B1 axis)
	Lower	6 axes (X2, Z2, C2(C1) Y2, B2, X3 axis)

Input command

Least input increment	X, Z, Y, B2 : 0.001mm/0.0001inch (diameter for X-axis), C, B1 : 0.001°
Least command increment	X : 0.0005mm / Z, Y, B2 : 0.001mm / C, B1 : 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, 0.01-315inch/min (1-4800mm/min, 0.01-188inch/min)
	feed/min Y2	1-6000mm/min, 0.01-236inch/min (1-4800mm/min, 0.01-188inch/min)
	feed/min C, B1	1-8000° /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 contour control I	G5.1	
Spindle override	50%-120% Set every 10%	

Program memory

Part program storage length / Number of registrable programs	4Mbyte Total 10240m 8Mbyte Total 20480m(op.)	4000
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
Superimposed control	Standard
Sub program	Standard
Custom macro	Standard(common variables #100-#149, #500-#549)
Additional customer macro variables (1000)	Standard(After addition, #100-#199, #500-#999, #98000-#98499)
PMS package 2 (Precision Milling Package) *1	Standard
Protona	Standard
Oscillation cutting	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)
Tool Spindle orientation	Standard : 4 positions (4×90°)(M785/M786/M787/M788) Maximum : 12 positions (12×30°)(G419)
Spindle orientation	Standard
Oscillation Cutting	G8.5

*1 It includes the following functions:

- AI contour control II
- Jerk control
- High-speed processing



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* This catalog was published in June 2026.
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