SC-100X^2

NAKAMURA-TOME
PRECISION INDUSTRY CO.,LTD.

Nakamura-Tome

SC-100X^2

Fast Machining, Fast Setup,

Make it Fast !!

High speed one hit machining.

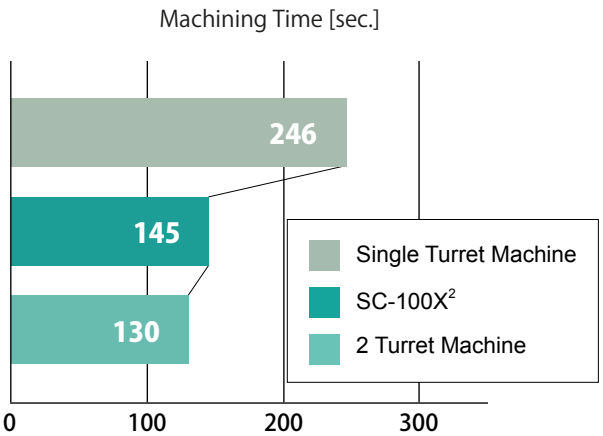
High efficiency manufacturing.

High Productivity

High value parts manufacturing with extra new features

Parts Sample

Material	SCM415
Material Size	φ50mm×L80mm
Machining Time	145 sec.



Fast Machining

2 Tools in Cut

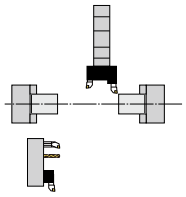
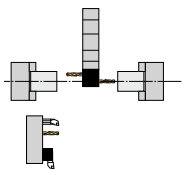
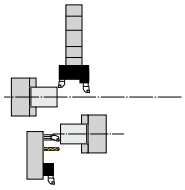
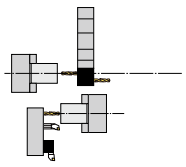
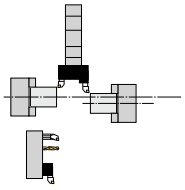
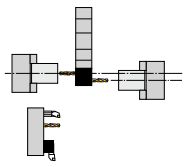
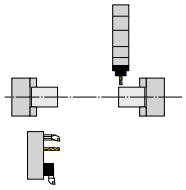
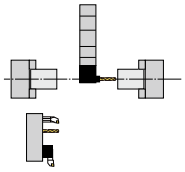
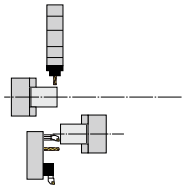
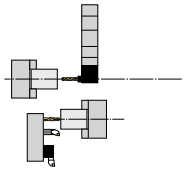
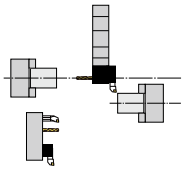
Lower Turret
Max. 9 Stations without Milling function
＋Unloading Gripper

Superimposed Machining

Superimposed cycle is simultaneous machining through overlapping control between Main spindle and Sub-spindle.

Machining capability

Thanks to new features, such as the sub-spindle X-axis and the lower turret, the machine is capable to perform various operations.

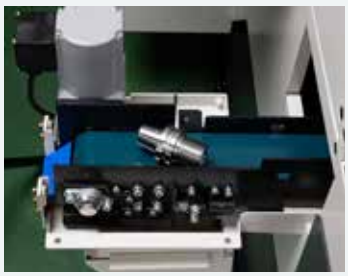
1 tools in cut		2 tools in cut			
Right spindle machining by Upper Turret		Simultanious Machining		Superimposed Machining	
					
					

Fast Programming for Simple Multi-Tasking Production

Unloading Gripper with Built-in Parts Conveyor (Standard)

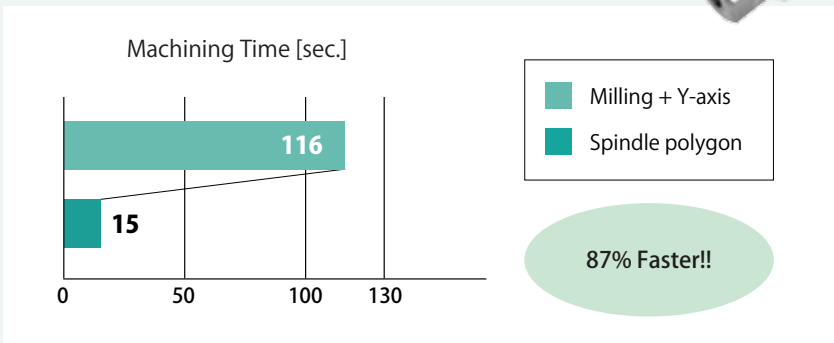
Unloading gripper is mounted on lower turret.
It is suitable for bar work automation.

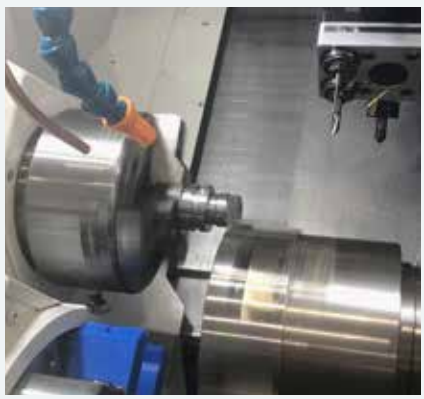
Workpiece size	Diameter	mm	φ15 - 51
	Length	mm	30 - 100
	Weight	kg	0.1 - 1.5



Spindle Polygon Turning Function

Faster than with milling and Y-axis

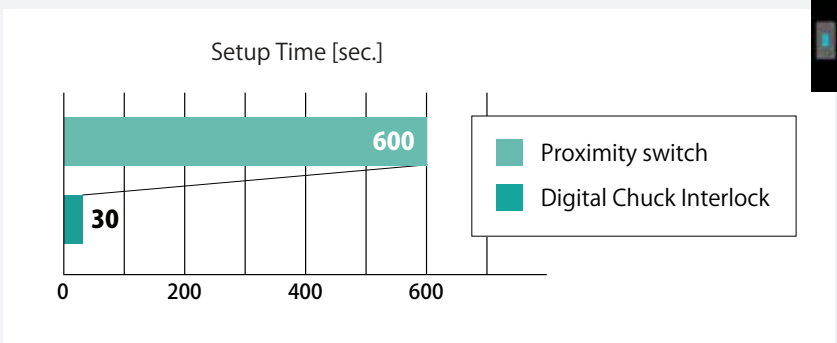




Fast & Easy Setup

Digital Chuck Interlock(Standard)

Set the detection position of open end and close end of chuck arbitrarily. The chuck open end / close end position is set on the control screen. Setup time and machining cycle time are reduced.

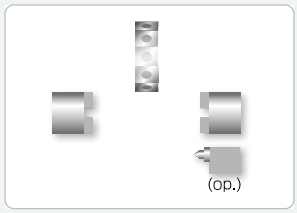


Fast & Easy Programming

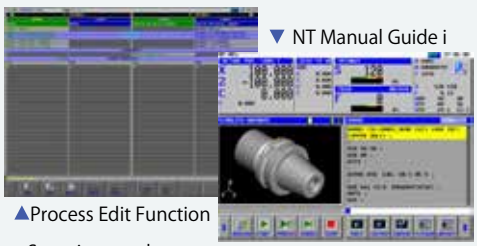
Nakamura-Tome Original Unique Software featured as standard

Easy Process Edit (Standard)

Single Turret Program



Process Edit

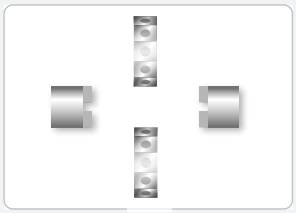


▼ NT Manual Guide i

▲Process Edit Function

Superimposed
L/R Simultaneous Machining

Multi-Turret Program
Done!!



Nakamura-Tome Unique Software Technology is to support the programming.
Multi-Turret program can be programmed easily like a single turret program.
It can be converted from single-path program to multi-path program by drag-and-drop.

Nakamura-Tome Intelligent Software

NT Thermo Navigator AI

Thermal Compensation system using AI.
Time and measured dimension data are input into dedicated.
AI learning software, to build an optimized thermal growth compensation model.

※ The screen image is from NT SmartX

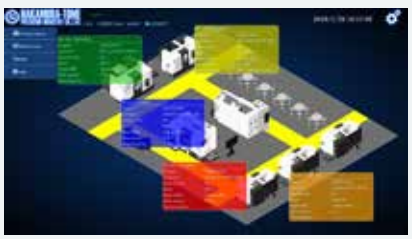
Smart Support

Conversional Programming Software for Nakamura-Tome machining Cycle.

- NT Work Navigator Cycle
- Cross-Hole Chamfering Cycle
- Spindle Quill Pusher Cycle

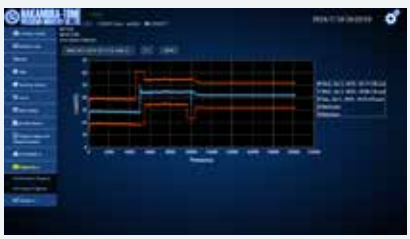
NT Smart Sign

Connect with the factory, visualization of the site



■ 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.



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

User Friendly Operation Panel

FANUC 0i-TF Plus With IHM Interface
15 inch touch screen control

NT Work Navigator

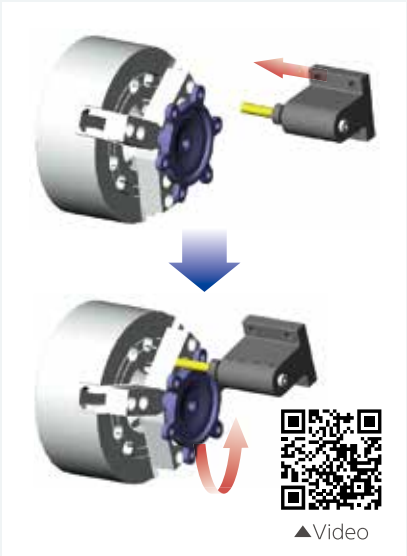
X Y Z B C

Advanced NT Work Navigator !

A new upgrade makes it possible to navigate with the X and Y-axes. Many parts with irregular outer surface, requiring coordinate recognition with X or Y-axes, become within the range of NT Work Navigator.

No fixtures required

Machining parts with non-round shapes, such as forgings or castings requires that the new part coordinates be recognized by the CNC control.
In order to achieve this without requiring extra cost or additional options, the NT Work Navigator is used.
It works just by touching the part with a simple inexpensive probe (mostly 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 a cost cutting feature in multitasking machine, eliminating the need for positioning fixtures and special clamping devices.



Airbag (Overload detection)

Compared to other machines, Nakamura-Tome machine will not break after the slightest collision. The "Airbag Function" minimizes the damage that may occur during a collision.

It a machine collision occurs, there is good reason to be assured: Airbag !

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

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

Barrier?
Even with barrier function, machine collisions may occur

Without Airbag

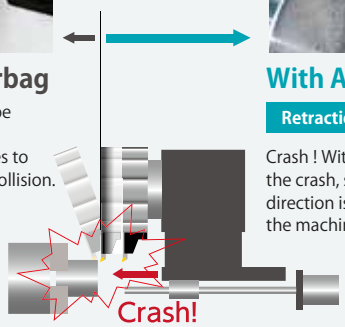
Machine will not be stop immediately.
The slide continues to move even after collision.

▲Video

With Airbag

Retraction within 0.001 sec

Crash ! Within 1 milliseconds after the crash, servo motor-feeding direction is reversed and the machine stops in EMG mode.

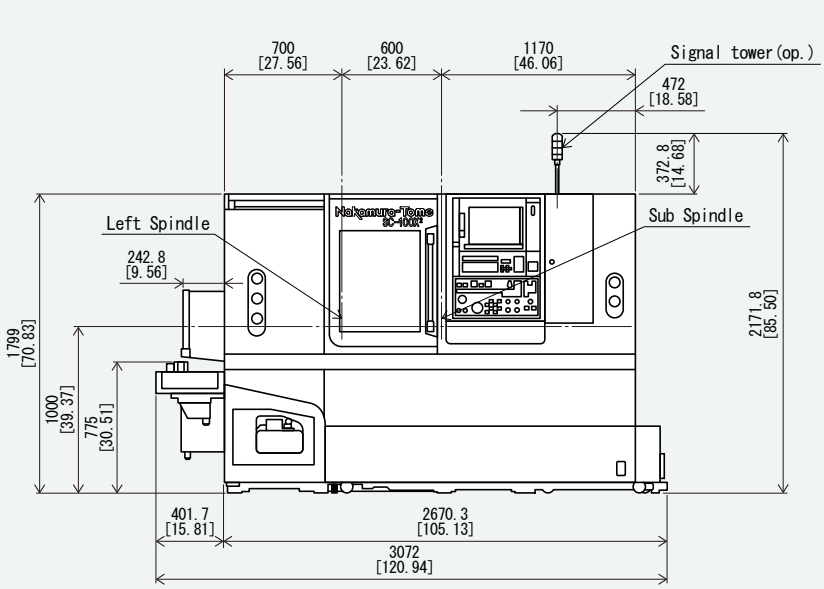


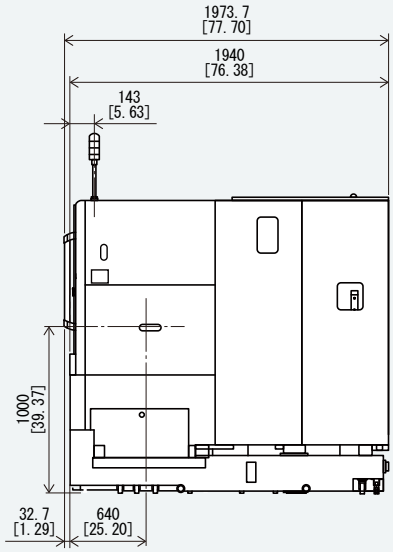
* This feature does not mean zero impact

Nakamura-Tome

SC-100X²

Machine Dimensions

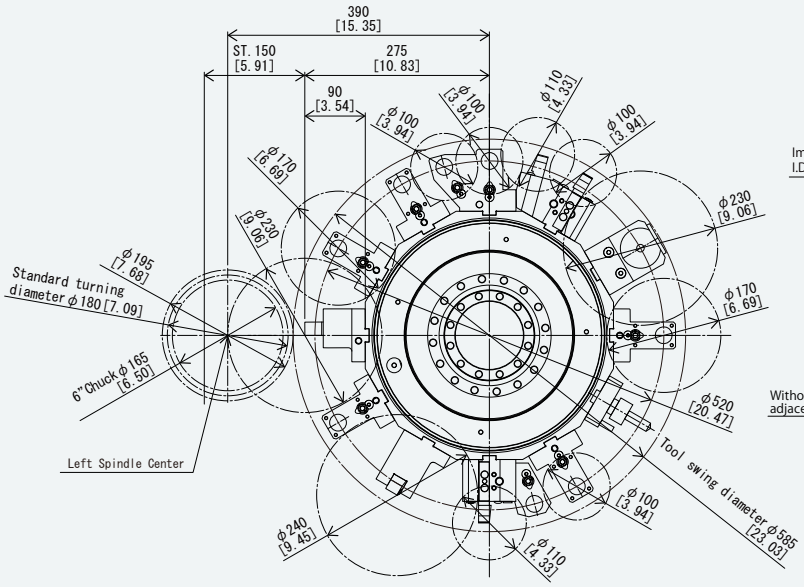


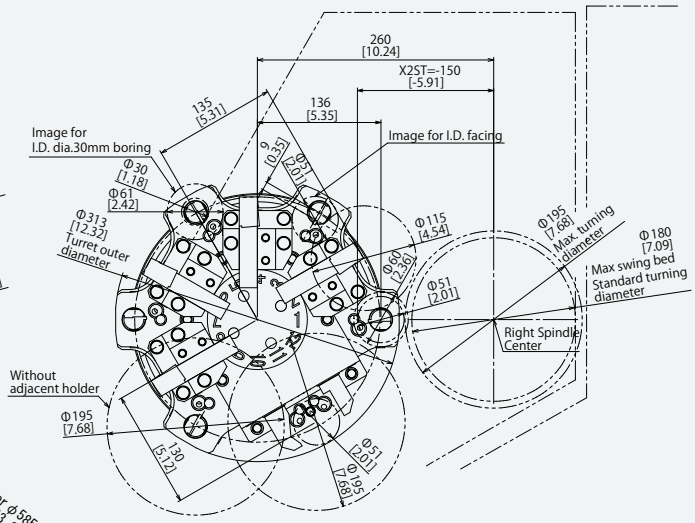


* The dimensions given herein are subject to change without prior notice.

mm[inch]

Tool Interference

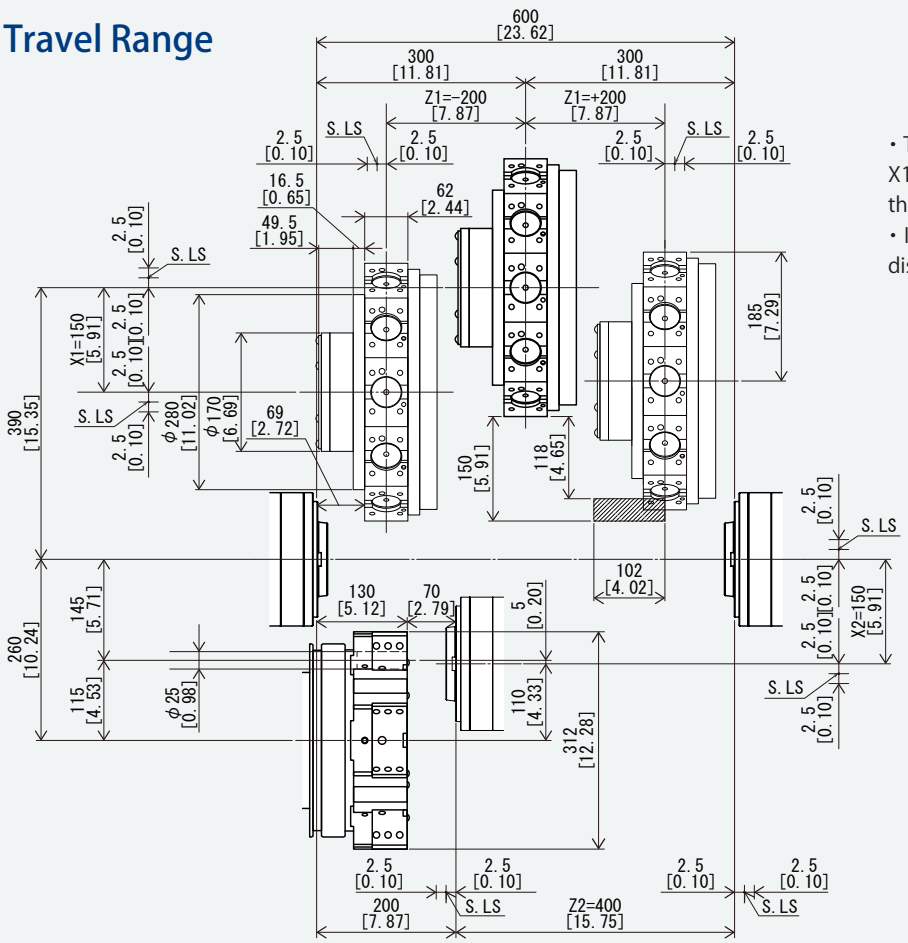




mm[inch]

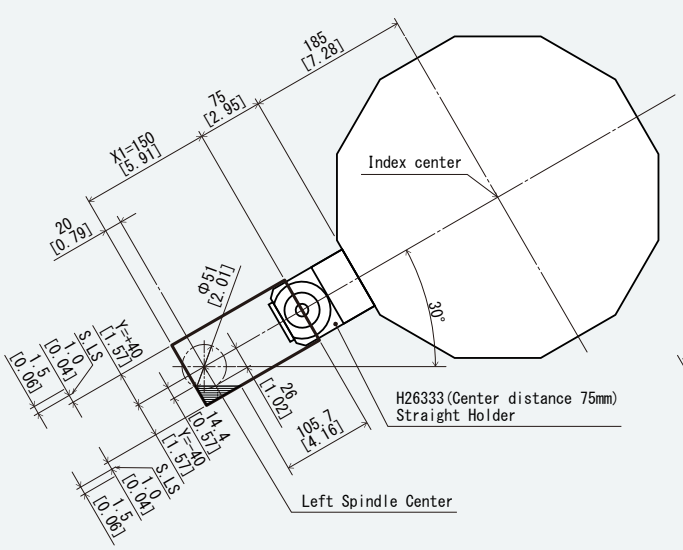
Machine Dimensions / Tool Interference / Travel Range

Travel Range

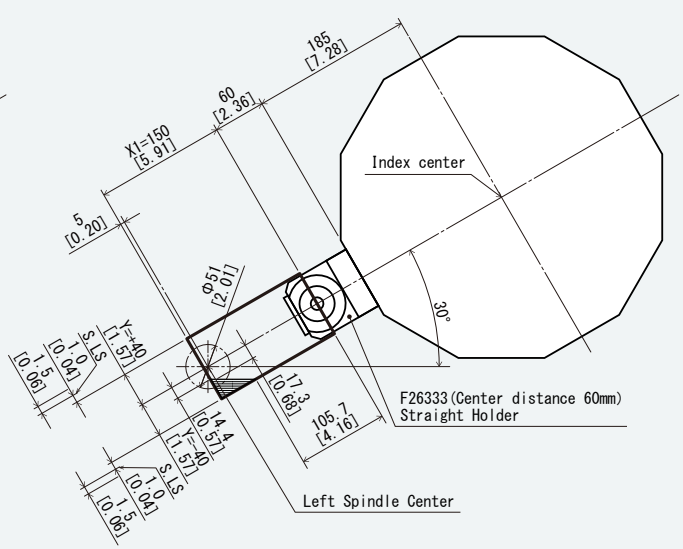


• The shaded area is an interlock area of X1/Z1-axis when X2 and Z2-axis are at the origin point.
• Interlock area are set by the relative distance of X1/X2-axis and Z1/Z2-axis.

Y-axis (for Tool holder H26333)



Y-axis (for Tool holder F26333)

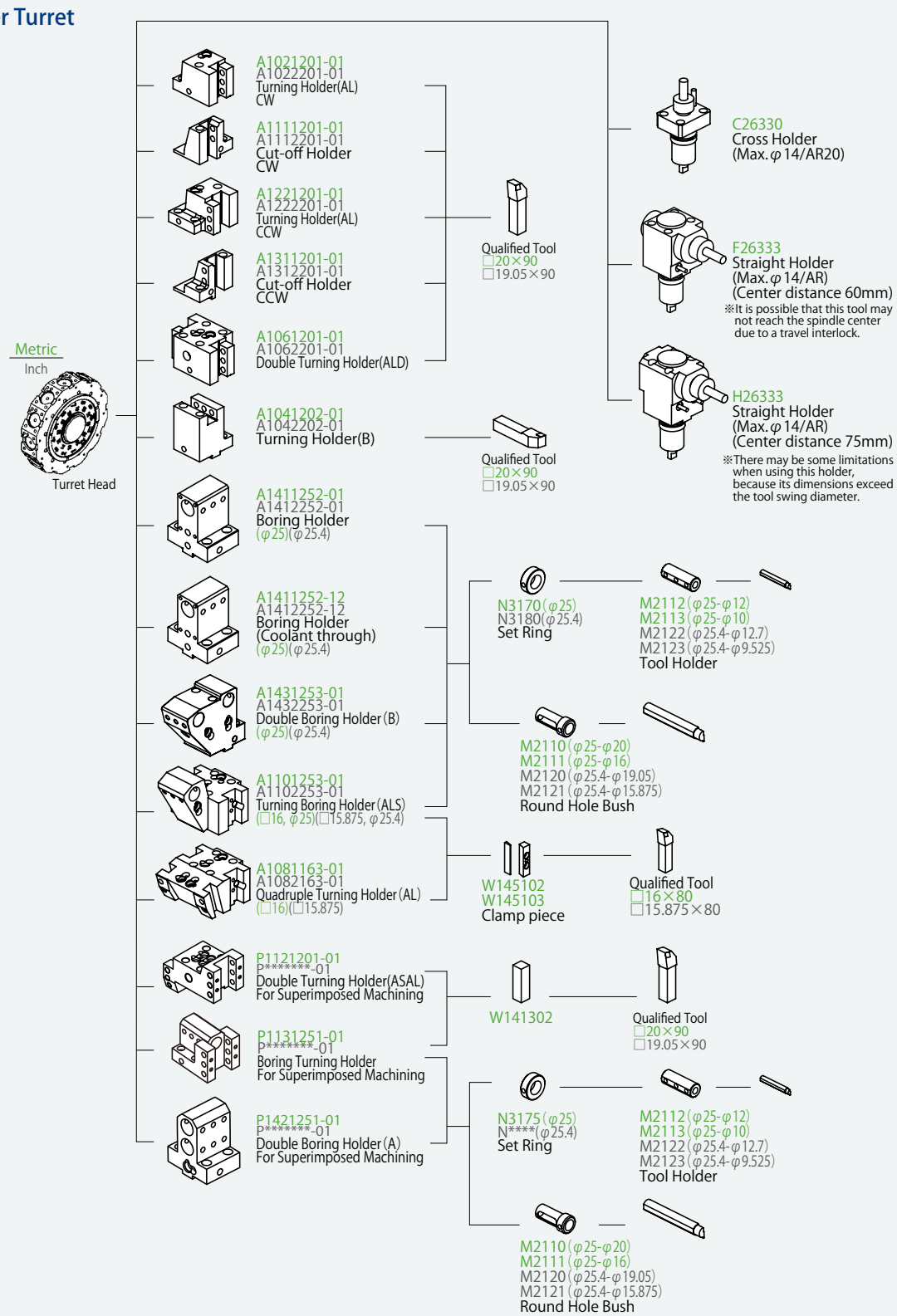


* The shaded area is interlock area.
It is possible that this tool may not reach the spindle center due to a travel interlock.

mm[inch]

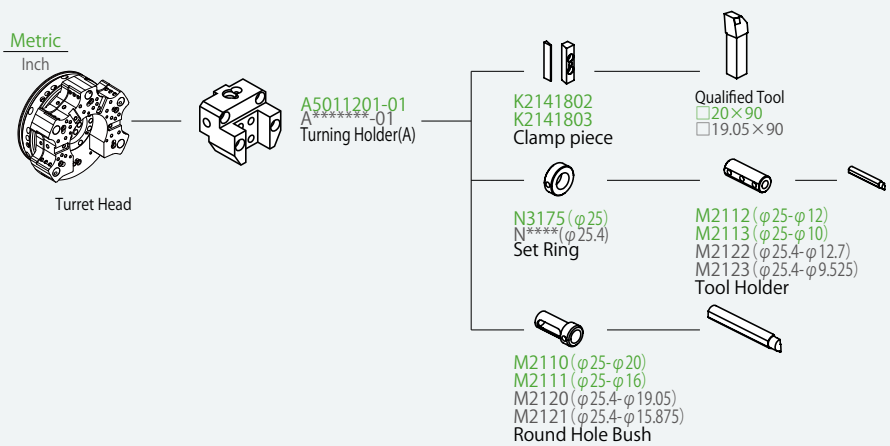
Tooling System

Upper Turret



Tooling System / Torque/Output Chart

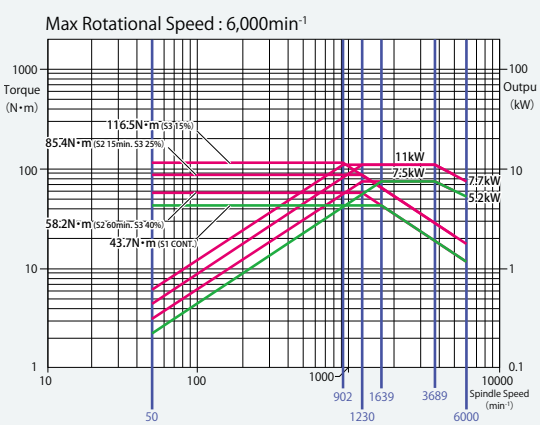
Lower Turret



Torque/Output Chart

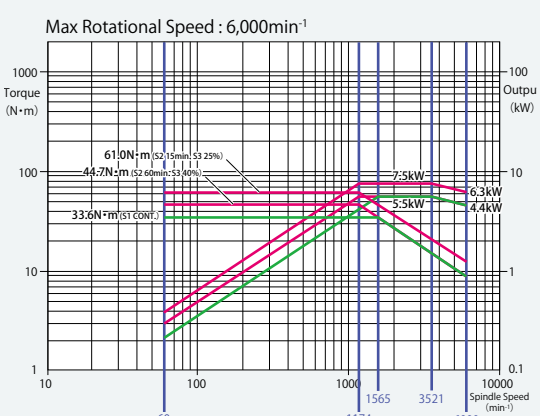
Main Spindle Motor

Bar capacity Φ 51
11/7.5kW



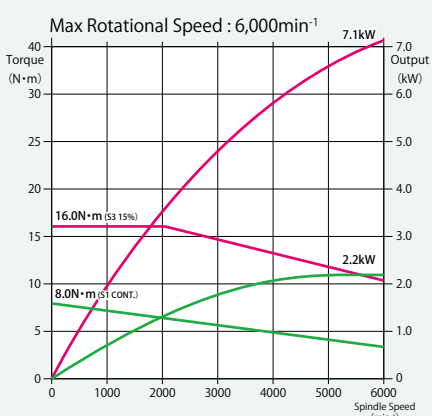
Sub Spindle Motor

Bar capacity Φ 42
7.5/5.5kW



Milling Motor

7.1/2.2kW



Nakamura-Tome

SC-100X²

Capacity

Max.turning diameter	195mm
Standard turning diameter	180mm
Max.turning length	400mm
Bar capacity (L/R)	φ51mm / φ42mm
Chuck size (L/R)	6" / 5"(6")

Axis Travel/ Rapid Feed

X1 / X2-Axis slide travel	150mm / 150mm
Z1 / Z2-Axis slide travel	400mm / 400mm
Y1-Axis slide travel	±40mm
X1 / X2-Axis rapid feed rate	20m/min
Z1 / Z2-Axis rapid feed rate	36m/min
Y1-Axis rapid feed rate	6m/min

Main Spindle φ51mm

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

Sub Spindle φ42mm

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

C-axis

Least input increment	0.001°
Least command increment	0.001°
Rapid index speed	600min^{-1}
Cutting feed rate	1 ～ 4,800° /min
C-axis clamp	Disk clamp
C-axis connecting time	1.5sec.

Parts Catcher (Unloading Gripper)

Workpiece size	Diameter	φ15mm ～φ51mm
	Length	30mm ～ 100mm
	Weight	0.1kg ～ 1.5kg

Upper Turret

Type of turret head	Dodecagonal drum turret
Number of tool stations	12 (max.24)
Number of indexing positions	24
Tool size (square shank)	□20mm (12st) / □16mm (24st)
Tool size (round shank)	φ25mm

Lower Turret

Type of turret head	Star-shaped turret
Number of tool stations	9
Number of indexing positions	9
Tool size (square shank)	□20
Tool size (round shank)	φ25mm

Milling (Upper Turret)

Driven system	Individual rotation
Milling spindle speed	6,000min^{-1}
Spindle speed range	Stepless
Number of milling stations	12
Holder type and Tool size	Straight holder φ1mm ～φ14mm
	Cross Holder φ1mm ～φ14mm

Drive motor power

Main spindle	11/7.5kW
Sub spindle	7.5/5.5kW
Milling Spindle	7.1/2.2kW

General

Height	1,799mm
Floor space (L × W)	3,072mm ×1,973.7mm (Standard)
Machine weight (incl. control)	6,500kg

● 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 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, expanding 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 warranty terms are void for any claims or damage arising from the use of inappropriate cutting fluids or lubricating oils.

Machine・Control Specifications

■ Items

Control Type	Nakamura-Tome FANUC (0i-TF Plus)

■ Controlled axes

Controlled axes	7 axes : X,Z,C,Y
Simultaneously Controlled axes	Upper：4 axes (X1,Z1,C1(C2),Y1)
	Lower：3 axes (X2,Z2,C2(C1))

■ Input command

Least input increment	0.001mm/0.0001inch（X in diameter）,0.001°
Least command increment	X：0.0005mm / Z, Y：0.001mm / C：0.001°
Max. programmable dimension	±999999.999mm/ ±39370.0787in、±999999.999°
Absolute / incremental programming	X, Z, C, Y / U, W, H, V
Decimal input	Standard
Inch / Metric conversion	G20 / G21
programmable date input	G10

■ Feed function

Cutting feed	feed/min X,Z: 0.001～8000mm/min, 0.0001～315inch/min (0.001～4800mm/min, 0.0001～188inch/min) Y: 0.001～6000mm/min, 0.0001～236inch/min (0.001～4800mm/min, 0.0001～188inch/min) C: 0.001～4800° /min feed/rev X,Z: 0.001～8000mm/rev (0.001～4800mm/rev) Y: 0.001～8000mm/rev (0.001～4800mm/rev) 0.0001～50.0000inch/rev The maximum cutting feed rate is the value in AI contour control mode. Also activated with G316. The values in parentheses are nomal values.
Dwell	G04
Feed per minute/ Feed per revolution	G98 / G99
Thread cutting	G32F
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 feed rate override	0～150% (each 10%)
AI Contouring control I	G5.1
Spindle override	50%～120%　Set every 10%

■ Program memory

Part program storage length	2Mbyte (Total 5120m) (Upper / Lower：Each 2560m)
Parts program editing	delete, insert, change
Program number search	Standard
Sequence number search	Standard
Address search	Standard
Number of registerable programs	Total 1000 programs (Upper / Lower：Each 500 programs)
Program storage memory	Backed up by battery
Multiple program simultaneous editing	Standard
DNC operation through memory card	Standard (not including memory card)
Extended parts program editing	Standard

■ Operation and display

Display	15-Inch color LCD
Keyboard	QWERTY keyboard

■ Programming assist function

Circular interpolation R programming	Standard
Direct drawing dimension programming or Chamfering/Corner R	Standard (switched by setting parameter)
Canned cycle	G90, G92, G94
Multiple repetitive canned cycle	G70～G76
Multiple repetitive canned cycle II	G71,G72
Canned cycle for drilling	G80～G89
Sub program	Standard
Custom macro	Standard（#100～#149, #500～#549）
Addition to custom macro common variables	Standard (After addition #100～#199, #500～#999)
FS10/11 tape format	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

■ Mechanical support

Rigid tap	Standard
Spindle orientation	Standard （any angle is available within 360°,Control unit: 0.088°）
Milling rigid tapping	Standard
Polygon function	Standard

■ ECO function

Servo motor off	Standard (selected on energy saving setting screen)
Control of motor output during acceleration and deceleration	Standard (selected on energy saving setting screen)
G code for servo motor energy-saving acceleration and deceleration	G356/G357
Fan motor stop	Standard(Fan motor on/off is controlled by detecting temperature of spindle motor)
Auto machine-light off	Standard (selected on energy saving setting screen)
Auto monitor off	Standard (selected on energy saving setting screen)

Methods®

SERVICE

Methods earned its unique reputation by developing a comprehensive umbrella of support and sales services utilizing decades of hands-on experience and expertise. Our sales and support staff work with an extensive national network of distributors and dealers to offer specific solutions for machine shop owners.

The unique blend of seasoned engineers, young talent, and an average level of experience of 15 years guarantees customer satisfaction.

APPLICATIONS

Method's applications engineering team is dedicated to solving challenges by integrating modifications and developing custom setups and configurations. Our engineers analyze your specific needs and develop the best solution to elevate your business and reach your goals.

Methods has taken application engineering and technology to the next level, offering precise machine selection, programming, and automation. We stay ahead of the curve to keep you ahead of the competition.

Nakamura-Tome

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