SC-450 SERIES

High Rigidity Machine Bed and Slides for Heavy Duty Cutting Performance

SC-450LL
Distance between centers
2,752mm
Max. swing over bed diameter
φ810mm

SC-450L
Distance between centers
1,752mm
Max. swing over bed diameter
φ810mm

SC-450
Distance between centers
1,050mm
Max. swing over bed diameter
φ810mm
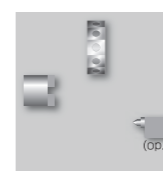
Traditionally hand-scraped and fitted slides

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 who has fostered high accuracy and precision manufacturing technology over many years.

Nakamura-Tome
SC-450 SERIES

M	Y	C
Milling Motor	Y-axis	C-axis
(op.)	(op.)	(op.)

Φ810mm Max. Swing Diameter
## Powerful Heavy-cutting Multitasking Machine

SC-450

Distance between centers 1050mm	Bar capacity 81mm	Chuck size A12"/Φ305mm B15"/Φ381mm	Spindle motor 30/22kW	Spindle speed 2500min⁻¹	Milling motor 5.5/3.7kW 3600min⁻¹ (op.)	Y-Axis ±70mm (op.)

- Max. turning length   **785/715mm (A/B)**
- Max. swing diameter   **φ810mm**
- Max. workpiece diameter   **520mm**
- Distance between centers   **1,050mm**

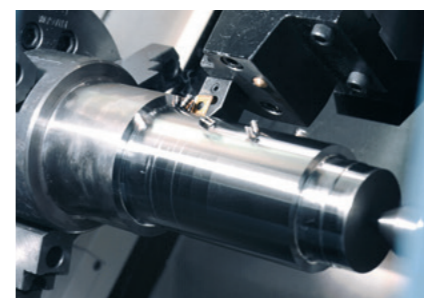**Medium to Large Size Heavy-Duty High-Precision Cutting.**
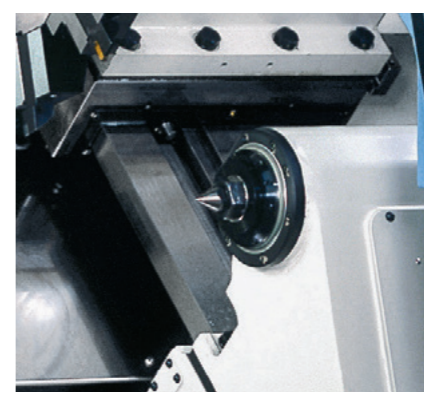
■ Tailstock (op.)

Equipped with high rigidity built-in center.
The tailstock is positioned using the manual pulse generator, after manually connecting a knock to the Z-Axis saddle.
Fully programmable automatic type (positioning with hydraulic cylinder) is optionally available.

- ● Quill taper : MT-4 Built-in center
- ● Quill stroke : 100mm
- ● Slide stroke : 760mm

■ Heavy cutting
Cross-sectional area : Max. 9mm²

- ● Cutting speed : 120m/min
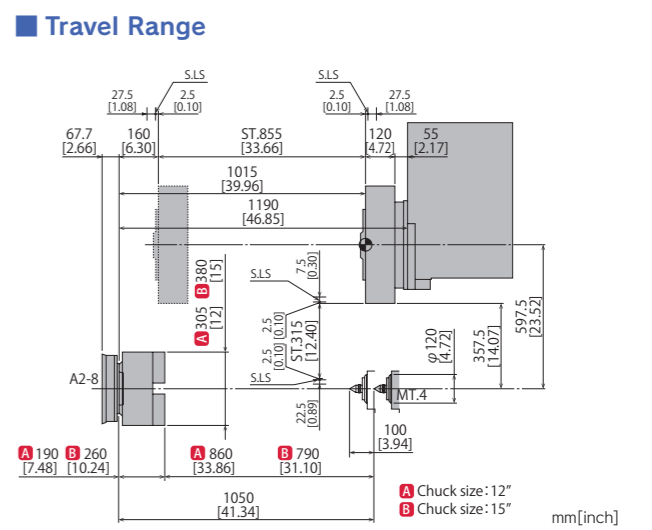- ● Cutting depth : 10mm
- ● Feed : 0.9mm/rev
- ● Material : S45C

■ Milling (op.)

The machine can be optionally equipped with a 5.5/3.7kW high output milling motor.
Milling tools can be mounted on max.12 stations.
Driven-tools rotate independently.
C-axis engagement time is only 1.5 sec.(from spindle to C-axis mode)
C-axis minimum command increment is 0.001 degrees, which is suitable for complex machining.

- ● Milling speed : MAX 3,600min⁻¹
- ● Drill diameter : MAX φ 20mm
- ● Tap diameter : MAX M16

■ Travel Range

S.LS
27.5 [1.08]   2.5 [0.10]   S.LS   2.5 [0.10]   27.5 [1.08]
67.7 [2.66]   160 [6.30]   ST.855 [33.66]   120 [4.72]   55 [2.17]
1015 [39.96]
1190 [46.85]
B 380 [15]   7.5 [0.30]
A 305 [12]   ST.315 [12.40]   φ 120 [4.72]   357.5 [14.07]   597.5 [23.52]
2.5 [0.10]
2.5 [0.10]   S.LS
A2-8   22.5 [0.09]   MT.4   100 [3.94]
A 190 [7.48]   B 260 [10.24]   A 860 [33.86]   B 790 [31.10]
1050 [41.34]
A Chuck size : 12"
B Chuck size : 15"
mm[inch]

※ Travel range shown here is for standard specifications.
It may be different depending on optional specifications.

SC-450 SERIES

Max. Turning Length 2,520mm※ Powerful Heavy Cutting Multitasking Machine
※ SC-450LL

M Milling Motor (op.)　**Y** Y-axis (op.)　**C** C-axis (op.)

SC-450L

- Max. turning length **1,520mm**
- Max. swing diameter **φ810mm**
- Max. workpiece diameter **520mm**
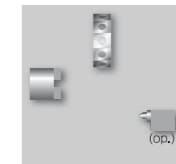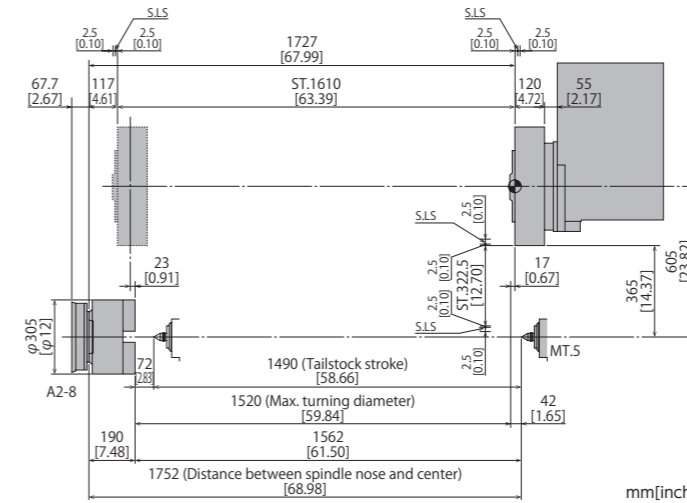- Distance between centers **1,752mm**

SC-450LL

- Max. turning length **2,520mm**
- Max. swing diameter **φ810mm**
- Max. workpiece diameter **520mm**
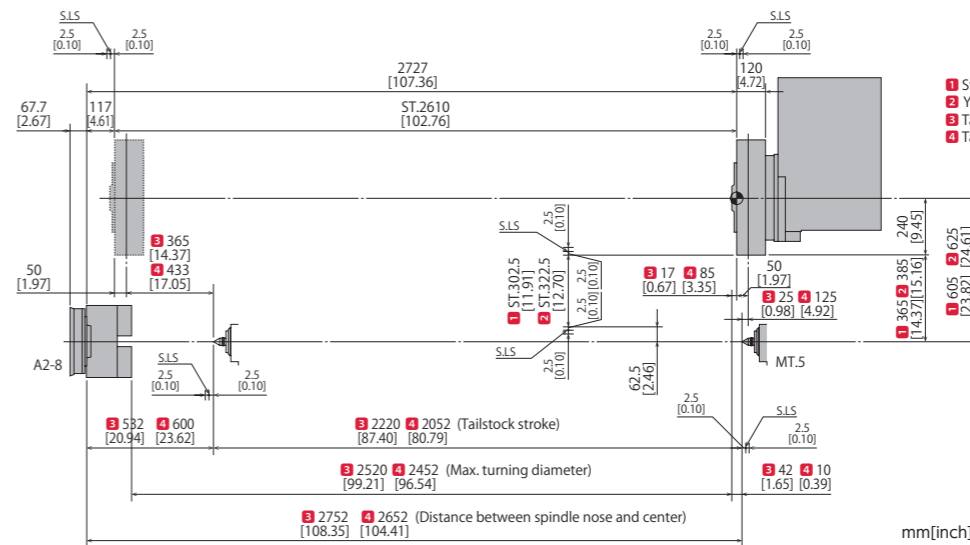- Distance between centers **2,752mm**

■ Travel Range　* Stroke limit occurs when using steady rest.

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

Spindle motor 30/22kW	Bar capacity 81mm	Chuck size 12"/305mm
Spindle speed 2500min⁻¹	Milling motor 5.5/3.7kW 3600min⁻¹ (op.)	Y-Axis ±75mm (op.)

mm[inch]

1 Standard
2 Y-axis Specifications (op.)
3 Tailstock 11kN Specifications (op.)
4 Tailstock 20kN Specifications (op.)

mm[inch]

※ Travel range shown here is for standard specifications. It may be different depending on optional specifications.
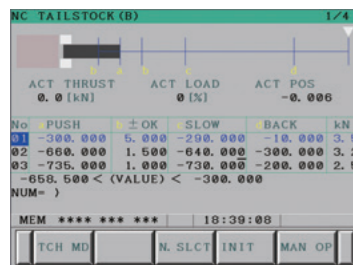
■ NC Tailstock

The programmable NC Tailstock is servo-driven.
Position and thrust can be easily set on the NT Nurse screen for a maximum of 12 registrable settings.
Each display can be called up by one touch using the NT Nurse button.
Two displays can be shown on the same screen.

	SC-450L	SC-450LL	
		11kN	20kN
Driving system	NC control servo-driven type		
Stroke	1,490mm	2,220mm	2,052mm
Rapid feed	15m/min	8m/min	
Range of thrust force	2.5〜6.5kN	2.5〜11kN	3.5〜20kN
Quill taper	MT-5(Rotating center/ Built-in center)	MT-5(Built-in center)	

■ Sliding Operation Control Box

Operation Control Box is equipped with a large size LCD screen and each button has eye-friendly LED illumination switches.
The control box can swing at 100 degrees and move 1m sideways for easy operation.

SC-450 SERIES

Full Operator Support :
User-Friendly and Highly Reliable

Jig-less!
Setup-less!
Skill-less!

This essential function for multitasking machines is standard.

Main Features

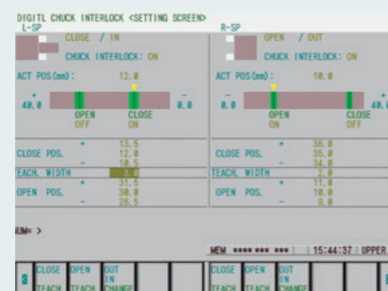| Standard |
| --- |
| NT Work Navigator |
| Airbag (Overload detection) |
| Advanced NT NURSE |
| NT Smart Sign |
| Digital Chuck Interlock |

Option
NT Manual Guide i (LUCK-BEI II)

Digital Chuck Interlock

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

### 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.
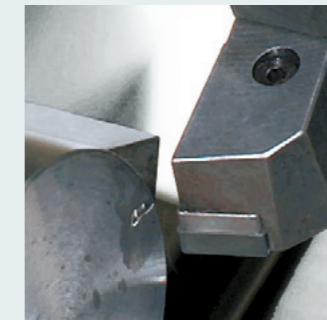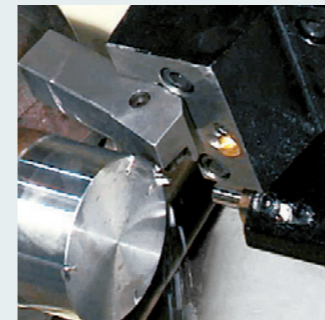
Without Airbag

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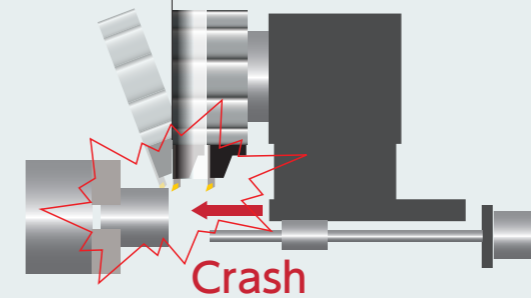The slide continues to move even after collision.

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.

Crash

▲Video

* This feature does not mean zero impact

NT Work Navigator

X	Y	Z	C	B

(op. NC Tail stock)

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.
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.

No fixtures required
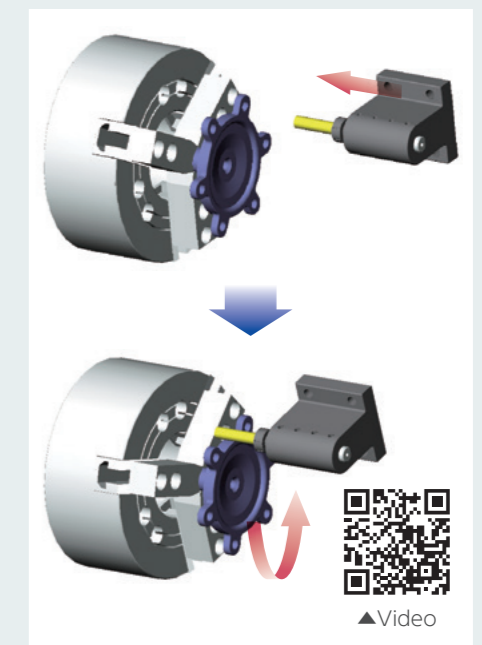
▲Video

Featuring Functions to Make Efficient Programs, Faster

Advanced NT NURSE

All-in-one software!

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.

※Depending on machine specifications, some functions are not available.
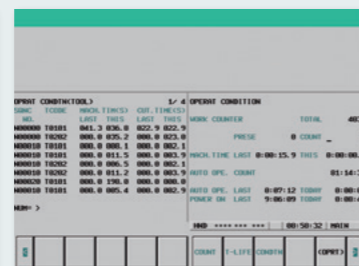
Useful functions
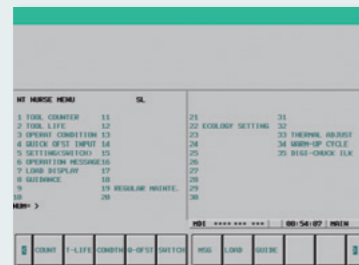
Menu Screen
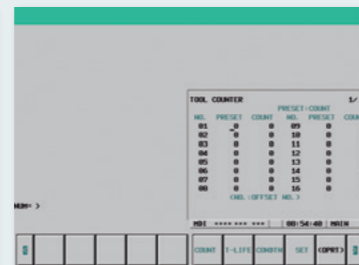
Tool Counter

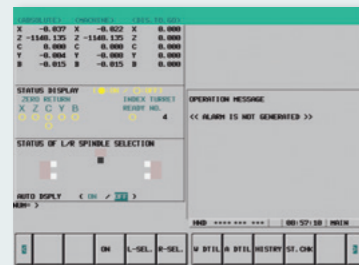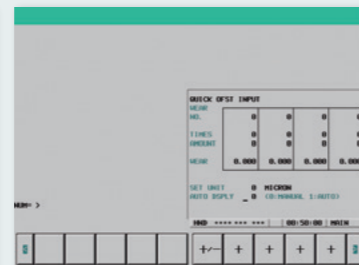Tool Life

Energy Saving
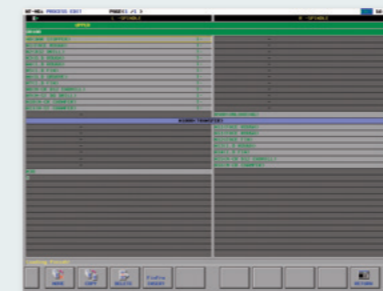

Operation Condition of each Tool

Operation Message

Quick Offset

NT NURSE Call Button

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.

▲ **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.

▲ **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.

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

Key Stroke frequency
Reduced by 50%!!
LUCK-BEI II
New
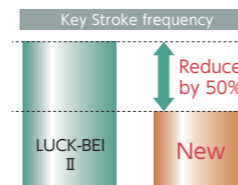
Automatic Cutting-Condition Setting Function

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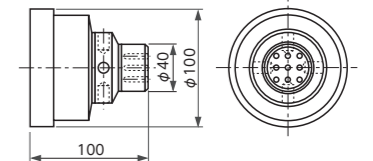
By selecting the material, cutting conditions B are automatically input.
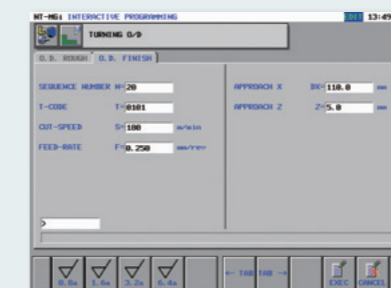
By setting the surface roughness, machining conditions are automatically input

Cutting conditions. End mill

SC-450 SERIES

Machine Dimensions

SC-450

2521.2 [99.26]
2100 [82.68]
1100 [43.31]
545 [21.46]
1985 [78.15]
79 [3.11]
386 [15.20]
3400 [183.86]
3865 [152.17]

SC-450L

1585 [62.40]
975 [38.39]
975 [38.39]
2164.8 [85.23]
2562.6 [100.89]
2181.4 [85.88]
2135 [84.06]
2015 [79.33]
1100 [43.31]
1630 [64.17]
4740 [186.61]
50 [1.97]
535 [21.06]
5050 [198.82]

SC-450LL

6210 [244.49]
1545 [60.83]
1440 [56.69]
1440 [56.69]
2164.6 [85.22]
2213.2 [87.13]
2155 [84.84]
1131.8 [44.56]
1610 [63.39]
1470 [57.87]
4750 [187.01]
310 [12.20]
503.2 [19.81]
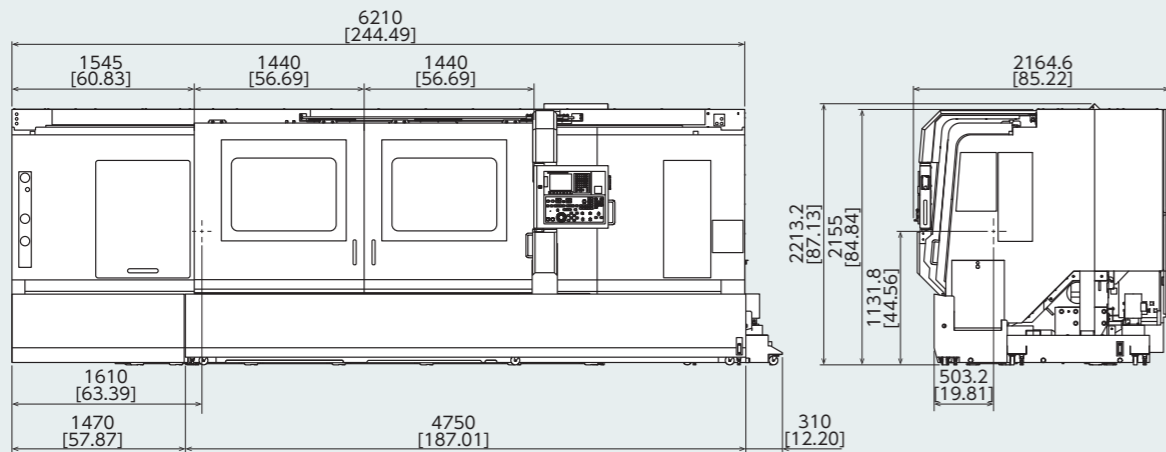
mm[inch]

※ Machine Dimensions shown here are for standard specifications.They may be different depending on optional specifications.

Tooling System

Metric / inch

Part	Description
D1011251-01 / D1012251-01	Turning Holder (A) CW
D1111251-01 / D1112251-01	Cut-off Holder CW
D1211251-01 / D1212251-01	Turning Holder (A) CCW
D1311251-01 / D1312251-01	Cut-off Holder CCW
C71412 / C71422	Turning Holder (AS)
D1041251-01 / D1042251-01	Turning Holder (B)
D1411501-01(φ50) / D1412501-01(φ50.8)	Boring Holder
D1411501-12(φ50) / D1412501-12(φ50.8)	Boring Holder (Coolant through)
D1411401-01(φ40) / D1412401-01(φ38.1)	Boring Holder
D1411401-12(φ40) / D1412401-12(φ38.1)	Boring Holder (Coolant through)
D1421321-01(φ32) / D1422321-01(φ31.75)	Double Boring Holder (A)

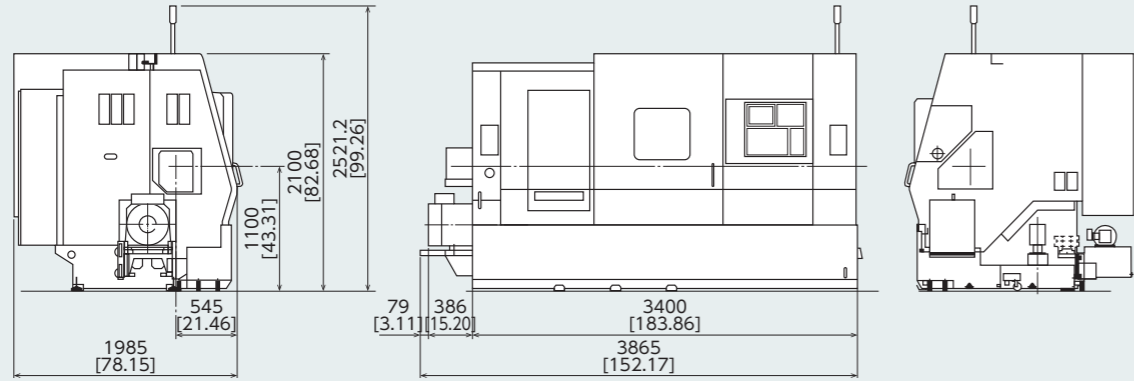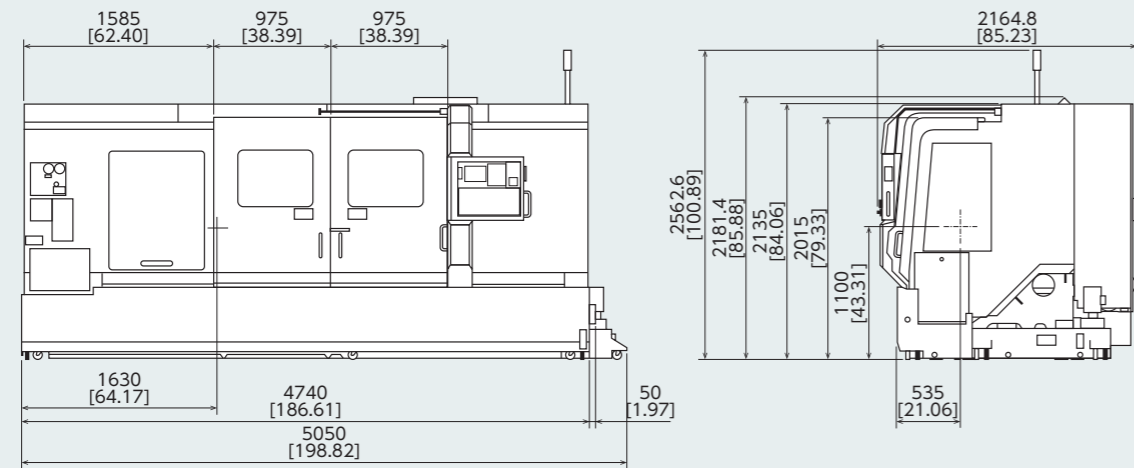Qualified Tool □25×125 / □25.4×125
Qualified Tool □25×150 / □25.4×150
Qualified Tool □25×125 / □25.4×125

N5117(φ50) / M4183(φ50.8) Set Ring
N3173(φ40) / N3182(φ38.1) Set Ring
N3171(φ32) / N3181(φ31.75) Set Ring

M5110(φ20) / M5111(φ25) / M5112(φ32) / M5113(φ40) / N3160(φ25.4) / N3161(φ31.75) / N3162(φ38.1) / M4887(φ44.45) Round Hole Bush

M3679(φ12) / M3678(φ16) / N2140(φ9.525) / N2141(φ12.7) / N2142(φ15.875) Tool Holder

M3877(φ20) / M3176(φ25) / M3175(φ32) / N2160(φ19.05) / N2161(φ25.4) / N2162(φ31.75) Round Hole Bush

HS130(φ6) / HS131(φ8) / HS132(φ10) / HS133(φ12) / HS134(φ16) / M2688(φ9.525) / M2682(φ12.7) Tool Holder

N1150(φ20) / N1151(φ25) / M2885(φ19.05) / M2886(φ12.7) / M2887(φ15.875) / M2888(φ25.4) Round Hole Bush

Z3510 Cross Holder (Collet MAX φ20)
Z3513 Straight Holder (Collet MAX φ20)

Tool Holder

SC-450/SC-450L/SC-450LL Spindle motor

30/22kW 2,500min⁻¹ φ81mm [Standard]

856N·m (S2 30min. S3 60%)
627N·m (S1 CONT.)
30kW 22kW
15kW
Torque (N·m) / Output (kW)
Spindle Speed (min⁻¹)
25 334 1744 2500
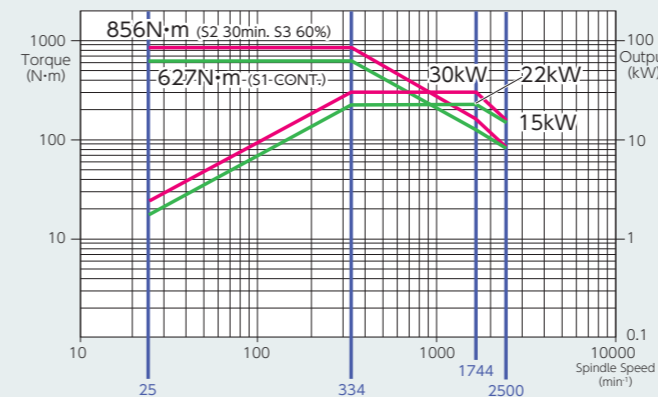
SC-450/SC-450L/SC-450LL Milling motor

5.5/3.7kW 3,600min⁻¹ [Standard]

58.3N·m (S2 30min.)
39.2N·m (S1 CONT.)
5.5kW
3.7kW
Torque (N·m) / Output (kW)
Spindle Speed (min⁻¹)
27 900 3600
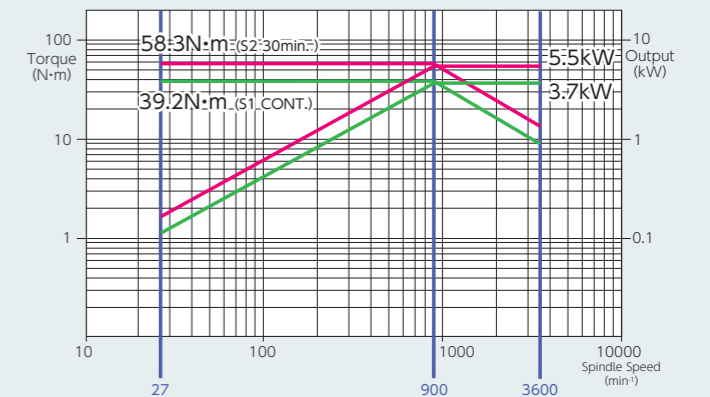
Machine Specifications

■ Capacity		SC-450	SC-450L		SC-450LL	
		φ81	φ81	φ89(op.)	φ81	φ89(op.)
Max swing over bed	mm	810	810		810	
Max. workpiece swing diameter	mm	520	520		520	
Max. turning diameter	mm	φ465	φ480		φ480	
Distance between centers	mm	1,050	1,752		2,752	
Max. turning length	mm	785 / 715	1,520		2,520	
Bar capacity	mm	φ81	φ81	φ89	φ81	φ89
Chuck size	inch	12" / 15"	12"		12"	15"
■ Axis travel / Rapid feed						
X-Axis slide travel	mm	315	322.5		302.5 / 322.5(Y-Axis)(op.)	
Z-Axis slide travel	mm	825(VDI Turret) / 855(Dodecagonal drum turret)	1,610		2,610	
Y-Axis slide travel(op.)	mm	±70	±75		±75	
X-Axis rapid feed rate	m/min	12	18		18	
Z-Axis rapid feed rate	m/min	18	24		24	
Y-Axis rapid feed rate(op.)	m/min	6	9		10	
■ Main spindle						
Spindle speed	min⁻¹	25～2,500	25～2,500		25～2500	
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
■ C-Axis (op.)						
Least input increment	°	0.001	0.001		0.001	
Least command increment	°	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	Dodecagonal drum turret		Dodecagonal drum turret	
Number of tool stations		12	12		12	
Number of Indexing positions		12	12		12	
Tool size (square shank)	mm	□25	□25		□25	
Tool size (round shank)	mm	φ50	φ50		φ50	
■ Milling(op.)						
Rotary system		Individual rotation	Individual rotation		Individual rotation	
Milling spindle speed	min⁻¹	3,600	3,600		3,600	
Spindle speed range		Stepless	Stepless		Stepless	
Number of milling stations		12	12		12	
Tool size — Straight holder	mm	φ1～φ20	φ1～φ20		φ1～φ20	
Tool size — Cross holder	mm	φ1～φ20	φ1～φ20		φ1～φ20	
■ Tailstock(op.)						
Driving system		Z-axis slide (Lever type) / Automatic with hyd. cylinder	NC control servo-driven type		NC control servo-driven type	
Stroke	mm	760	1,490		2,220	2,052
Rapid feed	m/min	—	15		8	
Quill diameter	mm	φ120	—		—	
Quill taper		MT-4 (Built-in center)	MT-5 (Rotating center / Built-in center)		MT-5 (Built-in center)	
Quill stroke	mm	100	—		—	
Range of thrust force	kN	—	2.5～6.5 / 2.5～11(op.)		2.5～11	3.5～20
■ Drive motor						
Main spindle	kW	30/22	30/22		30/22	
Milling (op.)	kW	5.5/3.7	5.5/3.7		5.5/3.7	
■ General						
Floor space — Height	mm	2,100 / 2,575(Y-Axis)(op.)	2,181.4 / 2,531.3(Y-Axis)(op.)		2,213	
Floor space — Length	mm	3,865	5,050		6,530	
Floor space — Width	mm	1,985 / 2,075(Y-Axis)(op.)	2,165		2,165	
Machine weight (incl. control)	kg	7,500	9,000 / 10,000(Y-Axis)(op.)		14,500	
■ Power supply						
Power supply	kVA	36.2	39.1		44.1	

※ Specifications listed in this catalogue are subject to change without prior notice.

● 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.

Control Specifications

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

■ Items	
Control type	Nakamura-Tome FANUC (0i-TD)
Operation panel	10.4-inch color LCD / Separate type MDI unit (Standard keys)
■ Controlled axes	
Controlled axes	2-axes: X, Z
Simultaneously controlled axes	2-axes
■ Input command	
Least input increment	0.001mm/0.0001in (X in diameter)
Least command increment	X：0.0005mm, Z：0.001mm
Max.programmable dimension	±999999.999mm/ ±39370.0787inch
Absolute / Incremental programming	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	feed / min X:1 ～ 4800mm/min, 0.01 ～ 188in/min Z:1 ～ 4800mm/min, 0.01 ～ 188in/min feed / rev 0.0001 ～ 500.0000mm/rev 0.000001 ～ 9.999999inch/rev
Dwell	G04
Feed per minute / Feed per revolution	G98 / G99
Thread cutting	G32F designation
Thread cutting retract	Standard
Continuous thread cutting	Standard
Variable lead threading	G34
Handle feed	Manual pulse generator 0.001/0.01/0.1mm (per pulse)
Automatic acceleration / deceleration	Standard
Linear acc./ dec. after cutting feed interpolation	Standard
Rapid feed override	Low range/25/50/100%
Cutting feed override	0 ～ 150%
Look ahead control	G08
■ Tool offset	
Tool geometry and wear offsets	T-function (Last 2 digits: Geometry, Wear)
Tool nose R compensation	G41, G42 / G40
Number of tool offset pairs	64
■ Program memory	
Part program storage length	512Kbyte (1280m) (Fixed) (No extension available)
Part program editing	delete, insert, change
Program number search	Standard
Sequence number search	Standard
Address search	Standard
Number of registerable programs	400 programs (Fixed) (No extension available)
Program storage memory	Battery backup
Background editing	Standard
DNC operation through memory card	Standard (not including memory card)
Extended part program editing	Standard
■ Programming assist functions	
Circular interpolation R programming	Standard
Direct drawing dimension programming or Chamfering/Corner R Canned cycles	Standard (Change over on setting parameter)
Canned cycles	G90, G92, G94
Multiple repetitive canned cycles	G70 ～ G76
Multiple repetitive canned cycles II	G71, G72
Canned cycles for drilling	G80 ～ G89
Sub program	Standard
Help function	Standard
Custom macro	Standard(Common variables: #100 ～ 149, #500 ～ #549)
Additional customer macro variables	Standard(After addition: #100 ～ 199, #500 ～ #999)
NT Work Navigator	Standard
NT NURSE	Standard
Z-axis abnormal load detection	Standard

● 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.

Cat.No.0183E01012006N

NAKAMURA-TOME PRECISION INDUSTRY CO., LTD.

http://www.nakamura-tome.co.jp