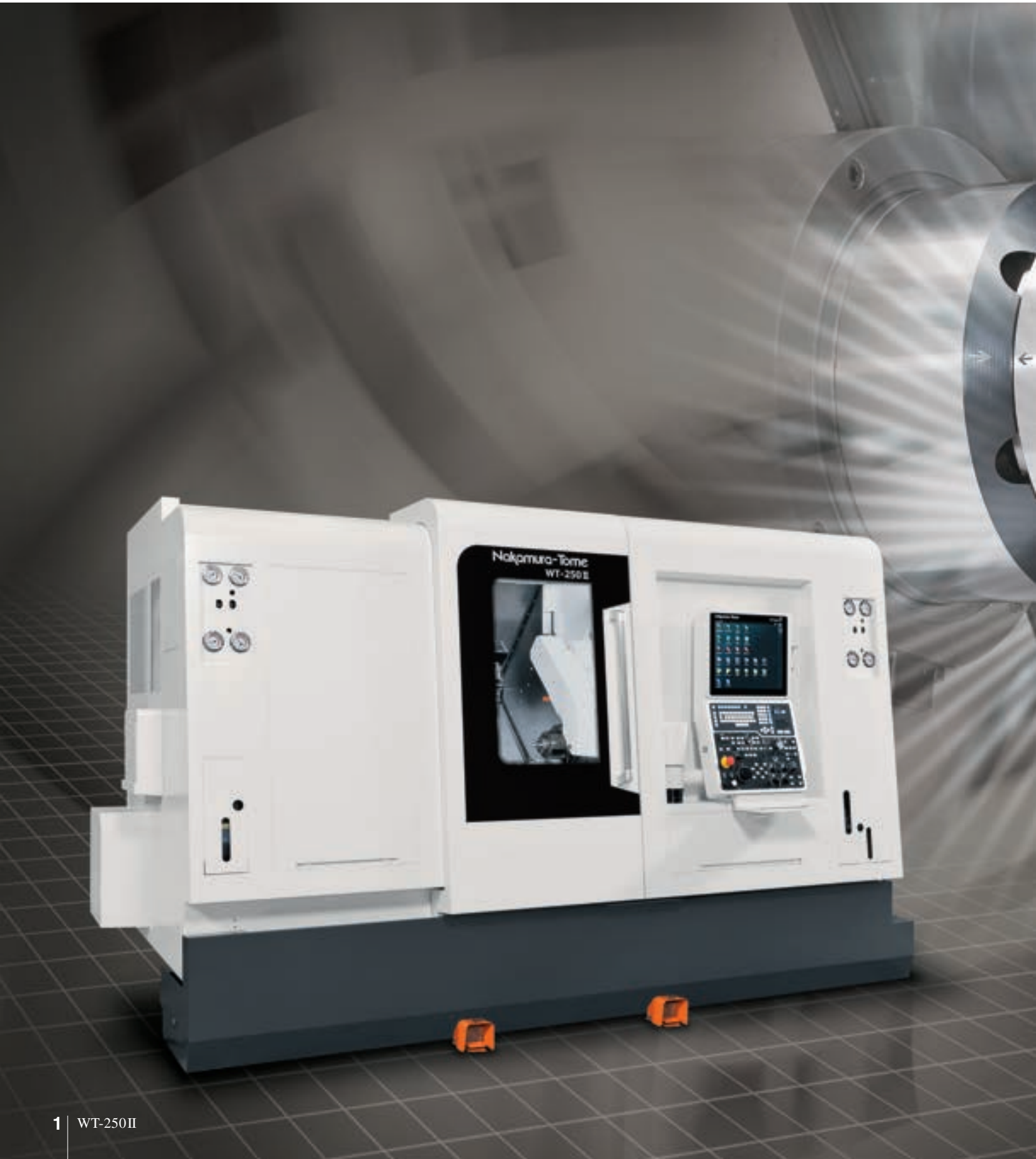
WT-250Ⅱ

NAKAMURA-TOME
PRECISION INDUSTRY CO.,LTD.

WT-250II

One hit machining

Finished parts, complete in one set up



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

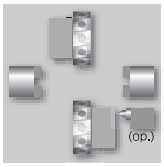
Possibility of high-valve added production

Major Improvements

for Diversified Variable-Lot-Size Production.

19″ Color LCD Touch Panel

NT Smart X



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.35/26/22kW・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

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

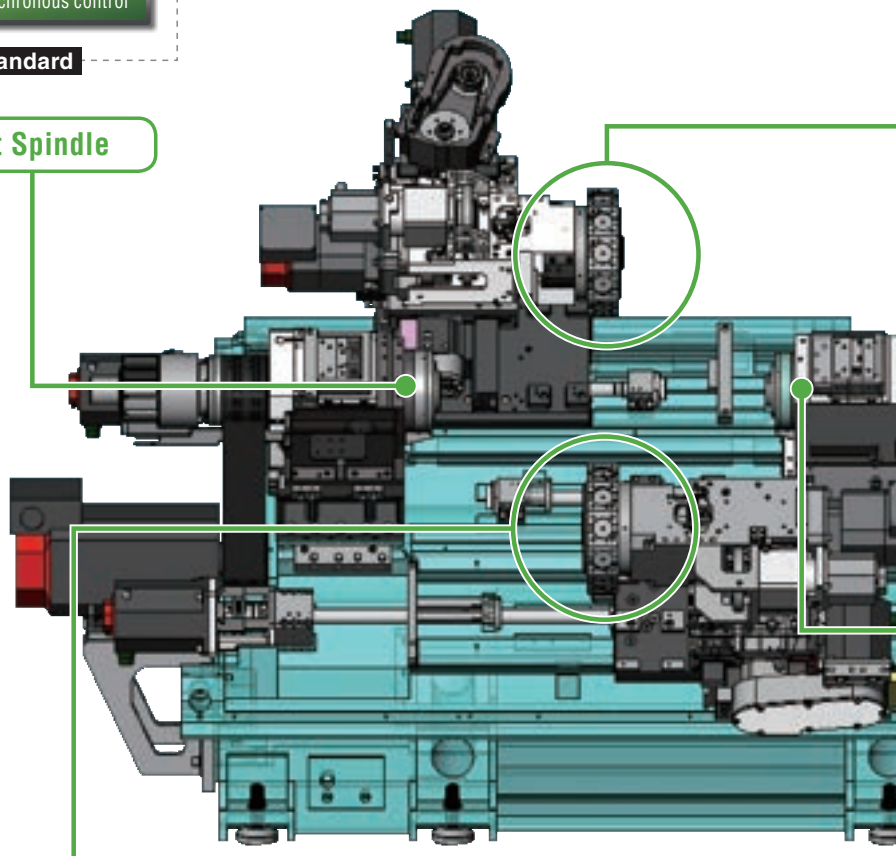
Spindle motor
26 / 22kW
183.9 / 155.6N·m
4500min^{-1}

Bar capacity ϕ65mm

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

Option

Left Spindle



Lower turret

Dodecagonal / 24-station

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

Standard

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

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

Stable Accuracy Ensured

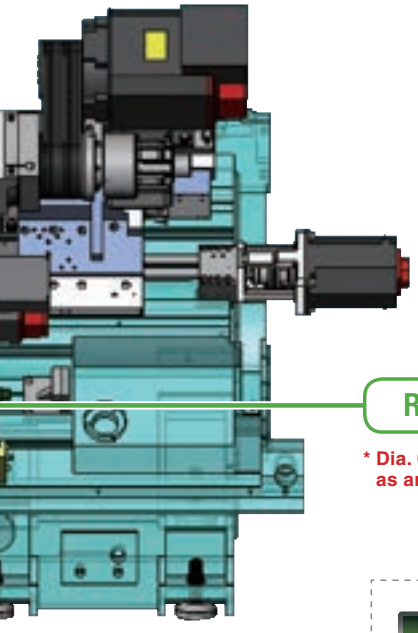
Dodecagonal / 24-station

- 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

Upper turret



Right spindle

* Dia. 65mm is available as an option

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

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

Aerospace

O.D. Rough

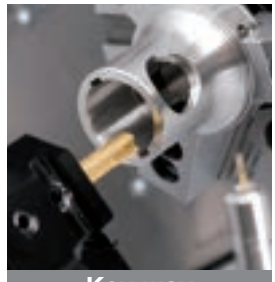
- **Type** : DWLNR2525M08
- **Diameter** : 65-45mm
- **Rpm** : 1132min^{-1} - 784min^{-1}
- **Feed** : 0.3mm/rev
- **Cutting speed** : 160m/min
- **Machining Time** : 75sec.

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

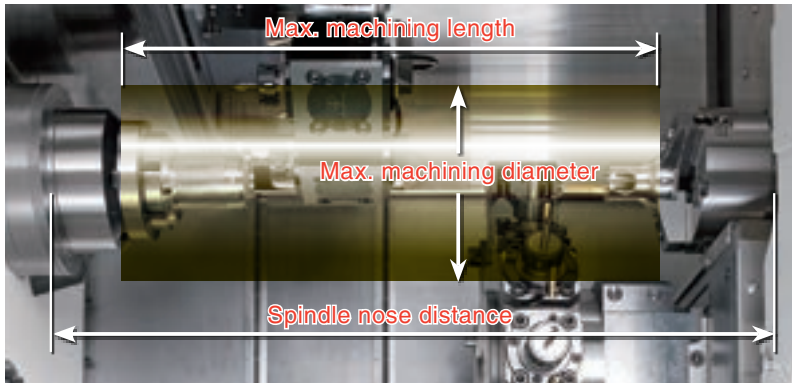

Upper-L, Lower-R boring operation


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

S×2 Twin-Spindle

WT-250II

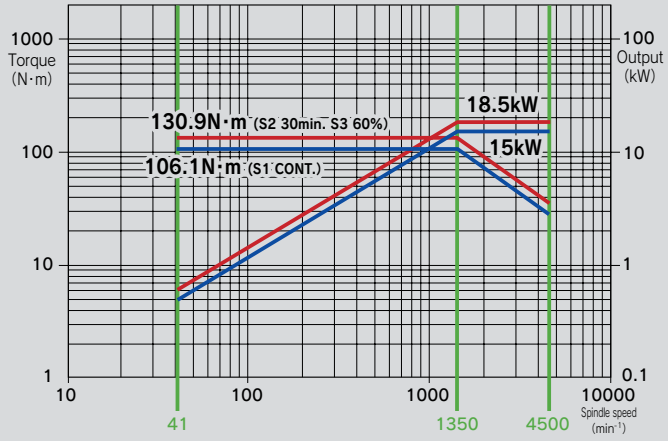
Cycle time reduced through simultaneous machining on Left and Right hand spindles.

L Spindle motors

Standard

Rotating speed : 4,500min-1

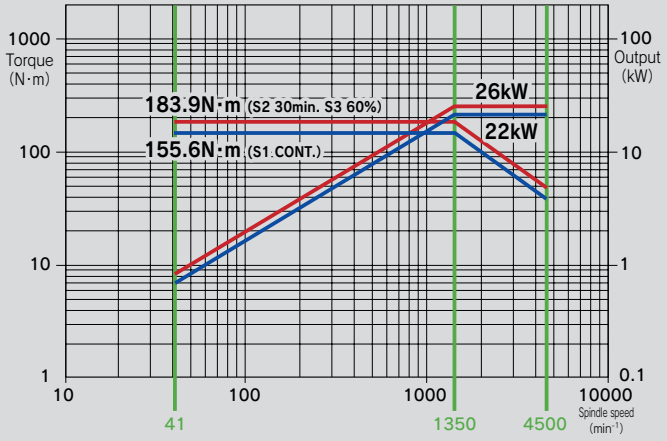
18.5/15kW φ65



Option

Rotating speed : 4,500min-1

26/22kW φ65

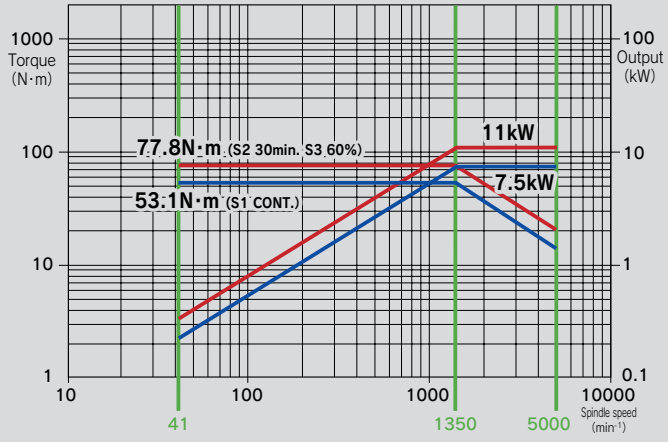


R Spindle motors

Standard

Rotating speed : 5,000min-1

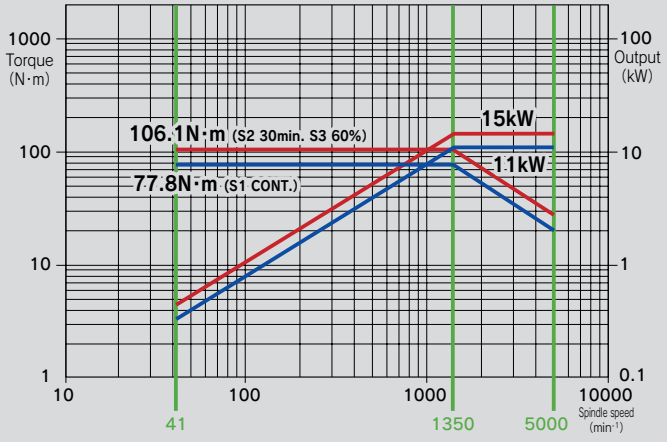
11/7.5kW φ51



Option

Rotating speed : 5,000min-1

15/11kW φ51



Milling

Faster Cycle Time

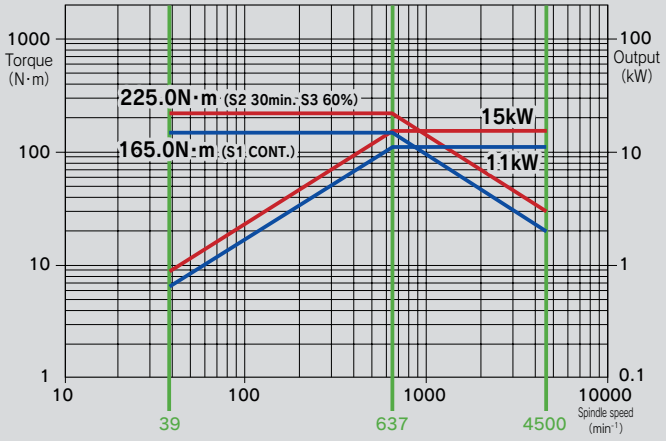
From diversified small-lot production to mass production

Milling-tool motor

Option

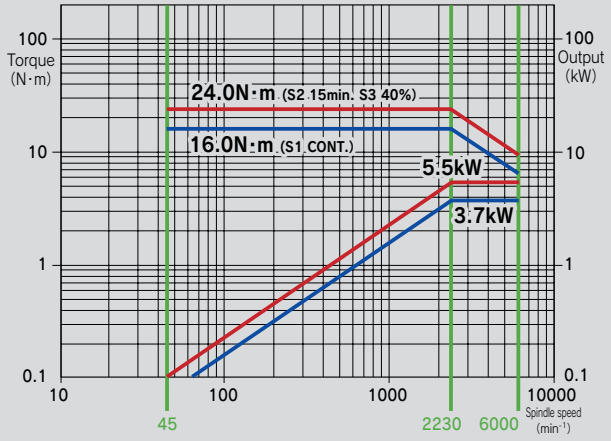
Rotating speed : 4,500min-1

15/11kW (Wide range) ϕ65



Standard

Rotating speed : 6,000min-1

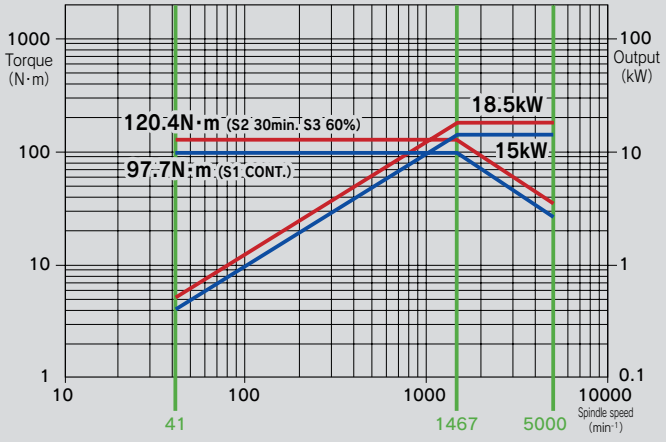


●When bar capacity ϕ 65mm is equipped on Right spindle (option), max rotation speed of driven tools will be 3,600min-1

Option

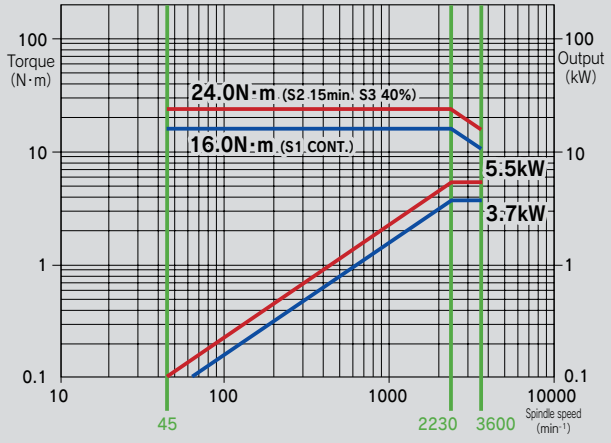
Rotating speed : 5,000min-1

18.5/15kW ϕ51



Option

Rotating speed : 3,600min-1



NT Smart X

Full Operator Support from
Ease of Use to Reliability.

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

- 19 inch color LCD touch panel
- PC memory 8 GB
- QWERTY keyboard
- Windows 8.1
- Touch pad
- USB 2.0 Port × 2

Main features of NT SmartX

Standard	
• NT Work Navigator	• Tool spindle loading Operation function
• Airbag (Overload detection)	• Parts Catcher G Operation Function
• NT Nurse function	• NT Machine Simulation
• Status Display Function	• NT Collision Guard
• Setup Display	• NT Multitasking Office (op.)
• Trouble Guidance	• NT Thermo Navigator AI
• Productivity Function	• NT Smart Sign
• Warm up Function	• Digital Chuck interlock
	• One touch MDI function

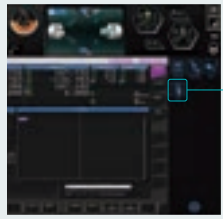
Digital Chuck Interlock

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

One Touch MDI

This function is to register in advance frequently used cycle programs such as home position return and tool exchange, and call with one touch.

Reduce programming and setup time, while eliminating input errors.

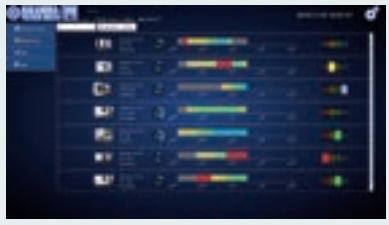


NT Smart Sign

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

Nakamura-Tome IoT software

■ Monitoring



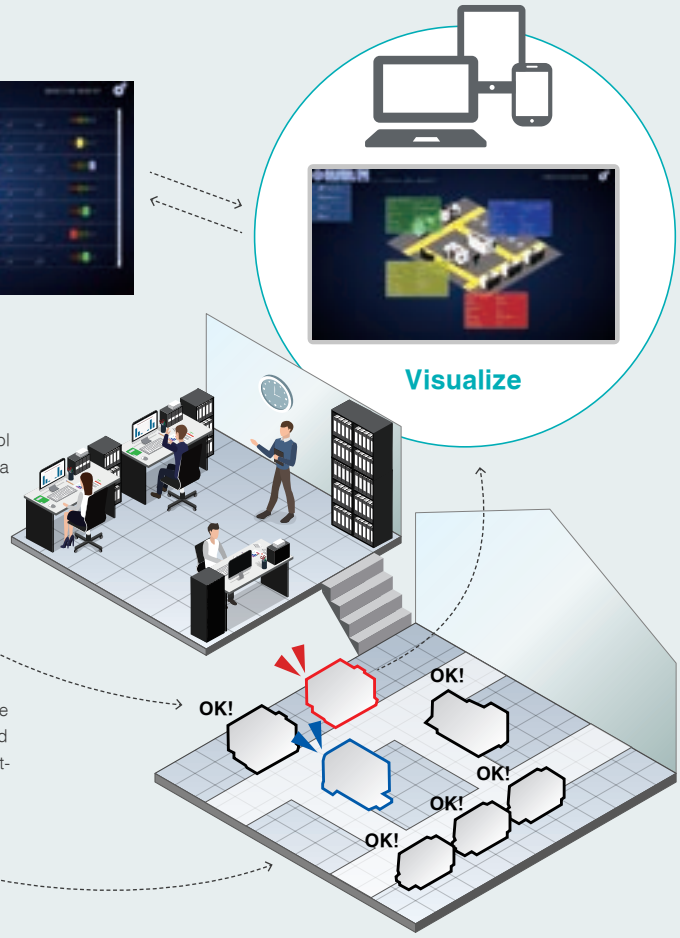
Real Time Monitoring of machine running conditions,
in addition to visualizing alarm history and past events.

■ Data Input / Output

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

■ Diagnosis

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



NT Thermo Navigator AI

Thermal Growth Compensation using AI.

Compensation model built using AI machine learning.

Standard for NT Smart X

① Time
② Measured Dimensions
③ Retrieval of Wear Offset Data

Acquired Data analyzed with NT Thermo Navi AI

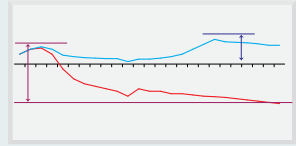
Feedback

Powered by AI

Time and measured dimension data are input into a dedicated AI Learning software, to build an optimized thermal growth compensation model.

High Precision Thermal Growth Compensation

The compensation value is calculated from acquired data.
The more data is input, the more accurate is the compensation value.



Pre-correction thermal displacement data
Thermal displacement data after correction

Double safety features for maximum protection

NT Machine Simulation / NT Collision Guard + Airbag

The machine is protected with dual safety features:
"NT Machine Simulation / NT Collision Guard" prevent collision beforehand, and the "Airbag Function" minimize damage to the machine in case of collision.

NT Machine Simulation

NT Machine Simulation is for Virtual Collision Checking of NC Programs without axis movement.

By checking in advance the chuck and the tool, the tool and the cover, etc. and checking the machining process etc., the risk of a machine collision when actually moving the machine can be reduced.

It can simulate while checking the remaining movement amount and modal information

It can override the settings for fast feed and cutting feed individually. Simulation by process, single feed is possible.

Image shown here is of a 2-turret machine

During part simulation, several display screens are available, such as tool view, turret view or machine view.

It can show or hide the machining program.
In addition, the display of the program is color-coded for each word, and this color scheme can be set arbitrarily from the option setting screen.

NT Collision Guard

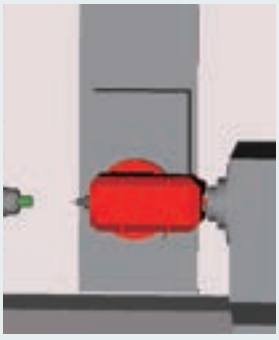
Preventive safety technology - Machine collisions are avoidable!

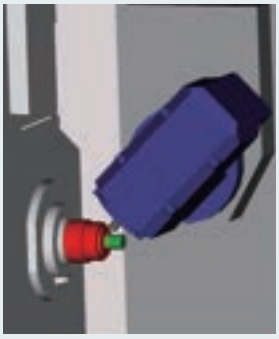
Available in automatic mode or in manual mode.
Using registered 3D models of machine, chucks, tools, holders and parts, machine collisions can be monitored and prevented in real time during automatic, manual or jog movements.
Even turret indexing is monitored to prevent collisions, drastically reducing collision risks, especially during machine setup.

Tool 3D Model setup was simplified.

After turret rotation, the tool being indexed is read from the program, and the corresponding tool 3D model is automatically displayed, or can be changed from a pre-registered tool 3D Model list if necessary.

Image shown here is of a Tool spindle machine





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,there is no reason to panic. Nakamura-Tome is...

The Airbag (Overload detection) of the machine tool greatly reduces the impact of a collision, and protects the machine.

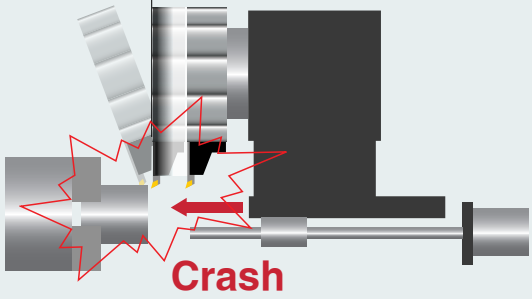
Without Airbag

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

With Airbag

Retraction within 0.001 sec

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



▲Video

* This feature does not mean zero impact

NT Work Navigator

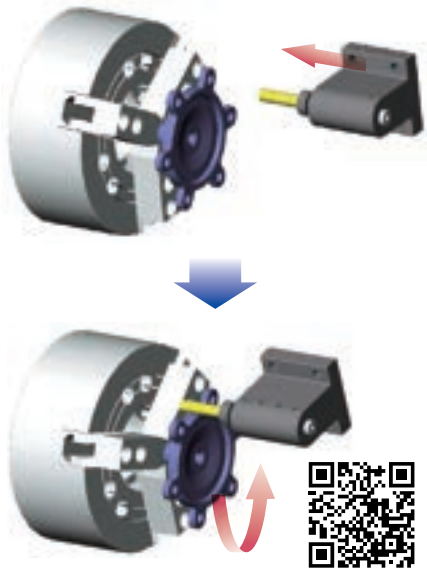
X Y Z B C

Advanced NT Work Navigator !

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.

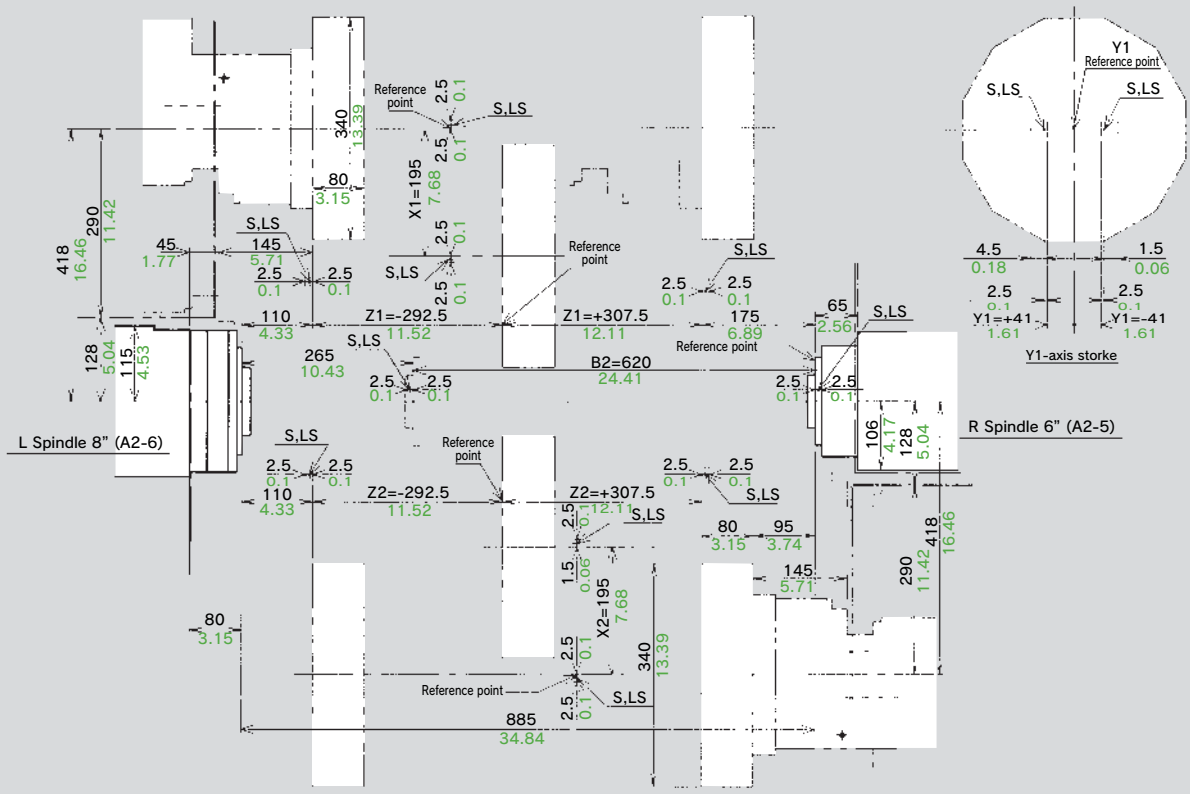
No fi xtures required

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.

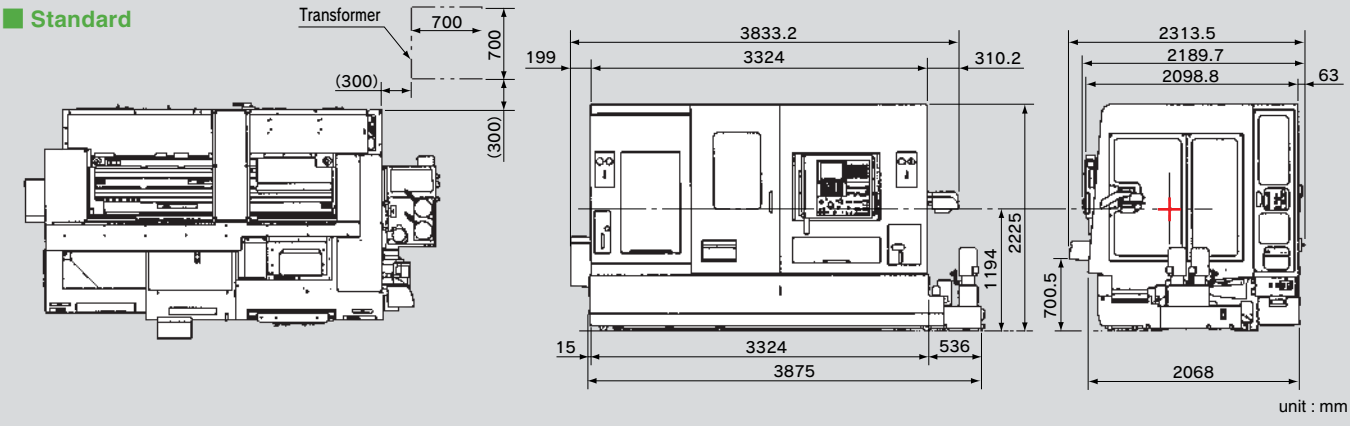


▲Video

Slide Travel Range



Machine Dimensions



Multi-Turret Type Multitasking Machine

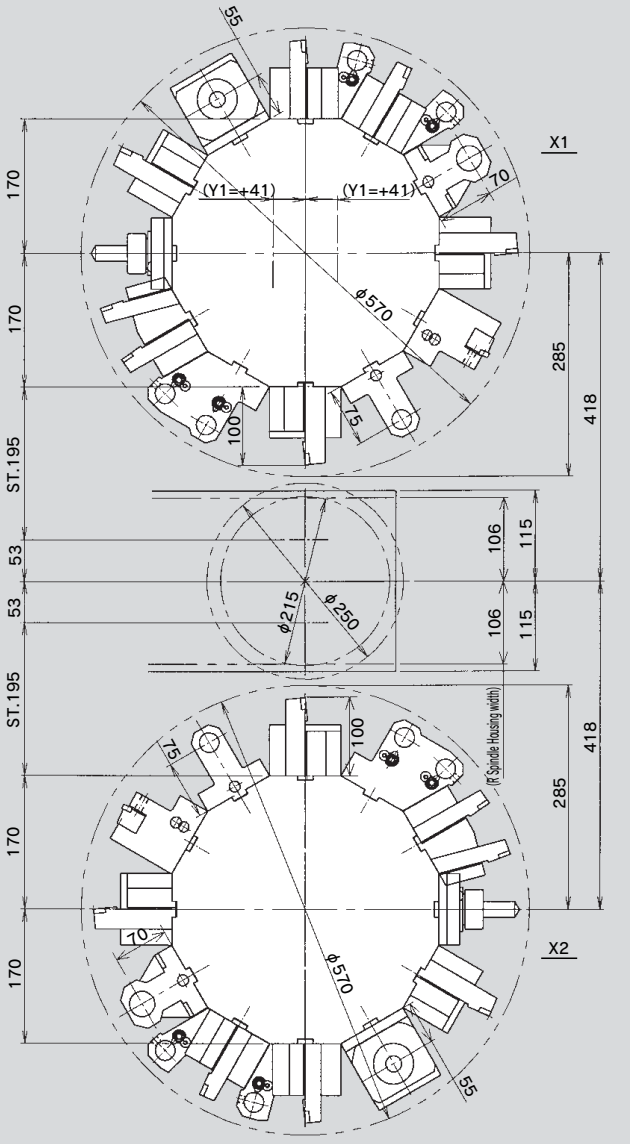
WT Series

WT-100

ϕ42

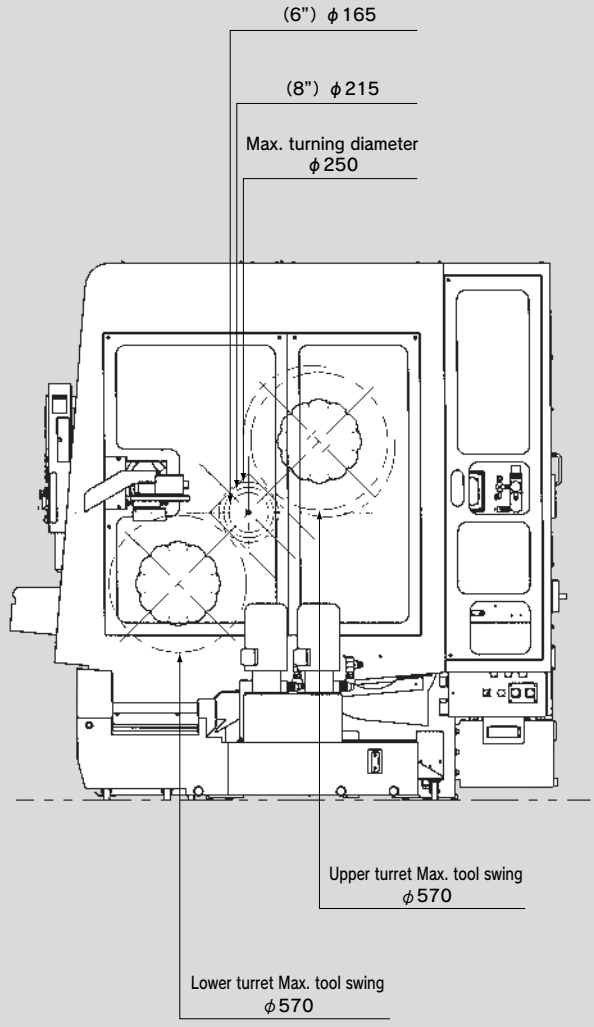
6"

Tool Interference



unit : mm

Maximum Tool Diameter



unit : mm

WT-150II

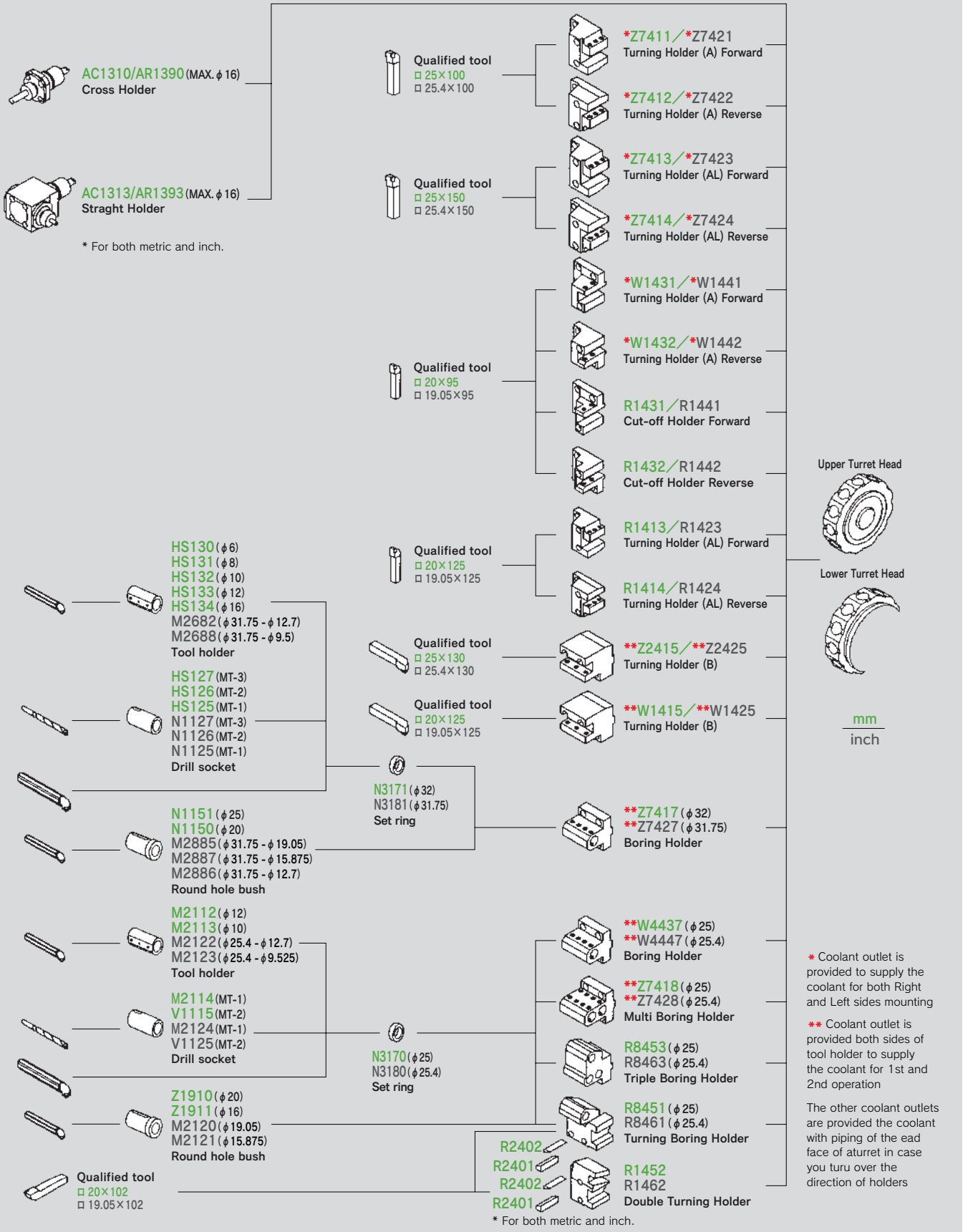
WT-250II

WT-300

Bar capacity ϕ102

Chuck size 12"

Tooling System Diagram



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

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