

WT-300



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

WT-300

One hit machining
Finished parts, complete in one set up

High Productivity Multitasking Machine
From diversified small-lot production to mass production



The best turning and milling capabilities in its class

This high rigidity multitasking machine is equipped with high-output motors featuring the ultimate in machining performance, in both turning and milling.

In addition to the low center of gravity and wide-bed design to provide more stability, the machine is equipped with box-type slides and guide-ways, which are high-frequency hardened and grinded to precision. The slides are traditionally hand scraped by highly skilled technicians, adopting a long established tradition called "KISAGE", which has been continued since the hydraulic lathe era.

Combining the latest in technology and the highest in capabilities, the WT300 is the ultimate turret-type multi-tasking machine.

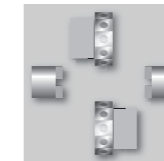
WT-300 High rigidity multitasking machine

with box-type slides for all axes



19"
Color LCD
Touch Panel

NT
IPS



T_{x2}
Double turret

M_{x2}
Double Milling Motor

S_{x2}
Twin-Spindle

C_{x2}
C-axes

Y
Y-axis
(op.)

Capacity		φ 65mm	φ 71mm	φ 80mm	φ 102mm
Max turning diameter Upper / lower turret		270mm		199 / 270mm	
Max turning length		780mm			
Distance between spindles		max. 1100mm / min. 250mm			
Bar capacity	L spindle	Standard	Option	Option	Option
	R spindle	Standard		-	
Chuck size		210mm (8")		305mm (12") L only	

Axis travel		195 / 195mm	188 / 195mm	152.5 / 195mm
Slide travel (X1 / X2)				
Slide travel (Z1 / Z2 / B)		780 / 780 / 850mm		
Slide travel (Y) upper turret		±60mm		±40mm

Spindle L, R		4500min ⁻¹	4000min ⁻¹	3500min ⁻¹	2500min ⁻¹
L spindle motor	L spindle	4500min ⁻¹			
	R spindle	4500min ⁻¹			
	Motor	15/11kW Standard	○	○	○
R spindle motor	Motor	18.5/15kW Option	○	○	○
	Motor	22/18.5kW Option	○	○	○
	Motor	15/11kW Standard		-	
Motor	18.5/15kW Option		-		

Upper turret	
Number of turrets	1
Milling-tool spindle speed	3600min ⁻¹
Type of turret / Number of indexing pos.	Dodecagonal / 24st
Milling motor	5.5/3.7kW 39.2/23.3N·m
Milling-tool / Number of milling-tool stations	Individual rotation / 12

Lower turret	
Number of turrets	1
Milling-tool spindle speed	3600min ⁻¹
Type of turret / Number of indexing pos.	Dodecagonal / 24st
Milling motor	5.5/3.7kW 39.2/23.3N·m
Milling-tool / Number of milling-tool stations	Individual rotation / 12

General	
Height	2266mm
Width	4230mm 4280mm 4238mm
Length	2518mm
Machine weight	14,000kg 14,500kg

WT-300 Machine Structure

Stable Accuracy Ensured

48 stations

High-rigidity turret

Bar capacity ϕ 65mm

Spindle motor 15 / 11kW 382 / 191N·m 4500min ⁻¹	Spindle motor 18.5 / 15kW 589 / 350N·m 4500min ⁻¹	Spindle motor 22 / 18.5kW 589 / 414N·m 4500min ⁻¹
C-axis C-axis synchronous control		Option
Standard		

Bar capacity ϕ 71mm

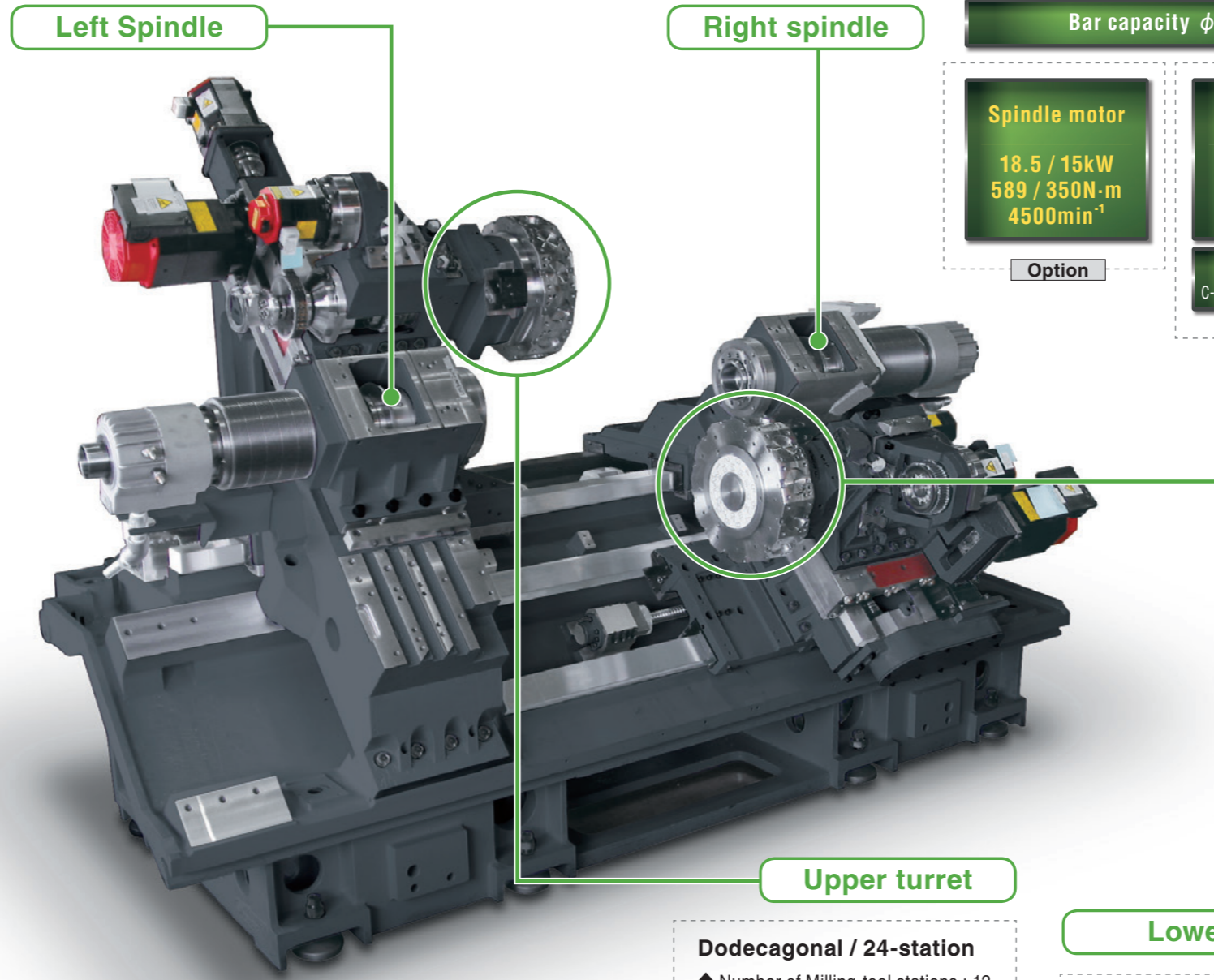
Spindle motor 15 / 11kW 382 / 191N·m 4000min ⁻¹	Spindle motor 18.5 / 15kW 589 / 350N·m 4000min ⁻¹	Spindle motor 22 / 18.5kW 589 / 414N·m 4000min ⁻¹
Option		

Bar capacity ϕ 80mm

Spindle motor 15 / 11kW 382 / 191N·m 3500min ⁻¹	Spindle motor 18.5 / 15kW 589 / 350N·m 3500min ⁻¹	Spindle motor 22 / 18.5kW 589 / 414N·m 3500min ⁻¹
Option		

Bar capacity ϕ 102mm

Spindle motor 15 / 11kW 382 / 191N·m 2500min ⁻¹	Spindle motor 18.5 / 15kW 589 / 350N·m 2500min ⁻¹	Spindle motor 22 / 18.5kW 589 / 414N·m 2500min ⁻¹
Option		



WT-300

High Productivity Multitasking Machine

Bar capacity ϕ 65mm

Spindle motor 18.5 / 15kW 589 / 350N·m 4500min ⁻¹	Spindle motor 15 / 11kW 382 / 191N·m 4500min ⁻¹
Option	C-axis C-axis synchronous control
Standard	

Upper turret

Dodecagonal / 24-station

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

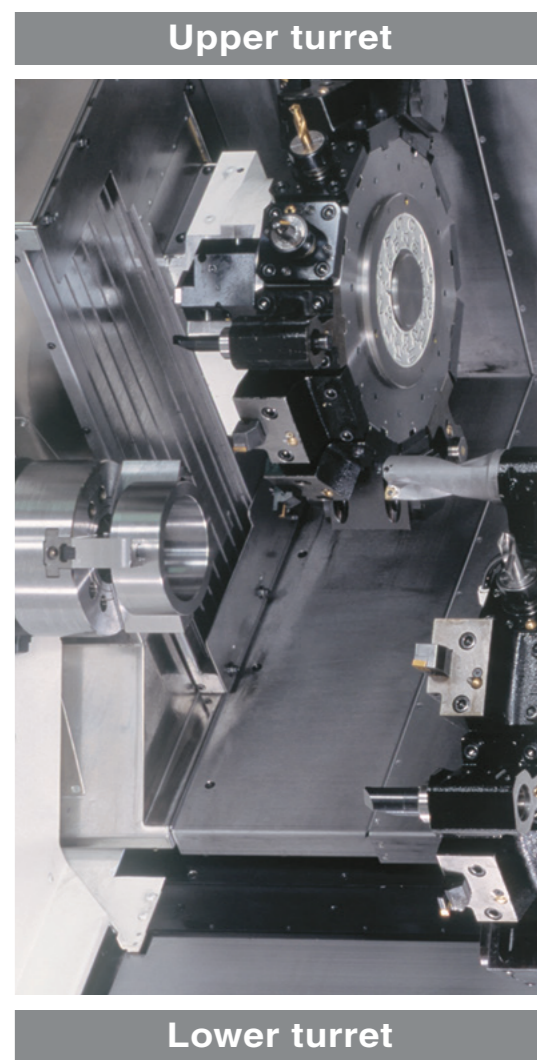
Milling	5.5 / 3.7kW 39.2 / 23.3N·m 3600min ⁻¹
Y-axis stroke \pm60mm	
Standard	

Lower turret

Dodecagonal / 24-station

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

Milling	5.5 / 3.7kW 39.2 / 23.3N·m 3600min ⁻¹
Standard	

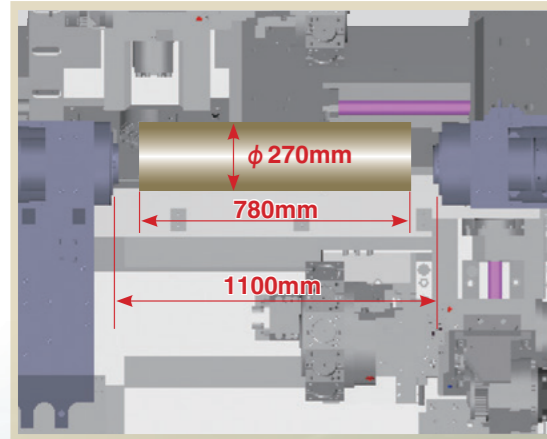


Max turning diameter

dia. **270mm**

Max turning length

780mm



Distance between spindles

Max. — **1100mm**

Min. — **250mm**

Larger window ensures better visibility



All axes box-type slides structure ensures long distance between spindles.

Gantry Loader Option

GR-210 NEW



WS-442W

Type	Multi-Layer pallet type
Workpiece diameter	φ 20 - φ 220mm
Number of pallets	20
Stack height	450mm
Max. workpiece weight	40kg / pallet

WS-445W

Type	Multi-Layer pallet type
Workpiece diameter	φ 20 - φ 220mm
Number of pallets	14
Stack height	450mm
Max. workpiece weight	40kg / pallet

* To reduce gantry service time, loading and unloading stations are separated.

Parts catcher G Option

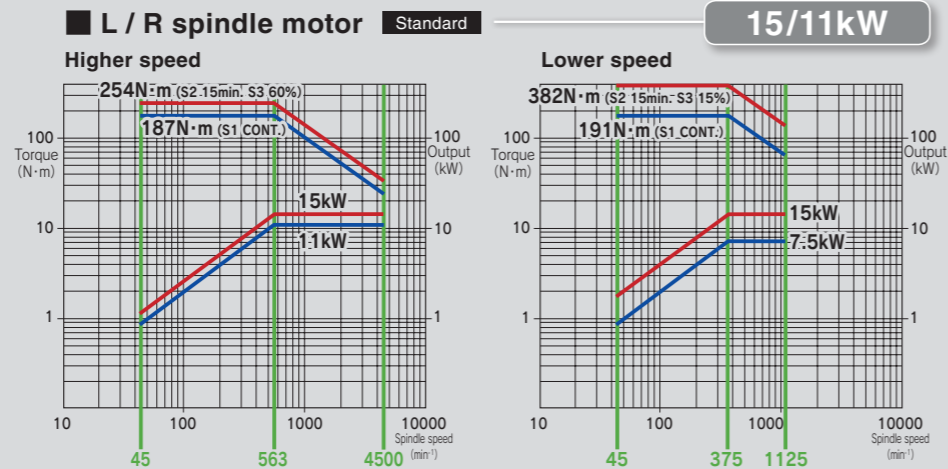
Bar capacity		φ 65	φ 71	φ 80	φ 102
Method		Swing hand			
Workpiece size	Diameter [mm]	φ 65	φ 71	φ 80	φ 102
	Length [mm]	150			
	Weight [kg]	3		5	
Cycle time [sec.]	6				
Ejecting method	Belt conveyor & Chute				



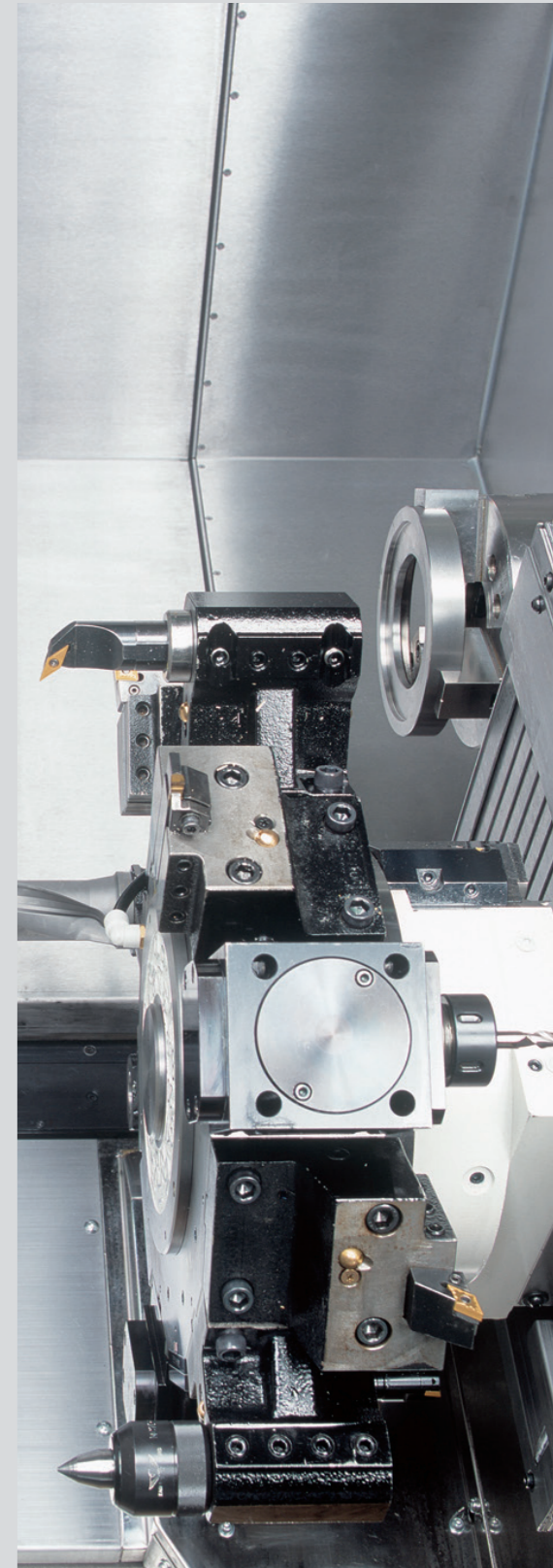
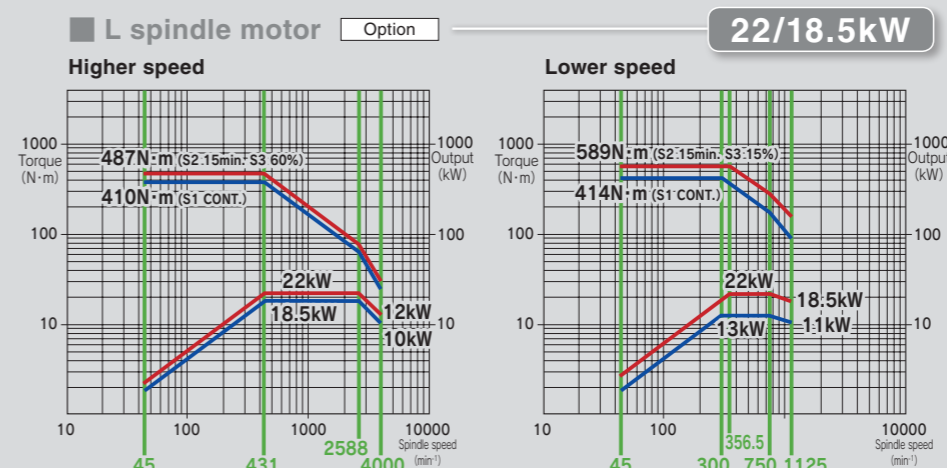
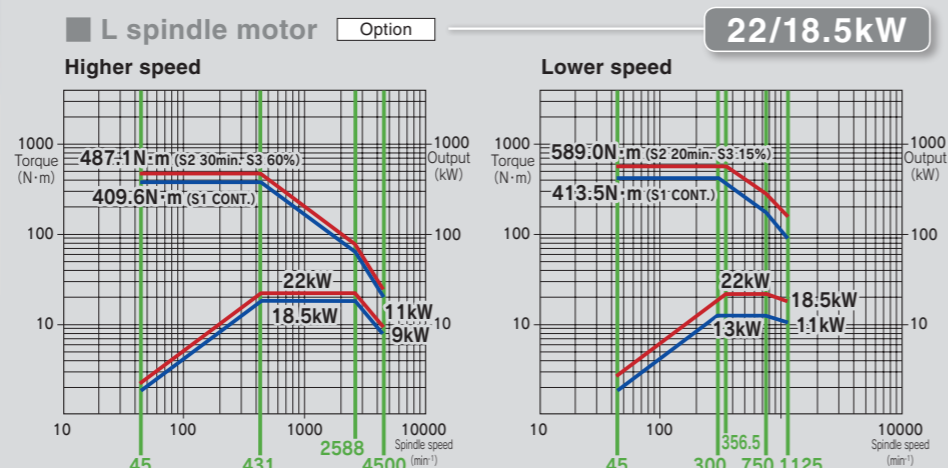
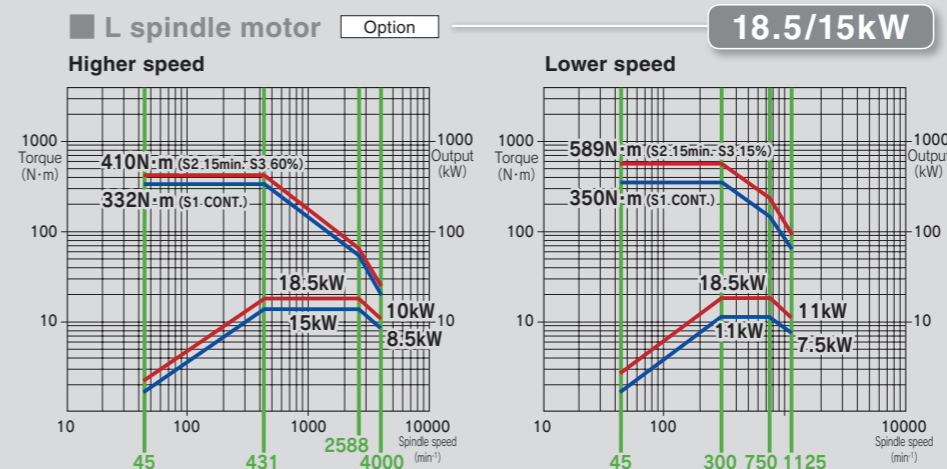
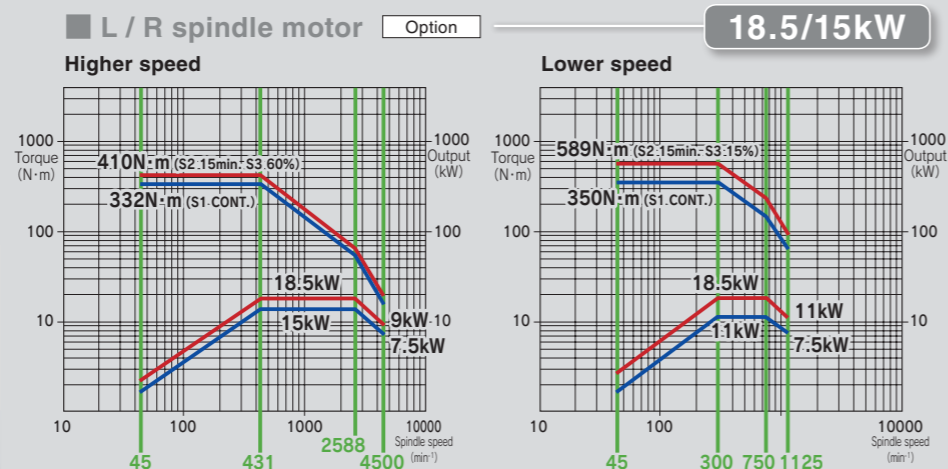
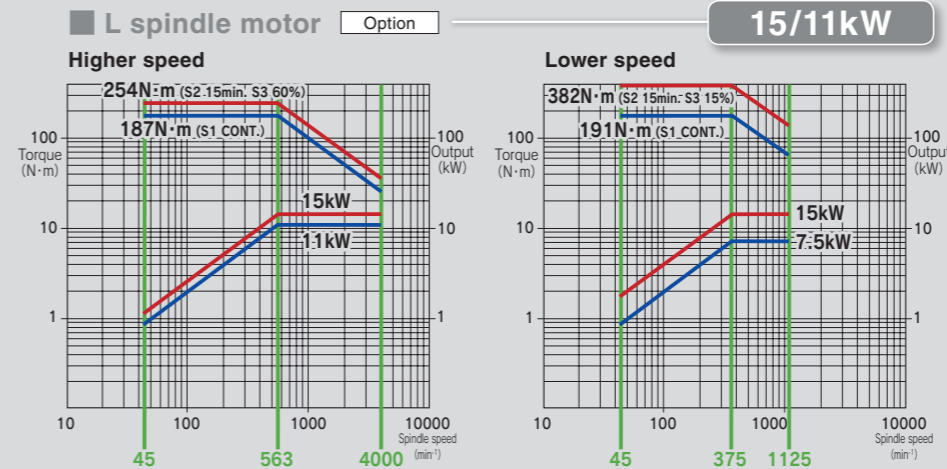
WT-300

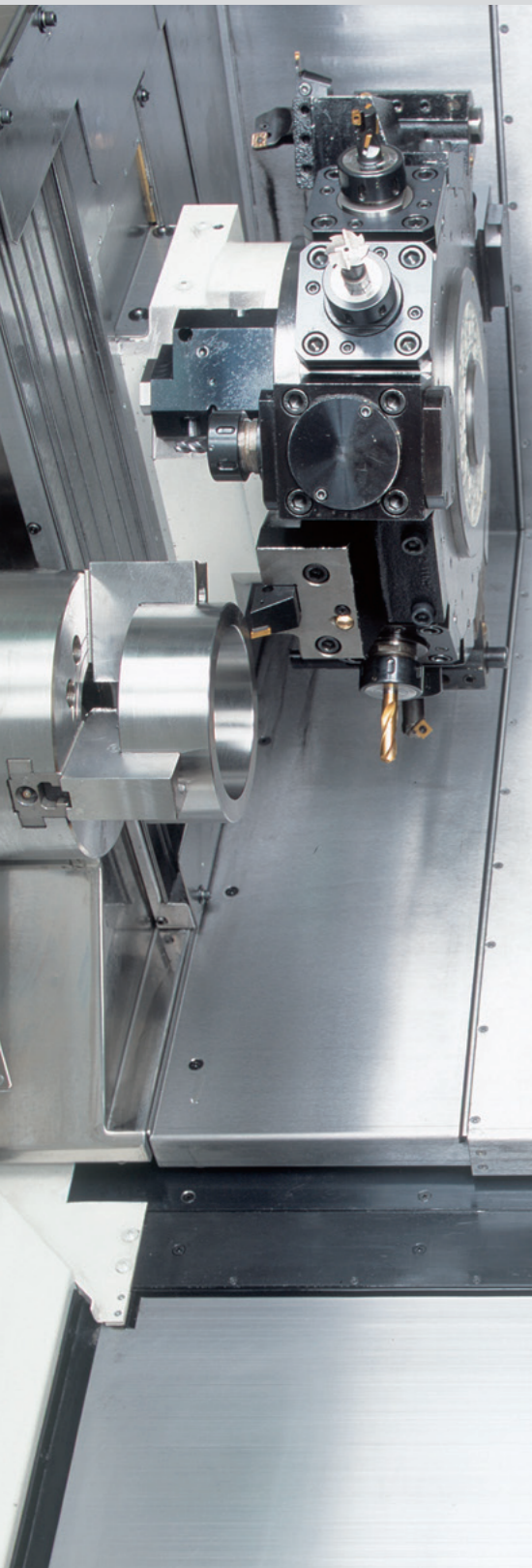
Cycle time reduced through simultaneous machining on Left and Right hand spindles.

dia. 65mm Standard

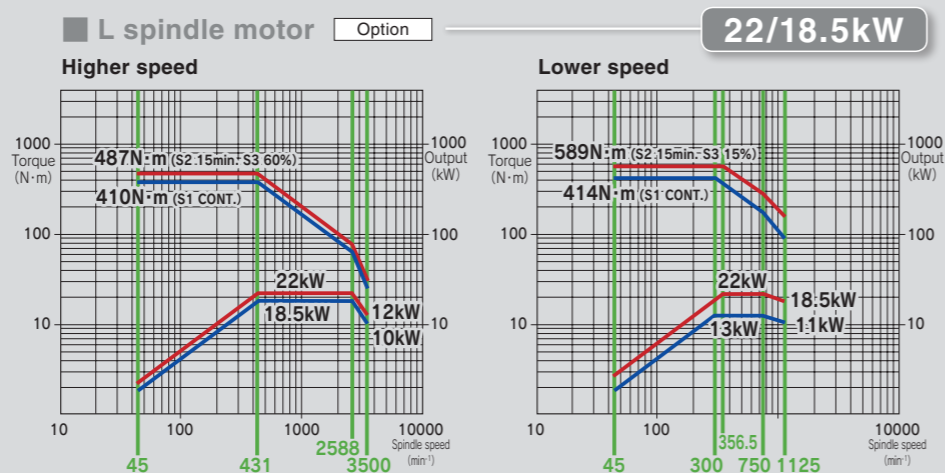
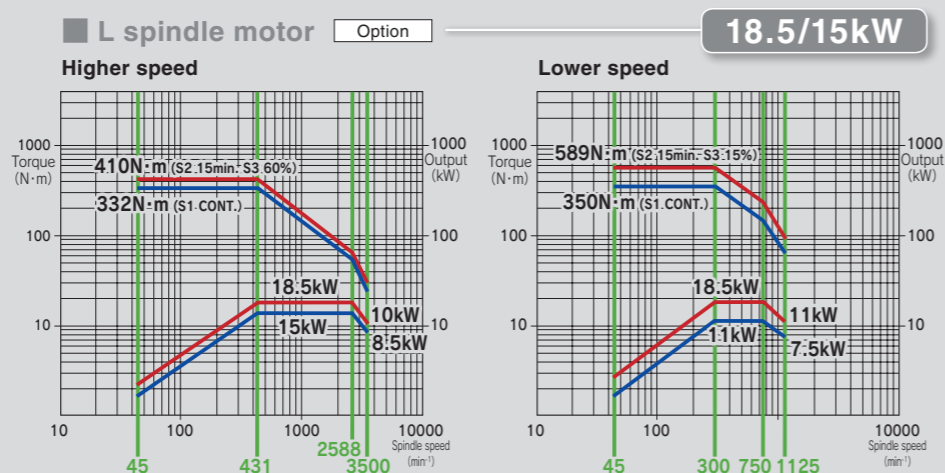
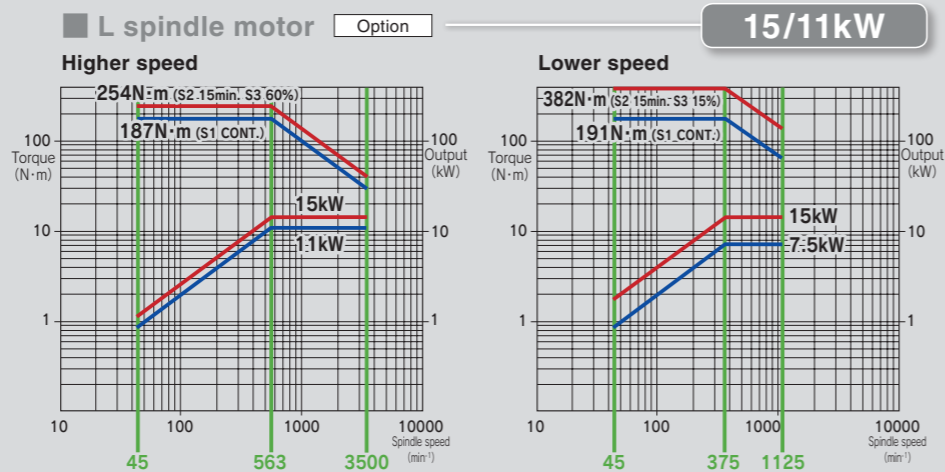


dia. 71mm Option

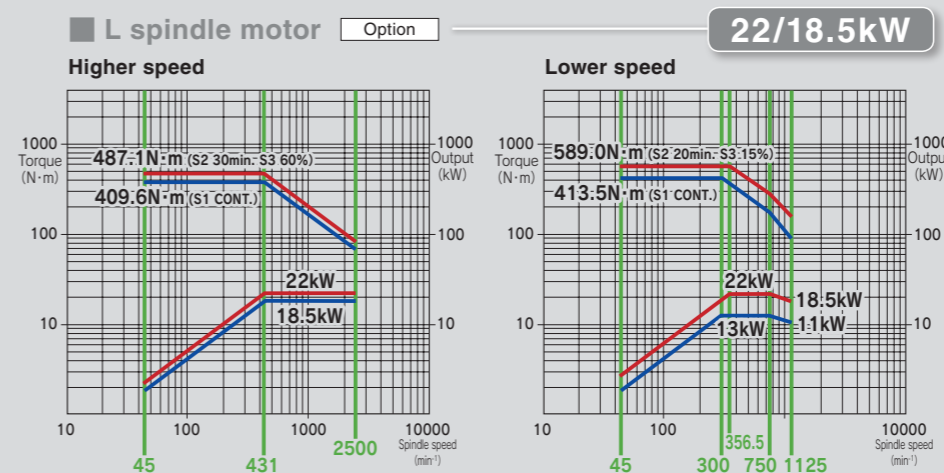
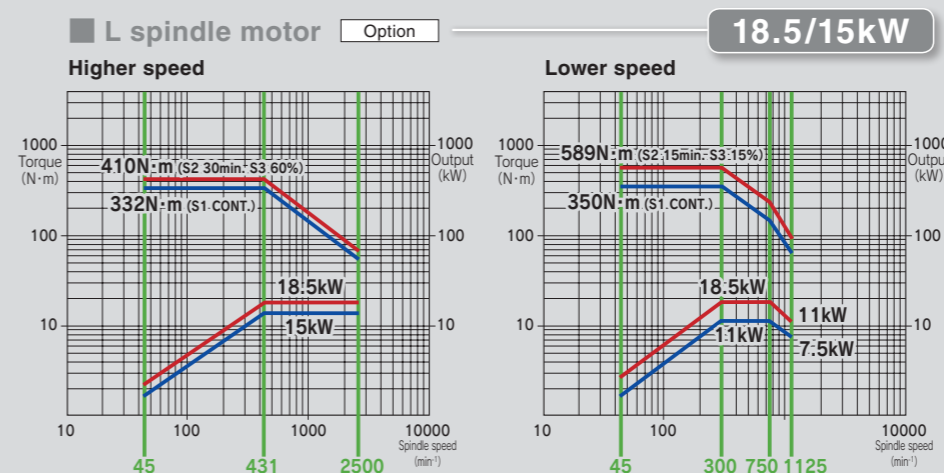
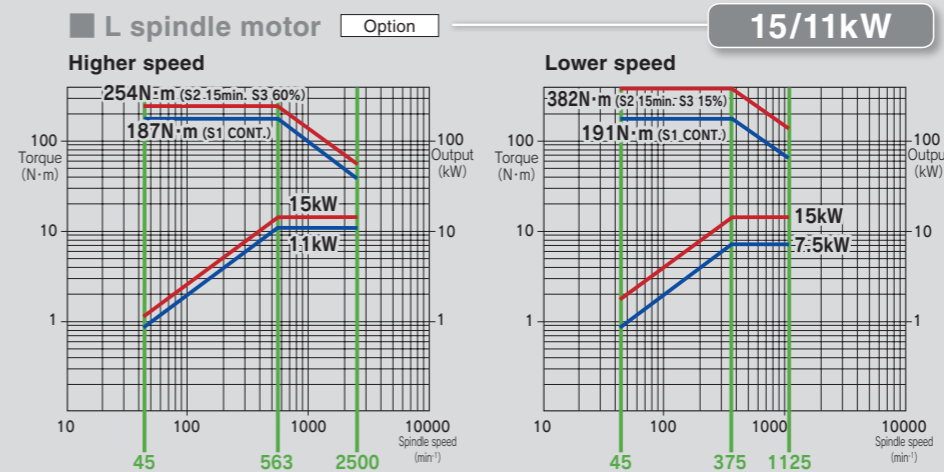




dia. 80mm Option

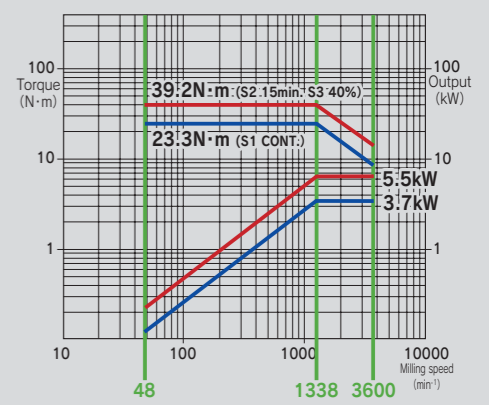


dia. 102mm Option



Milling-tool motor

Standard Upper / Lower
Milling speed : 3600min⁻¹



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.

Start Up Conditions [UPPER]
 W301 : FRONT DOOR IS NOT CLOSED
 W303 : RETURN THE Y-AXIS ZERO POS.
 W304 : MIS-SETTING OF PROGRAM NO SEARCH
 W306 : TURRET IS NOT CLAMPED
 W307 : INTERLOCK OF THE BAR-FEEDER
 W331 : TOOL IS NOT CLAMPED(TOOL-SPINDLE)

Display of Milling rotation
 Cycle start condition is popping up by pressing reference position LED.

Waiting tool number for upper turret
 Color of perimeter becomes white when override setting is 100%.

Spindle Status
 Selected head shown in blue color

Work counter
 Remaining count Value

Turret status display
 Reference position LED
 • Blue : Index ready
 • Green : Reference position return
 • Green Flashing : 2nd Reference position return
 • Blue : Cycle start ready

Machine status display
 Spindle RPM
 Waiting tool number for lower turret

Load status display
 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.

Shortcut bar
 Most used Icon can be registered at right side of display.

Spindle load meter
 • Red : 120% -
 • Yellow : 100% -120%
 • Green : 0 -100%

Load meter
 • Red : 120% -
 • Yellow : 100% -120%
 • Green : 0 -100%

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

Operating status display
 • Green : Automatic operation
 • White : Feed hold
 • Yellow : Warning
 • Red flashing : Alarm

Machine status display
 Spindle RPM
 Waiting tool number for lower turret

Load status display
 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.

Shortcut bar
 Most used Icon 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 the collision due to tooling, chuck, and program.



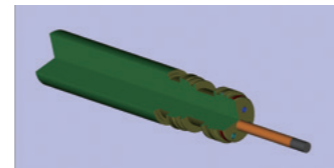
Simulation is performed to check the programs without running the machine. This helps prevent machine collisions due to programming or setup errors.

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

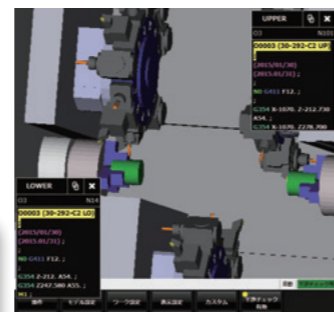
Rapid feed and Cutting feed can be adjusted using override setting. It is possible to make Simulation of each process, or to use single block.

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.

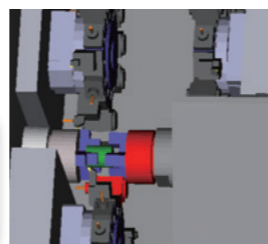
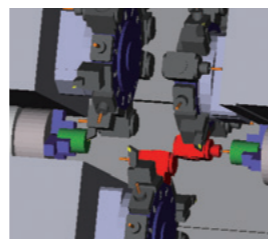
NT Collision Guard



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.

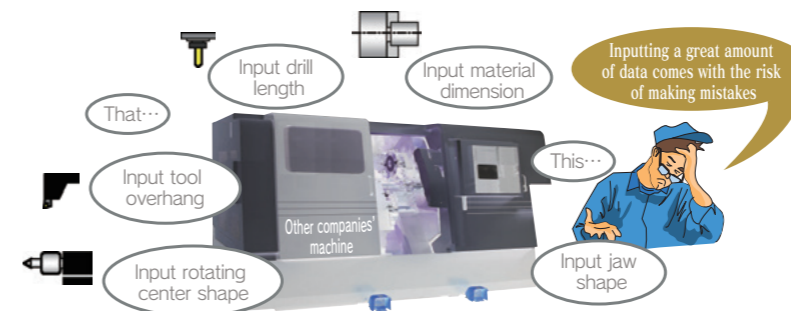


Airbag (Overload detection)

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

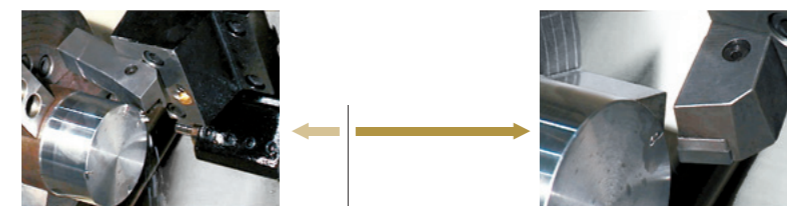
Even with barrier function, machine collisions may occur

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

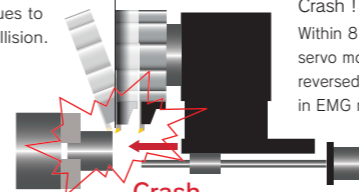
Machine will not be stop immediately. The slide continues to move even after collision.

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.



▲ Video



* This feature does not mean zero impact.

NT Work Navigator

New Navigator for X-axis and Y-axis

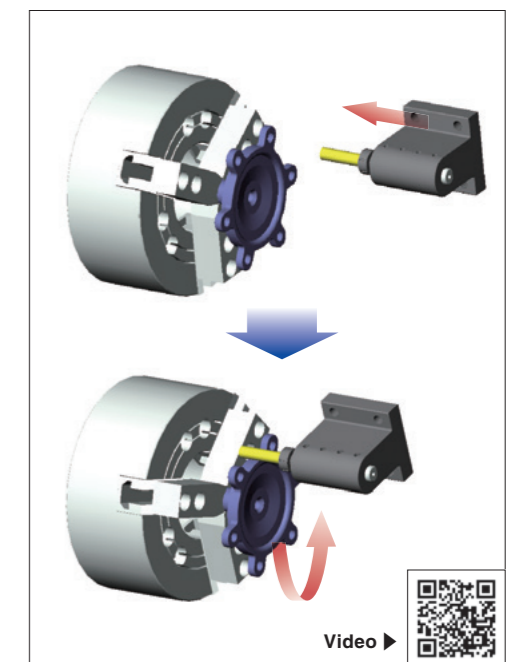


• Advanced NT Work Navigator !

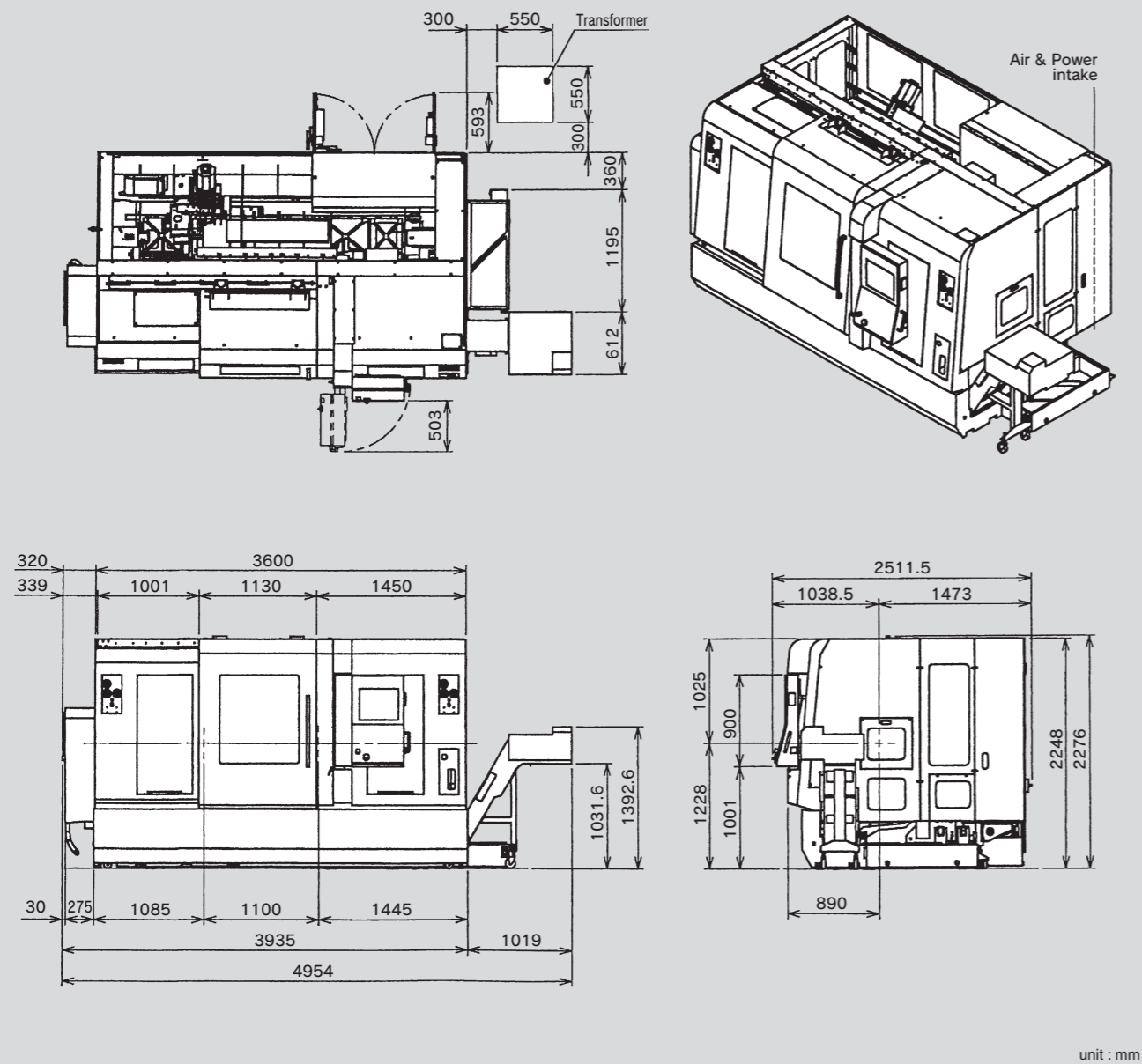
Navigation function is expanded to also include the X and Y-axis. Coordinate Recognition can made the part's outer surface in the X or Y-Axis direction.

• No fixtures required

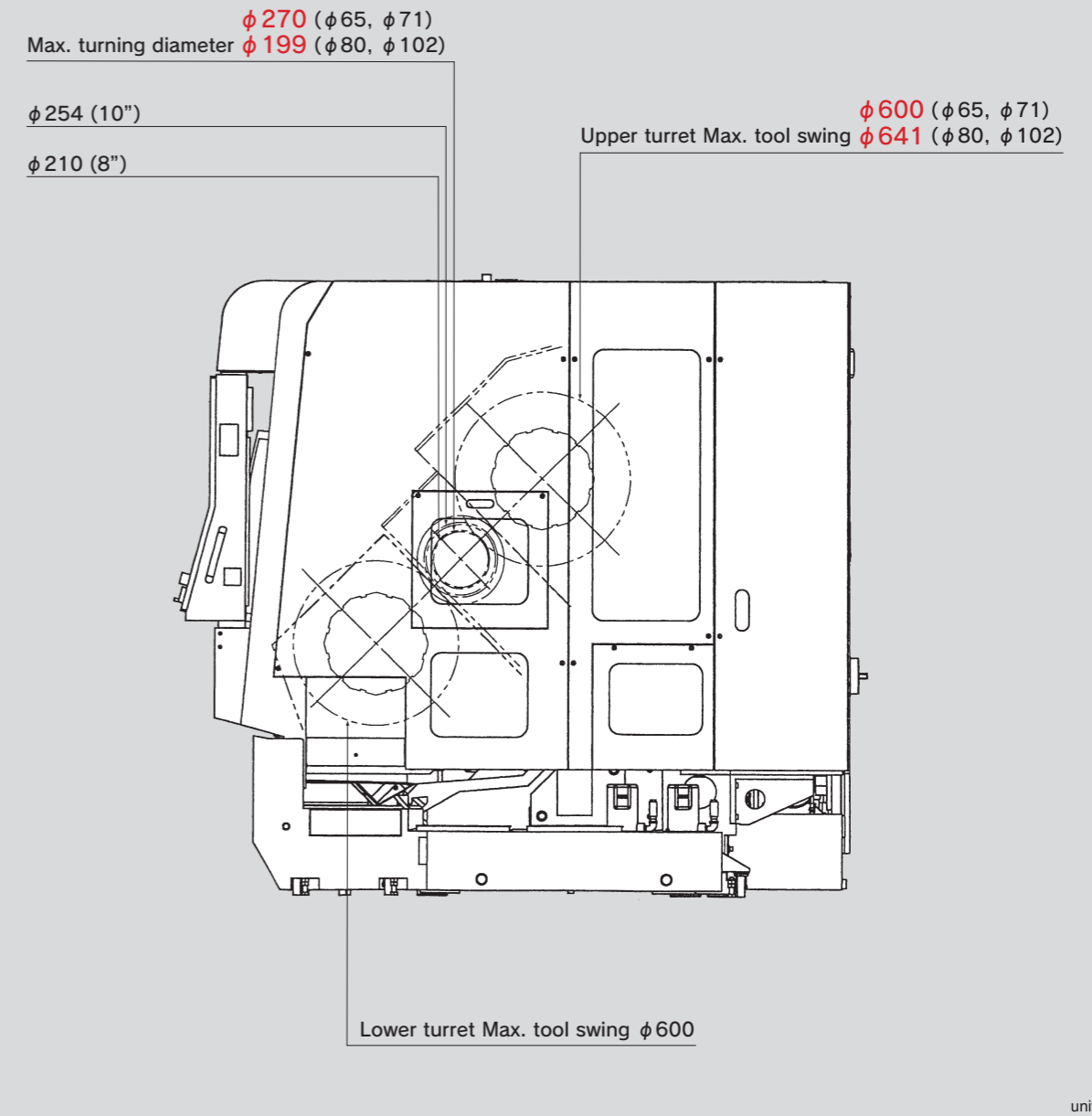
Machining parts with non-round shapes, such as forgings or castings requires that the raw part coordinates be recognized by the CNC control. In order to achieve this without requiring extra cost or additional options, the NT Navigator is used. It works just by touching the part with a simple inexpensive 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.



Machine Dimensions



Maximum Tool Diameter



Multi-Turret Type Multitasking Machine WT Series



WT-100



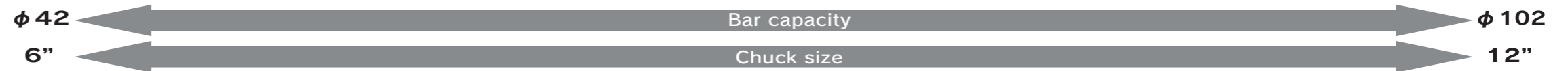
WT-150II



WT-250II

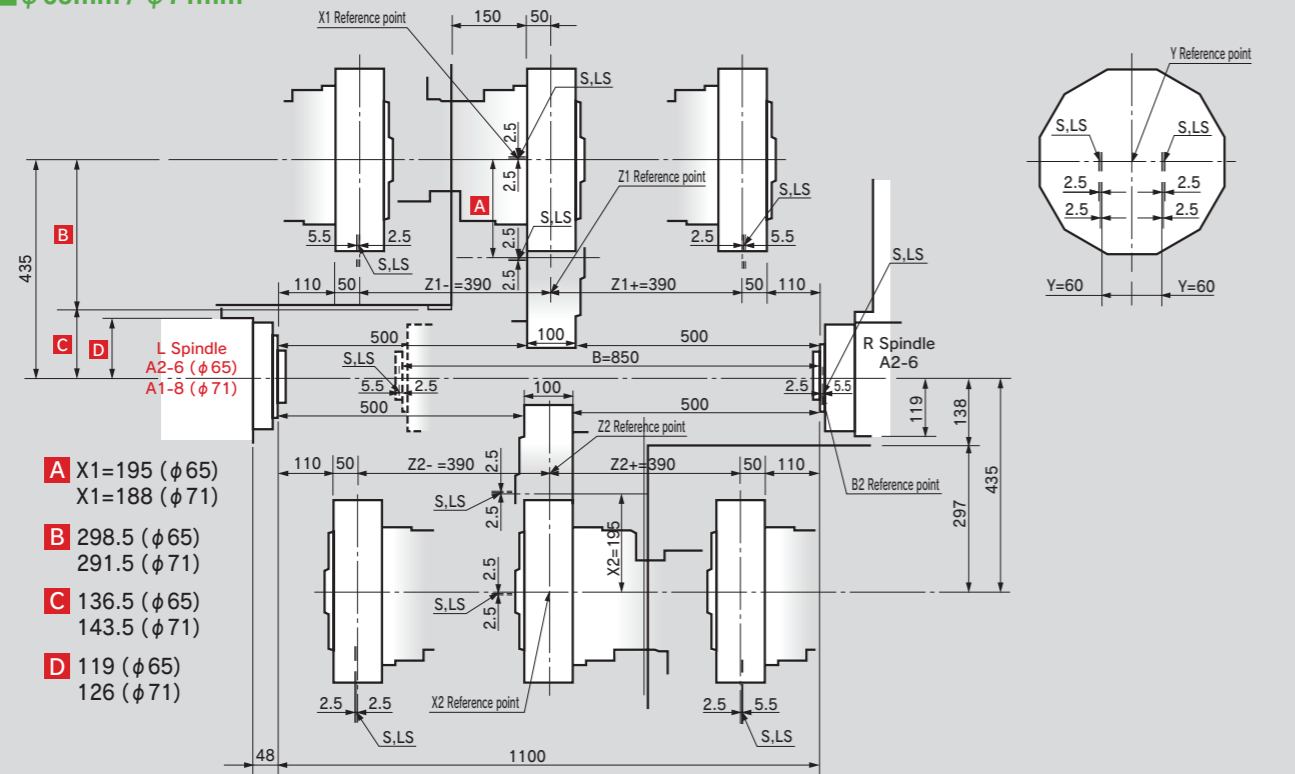


WT-300



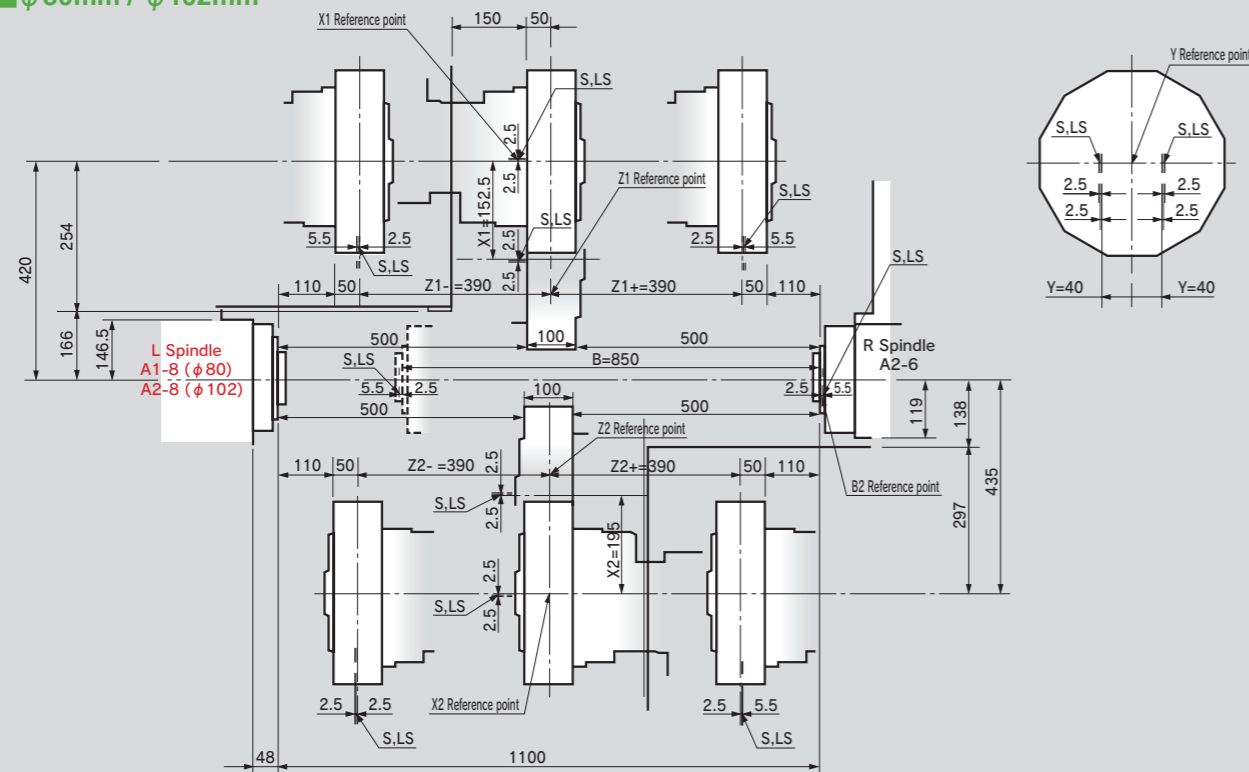
Slide Travel Range

■ $\phi 65\text{mm} / \phi 71\text{mm}$



unit : mm

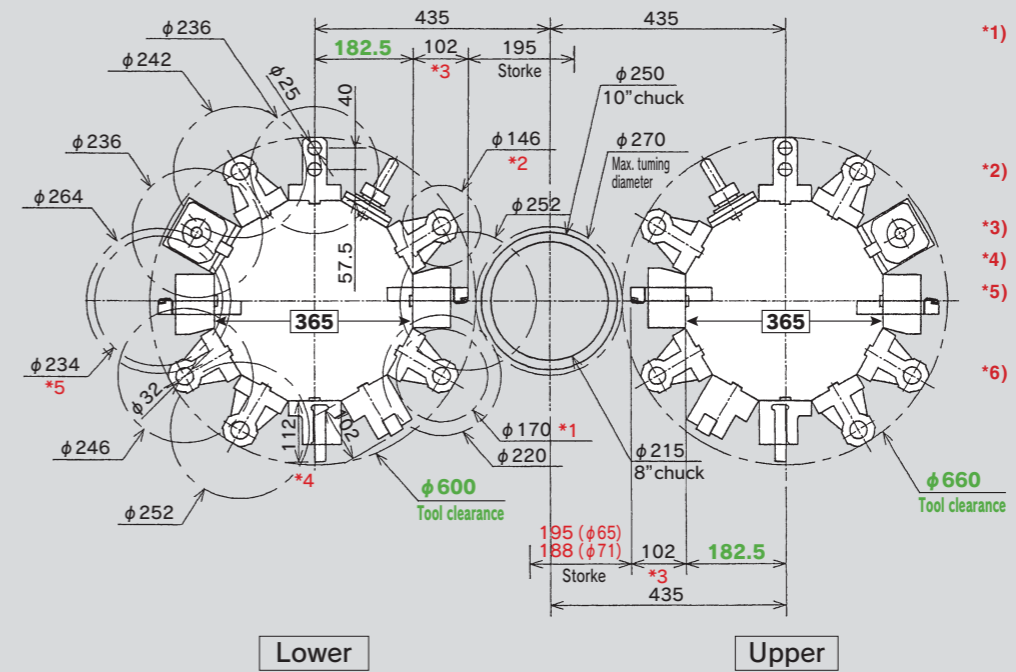
■ $\phi 80\text{mm} / \phi 102\text{mm}$



unit : mm

Tool Interference

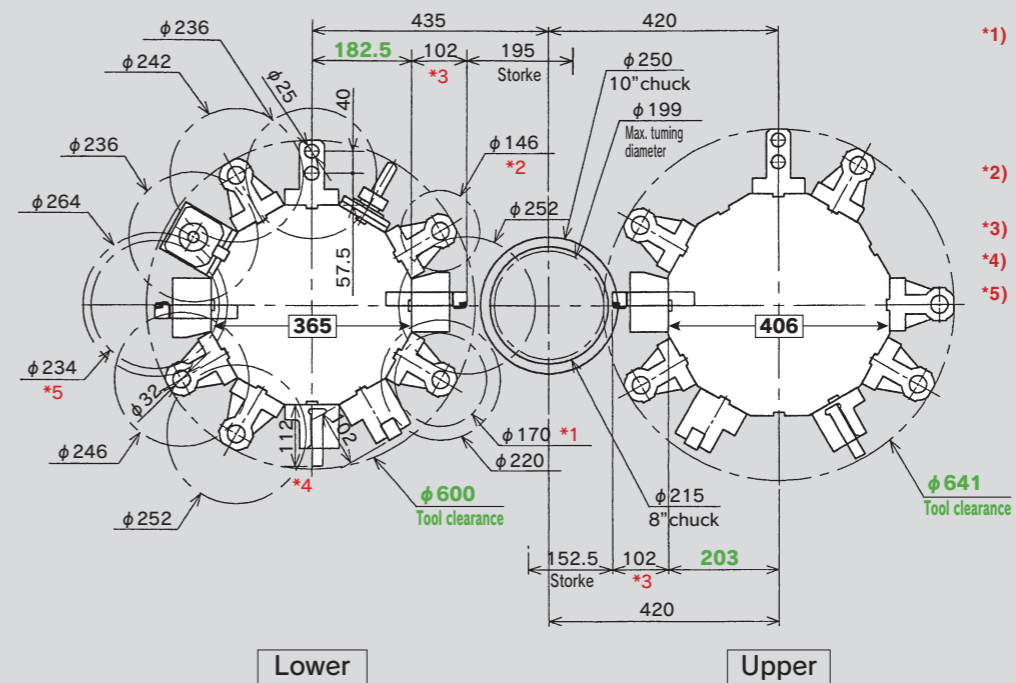
■ $\phi 65\text{mm} / \phi 71\text{mm}$



- *1) 170mm dia. up to 26mm from turret face turning holder (A) is used.
170mm dia. up to 15mm from turret face when turning holder (B) is used. 220mm dia. for others.
- *2) 146mm dia. up to 26mm from turret face when turning holder (A) is used.
- *3) Set 102mm when square shank tool.
- *4) Set 112mm when cut-off is used.
- *5) 234mm dia. up to 70mm from turret face when straight holder is used. 264mm dia. for others.
- *6) Tool discharge amount is 145mm from turret end face.

unit : mm

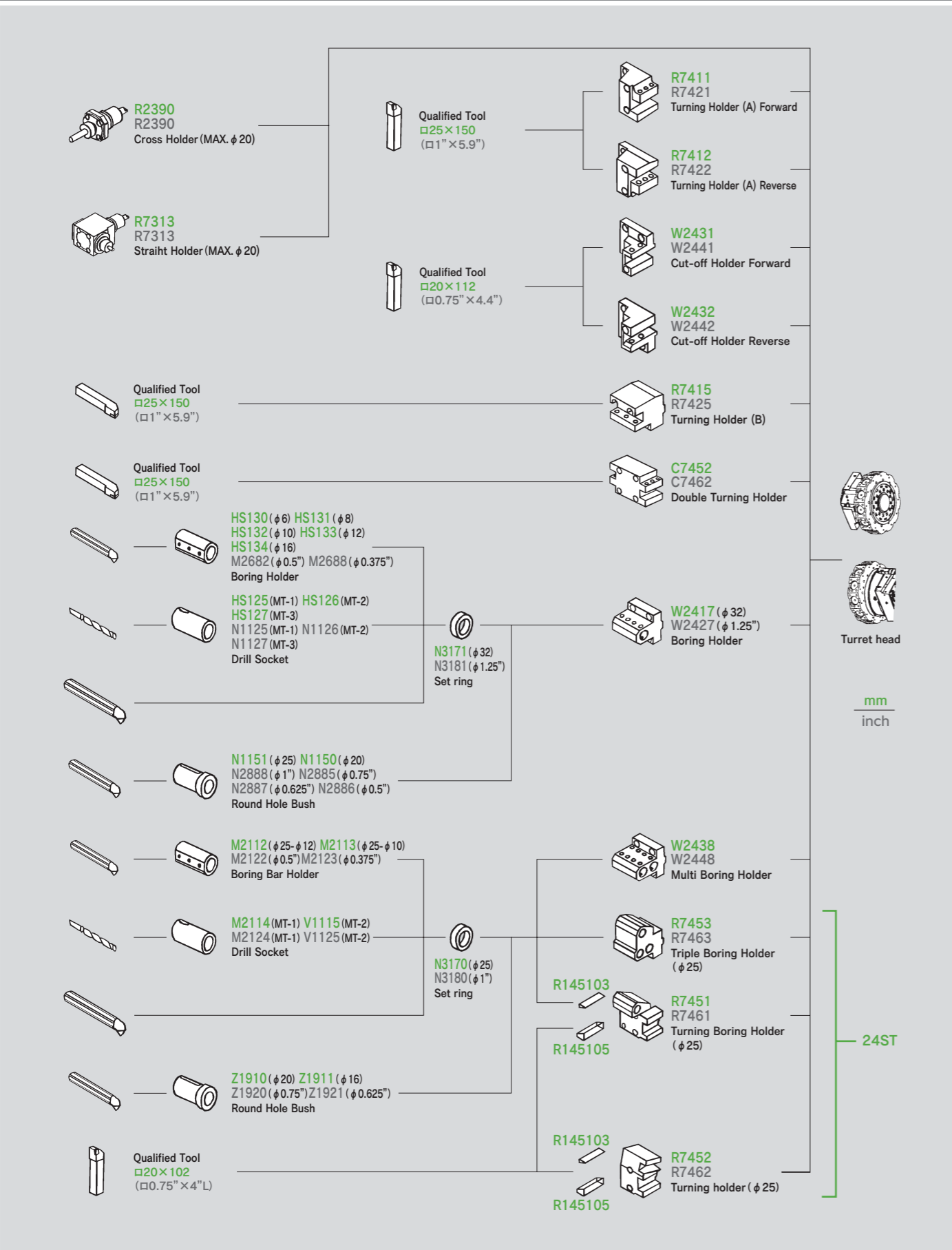
■ $\phi 80\text{mm} / \phi 102\text{mm}$



- *1) 170mm dia. up to 26mm from turret face turning holder (A) is used.
170mm dia. up to 15mm from turret face when turning holder (B) is used. 220mm dia. for others.
- *2) 146mm dia. up to 26mm from turret face when turning holder (A) is used.
- *3) Set 102mm when square shank tool.
- *4) Set 115mm when cut-off is used.
- *5) 234mm dia. up to 70mm from turret face when straight holder is used. 264mm dia. for others.

unit : mm

Tooling System Diagram



Machine Specification

Capacity	*1 L only	ϕ 65mm	ϕ 71mm (op.) *1	ϕ 80mm (op.) *1	ϕ 102mm (op.) *1
Max. turning diameter	270mm			199mm (upper turret)	
Standard turning diameter	215mm				
Distance between centers	max.1100mm / min.250mm				
Max. turning length	780mm				
Bar capacity	65mm	71mm (op.)	80mm (op.)	102mm (op.)	
Chuck size	210mm (8")	210mm (8")	305mm (12")		
Axis travel					
Slide travel (X1 / X2)	195 / 195mm	188 / 195mm	152.5 / 195mm		
Slide travel (Z1 / Z2)	780 / 780mm				
Slide travel (Y) *upper turret	\pm 60mm		\pm 40mm		
Slide travel (B)	850mm				
Rapid feed (X1 / X2)	16 / 16m/min				
Rapid feed (Z1 / Z2)	27 / 27m/min				
Rapid feed (B)	27m/min				
Rapid feed (Y)	6m/min				
Left and right spindles					
Spindle speed	ϕ 65mm	ϕ 71mm *1	ϕ 80mm *1	ϕ 102mm *1	
Spindle speed range	4500min ⁻¹	4000min ⁻¹	3500min ⁻¹	2500min ⁻¹	
Spindle nose	A2-6	A1-8	A2-6	A2-8	
Hole through spindle	80mm	85mm	95mm	120mm	
I.D. of front bearing	110mm	120mm	120mm	160mm	
Hole through draw tube	66mm	72mm	81mm	103mm	
C-axis					
Least input increment	0.001°				
Least command increment	0.001°				
Rapid index speed	600min ⁻¹				
Cutting feed rate	1 - 4800°/min				
C-ax1s clamp	Disk clamp				
C-axis engage time	1.5sec.				
Upper and Lower Turrets					
Type of turret head	Dodecagonal drum turret				
Number of tool stations	24				
Number of indexing positions	24				
Tool size (square shank)	<input type="checkbox"/> 20mm, <input type="checkbox"/> 25mm				
Tool size (round shank)	ϕ 25mm, ϕ 32mm				
Milling tools					
Rotary system	Individual rotation				
Spindle speed	3600min ⁻¹				
Spindle speed range	stepless				
Number of milling-tool stations	12 x 2				
Tool shank	Straight holder ϕ 2mm - ϕ 20mm		Cross holder ϕ 2mm - ϕ 20mm		
Drive motor power					
	ϕ 65mm	ϕ 71mm	ϕ 80mm	ϕ 102mm	
L Output	15/11kW	Standard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	18.5/15kW	Option	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	22/18.5kW	Option	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R Output	15/11kW	Standard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	18.5/15kW	Option	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Milling-tools spindles	5.5/3.7kW Torque (39.2N·m)				
General					
Machine height	2266mm				
Machine width	4230mm	4280mm	4238mm		
Machine length	2518mm				
Machine weight	14000kg	14500kg			
Power source					
Power supply	71.9kVA				
Air supply	150 - 200NL/min, 0.5 - 0.7MPa				

● 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.

Note) Multiple program simultaneous editing is not available during Gantry loader or Parts catcher G auto operation. Both GR and Parts catcher G cannot be equipped on the same machine.

Control Specification

Items	
Control type	FANUC 31i-B 2-PATH
Controlled axes	
Controlled axes (MM/MMY)	7axes / 8axes
Simultaneously controlled axes (MM)	3axes (X1, Z1, C1) + 4axes (X2, Z2, C2, B)
(MMY)	4axes (X1, Z1, C1, Y) + 4axes (X2, Z2, C2, B)
Input command	
Least input increment	0.001mm/0.0001inch (diameter for X-axes), 0.001°
Least command increment	X:0.0005mm, Z:0.001mm, C:0.001°, B:0.001mm
Max. programmable dimension	\pm 99999.999mm/ \pm 9999.9999inch, \pm 99999.999°
Absolute/incremental programming	X, Z, C, B (absolute only for B) /U, W, H
Decimal input	Standard
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 B : 1 - 4800mm/min, 0.01 - 188inch/min feed/rev : 0.0001mm/rev - 4800mm/min 0.000001inch/rev - 188inch/min
Dwell	G04
Feed per minute / Feed per revolution	G98 / G99
Thread cutting	G32 + F
Thread cutting retract	Standard
Continuous thread cutting	Standard
Variable lead threading	G34
Handle feed	Manual pluse generator 0.001/0.01/0.1mm, ^o (per pulse)
Automatic acceleration / deceleration	Standard
Linear accel. / decel. after cutting feed interpolation	Standard
Rapid override	F0/25/100% (changeable to every 10% by switch)
Cutting feed override	0 - 150%, (each 10%)
AI contouring control	G5.1
Program memory	
Part program storage length	640m
Part program editing	delete, insert, change
Program number search	Standard
Sequence number search	Standard
Address search	Standard
Number of registerable programs	500programs
Program storage memory	Backed up by battery
Multiple program simultaneous editing	Standard (Multiple program simultaneous editing is not available during gantry loader auto operation)
DNC operation through memory card	Standard (Only one turret can access memory card at a time) (not including memory card)
Program copy between two path	Standard
Extended part program editing	Standard
Operation and display	
Operation panel : Display	19" color SXGA liquid touch panel
Operation panel : keyboard	QWERTY keyboard
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
Axis recombination	Standard (used for C axis control from Lower)
Sub program	Standard
Balance cut	G68, G69
Custom marco	Standard
Addition to custom macro common variables	Standard (After addition, #100 - #199, #500 - #999)
FS15tape format	Standard
Luck-bei II	Standard
Abnormal Load detection	Standard
NT Work Navigator	Standard (contact bar is not included)
NT Nurse	Standard
NT Collision Guard	Standard
Mechanical support	
Rigid tapping	Standard
Spindle synchronised control	Standard
C axis synchronised control	Standard
Spindle orientation	Standard
NT-IPS	
O/S	Windows XP Embedded
Pointing device	Touch pad