WT-100

NAKAMURA-TOME
PRECISION INDUSTRY CO.,LTD.

WT-100

TOP BRAND **Top Leader of Multitasking Machines**

One Hit Machining

Suitable for Small to Large Batch Production

High productivity

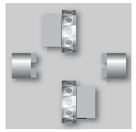
Top leader of one-hit machining

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×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	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^{-1}
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^{-1}
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^{-1}
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

Stable Accuracy Ensured

48 stations

High-rigidity turret

Upper turret

Lower turret

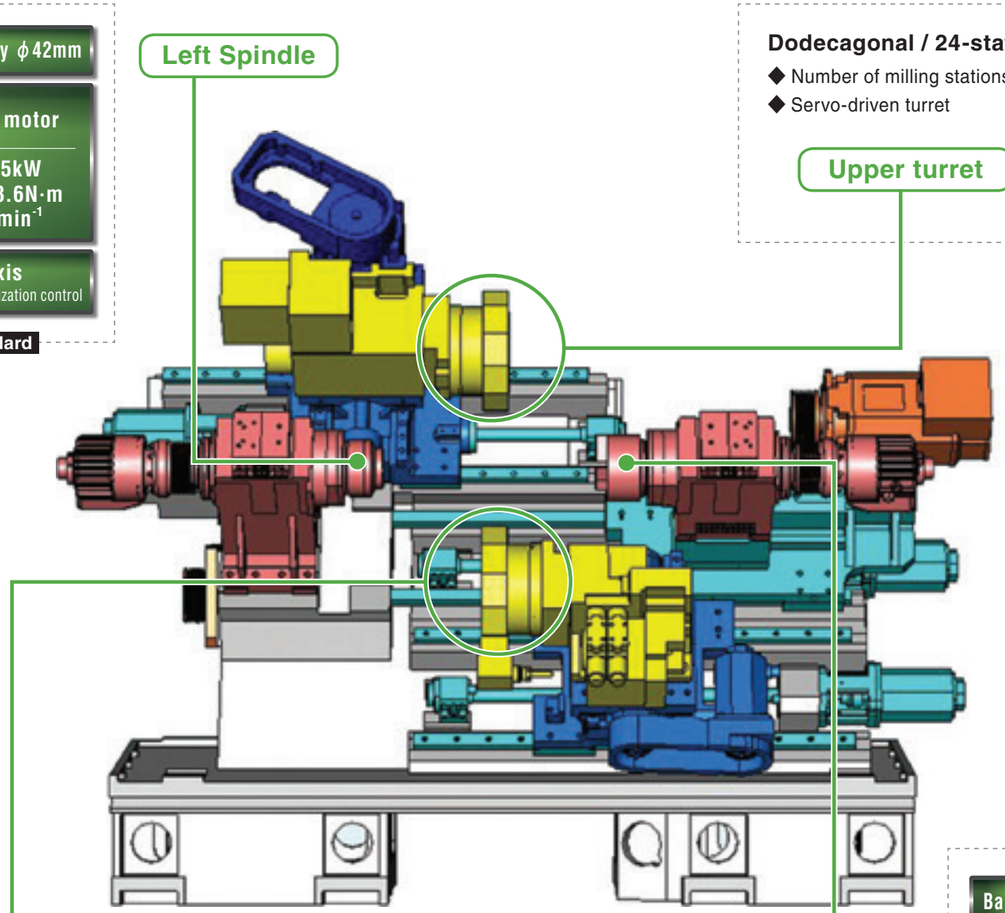
Bar capacity ϕ42mm

Spindle motor
11 / 7.5kW
75.4 / 38.6N·m
6,000min^{-1}

C-axis
C-axis synchronization control

Standard

Left Spindle



Upper turret

Dodecagonal / 24-station
- ◆ Number of milling stations : 12
- ◆ Servo-driven turret

Milling: 7.1 / 2.2kW, 16 / 8N·m, 6,000min^{-1}

Y-axis stroke ±31mm

Standard

Lower turret

Dodecagonal / 24-station
- ◆ Number of milling stations : 12
- ◆ Servo-driven turret

Milling: 7.1 / 2.2kW, 16 / 8N·m, 6,000min^{-1}

Standard

Right spindle

Bar capacity ϕ42mm

Spindle motor
11 / 7.5kW
75.4 / 38.6N·m
6,000min^{-1}

C-axis
C-axis synchronization control

Standard

Parts catcher G Option

Method		Swing / Hand
Workpiece size	Diameter [Dia.mm]	ϕ12 - 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

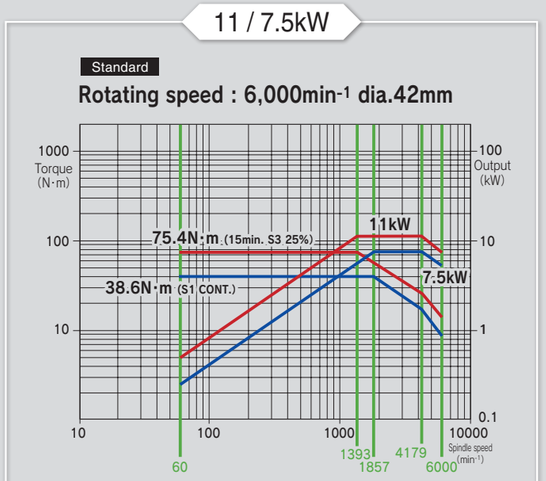
Faster Cycle Time
From diversified small-lot production to mass production

S×2 Twin-Spindle

M×2 Doubie Milling Motor

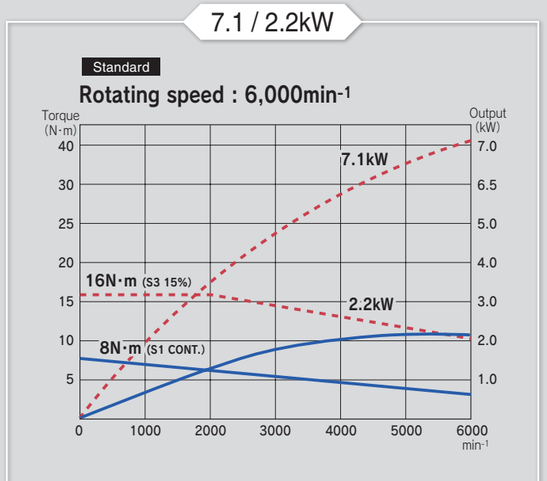
L/R Spindle motors

11 / 7.5kW



Driven-tool motor

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

Nakamura-Tome Intelligent System

NT Smart X

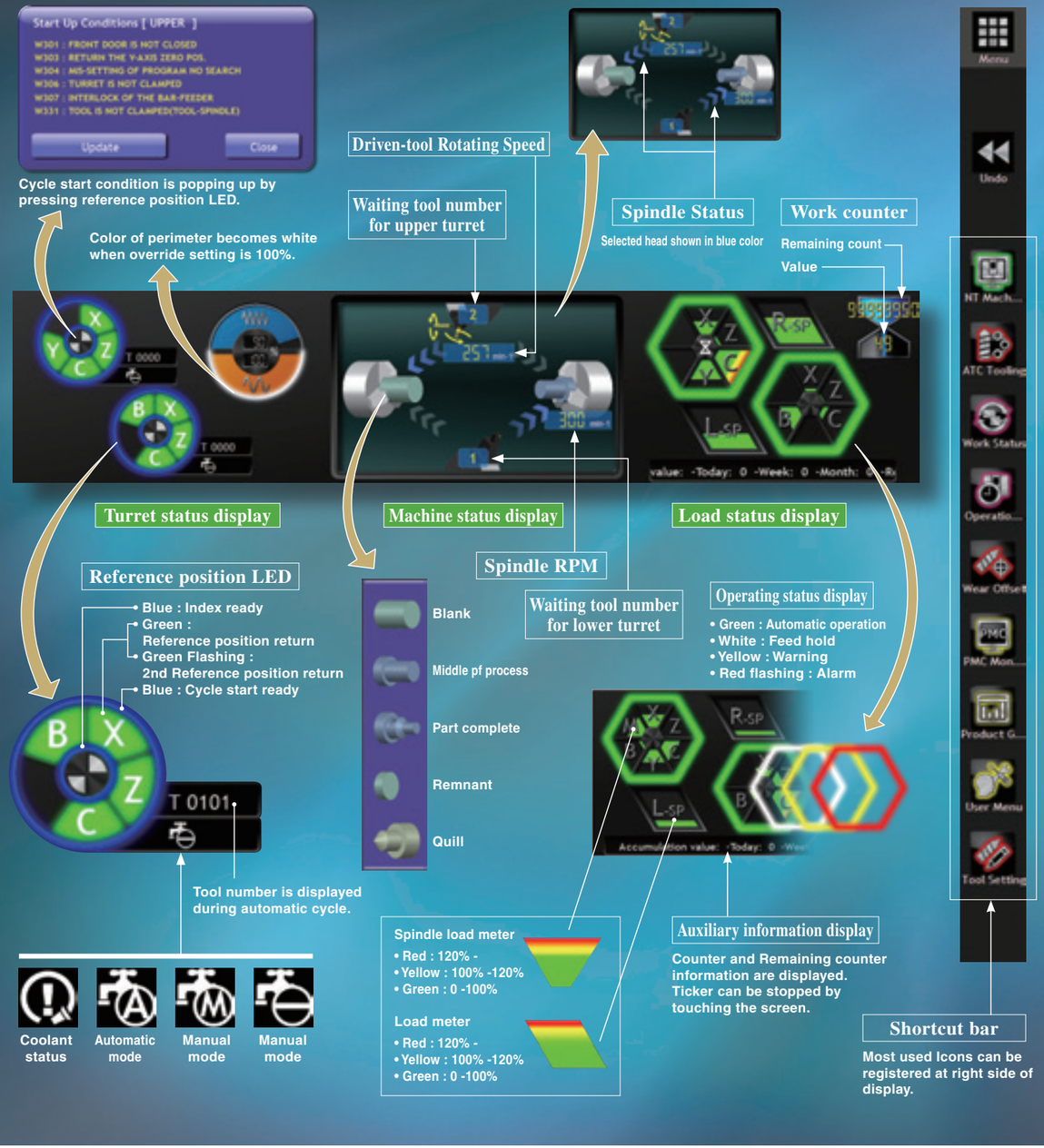
Advanced Production System

- 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 × 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.

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.

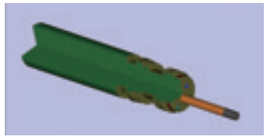
Simulation is performed to check the programs without running the machine.
This helps prevent machine collisions due to programming or setup errors.

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

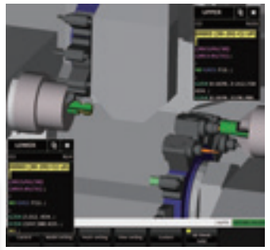
Rapid feed and Cutting feed can be adjusted using override setting. It is possible to make Simulation of each process, or to use single block.

Process

Single block



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



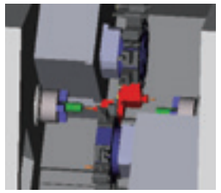
It is possible to choose between "with" or "without" program display. The color of the program block being simulated can be set to be displayed in a different color.

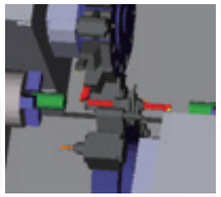
NT Collision Guard

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.



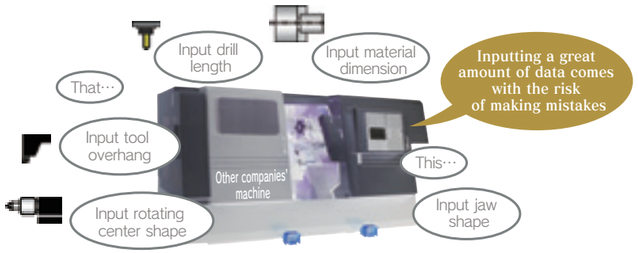


Airbag (Overload detection)

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

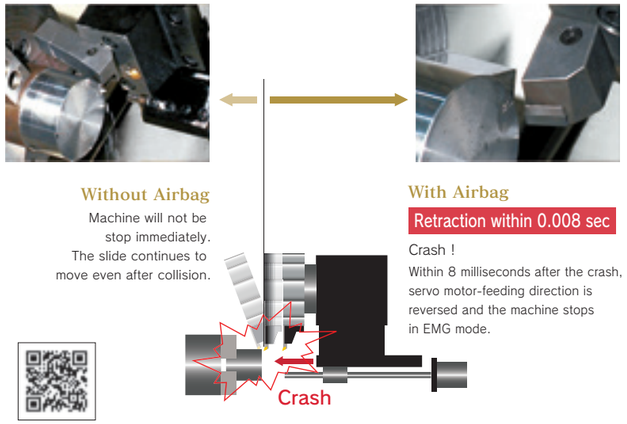
Even with barrier function, machine collisions may occur

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.



▲ Video

* This feature does not mean zero impact.

NT Work Navigator

New Navigator for X-axis and Y-axis

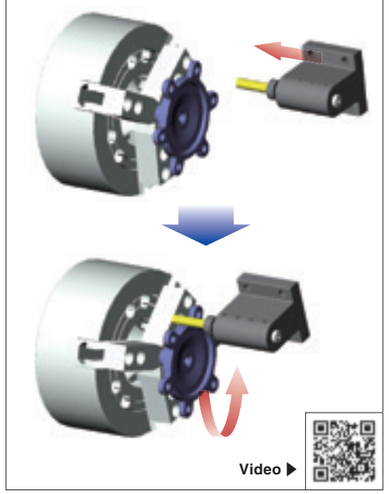
X Y Z B C

• 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.

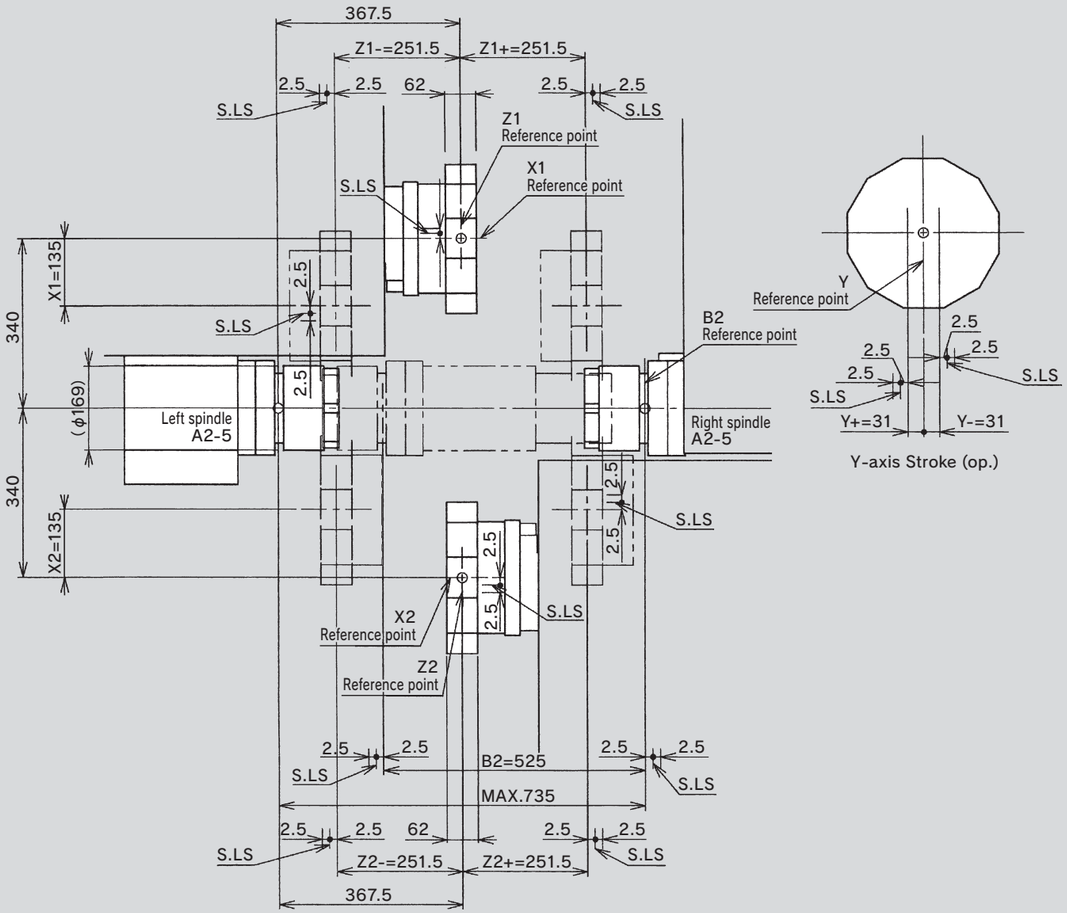
• No fixtures required

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.



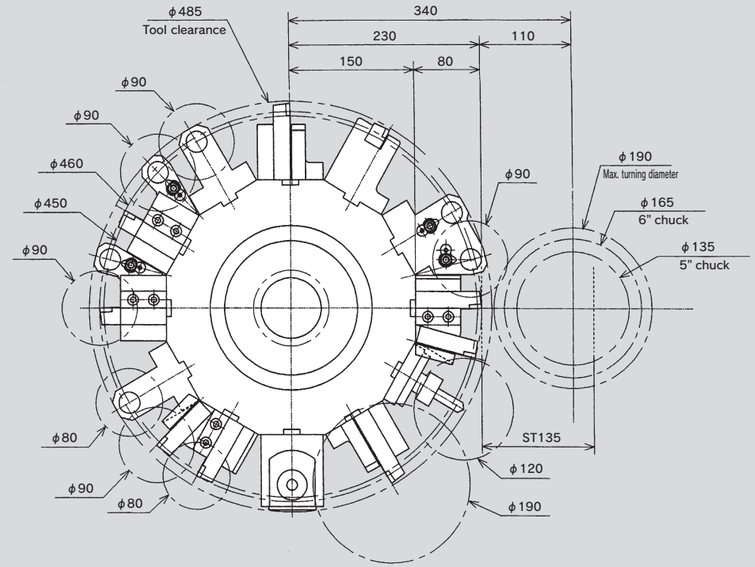
Video ▶

Slide Travel Range



unit : mm

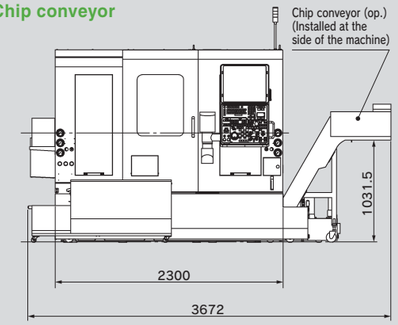
Tool Interference

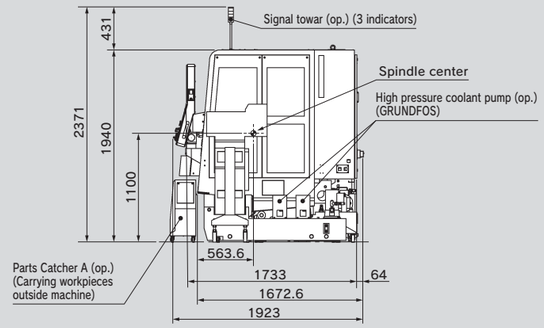


unit : mm

Machine Dimensions

Front and Side Views of WT-100 with Chip conveyor





unit : mm

WT SERIES

2 Turret
2 Spindle

WT-100

WT-150II

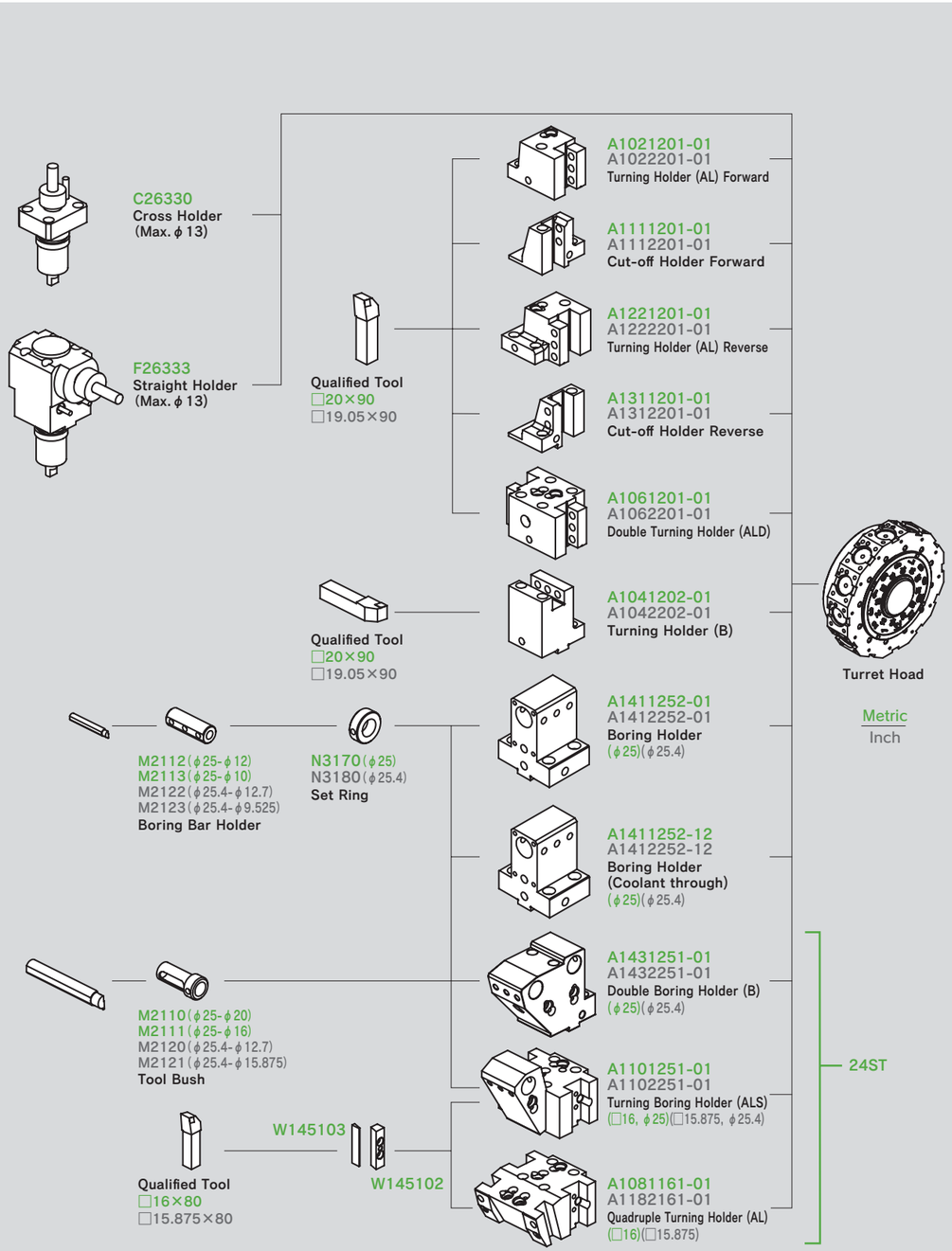
WT-250II

WT-300

φ42 ← Standard Bar Capacity → φ102

6" ← Standard Chuck Size → 12"

Tooling System Diagram



Machine Specification

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

■ items	
Control type	FANUC 31i-B 2CPU 2-PATH
■ Controlled axes	
Controlled axes	7axes
Simultaneously controlled axes	Upper turret : 3axes / X1, Z1, C1 (C2)
	Lower turret : 4axes / X2, Z2, C2 (C1), B2
■ Input command	
Least input increment	0.001mm / 0.0001inch (diameter for X-axis) 0.001 degree
Least command increment	X : 0.0005mm, Z : 0.001mm, B : 0.001mm, C : 0.001 degree
Max. programable dimension	±999999.999mm / ±39370.0787in, ±999999.999°
Absolute / Incremental programing	X, Z, C, B(absolute only for B) / U, W, H
Decimal input	Standard
Inch / Metric conversion	G20 / G21
Programable 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 approx. 0.000001inch/rev - 188inch/min approx.
Dwel	G04
Feed per minute / Feed per revolution	G98 / G99 (feed per rev. for rotating tool will be available from end of December, 2004)
Thread cutting	G32 + F (for rotating tool will be available from end of December, 2004)
Thread cutting retract	Standard
Continuous thread cutting	Standard (for rotating tool will be available from end of December, 2004)
Variable lead threading	G34 (for rotating tool will be available from end of December, 2004)
Handle feed	Manual pulse generator 0.001 / 0.01 / 0.1mm (per pulse)
Automatic acceleration/decelaration	Standard
Linear accel./decel. After cutting feed interpolation	Standard
Rapid override	F0, 25%, 50%,100% (changeable to every 10% by switch)
Cutting feed override	0 - 150% (each 10%)
AI contouring control I	G5.1
■ Programming functions	
Part program storage length	640m (for each turret)
Part program editing	delete, insert, change
Program number search	Standard
Sequence number search	Standard
Address search	Standard
Number of registerable programs	500programs (for each turret)
Program storage memory	Backed up by battery
Malutiple 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	Available
■ Operation&display	
HMI (Human Machine Interface)	NT Smart X
Operation panel: Display	19" color SXGA LCD touch panel
Operation panel: Keyboard	QWERTY keyboard
■ Programming assist function	
Circular interpolation R programming	Standard
Direct drawing dimension programmingor Chamfering/Corner R	Standard (Direct drawing dimension programming is standard)
Canned cycle	G90, G92, G94
Maltiple repeatitive canned cycle	G70 - G76
Maltiple repeatitive canned cycle II	Standard (G71, G72)
Canned cycle for drilling	G80 - G89
Axis recomposition	Standard (for L side C-axis control from lower side)
Sub program	Standard
Balance cut	G68, G69
Custom macro	Standard (common variable#100 - #149, #500 - #549)
Addition to custom macro common variables	Standard (After addition, #100 - #199, #500 - #999)
FS15 tape format	Standard
Luck-bei II / NT Manual Guide i	Standard
NT Machine Simulation Function	Standard
Mechanical error compensation	Standard
NT work navigator (torque type)	Standard (not including contact bar)
NT Nurse	Standard
NT Collision Guard	Standard
■ Machine Assist Function	
Rigid type	Standard
Spindle synchronised control	Standard
C axis synchronised control	Standard
Spindle orientation	Standard
■ NT Smart X	
O/S	Windows Embedded 8.1 Industry Pro
Pointing device	Touch pad
Memory	8GB

NAKAMURA-TOME PRECISION INDUSTRY CO., LTD.

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