

# Super Mill

WY-250



Super Mill  
WY-250



NAKAMURA-TOME PRECISION INDUSTRY CO., LTD.

Netsuno 15, Hakusan city, Ishikawa, 920-2195 Japan

Phone : 0761 93 1111 Fax : 0761 93 4312

E-mail : nt-jpn@nakamura-tome.co.jp

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

Cat.No.0069E014702N

NAKAMURA-TOME  
PRECISION INDUSTRY CO.,LTD.

D E B U T  
 Long-awaited Machine!

New Era of Multi-Tasking!  
 A machine featuring the fastest cycle-time ever!

# Birth of Super Mill



Chips tell you

## Multi-Tasking Machine for Production

From diversified small-lot production to mass production.



Y-axes on Upper and Lower Turrets



### Innovative Milling System

Metal Removal Rate

**336**cm<sup>3</sup>/min

168cm<sup>3</sup>/min × 2

【Cutting conditions】

- Tool diameter : φ50mm
- Cutting Speed : 235m/min
- Speed : 1500min<sup>-1</sup>
- Feed : 2.8mm/rev
- Depth : 0.8mm

## Double Performance!

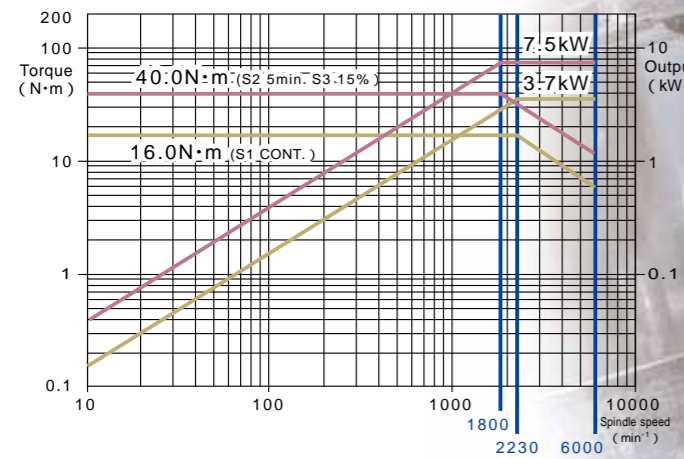
**7.5kW 40N·m**

High-power, High-torque Milling Motors on Upper and Lower Turrets



In addition to milling or drilling simultaneously with upper and lower turrets, improved chip-removal capabilities contribute to drastically faster cycle times.

### Upper & Lower Milling Motors



### 【Milling Tools】

Max. collet size-  $\phi$  20/AR32

Max. Face Milling Cutter diameter-  $\phi$  80mm



## Double Performance!

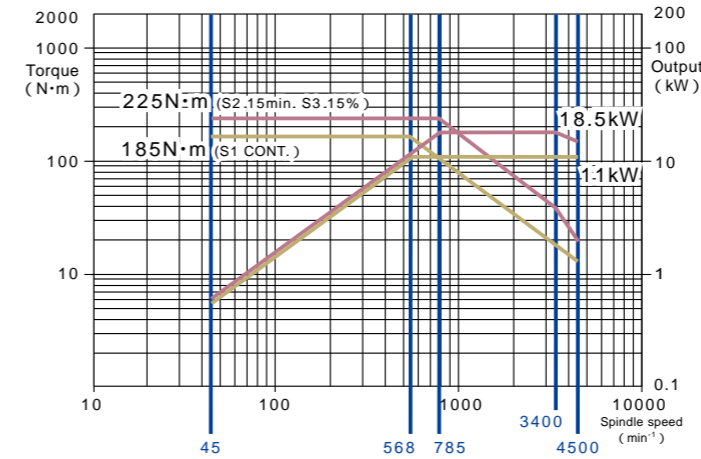
Wide-range double-coil motors on left and right hand side spindles



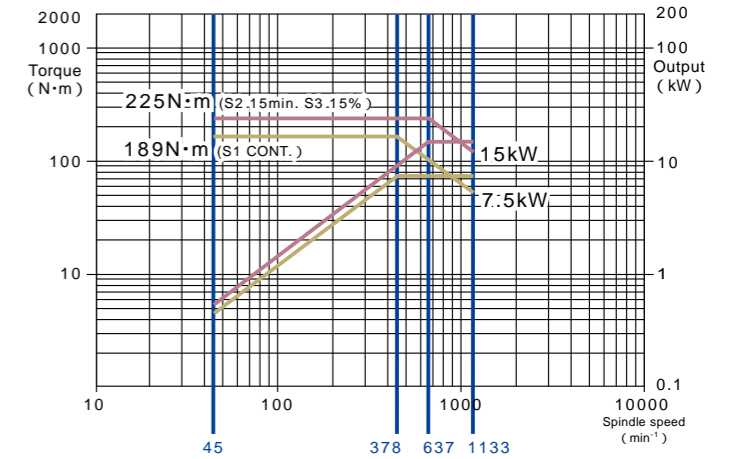
Simultaneous machining with synchronized left and right spindles contribute to faster cycle times.



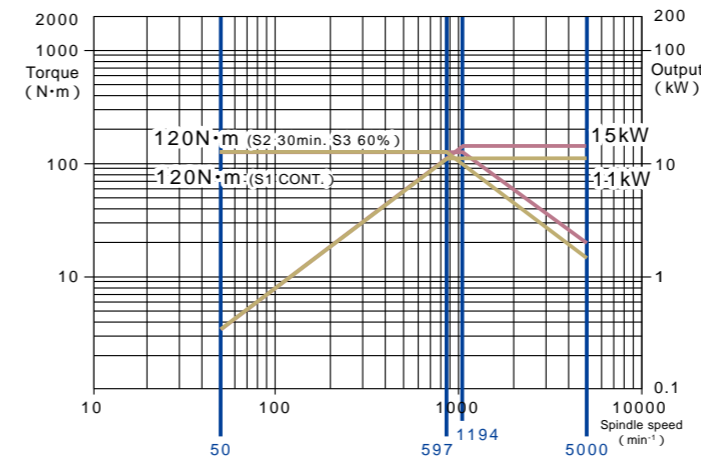
### Left spindle motor( High speed )



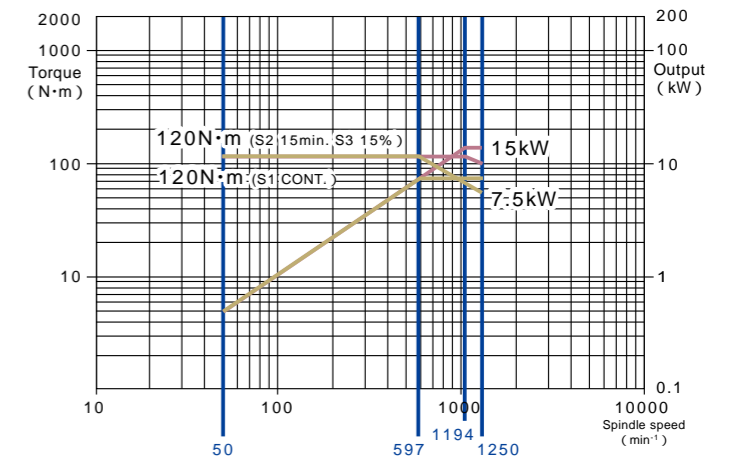
### Left spindle motor( Low speed )

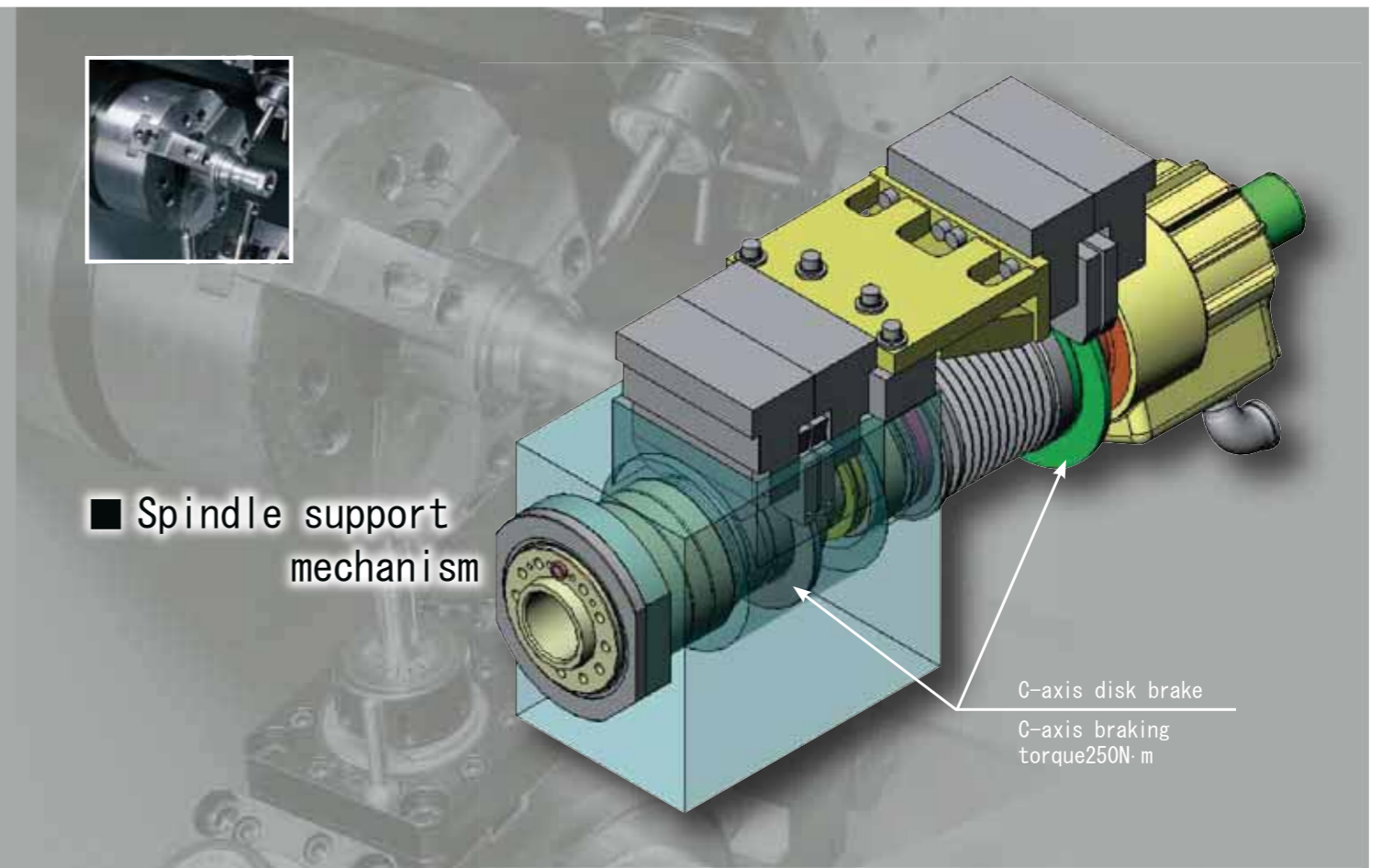
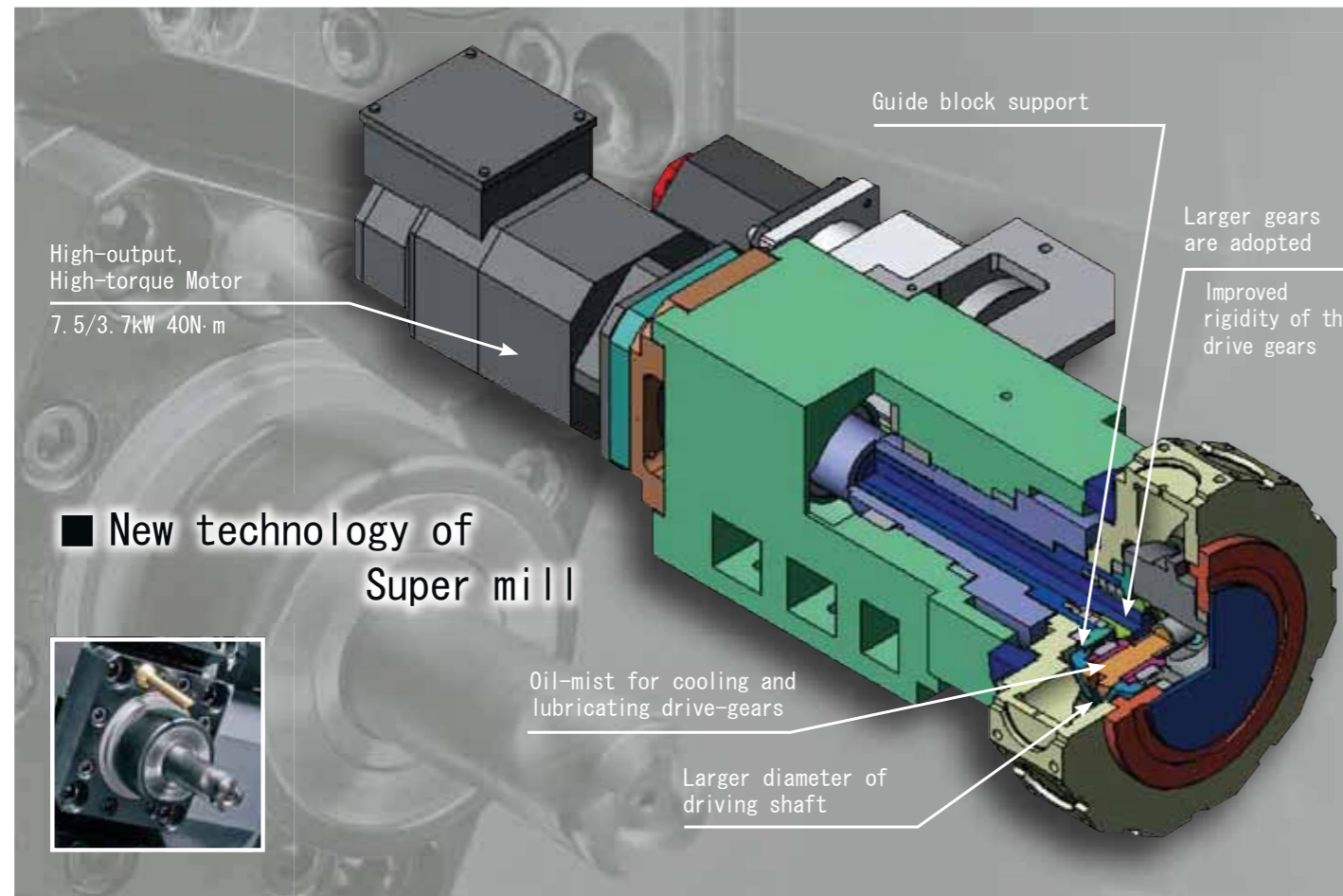


### Right spindle motor( High speed )

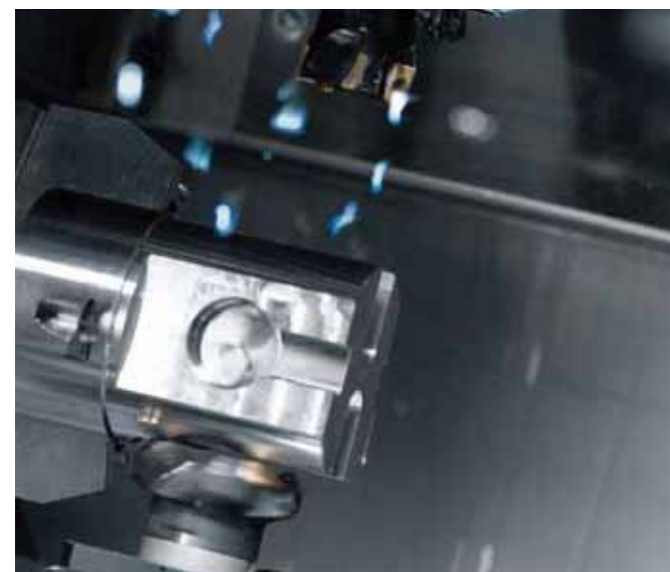


### Right spindle motor( Low speed )





Phenomenal machining ability with the high-output (7.5KW)/ high-torque motor Motor Torque Max. 40Nm



Dia.63mm Face milling cutter  
**Metal Removal Rate 90cm<sup>3</sup>/min**  
 ● Surface speed:235m/min (1200rpm)  
 ● Cutting depth:2.5mm  
 ● Feed:0.7mm/rev



Dia.20mm End mill  
**Metal Removal Rate 34cm<sup>3</sup>/min**  
 ● Surface speed:35m/min (557rpm)  
 ● Cutting depth:15mm  
 ● Feed:0.2mm/rev



Dia.25mm High feed end mill  
**Metal Removal Rate 120cm<sup>3</sup>/min**  
 ● Surface speed:235m/min (3000rpm)  
 ● Cutting depth:0.8mm  
 ● Feed:2.0mm/rev



Dia.50mm Face milling cutter  
**Metal Removal Rate 148cm<sup>3</sup>/min**  
 ● Surface speed:235m/min (1500rpm)  
 ● Cutting depth:4mm  
 ● Feed:0.7mm/rev

- High-efficiency spindle motor
- Servo-driven turret
- Servo-controlled tailstock function
- Thermal compensation system
- Turning center function
- Machining center function

### Upper Turret

Dodecagonal/ 24-station

- ◆ Y-axis stroke: ± 50mm
- ◆ Milling motor power: 7.5/3.7kW, 40/16N·m
- ◆ Milling motor speed: 6000min<sup>-1</sup>
- ◆ Servo-driven turret

### Left Spindle

High-efficiency spindle motor

- ◆ Output: 18.5/11kW 225N·m
- ◆ Speed: 4500min<sup>-1</sup>
- ◆ Bar capacity: Φ 65mm
- ◆ Spindle nose: A2-6
- ◆ Least input increment: 0.001°
- ◆ C-axis rapid speed: 600min<sup>-1</sup>

### Right Spindle

High-efficiency spindle motor

- ◆ Output: 15/11kW 120N·m
- ◆ Speed: 5000min<sup>-1</sup>
- ◆ Bar capacity: Φ 51mm
- ◆ Spindle nose: A2-5
- ◆ Least input increment: 0.001°
- ◆ C-axis rapid speed: 600min<sup>-1</sup>

### Lower Turret

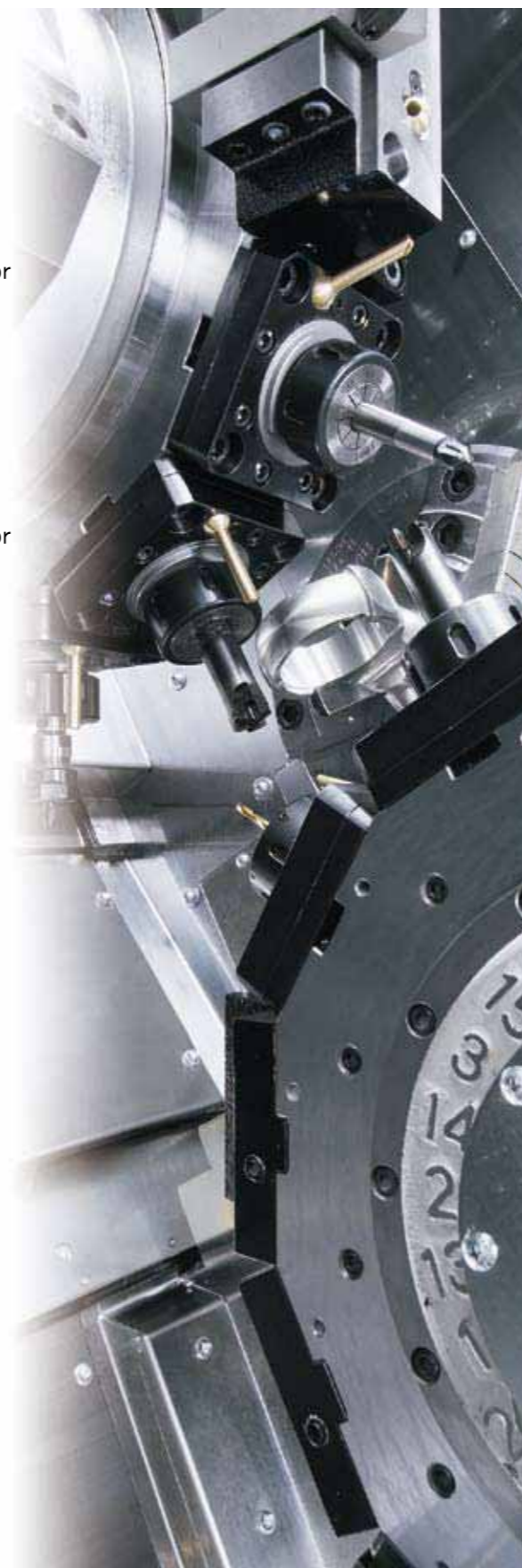
Dodecagonal/ 24-station

- ◆ Y-axis stroke: -50, +20mm
- ◆ Milling motor power: 7.5/3.7kW, 40/16N·m
- ◆ Milling motor speed: 6000min<sup>-1</sup>
- ◆ Servo-driven turret

### B-axis

Servo drive

	Turning Milling	Control FANUC 31i-A	L/R Chucks L: 8"/210mm R: 6"/165mm	Spindle Motors L: 18.5/11 kW R: 15/11 kW	Distance between centers 870mm	Spindle speed L: 4500min <sup>-1</sup> R: 5000min <sup>-1</sup>
	Max. turning diameter 225mm	Number of tool stations Dodecagonal/ 24-station	Max turning length 580mm	Milling Motor 7.5/3.7kW 6000min <sup>-1</sup>	Bar capacity L: 65mm R: 51mm	Y-axis function Upper: ± 50mm Lower: -50/+20mm



A wide variety of parts can be machined from bars, shafts, forgings or castings.

The highest productivity can be achieved with the newest technology in multi-tasking, all in a compact floor space.

*One-hit Machining!*



● Upper/ lower simultaneous Y-axis milling on the left hand side



● Upper/ lower simultaneous Y-axis milling on the right hand side



● Upper-left / lower-Right turning operation



● Upper-left/ lower-right radial milling operation



● Upper-right/ lower-left axial milling operation



● Transfer operation

# Less Fixtures! Less Set-up! Less Skills!

Necessary functions for multi-tasking are offered as standard features

"NT-Nurse II", "NT Work Navigator" and "Overload detection/ Airbag" were developed to facilitate programming and set-up, to reduce fixture costs of complex parts, and to reduce production stops.



## Nakamura-Tome Safety Technology

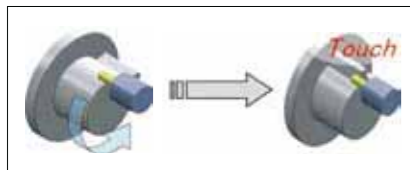
### ACTIVE SAFETY

- Avoid a crash before it happens!

Material recognition function (G310/G312) can be used not only to avoid collisions, but also to optimize the face turning process for forgings that have different lengths. In addition, it is also useful for part-loading status confirmation, machining datum shift, and distinguishing different parts.

- Fixtures no longer necessary

Parts are getting more and more complex. It is necessary to recognize irregular raw part geometry before machining. Coordinate recognition of raw part geometry, which is an essential tool for milling, can be realized with less cost, less labor and more ease. The measurement tool is a round bar, whose contact with the part triggers the coordinate values to be recorded in the CNC control. This is possible thanks to torque control technology of servo motors. In addition to eliminating the need for highly complex fixtures for chucks and stocker pallets, the cost of positioning parts can be dramatically reduced.



### Overload detection\* PASSIVE SAFETY

- A security feature to rely on when the worse happens

When unavoidable human error results in a collision, the servo drive detects overload and drastically reduces the impact on the machine by reversing the slide movement direction within less than 8 milliseconds.

In addition to minimizing damage of the first impact\*, fears that the tool will move to the next program block and cause a second impact, are reduced to zero. This standard feature is available on the X, Z, Y, C and B-Axes.



Not available

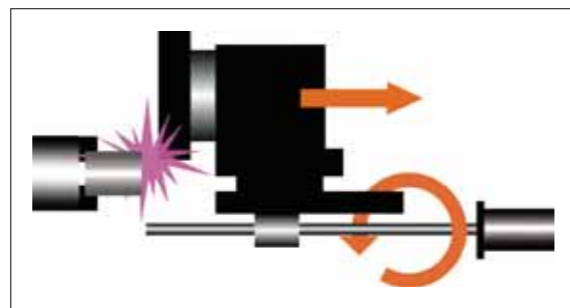


available

### NT Nurse II

- All-in-one Software package!

NT-Nurse is software that provides the operator with user-friendly environment for operation, programming, and production on the machine. Among vital features are coordinate recognition (a must for multi-tasking), direct chucking to prevent positioning error during transfer, and perfect synchronization of the left and right hand spindles. Other features include the load monitor for detecting tool breakage and tool wear, tool life management, operation condition monitoring, in addition to many other features to simply programming, set up, operation, and production, all offered in one single package.



\* This feature does not mean zero impact.

Operator full support through easy operation and reliability



DNC operation through memory card. Program can be executed from a memory card that is mounted in the provided slot.



○ standard ○ option

Program storage length	320m + 320m	Program storage length	640m + 640m	Program storage length	1280m + 1280m
Program registered number	250 + 250	Program registered number	500 + 500	Program registered number	1000 + 1000
Tool offset pairs	99pairs				

Various standard features, such as:

- NT-Manual guide i
- Program storage length 320m+320m
- Program registered number 250+250
- Tool offset pairs 99
- 10.4 Inch color display LCD
- Direct drawing dimension input programming
- Fixed cycles (G90, G92, G94)
- Multiple repetitive cycles type I (G70~G76)
- Multiple repetitive cycles type II
- Canned cycles for drilling (G80~G89)
- Synchronized mixture control
- Custom macro
- Additional custom macro common system variables
- DNC operation through memory card (Card is not included)
- Rigid tapping / spindle - milling
- Spindle synchronization
- NT-Work Navigator
- NT-Nurse
- Overload detection (Airbag)

- Index Override

Turret speed can be adjusted with the feed override rotary switch from 0 to 100% during indexing in automatic or manual mode. This can be used during fully automatic operation to reduce turret speed or even bring it to a halt when necessary.

- Jump Programming (G411)

For machines equipped with a gantry loader or a bar feeder, restarting operation after an interruption, is significantly improved. Even if the operator has to stop and reset the machine in the middle of automatic cycle, there is no need to remove all the parts from the chucks or gantry hands to restart operation. The part status displayed on the NT Nurse screen, is used to restart the program, which depending on part machining condition (raw, half-finished or finished part), jumps to the appropriate program block and re-starts from there. Thanks to this feature, programming of machines with a gantry loader has become drastically simplified, eliminating the need to divide each machining program into several sub-programs.

- Arbitrary Axis Torque Limit (G359)

During cut off and part transfer from left to right, closing the right hand side chuck may cause overload on the right hand spindle servo axis (B2-Axis), resulting in a servo alarm. By controlling the B2-Axis motor torque in a range between 20 and 100%, this feature prevents the servo motor thrust force from exceeding a certain value, by slightly moving the B2-axis when it is subjected to a certain load, thus preventing cut-off tool insert breakage and overload servo alarms.

- Deep Hole Rigid Tapping Cycle

Step feed rigid tapping cycle is useful for difficult-to-machine materials and deep holes. Regarding the tapping tool retract amount, it is possible to choose between two patterns.

- Less Control Limitations

Contrary to previous control limitations, rigid tapping and polygon machining (option) are now possible on either spindle with upper or lower turret. Rigid tapping is a standard feature.

# The NT Nurse with its user-friendly features

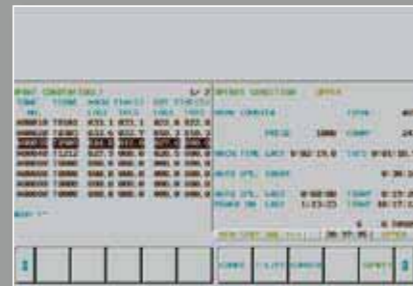


A machine management feature, that contributes to drastic reduction of set-up time.

NT-Nurse provides a user-friendly environment to achieve the best production results. Among NT Nurse features are the Load Monitor for monitoring tool breakage and tool wear, the Soft Work Pusher for accurate parts transfer, as well as several other features to prevent errors and facilitate production.



● Menu display



● Operation condition display



● Alarm display



● Tool life(Spare tool call-up)



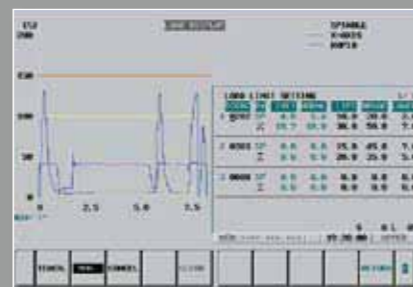
● Tool counter



● Alarm history display



● Offset history



● Load monitor



● Air cut



● Ecology Setting



● Quick offset input



● Work-piece statement display  
Display for machines with Gantry Loader.

These are part of 24 functions.

# Luck-bei II NT Manual Guide i

A programming system for creating NC programs (ISO/EIA G-code programs) easily. Among its features are: creating machining cycles (conversational function), cutting, copying, pasting and moving already-programmed machining processes, setting waiting M-codes, as well as simulating NC programs using tool path or solid models.

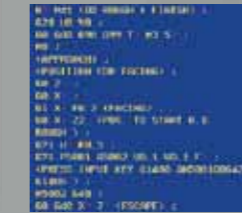
## ●Process editing function

A function that automatically recognizes and extracts the name and order of all machining processes, then displays them in a table layout. Machining processes can be moved, copied or swapped easily. In addition, waiting M-codes can be added with the click of a button.



- Separate display based on Spindle and Turret
- Displayed in a clear layout

### ■ Program Display



Waiting M-code line-up function

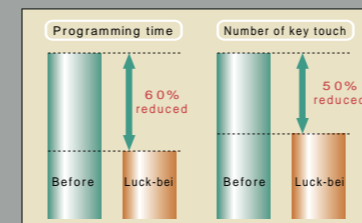
## ●Fixed form function

- Over 600 fixed forms are now standard (10 times more than before)
- Fixed forms can be easily selected from a menu.
- Customer-made programs can be registered.



## ●Machining process (conversational) function

- Complex machining processes created with minimum key strokes
- Best guidance for Nakamura-Tome multitasking machines
- Smooth programming without confusion



Guided programming of NT Nurse and NT Work Navigator functions is also possible through the conversational function.



■ Work Navigator programming screen

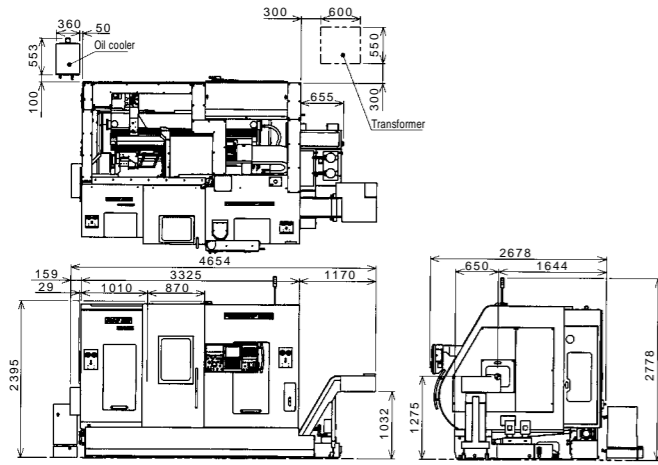


■ Soft work pusher programming screen

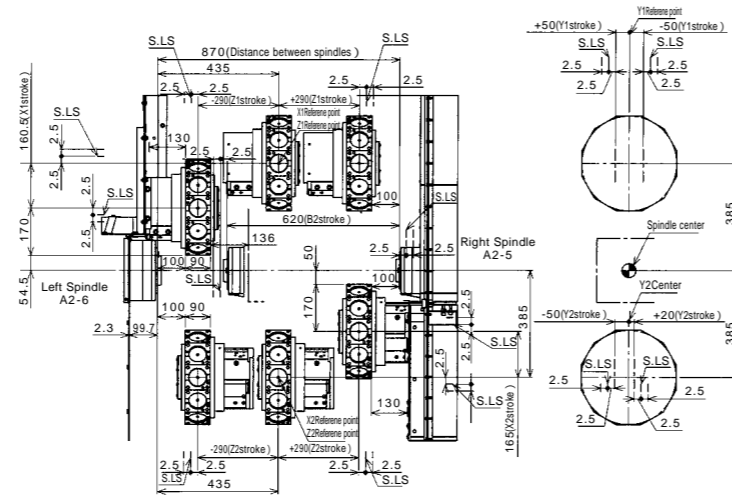


■ Soft quill pusher programming screen

Floor Space



Stroke Related



Machine Specification

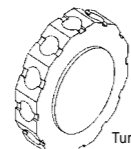
<b>Capacity</b>	
Max. turning diameter	215mm
Standard turning diameter	150mm
Distance between centers	max 870mm / min. 250mm
Max. turning length	580mm
Bar capacity L/R	L : 65mm R : 51mm
Chuck size	L : 210mm (8") R : 165mm (6")
<b>Axis travel</b>	
Slide travel (X1 / X2)	160.5mm/160mm
Slide travel (Z1 / Z2)	580/580mm
Slide travel (Y1 / Y2)	± 50mm/-50mm, +20mm
Slide travel (B2-axis)	620mm
Rapid feed X1 / X2	18 m/min
Rapid feed Z1 / Z2	36 m/min
Rapid feed B2 axis	36m/min
Rapid feed Y1 / Y2	10m/min
<b>Left and Right spindles</b>	
Spindle speed	4500min <sup>-1</sup> 5000min <sup>-1</sup>
Spindle speed range	Stepless Stepless
Spindle nose	A2-6 A2-5
Hole through spindle	80mm 63mm
I.D. of front bearing	110mm 90mm
Hole through draw tube	66mm 52mm
<b>C-axis</b>	
Least input increment	0.001°
Least command increment	0.001°
Rapid index speed	600min <sup>-1</sup>
Cutting feed rate	1 ~ 4800° /min
C-axis clamp	Disk clamp
C-axis engagement time	1.5sec.
<b>Upper/Lower turret</b>	
Type of turret	Dodecagonal drum turret
Number of Tool stations	24
Number of Indexing positions	24
Tool size (square shank)	□ 25mm
Tool size (round shank)	φ 32mm
<b>Driven tools</b>	
Rotary system	Individual rotation
Spindle speed	600min <sup>-1</sup> 3600min <sup>-1</sup> ※1
Spindle range	Stepless
Number of driven-tool stations	12 × 2
Collet size	AR32
Holder type and tool size	
Straight holder	φ 2mm ~ φ 20mm
Cross holder	φ 2mm ~ φ 20mm
<b>Drive motor power and torque</b>	
L-spindle	18.5/11kW 225/185N · m
R-spindle	15/11kW 120/120N · m
Driven-tool spindles	7.5/3.7kW 40/16N · m
<b>General</b>	
Machine height	2395mm
Floor space	4436mm × 2674mm
Floor space	4905mm × 3331mm ※2
Machine weight	12000kg
<b>Power source</b>	
Power supply	69.2kVA ※3
Air supply	400L/min

Control Specification

<b>Items</b>	
Control Type	FANUC 31i-A 2-PATH
<b>Controlled axes</b>	
Controlled axes	9-axes
Simultaneously controlled axes	4-axes (Upper X, Z, C, Y) + 4 axes (Lower turret X, Z, C, Y, B2)
<b>Input command</b>	
Least input increment	X, Z, Y, B2: 0.001mm / 0.0001inch (diameter for X-axis), 0.001deg.
Least command increment	X: 0.0005mm, Z: 0.001mm, C: 0.001°, B2: 0.001mm, Y: 0.001mm
Max. programmable dimension	± 99999.999mm / ± 39370.0787in, ± 99999.999°
Absolute / incremental programming	X, Z, C, Y, B2 (absolute only for B1, B2) / U, W, V, H
Decimal input	Available
Program code	EIA / ISO automatic recognition
Inch / Metric conversion	G20 / G21
Programmable data input	G10
<b>Feed function</b>	
Cutting feed	feed / min X 1 ~ 4800mm/min, 0.01 ~ 188inch/min Z 1 ~ 4800mm/min, 0.01 ~ 188inch/min C : 1 ~ 4800degree/min B2 : 1 ~ 4800mm/min, 0.01 ~ 188in/min feed/rev 0.0001 ~ 4800.0000mm/rev 0.000001 ~ 50.00000in/rev
Dwell	G04
Feed per minute / Feed per revolution G98/G99	G98/G99
Thread cutting	G32
Thread cutting retract	Available
Continuous thread cutting	Available
Variable lead threading	G34
Handle feed	Manual pulse generator 0.001/0.01/0.1mm. ° (per pulse)
Automatic acceleration/ deceleration	Available
Linear acceleration/ deceleration after cutting feed interpolation	Available
Rapid feed override	F0/25/100% (changeable to every 10% by switch)
Cutting feed-rate override	0 ~ 150% (each 10%)
AI contouring control I	G5.1
<b>Program memory</b>	
Part program storage length	640m
Part program edit	delete, insert, change
Program number search	Available
Sequence number search	Available
Address search	Available
Number of registrable programs	500programs (Upper/Lower 250each)
Program storage memory	backed up by battery
Multiple program simultaneous editing	Available
DNC operation through memory card	Available (Only one turret can access memory card at a time (not including memory card))
Extended part program editing	
Available	Available
<b>Operation and display</b>	
Operation panel: Display	10.4"color LCD
: Keyboard	Separate type MDI unit (standard keys)
<b>Program support</b>	
Circular interpolation R programming	Available
Direct drawing dimension programming or Chamfering / Corner R	Available (Direct drawing dimension programming is standard)
Canned cycle	G90, G92, G94
Multiple repetitive canned cycle	G70 ~ G76
Multiple repetitive canned cycle II	Available
Canned cycle for drilling	G80 ~ G89
Synchronized mixture control	Available (used for C axis control from Lower)
Sub program	Available
Balance cut	G68, G69
Custom macro	Available
Addition to custom macro common variables	Available (After addition, #100-#199, #500-#999)
Helical interpolation	Available
Luck-bei II	Available
Abnormal Load detection	Available
NT Work Navigator	Available (not including contact bar)
NT NURSE	Available

Tooling System

mm  
inch



Quick change tool holders are optionally available (Op. Sandvik Capto C3)  
Straight holder, cross holder, OD/ID turning holders also optionally available.  
Note: AR20 Collets For Capto C3: Max. Diameter 13mm  
Note: (\*) For quick change holders, Capto C3 turret option is necessary

