

SC SERIES



NAKAMURA-TOME PRECISION INDUSTRY CO., LTD.

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**NAKAMURA-TOME
PRECISION INDUSTRY CO.,LTD.**

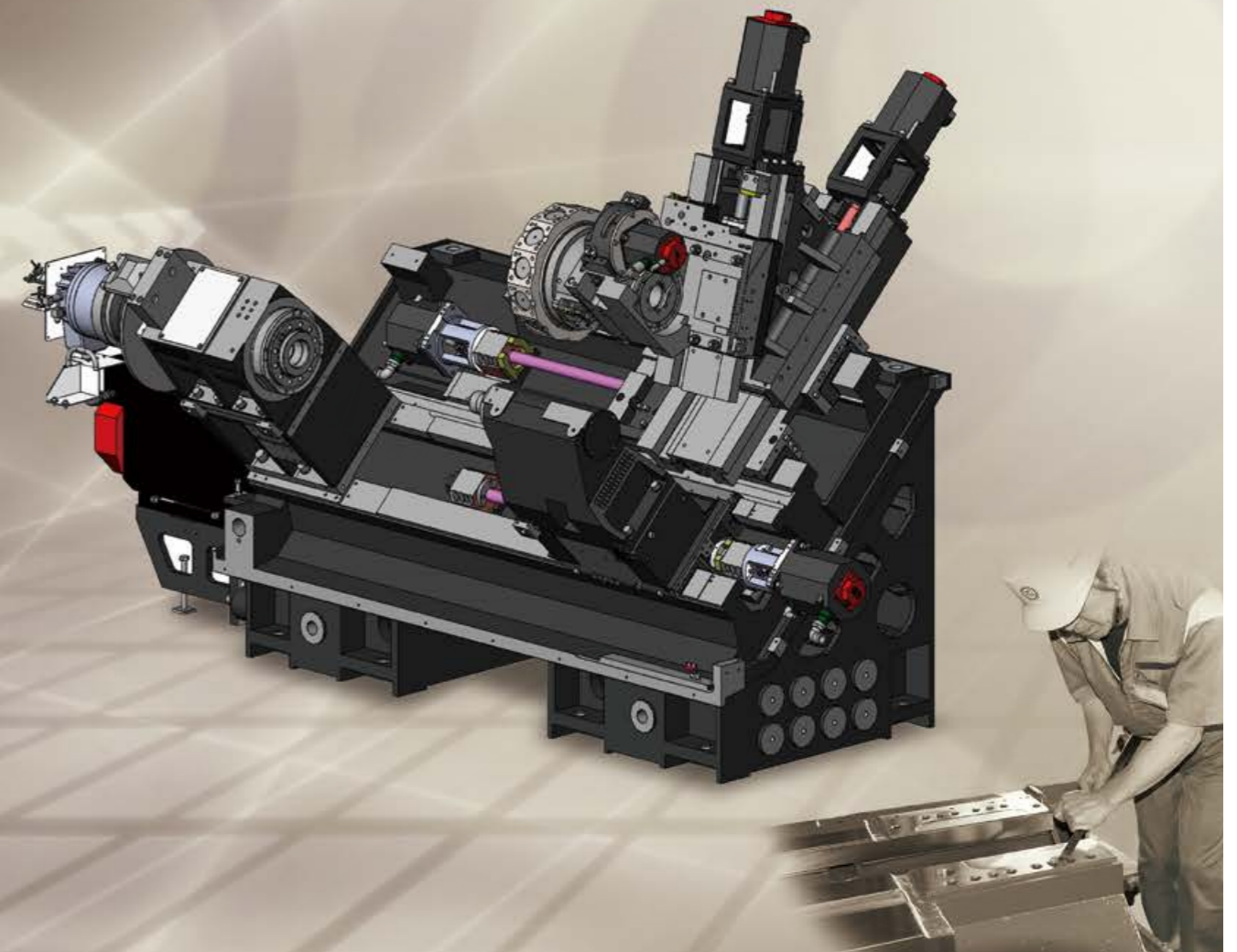
High Rigidity for all Axes : High Durability Box-Way Slides

Traditionally hand-scraped and fitted slides

A tradition that has been kept since the automatic turret lathe era, "KISAGE" is a process, which prides itself for providing ultra-precision gliding qualities. Nakamura-Tome offers high-grade slide scraping for all machines

Turcite-B ® used for coating the slide-ways, is an exceptionally low-wearing low-friction polymer, which increases slide life and rigidity, and reduces vibrations.

- By keeping a constant coefficient of friction, when the slide is static or moving, Turcite B ® prevents stick-slip motion and increases positional accuracy.
- Additionally, the low friction coefficient ensures heavy cutting even with increased loads.
- Turcite B ® has a high wear resistance, which ensures a long service life.
- Turcite B ® provides excellent vibration dampening properties. It absorbs cutting tool vibrations and prevents them from migrating throughout the machine tool.
- This property is an essential factor for achieving the best surface finish, which is a prerequisite for a machine delivering the highest precision.



Spindle and slide units are mounted on the machine bed by highly-qualified technicians, and each machine does not leave the production line before undergoing the most stringent quality control checks. This machine does not only feature high capabilities, but also high performance and reliability, delivered from a machine-tool manufacturer fostering high accuracy and precision manufacturing technology over many years.





		SC-100	SC-200	SC-200L	AS-200	AS-200L	SC-250
■ Capacity							
Max.turning diameter	mm	230	432(410 / with Y-axis)	410	290(280 / 15st)		300
Max.turning length	mm	400(Standard/Sub spindle) / 300(Tailstock)	370	570	300	570	500(480 / 10st)
Distance between centers	mm	430	509	757.8	427(Tailstock)	760(Tailstock) / 800(Sub spindle)	689
Bar capacity	mm	φ51	φ65	φ65	φ65 (op.φ71)	φ65 (op.φ71)	φ51 φ65 (op.)
Chuck size	inch	6"	8"	8"	8"	8"	8"
■ Y axis		Standard	(op.)	Standard	(op.)	Standard	(op.)
Slide travel(Y)	mm	±40	±41	±41	±41	±41	±41
■ Main spindle							
Spindle speed	min ⁻¹	5,000	4,500	4,500	4,500	5,000	4,500
Spindle motor	kW	11/7.5	11/7.5	11/7.5(op. 15/11, 18.5/15)	15/11	15/11(op. 18.5/15)	
■ Turret							
Type of turret head / Number of indexing positions	12st / 10st / 15st	Dodecagonal drum turret / 24	Dodecagonal drum turret / 12(op. 24)	Dodecagonal drum turret / 24	Dodecagonal drum turret / 24	Dodecagonal drum turret / 24	Dodecagonal drum turret / 12 / 10 stations turret / 10(op.)
■ Milling tools		Standard	(op.)	Standard	(op.)	Standard	(op.)
Spindle speed	min ⁻¹	6,000	6,000	6,000	6,000	3,600	3,600
Milling motor Power	12st kW	7.1/2.2	5.5/3.7	5.5/3.7	5.5/3.7	5.5/3.7	5.5/3.7
	10st kW	—	—	—	—	5.5/3.7(op.)	—
	15st kW	—	—	—	—	—	—
Number of milling tool stations	12st / 10st / 15st	12	12	12	12	12	10(op.)
■ Tailstock (op.)		(op.)					
Driving system	—	NC control servo-driven type	Manual	Automatic with hyd. cylinder	Manual	Automatic with hyd. cylinder	Z-axis slide (Lever type) / Automatic with hyd. cylinder
Stroke / Rapid feed	mm / m/min	400 / 20	255 / —	200 / —	435 / —	200 / —	435 / —
Range of thrust force	kN	1.0~4.0	—	—	—	—	—
Quill taper	—	MT-3 (Rotating center)	MT-4 (Rotating center)	MT-3 (Built-in center)	MT-3 (Built-in center)	MT-4 (Rotating center)	MT-4 (Rotating center), MT-3 (Built-in center)
Quill diameter / Quill stroke	mm	—	φ80 / 80	φ80 / 80	φ80 / 80	φ80 / 80	φ80 / 80
■ Sub spindle (op.)		(op.)					
Chuck size / Bar capacity	inch / mm	5" (6") / φ42	6" / φ34	6" / φ42	—	6" / φ42	6" / φ51
Spindle speed / Spindle motor	min ⁻¹ / kW	6,000 / 7.5/5.5	5,000 / 5.5/3.7	6,000*1) / 7.5/5.5, 11/7.5	—	6,000*1) / 7.5/5.5	5,000 / 11
Distance between spindles [max./min.]	mm	600 / 200	615 / 220	800 / 220	—	800 / 220	780 / 280
Slide travel(B)	mm	400	395	580	—	580	500
■ General							
Floor space	Height	1,780	1,730	1,965	1,852	1,935	1,815
	Width	2,524	2,430	2,771	1,655	2,716	2,598
	Length	1,825	1,745	1,884	1,665	1,805	1,671

*1) For R-side parts ejector specification, max. spindle speed is 5,000min⁻¹



AS-200/200L



SC-100



SC-300III



SC-450/450L/450LL

* Image may contain optional equipment

		SC-300II	SC-300III	SC-450	SC-450L	SC-450LL*2
■ Capacity						
Max.turning diameter	mm	360		465	480	480
Max.turning length	mm	600 (Tailstock) / 635 (Sub spindle)	1,100 (Tailstock) / 1,135 (Sub spindle)	785	715	1,520
Distance between centers	mm	713.5	1213.5	1,050	1,752	2,752 / 2,652 *1
Bar capacity	mm	φ71	φ89(op.)	φ81	φ81	φ89(op.)
Chuck size	inch	10", 12"		12"	15"	12" 15"
■ Y axis		Standard		(op.)		
Slide travel(Y)	mm	±60		±70	±75	±75
■ Main spindle						
Spindle speed	min ⁻¹	3,500		2,500		
Spindle motor	kW	22/18.5		30/22		
■ Turret						
Type of turret head / Number of indexing positions	12st / 16st	Dodecagonal drum turret / 24		Dodecagonal drum turret / 12		
■ Milling tools		Standard		(op.)		
Spindle speed	min ⁻¹	6,000		3,600		
Milling motor power	12st kW	7.5/3.7		5.5/3.7		
	16st kW	5.5/3.7(op.)		—		
Number of milling tool stations	12st / 16st	12		12		
■ Tailstock (op.)		(op.)				
Driving system	—	Z-axis slide (knock type)	NC control servo-driven type	Z-axis slide (knock type)	NC control servo-driven type	Z-axis slide (Lever type) / Automatic with hyd. cylinder
Stroke / Rapid feed	mm / m/min	400 / —	500 / 8	900 / —	1,000 / 8	760 / —
Range of thrust force	kN	1.3 ~ 7.85	2.5 ~ 6.5	1.3 ~ 7.85	2.5 ~ 6.5	—
Quill taper	—	MT-5 (Rotating center), MT-4 (Built-in center)		MT-4 (Built-in center)	MT-5 (Rotating center) / Built-in center	MT-5 (Built-in center)
Quill diameter / Quill stroke	mm	φ90 / 100	—	φ90 / 100	—	φ120 / 100
■ Sub spindle (op.)		(op.)				
Chuck size / Bar capacity	inch / mm	6", 8" / φ51		—		
Spindle speed / Spindle motor	min ⁻¹ / kW	5,000 / 15/11		—		
Distance between spindles [max./min.]	mm	910 / 310		1,310 / 310		
Slide travel(B)	mm	600		1,000		
■ General						
Floor space	Height	2,300		2,300		2,213
	Width	3,995		4,902		5,050
	Length	2,130		2,130		2,165

*Bar capacity (Dia.71/Dia.89), turret head (12/16) and tailstock (NC/ knock) in any combinations are available.

*1 For Tailstock 20kN specification (op.)
*2 C-axis Contouring machining is not available.

Powerful High Rigidity Multitasking Machine with Box-way Slides

Cutting cross-sectional area 4.95 mm²/rev.

High rigidity ensures high performance machining in difficult-to-machine materials.

12 24 stations 16 16 stations



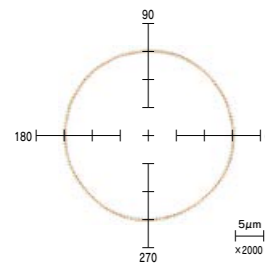
Spindle motor
Output 22/18.5kW Torque 500.2/420.6Nm

Driven-tool motor
Output 7.5/3.7kW Torque 40/17.7N·m

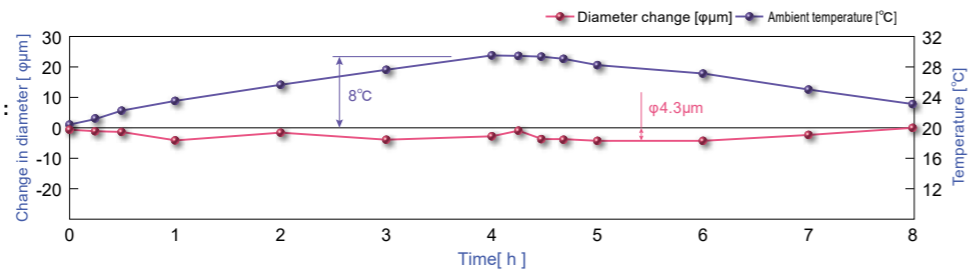
Turning
Cutting cross sectional area 4.95 mm²/rev
▶ Cutting depth 9mm (Max.)
▶ Feed rate 0.55mm/rev
▶ Cutting speed 120m/min

Roundness 0.48μm

NT Thermo Navigator-Thermal Growth Control



Actual measurement example
● Spindle speed : 2,350min⁻¹
● Material : BsBM



※ The above values may not be obtained depending on the processing conditions and the environment.

Digital Chuck Interlock is Standard !

Digital Chuck Open/ Close Confirmation: Easy Setup and High Productivity.

- Bar stopper
- Work pusher
- Pull-out the material
- Work rest
- Tailstock
- Part catcher A/G
- Gantry Loader

- By eliminating chuck Open / Close proximity switches, no mechanical adjustment is required. Chuck Open / Close stroke limits can be set in 0.1mm increments and adjustment is done easily on Operation Panel.
- Settings can be saved and recalled, Reducing Set-Up time for repetitive jobs.
- Setting on NT setting screen.
- All processes requiring chuck Open / Close operation become faster, such as Bar stopper, Parts Transfer, ...etc.

SC-300II/300IIL

Common

Various Options and Peripheral Equipment

SC-300IIL (op.)

High speed gantry loader

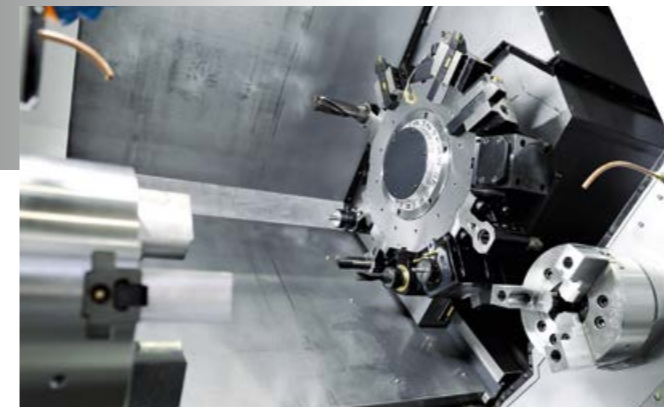
GR-210 ● Max. Parts weight 10kg×2
● Loading/unloading time 6sec.
High-Speed

Standard Specifications

Rapid feedrate (Z)	200m/min
Rapid feedrate (Y)	120m/min
Rapid feedrate (X)	50m/min
Hand swiveling amount	180°
Hand rotation speed	1s/180°
Workpiece diameter	φ20~φ220mm
Workpiece length	20~100mm



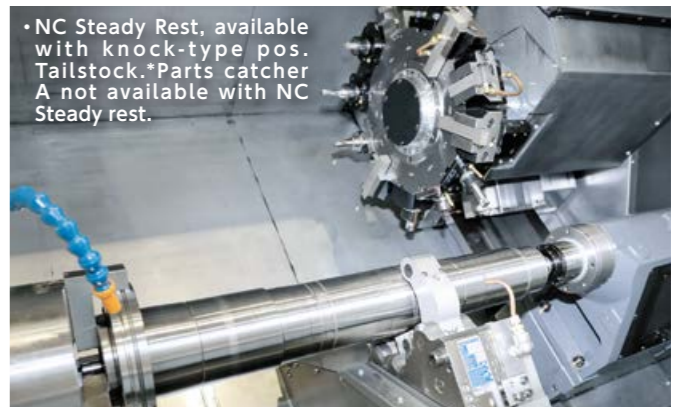
SC-300II/300IIL (op.)



Sub spindle specifications (op.)

Distance between spindles	SC-300II max. 910mm / min. 310mm	SC-300IIL max.1,310mm / min. 310mm
Chuck size / Bar capacity	165mm (6"), 210mm (8") / 51mm	
Spindle speed / Spindle motor output	5,000min ⁻¹ / 15/11kW	
Least command increment / input increment	0.001° / 0.001°	
C-Axis rapid speed / Cutting feed	200min ⁻¹ / 1 ~ 4800°/min	

SC-300IIL (op.)



● NC Steady Rest, available with knock-type pos. Tailstock.*Parts catcher A not available with NC Steady rest.

Steady rest specifications (op.)

Tailstock Drive system	NC type CNC servo-driven
Positioning stroke	750mm
Model	SLU-X3.1
Centering range	20 ~ 165mm
Pressure range	0.8 ~ 3.5MPa
Max. Roller surface speed / Roller Diameter	725m/min / φ47mm

Large door window ensures good visibility of the machine interior.



The large window ensures that the operator has a good visibility of the machine working area during setup and during cutting. The CE Marked window glass and the robust double layer door were designed with sufficient strength to protect the operator.

15 inch color panel / Swiveling Operation Panel



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

Inverter type hydraulic unit



Common



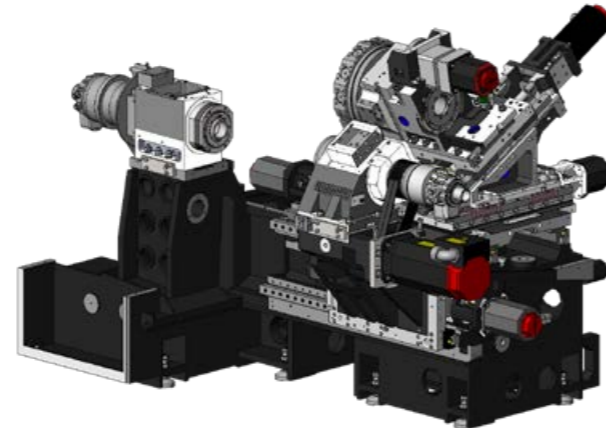
High rigidity • Compact 6-inch Machine

12
24 stations

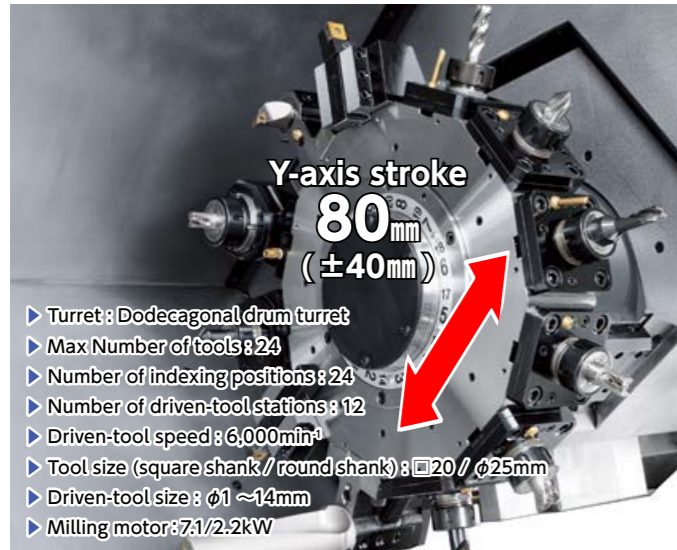
High performance machining and high capabilities.



• Sub spindle specification



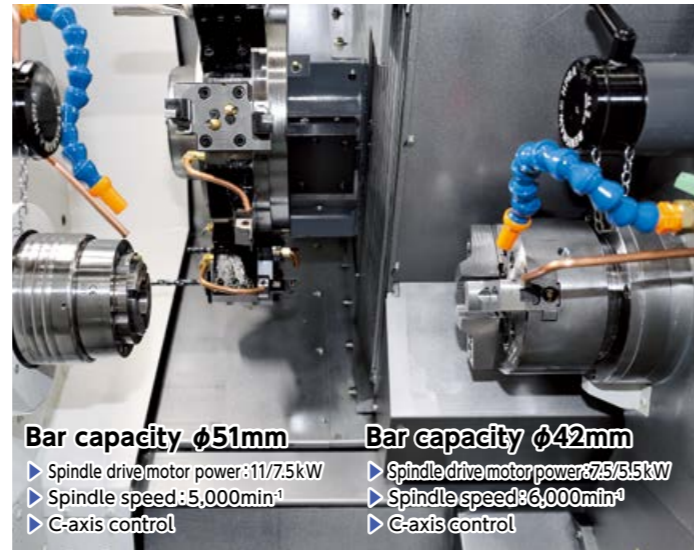
Equipped with Standard Milling and Y axis.



Y-axis stroke
80mm
(±40mm)

- ▶ Turret: Dodecagonal drum turret
- ▶ Max Number of tools: 24
- ▶ Number of indexing positions: 24
- ▶ Number of driven-tool stations: 12
- ▶ Driven-tool speed: 6,000min⁻¹
- ▶ Tool size (square shank / round shank): □20 / φ25mm
- ▶ Driven-tool size: φ1~14mm
- ▶ Milling motor: 7.1/2.2kW

NC Sub spindle / NC Tailstock (op.)



Bar capacity φ51mm

- ▶ Spindle drive motor power: 11/7.5kW
- ▶ Spindle speed: 5,000min⁻¹
- ▶ C-axis control

Bar capacity φ42mm

- ▶ Spindle drive motor power: 7.5/5.5kW
- ▶ Spindle speed: 6,000min⁻¹
- ▶ C-axis control



• Standard specification + Robot

• Sub spindle specification + Bar feeder

Best Cutting and Milling Capabilities in its Class

12
12 stations

12
24 stations

Powerful CNC Multitasking Machine with High Output and High Rigidity



OD cutting

- Cutting depth: 4.5mm
- Feed: 0.3mm/rev
- Cutting speed: 130m/min
- Material size: φ120mm



Cross Endmill cutting 0.5D

- Cutting depth: 8mm
- Cutting width: 16mm (End mill diameter)
- Feed: 0.37mm/rev ● Cutting speed: 110m/min
- Spindle speed: 1,200min⁻¹



φ 50 Indexable drill

- Diameter: φ50mm ● Feed: 0.1mm/rev
- Cutting speed: 110m/min
- Spindle speed: 700min⁻¹



Straight Endmill cutting 1D

- Tooling diameter: φ16mm
- Cutting width: 16mm ● Cutting depth: 16mm
- Feed: 0.25mm/rev ● Cutting speed: 110m/min
- Spindle speed: 2,190min⁻¹



OD grooving

- Grooving width: 8mm
- Feed: 0.15mm/rev
- Cutting speed: 110m/min



Straight Endmill cutting / EPolar coordinate interpolation

- Tool diameter: φ16mm ● Cutting width: 16mm
- Cutting depth (Z-axis direction): 16mm
- Cutting depth (X-axis max direction): 9mm
- Feed: 0.37mm/rev ● Cutting speed: 110m/min
- Spindle speed: 2,190min⁻¹

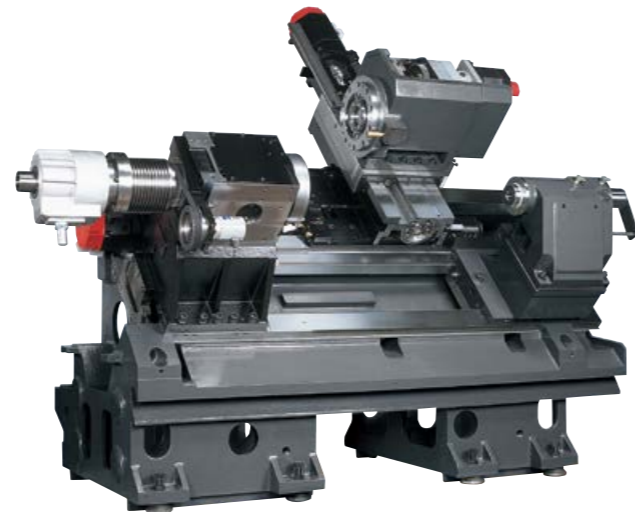
[Gantry Loader] SC-250 + GR-103 Multi-layer type stocker WS221 (with Chip conveyor right side outlet)

	Standard hand	Mata-Bei hand
Work diameter	φ20mm~φ130mm	φ20mm~φ80mm
Work length	20mm~100mm	20mm~60mm
Work weight		3kg

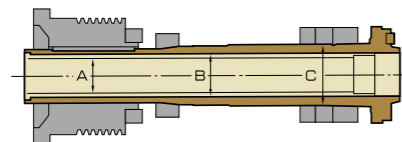
Powerful Machine with High Rigidity Box-way Slides



High-speed high-precision spindle, high-accuracy slide unit



The high accuracy main spindle with well balanced and ideally designed high-rigidity bearings, ensures superior performance. It is available with bar capacity dia. 51mm (op. 65mm).



Items	Standard	Option
A Draw tube I.D.	52mm	66mm
B Spindle I.D.	65mm	80mm
C Front bearing I.D.	100mm	110mm

※Max spindle speed 4,500min⁻¹, when spindle bar capacity is dia. 65mm



Tailstock (op.)

The manual positioning tailstock (rotating-center type) with diameter 80mm quill is positioned by a manual pulse generator after connecting its slide to the saddle.

- Quill taper : MT-4
- Quill stroke : 80mm
- Slide stroke : 400mm

[Gantry Loader] SC-250 + GR-103

The GR203 is equipped with a raw-part gripper and a finished-part gripper. In case of subspindle specification, a 180-degree revolving Matabei-hand may be necessary.

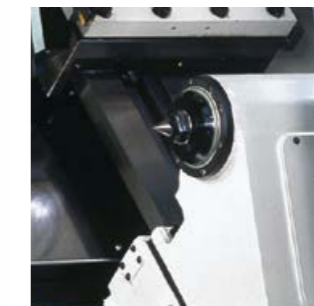


Powerful Heavy-Duty Multitasking Machine with Large Swing Dia.



Medium to Large Size Heavy-Duty High-Precision Cutting.

φ810mm Max. Swing Dia.



Tailstock (op.)

The Tailstock is equipped with high-rigidity built-in center. The tailstock is positioned using the manual pulse generator, after manually connecting a lever to the Z-Axis saddle. A fully programmable automatic type (knock-type auto. positioning) is optionally available.

- Quill taper : MT-4
- Quill stroke : 100mm
- Slide stroke : 760mm

SC-450

Powerful Heavy Duty Machine with Max. 1,520 mm Turning Length.



The machine is equipped with box-way slides which are traditionally hand scraped by highly skilled technicians.

1,520mm Max. Turning length
φ810mm Max. Swing Dia.

520mm Max. Workpiece Swing Diameter



Sliding and Swiveling Operation Panel

The User-friendly Operation Control Panel is equipped with an LCD display, and illuminated LED buttons. It can be swiveled up to 100 degrees, and it has a sliding base with up to 1 meter travel for optimum operator comfort.

SC-450L

2,520mm Max. Turning length, Heavy-Duty powerful machine



Make high precision processing possible by traditional "KISAGE" slide and High rigidity slide structure.

2,520mm Max. Turning length
φ810mm Max. Swing Dia.

520mm Max. Workpiece Swing Diameter
2,750mm Distance between centers

SC-450LL

Full Operator Support

NT Smart Sign

Nakamura-Tome IoT software

※Please refer to the NT Smart Sign exclusive catalog for details.

Monitoring



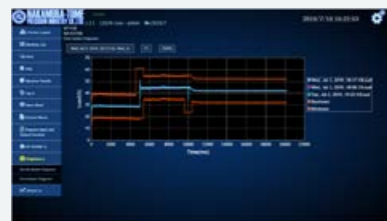
Real Time Monitoring of machine running conditions, in addition to visualizing alarm history and past events.

Data Input / Output



Input and output programs, tool data and other machine data from the monitoring PC.

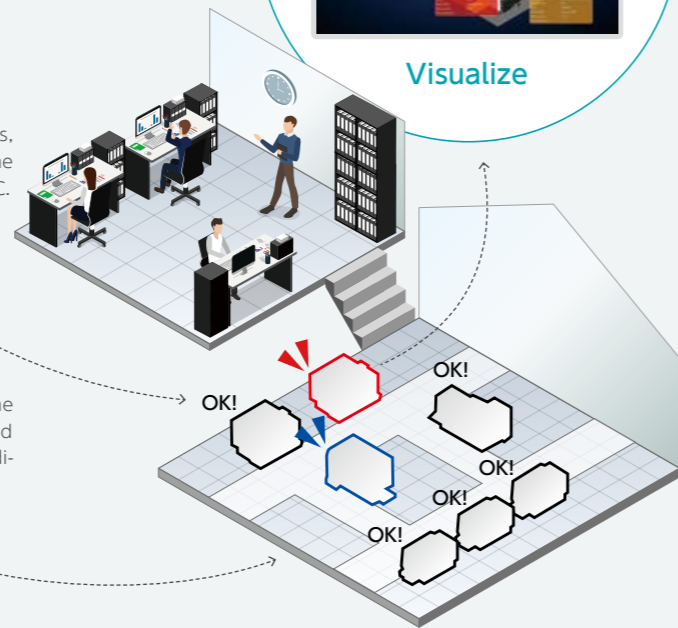
Diagnosis



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



Visualize



NT Thermo Navigator AI

Thermal Growth Compensation using AI.

Compensation model built using AI machine learning.

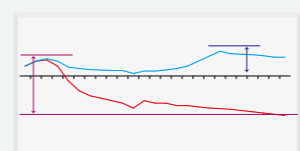
Powered by AI

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

- ① Time
- ② Measured Dimensions
- ③ Retrieval of Wear Offset Data

Acquired Data analyzed with NT Thermo Navigator AI



Feedback



Standard for NT Smart X

Various Option to Meet Customers Needs. Total Provider for Peripheral Equipment.



Mata-Bei (Sub spindle)



Tailstock



Parts Catcher A + Built-in conveyor. *Only for SC100 with sub-spindle.



Tool setter



Han-Bei (In-process measuring system)



Chip conveyor



Oil skimmer



Signal tower



Coolant pump



Digital chuck interlock

Full Operator Support : User-Friendly and Highly Reliable.

**Jig less !
Setup less !
Skill less !**

This essential function for multitasking machines is standard.

Main Features

Standard

- ◆ NT Work Navigator
- ◆ Airbag(Overload detection)
- ◆ Advanced NT NURSE
- ◆ NT Smart Sign

Options

- ◆ NT Manual Guide i (LUCK-BEI II)



10.4 inch color LCD unit
Installed on the SC-200/200L, SC-250,
SC-450/450L/450LL



15inch color LCD unit
Standard for the SC-100, SC-300II, and SC-300IIL

			SC-100, SC-300II/300IIL		SC-200/200L, SC-250		SC-450/450L/450LL	
			Standard	Option	Standard	Option	Standard	Option
Program storage length	Sub-spindle (MATA-BEI)	without	512Kbyte	2Mbyte	512Kbyte	—	512Kbyte	—
		with	1Mbyte	—	1Mbyte	—	—	—
Number of registered programs	Sub-spindle (MATA-BEI)	without	400pcs	1000pcs	400pcs	—	400pcs	—
		with	800pcs	—	800pcs	—	—	—
Tool offset pairs			99pcs	200pcs	64pcs	99pcs 200pcs	64pcs	99pcs

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.

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

Barrier?
Even with barrier function, machine collisions may occur

When the machine collision occurs, 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.



Without Airbag

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

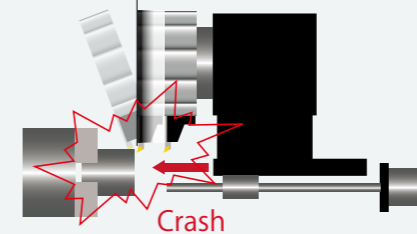
With Airbag

Retraction within 0.001 sec

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



▲ Video



* This feature does not mean zero impact.

NT Work Navigator



(op. NC Tailstock)

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

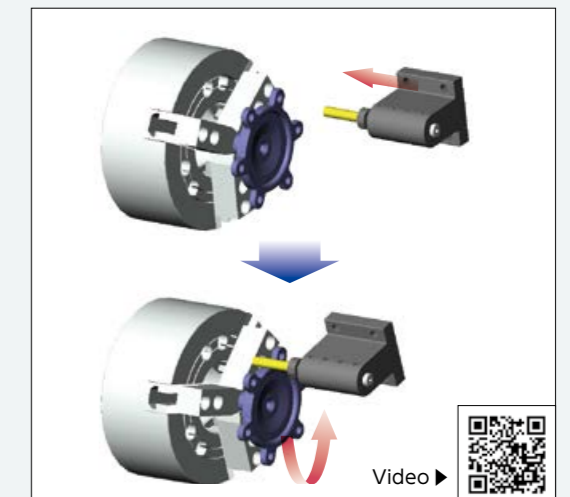
Advanced NT Work Navigator !

Machining parts with non-round shapes, such as forgings or castings requires that the raw part coordinates be recognized by the CNC control.

No fixtures required

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 Efficient-Programs Faster.

All-in-one software!

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.

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.

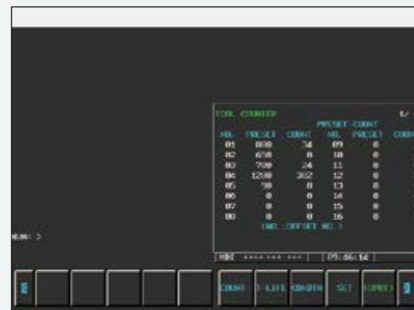


▲ Simulation
Accurate simulation of turning and milling operations using a 3D solid model.

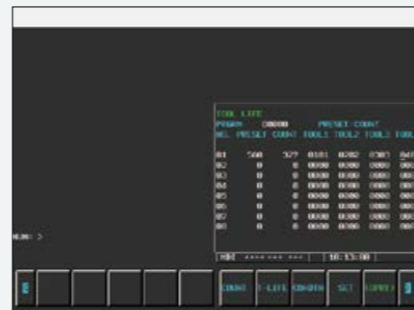
Useful functions



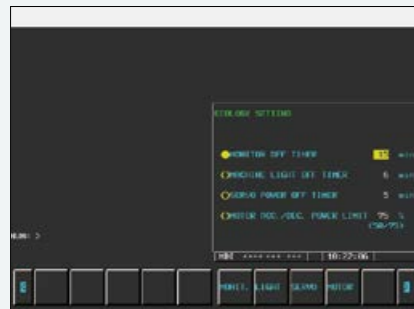
Menu screen



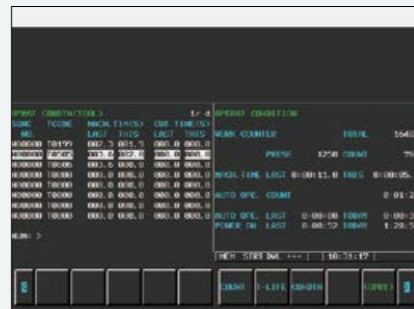
Tool counter



Tool Life



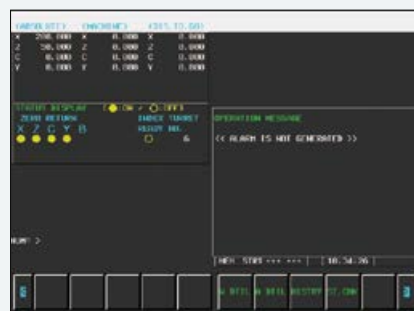
Energy Saving



Operation condition of each tool



NT NURSE call button



Operation message

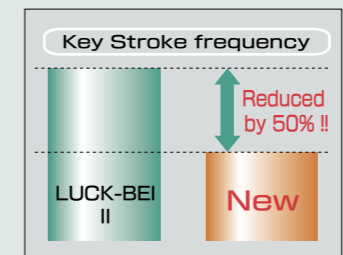


Quick offset



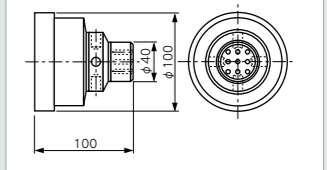
▲ Fixed-form sentence function
NT Manual Guide i contains more than 300 types of fixed form sentences. Operator can select these fixed form sentences for the program from a menu screen.

▲ 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 n", 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.

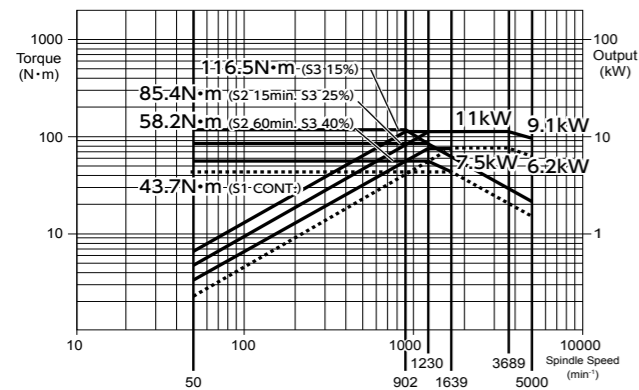


Cutting conditions. End mill

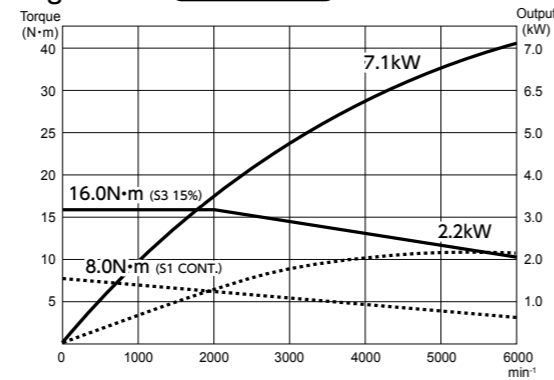
High-Rigidity Machine for Bar Work

- High rigidity bed design
- 11/7.5kW spindle motor
- Spindle speed 5,000min⁻¹
- Bar capacity Dia.51mm
- High speed, X axis 20m/min, Z axis 36m/min
- FANUC CNC Control and motors
- 12/24 stations turret
- Stainless cover, powder coating

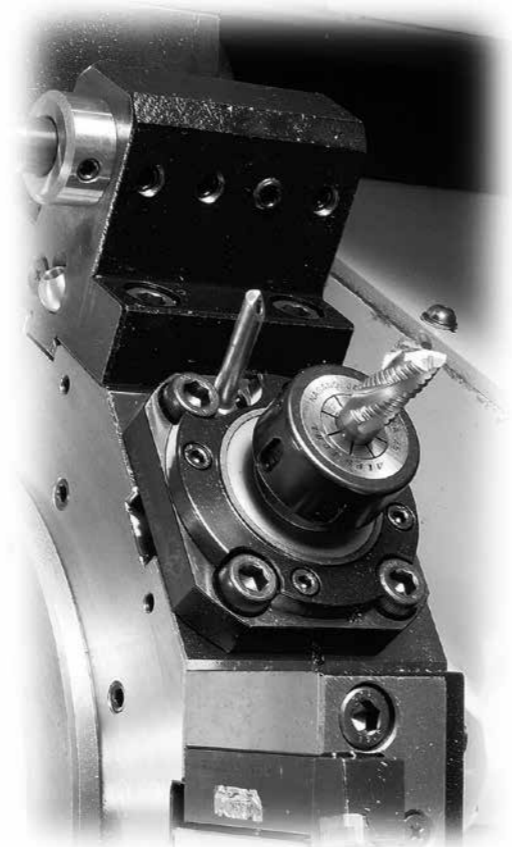
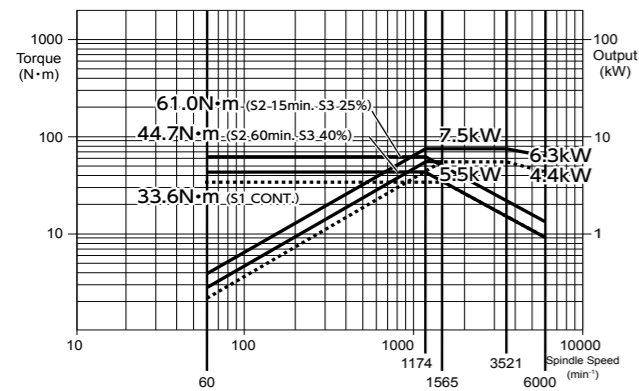
■ Spindle motor 11kW/7.5kW



■ Milling motor 7.1kW/2.2kW



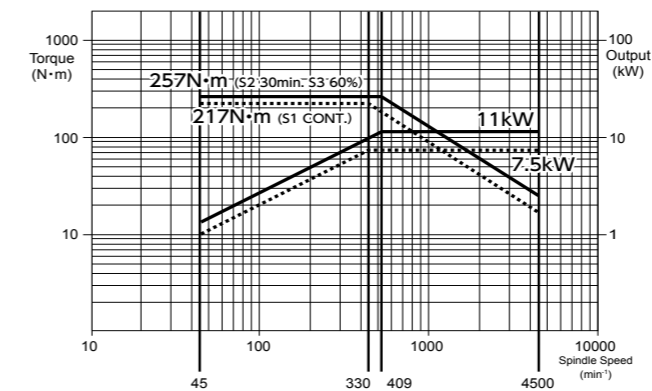
■ Sub spindle motor (op.) 7.5kW/5.5kW



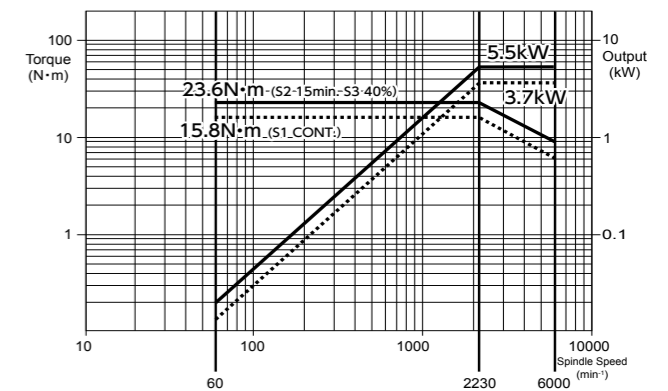
Innovative Milling System

- High-rigidity box-type slides on all axes
- Main spindle motor 11/7.5kW
- Spindle speed 4,500min⁻¹
- Bar capacity dia.65mm
- High-speed slides X-axis 24m/min, Z-axis 36m/min
- High-reliability all-FANUC control
- 12/24 station turret (op.for SC200)
- High quality powder coating

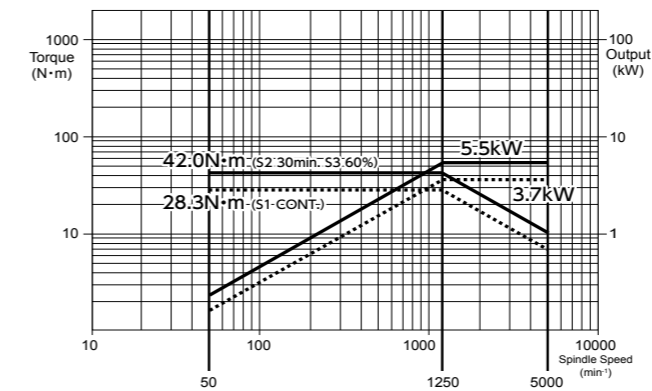
■ Spindle motor SC-200/200L 11kW/7.5kW



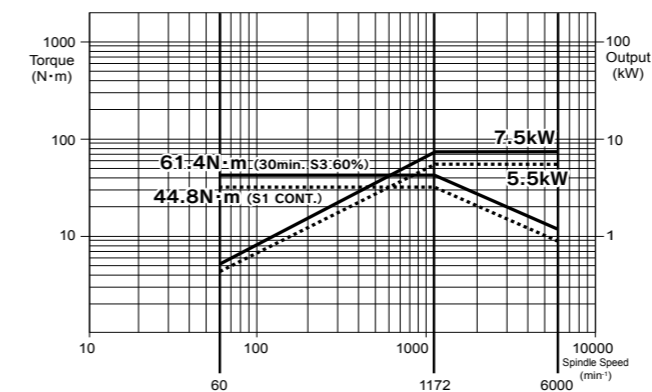
■ Milling motor (op.) SC-200/200L 5.5kW/3.7kW



■ Sub spindle motor (op.) SC-200 5.5kW/3.7kW



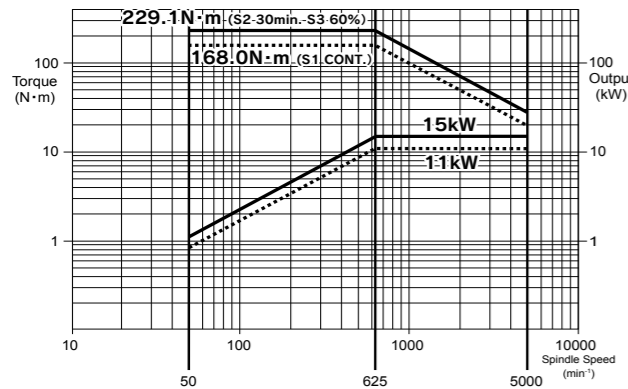
■ Sub spindle motor (op.) SC-200L 7.5kW/5.5kW



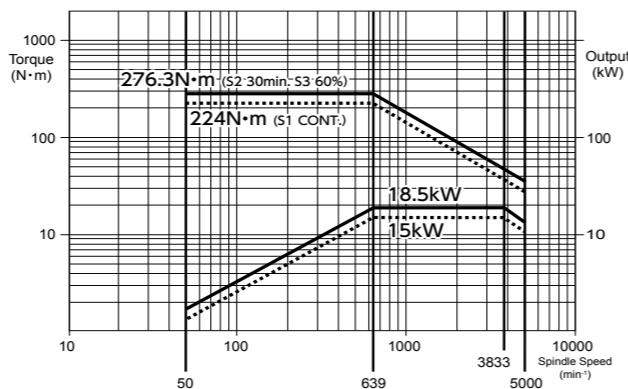
Powerful cutting with high-rigidity box-type slides

- High-rigidity box-type slide-ways on all axes
- Main spindle motor 15/11kW, 5,000min⁻¹
- Milling motor 5.5/3.7kW, 3,600min⁻¹
- Max. turning diameter dia.300mm Max. turning length 500mm
- Bar capacity dia. 51mm (op. dia.65mm)
- Servo-driven non-lift index
- 12 -station turret
- Milling, Y-axis/±41mm, NC sub spindle are optionally available

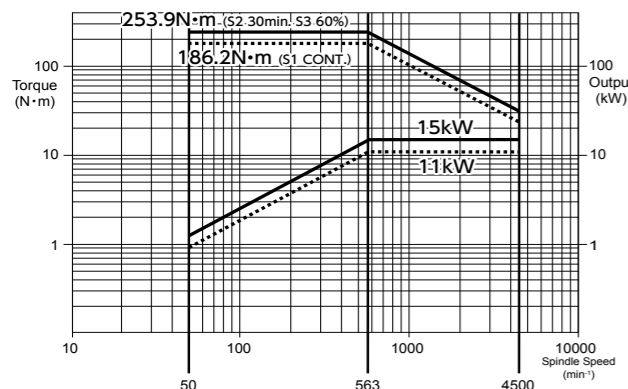
■ Dia.51mm Spindle motor (15kW/11kW)



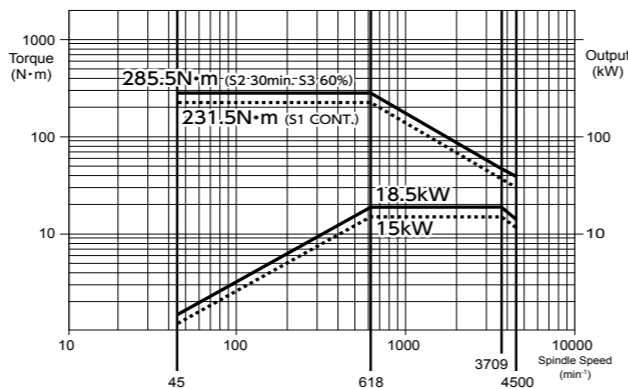
■ Dia.51mm Spindle motor (op.) (18.5kW/15kW)



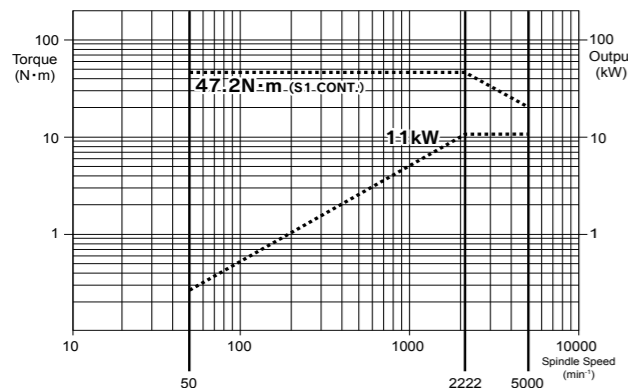
■ Dia.65mm Spindle motor (op.) (15kW/11kW)



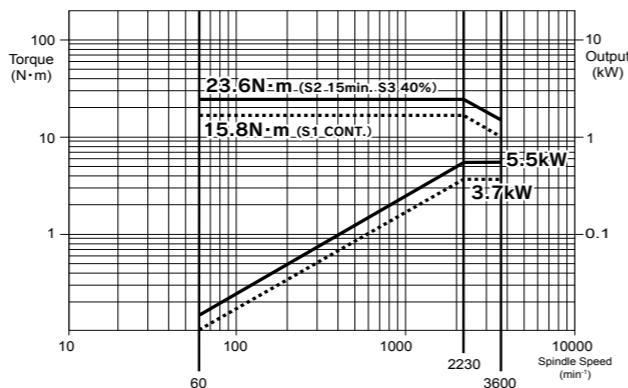
■ Dia.65mm Spindle motor (op.) (18.5kW/15kW)



■ Sub spindle motor (op.) (11kW)



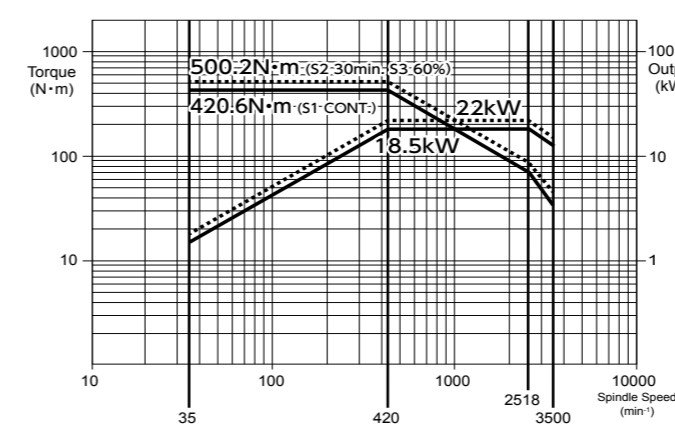
■ Milling motor (op.) (5.5kW/3.7kW)



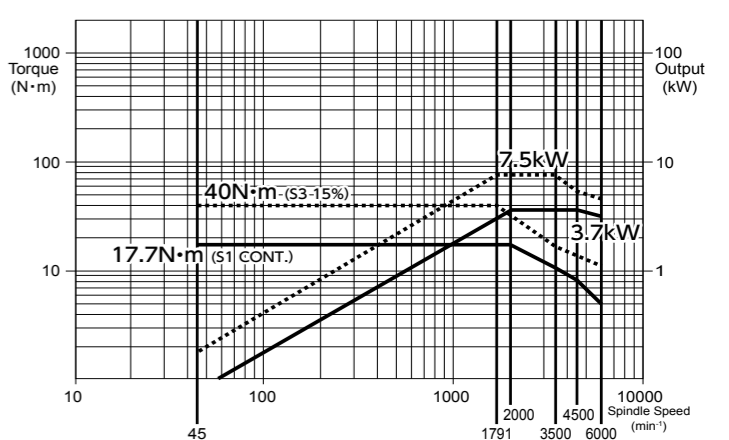
Best in its class. High performance machining with up to 9mm cutting depth using the Y-Axis unit.

- High-rigidity box-type slide-ways on all axes
- Main spindle motor 22/18.5kW, 3,500min⁻¹
- 7.5/3.7kW Milling motor, Milling speed 6,000min⁻¹(Only for 12st turret)
- Max turning length 600mm/1000mm(SC-300II/SC-300IIL)
- Bar capacity Dia.71mm(op. 89mm)
- 12/24 -station turret, 16 station turret (op.)
- Y axis standard / ±60mm
- Tailstock(NC Servo driven, Knock Type), Steady rest(SC-300IIL)
- Sub Sp. 8" chuck, Bar cap. 51 mm, Max. 5,000 min⁻¹.

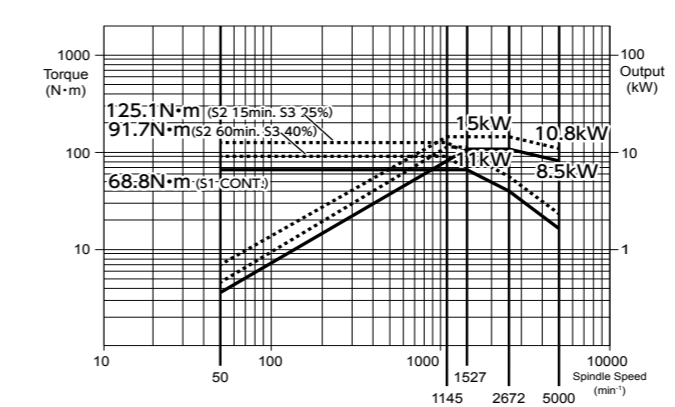
■ Spindle motor (22kW/18.5kW)



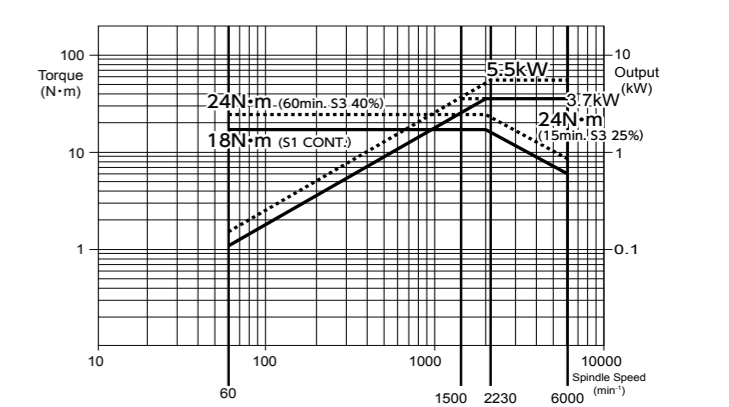
■ Milling motor / Dodecagonal 24-station (7.5kW/3.7kW)



■ Sub spindle motor (op.) (15kW/11kW)



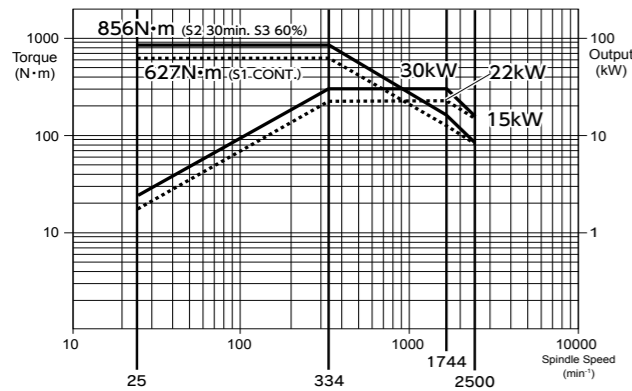
■ Milling motor / Hexadecagonal 16-station (5.5kW/3.7kW)



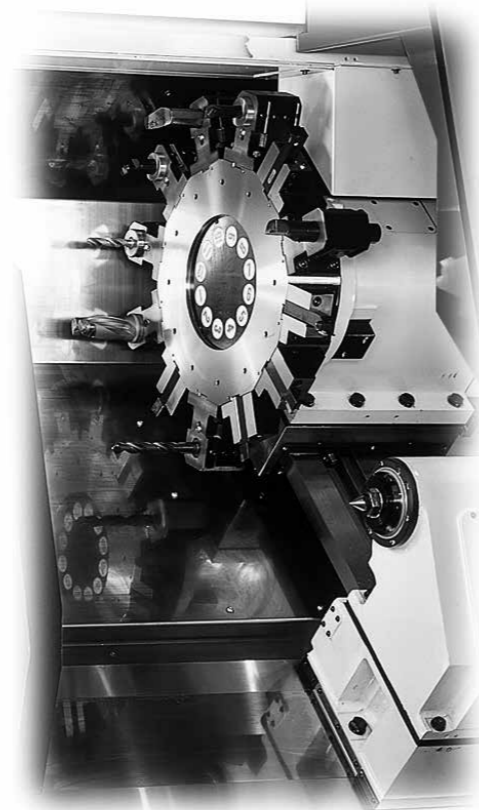
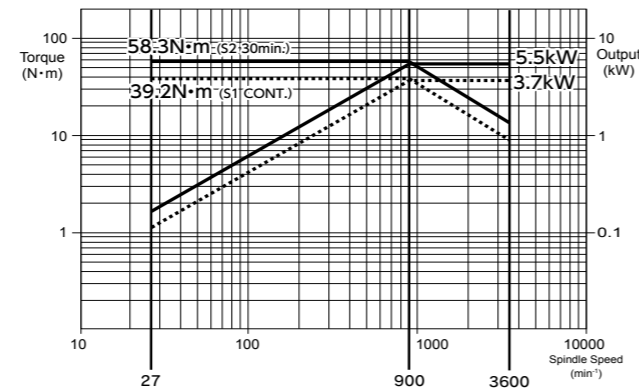
**Max. Swing dia. 810 mm.
Powerful heavy duty
machine.**

- High-rigidity box-type slide-ways on all axes
- Spindle motor 30/22kW, 2,500min⁻¹
- Milling motor 5.5/3.7kW, 3,600min⁻¹
- Max turning diameter ϕ 465mm(SC-450) ϕ 480mm(SC-450L, SC-450LL)
- Max turning length 785mm(SC-450) 1,520mm(SC-450L) 2,520mm(SC-450LL)
- Bar capacity ϕ 81 mm(SC-450, SC-450L, SC-450LL)
- Servo-driven non-lift index (When with Y-axis)
- 12 -station turret
- Milling and Y-axis \pm 70mm(SC-450) \pm 75mm(SC-450L, SC-450LL) are optionally available

■ Dia.81mm Spindle motor 30kW/22kW



■ Milling motor 5.5kW/3.7kW

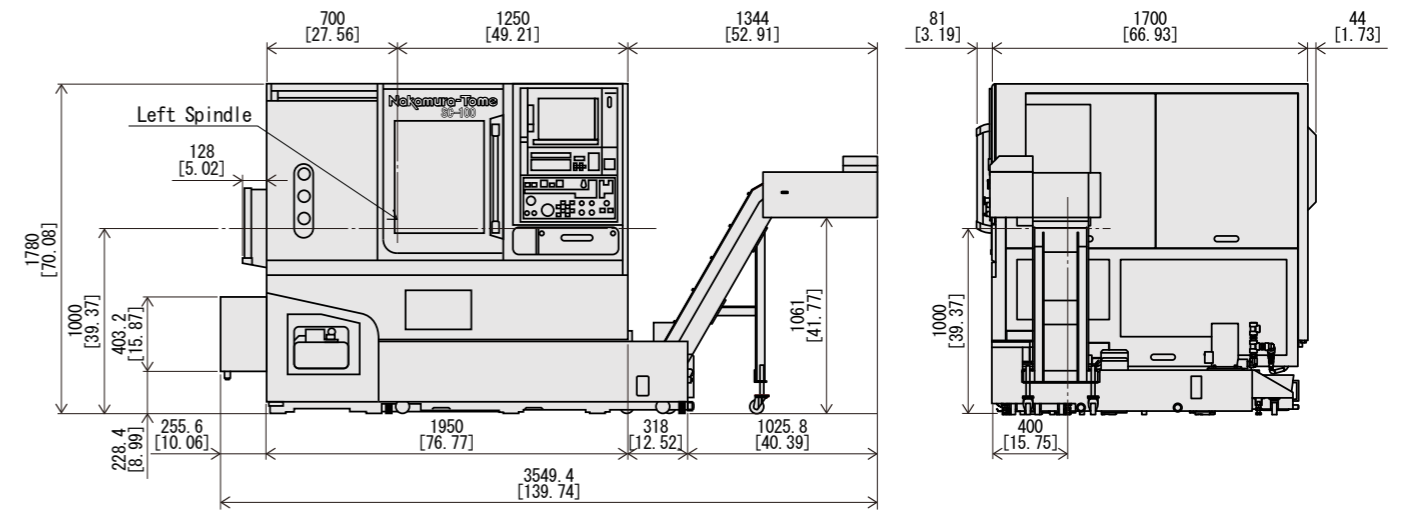


Machine Dimensions

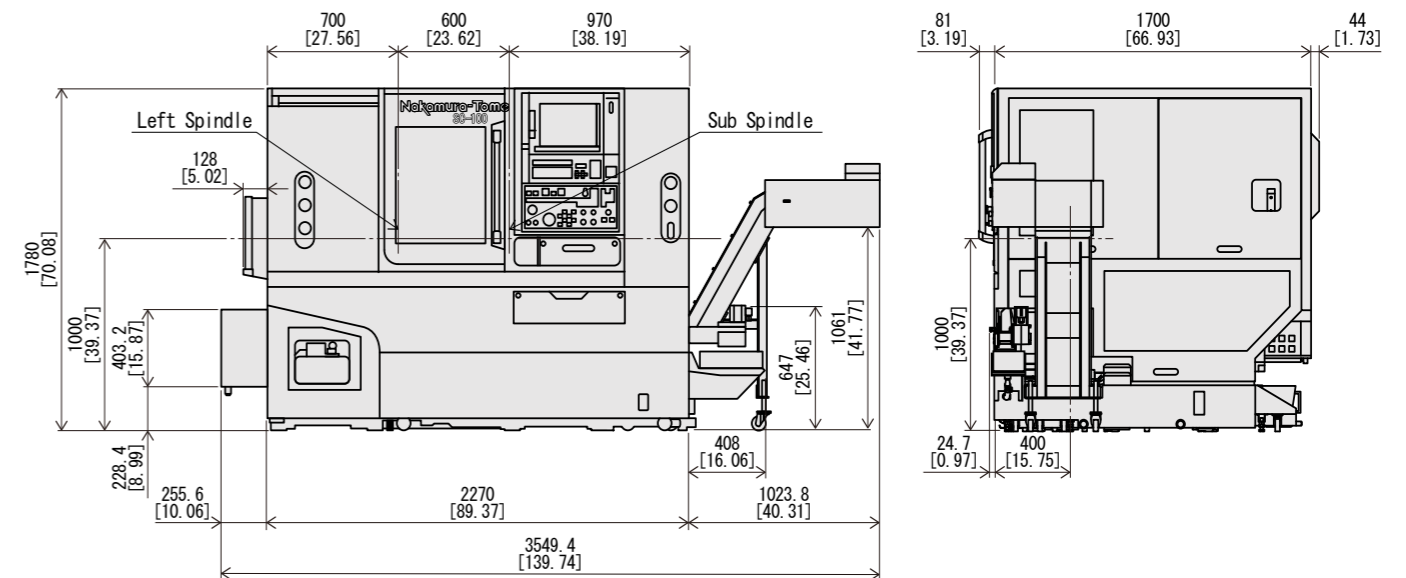
SC-100

Machine Dimensions

■ Standard / Tailstock specifications



■ Sub spindle specifications



(unit : mm [inch])

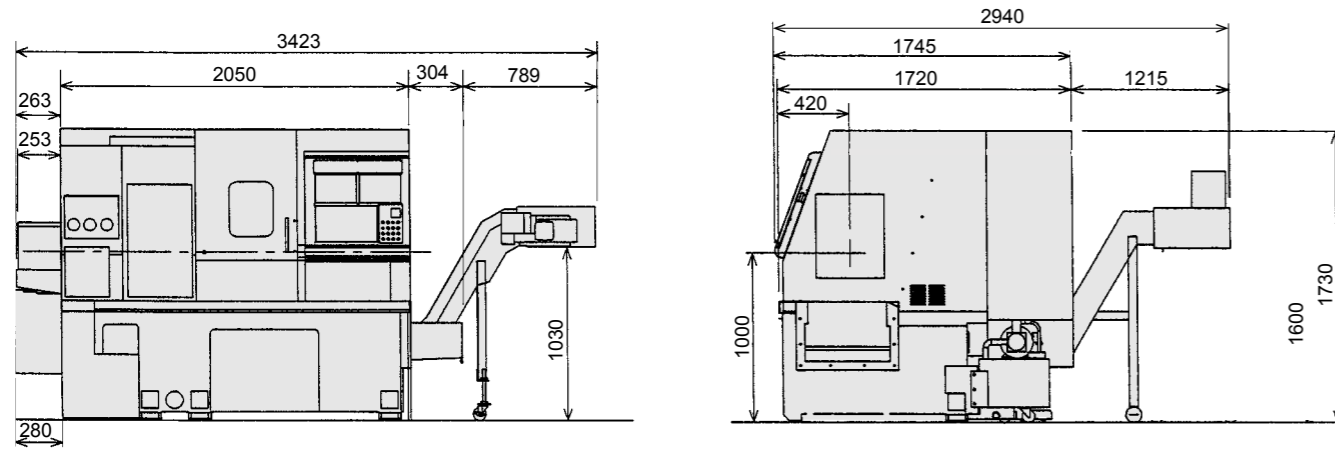
● Some dimensions are subject to change depending on the specifications.

Machine Dimensions

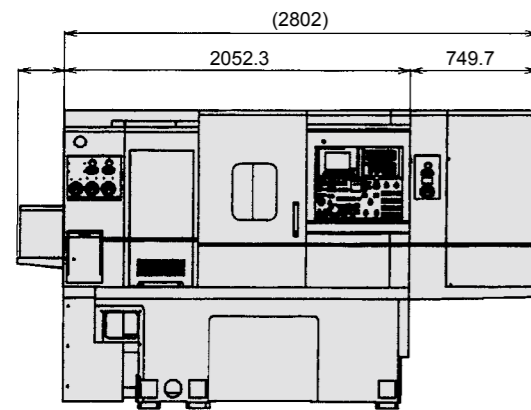
SC-200

Machine Dimensions

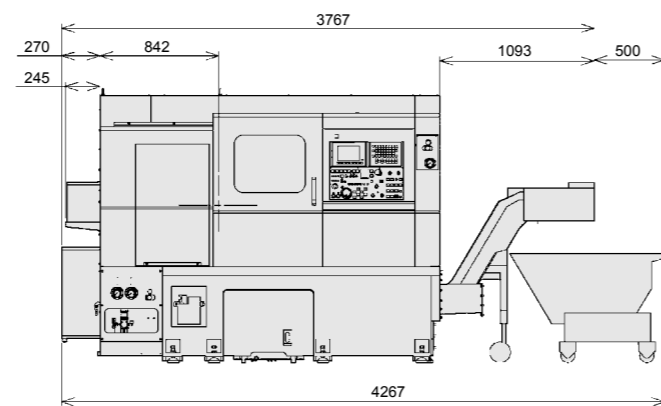
Side outlet conveyor/ backside outlet conveyor specifications



Sub spindle specifications



Side outlet conveyor/ backside outlet conveyor specifications

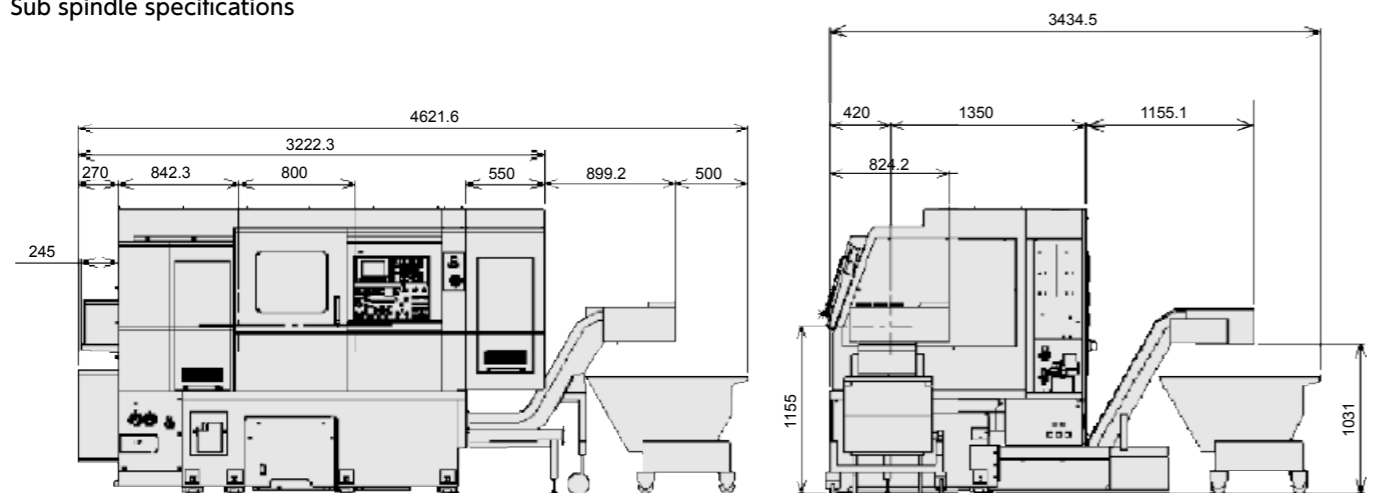


(unit : mm)

SC-200L

Machine Dimensions

Side outlet conveyor/ backside outlet conveyor for Sub spindle specifications



(unit : mm)

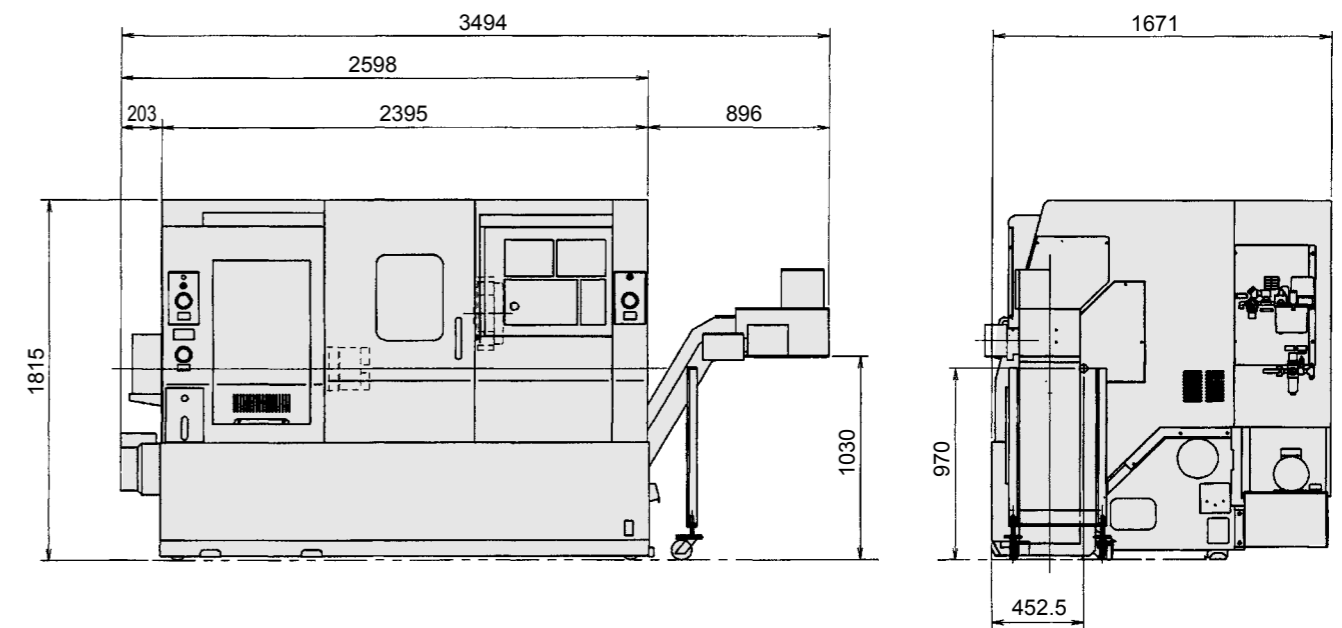
Some dimensions are subject to change depending on the specifications.

Machine Dimensions

SC-250

Machine Dimensions

Chip conveyor specifications

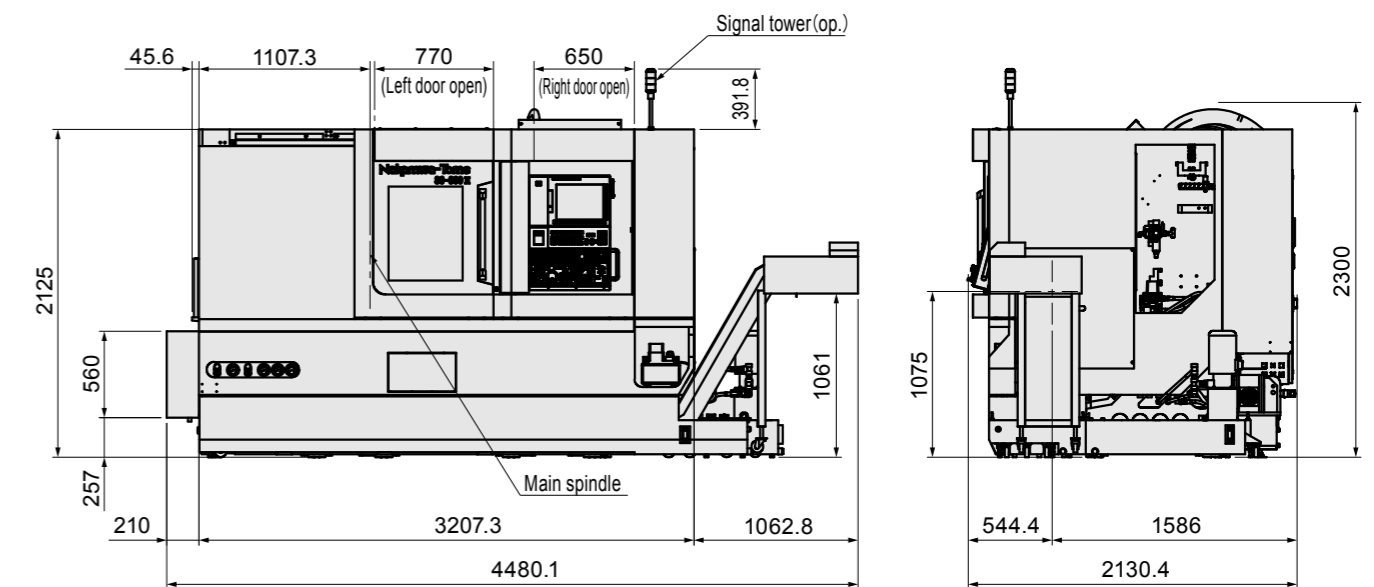


(unit : mm)

SC-300II

Machine Dimensions

Chip conveyor with right side outlet specifications



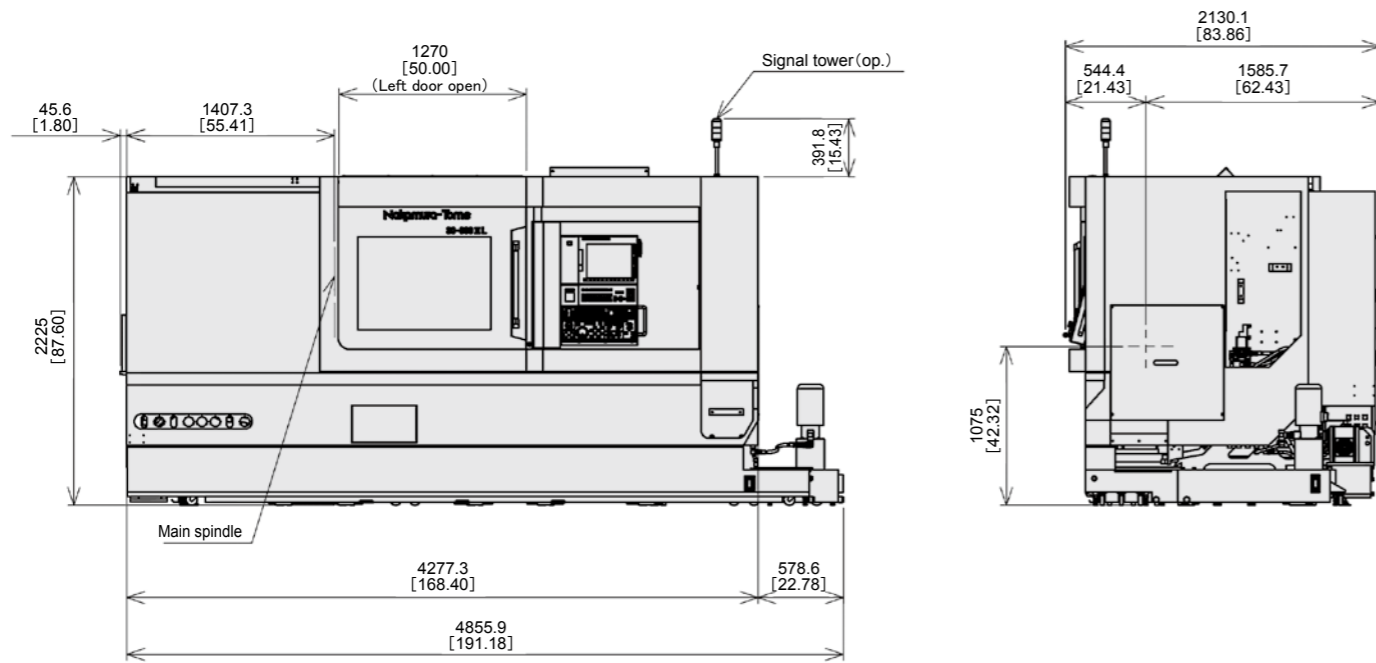
(unit : mm)

Some dimensions are subject to change depending on the specifications.

Machine Dimensions

SC-300IIL

Machine Dimensions

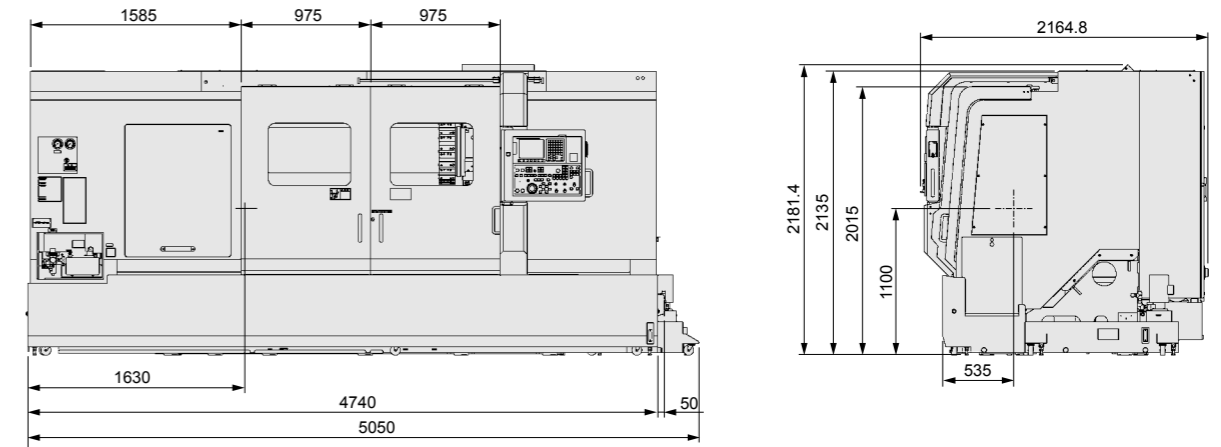


(unit : mm [inch])

Machine Dimensions

SC-450L

Machine Dimensions

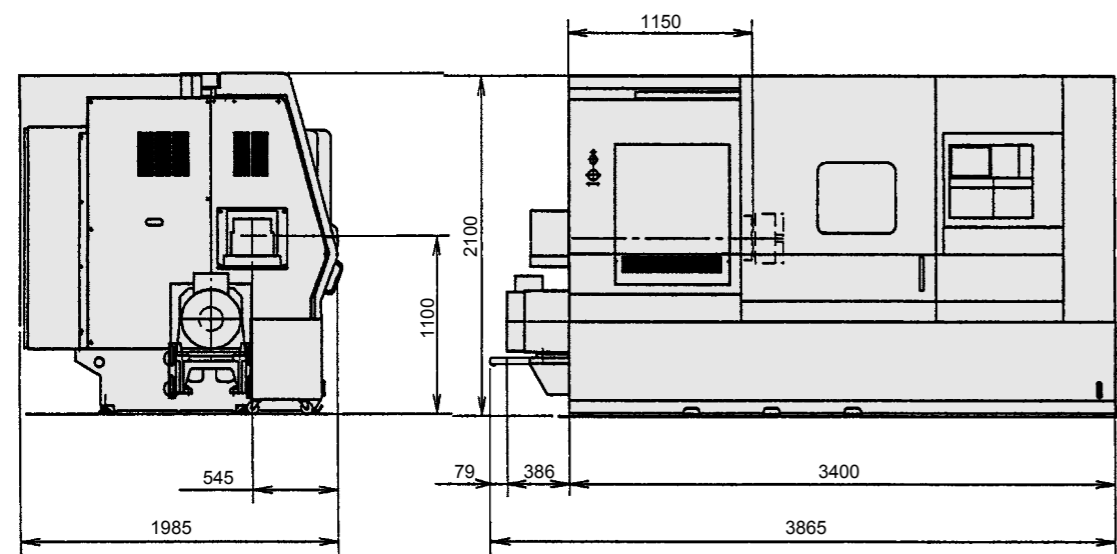


(unit : mm)

SC-450

Machine Dimensions

Standard specifications

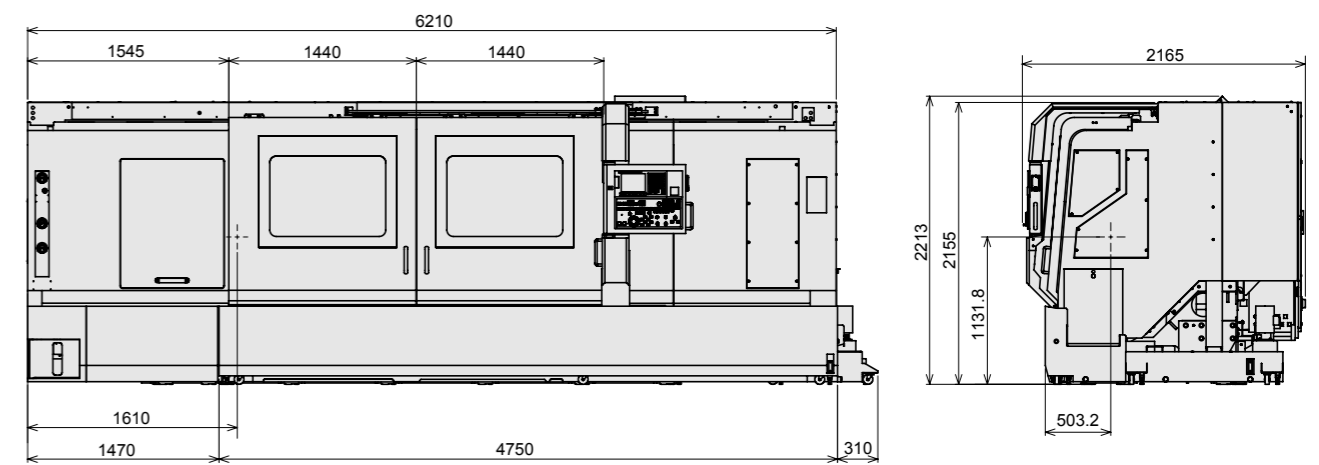


(unit : mm)

● Some dimensions are subject to change depending on the specifications.

SC-450LL

Machine Dimensions



(unit : mm)

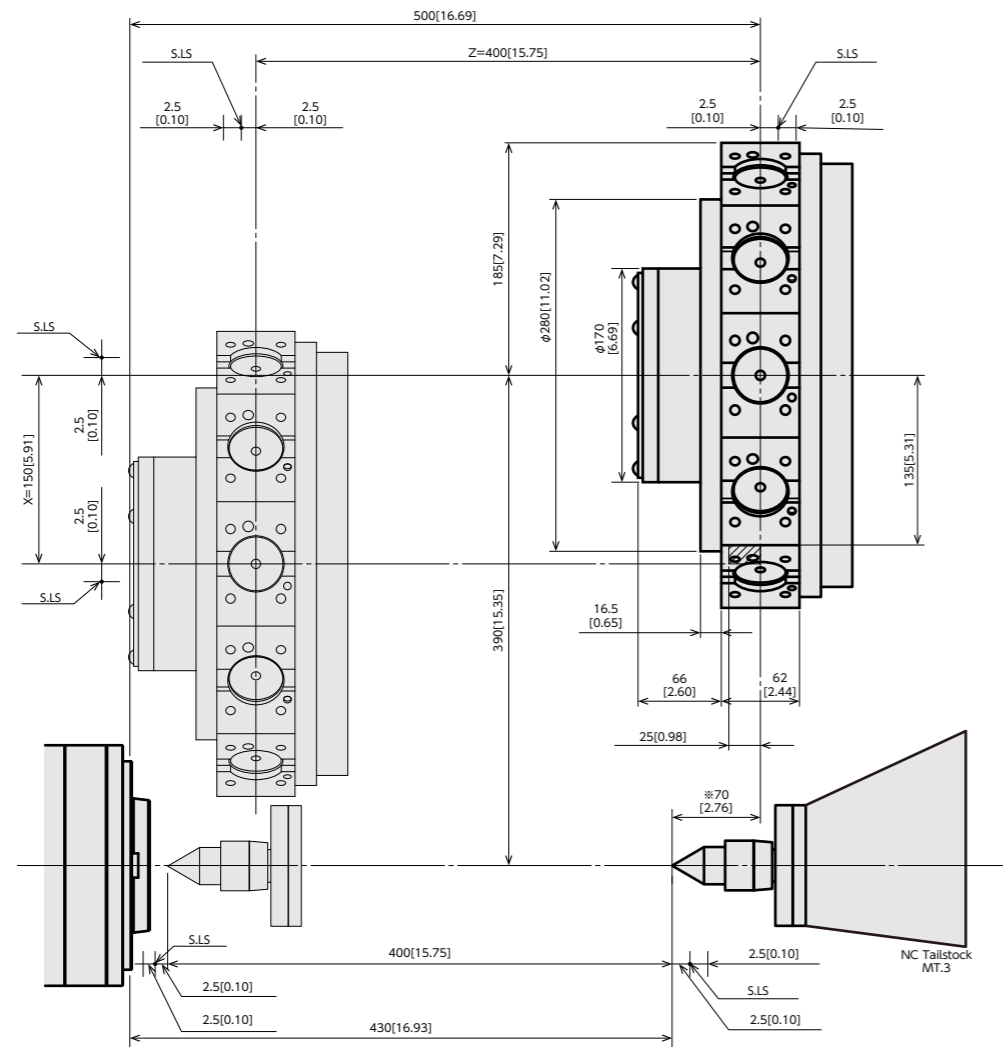
● Some dimensions are subject to change depending on the specifications.

Travel Range

SC-100

Travel Range

■ NC tailstock specifications



(unit : mm [inch])

* The shaded area is interlock area.
Interlock area for Z-axis direction depends on the transfer of tailstock.
Tailstock cannot approach more than 70mm; relative distance with Z-axis. (marked as ※)

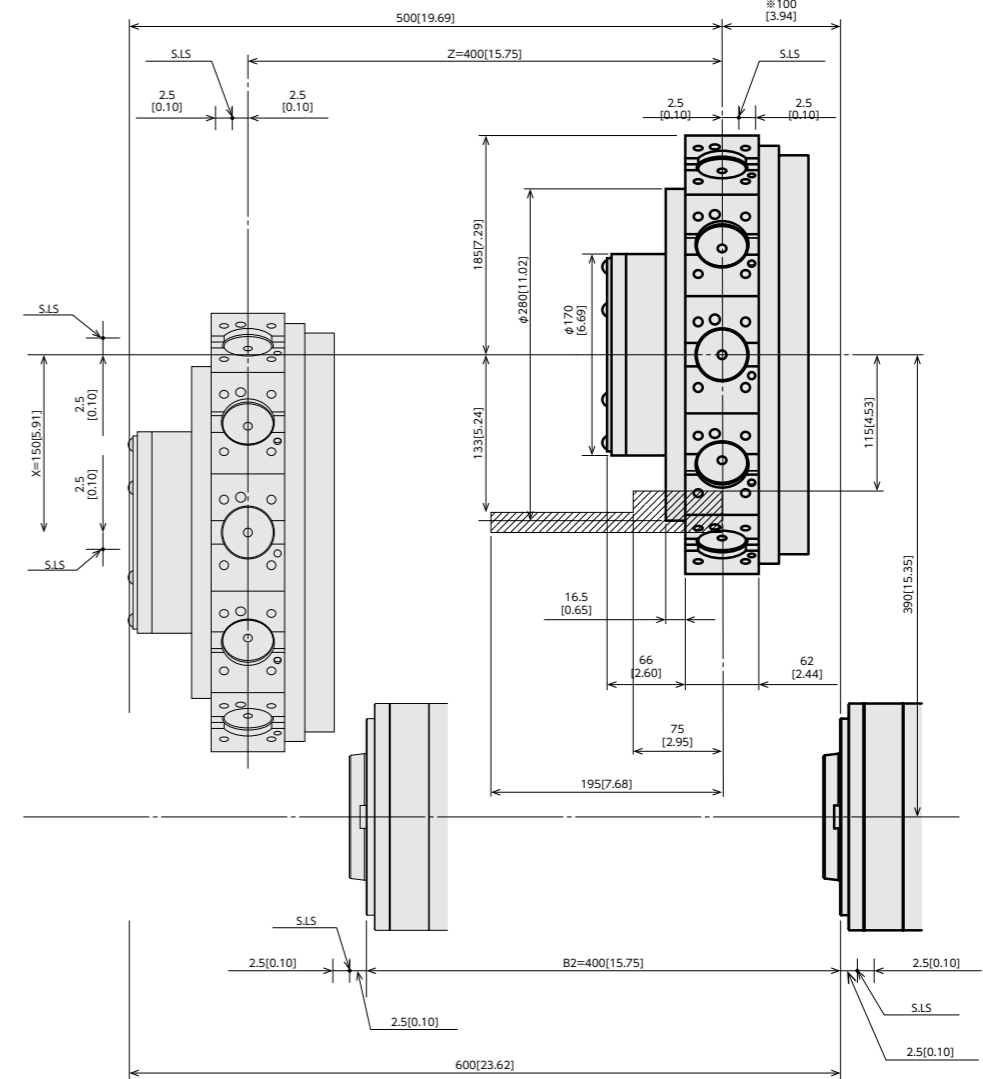
● Machine travel range may change depending on optional specifications.

Travel Range

SC-100

Travel Range

■ Sub spindle specifications



(unit : mm [inch])

* The shaded area is interlock area.
Interlock area for Z-axis direction depends on the transfer of B2-axis.
B2-axis cannot approach less than 100mm; relative distance with Z-axis. (marked as ※)

● Machine travel range may change depending on optional specifications.

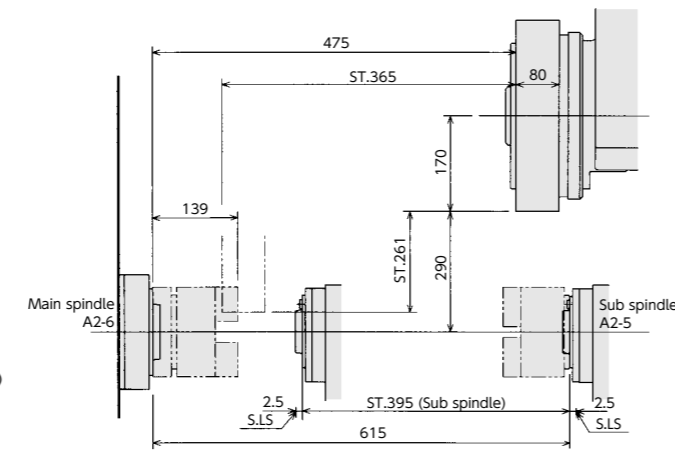
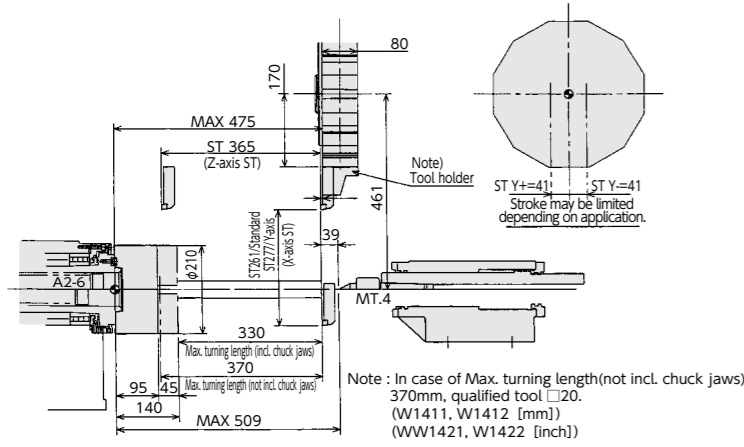
Travel Range

SC-200

Travel Range

Standard specifications

Sub spindle specifications



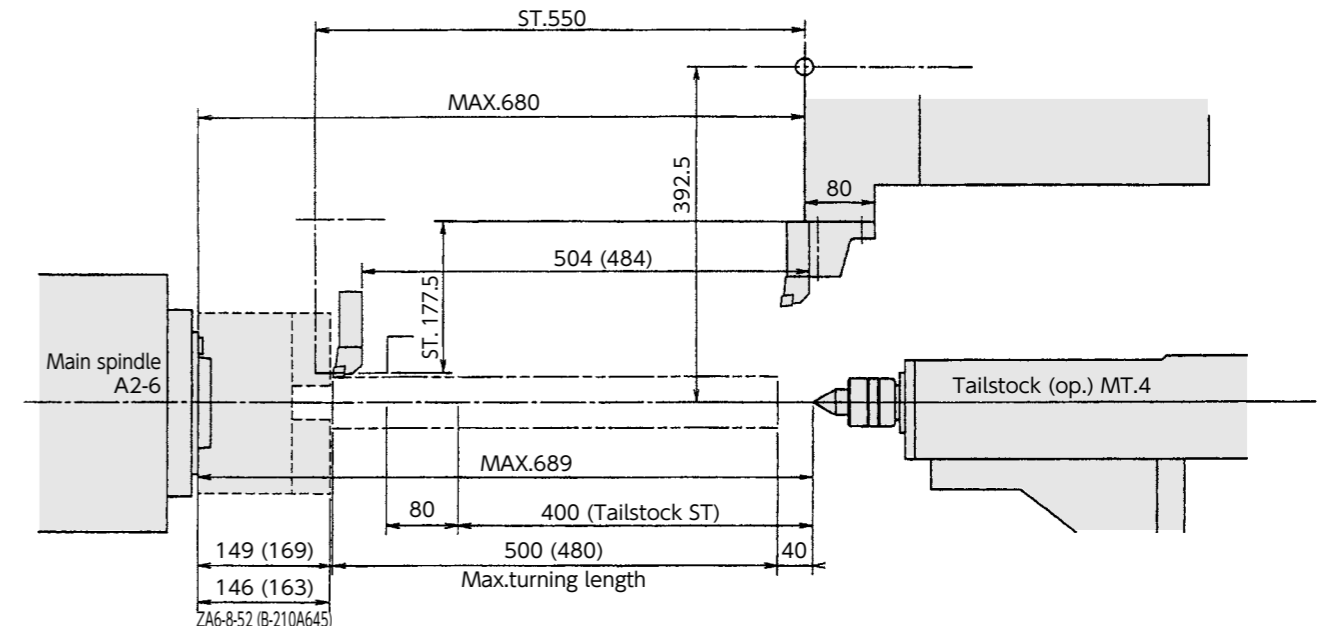
(unit : mm)

Travel Range

SC-250

Travel Range

Tailstock specifications

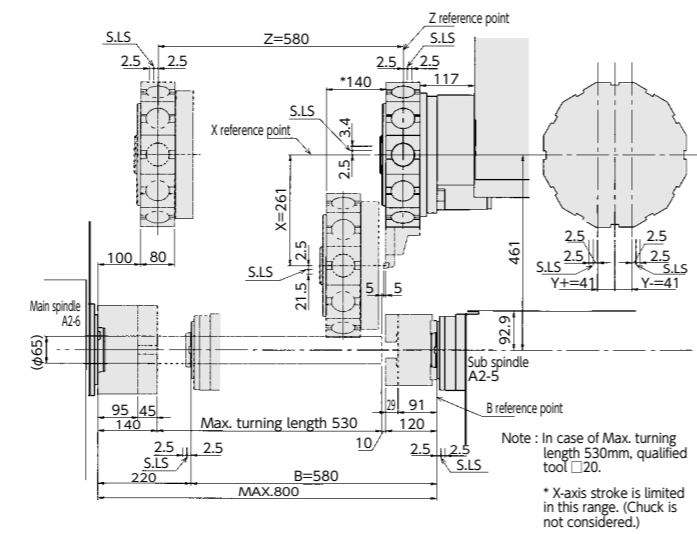
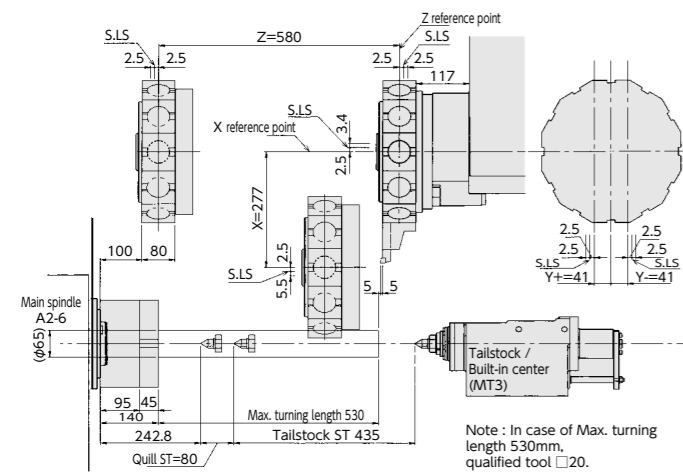


SC-200L

Travel Range

Tailstock specifications

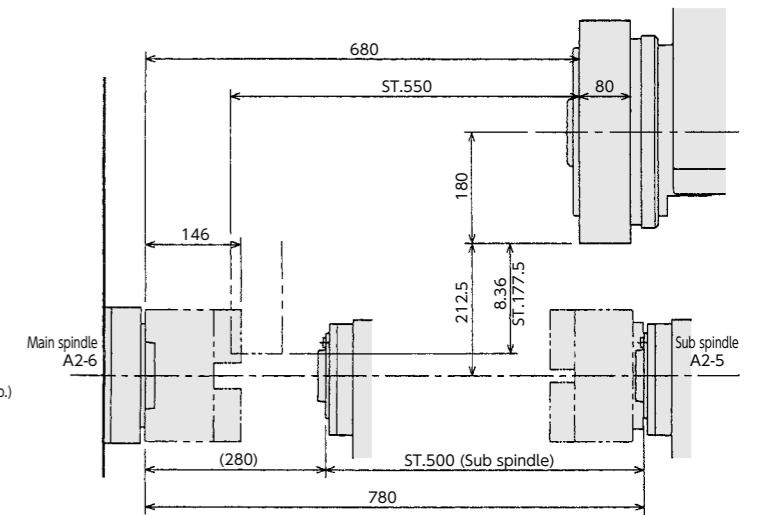
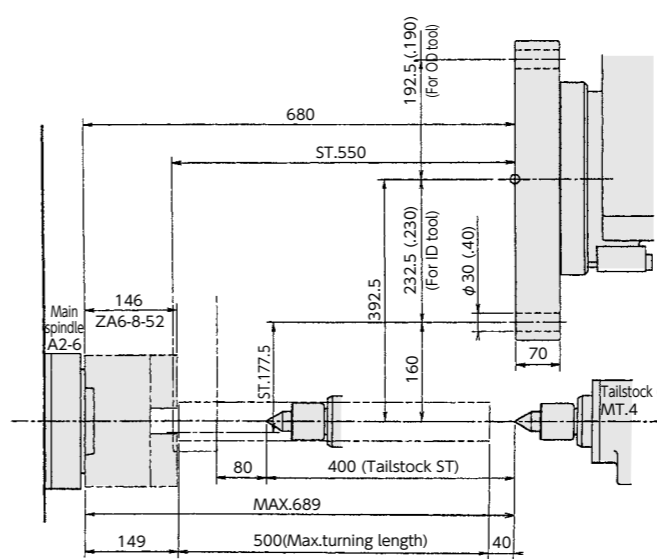
Sub spindle specifications



(unit : mm)

tailstock specifications (VDI turret)

Sub spindle specifications



(unit : mm)

● Machine travel range may change depending on optional specifications.

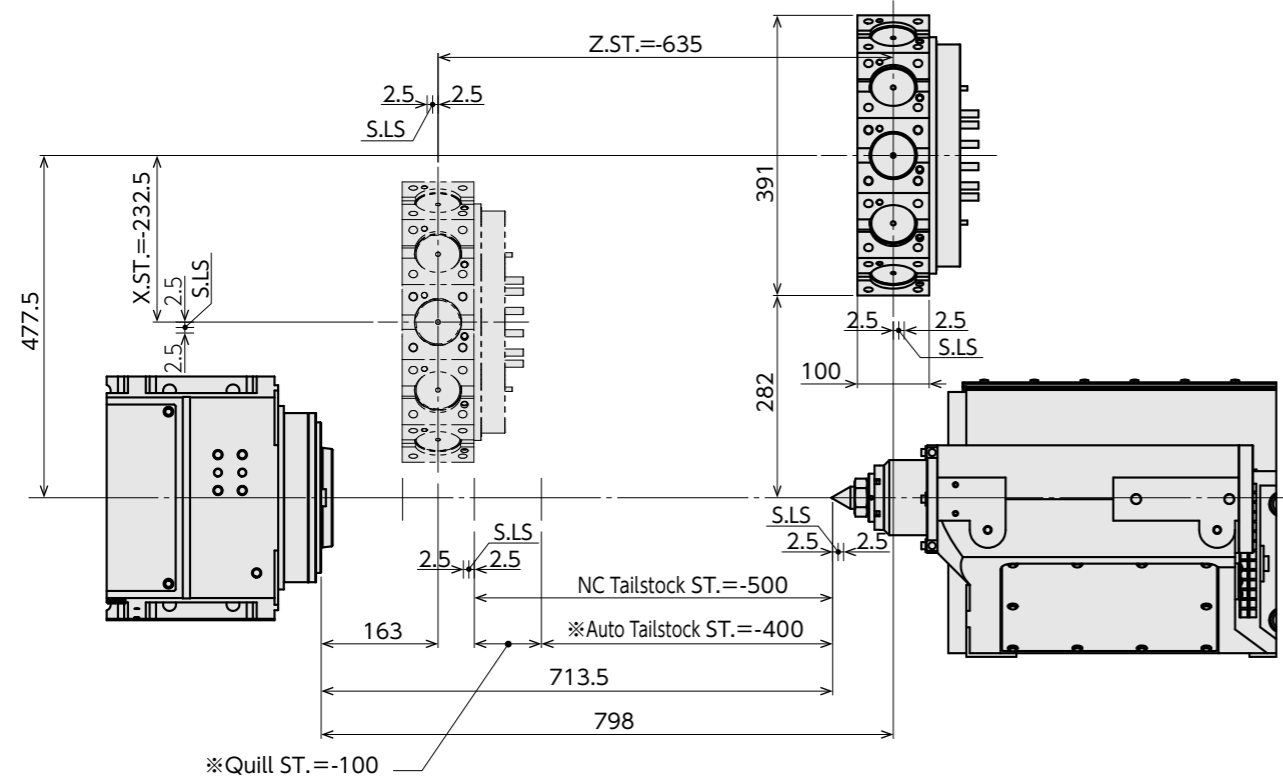
● Machine travel range may change depending on optional specifications.

Travel Range

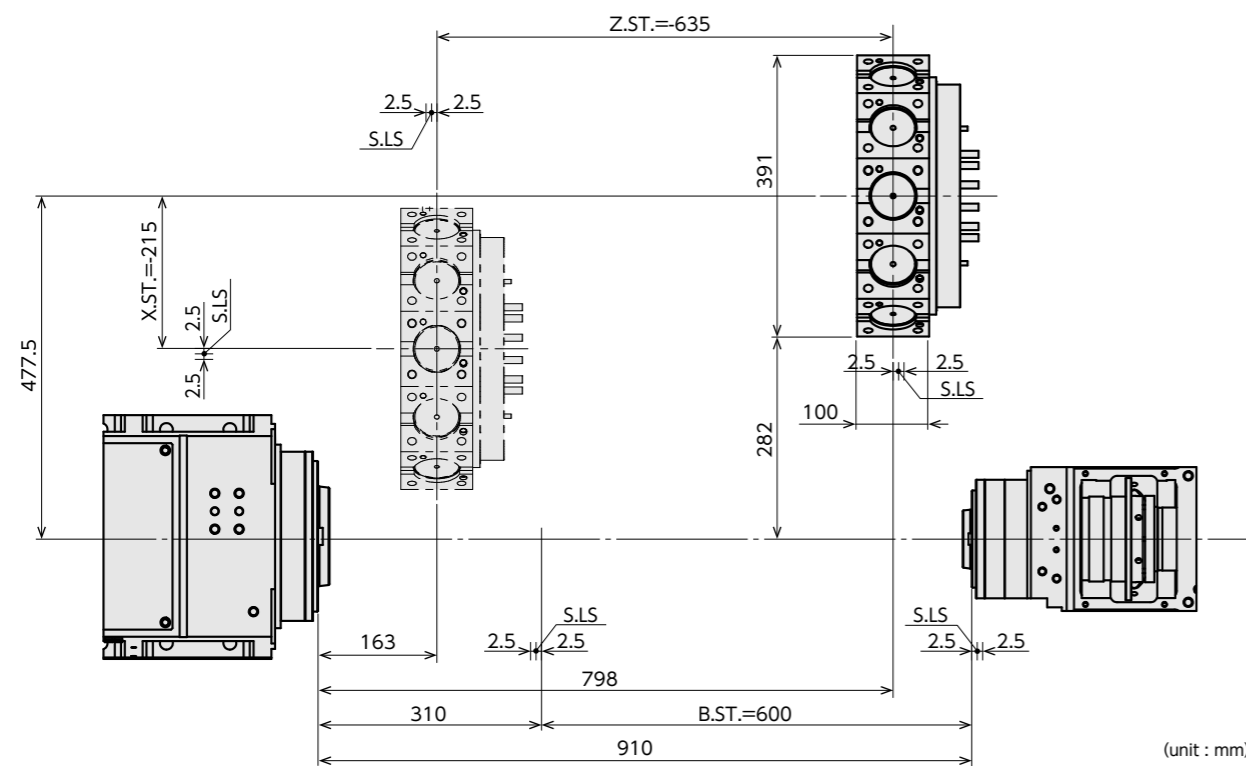
SC-300II

Travel Range

■ Tailstock specifications



■ Sub spindle specifications



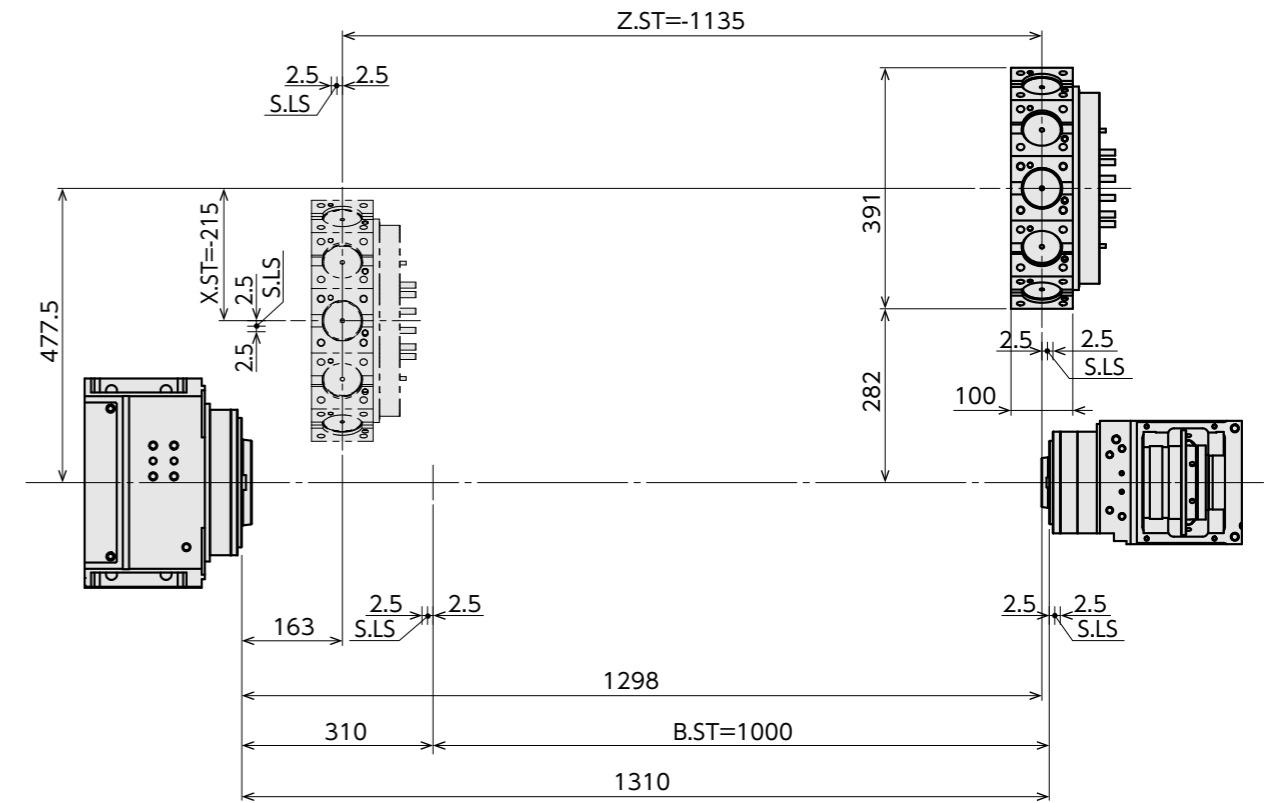
● Machine travel range may change depending on optional specifications.

Travel Range

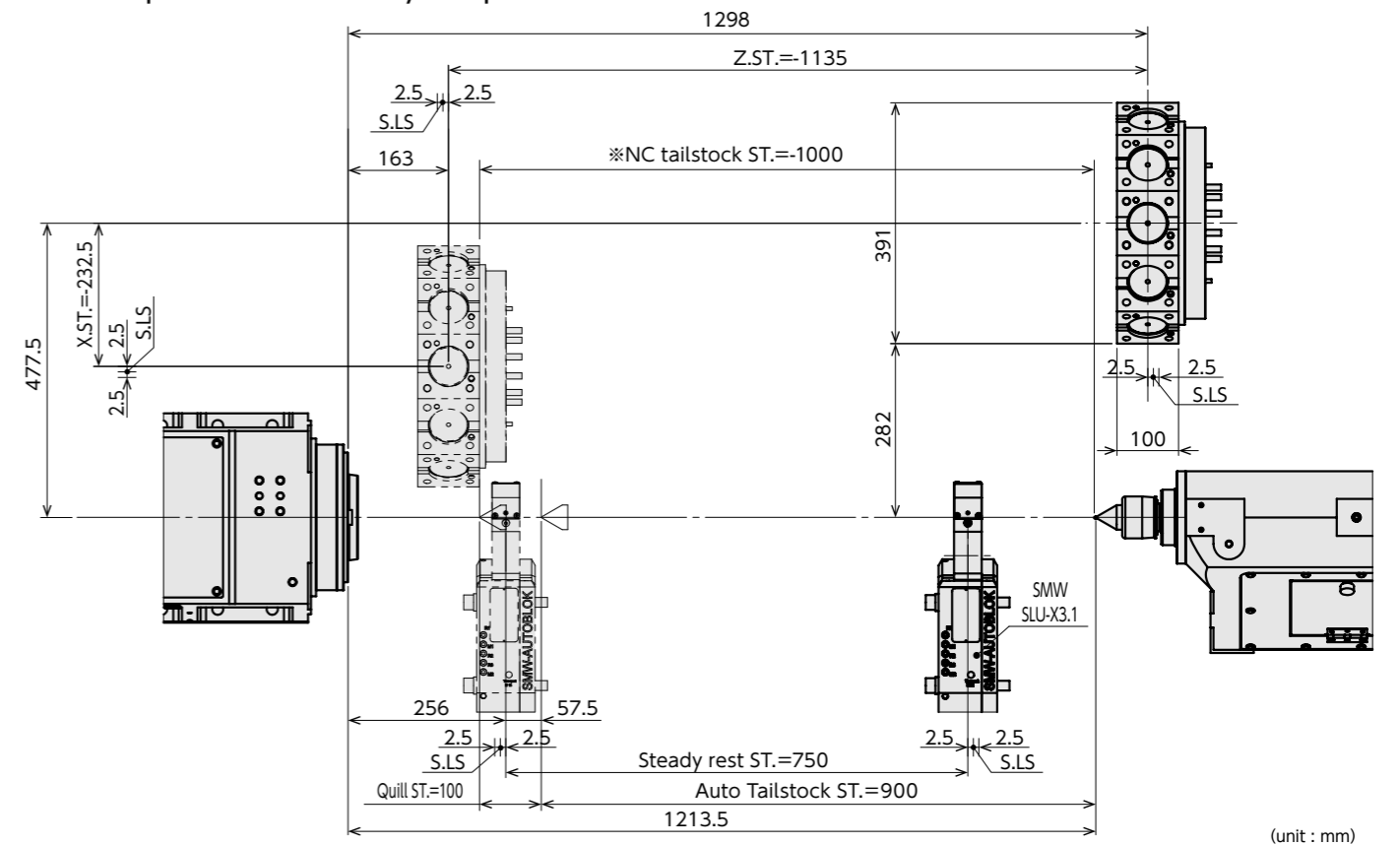
SC-300IIL

Travel Range

■ Sub spindle specifications



■ Tailstock specification + NC steady-rest specifications

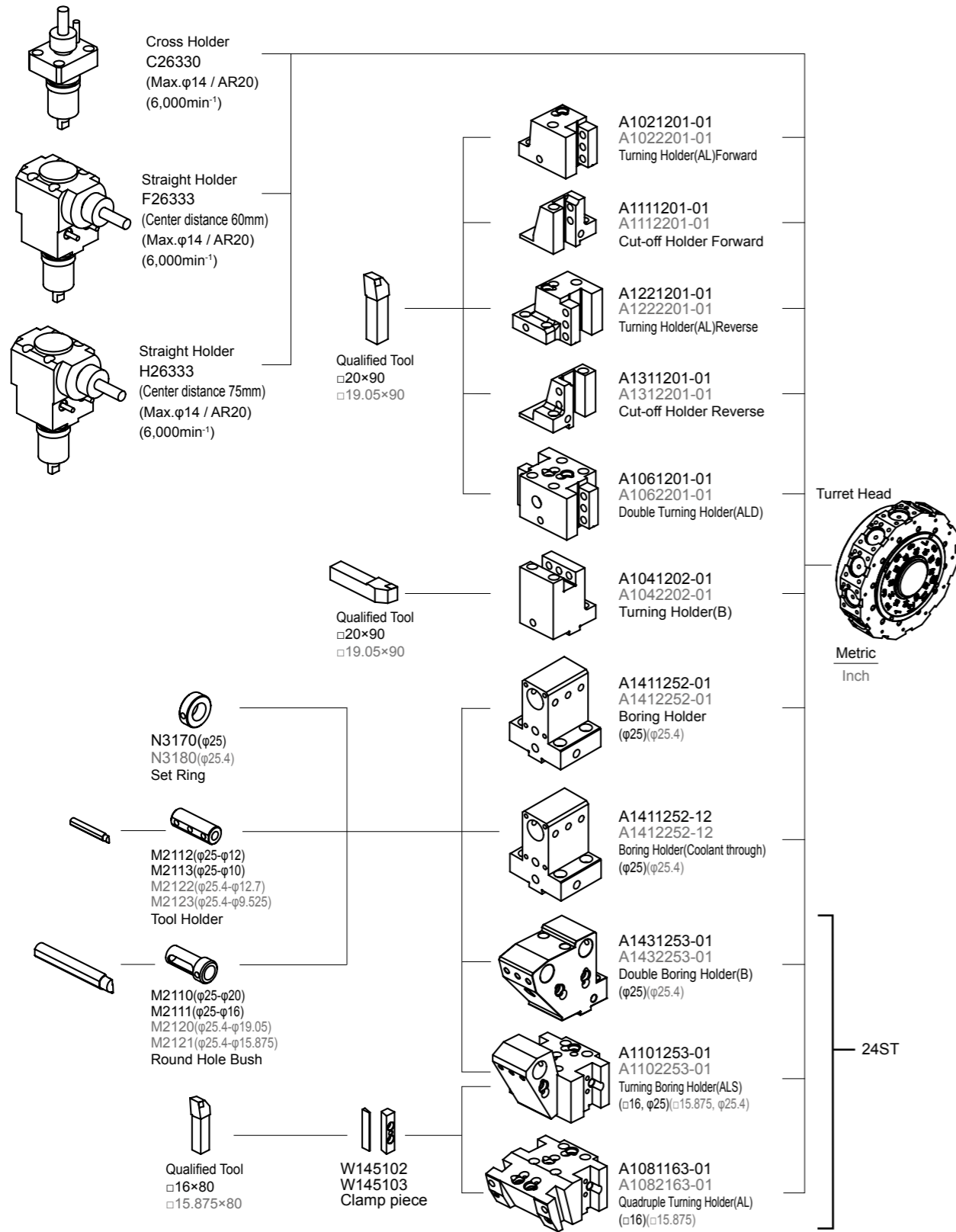


● Machine travel range may change depending on optional specifications.

Tooling system diagram

SC-100

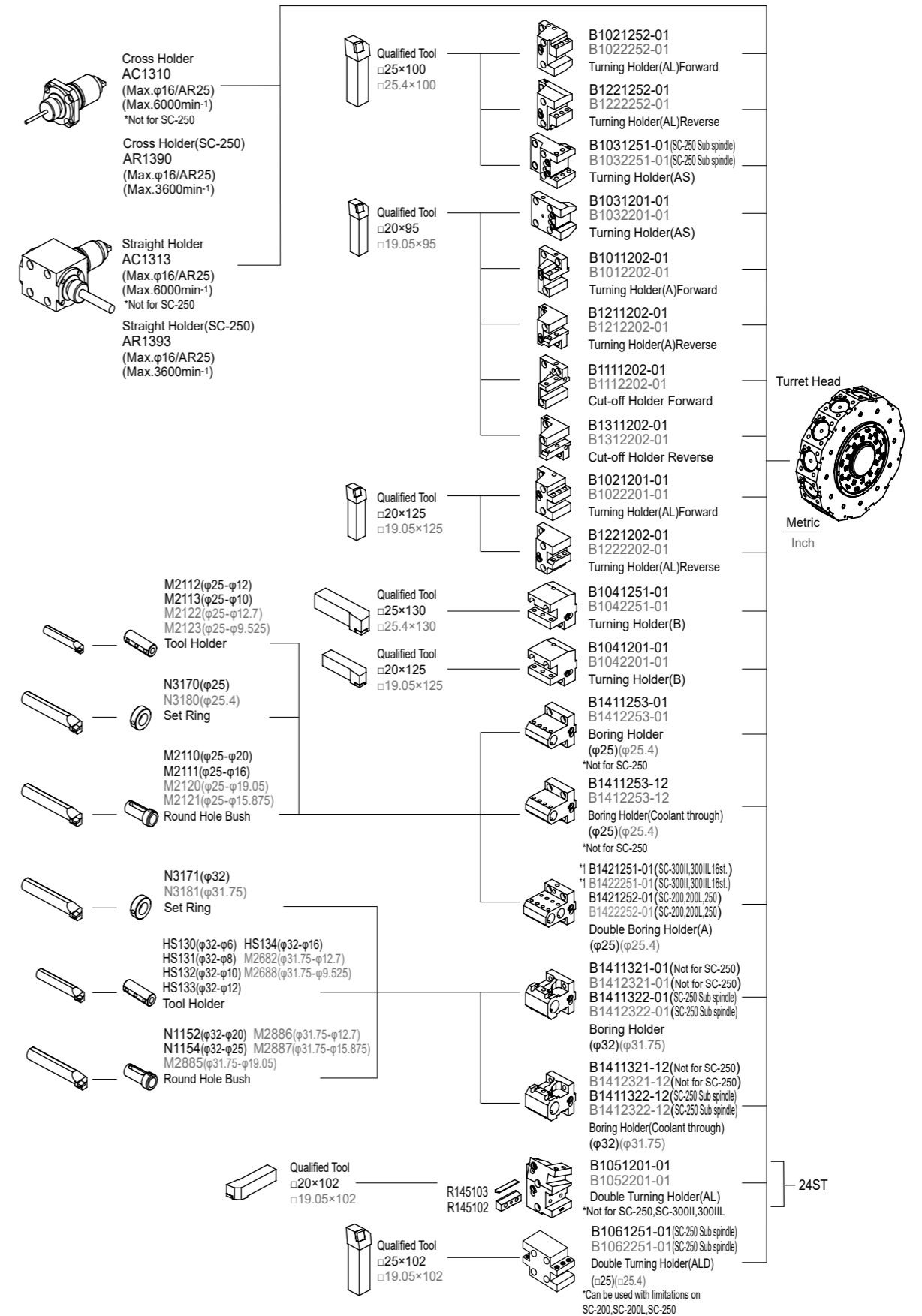
Tooling System



Tooling system diagram

SC-200,SC-200L,SC-250,SC-300II • 300IIL-16st.

Tooling System

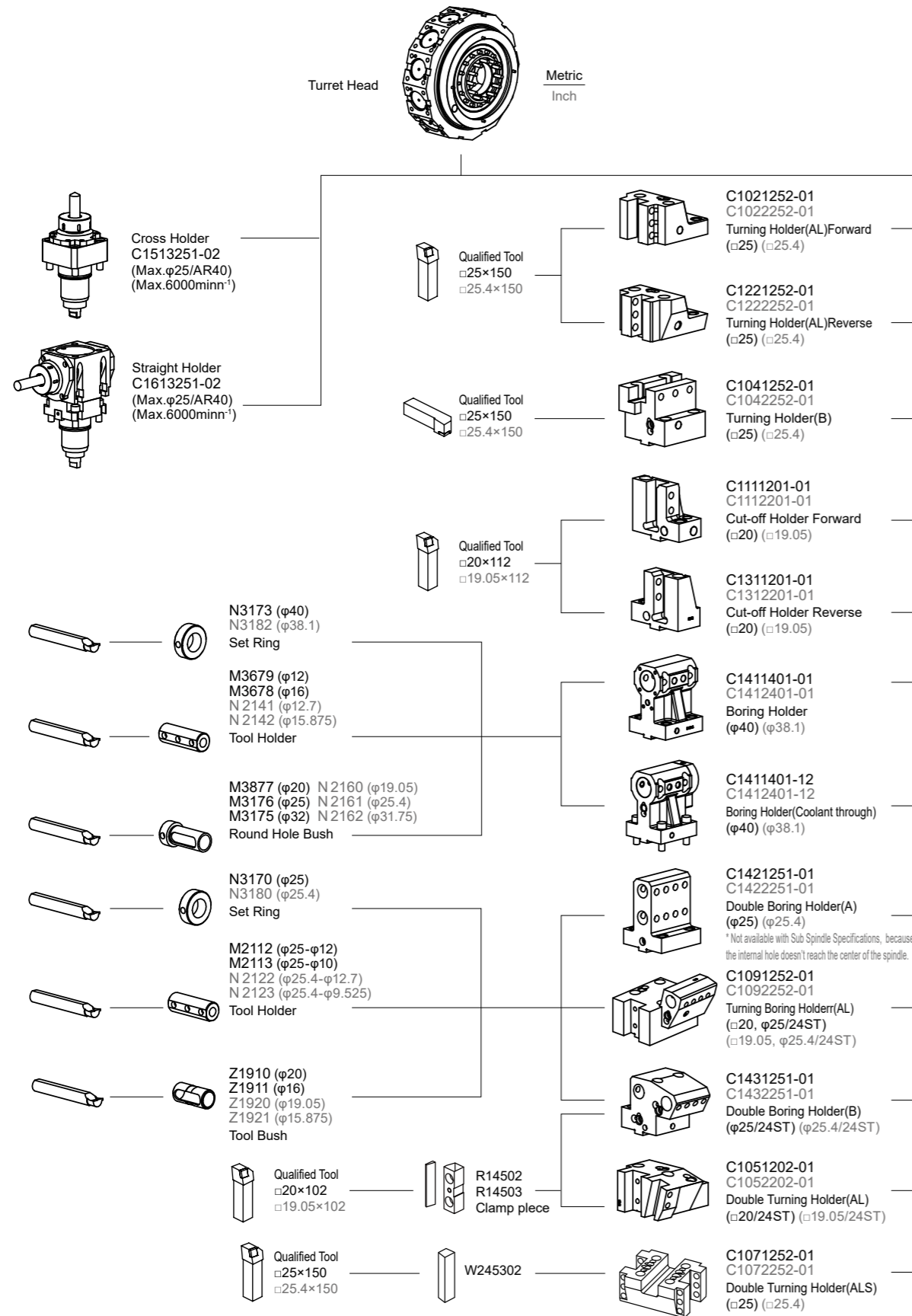


*1 Not available for sub spindle specifications. The hole on the mounting surface side does not reach the center of the spindle.

Tooling system diagram

SC-300II / SC-300IIL (Dodecagonal drum turret)

Tooling System

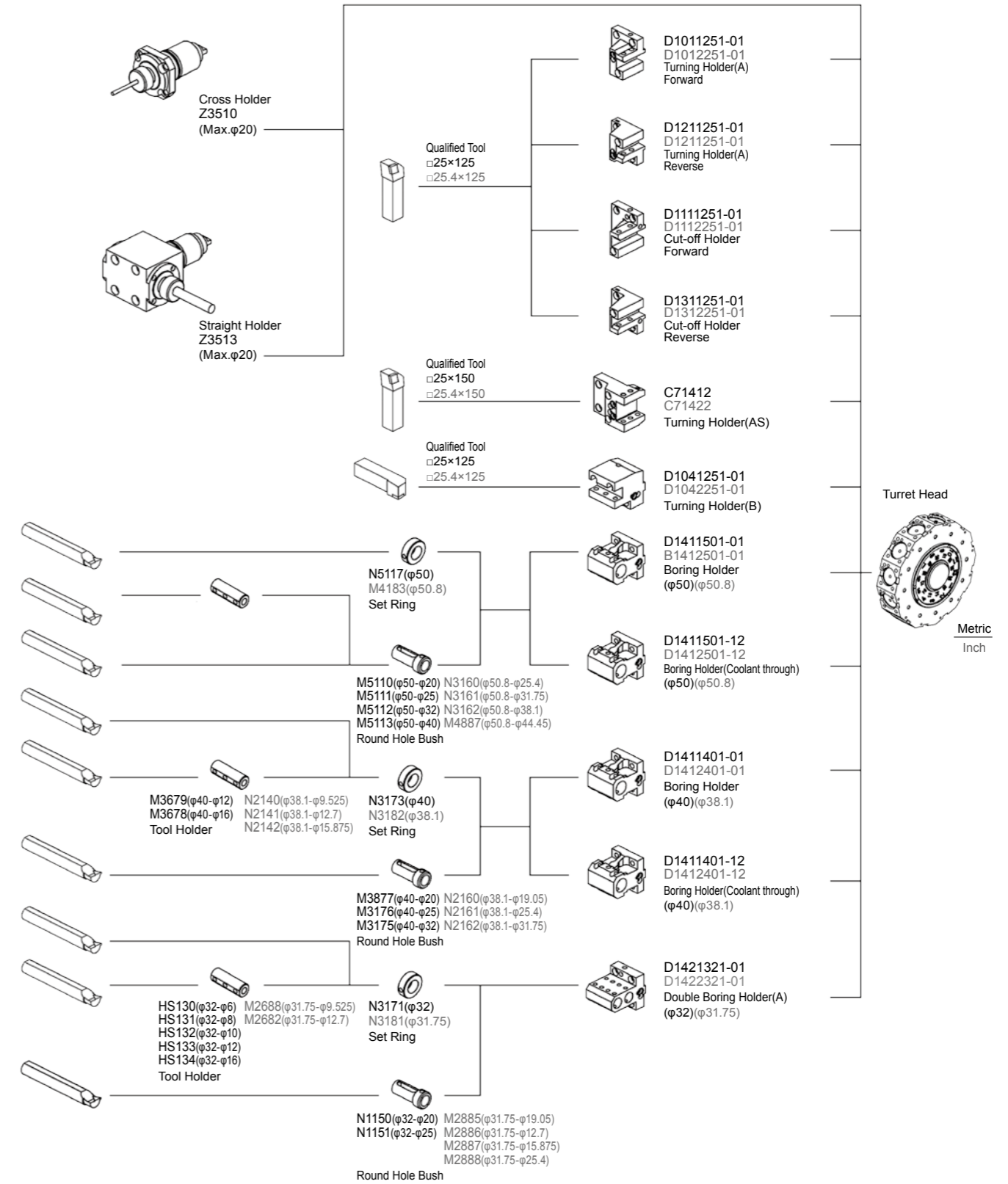


Tooling system diagram

SC-450 / SC-450L / SC-450LL

Tooling System

■ Dodecagonal drum turret



Machine Specifications

		SC-100	SC-200	SC-200L
·Milling		Standard	Option	Option
·Y-axis		Standard	Option	Option
·Sub spindle		Option	Option	Option
·Sub spindle side C axis		Available with sub spindle	Option (Positioning only)	Option
■ Capacity	unit			
Max. turning diameter	mm	230	432 (410 / with Y-axis)	410
Max. turning length	mm	400 (Standard / Sub spindle), 300 (tailstock)	370	570
Distance between centers	mm	430	509	757.8
Bar capacity	mm	φ 51	φ 65	φ 65
Chuck size	inch	6"	8"	8"

■ Axis travel / Rapid feed

X-axis	mm / m/min	150 / 20	261(277/Y-axis) / 24	277 (261/Sub spindle) / 24
Z-axis	mm / m/min	400 / 36	365 / 36	580 / 36
Y-axis	mm / m/min	±40 / 6	±41 / 6	±41 / 6
B-axis	mm / m/min	400 / 20	395 / 24	580 / 24

■ Main spindle

Spindle speed	min ⁻¹	5,000	4,500	4,500
Spindle speed range	-	Stepless	Stepless	Stepless
Spindle nose	-	A2-5	A2-6	A2-6
Hole through spindle	mm	63	80	80
I.D. of front bearing	mm	90	110	110
Hole through draw tube	mm	52	66	66
Spindle motor	kW	11/7.5	11/7.5	11/7.5 (op. 15/11, 18.5/15)

■ C-axis

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

■ Turret

Type of turret head	-	Dodecagonal drum turret	Dodecagonal drum turret	Dodecagonal drum turret
Number of tool stations	-	12 (Max.24)	12 (op.24)	12 (Max.24)
Number of Indexing positions	-	24	12 (op.24)	24
Tool size (square shank)	mm	□ 20 / □ 16(24st Holder)	□ 25 / □ 20 (Qualified if Max. turning length 370mm is cleared.)	□ 25 / □ 20 (Qualified if Max. turning length 570mm is cleared.)
Tool size (round shank)	mm	φ 25	φ 32	φ 32

■ Milling tools

Spindle speed	min ⁻¹	6,000	6,000	6,000
Motor Power	kW	7.1/2.2	5.5/3.7	5.5/3.7
Drive type / Number of milling tool stations	-	Individual rotation / 12	Individual rotation / 12	Individual rotation / 12
Tool shank / Collet size	mm	φ 1~14 / AR20	φ 1~16 / AR25	φ 1~16 / AR25

■ Tailstock (op.)

Driving system	-	NC control servo-driven type	Manual / Automatic with hyd. cylinder	Manual / Automatic with hyd. cylinder
Stroke	mm	400	255(Manual) / 200(Automatic)	435
Rapid feed	m/min	20	-	-
Range of thrust force	kN	1.0~4.0	-	-
Quill taper	-	MT-3 (Rotating center)	Manual : MT-4 (Rotating center) Automatic with hyd. cylinder: MT-3 (Built-in center)	MT-3 (Built-in center)
Quill diameter / Quill stroke	mm	-	φ 80 / 80	φ 80 / 80

■ Sub spindle (op.)

Driving system		NC Servo	NC Servo	NC Servo
Chuck size / Bar capacity	inch / mm	5" (6") / φ 42	6" / φ 34	6" / φ 42
Spindle speed / Spindle motor	min ⁻¹ / kW	6,000 / 7.5/5.5	5,000 / 5.5/3.7	6,000 (5,000/with parts ejector) / 7.5/5.5, 11/7.5
Distance between centers [max. / min.]	mm	600 / 200	615 / 220	800 / 220

■ General

Floor space	Height	mm	1,780	1,730	1,965
	Width		2,523.6(Standard/Tailstock), 2,933.6(Sub spindle)	2,430	2,771
	Length		1,825	1,745	1,884
Machine weight (Incl. control)	kg	4,500(Standard), 5,000(Tailstock/Sub spindle)	3,000	5,000	

■ Power supply

Power supply	kVA	17.4(20.2)(Standard), 22.0(24.8)(Sub spindle)	16.6(22.0)	24.0(37.0)
Air supply	NL/min / MPa	-	-	200 / 0.4

Machine Specifications

		SC-250	SC-300II	SC-300IIL
·Milling		Option	Standard	Standard
·Y-axis		Option	Standard	Standard
·Sub spindle		Option	Option	Option
·Sub spindle side C axis		Option	Available with sub spindle	Available with sub spindle
■ Capacity	unit			
Max. turning diameter	mm	300	360	360
Max. turning length	mm	500	480 *1	600 (Tailstock)/635 (Sub spindle)
Distance between centers	mm	689	713.5	1,213.5
Bar capacity	mm	φ 51	φ 65 (op.)	φ 71
Chuck size	inch	8"	10", 12"	10", 12"

■ Axis travel / Rapid feed

X-axis	mm / m/min	177.5 / 16	232.5(215 / Sub spindle) / 25	232.5(215 / Sub spindle) / 25
Z-axis	mm / m/min	550 / 30	635 / 30	1,135 / 30
Y-axis	mm / m/min	±41 / 6	±60 / 12.5	±60 / 12.5
B-axis	mm / m/min	500 / 30	600 / 20	1,000 / 20

■ Main spindles

Spindle speed	min ⁻¹	5,000	4,500	3,500	3,500
Spindle speed range	-	Stepless		Stepless	
Spindle nose	-	A2-6		A2-8	
Hole through spindle	mm	65	80	85	100
I.D. of front bearing	mm	100	100	120	140
Hole through draw tube	mm	52	66	72	90
Spindle motor	kW	15/11 (op.18.5/15)		22/18.5	

■ C-axis

Least input increment / Least command increment	-	0.001 / 0.001		0.001 / 0.001	
Rapid speed	min ⁻¹	400		200	
Cutting feed rate	° / min	1~4,800		1~4,800	
C-axis clamp	-	Disk clamp		Disk clamp	
C-axis connecting time	sec.	1.5		1.5	

■ Turret

Type of turret head	-	Dodecagonal drum turret	10 stations turret (op.)	Dodecagonal drum turret	16 stations turret (op.)	Dodecagonal drum turret	16 stations turret (op.)
Number of tool stations	-	12 (op.24)	10	12 (Max.24)	16	12 (Max.24)	16
Number of Indexing positions	-	12 (op.24)	10	24	16	24	16
Tool size (square shank)	mm	□ 25 (□ 20)		□ 25	□ 20	□ 25	□ 20
Tool size (round shank)	mm	φ 32		φ 50	φ 32	φ 50	φ 32

■ Milling tools

Spindle speed	min ⁻¹	3,600		6,000	6,000	6,000	6,000
Motor Power	kW	5.5/3.7		7.5/3.7	5.5/3.7	7.5/3.7	5.5/3.7
Drive type / Number of milling tool stations	-	Individual rotation / 12		Individual rotation / 12	Individual rotation / 16	Individual rotation / 12	Individual rotation / 16
Tool shank / Collet size	mm	φ 1~16 / AR25		φ 1~25/ AR40	φ 1~16/ AR25	φ 1~25/ AR40	φ 1~16/ AR25

■ Tailstock (op.)

Driving system	-	Z-axis slide (Lever type) / Automatic with hyd. cylinder	Z-axis slide(knock type)	NC control servo-driven type	Z-axis slide(knock type)	NC control servo-driven type
Stroke	mm	400	400	500	900	1000
Rapid feed	m/min	-	-	8	-	8
Range of thrust force	kN	-	1.3~7.85	2.5~6.5	1.3~7.85	2.5~6.5
Quill taper	-	MT-4(Rotating center), MT-3(Built-in center)	MT-5 (Rotating center), MT-4 (Built-in center)	MT-5 (Rotating center), MT-4 (Built-in center)	MT-5 (Rotating center), MT-4 (Built-in center)	MT-5 (Rotating center), MT-4 (Built-in center)
Quill diameter / Quill stroke	mm	φ 80 / 80		φ 90 / 100	-	φ 90 / 100

■ Sub spindle (op.)

Driving system		NC Servo	NC Servo	NC Servo
Chuck size / Bar capacity	inch / mm	6" / φ 51	6", 8" / φ 51	6", 8" / φ 51
Spindle speed / Spindle motor	min ⁻¹ / kW	5,000 / 11	5,000 / 15/11	5,000 / 15/11
Distance between centers [max. / min.]	mm	780 / 280	910 / 310	1,310 / 310

■ General

Floor space	Height	mm	1,815 (2,065/with Y-axis)	2,300	2,300
	Width		2,598 (2,777/with Y-axis)	3,995	4,902
	Length		1,671 (1,725/with Y-axis)	2,130	2,130
Machine weight (Incl. control)	kg	4,000 (4,500/with Y-axis)		9,000	11,000

■ Power supply

Power supply	kVA	22.3(35.3)	31(33.9)(Standard), 39.2(42.1)(Sub spindle)	31(33.9)(Standard), 39.2(42.1)(Sub spindle)
Air supply	NL/min / MPa	150~200 / 0.5~0.7		-

*1 10 stations turret specification(op.)

* Combination of bar capacity (φ 71 / φ 89), turret (12 st / 16 st), tailstock (knock type / NC control) is free.

		SC-450		SC-450L		SC-450LL	
· Milling		Option		Option		Option	
· Y-axis		Option		Option		Option	
· Sub spindle		-		-		-	
· Sub spindle side C axis		-		-		-	
■ Capacity		unit		type-A		type-B	
Max. turning diameter	mm	465		480		480	
Max. turning length	mm	785	715	1,520	2,520 (2,452 / Tailstock 20kN(op.))		
Distance between centers	mm	1,050		1,752		2,752 (2,652 / Tailstock 20kN(op.))	
Bar capacity	mm	φ 81		φ 81	φ 89 (op.)	φ 81	φ 89 (op.)
Chuck size	inch	12"	15"	12"	12"	15"	15"
■ Axis travel / Rapid feed							
X-axis	mm / m/min	315 / 12		322.5 / 18		302.5(322.5/Y-axis) / 18	
Z-axis	mm / m/min	825(VDI) / 855(Dodecagonal) / 18		1,610 / 24		2,610 / 24	
Y-axis	mm / m/min	±70 / 6		±75 / 9		±75 / 10	
B-axis	mm / m/min	-		-		-	
■ Main spindle							
Spindle speed	min ⁻¹	2,500		2,500		2,500	
Spindle speed range	-	Stepless		Stepless		Stepless	
Spindle nose	-	A2-8		A2-8		A2-8	
Hole through spindle	mm	100		100		100	
I.D. of front bearing	mm	140		140		140	
Hole through draw tube	mm	82		82	90	82	90
Spindle motor	kW	30/22		30/22		30/22	
■ C-axis							
Least input increment / Least command increment	-	0.001 / 0.001		0.001 / 0.001		0.001 / 0.001	
Rapid speed	min ⁻¹	200		200		200	
Cutting feed rate	° / min	1~4,800		1~4,800		1~4,800	
C-axis clamp	-	Disk clamp		Disk clamp		Disk clamp	
C-axis connecting time	sec.	1.5		1.5		1.5	
■ Turret							
Type of turret head	-	Dodecagonal drum turret					
Number of tool stations	-	12					
Number of Indexing positions	-	12					
Tool size (square shank)	mm	□ 25					
Tool size (round shank)	mm	φ 50					
■ Milling tools							
Spindle speed	min ⁻¹	3,600					
Motor Power	kW	5.5/3.7					
Drive type / Number of milling tool stations	-	Individual rotation/12					
Tool shank / Collet size	mm	φ 1~20 / AR32					
■ Tailstock (op.)							
Driving system	-	Z-axis slide (Lever type) / Automatic with hyd. cylinder	NC control servo-driven type				
Stroke	mm	760	1,490	2,220			
Rapid feed	m/min	-	15	8			
Range of thrust force	kN	-	2.5~6.5 (op.2.5~11)	2.5~11 (op.3.5~20)			
Quill taper	-	MT-4 (Built-in center)	MT-5 (Rotating center / Built-in center)	MT-5 (Built-in center)			
Quill diameter / Quill stroke	mm	φ 120 / 100		-			
■ Sub spindle (op.)							
Driving system	-	-					
Chuck size / Bar capacity	inch / mm	-					
Spindle speed / Spindle motor	min ⁻¹ / kW	-					
Distance between centers [max. / min.]	mm	-					
■ General							
Floor space	Height	2,100 (2,575/with Y-axis)		2,185 (2,531/with Y-axis)		2,213	
	Width	3,865 (4,709/with Y-axis)		5,050		6,530	
	Length	1,985 (2,075/with Y-axis)		2,165		2,165	
Machine weight (Incl. control)	kg	7,500		9,000 (10,000/with Y-axis)		14,500	
■ Power supply							
Power supply	kVA	36.2(41.4)		39.1(44.5)		44.1(49.4)	
Air supply	NL/min / MPa	150~200 / 0.5~0.7					

		SC-100	SC-200	SC-200L	SC-250	SC-300II/300IIL	SC-450	SC-450L	SC-450LL
■ Items									
Control type		0i-TF		0i-TD		0i-TF		0i-TD	
		Nakamura-Tome FANUC							
■ Controlled axes									
Controlled axes	Standard	4 axes : X,Z,C,Y		2 axes : X, Z		4 axes : X,Z,C,Y		2 axes : X, Z	
	C-axis / Milling	-		1 axes : C Total 3 axes		-		1 axes : C Total 3 axes	
	Y-axis	-		2 axes : C,Y Total 4 axes		-		2 axes : C,Y Total 4 axes	
Simultaneously controlled axes	Standard	4 axes		2 axes		4 axes		2 axes	
	C-axis / Milling	-		3 axes		-		3 axes	
	Y-axis	-		4 axes		-		4 axes	
■ Input command									
Least input increment	Standard	0.001mm/0.0001inch (X in diameter)							
	C-axis / Milling	0.001"							
Least command increment	Standard	0.001mm/0.0001inch							
	C-axis / Milling	X : 0.0005mm, Z : 0.001mm							
Max. programmable dimension	±999999.999mm/±39370.0787inch, ±999999.999" (C-axis / Milling)								
Absolute / incremental programming	X,Z,C,Y/U,W,H,V		X, Z / U, W		X,Z,C,Y/U,W,H,V		X, Z / U, W		
Decimal input	Standard								
Inch / Metric conversion	G20 / G21								
Programmable data input	G10								
■ Interpolation									
Positioning	G00								
Linear interpolation	G01								
Circular interpolation	G02/03, CW/CCW								
Polar coordinate interpolation	Standard for milling								
Cylindrical interpolation	Standard for milling								
■ Feed function									
Cutting feed	Per minute	1~4800mm/min, 0.01~188inch/min							
	Per revolution	1~4800' /min							
Dwell	Per minute	0.0001~500.0000mm/rev, 0.000001~9.99999inch/rev							
	Per revolution	G04							
Feed per minute / Feed per revolution	G98 / G99								
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 acceleration/ deceleration after cutting feed interpolation	Standard								
Rapid feed override	F0/25/50/100%								
Cutting feed-rate override	0~150% (each 10%)								
Look ahead control	-	G08		-		-		G08	
AI contouring control I	G5.1	-		-		G5.1		-	
Spindle override	50%~120%, Set every 10%								
■ Program memory									
Part program	Standard	512Kbyte op.2Mbyte	512Kbyte (1280m, Not expandable)	512Kbyte op.2Mbyte	512Kbyte(280m, Not expandable)				
storage length	Sub spindle	1Mbyte op.2Mbyte	1Mbyte (2560m, Not expandable)	1Mbyte op.2Mbyte	-				
Part program edit	delete, insert, change								
Program number search	Standard								
Sequence number search	Standard								
Address search	Standard								
Number of registerable programs	Standard	400pcs op.1,000pcs	400pcs(Not expandable)	400pcs op.1,000pcs	400pcs (Not expandable)				
	Sub spindle	800pcs op.1,000pcs	800pcs(Not expandable)	800pcs op.1,000pcs	-				
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								
Tool offset pairs	99 (op.200)	64 (op.99)		99 (op.200)		64 (op.99)			
■ Program support									
Circular interpolation R programming	Standard								
Direct drawing dimension programming or Chamfering and Corner R	Standard (Direct drawing dimension programming is standard setting)								
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								
Help Function	Standard								
Custom macro	Standard (common variable#100~149, #500~#549)								
Addition to custom macro common variables	Standard (After addition, #100~199, #500~#999)								
NT Work Navigator	Standard (not including contact bar)								
NT NURSE	Standard								
Abnormal Load detection	Standard								
Spindle rigid tap	Standard								
Driven-Tool rigid tapping	Standard								
Polygon function	Standard (with C axis)							op.	Standard (with C axis)
■ Operation / Display									
Operation panel : Display	15inch color LCD unit	10.4inch color LCD unit			15inch color LCD unit		10.4inch color LCD unit		
Input / output interface	USB memory, Memory card, Embedded Ethernet								