

SC-300II

NAKAMURA-TOME
PRECISION INDUSTRY CO.,LTD.

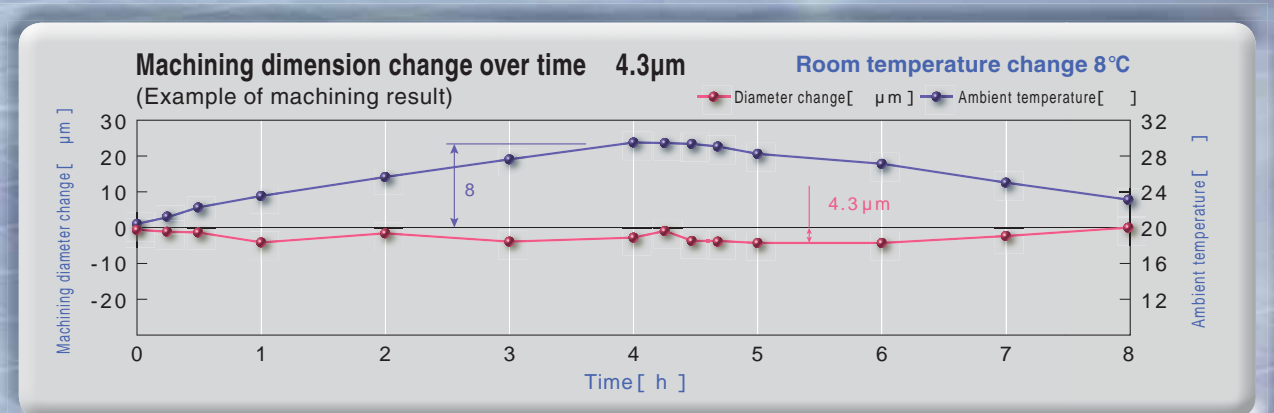
High-performance User-friendly Multitasking machine



SC-300II

Powerful cuts and better cost performance

NT Thermo Navigator-Thermal Growth Control



The values given here are based on the environment set by Nakamura-Tome. These values may change depending on the machine environment and cutting conditions.

Highest Machining Capabilities in its Class!

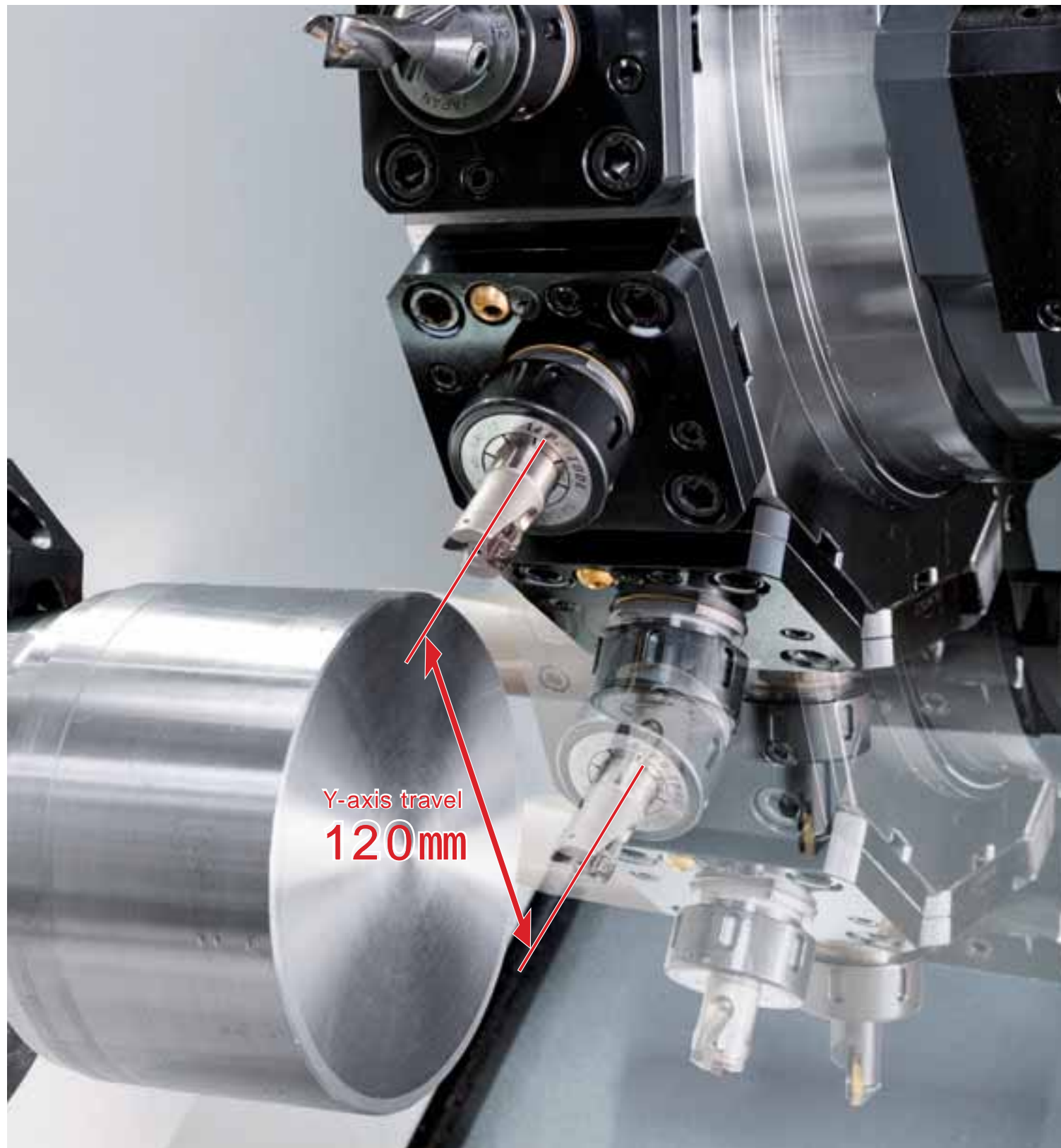
More Capacity with Large Y-axis Travel



Featuring the latest machining technology



Standard

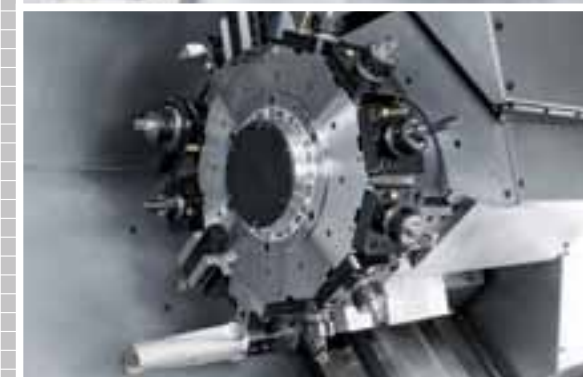
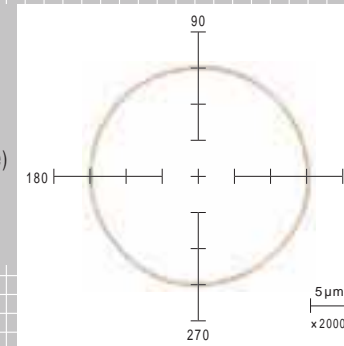


Y-axis travel
120mm

Circularity
0.48μm

(Actual measurement example)

- Rotating speed : 2350min⁻¹
- Cutting material : BsBM



High-rigidity machine structure realizes machining of difficult-to-machine-materials as well as high-hardness materials

Turning

Cross-section area of cutting **4.95 mm²/rev**



- Cutting depth **9mm** (Max.)
- Feed rate **0.55mm/rev**
- Cutting speed **120m/min**

Spindle motor

Output **22/18.5 kw** Torque **500.2/420.6 N·m**

Milling

Y-axis travel **±60 mm**

Driven-Tool spindle rotating speed **6,000 min⁻¹**



- 20 End mill**
- Diameter **20**
 - Cutting depth **5 mm**
 - Feed rate **0.14mm/rev**
 - Cutting speed **140m/min**



- 22 End mill**
- Diameter **22** (2-flute)
 - Cutting depth **1 mm**
 - Feed rate **2.0mm/rev**
 - Cutting speed **100m/min**

Driven-tool spindle motor

Output **7.5/3.7 kw** Torque **40/17.7 N·m**

Easy to Use, Fast, and Environment-Friendly Energy-Saving Machine.

Bar capacity 71mm OR Bar capacity 89mm

Spindle motor
 22/18.5kW
 500.2/420.6N·m
 3,500min⁻¹

C-axis
 C-axis synchronization

Spindle

Tailstock

NC Servo driven Tailstock
 Tailstock body movement is program controlled by NC servo drive. The setting can be easily done on NT Nurse screen for maximum 12 settings. Each display can be call up by one touch on the NT Nurse button. Two displays can be shown on the same screen.

24 stations

Turret

Milling motor
 7.5/3.7kW
 40/17.7N·m
 6,000min⁻¹

Y-axis travel ±60mm

12 / 24 - Station Turret

Turret type : Dodecagonal
 Number of tools : 24
 Number of indexing pos. : 24
 Number of driven-tools : 12
 Max. Speed of driven tools : 6,000min⁻¹
 O.D. turning tool : 20/16mm
 I.D. Boring : dia.25mm
 Collet diameter for driven tools : 1mm to 25mm

Swiveling Operation Panel

The Ergonomically designed operation panel with swiveling function ensures maximum operator support and comfort during machine set up and operation.

15-inch color display is standard

Large door window ensures good visibility of the machine interior.

SC-300II has a large door window to ensure a good visibility of the machine interior during machining and set up.

Cover is cut at an angle

Inverter type hydraulic unit

Power consumption reduction

21% *1

*1) This value may change depending on actual machining conditions.

Lubrication oil collection

Collection rate 47.3% *2

*2) Without Tailstock

Easy to refill lubrication oil

Small floor space with compact design

Floor space
 L 3,995mm × W 2,130mm × H 2,300mm

The Ultimate Powerful-Machine : High-Rigidity, High -Precision, User-Friendly Design.



Air / coolant blow devices (op.)

- Coolant blow through spindle
- Turret air blow
- In-process measuring system / HAN-BEI
- Tool setter / manual detachable type
- Fixed air blow for Left side unit
- Coolant pipe over spindle (Left side unit)

Automation devices (op.)

- Bar feeder interface
- Automatic door
- Parts catcher type A with outlet chute
*Part ejector shall be ordered additionally
- Parts catcher type A with stocker
*Unloaded parts are stocked in the small box.

High accuracy specification (op.)

- Linear scale is selected from X, Z and Y axis.

SC-300II

Powerful cuts and better cost performance



Capacity

Max. turning diameter / Max. turning length	360mm / 600mm	
Distance between center and spindle	713.5mm	
Bar capacity	71mm	89mm (op.)
Chuck size	10" (12")	

Axis travel

Slide travel (X)	232.5mm	
Slide travel (Z)	635mm	
Slide travel (Y)	±60mm	

Spindle

Spindle speed	3,500min ⁻¹	3,500min ⁻¹
I.D. of front bearing	120mm	140mm
Hole through draw tube	72mm	90mm
Spindle motor	22/18.5kW	

Turret

Type of turret head / Number of indexing pos.	Dodecagonal drum turret / 24	
Tool size (square shank / round shank)	25mm / 50mm	

Rotating tool

Driven-tool spindle speed	6,000min ⁻¹	
Driven tools	7.5/3.7kW	
Rotary system / Number of driven-tool stations	Individual rotation / 12	
Tool shank	1 - 25mm	

C-axis

Rapid index speed	200min ⁻¹	
Cutting feed rate	1 - 4800°/min	
Least input increment / Least command increment	0.001°/0.001°	

Tailstock

Driving Methods	NC type	Hyd. Knock type (op.)
Tailstock positioning stroke	500mm	400mm
Tailstock force	2.5 - 6.5kN	1.3 - 7kN
Quill Diameter	90mm	
Tailstock taper size	MT-5 (Rotating center)	
Quill Travel	100mm	

General

Floor space (L x W x H)	3,995mm x 2,130mm x 2,300mm	
Machine weight (incl. control)	9,000kg	

Full Operator Support: User Friendly and Highly Reliable.

**Jig less!
Set-up less!
Skill less!**

This essential function for multitasking machines is standard.



Main Features

Standard

- NT Work Navigator
- Airbag (Overload detection)
- Advanced NT Nurse

Option

- NT Manual Guide i (LUCK-BEI II)
- Net Monitor



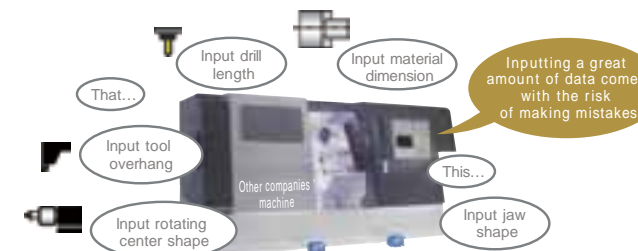
Program storage length	Total 512 Kbyte (1280m)
Program registered number	Total 400
Tool offset pairs	99 Total 200 (Option)

Airbag (Overload detection)

Nakamura-Tome machines will not break for the slightest collision, as other machines do. The function minimize damage in case of collision.

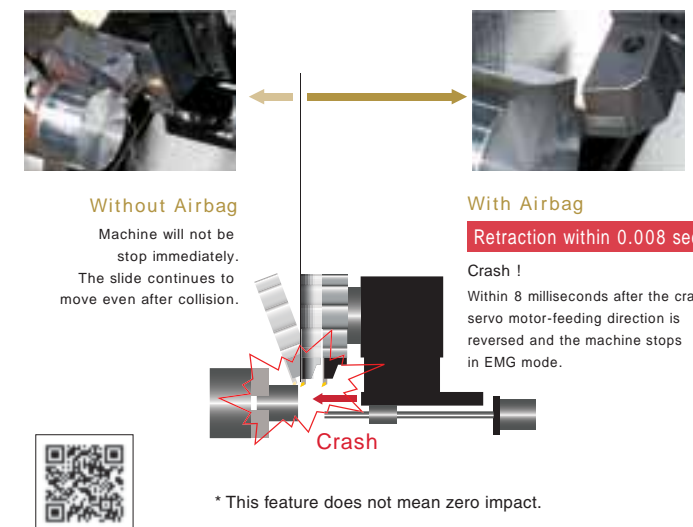
Even with barrier function, machine collisions may occur

Soft barrier function is not perfect. If wrong data is input, a collision will occur.



When unavoidable human error results in machine collision, there is no reason to panic.

All Nakamura-Tome machines are equipped with a safety feature called "airbag" (overload detection), which will greatly reduce the impact force and prevent heavy damage to the machine.



Video

* This feature does not mean zero impact.

NT Work Navigator

New Navigator for X-axis and Y-axis

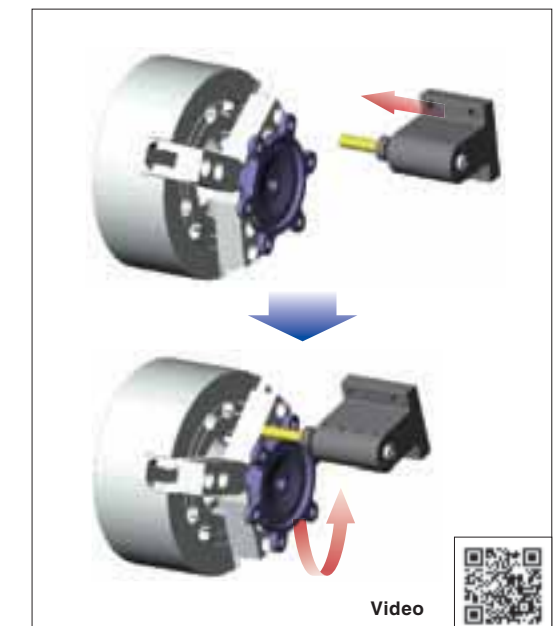


• Advanced NT Work Navigator !

Navigation function is expanded to also include the X and Y-axis. Coordinate Recognition can be made the part's outer surface in the X or Y-Axis direction.

• No fixtures required

Machining parts with non-round shapes, such as forgings or castings requires that the raw part coordinates be recognized by the CNC control. In order to achieve this without requiring extra cost or additional options, the NT 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 Navigator is a cost cutting feature in multitasking machines, eliminating the need for positioning fixtures and special clamping devices.



Video



Featuring Functions to Make Fast and Efficient Programs.

Advanced NT Nurse

NT Nurse is software that provides the operator with user-friendly support for operation, programming and production on the machine. Among vital features are phase recognition (a must for multitasking), direct chucking to prevent positioning error during transfer, and perfect synchronization of the left

and right hand spindles. Among other features, are the load monitor for detecting tool wear and tool breakage, tool life management, operation condition monitoring, in addition to many other features to simplify programming, set up, operation and production, all offered in one single package.

Useful functions

This only part of 24 functions



Menu screen



Tool counter



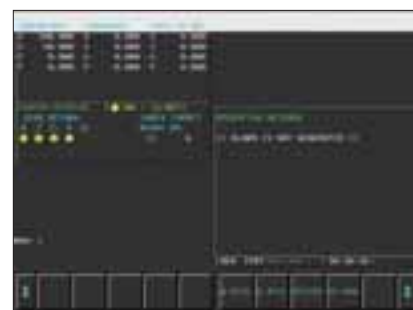
Tool Life



Energy Saving



Operation condition of each tool



Operation message



Quick offset



NT Nurse call button

Up to two NT Nurse frequently used functions can be registered, and later called with in one-key stroke.

NT Manual Guide i (LUCK-BEI II) Option

A programming guidance system with the ability to generate NC programs (ISO/EIA G-code programs) easily. Processes created in conversational mode can be cut, copied or moved ensuring flexibility. Additionally, several cycles such as part-transfer cycle, requiring waiting M-codes, are readily made with the "NC program editing support function". The "NC program simulation function" can be used to check created- programs by tool-path simulation or solid-model animation.



Simulation

Accurate simulation of turning and milling operations using a 3D solid model.

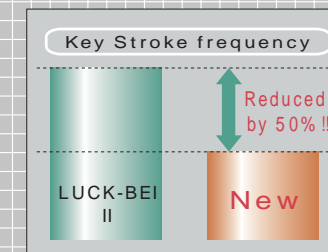


Fixed-form sentence function

NT Manual Guide i contains more than 300 types of fixed form sentences. Operator can select these fixed form sentences for the program from a menu screen.

Process Editing Function

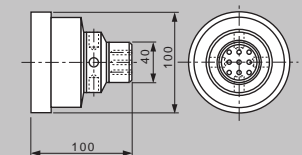
NT Manual Guide i automatically recognizes each process and lists all processes. Operator can easily change and optimize the program by moving processes, copying processes or adding waiting-functions.



By introducing the "automatic cutting condition setting function", the number of key strokes required to make a program were reduced by 50% reduced, compared with the previous NT-Manual guide version.

Automatic Cutting-Condition Setting Function

By setting the material type and required surface roughness, cutting conditions are automatically generated. These can be also changed depending on customer's experience.



By selecting the material, cutting conditions are automatically input.



By setting the surface roughness, machining conditions are automatically input



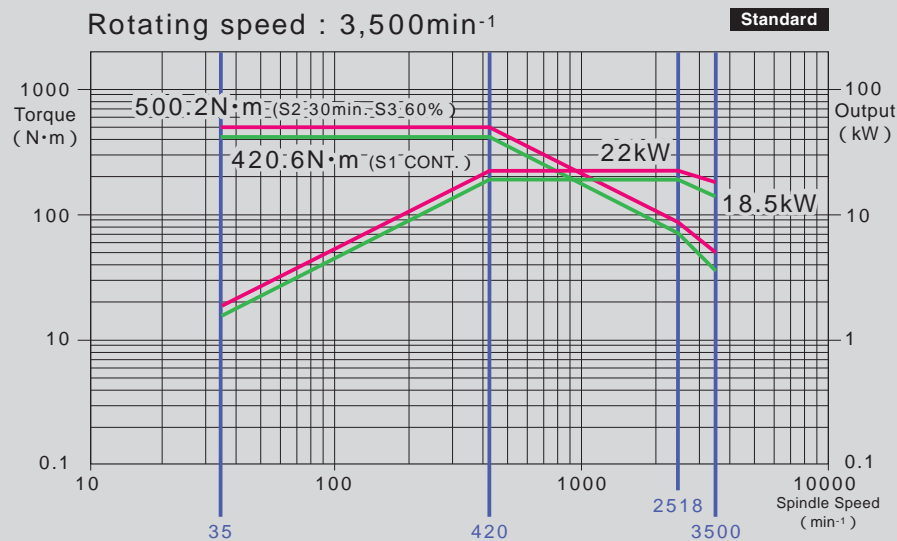
Cutting conditions. End mill

High-Performance Turning and Milling Motors

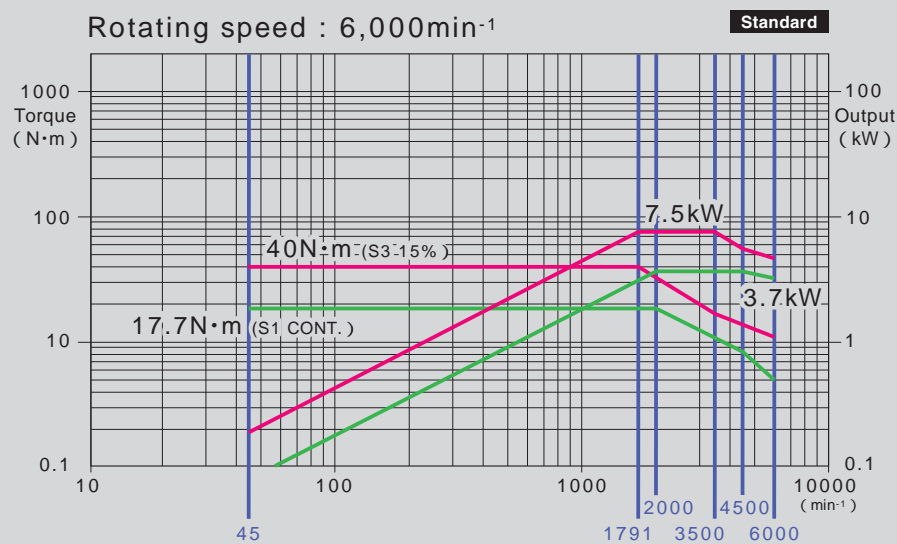
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Machine Dimensions

SC-300II

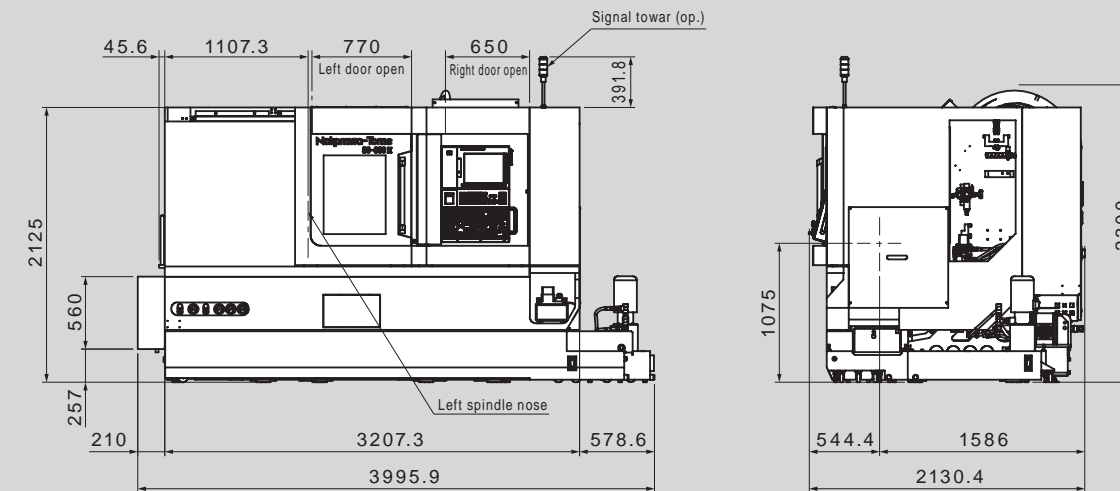


Spindle motors

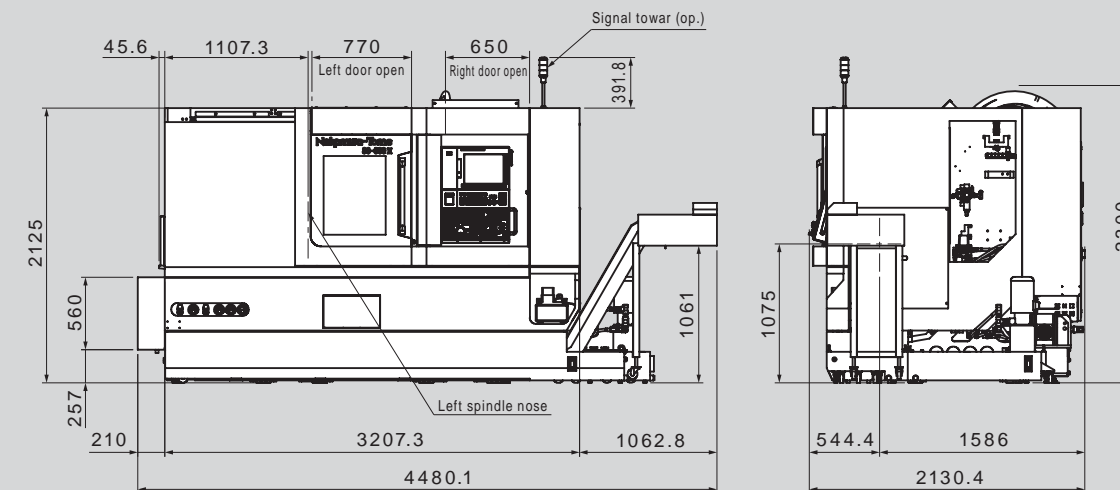


Driven-tool motor

Standard



Chip conveyor right side outlet type



Unit : mm

Single Spindle SERIES



SC-200



SC-200L



SC-250



SC-300II



SC-450



SC-450L

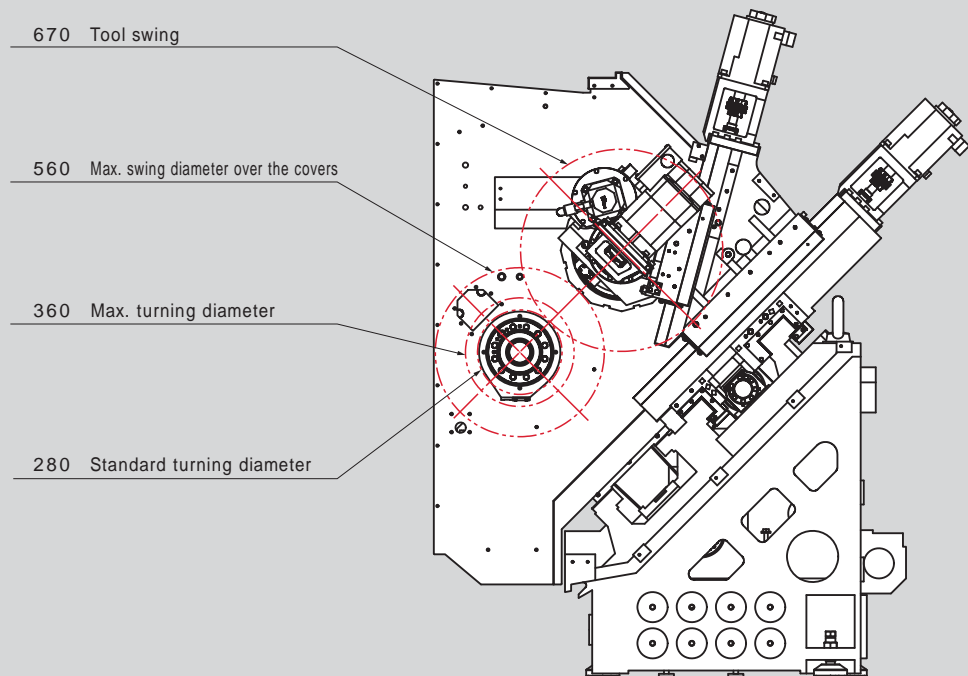
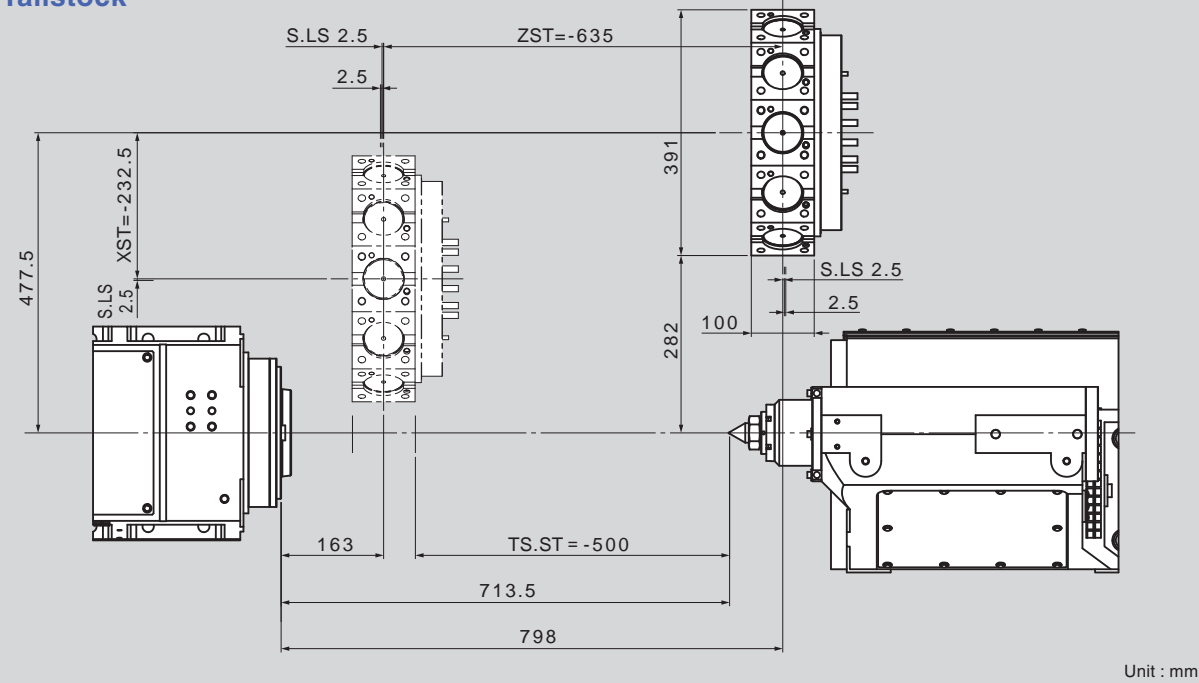


SC-450LL

Slide Travel Range / Maximum Tool Diameter

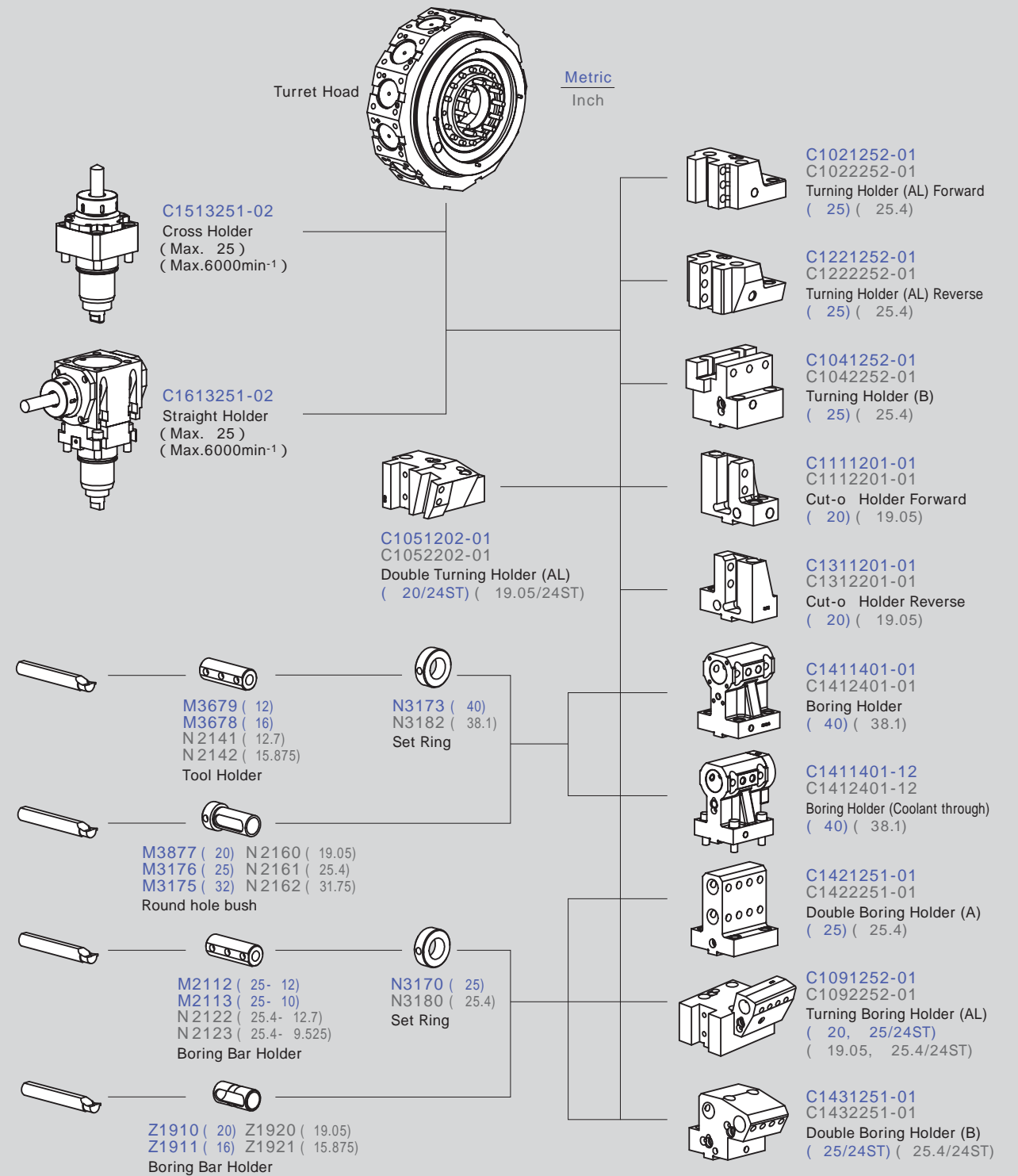
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NC Tailstock



Tooling System Diagram

SC-300II



Machine Specification

SC-300II

Capacity

Max. turning diameter	360mm	
Standard turning diameter	280mm	
Distance between center and spindle	713.5mm	
Max. turning length	600mm	
Bar capacity	71mm	89mm (op.)
Chuck size	10" (12")	

Axis travel

Slide travel (X)	232.5mm	
Slide travel (Z)	635mm	
Slide travel (Y)	±60mm	
Rapid feed X	25m/min	
Rapid feed Z	30m/min	
Rapid feed Y	12.5m/min	

Spindle	71mm	89mm (op.)
Spindle speed	3,500min ⁻¹	3,500min ⁻¹
Spindle speed range	Stepless	Stepless
Spindle nose	A2-8	A2-8
Hole through spindle	85mm	100mm
I.D. of front bearing	120mm	140mm
Hole through draw tube	72mm	90mm

C-axis

Least input increment	0.001°
Least command increment	0.001°
Rapid index speed	200min ⁻¹
Cutting feed rate	1- 4,800°/min
C-axis clamp	Disk clamp
C-axis connecting time	1.5sec.

Turret

Type of turret head	Dodecagonal drum turret
Number of driven-tool stations	24
Number of index positions	24
Tool size (square shank)	25mm
Tool size (round shank)	50mm

Tailstock

Driving Methods	NC type	Hyd. Knock type (op.)
Tailstock positioning stroke	500mm	400mm
Tailstock force	2.5 - 6.5kN	1.3 - 7.0kN
Quill diameter	90mm	
Tailstock taper size	MT-5 (Rotating center)	
Quill travel	100mm	

Rotating tool

Rotary system	Individual rotation	
Driven-tool spindle speed	6,000min ⁻¹	
Spindle speed range	Stepless	
Number of driven-tool stations	12	
Tool shank	Straight holder	1mm - 25mm
	Cross holder	1mm - 25mm

Drive motor

L-spindle	22/18.5kW	500.2/420.6N·m
Driven tools	7.5/3.7kW	40/17.7N·m

General

Height	2,300mm
Floor space (L × W)	3,995mm × 2,130mm
Machine weight (incl. control)	9,000kg

Power requirements

power supply	34.2kVA
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Precautions about the use of cutting coolant

Synthetic Coolants are Damaging to Machine Components. Concerning the use of cutting fluids, cautions have to be taken on the type of coolant being used. Among coolants available in the market, some types are damaging to machine components and should be avoided. Typical damages are turcrite wear, peeling of paint, cracking and damage to plastics and polymers, expansion of rubber parts, corrosion and rust build up on aluminum and copper. To prevent such damages, coolants that are synthetic, or containing chlorine have to be avoided. Machine warranty terms do not apply to any claims or damage arising from the use of improper coolant.

Safety devices such as various interlocks, fences for robotics, auto loading device, work stocker, automatic fire extinguisher etc. are available as options which can be included in your purchase package. Please contact our local distributor and dealer for your specific requirements.

Control Specification

SC-300II

items

Control type	Nakamura-Tome FANUC
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Controlled axes

Controlled axes	4axes (X, Z, C, Y)
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Input command

Least input increment	0.001mm/0.0001inch (diameter for X-axis), 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 data input	G10

Feed function

Cutting feed	feed / min X, Z : 1 - 8000mm/min, 0.01 - 314inch/min (1 - 4800mm/min, 0.01 - 188inch/min) Y : 1 - 8000mm/min, 0.01 - 314inch/min (1 - 4800mm/min 0.01 - 188inch/min) C : 1 - 4800°/min (op.) feed / rev : 0.0001 - 500.0000mm/rev 0.000001 - 9.99999inch/rev The maximum cutting feed rate is the value in AI contour control mode. It is also on with G316 command. The values in parentheses are normal values.
	Dwel
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, ^o (per pulse)
Automatic acceleration / deceleration	Standard
Linear accel./ decel. After cutting feed interpolation	Standard
Rapidfeed override	F0, 25, 50, 100% (changeable to every 10% by switch)
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	512kbyte (Total 1,280m)
Part program editing	delete, insert, change
Program number search	Standard
Sequence number search	Standard
Address search	Standard
Number of registerable programs	400
Program storage memory	Backed up by battery
Multiple program simultaneous editing	Standard
DNC operation through memory card	Standard (not including memory card)
Extended part program editing	Standard

Operation and display

Operation panel : Display	15inch color LCD unit
Operation panel : keyboard	Separated MDI unit / standard key

Programming assist function

circular interpolation R programming	Standard
Direct drawing dimension programming or Chamfering / Corner R	Standard (Direct drawing dimension programming is standard)
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 (common variable#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	Option
Abnormal load detection function	Standard
NT Work Navigator	Standard (not including contact bar)
NT Nurse	Standard

Mechanical support

Rigid type	Standard
Spindle orientation	Standard (Any angle is available within 360°. Control unit: 0.088°)
Driven-Tool rigid tapping	Standard
Polygon function	Standard

Energy-Saving 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 (Acceleration and deceleration time of servo motor is programmable using a G code.)
Fan motor stop	Standard (Fan motor on/off is controlled by detecting temperature of spindle motor)
Auto machine-light off	Standard (selected on the energy saving setting display)
Auto Monitor off	Standard (selected on the energy saving setting display)



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