

# WT-100



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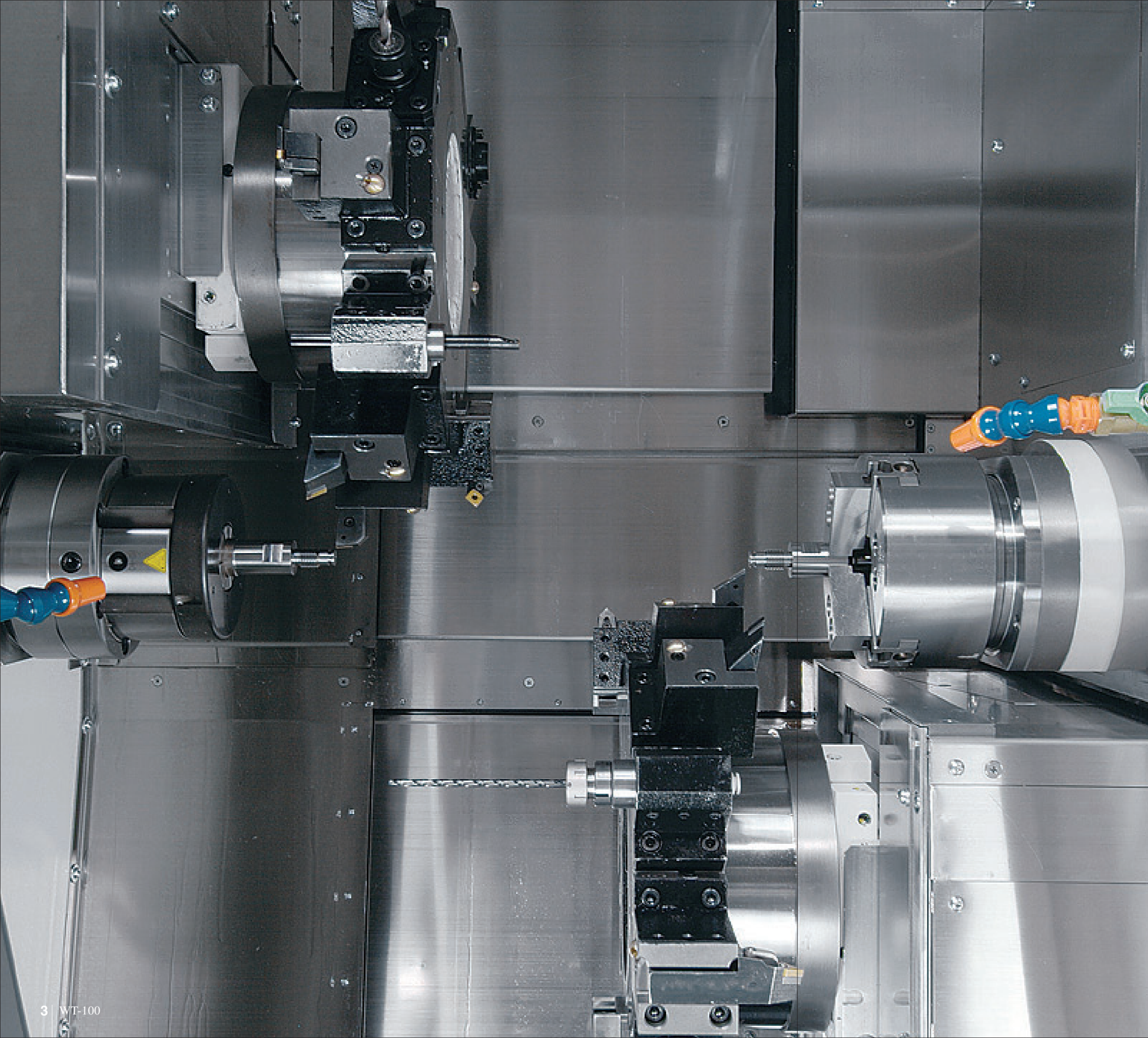
WT-100 ——— TOP BRAND Top Leader

of Multitasking Machines

# One Hit Machining

Suitable for Small to Large Batch Production





# High productivity

Top leader of one-hit machining

No work in process  
One-hit machining  
Less set up time



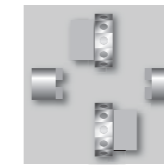
# WT-100 Compact Multitasking Machine

# Featuring State of the Art Capabilities



19"  
Color LCD  
Touch Panel

NT  
Smart  
X



T<sub>x2</sub>  
Double turret

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

Y  
Y-axis

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

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

## Capacity

Max. turning diameter / Max. turning length	190mm / 503mm
Distance between spindles	max. 735mm / min. 210mm
Bar capacity	42mm
Chuck size	6" 165mm

## Axis travel

Slide travel (X1 / X2)	135 / 135mm
Slide travel (Z1 / Z2 / B)	503 / 503 / 525mm
Slide travel (Y) upper turret	±31mm (op.)

## Spindle L, R

spindle speed (max.)	6000min <sup>-1</sup>
L spindle motor	11/7.5kW 75.4/38.6N·m
R spindle motor	11/7.5kW 75.4/38.6N·m

## Upper turret

Number of turrets	1
Driven-tool speed	6000min <sup>-1</sup>
Driven-tool motor	7.1/2.2kW 16/8N·m
Type of turret / Number of indexing pos.	Dodecagonal / 24
Drive type / Number of driven-tool stations	Individual rotation / 12

## Lower turret

Number of turret	1
Driven-tool speed	6000min <sup>-1</sup>
Driven-tool motor	7.1/2.2kW 16/8N·m
Type of turret / Number of indexing pos.	Dodecagonal / 24
Drive type / Number of driven-tool stations	Individual rotation / 12

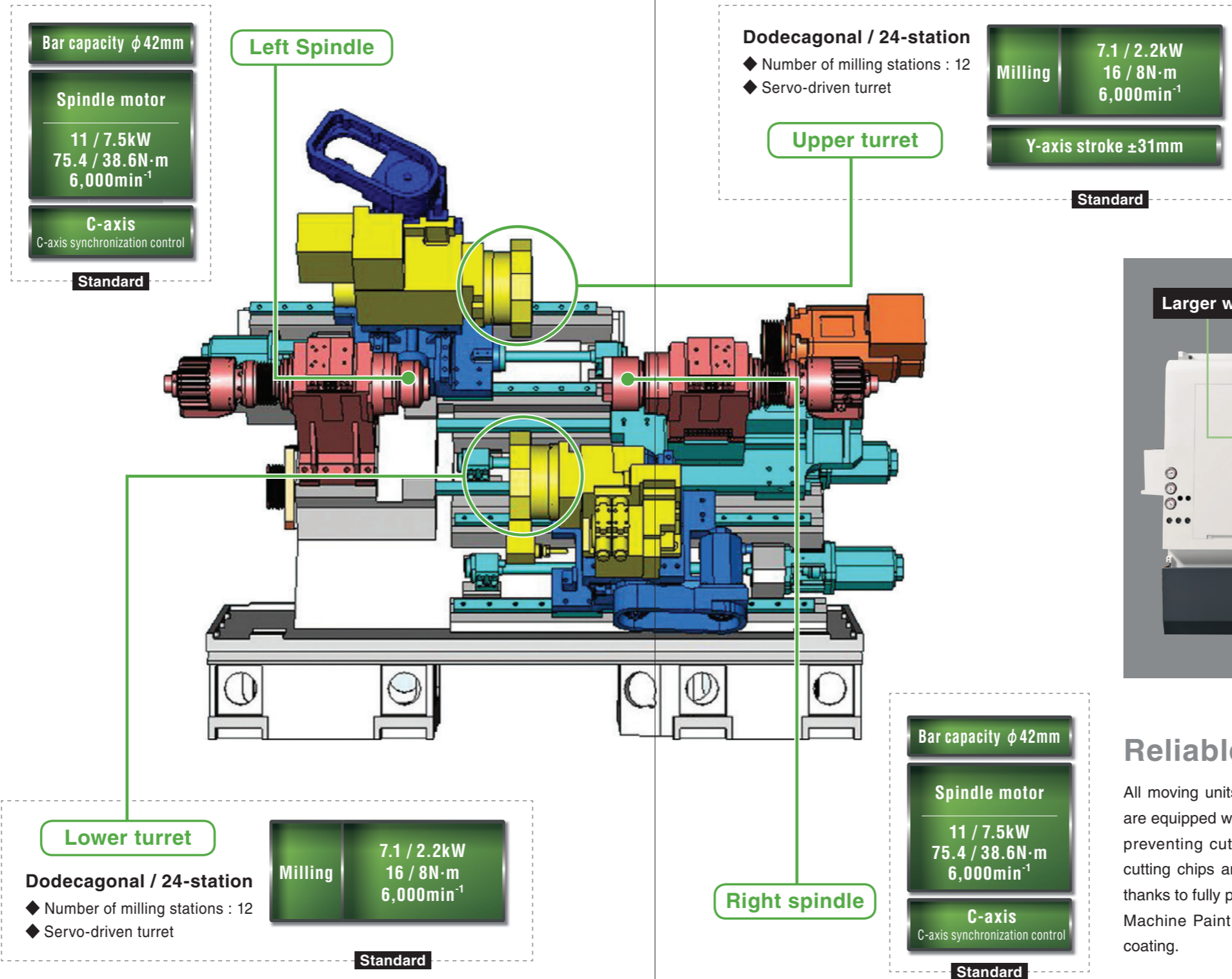
## General

Floor space	2,630mm × 1,623mm × 1,940mm
Machine Weight	5,700kg

# WT-100

# WT-100 Machine Structure

48 stations  
High-rigidity turret



# Stable Accuracy Ensured

		Parts catcher G	Option
Method		Swing / Hand	
Workpiece size	Diameter [Dia.mm]	$\phi 12 - 42$	
	Length [mm]	15 - 150	
	Weight [kg]	1.5	
Cycle time [sec.]		6.1	
Ejecting method		Belt conveyor & Chute	



### Reliable Covers

All moving units including the upper slide, lower slide and B-Axis unit, are equipped with top class stainless-steel covers and protective wipers, preventing cutting chip accumulation, and providing cover against cutting chips and coolant. The whole machining area is leakage-proof thanks to fully protective covering.

Machine Paint : Environment-friendly non-toxic high quality powder coating.



# WT-100 Combining Turning and

# Milling

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

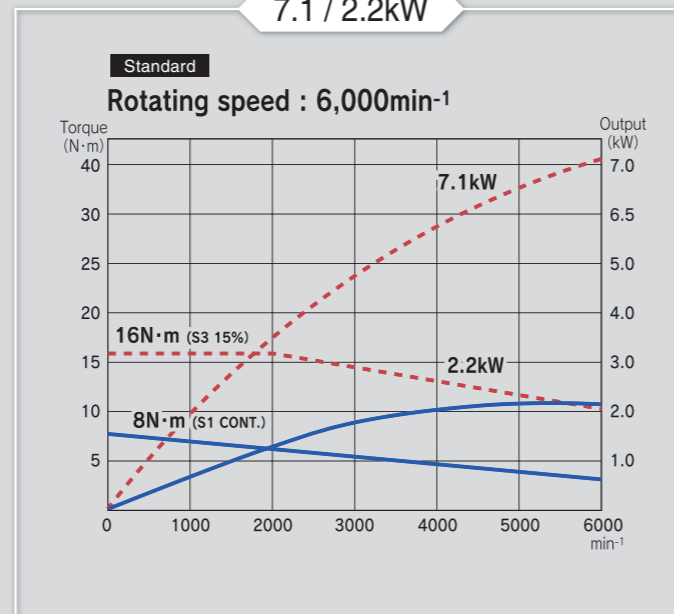
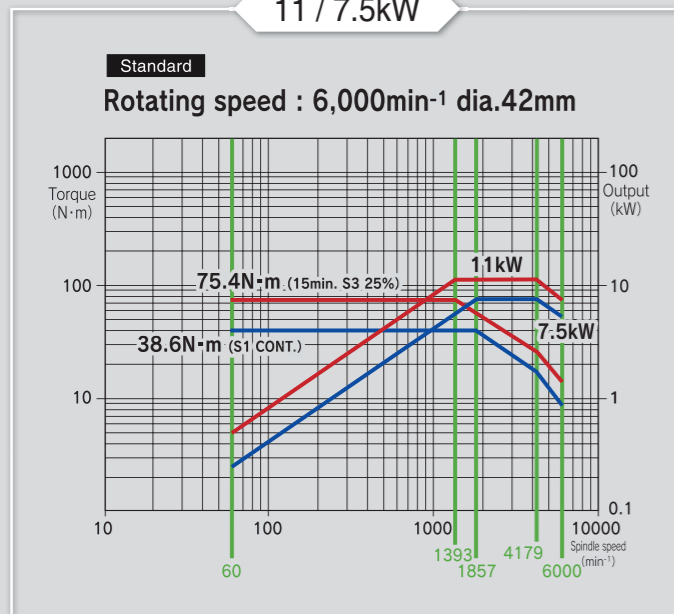


## L/R Spindle motors

## Driven-tool motor

11 / 7.5kW

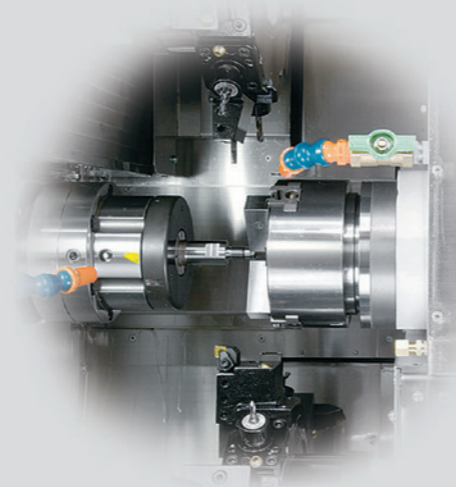
7.1 / 2.2kW



The left and right hand side spindles feature 11/ 7.5 kW high-output motors with a max. 75 N·m torque. This means that a round part with Dia. 48 mm × Length 110 mm can be reduced into cutting chips within 26 Seconds, or 2.3 parts can be turned in one minute.

Part size	Dia. 48 × 110 mm
Metal volume	199ml / Part
Material	S45C (JIS)
Cutting depth	4mm
Feed rate	0.6mm/rev
Cutting Speed	250m/min

Shaft work clamped with both chucks, can be turned with synchronized spindles, with up to 22/15KW cutting power.

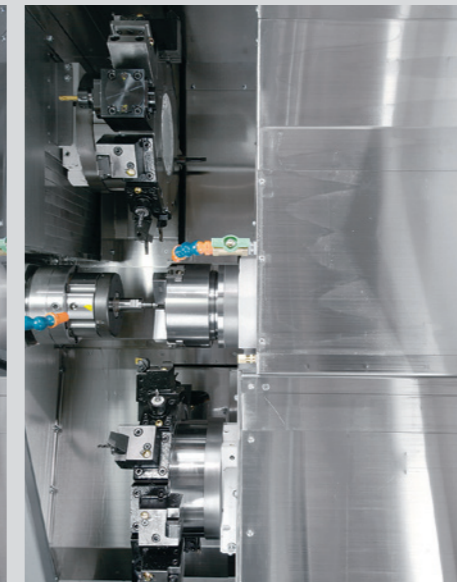


## Flexibility

Whether it is shaft work, bar work, or chuck work, the most suitable machining for various types of materials can be done in one-chucking. Get maximum productivity from a machine requiring a compact space



Upper-Left / Lower-Right



Transfer



Upper-Right / Lower-Left



Left hand side 4-axis turning



Right hand side 4-axis turning



Milling



# NT Smart X

## Advanced Production System

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

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

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

Standard / Option

### Main features

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



### Cut-in Check

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

**Start Up Conditions [ UPPER ]**  
 W301 : FRONT DOOR IS NOT CLOSED  
 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)

**Driven-tool Rotating Speed**  
 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

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

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

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

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

**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

**Spindle RPM**  
 Waiting tool number for lower turret

**Machine status display**  
 Spindle RPM

**Load status display**  
 Operating status display

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

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

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

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

### G131 Soft work pusher

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



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

### G376 Soft quill pusher cycle

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



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



## Dual safety

NT Machine Simulation / NT Collision Guard + Airbag

# Dual safety

### Double safety features for maximum protection

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

## NT Machine Simulation

Prevent the collision due to tooling, chuck, and program.



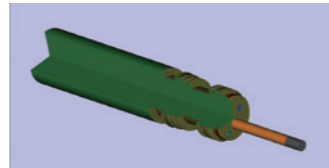
Simulation is performed to check the programs without running the machine. This helps prevent machine collisions due to programming or setup errors.

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

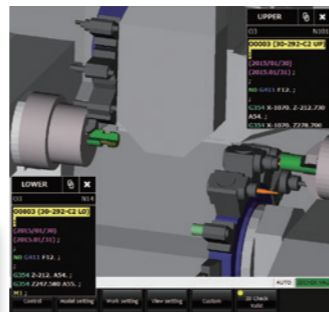
Rapid feed and Cutting feed can be adjusted using override setting. It is possible to make Simulation of each process, or to use single block.

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.

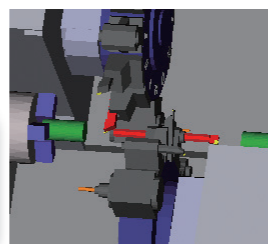
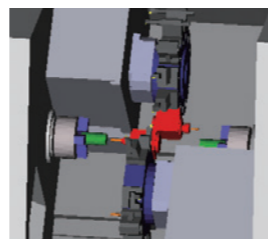
## NT Collision Guard



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.

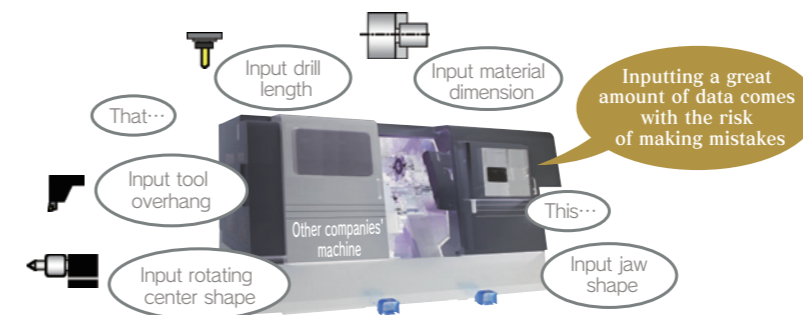


## Airbag (Overload detection)

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

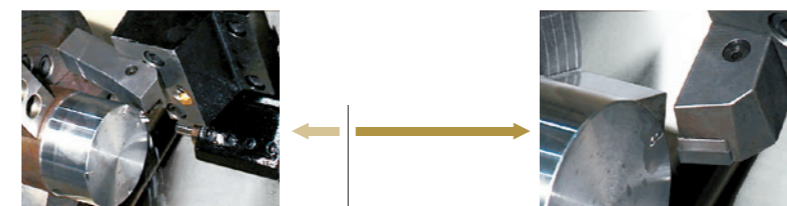
Even with barrier function, machine collisions may occur

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

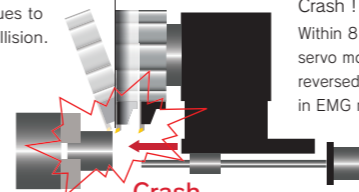
Machine will not be stop immediately. The slide continues to move even after collision.

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

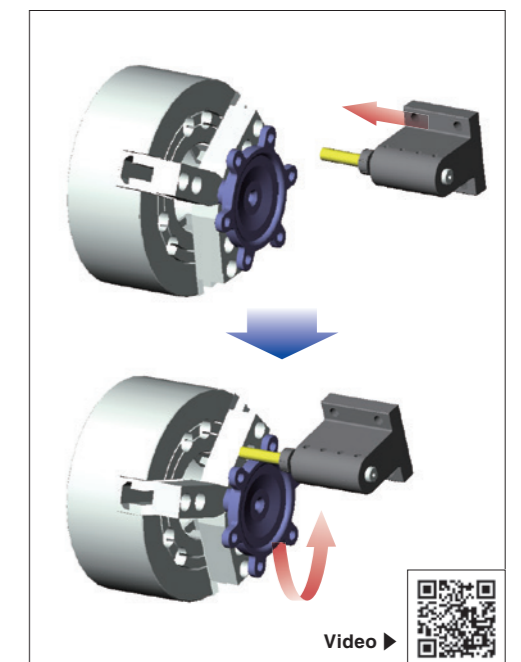


• Advanced NT Work Navigator !

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.

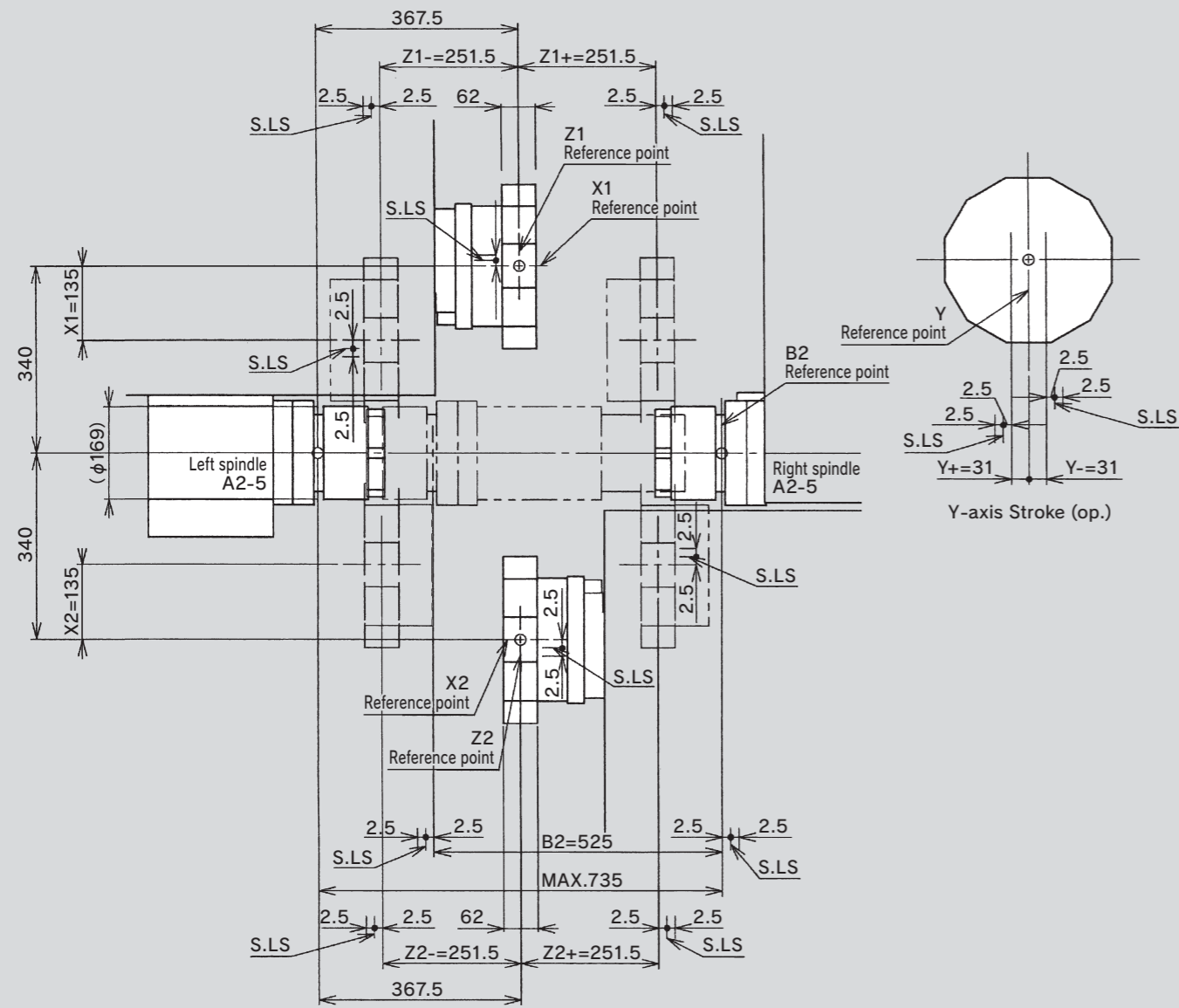


Video ▶



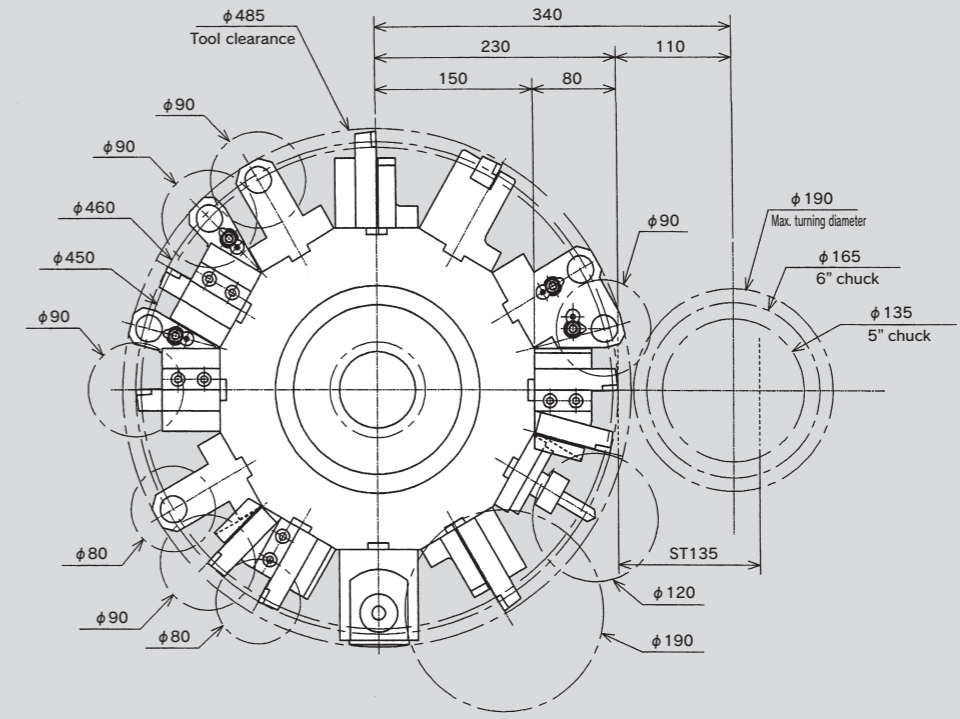


## Slide Travel Range



unit : mm

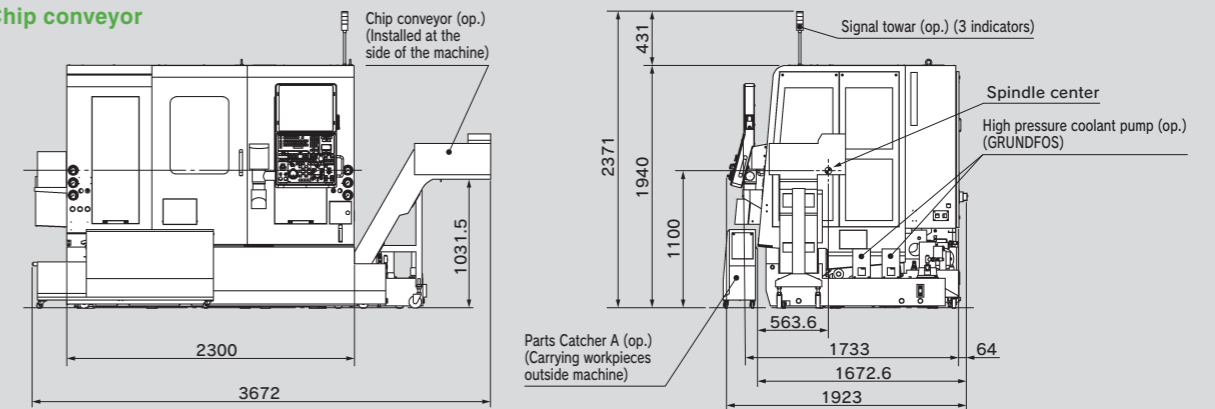
## Tool Interference



unit : mm

## Machine Dimensions

### Front and Side Views of WT-100 with Chip conveyor



unit : mm

**WT** 2 Turret  
2 Spindle  
**S E R I E S**



WT-100



WT-150II



WT-250II



WT-300

φ 42

6"

Standard Bar Capacity

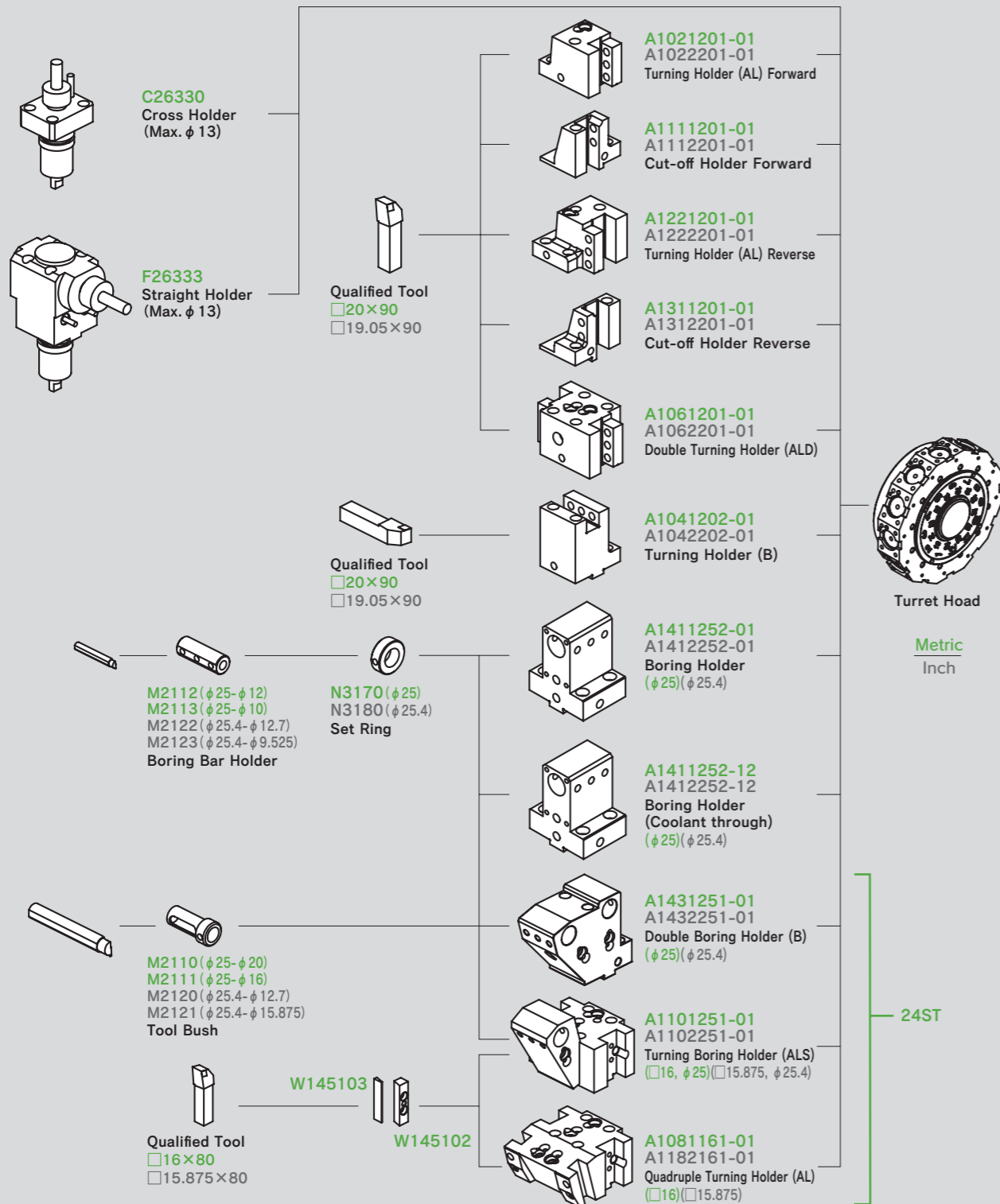
Standard Chuck Size

φ 102

12"



## Tooling System Diagram



## Machine Specification

<b>Capacity</b> <b>Max. turning diameter</b> 190mm <b>Standard turning doameter</b> 170mm <b>Distance between spindle noses</b> max.735mm / min.210mm <b>Max. turning length</b> 503mm <b>Bar capacity</b> 42mm <b>Chuck size</b> 165mm (6")	
<b>Axis travel</b> <b>Slide travel (X1/X2)</b> 135mm <b>Slide travel (Z1/Z2)</b> 503mm <b>Slide travel (Y)</b> ±31mm (op.) <b>Slide travel (B)</b> 525mm <b>Rapid feed X1/X2</b> 16m/min <b>Rapid feed Z1/Z2</b> 40m/min <b>Rapid feed B axis</b> 40m/min <b>Rapid feed Y axis</b> 6m/min	
<b>Left spindle Right spindle</b> <b>Spindle speed</b> 6,000min <sup>-1</sup> <b>Spindle speed range</b> Stepless <b>Spindle nose</b> A2-5 <b>Hole through spindle</b> 56mm <b>Front bearing I.D.</b> 80mm <b>Hole through draw tube</b> 43mm	
<b>C-axis</b> <b>Least input increment</b> 0.001° <b>Least command increment</b> 0.001° <b>Rapid index speed</b> 600min <sup>-1</sup> <b>Cutting feed rate</b> 1 - 4800°/min <b>C-axis clamp</b> Disk clamp <b>C-axis engage time</b> 1.5sec.	
<b>Upper &amp; Lower turrets</b> <b>Type of turret head</b> Dodecagonal drum turret <b>Number of tool stations</b> 12 station <b>Number of index positions</b> 24 <b>Tool size (square shank)</b> □ 20mm <b>Tool size (round shank)</b> φ 25mm	
<b>Rotating tool</b> <b>Rotary system</b> Individual rotation <b>Spindle speed</b> 6,000min <sup>-1</sup> <b>Spindle speed range</b> Stepless <b>Number of rotation tool station</b> 12 × 2 <b>Tool shank</b> Straight holder φ 1mm - φ 13mm Cross holder φ 1mm - φ 13mm	
<b>Drive motor</b> <b>Left spindle</b> 11/7.5kW 75.4/38.6N·m <b>Right spindle</b> 11/7.5kW 75.4/38.6N·m <b>Driven tools</b> 7.1/2.2kW Max16N·m	
<b>General</b> <b>Machine height</b> 1,940mm <b>Floor space</b> 2,630mm × 1,923mm <b>Floor space</b> 3,672mm × 1,923mm *1 <b>Machine weight</b> 5,700kg	
<b>Power requirements</b> <b>Power supply</b> 32.7kVA <b>Air supply</b> 150 - 200NL/min, 0.5 - 0.7MPa	

\*1) including right side chip conveyor

- 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

<b>Items</b> <b>Control type</b> FANUC 31i-B 2CPU 2-PATH	
<b>Controlled axes</b> <b>Controlled axes</b> 7axes <b>Simultaneously controlled axes</b> Upper turret : 3axes / X1, Z1, C1 (C2) Lower turret : 4axes / X2, Z2, C2 (C1), B2	
<b>Input command</b> <b>Least input increment</b> 0.001mm / 0.001inch (diameter for X-axis) 0.001 degree <b>Least command increment</b> X : 0.0005mm, Z : 0.001mm, B : 0.001mm, C : 0.001 degree <b>Max. programmable dimension</b> ±999999.999mm / ±39370.0787in, ±999999.999° <b>Absolute / Incremental programing</b> X, Z, C, B( absolute only for B ) / U, W, H <b>Decimal input</b> Standard <b>Inch / Metric conversion</b> G20 / G21 <b>Programmable data input</b> G10	
<b>Feed function</b> <b>Cutting feed</b> 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 approx. 0.00001inch/rev - 188inch/min approx.	
<b>Dwell</b> G04 <b>Feed per minute / Feed per revolution</b> G98 / G99 (feed per rev. for rotating tool will be available from end of December, 2004) <b>Thread cutting</b> G32 + F (for rotating tool will be available from end of December, 2004) <b>Thread cutting retract</b> Standard <b>Continuous thread cutting</b> Standard (for rotating tool will be available from end of December, 2004) <b>Variable lead threading</b> G34 (for rotating tool will be available from end of December, 2004) <b>Handle feed</b> Manual pulse generator 0.001 / 0.01 / 0.1mm (per pulse) <b>Automatic acceleration/deceleration</b> Standard <b>Linear accel./decel. After cutting feed interpolation</b> Standard <b>Rapid override</b> F0, 25%, 50%, 100% (changeable to every 10% by switch) <b>Cutting feed override</b> 0 - 150% (each 10%) <b>AI contouring control I</b> G5.1	
<b>Programming functions</b> <b>Part program storage length</b> 640m (for each turret) <b>Part program editing</b> delete, insert, change <b>Program number search</b> Standard <b>Sequence number search</b> Standard <b>Address search</b> Standard <b>Number of registerable programs</b> 500programs (for each turret) <b>Program storage memory</b> Backed up by battery <b>Malultiple program simultaneous editing</b> Standard <b>DNC operation through memory card</b> Standard (Only one turret can access memory card at a time) (not including memory card) <b>Extended part program editing</b> Available	
<b>Operation &amp; display</b> <b>HMI (Human Machine Interface)</b> NT Smart X <b>Operation panel: Display</b> 19" color SXGA LCD touch panel <b>Operation panel: Keyboard</b> QWERTY keyboard	
<b>Programming assist function</b> <b>Circular interpolation R programming</b> Standard <b>Direct drawing dimension programming/ Chamfering/ Corner R</b> Standard (Direct drawing dimension programming is standard) <b>Canned cycle</b> G90, G92, G94 <b>Multiple repetitive canned cycle</b> G70 - G76 <b>Multiple repetitive canned cycle II</b> Standard (G71, G72) <b>Canned cycle for drilling</b> G80 - G89 <b>Axis recomposition</b> Standard (for L side C-axis control from lower side) <b>Sub program</b> Standard <b>Balance cut</b> G68, G69 <b>Custom macro</b> Standard (common variable #100 - #149, #500 - #549) <b>Addition to custom macro common variables</b> Standard (After addition, #100 - #199, #500 - #999)	
<b>FS15 tape format</b> Standard <b>LUCK-bei II / NT Manual Guide i</b> Standard <b>NT Machine Simulation Function</b> Standard <b>Mechanical error compensation</b> Standard <b>NT work navigator (torque type)</b> Standard (not including contact bar) <b>NT Nurse</b> Standard <b>NT Collision Guard</b> Standard	
<b>Machine Assist Function</b> <b>Rigid type</b> Standard <b>Spindle synchronised control</b> Standard <b>C axis synchronised control</b> Standard <b>Spindle orientation</b> Standard	
<b>NT Smart X</b> <b>O/S</b> Windows Embedded 8.1 Industry Pro <b>Pointing device</b> Touch pad <b>Memory</b> 8GB	