

# WY-100II

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

# WY-100II

High Productivity Multitasking Machine

From diversified small-lot production to mass production

Nakamura-Tome

Innovation Technology

Creating Value

## Compact Machine with Powerful Machining Capabilities

### One hit machining

Finished parts, complete in one set up

15  
15-Station

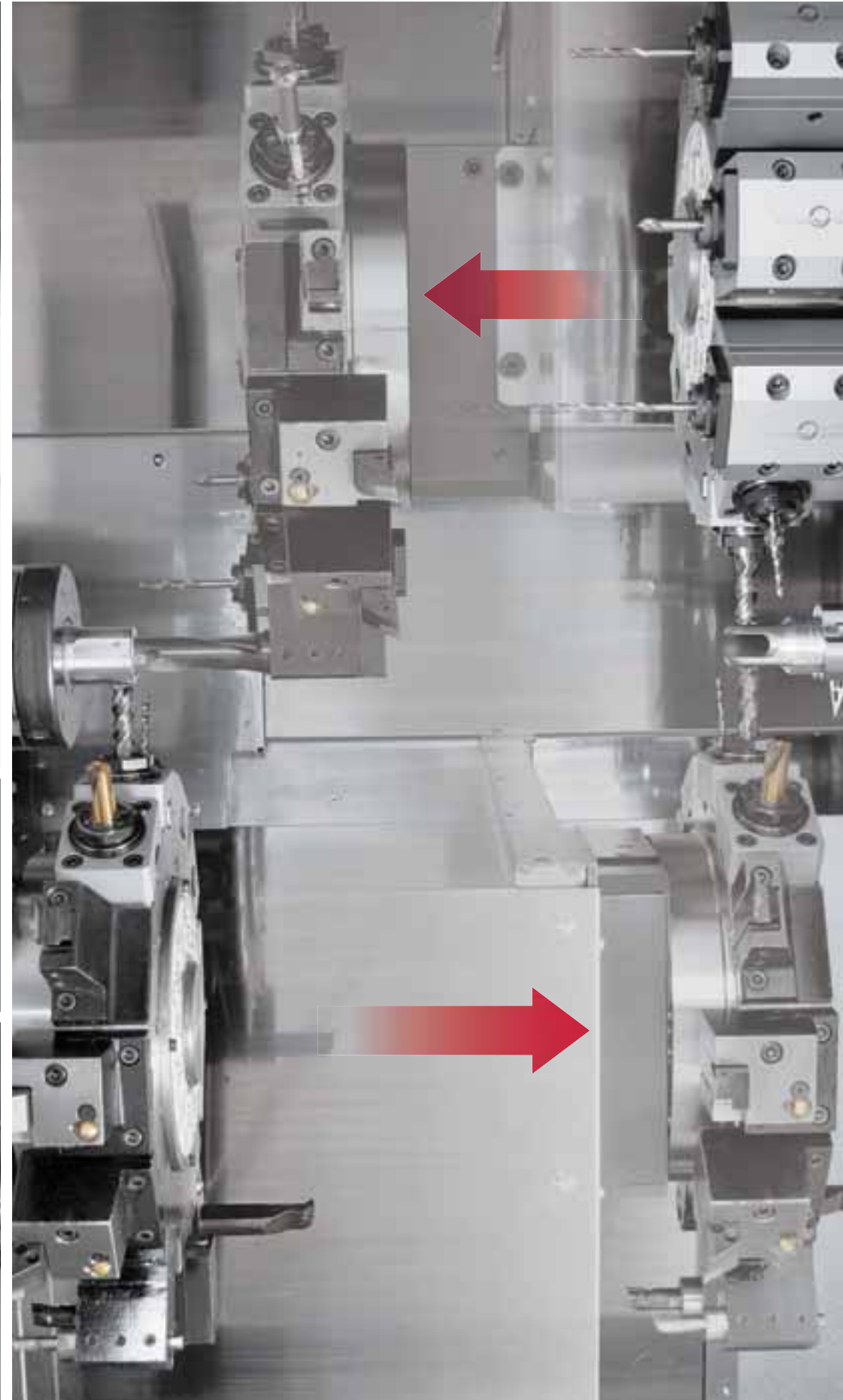
12  
24-Station



M<sub>x2</sub>  
Double Milling Motor

Y<sub>x2</sub>  
Double Y-axes





# High Productivity

**Top Leader of One-hit Machining**

No Work in Process  
 Less setup time  
 Complete in one setup

12-Station Turret

# 48

12 / 24 - Station

24 + 24

15-Station Turret

# 30

15 - Station

15 + 15

Double Performance!

# M<sub>x2</sub>

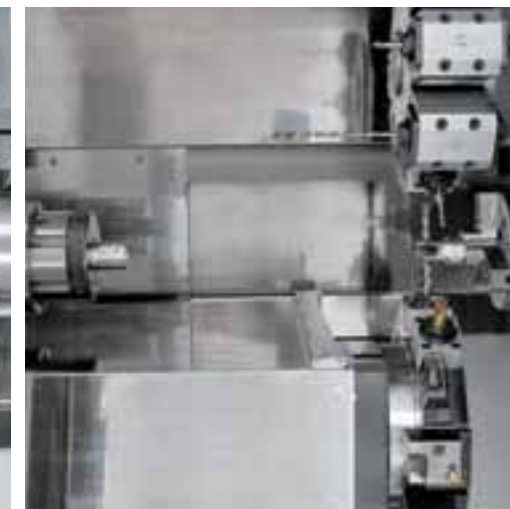
Milling-tool motor  
 7.1/2.2kW (6,000min<sup>-1</sup>)

Milling-tool motor (op.)  
 5.5/2.2kW (8,000min<sup>-1</sup>)

Y-axis on upper  
 and lower turrets

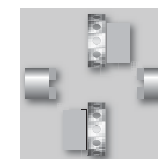
# Y<sub>x2</sub>

Y-axis travel  
 ±42 / ±32.5mm (12st)  
 ±31 / ±31mm (15st)



19"  
Color LCD  
Touch Panel

NT  
Smart  
X



T<sub>x2</sub>  
Double turret

M<sub>x2</sub>  
Double Milling Motor

Y<sub>x2</sub>  
Double Y-axes

S<sub>x2</sub>  
Twin-Spindle

C<sub>x2</sub>  
C-axes

Capacity		42mm	51mm (op.)	65mm (op.)
Max. turning diameter / Max. turning length	12st.	175mm / 588mm	200mm / 570mm	
	15st.		190mm / 570mm	
Distance between spindles	max. 820mm / min. 200mm			
Bar capacity		42mm	51mm	65mm
Chuck size	165mm (6")			

Axis travel				
Slide travel (X1 / X2)	12st.	150mm / 135mm	150mm / 141mm	
	15st.	130mm / 130mm		
Slide travel (Z1 / Z2)	12st.	588mm / 560mm	570mm / 560mm	
	15st.	570mm / 560mm		
Slide travel (Y1 / Y2)	12st.	±42mm / ±32.5mm		
	15st.	±31mm / ±31mm		
Slide travel (B)	620mm			

Spindle L, R				
Spindle speed		6,000min <sup>-1</sup>	5,000min <sup>-1</sup>	4,500min <sup>-1</sup>
Spindle motor output (L / R)		11/7.5kW	11/7.5kW	15/11kW (op.)
Spindle motor torque (L / R)		76/39N·m	77/39.4N·m	85/43N·m

Turrets				
Number of turrets	2			
Driven-tool spindle speed	6,000min <sup>-1</sup> (op. 8,000min <sup>-1</sup> Only for 12-station turret)			
Drive motor	7.1/2.2kW (op. 5.5/2.2kW)			
Type of turret head / Number of indexing pos.	12st.	Dodecagonal drum turret / 24		
	15st.	15-station turret / 15		
Drive type / Number of driven-tool stations	12st.	Individual rotation / 12		
	15st.	Individual rotation / 15		

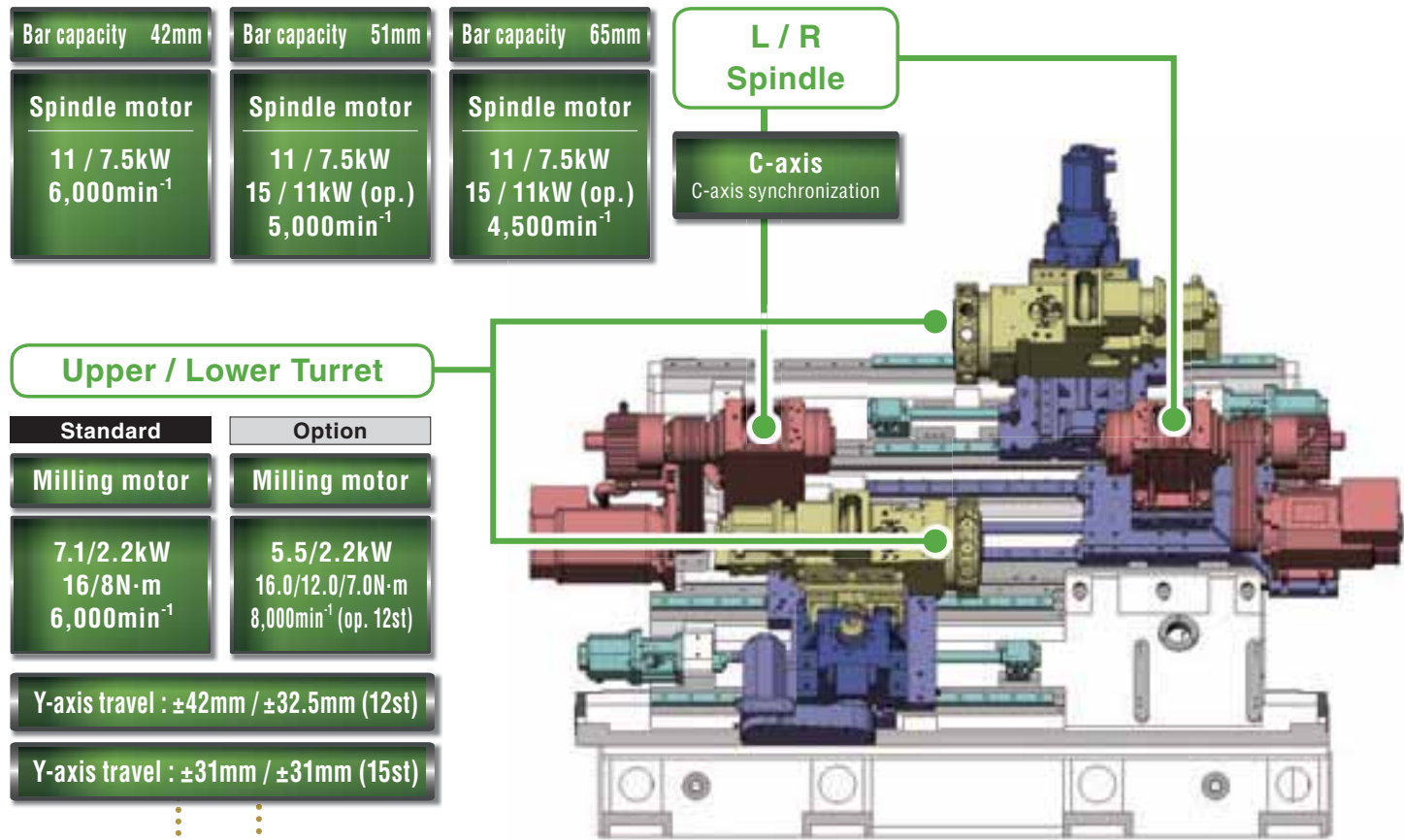
General				
Floor space (LxWxH)	3,424mm × 2,257mm × 1,930mm			
Machine Weight (incl.control)	8,500kg			

Bar Capacity and spindle motor configurations		R Spindle motor				
	Bar capacity	Spindle motor output				
		42		51		65
		11/7.5kW	11/7.5kW	15/11kW	11/7.5kW	15/11kW
		6,000min <sup>-1</sup>		5,000min <sup>-1</sup>		4,500min <sup>-1</sup>
L Spindle motor	42	11/7.5kW	6,000min <sup>-1</sup>			
	51	11/7.5kW	5,000min <sup>-1</sup>			
		15/11kW				
	65	11/7.5kW	4,500min <sup>-1</sup>			
15/11kW						



# WY-100II Evolution into High Productivity Multitasking Machines

# WY-100II Various applications and increased productivity



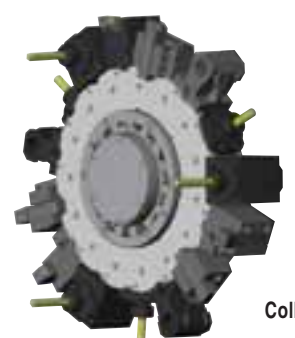
48 stations

30 stations



**12 / 24 - Station Turret**

Turret type: Dodecagonal  
 Number of tools: 24  
 Number of indexing pos.: 24  
 Number of driven-tools: 12  
 Max. Speed of driven tools: 6,000min<sup>-1</sup>  
 (op. 8,000min<sup>-1</sup>)  
 O.D. turning tool: 20/16mm  
 I.D. Boring: dia.25mm  
 Collet diameter for driven tools: 1mm to 14mm



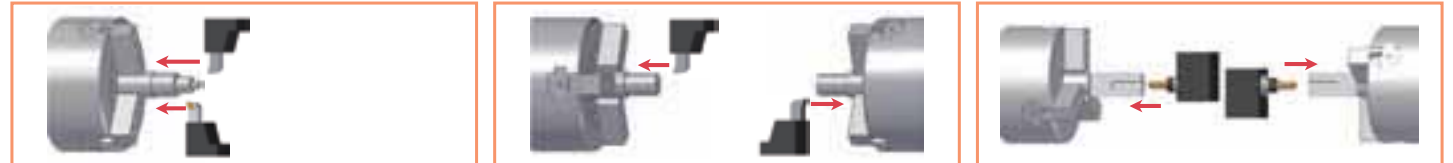
**15 - Station Turret**

Turret type: 15 - station turret  
 Number of tools: 15  
 Number of indexing pos.: 15  
 Number of driven-tools: 15  
 Max. Speed of driven tools: 6,000min<sup>-1</sup>  
 O.D. turning tool: 20/16mm  
 I.D. Boring: dia.25mm  
 Collet diameter for driven tools: 1mm to 14mm

## Perfect Flexibility!

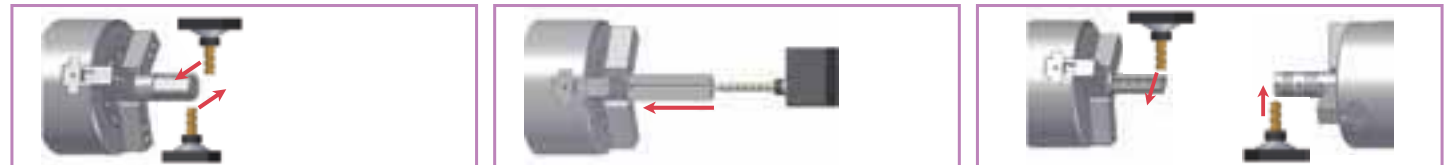
Whether machining from bar stock, shaft work, castings or forged parts, the most suitable process combination can be made, thanks to maximum flexibility. In spite of its compact floor space, this machine priding itself for high productivity is the latest in multitasking technology.

### TURNING PROCESS



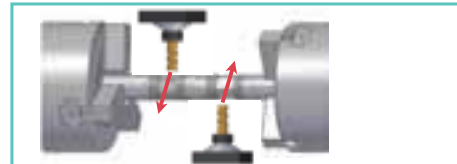
Balance cutting      Individual OD machining      Individual ID machining

### Milling



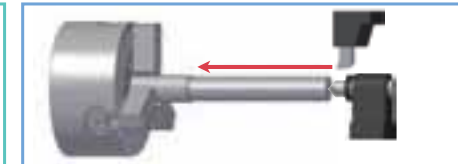
Simultaneous dual milling      Deep drilling      Individual milling on the left and right spindles

### Work-holding with 2 chucks



Simultaneous Y-axis milling with upper and lower tools

### Work-holding with Center support



OD cutting with Center support.



Increase work rigidity by PULL-Tension for Weak parts



Description	
Work name	Yoke
Type of industry	Aeronautics industry
Machining time	11 min 30 sec
Material	Duralumin
Material dimensions	42mm bar stock



**Upper & lower simultaneous Y-axis machining with main & sub spindle work-holding**  
(Complete C axis synchronization)

Type : Endmill EPP3160-CS      Feed : 0.45mm/rev (Rough)  
 Dia : 16mm      Cutting depth : 5mm  
 rpm : 1200min<sup>-1</sup>      Process time : 90sec



**deep hole milling operation**

Type : 20WHNSB0600-SD      Speed : 113m/min  
 Dia : 6mm      Cutting depth : 120mm(20D)  
 rpm : 6000min<sup>-1</sup>      Process time : 7sec  
 Feed : 0.35mm/rev



# High-Performance Turning and

# Milling Motors.

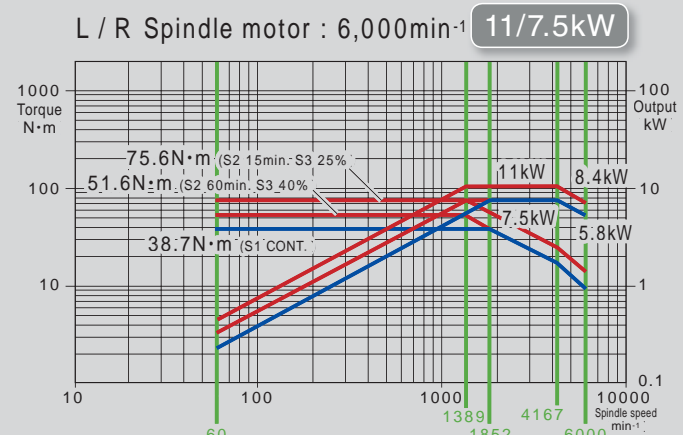
From simple to complex parts  
One hit machining from raw material to finished part



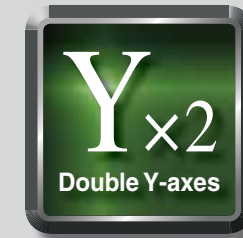
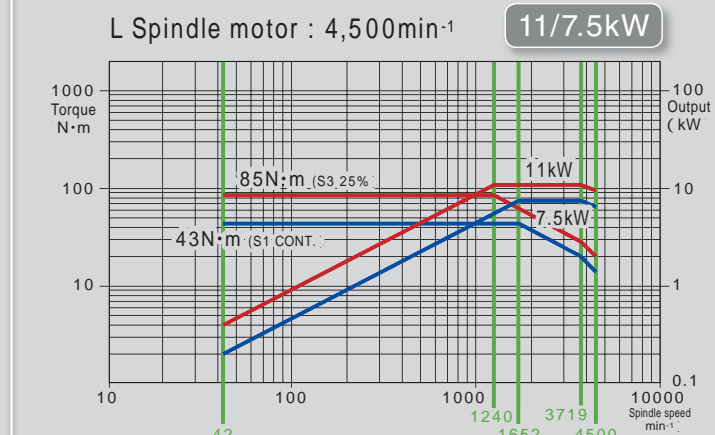
## WY-100II

Cycle time reduced through simultaneous machining on Left and Right hand spindles.

42mm **Standard**

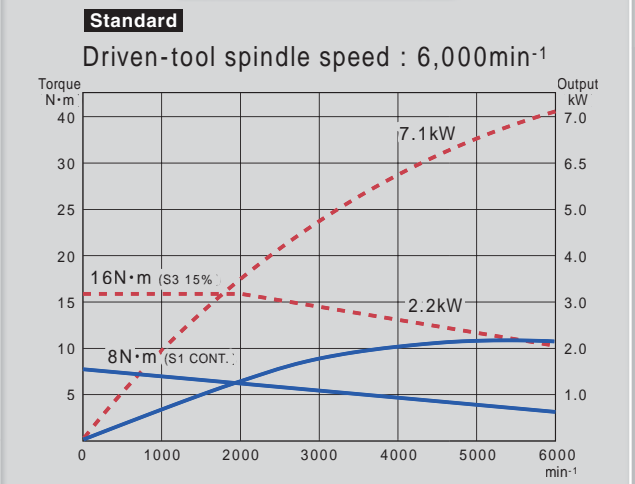


65mm **Option**

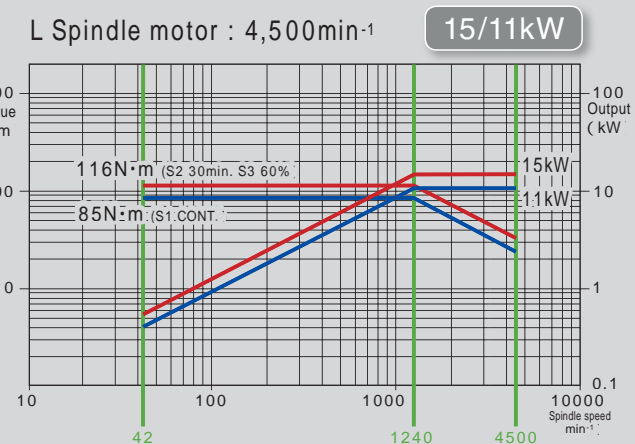
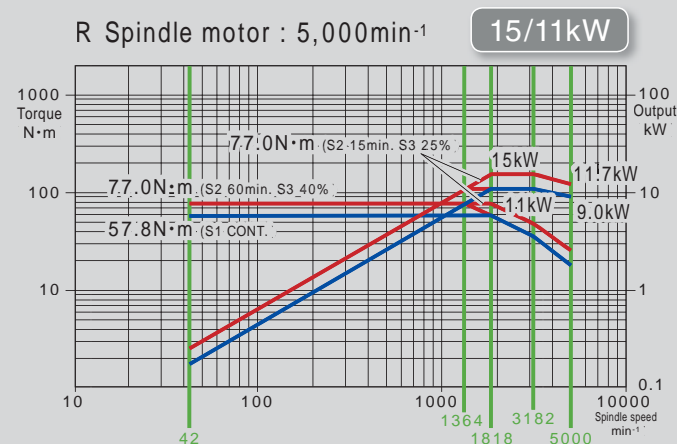
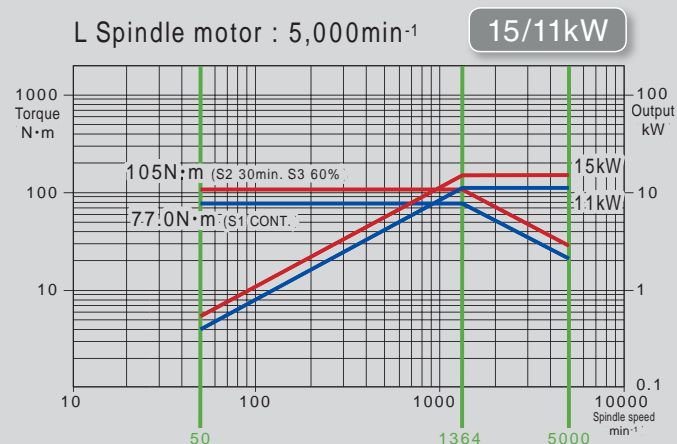
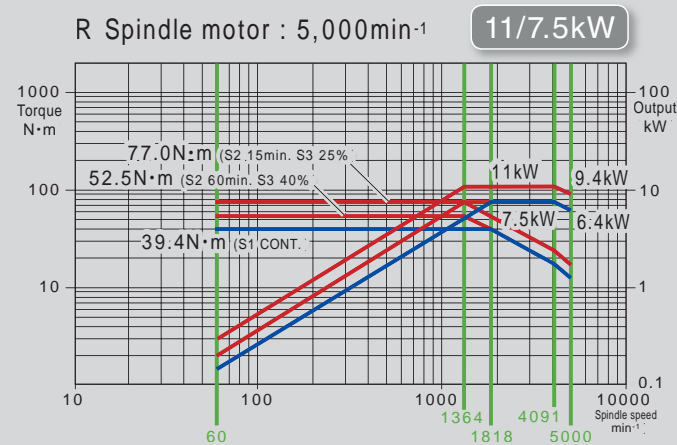
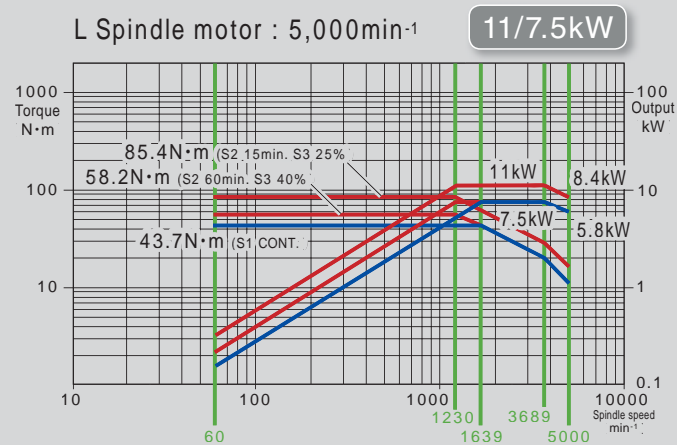


## Upper & Lower Milling Motors

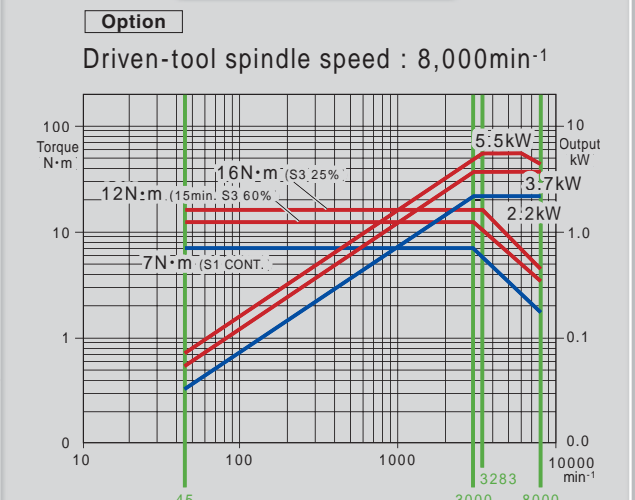
**7.1 / 2.2kW**



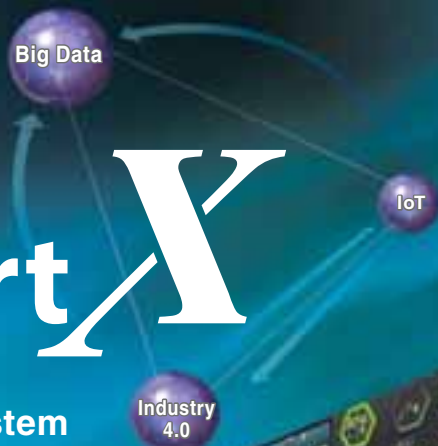
51mm **Option**



**5.5 / 2.2kW**







# NT Smart X

## Advanced Production System

- 3D Smart PRO
- Original Menu Screen
- Voice Guidance
- Multiple-Touch screen
- Windows 8.1



• 19 inch color LCD Touch panel • PC memory 8GB • QWERTY Key board • Windows 8.1 • Touch Pad • USB 2.0 port x 2

Program storage length	Total 256Kbyte (640m)	Total 512Kbyte (1,280m)	Total 1Mbyte (2,560m)	Total 2Mbyte (5,120m)	Total 24Mbyte (10,240m)	Total 28Mbyte (20,480m)
Program registered number	Total 500	Total 1,000	Total 1,000 or Total 2,000	Total 1,000 or Total 4,000		
Tool offset pairs	99 + 99					

Standard / Option

### Main features

- NT Manual Guide i
- NT Work Navigator
- Airbag (Overload detection)
- Advanced NT Nurse
- Status Display Function
- Setup Display
- Trouble Guidance
- Productivity Function
- Operation Level Control Function
- Warm up Function
- Built-in Loading Device Setting Screen (op.)
- Parts Catcher G Operation Function (op.)
- NT Machine Simulation
- NT Collision Guard
- NT Multitasking Office (op.)
- Net Monitor (op.)
- 3D Smart PRO



#### Cut-in Check

The machine can be stopped immediately while in automatic cycle. After reading G00 command in the machining program, the Spindle, Tool spindle, Axis Feeding and Coolant will stop. It is faster than M01 optional stop. After checking the machine internal status, the machining can be restarted by pressing "Program restart" button.

**Start Up Conditions [ UPPER ]**

- W301 : FRONT DOOR IS NOT CLOSED
- W302 : RETURN THE Y-AXIS ZERO POS
- W304 : 4th-SETTING OF PROGRAM NO SEARCH
- W306 : TURRET IS NOT CLAMPED
- W307 : INTERLOCK OF THE BAR-FEEDER
- W331 : TOOL IS NOT CLAMPED(TOOL-SPINDLE)

Update Close

Cycle start condition is popping up by pressing reference position LED.

Color of perimeter becomes white when override setting is 100%.

Driven-tool Rotating Speed

Waiting tool number for upper turret

Spindle Status

Work counter

Selected head shown in blue color

Remaining count Value

Turret status display

Machine status display

Load status display

Reference position LED

- Blue : Index ready
- Green : Reference position return
- Green Flashing : 2nd Reference position return
- Blue : Cycle start ready

Tool number is displayed during automatic cycle.

Spindle RPM

Waiting tool number for lower turret

Operating status display

- Green : Automatic operation
- White : Feed hold
- Yellow : Warning
- Red flashing : Alarm

Auxiliary information display

Counter and Remaining counter information are displayed. Ticker can be stopped by touching the screen.

Spindle load meter

- Red : 120% -
- Yellow : 100% -120%
- Green : 0 -100%

Load meter

- Red : 120% -
- Yellow : 100% -120%
- Green : 0 -100%

Blank

Middle pf process

Part complete

Remnant

Quill

Shortcut bar

Most used icons can be registered at right side of display.

### G131 Soft work pusher

This cycle is used during part transfer from left to right side spindle. Once part contact with the jaws or stopper of the right side spindle has been confirmed, the right side spindle servo axis stops.



- Contact force can be changed in the program.
- It is possible to set OK/ NG range as well.
- An additional work pusher for the right side is not required and cycle time can be reduced.

### G376 Soft quill pusher cycle

Thrust force of center support can be set in the program by using servo motor technology, which helps keeping a constant pushing thrust during cutting.



- It is available for Z axis and B2 axis.
- Quill thrust force can be changed in the program.
- It is possible to set OK/ NG range as well.



## Dual safety

NT Machine Simulation / NT Collision Guard + Airbag

# Dual safety



### Double safety features for maximum protection

NT collision Guard to avoid machine collision and Air bag function (Abnormal load detection) to minimize damage even in case of collision.

## NT Machine Simulation

Prevent collision due to tooling, chucks, or program.



Simulation is performed to check the programs without running the machine. This helps prevent machine collisions due to programming or setup errors.

"Distance to go" and "Modal information" can be checked during with simulation.

Rapid feed and Cutting feed can be adjusted using override setting. It is possible to make Simulation of each process, or to use single block.

Process

Single block



Simulation of part machining. There are several view screen display settings, such as machine display, turret display and tooling display.



It is possible to choose between "with" or "without" program display. The color of the program block being simulated can be set to be displayed in a different color.

## NT Collision Guard



Preventive safety technology - Machine collisions are avoidable!

This function is available in automatic mode and manual mode. Collisions can be prevented, especially after modifying the program, or changing the tool geometry offset. Registered machine data, chucks, tools, holders, and parts are used to monitor the machine during automatic, manual or jog movement, and recognize in advance collisions before they happen. Even turret indexing is monitored to avoid collisions, drastically reducing machine collision risks, especially during set up.

• Model setup was simplified. Type of tool being indexed is automatically sorted out from the program, and the tool model can be selected from a displayed list.

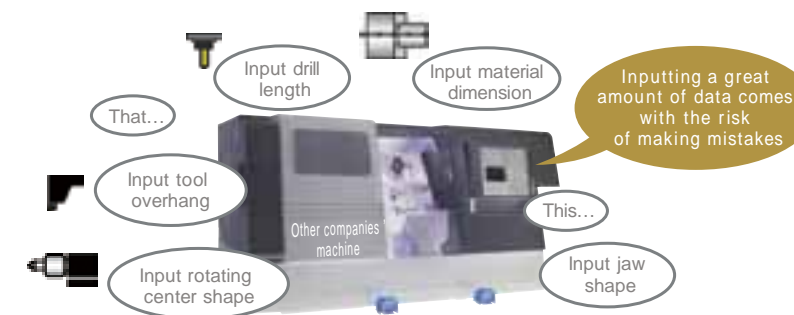


## Airbag (Overload detection)

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

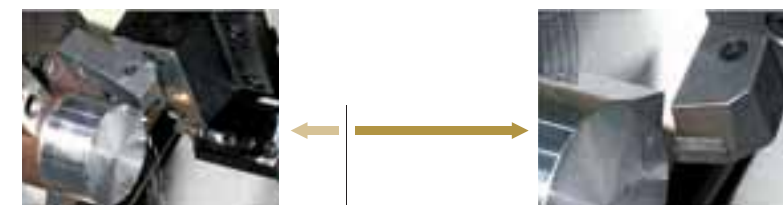
Even with barrier function, machine collisions may occur

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



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

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



Without Airbag

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

With Airbag

Retraction within 0.008 sec  
Crash!  
Within 8 milliseconds after the crash, servo motor-feeding direction is reversed and the machine stops in EMG mode.



Video



Crash

\* This feature does not mean zero impact.

## NT Work Navigator

New Navigator for X-axis and Y-axis

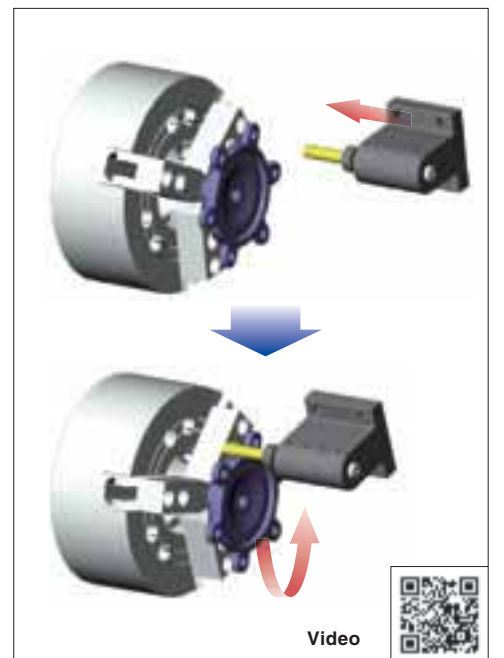
X Y Z B C

• Advanced NT Work Navigator !

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

• No fixtures required

Machining parts with non-round shapes, such as forgings or castings requires that the raw part coordinates be recognized by the CNC control. In order to achieve this without requiring extra cost or additional options, the NT Navigator is used. It works just by touching the part with a simple inexpensive probe (mostly round bar mounted on a tool holder) and using the torque control feature of the servo-motor, which is to record required coordinates in the CNC. The NT Navigator is a cost cutting feature in multitasking machines, eliminating the need for positioning fixtures and special clamping devices.



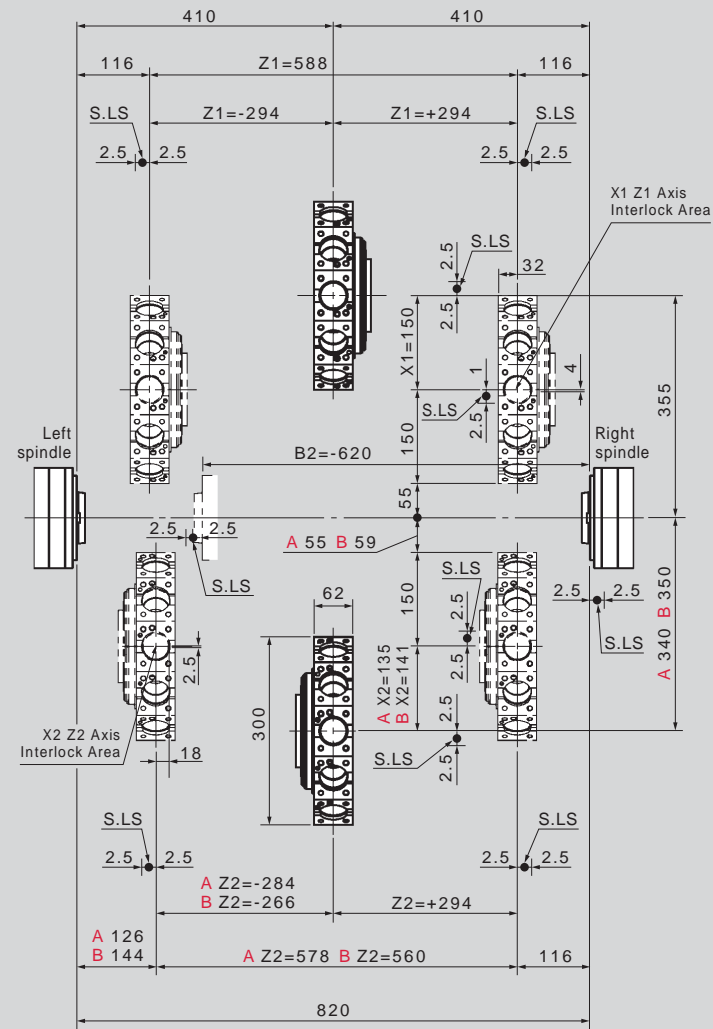
Video





# Slide Travel Range

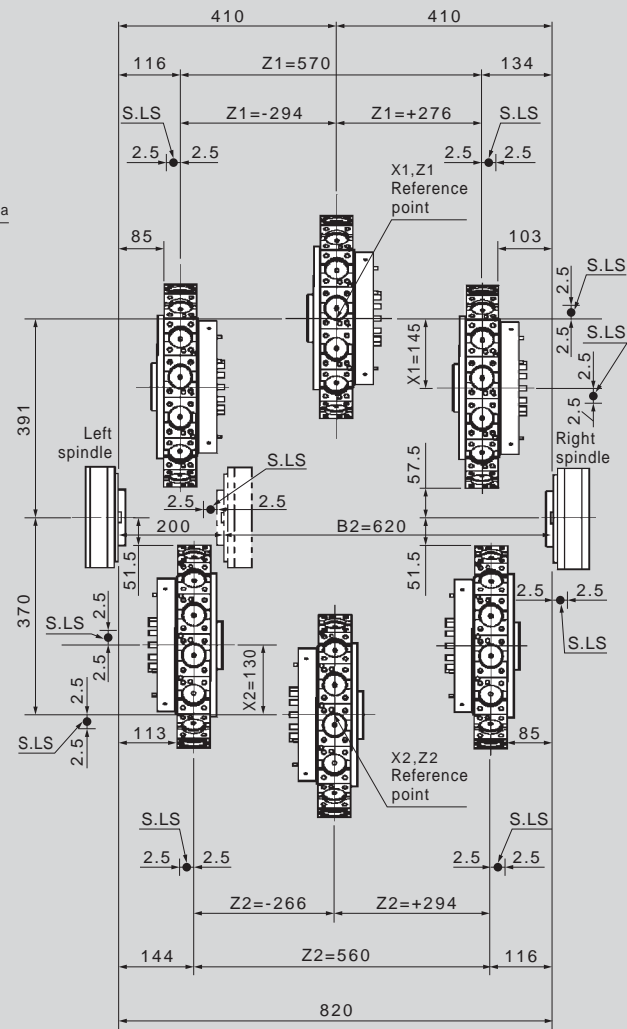
12 / 24 - Station



A : L, R 42  
B : L 51, 65 / R 42, 51, 65

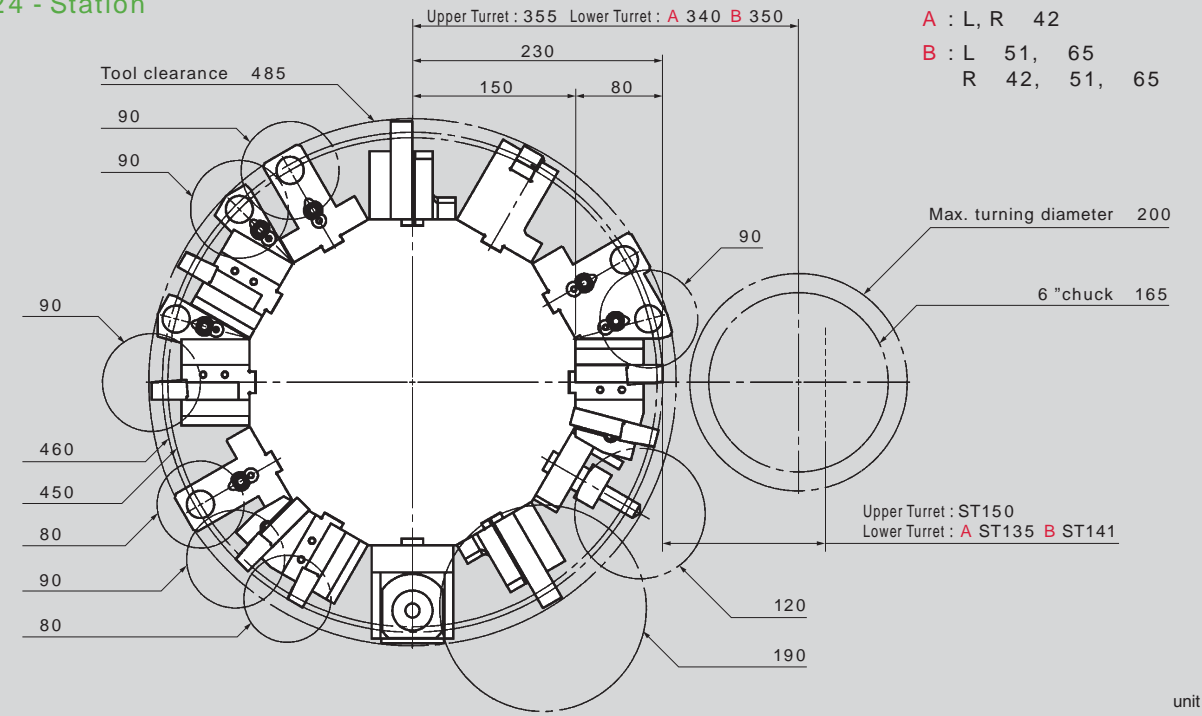
unit : mm

15 - Station



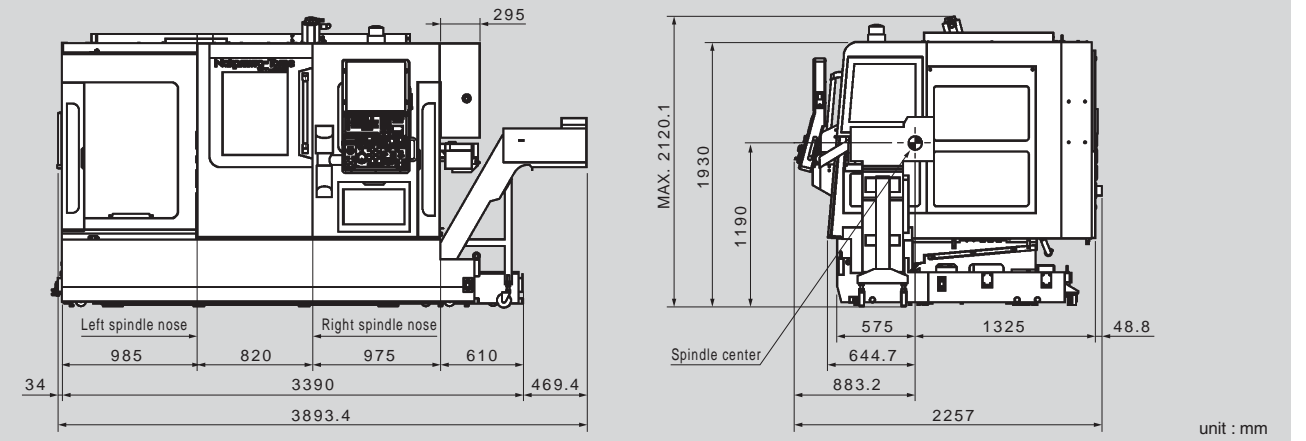
# Tool Interference

12 / 24 - Station



unit : mm

# Machine Dimensions



unit : mm

**WY** 2 Turret  
2 Spindle  
**SERIES**



WY-100II



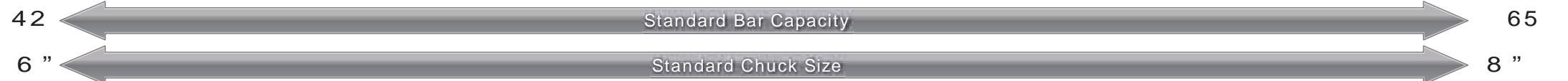
WY-150



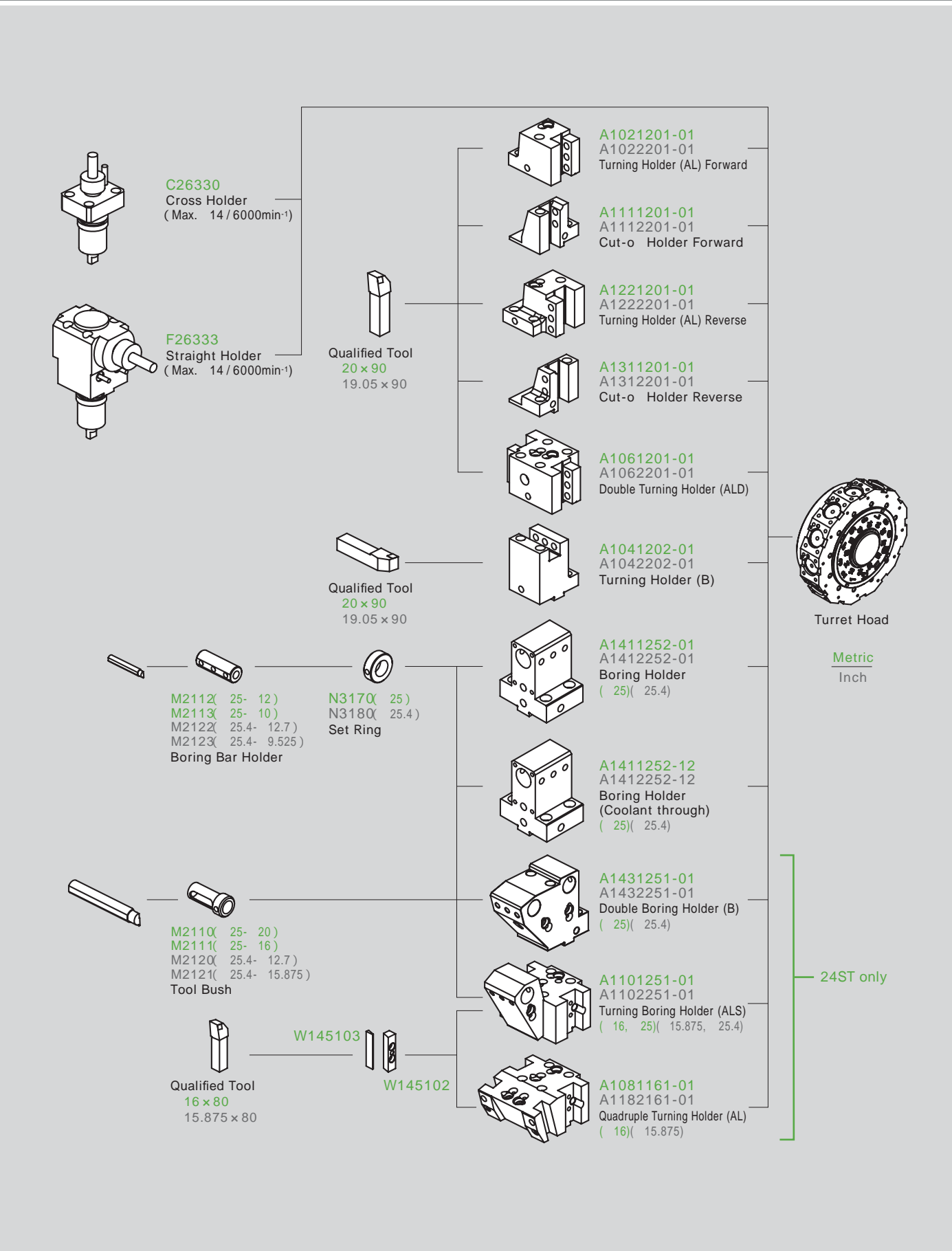
WY-250



WY-250L



## Tooling System Diagram (15/24 station)



## Machine Specification

Capacity	42mm	51mm (op.)	65mm (op.)
Max. turning diameter	12st 15st	175mm 200mm	190mm
Standard turning diameter	170mm		
Distance between centers	max.820mm / min.200mm		
Max. turning length	588mm	570mm	
Bar capacity	42mm	51mm	65mm
Chuck size	165mm (6")		
<b>Axis travel</b>			
Slide travel (X1 / X2)	12st	150mm/135mm	150mm / 141mm
	15st	130mm / 130mm	
Slide travel (Z1 / Z2)	12st	588mm/578mm	588mm / 560mm
	15st	570mm / 560mm	
Slide travel (Y1 / Y2)	12st	±42mm / ±32.5mm	
	15st	±31mm / ±31mm	
Slide travel (B)	620mm		
Rapid feed X1 / X2	20m/min		
Rapid feed Z1 / Z2	40m/min		
Rapid feed B axis	40m/min		
Rapid feed Y1 / Y2	8m/min		
<b>Left and right spindles</b>			
Spindle speed	6,000min <sup>-1</sup>	5,000min <sup>-1</sup>	4,500min <sup>-1</sup>
Spindle speed range	Stepless		
Spindle nose	A2-5	A2-5	A2-6
Hole through spindle	56mm	63mm	80mm
I.D. of front bearing	80mm	90mm	110mm
Hole through draw tube	43mm	52mm	66mm
<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- 4,800°/min		
C-axis clamp	Disk clamp		
C-axis connecting time	1.5sec.		
<b>Upper &amp; Lower turrets</b>			
Type of turret head	12st	Dodecagonal drum turret	
	15st	15 station turret	
Number of driven-tool stations	12st	12	
	15st	15	
Number of index positions	12st	24	
	15st	15	
Tool size (square shank)	20mm		
Tool size (round shank)	25mm		
<b>Rotating tool</b>			
Rotary system	Individual rotation		
Driven-tool spindle speed	6,000min <sup>-1</sup> (op. 8,000min <sup>-1</sup> available only for 12-station turret)		
Spindle speed range	Stepless		
Number of driven-tool stations	12st	12 x 2	
	15st	15 x 2	
Tool shank	Straight holder	1mm - 14mm	
	Cross holder	1mm - 14mm	
<b>Drive motor</b>			
Spindle motor output (L / R)	11/7.5kW	11/7.5kW (op. 15/11kW)	
Spindle motor torque (L / R)	76/39N·m	77/39.4N·m	85/43N·m
Driven tools	7.1/2.2kW (op. 5.5/2.2kW)		
<b>General</b>			
Height	1,930mm		
Floor space (L x W)	3,424mm x 2,257mm		
Machine weight (incl. control)	8,500kg		
<b>Power requirements</b>			
power supply	32.3kVA		
Air supply	360 - 410NL/min, 0.5 - 0.7MPa		

(NOTE) Both GR and Parts catcher G are not available on same machine.

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

### Precautions about the use of cutting coolant

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

## Control Specification

items	
Control type	FANUC 31i-B 2-PATH
Controlled axes	
Controlled axes	9 axes
Least command increment	Upper : 4 axes (X1, Z1, C1 [C2], Y1) Lower : 4 axes (X2, Z2, C2 [C1], Y2, B2)
<b>Input command</b>	
Least input increment	0.001mm / 0.0001inch (diameter for X-axis), 0.001°
Least command increment	X:0.0005mm, Z:0.001mm, C:0.001°, B2:0.001mm, Y:0.001mm
Max. programmable dimension	±999999.999mm / ±39370.0787inch, ±999999.999°
Absolute / incremental programming	X, Z, C, Y, B2 (absolute only for B2) / U, W, H
Decimal input	Standard
Inch / Metric conversion	G20 / G21
Programmable data input	G10
<b>Feed function</b>	
Cutting feed	feed / min X : 1 - 8000mm/min, 0.01 - 315in/min (1 - 4800mm/min, 0.01 - 188in/min)
	Z : 1 - 8000mm/min, 0.01 - 315in/min (1 - 4800mm/min, 0.01 - 188in/min)
	C : 1 - 4800°/min
	Y : 1 - 8000mm/min, 0.01 - 315in/min (1 - 4800mm/min, 0.01 - 188in/min)
feed / rev	B2 : 1 - 8000mm/min, 0.01 - 315in/min (1 - 4800mm/min, 0.01 - 188in/min)
	0.00001 - 850.00000in/rev
The maximum cutting feed rate is the value in AI contour control mode. It is also on with G316 command. The values in parentheses are normal values.	
Dwel	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 accel./decel. After cutting feed interpolation	Standard
Rapidfeed override	F0, 25, 50, 100% (changeable to every 10% by switch)
Cutting feedrate override	0 - 150% (each 10%)
AI contouring control I	G5.1
Spindle override	50% - 120% Set every 10%
<b>Program memory</b>	
Part program storage length	256kbyte (Total 640m)
Part program editing	delete, insert, change
Program number search	Standard
Sequence number search	Standard
Address search	Standard
Number of registerable programs	500 programs
Program storage memory	Backed up by battery
Multiple program simultaneous editing	Standard
DNC operation through memory card	Standard (Only one turret can access memory card at a time) (not including memory card)
Extended part program editing	Standard (Replacement of word, address, cut & paste for word / character, cancel operation, copy or move the program)
<b>Operation and display</b>	
HMI (Human Machine Interface)	NT Smart X
Operation panel:Display	19" color SXGA LCD touch panel
Operation panel:keyboard	QWERTY keyboard
<b>Programming assist function</b>	
circular interpolation R programming	Standard
Direct drawing dimension programming or Chamfering/Corner R	Standard (Direct drawing dimension programming is standard)
Canned cycle	G90, G92, G94
Multiple repetitive canned cycle	G70 - G76
Multiple repetitive canned cycle II	G71, G72
Canned cycle for drilling	G80 - G89
Polar coordinate interpolation	Standard
Cylindrical interpolation	Standard
Helical interpolation	Standard
Axis recomposition	Standard (R side C-axis control from upper side / L side C-axis control from lower side)
Sub program	Standard
Balance cut	G68, G69
Custom macro	Standard (common variable#100 - #149, #500 - #549)
Addition to custom macro common variables	Standard (After addition, #100 - #199, #500 - #999)
FS15 tape format	Standard
Luck-bei II NT Manual Guide I	Standard
Abnormal load detection function	Standard
NT Work Navigator	Standard (not including contact bar)
NT Nurse	Standard
NT Machine Simulation Functions	Standard
NT Collision Guard	Standard
<b>Mechanical support</b>	
Rigid type	Standard
Spindle synchronised control	Standard
C axis synchronised control	Standard (G496 C1, fast forward positioning)
Spindle orientation	Standard
<b>NT Smart X</b>	
O/S	Windows Embedded 8.1 Industry PRO
Pointing device	Touch pad
Memory	8GB





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