WT-250Ⅱ

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NAKAMURA-TOME
PRECISION INDUSTRY CO.,LTD.

WT-250II

One hit machining

Finished parts, complete in one set up

Nakamura-Tome Innovation Technology
Creating Value

High Productivity Multitasking Machine

From diversified small-lot production to mass production

High Rigidity Box-Type Slide-Ways on all Axes

Equipped with all box-type slide-ways, which are traditionally hand scraped by highly skilled technicians, according to stringent quality control standards. Having high rigidity slides, the high-output motors ensure powerful cutting. WT250II is the ultimate two-spindle Multitasking Turning Center, made with high-level skills and interactive technology.

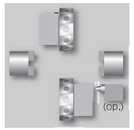
WT-250II

Possibility of high-valve added production

Major Improvements for Diversified Variable-Lot-Size Production.

19″ Color LCD Touch Panel

NT IPS



T×2 Double turret

M×2 Double Milling Motor

Y Y-axis

S×2 Twin-Spindle

C×2 C-axes

Capacity

Max. turning diameter / Max. turning length	250mm / 555mm		
Distance between spindles (max / min)	885mm / 265mm		
Bar capacity	L : 65mm	R : 51mm	R : 65mm (op.)
Chuck size	8” 215mm	6” 165mm	

Axis travel

Slide travel (X1 / X2)	195mm / 195mm		
Slide travel (Z1 / Z2 / B)	600mm / 600mm / 620mm		
Slide travel (Y) upper turret	±41mm (op.)		
Spindle L, R	**L: ϕ65mm**	**R: ϕ51mm**	**R: ϕ65mm (op.)**
Spindle speed	4500min^{-1}	5000min^{-1}	4500min^{-1}
L spindle motor	18.5/15kW (op. 26/22kW 15/11kW Wide range)		
R spindle motor	11/7.5kW (op. 15/11kW 18.5/15kW)		

Upper turret

Number of turrets	1
Type of turret / Number of indexing pos.	Dodecagonal drum turret / 24
Driven-tool spindle speed	6000min^{-1}
Drive motor	5.5/3.7kW
Milling-tool / Number of driven-tool station	Individual rotation / 12

Lower turret

Number of turrets	1
Type of turret / Number of indexing pos.	Dodecagonal drum turret / 24
Driven-tool spindle speed	6000min^{-1}
Drive motor	5.5/3.7kW
Milling-tool / Number of driven-tool station	Individual rotation / 12

General

Machine dimension (L × W × H)	4,059mm × 2,314mm × 2,225mm
Machine Weight	8,700kg

WT-250II

WT-250II Machine Structure

Stable Accuracy Ensured

48 stations

High-rigidity turret

Upper turret

Lower turret

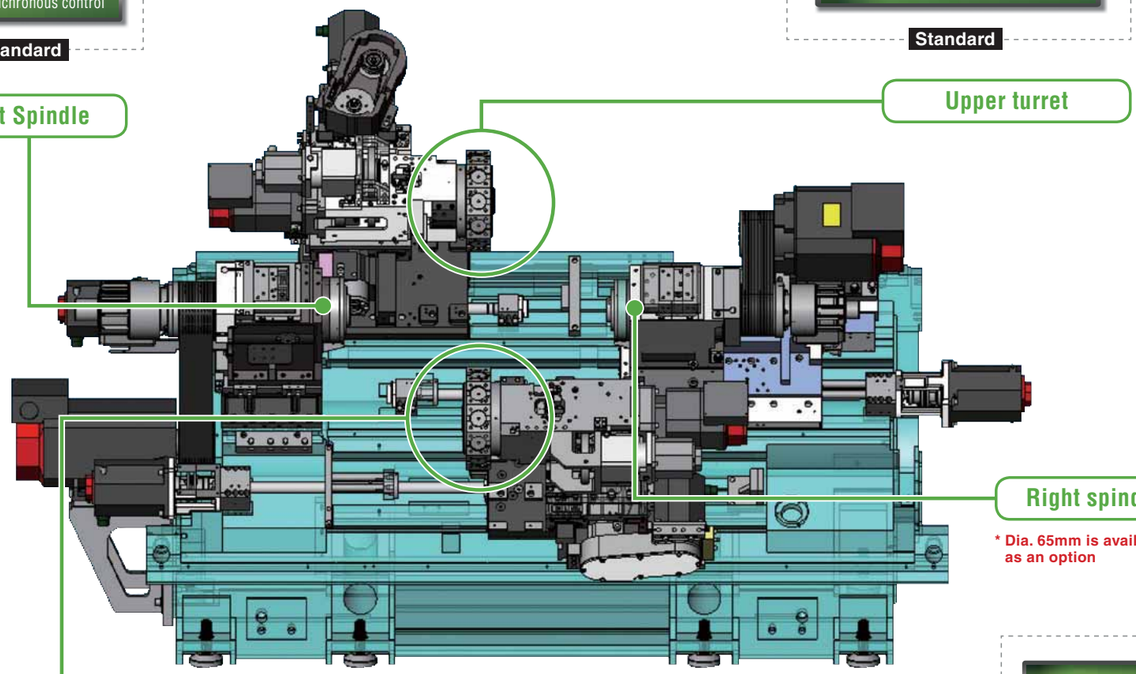
Bar capacity ϕ65mm
Spindle motor
18.5 / 15kW
130.9 / 106.1N·m
4500min^{-1}
C-axis
C-axis synchronous control

Standard

Bar capacity ϕ65mm
Spindle motor
26 / 22kW
183.9 / 155.6N·m
4500min^{-1}

Bar capacity ϕ65mm
Spindle motor
15 / 11kW
225.0 / 165.0N·m
4500min^{-1}

Option



Dodecagonal / 24-station

- ◆ Number of driven-tool stations : 12
- ◆ Servo-driven turret

Milling: 5.5 / 3.7kW, 24.0 / 16.0N·m, 6000min^{-1}

Y-axis stroke ±31mm

Standard

* Dia. 65mm is available as an option

Dodecagonal / 24-station

- ◆ Number of driven-tool stations : 12
- ◆ Servo-driven turret

Milling: 5.5 / 3.7kW, 24.0 / 16.0N·m, 6000min^{-1}

* Milling motor speed is 3600min^{-1} for ϕ65mm right spindle bar capacity

Standard

Bar capacity ϕ51mm
Spindle motor
11 / 7.5kW
77.8 / 53.1N·m
5000min^{-1}
C-axis
C-axis synchronous control

Standard

Bar capacity ϕ51mm
Spindle motor
15 / 11kW
106.1 / 77.8N·m
5000min^{-1}

Bar capacity ϕ51mm
Spindle motor
18.5 / 15kW
120.4 / 97.7N·m
5000min^{-1}

Option

- Wide box-type slide-ways on X, Z and Y-axes.
- 45 degrees slant bed structure with high rigidity torque tube and smooth chip disposal
- Dodecagonal / 24-station upper and lower turrets
- Dia. 210mm (8inch) chucks for left and right hand side spindles

Parts catcher G Option

Method		Swing hand
Workpiece size	Diameter [mm]	ϕ65
	Length [mm]	200
	Weight [kg]	3
Cycle time [sec.]		6
Ejecting method		Belt conveyor & Chute

WT-250II Shorter Idle Time, Higher Productivity.

Max. Machining Length 555mm! Easy Handling of Long Shafts.

Part	JOINT
Category	Aircraft
Cycle time	8min 15sec.
Material	SUS303
Raw part dimension	D65mm Bar stock (FINISHED 80mm)

Aerospace

O.D. Rough

- **Type** :DWLNR2525M08
- **Diameter** :65-45mm
- **Rpm** :1132min^{-1} - 784min^{-1}
- **Feed** :0.3mm/rev
- **Cutting speed** :160m/min
- **Machining Time** :75sec.

Indexable drill

- **Type** :TAFS3700F40
- **Diameter** :37mm
- **Rpm** :1300min^{-1}
- **Feed** :0.12mm/rev
- **Cutting speed** :150m/min
- **Depth** :24mm
- **Machining Time** :13sec.

Thread mill

- **Type** :WX-PNC 16X42 P1.5-INT
- **Diameter** :16mm
- **Rpm** :800min^{-1}
- **Feed** :0.06mm/rev
- **Cutting speed** :40m/min
- **Machining Time** :55sec.

Key way

- **Wedge** :6mm
- **Depth** :3mm
- **Length** :32.5mm
- **Type** :N50-6814
- **Diameter** :39mm
- **Rpm** :0
- **Feed** :30m/min
- **Cutting speed** :3m/min
- **Machining Time** :84sec.

Small drilling

- **Type** :EX-GDN0.5
- **Diameter** :0.5mm
- **Rpm** :6000min^{-1}
- **Feed** :0.015mm/rev
- **Cutting speed** :9.4m/min
- **Deep** :3.5mm
- **Machining Time** :25sec.

Complete Control

A wide variety of parts can be machined from bar, shafts, forgings or castings.
The highest productivity can be achieved with the newest technology in multitasking, all in a compact floor space.

Upper-L, Lower-R Turning operation

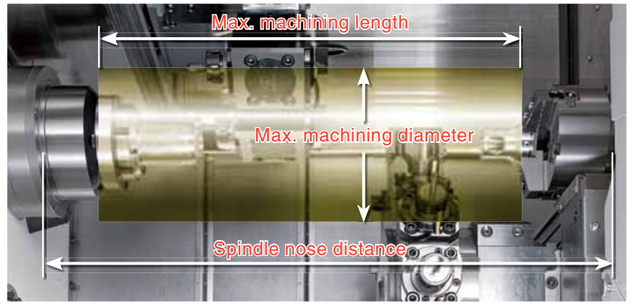
Upper-L, Lower-R boring operation

Left Simultaneous Upper Lower Milling operation

Upper-R, Lower-L machining

Transfer

Right Simultaneous Upper Lower Milling operation



Max. machining length —— **555mm**

Max. machining diameter — **φ250mm**

Spindle nose distance **Max. 885mm**
Min. 265mm

WT-250II Combining Turning and Milling

Faster Cycle Time
From diversified small-lot production to mass production

S×2 Twin-Spindle

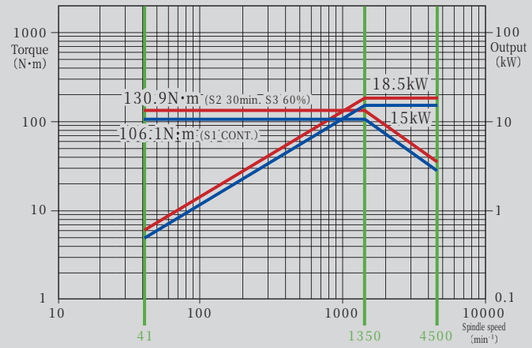
WT-250II

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

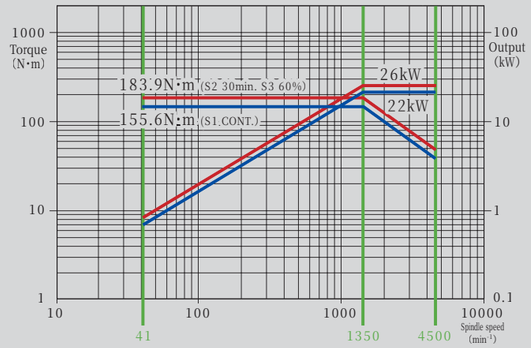
M×2 Doubie Milling Motor

L Spindle motors

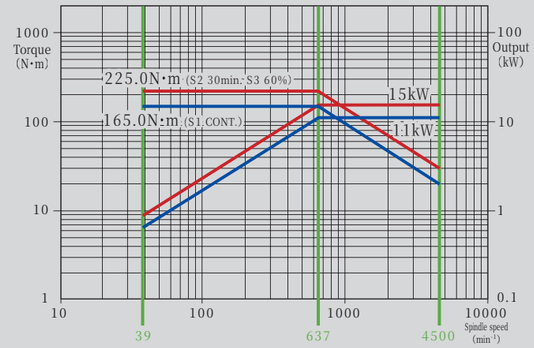
Standard
Rotating speed : 4,500min-1 **18.5/15kW φ65**



Option
Rotating speed : 4,500min-1 **26/22kW φ65**

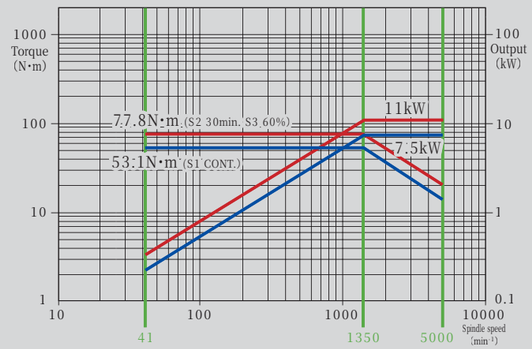


Option
Rotating speed : 4,500min-1 **15/11kW (Wide range) φ65**

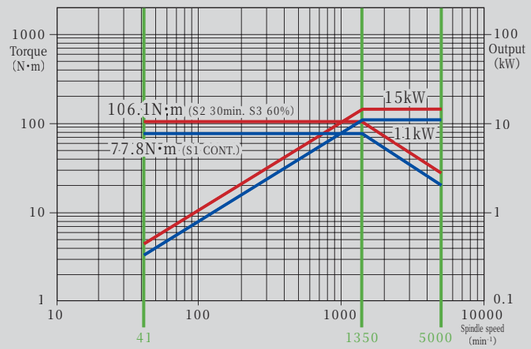


R Spindle motors

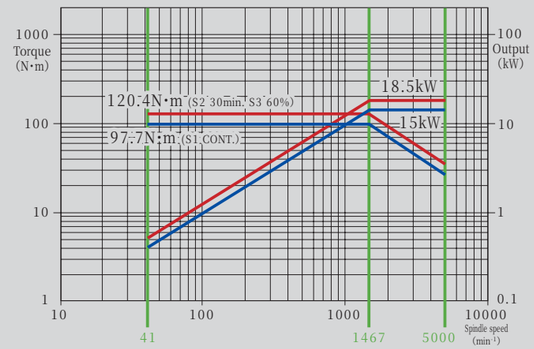
Standard
Rotating speed : 5,000min-1 **11/7.5kW φ51**



Option
Rotating speed : 5,000min-1 **15/11kW φ51**

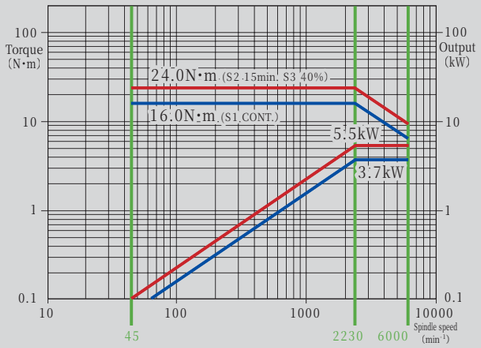


Option
Rotating speed : 5,000min-1 **18.5/15kW φ51**



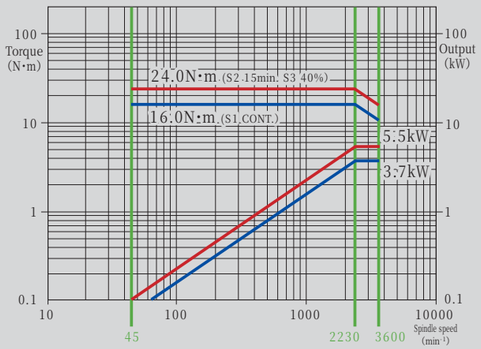
Milling-tool motor

Standard
Rotating speed : 6,000min-1



● When bar capacity φ 65mm is equipped on Right spindle (option), max rotation speed of driven tools will be 3,600min-1

Option
Rotating speed : 3,600min-1



Nakamura-Tome Intelligent System

Advanced Production System

• 19 inch color LCD Touch panel • PC memory 9GB • QWERTY Key board • Windows 8 • Touch Pad • USB 2.0 port x 2

Program storage length	256Kbyte (640m)	512Kbyte (1280m)	1Mbyte (2560m)	2Mbyte (5120m)	4Mbyte (10240m)	8Mbyte (20480m)
Program registered number	500	1000	1000 or 2000	1000 or 4000		
Tool offset pairs	99 + 99					

Standard / Option

Main function

- 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
- Parts Catcher G Operation Function
- NT Machine Simulation
- NT Collision Guard
- NT Multitasking Office
- Net Monitor

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.

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 the collision due to tooling, chuck, and program.

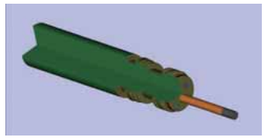
Simulation is performed to check the programs without running the machine.
This helps prevent machine collisions due to programming or setup errors.

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

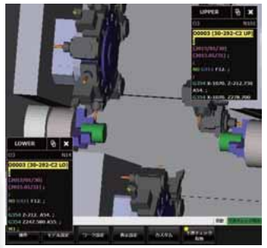
Rapid feed and Cutting feed can be adjusted using override setting. It is possible to make Simulation of each process, or to use single block.

Process

Single block



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

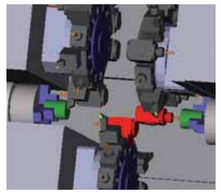


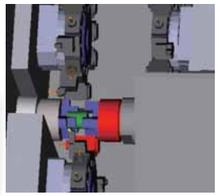
It is possible to choose between "with" or "without" program display. The color of the program block being simulated can be set to be displayed in a different color.

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.





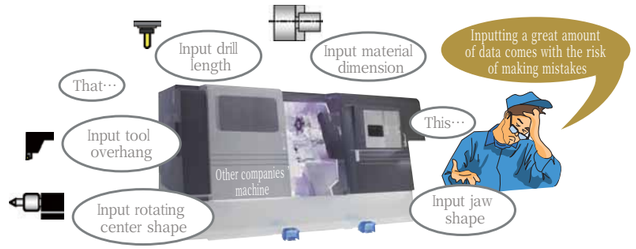
• Model setup was simplified.
Type of tool being indexed is automatically sorted out from the program, and the tool model can be selected from a displayed list.

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.

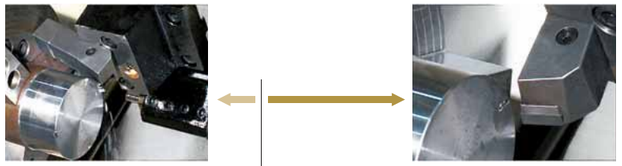
Even with barrier function, machine collisions may occur

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.

Crash

▲ Video

* This feature does not mean zero impact.

NT Work Navigator

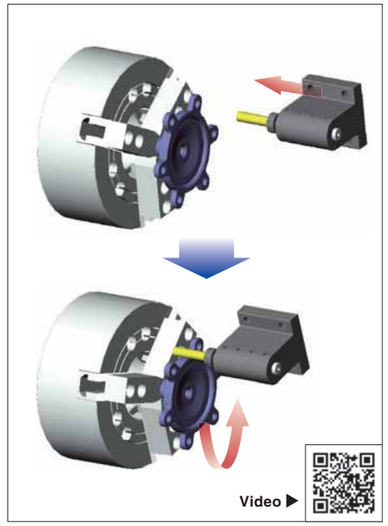
NT Work Navigator

New Navigator for X-axis and Y-axis

X Y Z B C

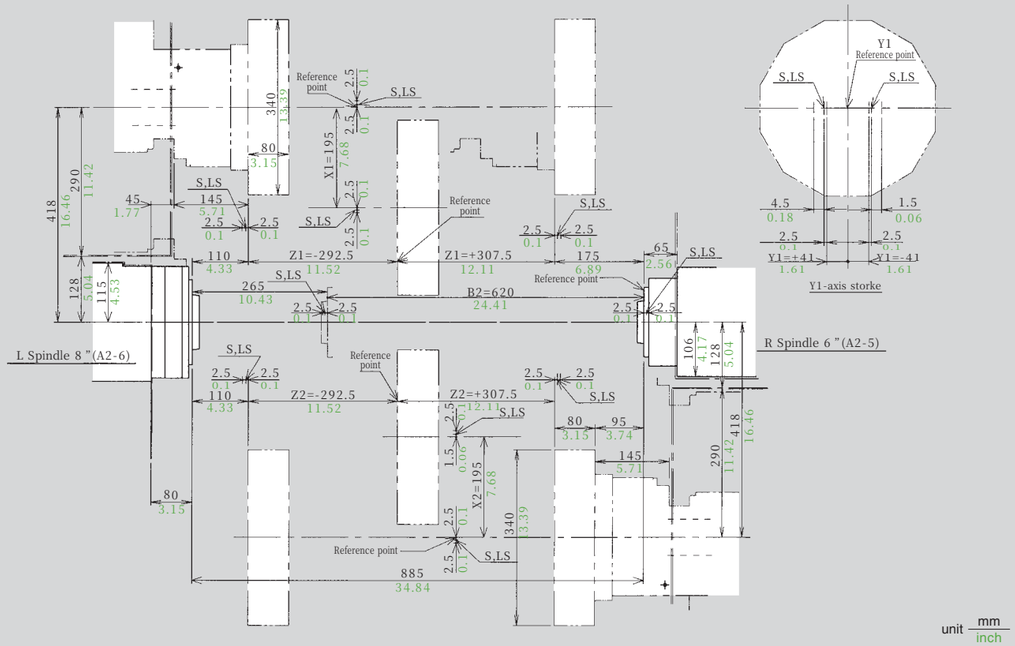
• Advanced NT Work Navigator !
Navigation function is expanded to also include the X and Y-axis. Coordinate Recognition can made the part’s outer surface in the X or Y-Axis direction.

• 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.



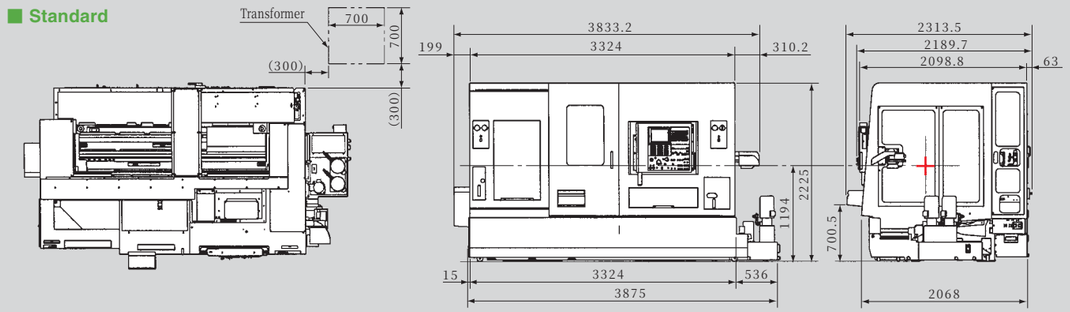
Video ▶

Slide Travel Range

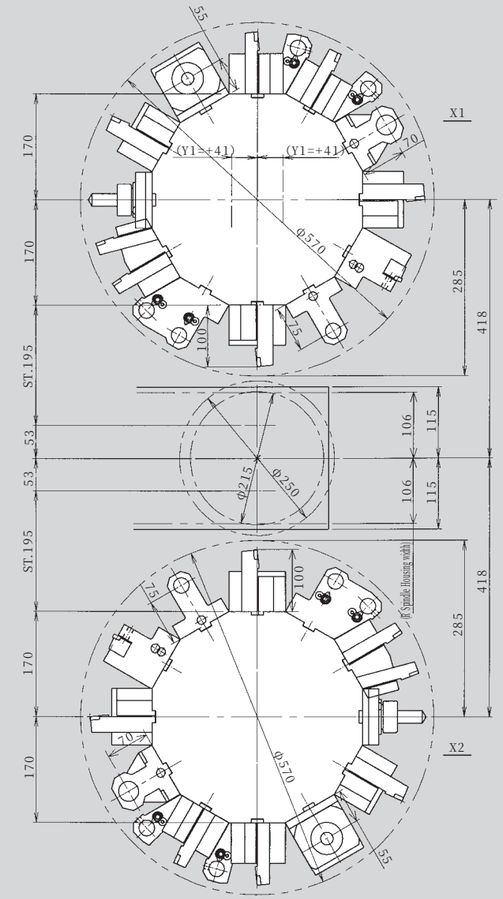


Machine Dimensions

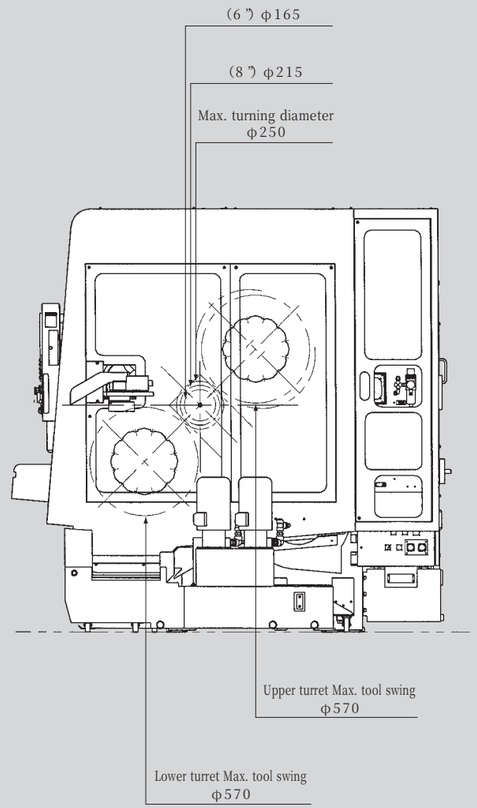
■ Standard



Tool Interference



Maximum Tool Diameter



Multi-Turret Type Multitasking Machine

WT Series

WT-100

WT-150II

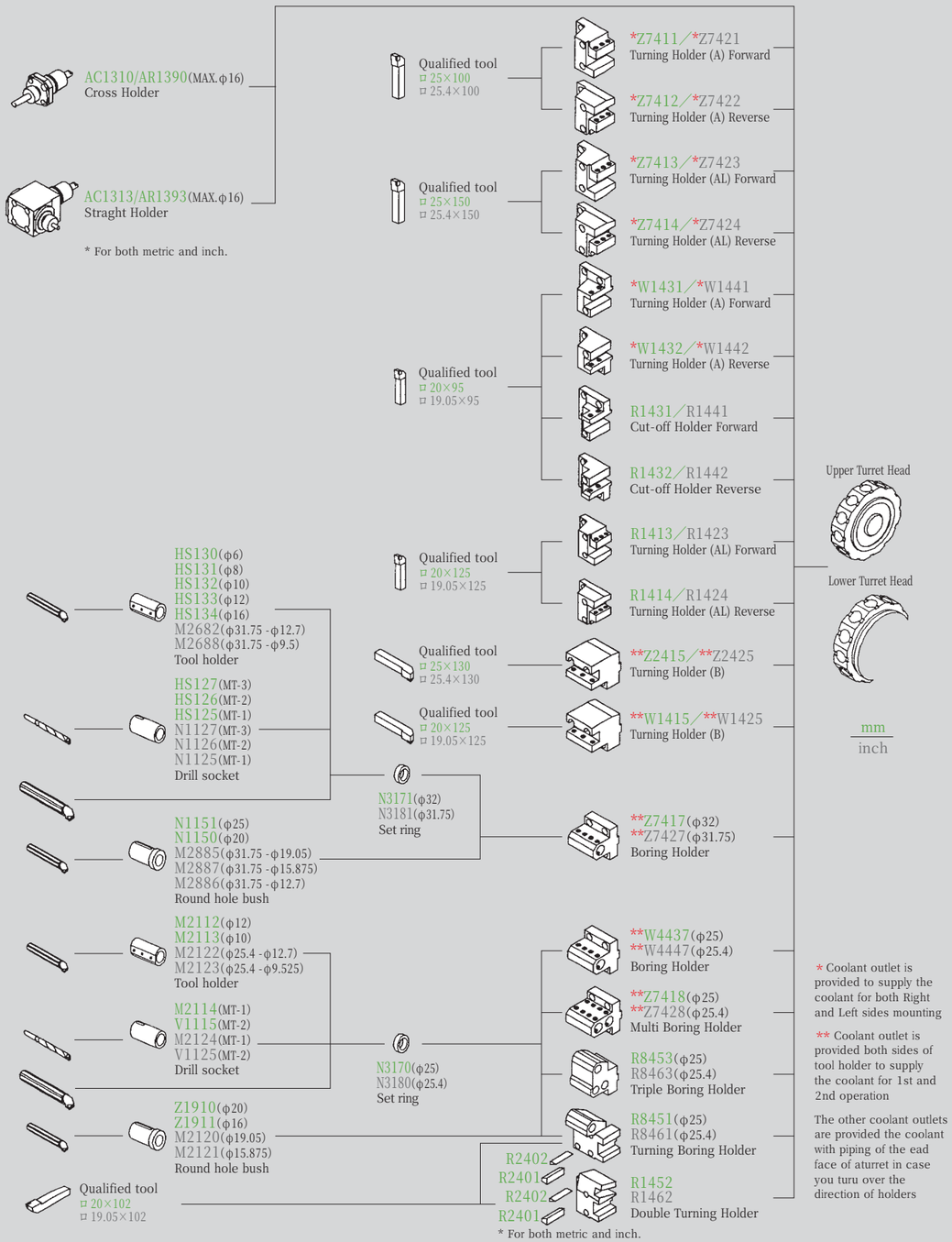
WT-250II

WT-300

φ42 ← Bar capacity → φ102

6 " ← Chuck size → 12 "

Tooling System Diagram



* Coolant outlet is provided to supply the coolant for both Right and Left sides mounting

** Coolant outlet is provided both sides of tool holder to supply the coolant for 1st and 2nd operation

The other coolant outlets are provided the coolant with piping of the ead face of aturret in case you turu over the direction of holders

* For both metric and inch.

Machine Specification

■ Capacity			
Max. turning diameter	250mm		
Standard turning diameter	100mm		
Distance between centers	max. 885mm / min. 265mm		
Max. turning length	555mm		
Bar capacity L / R	L : 65mm R : 51mm, 65mm (op.)		
Chuck size	215mm (8") / 165mm (6")		
■ Axis travel			
Slide travel (X1 / X2)	195mm / 195mm		
Slide travel (Z1 / Z2)	600mm / 600mm		
Slide travel (Y1)	±41mm *Upper turret		
Slide travel (B2-axis)	620mm		
Rapid feed X1 / X2	16m/min		
Rapid feed Z1 / Z2	30m/min		
Rapid feed B2 axis	30m/min		
Rapid feed Y1	6m/min		
■ Left and Right spindles	L : 65mm	R : 51mm	R : 65mm (op.)
Spindle speed	4500min^{-1}	5000min^{-1}	4500min^{-1}
Spindle speed range	Stepless	Stepless	Stepless
Spindle nose	A2-6	A2-5	A2-6
Hole through spindle	80mm	63mm	80mm
I.D. of front bearing	110mm	90mm	110mm
Hole through draw tube	66mm	52mm	60mm
■ C-axis			
Least input increment	0.001°		
Least command increment	0.001°		
Rapid index speed	600min^{-1}		
Cutting feed rate	1 - 4800°/min		
C-axis clamp	Disk clamp		
C-axis engagement time	1.5sec.		
■ Upper / Lower turret			
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		
■ Milling tools	L65mm / R51mm	R65mm	
Rotary system	Individual rotation		
Spindle speed	6000min^{-1}	3600min^{-1} *1	
Spindle range	Stepless		
Number of driven-tool stations	12×2		
Collet size	AR25		
Holder type and tool size	Straight holder φ 1mm - φ 16mm		
	Cross holder φ 1mm - φ 16mm		
■ Drive motor power and torque			
L-spindle	18.5/15kW	(131/106N·m)	
Option	26/22kW	(184/156N·m)	
Option	15/11kW [Wide range]	(225/165N·m)	
R-spindle	11/7.5kW	(78/53N·m)	
Option	15/11kW	(106/78N·m)	
Option	18.5/15kW	(120/98N·m)	
Milling-tool spindles	5.5/3.7kW	(24/16N·m)	
■ General			
Machine height	2225mm		
Floor space	4059mm × 2314mm		
Floor space	4838mm × 2518mm *2		
Machine weight	8700kg		
■ Power source			
Power supply	54.8kVA *3		
Air supply	150 - 200NL/min, 0.5 - 0.7MPa		

*1 Some tool holders have a max. 3,600min^{-1}.
*2 When with chip conveyor.
*3 Depends on equipped options and peripherals.

● 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	5-axes
Simultaneously controlled axes	2-axes (Upper X, Z, C) + 3 axes (Lower X, Z, C, B)
Simultaneously controlled axes with milling	3-axes (Upper X, Z, C) + 4 axes (Lower X, Z, C, B)
Simultaneously controlled axes with Y-axis (op.)	4-axes (Upper X, Z, C, Y) + 4 axes (Lower X, Z, C, B)
■ Input command	
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	±999999.999mm / ±39370.0787in, ±99999.999°
Absolute / incremental programming	X, Z, C, Y, B2 (absolute only for B2) / U, W, V, H
Decimal input	Standard
Program code	EIA / ISO automatic recognition
Inch / Metric conversion	G20 / G21
Programmable data input	G10
■ Feed function	
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 - 50.000000in/rev
Dwell	G04
Feed per minute / Feed per revolution	G98 / G99
Thread cutting	G32F
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	F0/25/100% (changeable to every 10% by switch)
Cutting feed-rate override	0 - 150% (each 10%)
AI contour control	G5.1
■ Program memory	
Part program storage length	256Kbyte (640m)
Part program edit	delete, insert, change
Program number search	Standard
Sequence number search	Standard
Address search	Standard
Number of registrable programs	500programs
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
■ Operation and display	
Operation panel : Display	19" color LCD
Operation panel : Keyboard	Separate type MDI unit (standard keys)
■ Program support	
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	Standard
Canned cycle for drilling	G80 - G89
Polar coordinate interpolation	Standard (used for C axis control from Lower)
Cylindrical interpolation	Standard (used for C axis control from Lower)
Synchronized mixture control	Standard (used for C axis control from Lower)
Sub program	Standard
Balance cut	G68, G69
Custom macro	Standard
Addition to custom macro common variables	Standard (After addition, #100 - #199, #500 - #999)
FS15 tape format	Standard
Luck-bei II	Standard
Abnormal load detection function	Standard
NT Work Navigator	Standard (not including contact bar)
NT Nurse	Standard
NT Collision Guard	Standard
■ Mechanical support	
Rigid type	Standard
Spindle synchronised control	Standard
C axis synchronised control	Standard
Spindle orientation	Standard
■ NT-IPS	
O/S	Windows XP Embedded
Pointing device	Touch pad