

WT-150II



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NAKAMURA-TOME
PRECISION INDUSTRY CO.,LTD.

The Best-Selling Multi-Turret Type Multitasking Turning Center

A machine successfully differentiating itself from others, when it comes to multitasking

This is an innovative multi-turret multitasking machine for production. Thanks to the opposed twin-spindles and upper & lower turret design, simultaneous machining with multiple tools becomes a reality, contributing to process efficiency, drastic cycle time reduction and higher productivity. By offering Nakamura-Tome own-made automation systems, such as built-in gantry loaders, shaft loaders, shaft un-loaders and bar feeders, independent cells can be customized for production needs.

The WT-150II is a high productivity Multitasking Turning Center, featuring the latest in technology and in manufacturing.



WT-150II High-Speed, High-Rigidity Compact

Multitasking Machine WT-150II / SuperMill WT-150II



19"
Color LCD
Touch Panel

NT
IPS

WT-150II

Twin-Spindle (S²) Double turret (T²) Double Milling Motor (M²) C-axes (C²) Y-axis (Y)

SuperMill WT-150II

Twin-Spindle (S²) Double turret (T²) Double Milling Motor (M²) C-axes (C²) Y-axis (Y)

Capacity	WT-150II		SuperMill WT-150II	
Max. turning diameter / Max. turning length	190mm / 515mm		190mm / 515mm	
Distance between centers	max.800mm / min.200mm		max.800mm / min.200mm	
Bar capacity	51mm	65mm (op. L)	51mm	65mm (op. L)
Chuck size	6" 165mm, 8" 210mm		6" 165mm	
Axis travel				
Slide travel (X1/X2)	167.5 / 167.5mm	152.5 / 167.5mm	167.5 / 167.5mm	152.5 / 167.5mm
Slide travel (Z1/Z2/B)	515mm / 515mm / 600mm		515mm / 515mm / 600mm	
Slide travel (Y Upper turret)	±35mm (op.)		±35mm (op.)	
Left and Right spindles				
Spindle speed	5,000min ⁻¹	4,500min ⁻¹	5,000min ⁻¹	4,500min ⁻¹
Left spindle	15/11kW 136.4 / 113.7 / 83.4N·m		15/11kW 136.4 / 113.7 / 83.4N·m	
Right spindle	11/7.5kW 89.1 / 83.2 / 56.7N·m		11/7.5kW 89.1 / 83.2 / 56.7N·m	
Upper Turret				
Number of turrets	1		1	
Spindle speed	6,000min ⁻¹ (op.)		6,000min ⁻¹ (op.)	
Drive motor power and torque	5.5/3.7kW 24/16N·m (op.)		7.5/3.7kW 40/16N·m (op.)	
Type of turret head / Number of indexing position	Dodecagonal / 24		Dodecagonal / 24	
individual rotation	Individual rotation/12 (op.)		Individual rotation/12	
Lower Turret				
Number of turrets	1		1	
Spindle speed	6,000min ⁻¹ (op.)		6,000min ⁻¹ (op.)	
Drive motor power and torque	5.5/3.7kW 24/16N·m (op.)		7.5/3.7kW 40/16N·m (op.)	
Type of turret head / Number of indexing position	Dodecagonal / 24		Dodecagonal / 24	
individual rotation	Individual rotation/12 (op.)		Individual rotation/12	
General				
Floor space (L×W×H)	3,674mm × 2,264mm × 1,885.2mm		3,674mm × 2,264mm × 1,885.2mm	
Machine weight (incl Control)	9,000kg		9,000kg	

48 stations

High-rigidity turret



Left Spindle

High-efficiency spindle motor

Spindle nose : A2-5 / A2-6 (op.)
 Least input increment : 0.001°
 C-axis rapid speed : 600min⁻¹
 C-axis synchronous control

Bar capacity 51mm

Spindle motor
 15/11kW
 136.4/113.7/83.4N·m
 5000min⁻¹

C-axis (op.)

Bar capacity 65mm (op.)

Spindle motor
 15/11kW
 152.8/127.3/93.4N·m
 4500min⁻¹

WT-150II

C-axis Super Mill WT-150II

Upper Turret

Dodecagonal/24-station

Servo-driven turret

WT-150II

Milling (op.)

Driven-tool spindles
 5.5/3.7kW
 24/16N·m 6000min⁻¹
 1 - 16mm

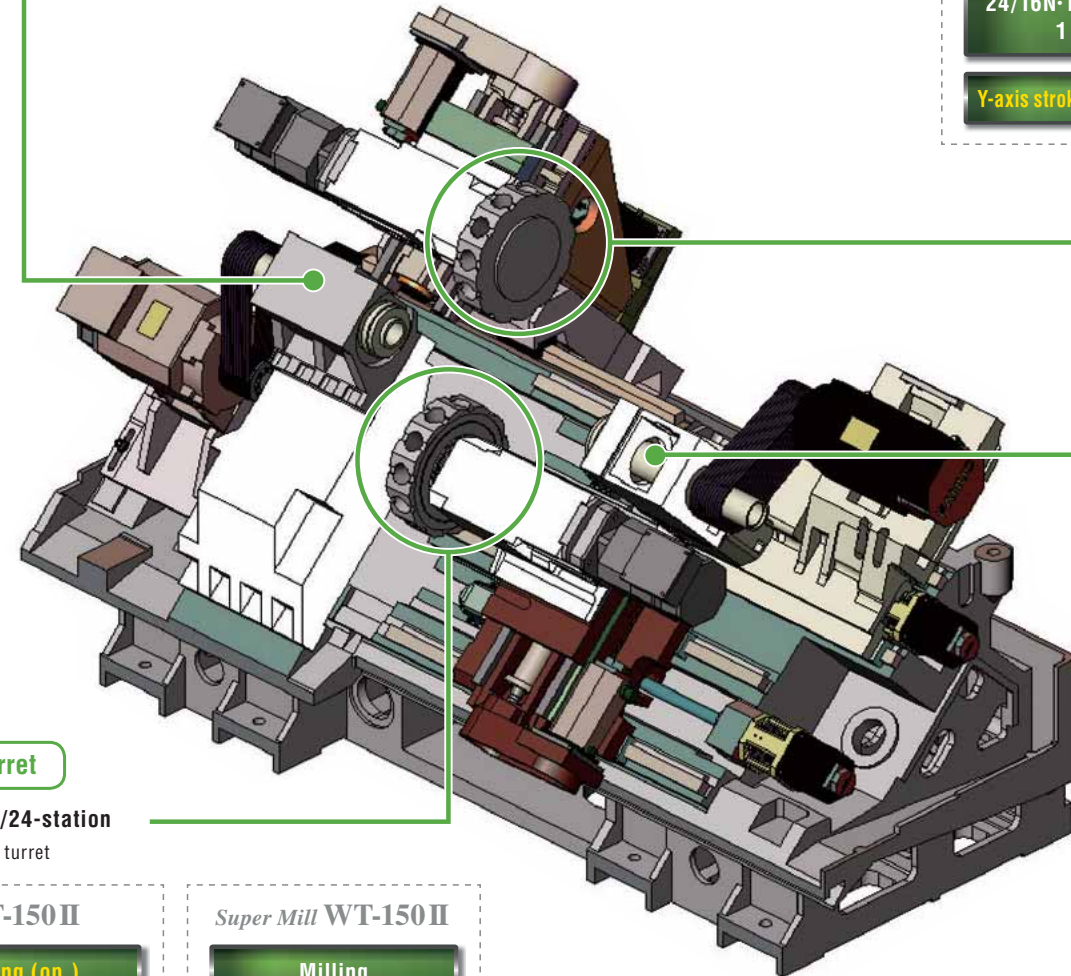
Y-axis stroke ±35mm (op.)

Super Mill WT-150II

Milling

Driven-tool spindles
 7.5/3.7kW
 40/16N·m 6000min⁻¹
 1 - 20mm

Y-axis stroke ±35mm (op.)



Right spindle

High-efficiency spindle motor

Spindle nose : A2-5
 Least input increment : 0.001°
 C-axis rapid speed : 600min⁻¹
 C-axis synchronous control

Bar capacity 51mm

Spindle motor
 11/7.5kW
 89.1/83.2/56.4N·m
 5000min⁻¹

C-axis (op.)
 WT-150II

C-axis
 Super Mill WT-150II

Lower turret

Dodecagonal/24-station

Servo-driven turret

WT-150II

Milling (op.)

Driven-tool spindles
 5.5/3.7kW
 24/16N·m 6000min⁻¹
 1 - 16mm

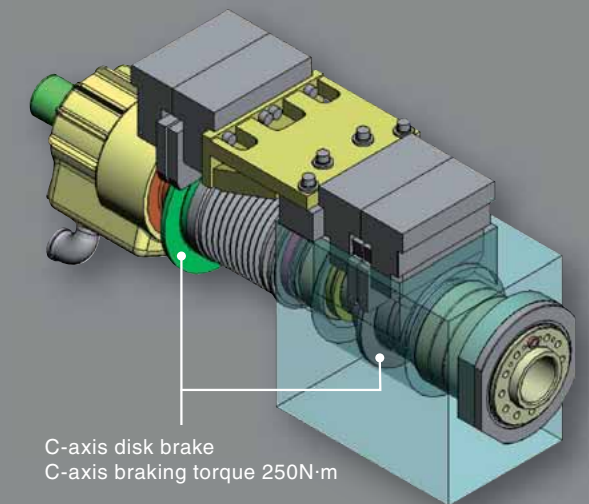
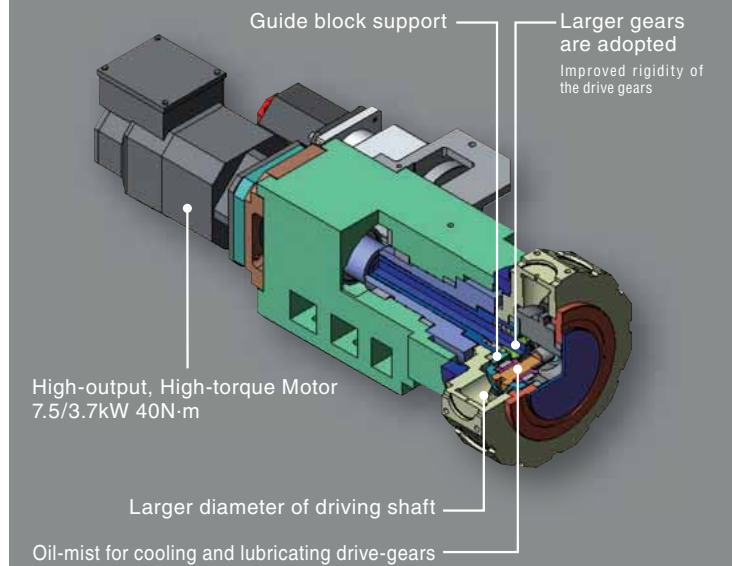
Super Mill WT-150II

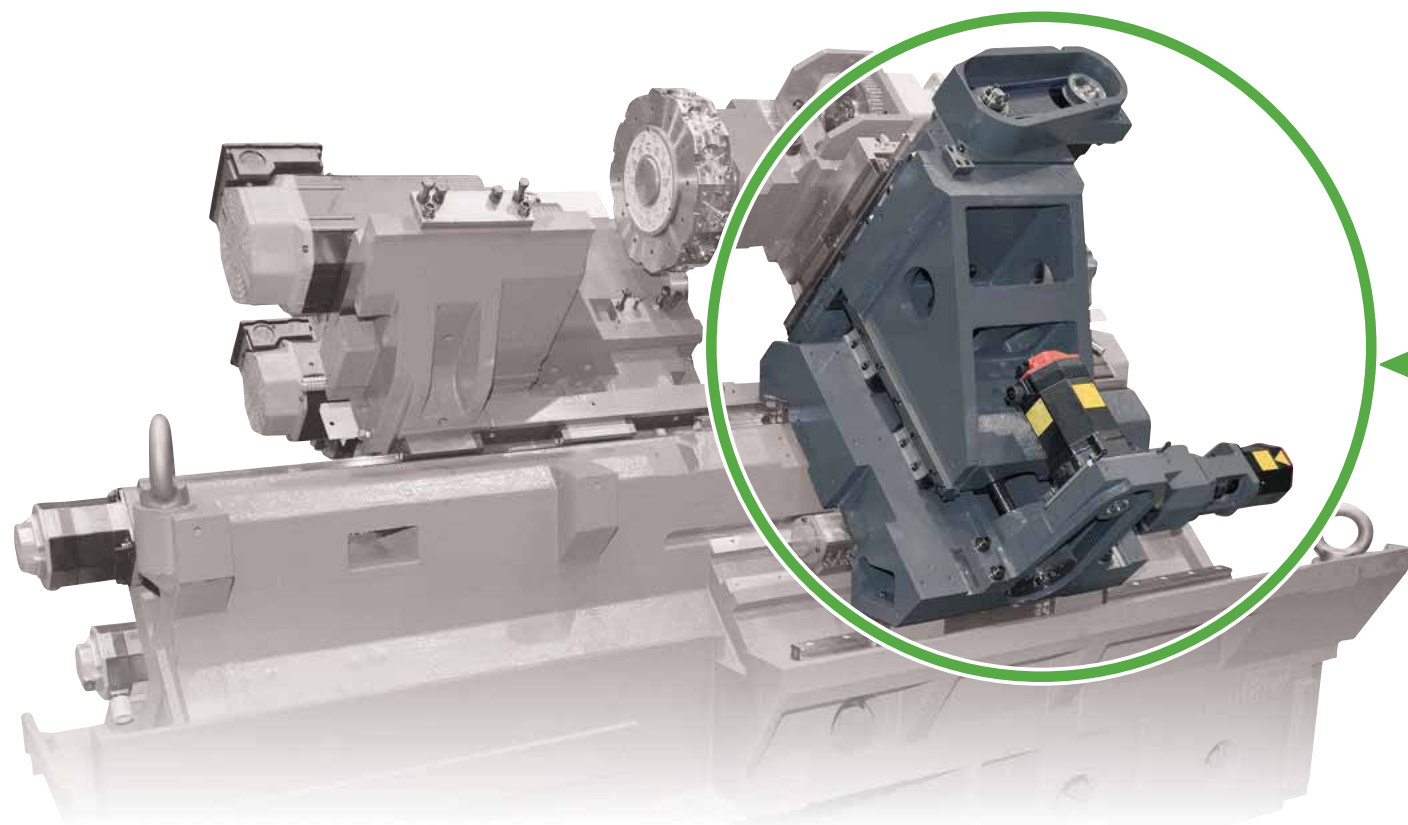
Milling

Driven-tool spindles
 7.5/3.7kW
 40/16N·m 6000min⁻¹
 1 - 20mm

Super Mill

Major improvement of the milling-unit, resulting in higher rigidity





• Wide and very rigid slides for Z-axis slide

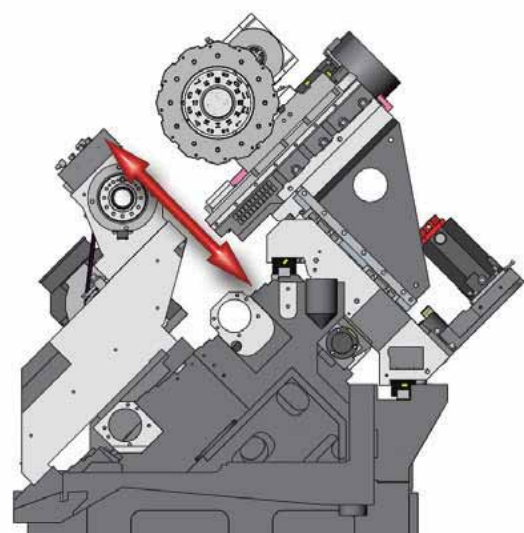
The upper Z-axis slide was designed in the direction of gravity to avoid any load unbalance.



Larger window ensures better visibility

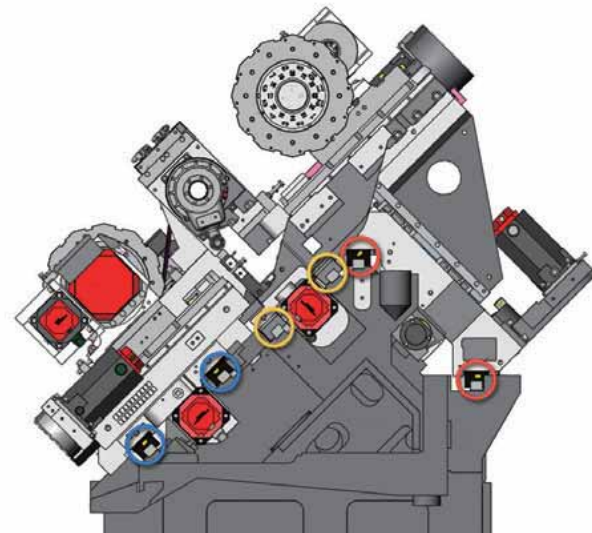
Stable cutting capacity ensured

Metal Removal Rate **432mL/min**



• High rigidity Y-axis slide

The Upper machine-structure was designed with the Y-axis in mind. High rigidity of the machine ensures maximum stability during heavy duty turning and milling with full power



• 3 way slide

Upper and lower index units, as well as right spindle unit are mounted on individual saddles, so they can move freely without limitations

Upper turret



Cutting Sectional area : 3.6mm²
 Cutting Depth : 6mm
 Feed : 0.6mm/rev
 Spindle speed : 1270min⁻¹
 Load : 140%
 Material : S45C (JIS)

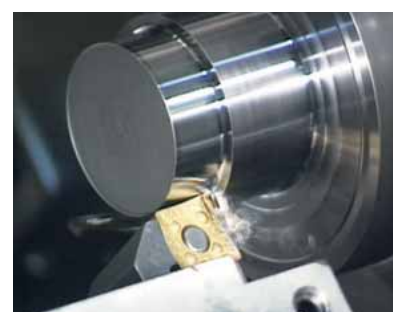


Cutting Sectional area : 2mm²
 Cutting Depth : 5mm
 Feed : 0.4mm/rev
 Spindle speed : 1270min⁻¹
 Load : 140%
 Material : S45C (JIS)

Lower turret

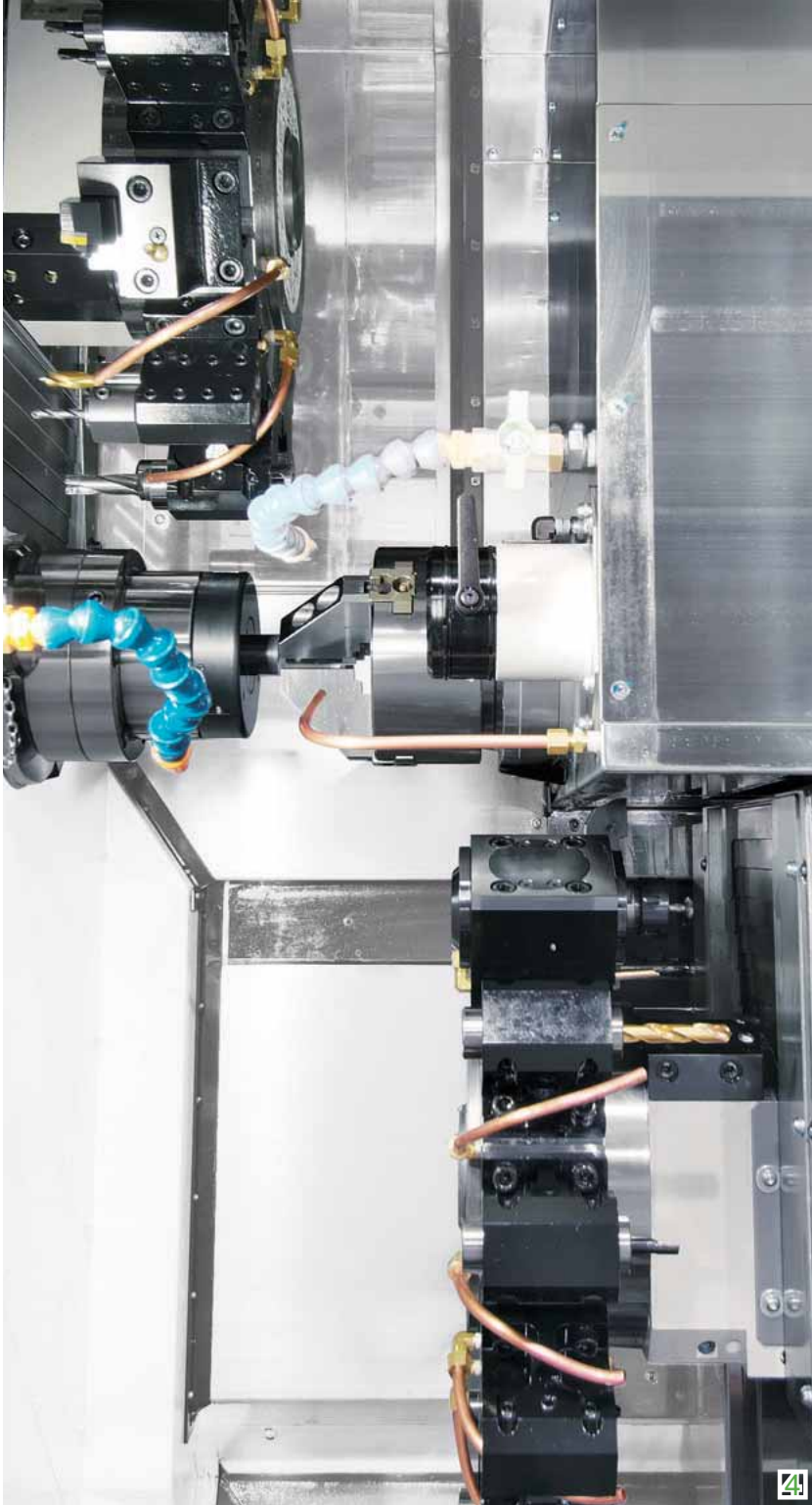


Cutting Sectional area : 3.3mm²
 Cutting Depth : 6mm
 Feed : 0.55mm/rev
 Spindle speed : 1270min⁻¹
 Load : 137%
 Material : S45C (JIS)



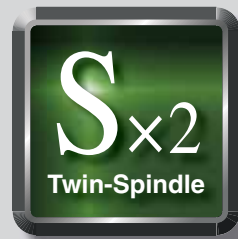
Cutting Sectional area : 2mm²
 Cutting Depth : 5mm
 Feed : 0.4mm/rev
 Spindle speed : 1270min⁻¹
 Load : 135%
 Material : S45C (JIS)

A wide range of parts can be machined from bar stock, blanks or forgings



1 Upper-left/ lower-right turning operation 2 Upper-right/ lower-left operation 3 Upper-left/ lower-right operation

4 Transfer operation 5 Upper/ lower simultaneous milling on the left hand side 6 Upper/ lower simultaneous milling on the right hand side



■ WT-150II ■ *Super Mill* WT-150II

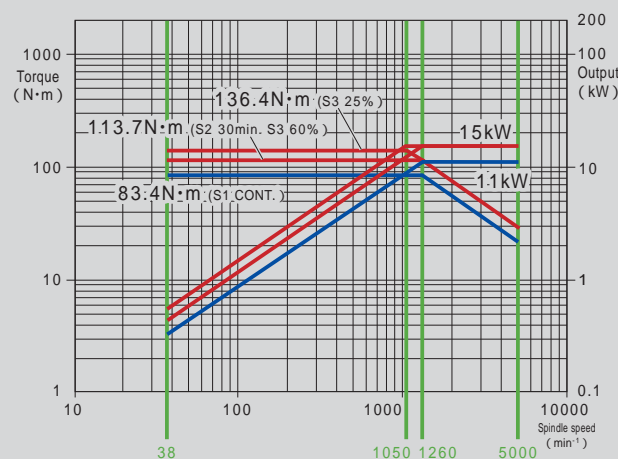
Simultaneous machining with synchronized left and right spindles contribute to faster cycle times.



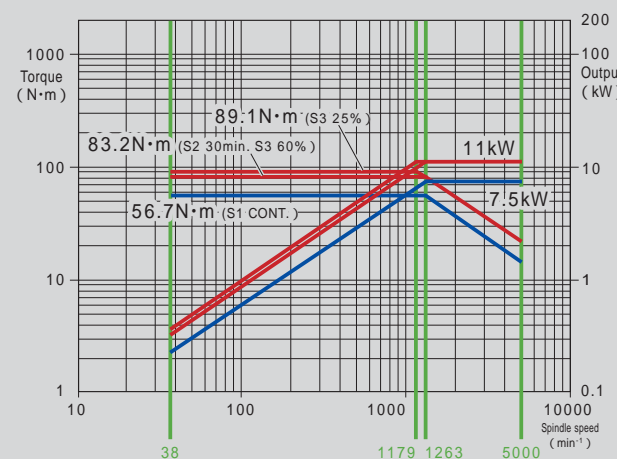
■ WT-150II

5.5/3.7kWx2

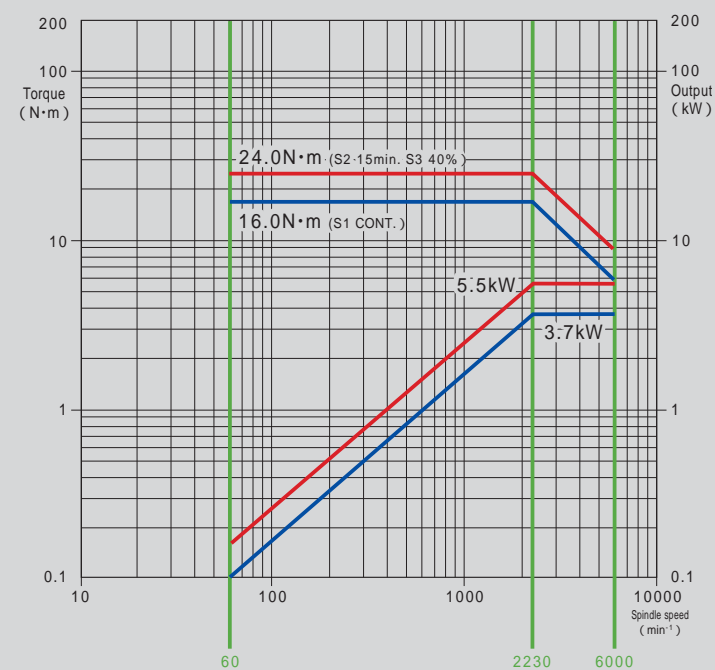
Left spindle motor [Bar capacity 51mm (std.)]



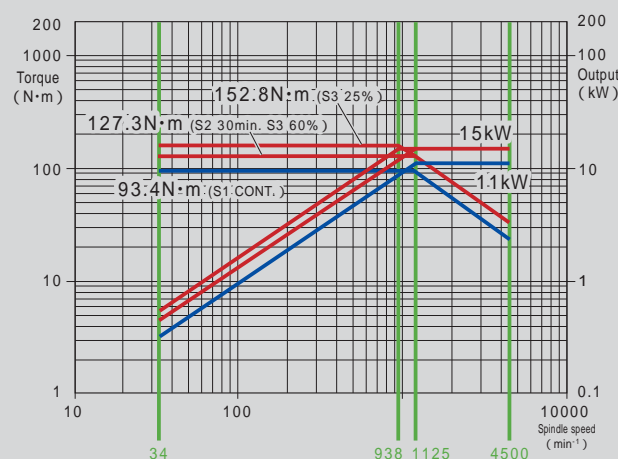
Right spindle motor [Bar capacity 51mm (std.)]



Upper & Lower Milling Motors (op.)



Left spindle motor [Bar capacity 65mm (op.)]



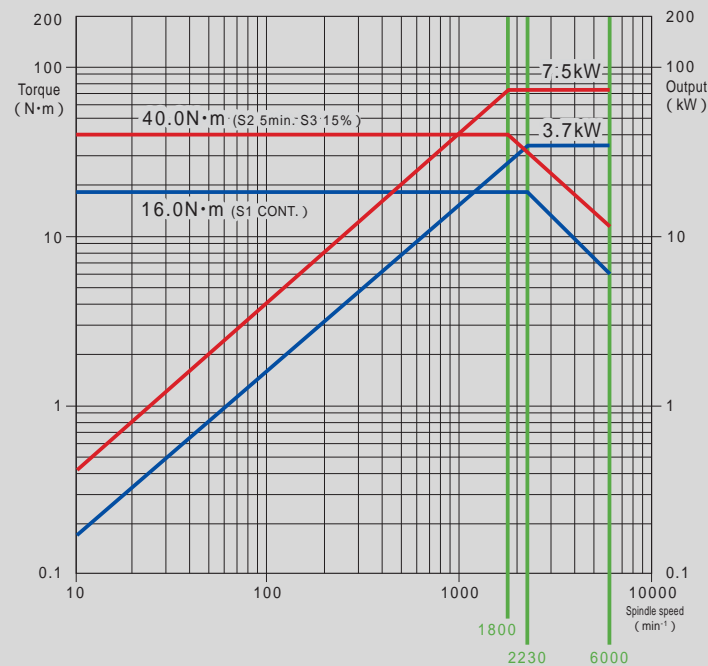
Major improvement of the milling-unit, resulting



Super Mill WT-150II

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

Upper & Lower Milling Motors



7.5kW 40N·m

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

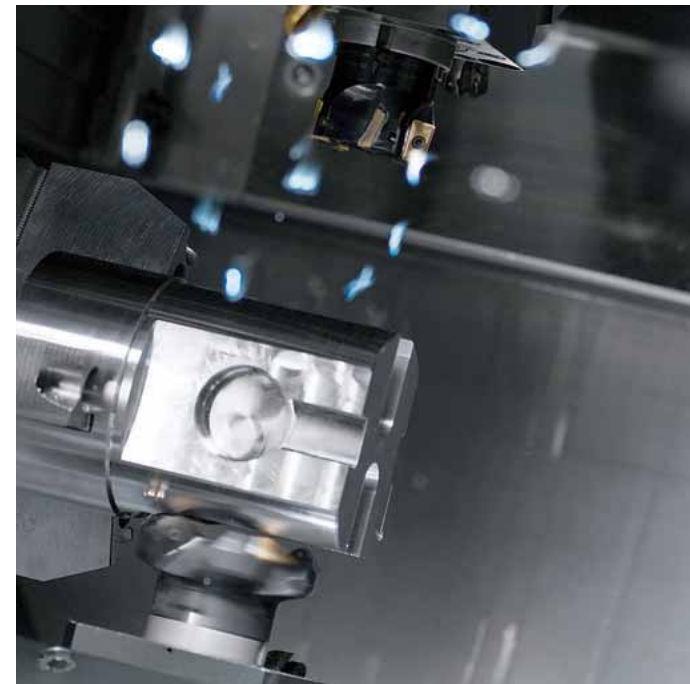
[Milling Tools]

Max. collet size 20mm/AR32
Max. face milling cutter diameter 80mm

in higher rigidity

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

Phenomenal machining capabilities with the high-output (7.5KW) / high-torque (40Nm) motor



Dia. 63mm Face milling cutter
Metal Removal Rate **90mL/min**

- Surface speed : 235m/min (1200min⁻¹)
- Depth : 2.5mm
- Feed : 0.7mm/rev



Dia. 20mm End mill
Metal Removal Rate **34mL/min**

- Surface speed : 35m/min (557min⁻¹)
- Depth : 15mm
- Feed : 0.2mm/rev



Dia. 25mm High feed end mill
Metal Removal Rate **120mL/min**

- Surface speed : 235m/min (3000min⁻¹)
- Depth : 0.8mm
- Feed : 2.0mm/rev



Dia. 50mm Face milling cutter
Metal Removal Rate **148mL/min**

- Surface speed : 235m/min (1500min⁻¹)
- Depth : 4mm
- Feed : 0.7mm/rev

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

Waiting tool number for upper turret
Spindle Status
 Selected head shown in blue color

Work counter
 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

Spindle RPM
Waiting tool number for lower turret
Operating status display
 • Green : Automatic operation
 • White : Feed hold
 • Yellow : Warning
 • Red flashing : Alarm

Blank
Middle pf process
Part complete
Remnant
Quill

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%

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

NT Mach...
ATC Tooling
Work Status
Operatio...
Wear Offset
PMC
PMC Mon...
Product G...
User Menu
Tool Setting

Coolant status **Automatic mode** **Manual mode** **Manual mode**

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.



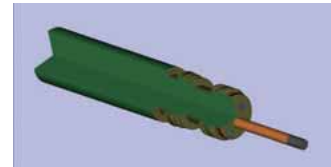
Simulation is performed to check the programs without running the machine. This helps prevent machine collisions due to programming or setup errors.

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

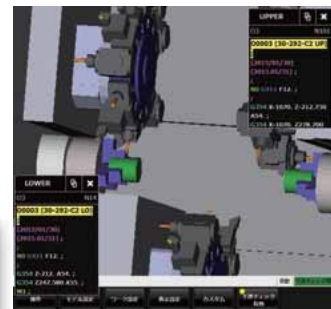
Rapid feed and Cutting feed can be adjusted using override setting. It is possible to make Simulation of each process, or to use single block.

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.

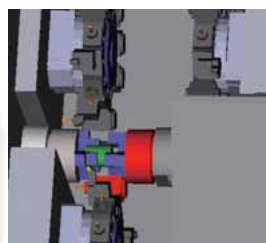
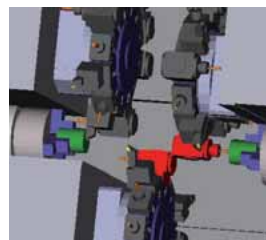
NT Collision Guard



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.

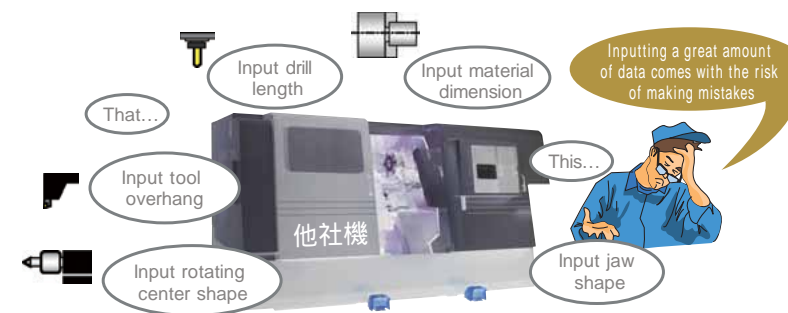


Airbag (Overload detection)

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

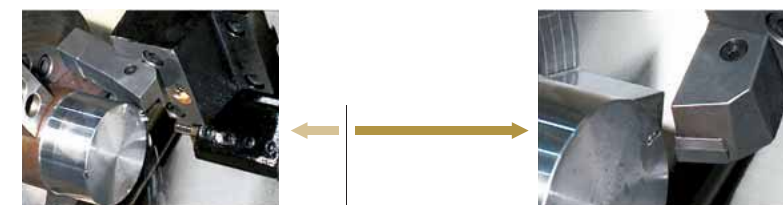
Even with barrier function, machine collisions may occur

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.

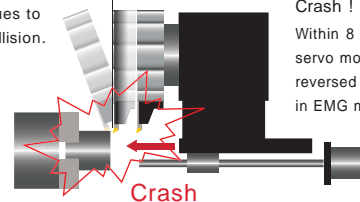


Without Airbag
Machine will not be stop immediately. The slide continues to move even after collision.

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

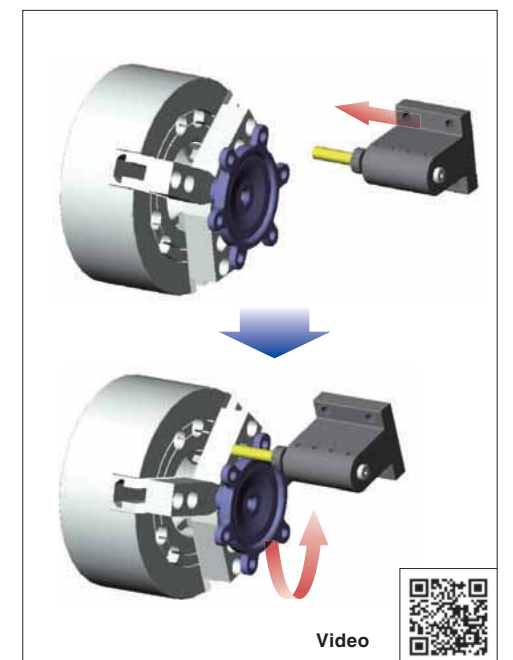
X Y Z B C

• 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.

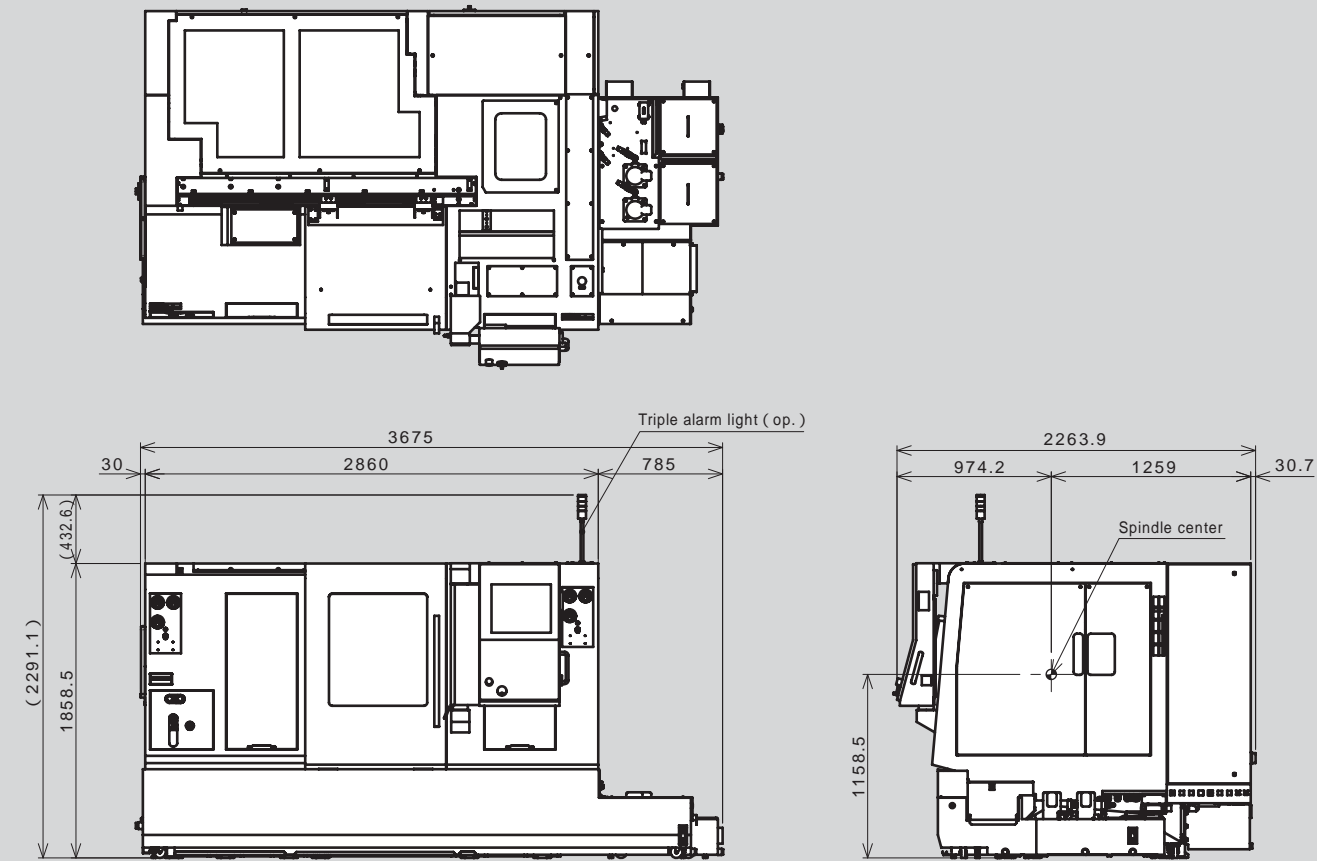
• No fixtures required

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.

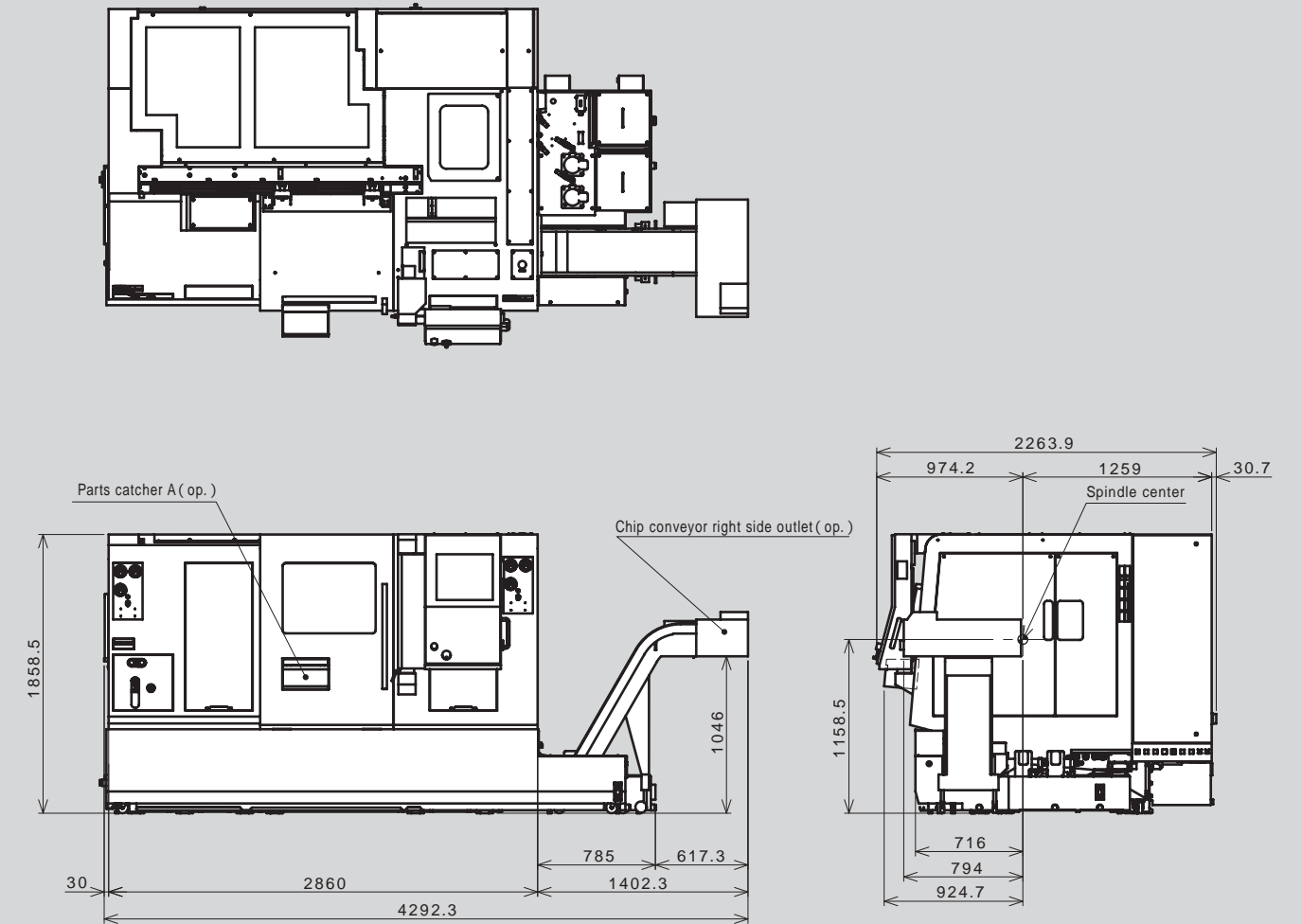


Video

Standard



Chip conveyor right side outlet type



Multi-Turret Type Multi-Tasking Machine

WT Series



WT-100



WT-150II

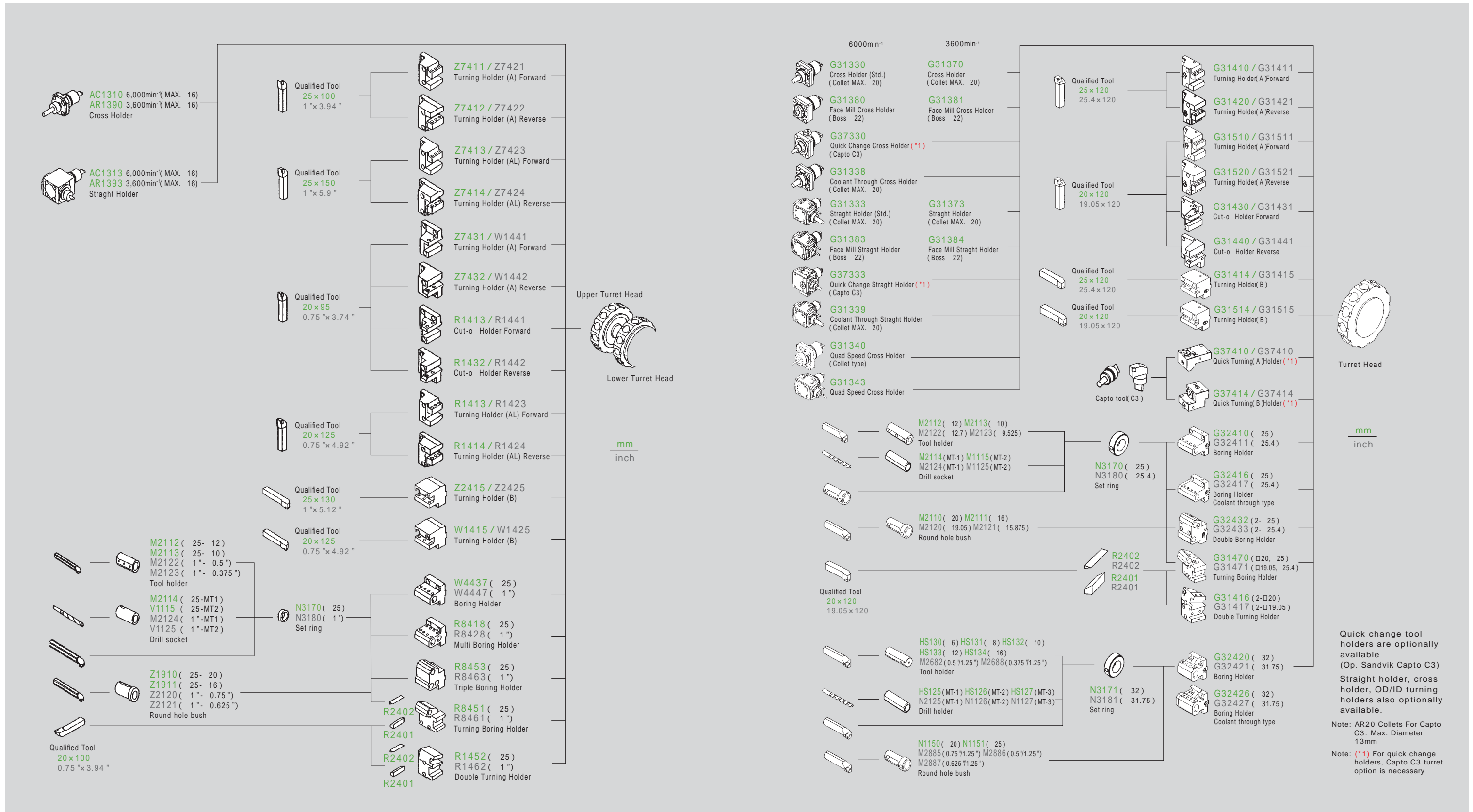


WT-250II

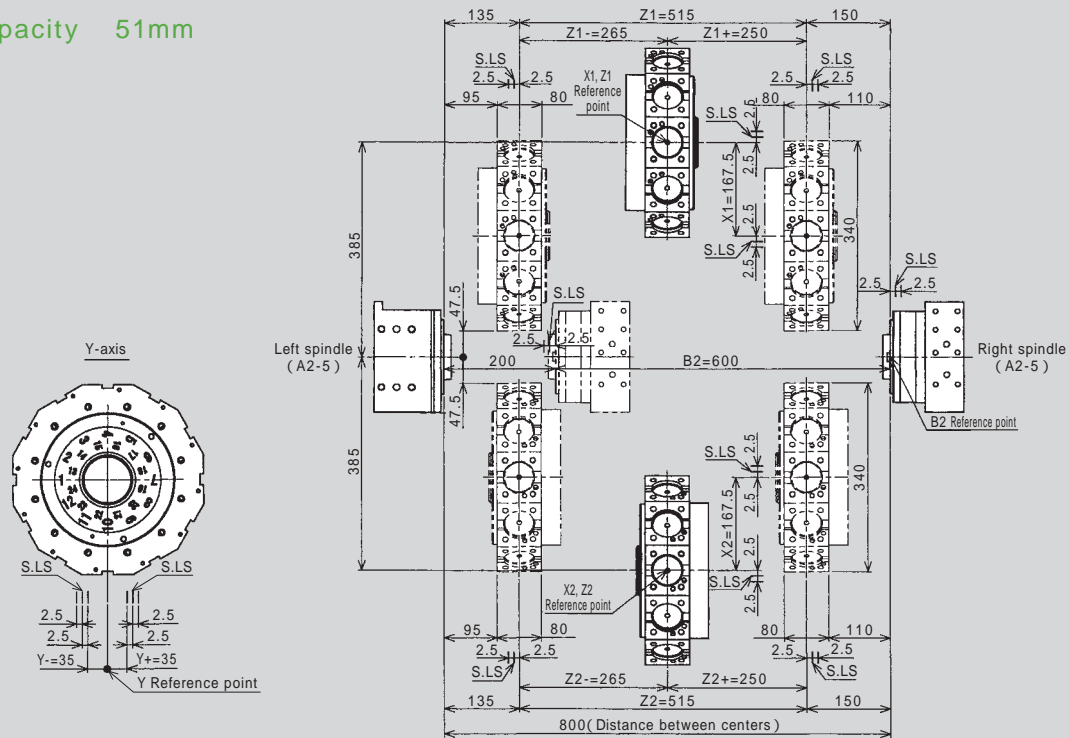


WT-300



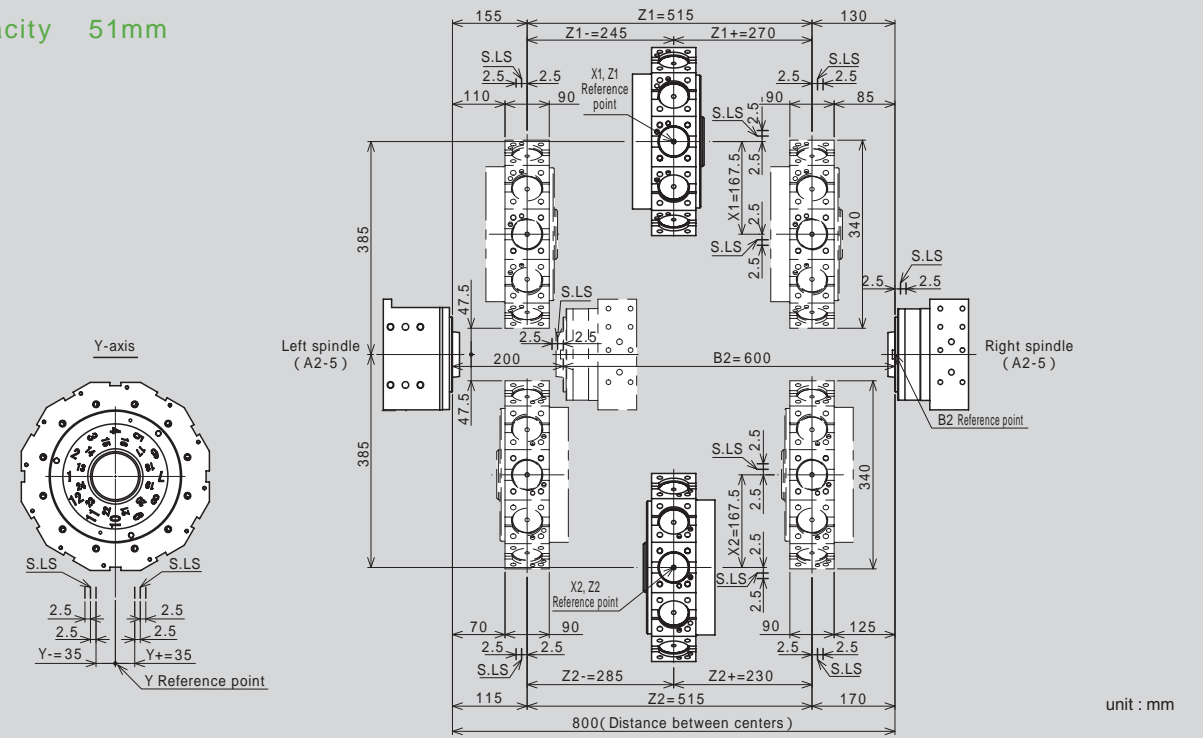


Bar capacity 51mm



unit : mm

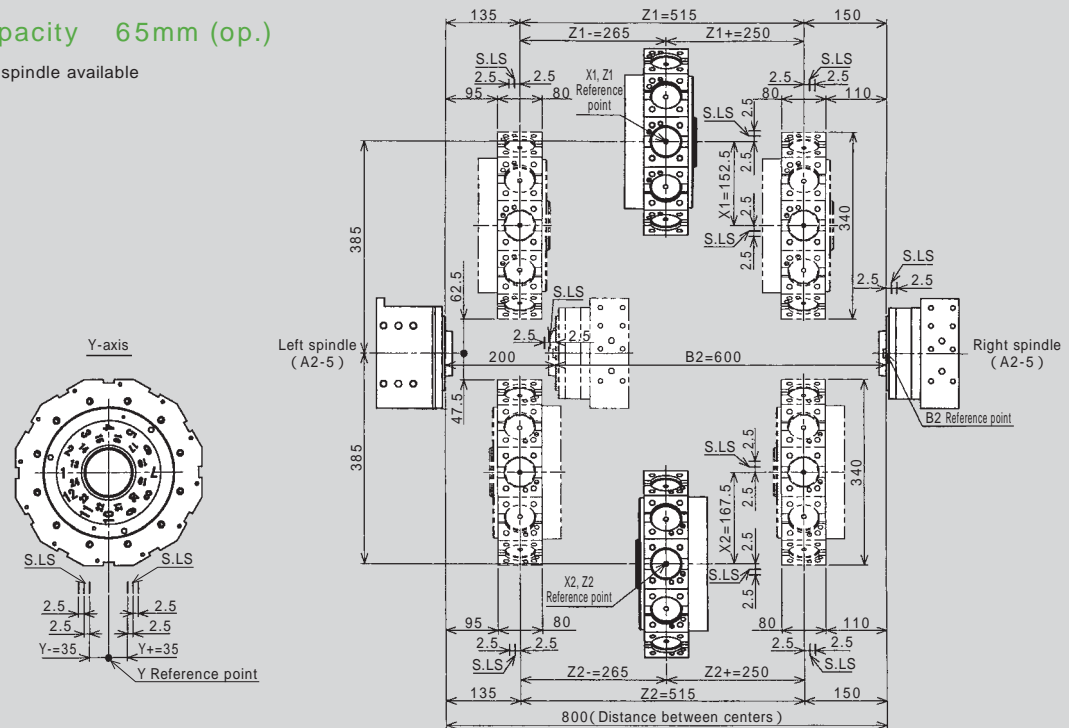
Bar capacity 51mm



unit : mm

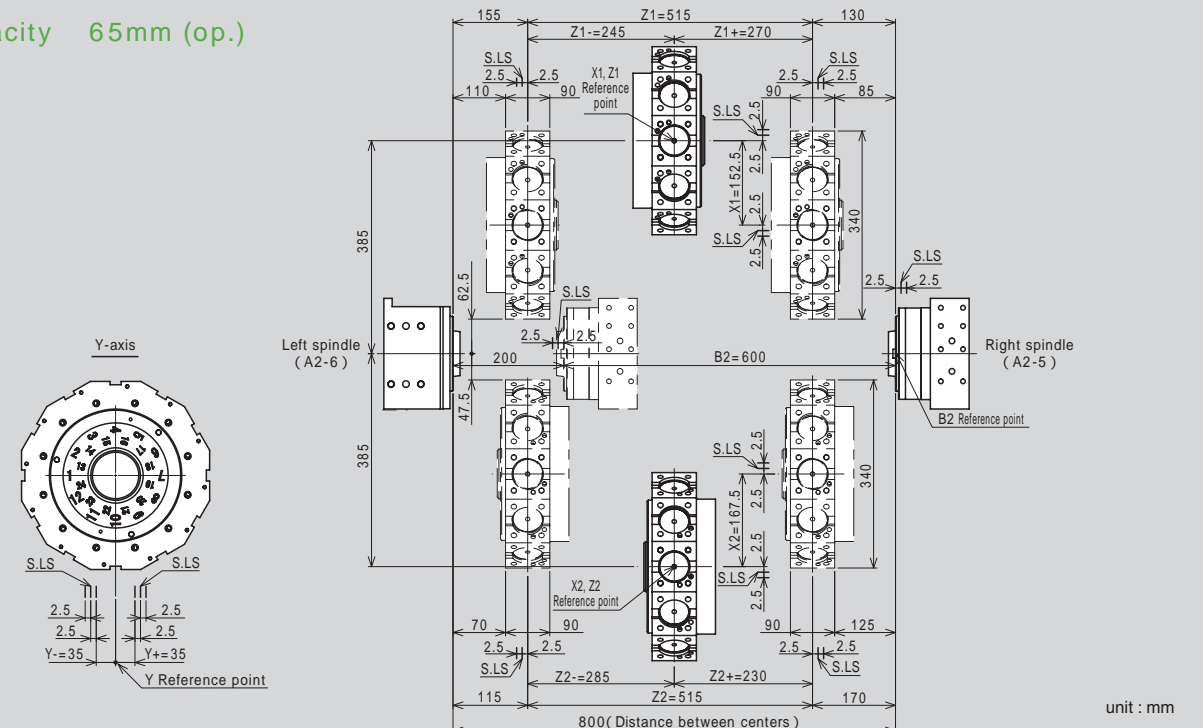
Bar capacity 65mm (op.)

* 65mm Left spindle available



unit : mm

Bar capacity 65mm (op.)



unit : mm

Machine Specification

WT-150II



SuperMill WT-150II



Capacity	51	65 <small>L spindle only</small>
Max. turning diameter	190mm	
Standard turning diameter	170mm	
Distance between centers	max.800mm / min.200mm	
Max. turning length	515mm	
Bar capacity	51mm	65mm (op.)
Chuck size	165mm (6 ")	

Axis travel		
Slide travel X1/X2	167.5mm/167.5mm	152.5mm/167.5mm
Slide travel Z1/Z2	515mm	
Slide travel Y (op.)	± 35mm	
Slide travel B	600mm	
Rapid feed X1/X2	20m/min	
Rapid feed Z1/Z2	40m/min	
Rapid feed B axis	40m/min	
Rapid feed Y axis (op.)	6m/min	

Left and Right spindles		
Spindle speed	5,000min ⁻¹	4,500min ⁻¹
Spindle speed range	Stepless	
Spindle nose	A2-5	A2-6
Hole through spindle	63mm	80mm
I.D. of front bearing	90mm	110mm
Hole through draw tube	52mm	66mm

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 engage time	1.5sec.	

Upper and Lower Turrets		
Type of turret head	Dodecagonal drum turret × 2	
Number of tool stations	24station × 2	
Number of indexing positions	24	
Tool size (square shank)	25mm	
Tool size (round shank)	32mm	

Rotating tools		
Rotary system	Individual rotation	
Spindle speed	6,000min ⁻¹ (Super Mill 6,000min ⁻¹ 3,600min ⁻¹)	
Spindle speed range	Stepless	
Number of driven-tool stations	12 × 2	
Collet size	AR25, AR32	
Holder type and tool size	Straight holder	
	1mm - 16mm	1mm - 20mm*
	Cross holder	
	1mm - 16mm	1mm - 20mm*

Drive motor power and torque		
L-spindle	15/11kW	113.4/113.7/83.1N·m
R-spindle	11/7.5kW	89.1/83.2/56.7N·m
Rotating tools spindle (op.)	5.5/3.7kW	24/16N·m × 2 (Super Mill 7.5/3.7kW 40/16N·m)

General		
Machine height	1,885.2mm	
Floor space	3,674mm × 2,264mm	
Machine weight	8,900kg	

Power source		
Power supply	51.0kVA (Depending on optional features)	
Air supply	200NL/min, 0.5 - 0.7MPa	
Hydraulic pump motor	2.2kW *	
Oil temperature control motor	1.3/1.4kW *	

* Super Mill only

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	Standard / Milling / Y-axes 5-axis / 7-axis / 8-axis	
Simultaneously controlled axes (Standard)	2-axis (Upper X1, Z1) + 3-axis (Lower X2, Z2, B2)	
Simultaneously controlled axes (Milling)	3-axis (Upper X1, Z1, C1) + 4-axis (Lower X2, Z2, C2, B2)	
Simultaneously controlled axes (Y-axes)	4-axis (Upper X1, Z1, C1, Y1) + 4-axis (Lower X2, Z2, C2, B2)	

Input command		
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 °, B: 0.001mm	
Max. programmable dimension	± 999999.999mm / ± 39370.0787inch, ± 999999.999 °	
Absolute / incremental programming	X, Z, C, B (absolute only) / U, W, H	
Decimal input	Standard	
Inch / Metric conversion	G20/G21	
Programmable data input	G10	

Feed function		
Cutting feed	feed / min X: 1 ~ 8000mm/min, 0.01 ~ 314inch/min	
	Z: 1 ~ 8000mm/min, 0.01 ~ 314inch/min	
	C: 1 ~ 4800 °/min	
Cutting feed	B: 1 ~ 8000mm/min, 0.01 ~ 314inch/min	
	feed / rev 0.0001 ~ 8000mm/rev 0.000001 ~ 50in/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	F0/25/50/100% (changeable to every 10% by switch)	
Cutting feed-rate override	0 - 150% (each 10%)	

NT-IPS		
O/S	Windows XP Embedded	
Pointing device	Touch pad	

SuperMill WT-150II / WT-150II

Program memory		
Part program storage length	320m (for each turret)	
Part program edit	delete, insert, change	
Program number search	Standard	
Sequence number search	Standard	
Address search	Standard	
Number of registrable programs	500pcs (1 path 250 pcs each)	
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 SXGA LCD touch 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	G71, G72	
Canned cycle for drilling	G80 - G89	
Axis re-composition	Standard	
Sub program	Standard	
Balance cut	G68, G69	
Custom macro	Standard	
Addition to custom macro common variables	Available (After addition, #100 - #199, #500 - #999)	
FS15 tape format	Standard	
Luck-bei / NT Manual Guide i	Standard	
Abnormal Load detection	Standard (Z-axes)	
NT Work Navigator	Standard (not including contact bar)	
NT NURSE	Standard	

Machining support		
Rigid tapping	Standard	
Spindle synchronization	Standard	
C-axis synchronization	Standard	
Spindle orientation	Standard	
NT Collision Guard	Standard	