

WY-150

NAKAMURA-TOME
PRECISION INDUSTRY CO.,LTD.

WY-150

High Productivity Multitasking Machine

From diversified small-lot production to mass production

Nakamura-Tome

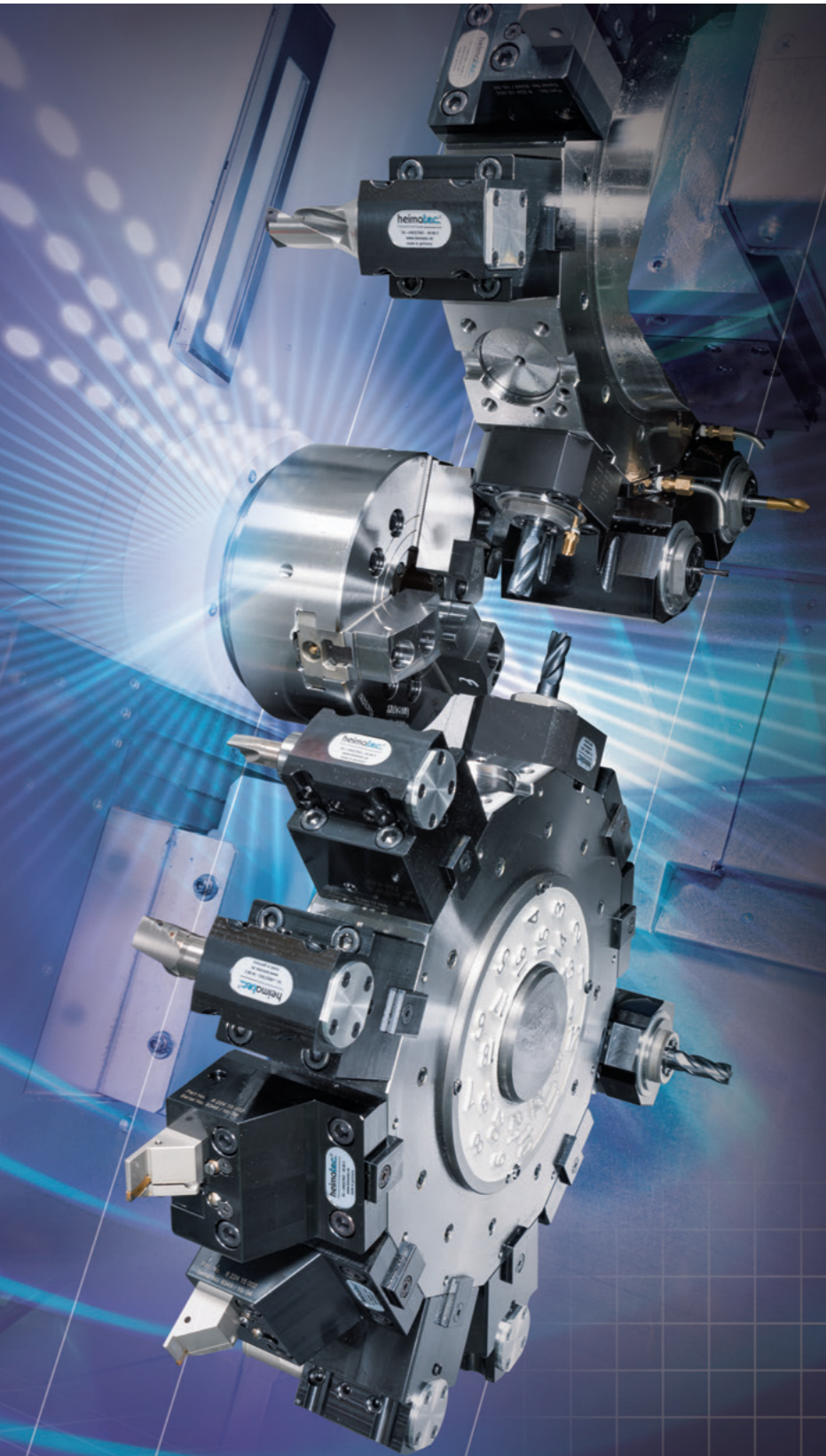
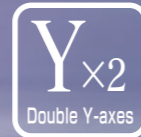
Innovation Technology

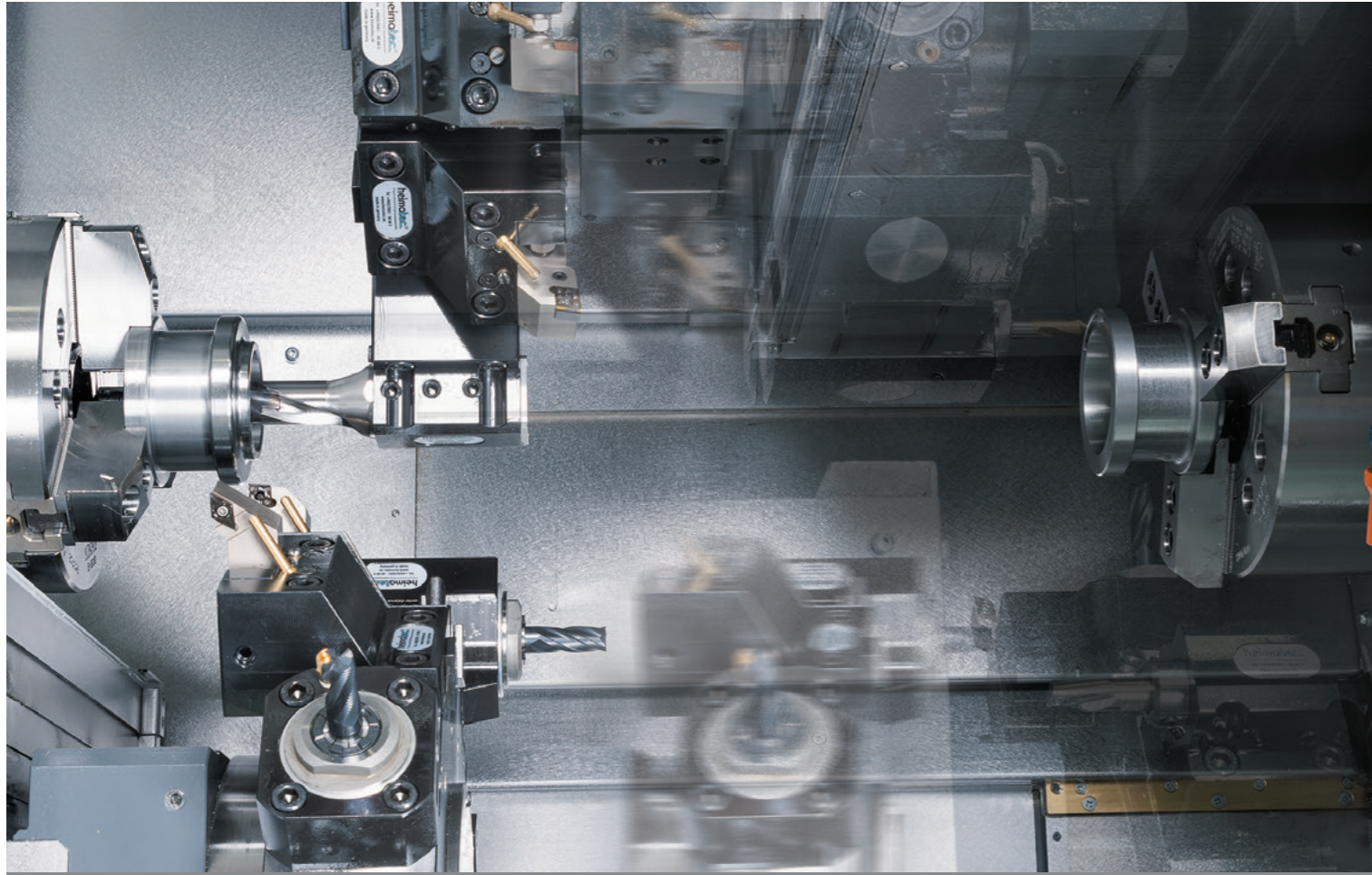
Creating Value

Compact Machine with Powerful Machining Capabilities

2 Turrets 2 Y-axes

One hit machining
Finished parts, complete in one setup





Simultaneous Drilling and OD Turning: Turning tool □25mm, boring bar Dia. 32mm

48

12 / 24 - Station Turret

24 + 24

Up to 48 tool stations
for turning and 24 tool
stations for milling.

Double
Performance!

$M \times 2$

Milling-tool motor
5.5/3.7kW × 2

Y-axis on upper
and lower turrets

$Y \times 2$

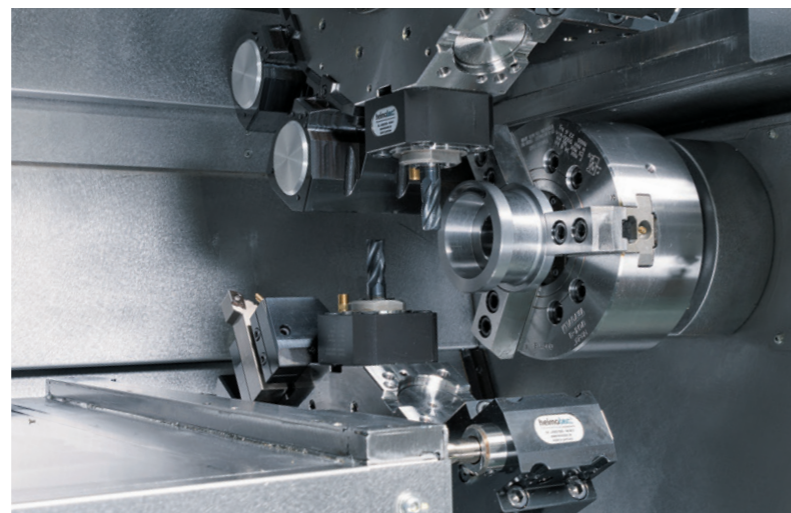
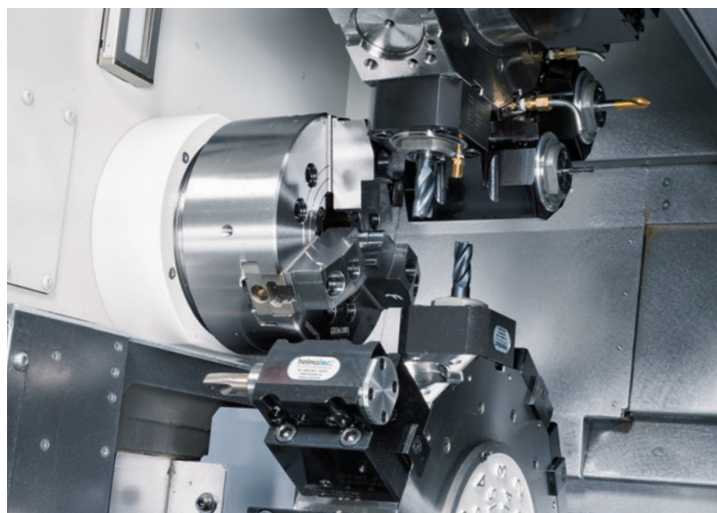
Y-axis travel
Upper : ±45mm
Lower : ±35mm



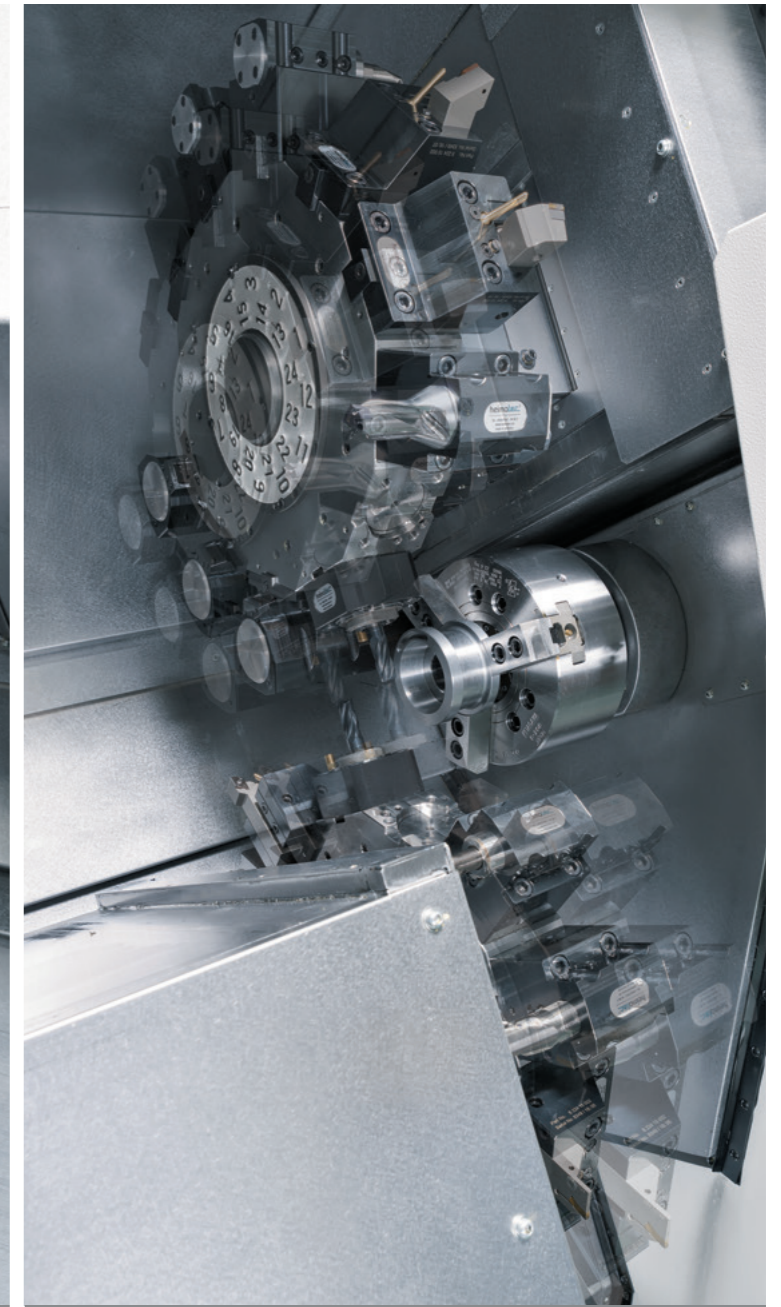
High Productivity

Top Leader of One-hit Machining

No work in process
Less setup time
Complete in one setup



Simultaneous milling with upper and lower turrets.



Milling tool : Dia 16mm

WY-150

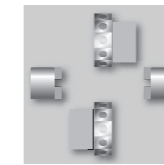
High-Performance Milling Capabilities

State-of-the art Multitasking machine



19"
Color LCD
Touch Panel

NT
Smart
X



T_{x2}
Double turret

M_{x2}
Double Milling Motor

Y_{x2}
Double Y-axes

S_{x2}
Twin-Spindle

C_{x2}
C-axes

B₂
B-axis

Capacity	φ51mm	φ65mm (op.)
Max. turning diameter	225mm	
Max. turning length	565mm	
Distance between spindles	max. 850mm / min. 200mm	
Bar capacity	φ 51mm	φ 65mm (L only)
Chuck size	165mm (6")	
Axis travel		
Slide travel (X1 / X2)	160.5 / 160.5mm	
Slide travel (Z1 / Z2)	565 / 565mm	
Slide travel (Y1 / Y2)	±45 / ±35mm	
Slide travel (B)	650mm	
Spindle L, R		
Spindle speed	5,000min ⁻¹	4,500min ⁻¹
Spindle motor output (L / R)	15/11kW / 11/7.5kW (op.15/11kW)	
Turrets		
Number of turrets (Upper / Lower)	1 / 1	
Driven-tool spindle speed	6,000min ⁻¹	
Drive motor	5.5/3.7kW	
Type of turret head / Number of indexing pos.	Dodecagonal drum turret / 24	
Drive type / Number of driven-tool stations	Individual rotation / 12	
General		
Floor space (L×W×H)	3,814mm × 2,218mm × 2,010mm	
Machine Weight (incl.control)	9,500kg	

WY-150

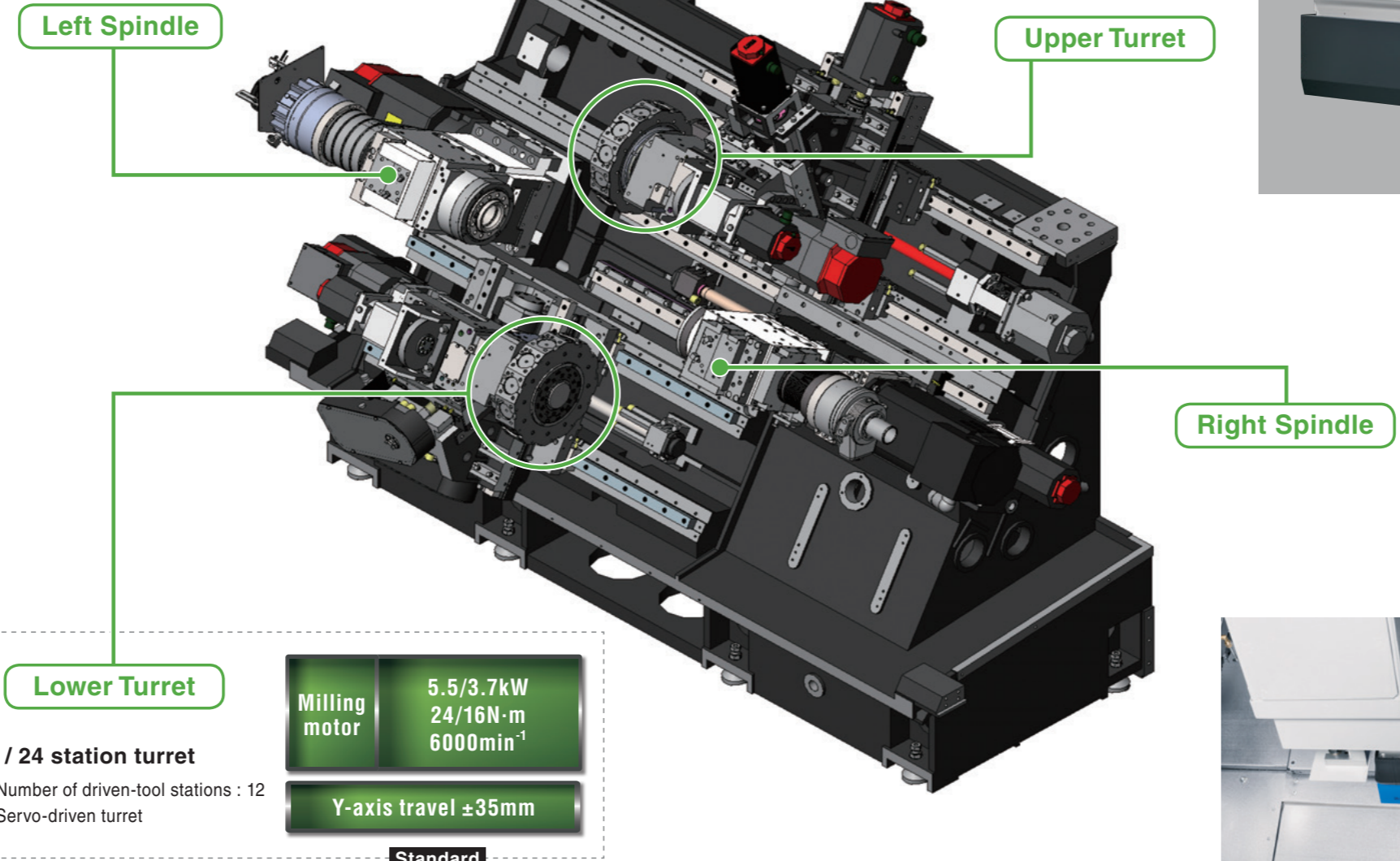
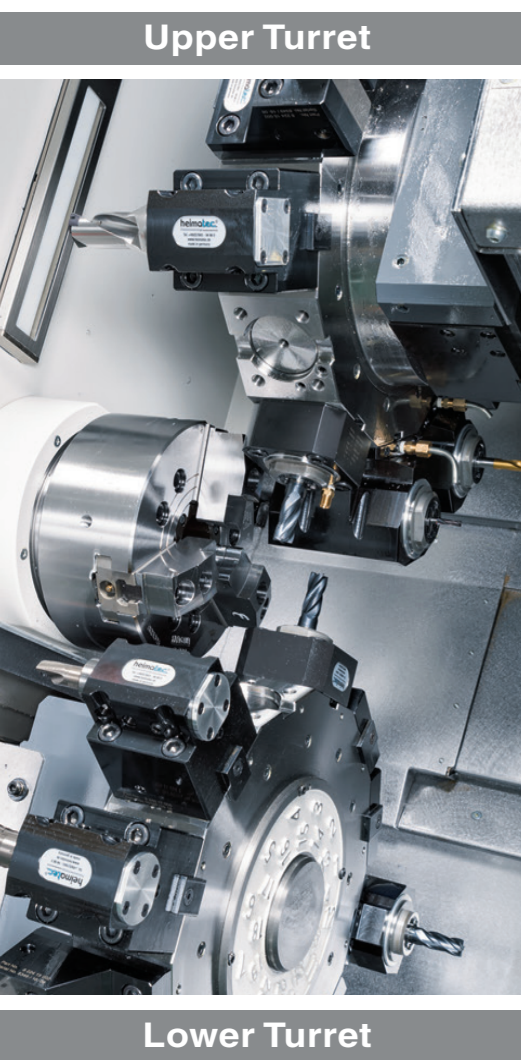
WY-150 Machine Structure

Ensures Stable Accuracy

48 stations
High-rigidity turrets

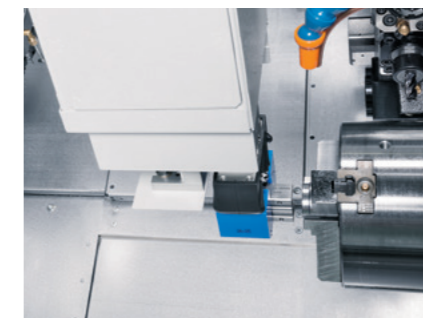
<p>Bar capacity $\phi 51\text{mm}$</p> <p>Spindle motor 15 / 11kW 5000min⁻¹</p> <p>C-axis C-axis synchronisation</p> <p>Standard</p>	<p>Bar capacity $\phi 65\text{mm}$</p> <p>Spindle motor 15 / 11kW 4500min⁻¹</p> <p>C-axis C-axis synchronisation</p> <p>Option</p>
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<p>12 / 24 station turret</p> <ul style="list-style-type: none"> ◆ Number of driven-tool stations : 12 ◆ Servo-driven turret <p>Milling motor 5.5/3.7kW 24/16N·m 6000min⁻¹</p> <p>Y-axis travel $\pm 45\text{mm}$</p> <p>Standard</p>
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<p>Bar capacity $\phi 51\text{mm}$</p> <p>Spindle motor 11 / 7.5kW 5000min⁻¹</p> <p>C-axis C-axis synchronisation</p> <p>Standard</p>	<p>Bar capacity $\phi 51\text{mm}$</p> <p>Spindle motor 15 / 11kW 5000min⁻¹</p> <p>C-axis C-axis synchronisation</p> <p>Option</p>
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<p>12 / 24 station turret</p> <ul style="list-style-type: none"> ◆ Number of driven-tool stations : 12 ◆ Servo-driven turret <p>Milling motor 5.5/3.7kW 24/16N·m 6000min⁻¹</p> <p>Y-axis travel $\pm 35\text{mm}$</p> <p>Standard</p>
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		Parts catcher G	Option
Method		Swing / Gripper	
Workpiece size	Diameter [mm]	$\phi 12 - 65$	
	Length [mm]	15 - 150	
	Weight [kg]	3.0	
Ejecting method		Belt conveyor & Chute	



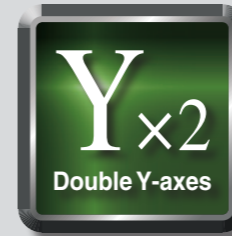
High-Performance Turning and Milling Motors.

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



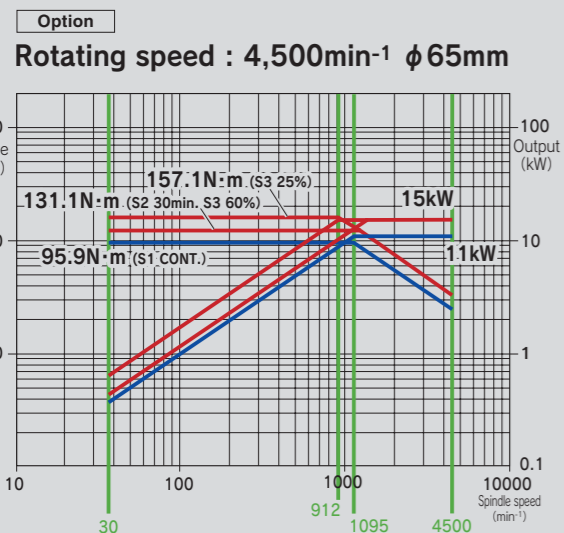
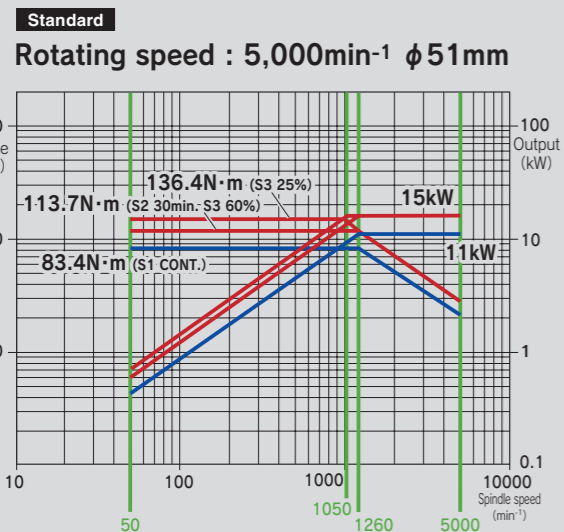
WY-150

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



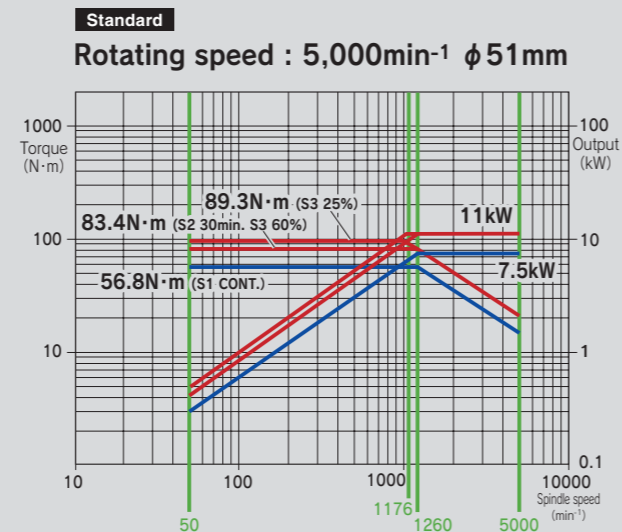
Left Spindle Motors

15 / 11kW



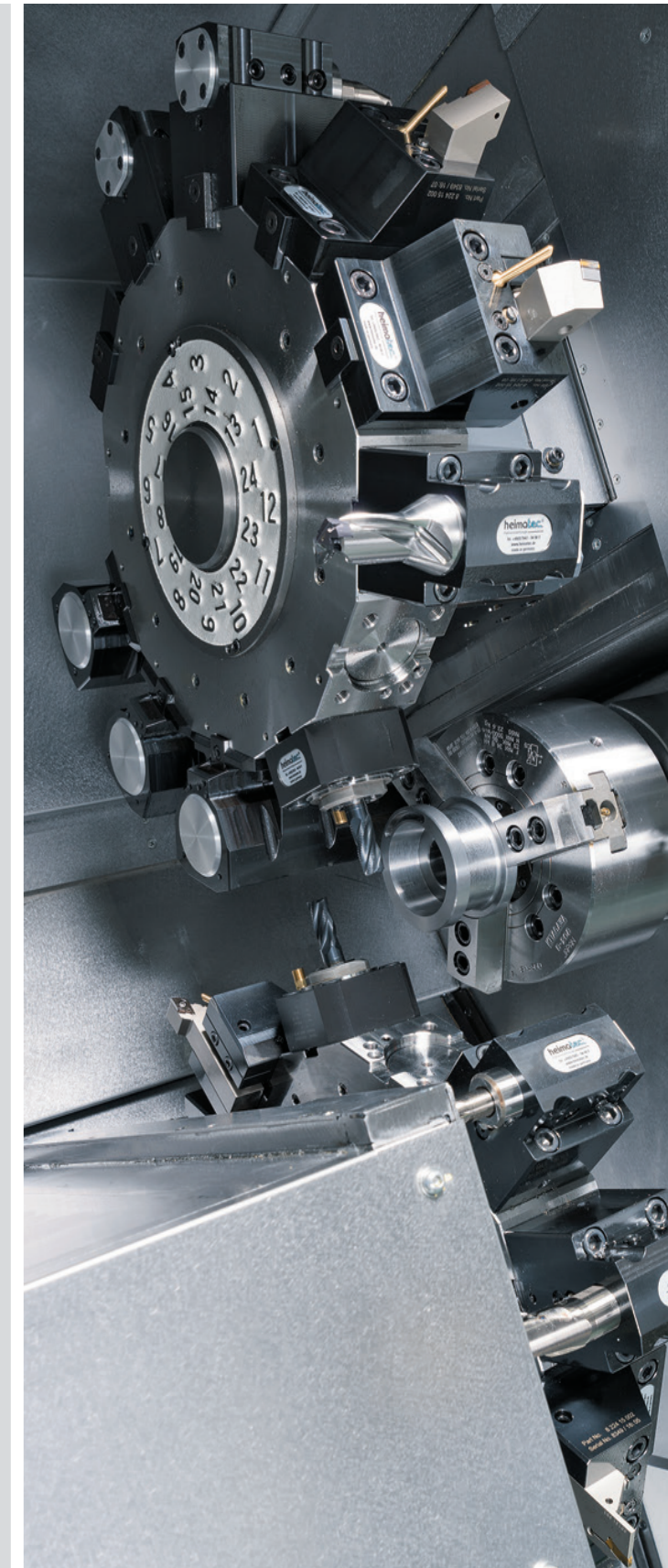
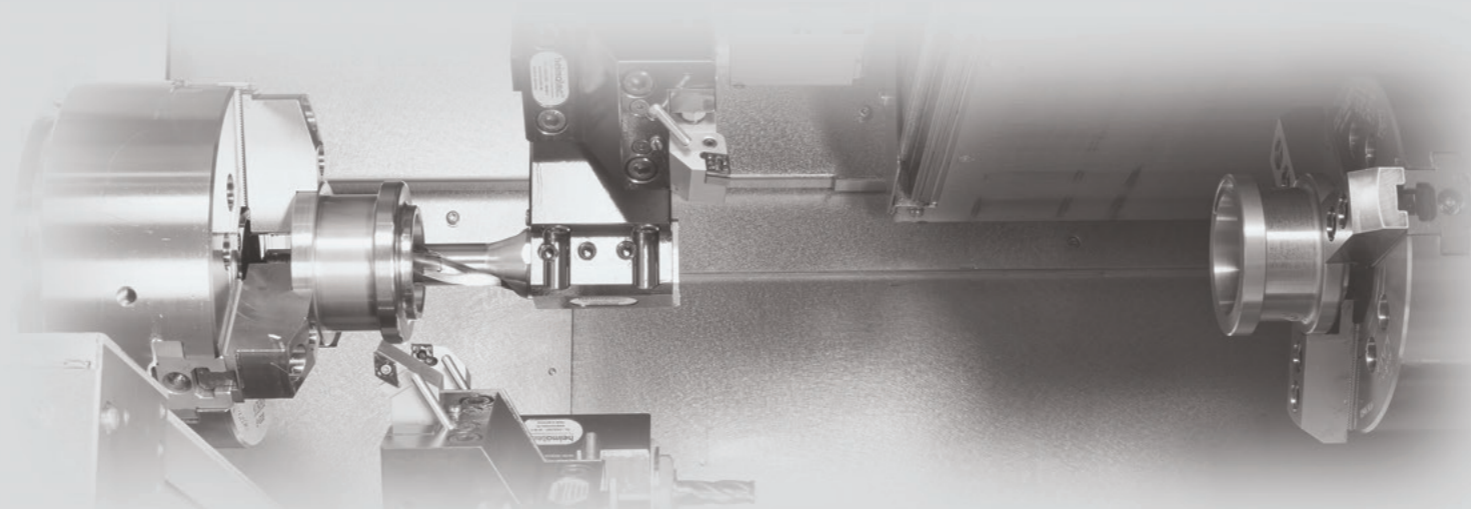
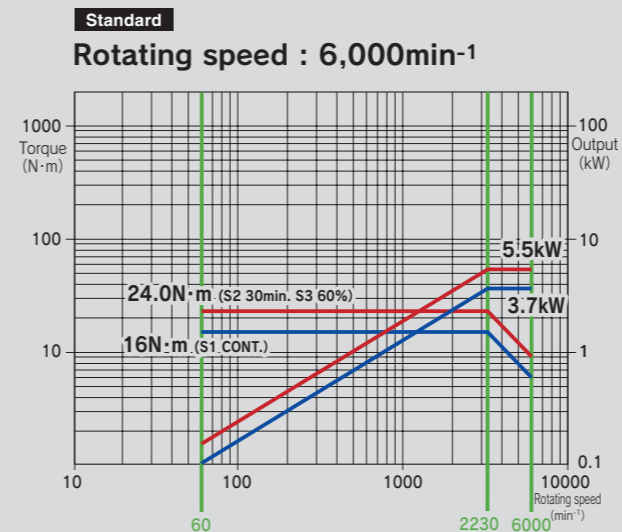
Right Spindle Motors

11 / 7.5kW



Upper & Lower Milling Motors

5.5 / 3.7kW



NT Smart X

Full Operator Support from Ease of Use to Reliability.

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

Main features of NT SmartX

Standard

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



Cut in check

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



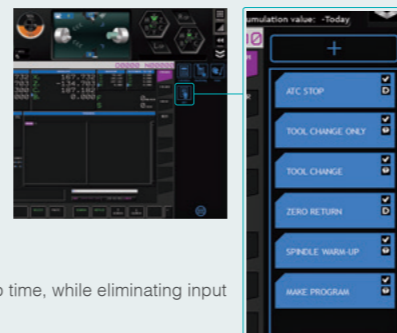
Digital Chuck Interlock

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

One Touch MDI

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

Reduce programming and setup time, while eliminating input errors.



NT Smart Sign

Nakamura-Tome IoT software

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

Monitoring



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

Data Input / Output

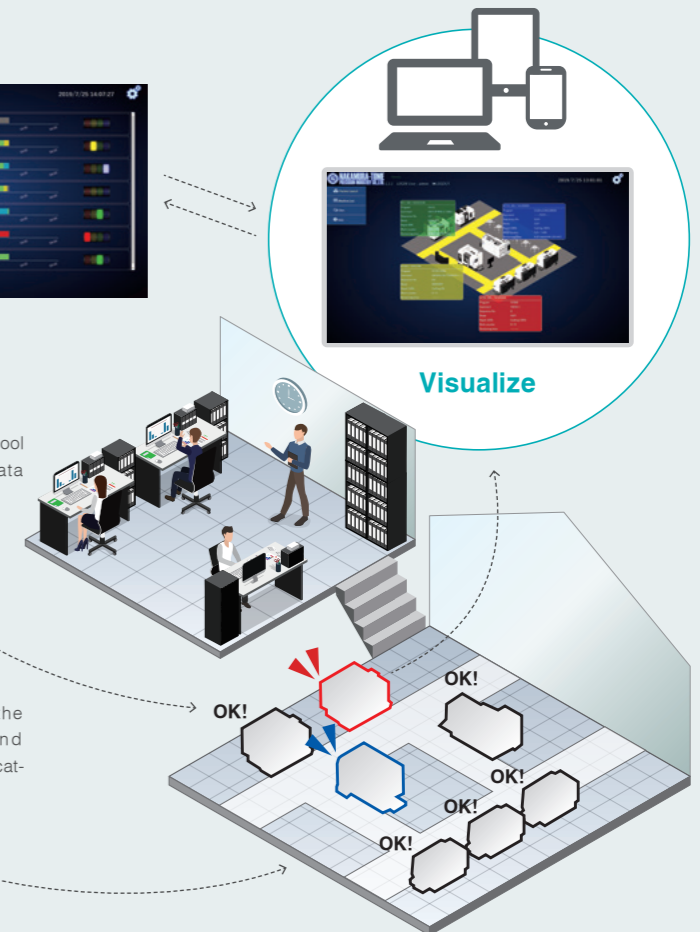


Input and output programs, tool data and other machine data from the monitoring PC.

Diagnosis



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



NT Thermo Navigator AI

Thermal Growth Compensation using AI.

Compensation model built using AI machine learning.

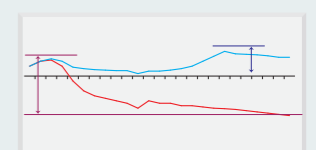
Powered by AI

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



High Precision Thermal Growth Compensation

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

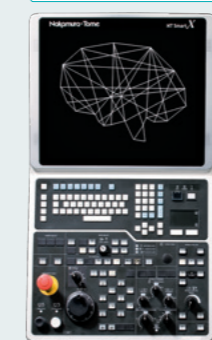


— Pre-correction thermal displacement data
— Thermal displacement data after correction

- ① Time
- ② Measured Dimensions
- ③ Retrieval of Wear Offset Data

Acquired Data analyzed with NT Thermo Navi AI

Feedback



Standard for NT Smart X

Double safety features for maximum protection

NT Machine Simulation / NT Collision Guard + Airbag

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

NT Machine Simulation

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



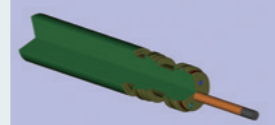
By checking in advance the chuck and the tool, the tool and the cover, etc. and checking the machining process etc., the risk of a machine collision when actually moving the machine can be reduced.

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

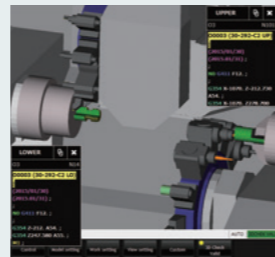
It can override the settings for fast feed and cutting feed individually. Simulation by process, single feed is possible.

By process
Single feed

Image shown here is of a 2-turret machine



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



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

NT Collision Guard

Preventive safety technology - Machine collisions are avoidable!



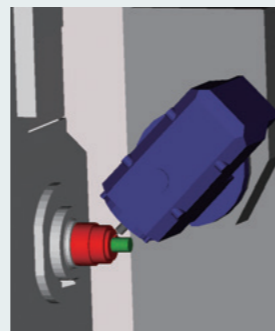
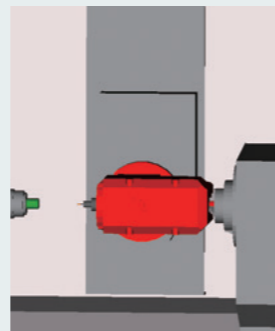
Available in automatic mode or in manual mode. Using registered 3D models of machine, chucks, tools, holders and parts, machine collisions can be monitored and prevented in real time during automatic, manual or jog movements.

Even turret indexing is monitored to prevent collisions, drastically reducing collision risks, especially during machine setup.

Tool 3D Model setup was simplified.

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

Image shown here is of a Tool spindle machine



Airbag (Overload detection)

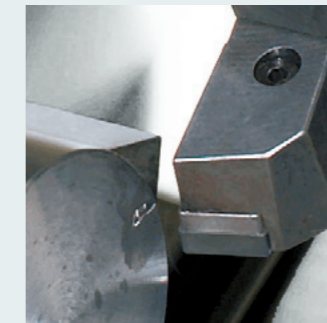
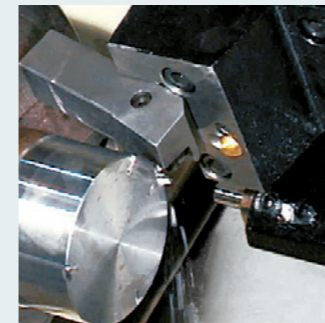
Compared to other machines, Nakamura-Tome machine will not break after the slightest collision. The "Airbag Function" minimizes the damage that may occur during a collision.

If a machine collision occurs, there is good reason to be assured: Airbag !

Barrier?
Even with barrier function, machine collisions may occur

When the machine collision, there is no reason to panic. Nakamura-Tome is...

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



Without Airbag

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

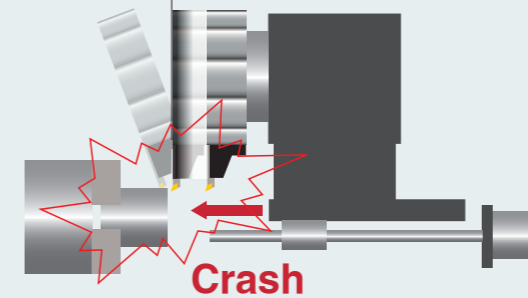
With Airbag

Retraction within 0.001 sec

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



▲Video



* This feature does not mean zero impact

NT Work Navigator

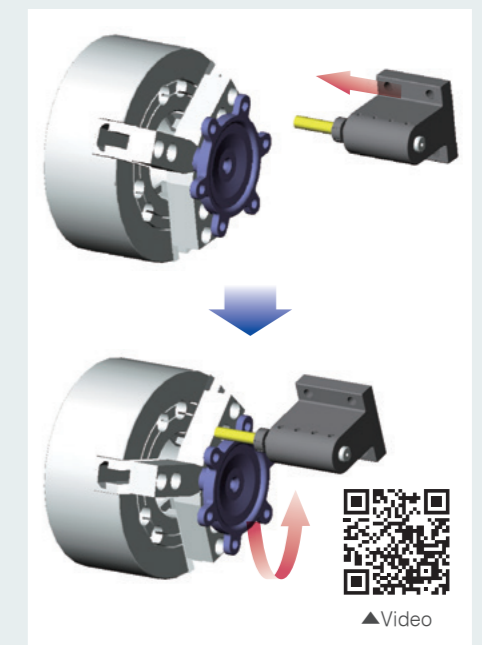


A new upgrade makes it possible to navigate with the X and Y-axes. Many parts with irregular outer surfaces, requiring coordinate recognition with X or Y-Axis, become within the range of NT Work Navigator.

Advanced NT Work Navigator !

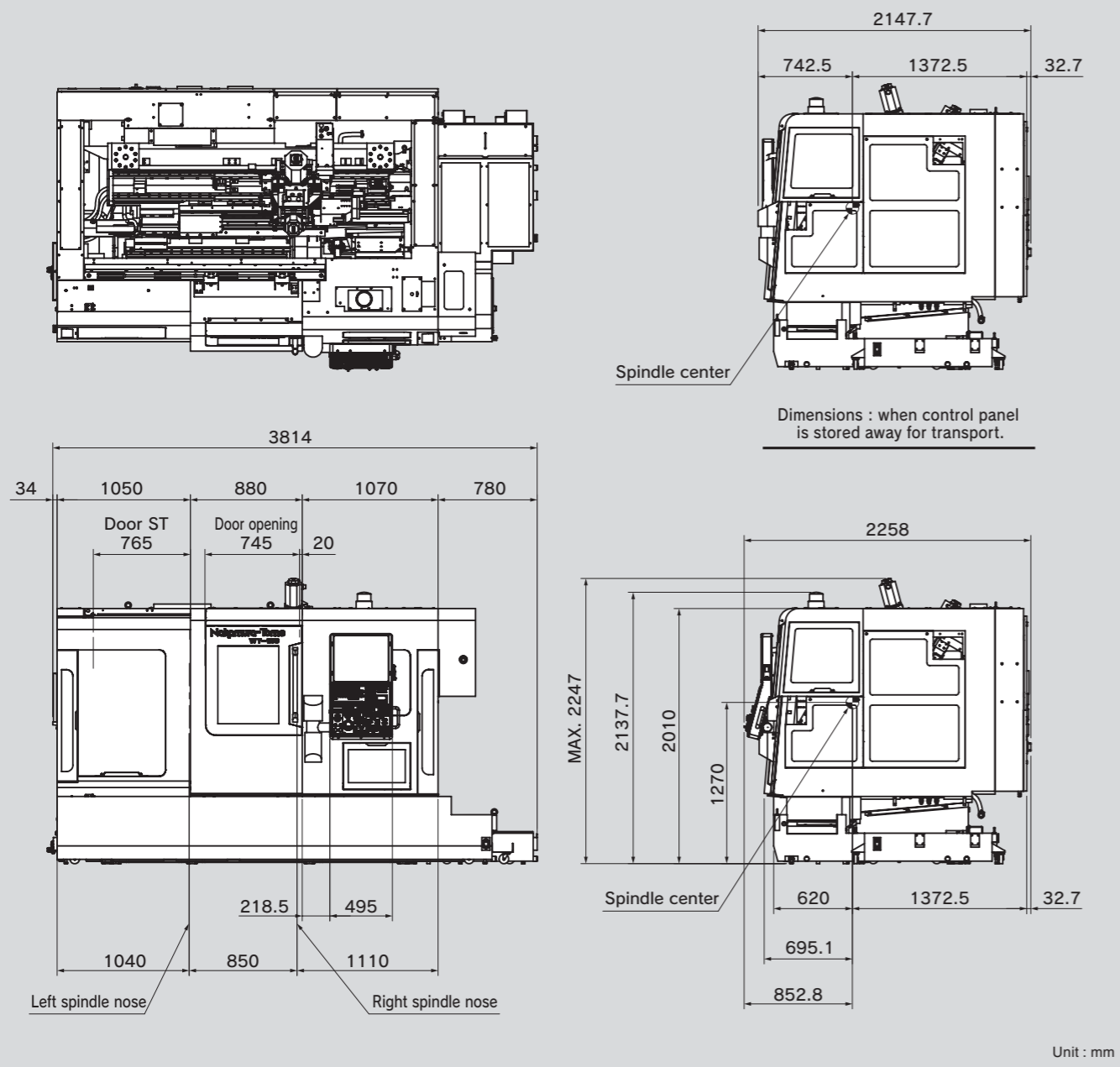
No fixtures required

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.

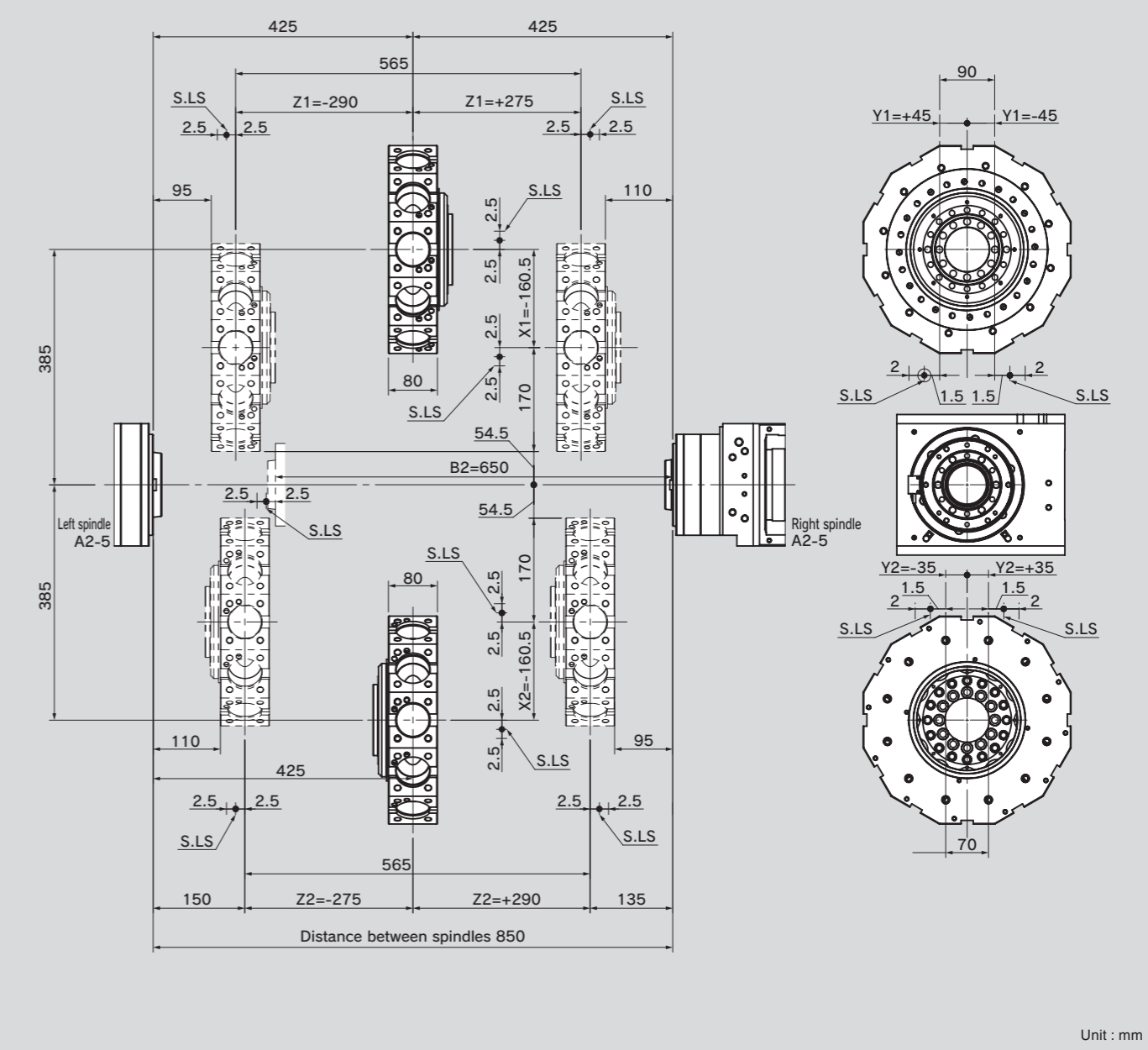


▲Video

Machine Dimensions



Slide Travel Range



WY-100II



WY-150



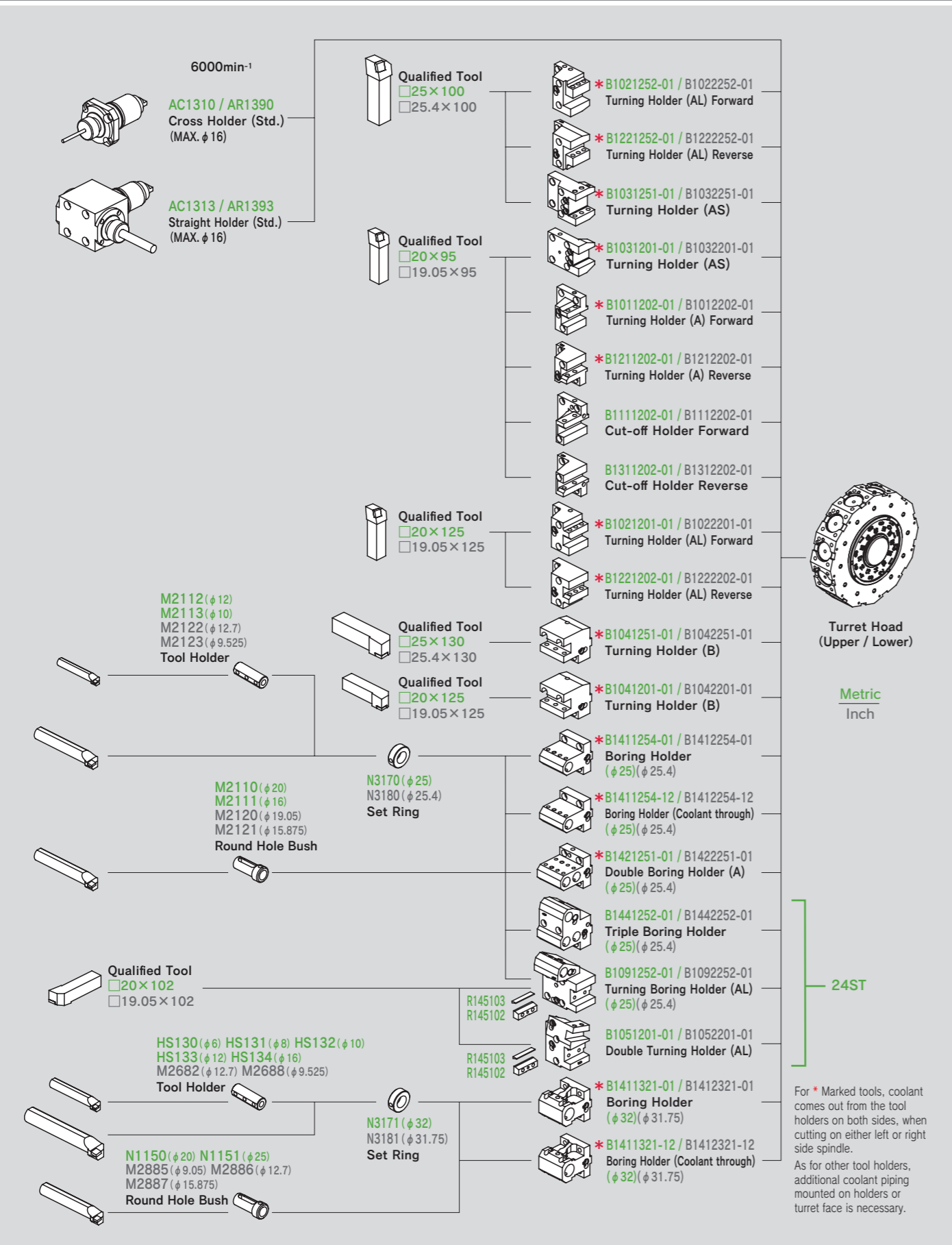
WY-250



WY-250L



Tooling System Diagram



Machine Specifications

	φ51mm	φ65mm (op.)
Capacity		
Max. turning diameter	225mm	
Standard turning diameter	150	
Distance between spindles	max. 850mm / min. 200mm	
Max. turning length	565mm	
Bar capacity	51mm	65mm (L only)
Chuck size	165mm (6")	
Axis travel		
Slide travel (X1 / X2)	160.5mm / 160.5mm	
Slide travel (Z1 / Z2)	565mm / 565mm	
Slide travel (Y1 / Y2)	±45mm / ±35mm	
Slide travel (B2)	650mm	
Rapid feed X1 / X2	20m/min ⁻¹	
Rapid feed Z1 / Z2	40m/min ⁻¹	
Rapid feed B2 axis	40m/min ⁻¹	
Rapid feed Y1 / Y2	8m/min ⁻¹	
Left and right spindles		
Spindle speed	5000min ⁻¹	4500min ⁻¹
Spindle speed range	Stepless	
Spindle nose	A2-5	A2-6
Hole through spindle	65mm	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 connecting time	1.5 sec.	
Upper & Lower turrets		
Type of turret head	Dodecagonal drum turret	
Number of driven-tool stations	12	
Number of index positions	24	
Tool size (square shank)	□25mm	
Tool size (round shank)	φ32mm	
Rotating tool		
Rotary system	Individual rotation	
Driven-tool spindle speed	6000min ⁻¹	
Spindle speed range	Stepless	
Number of driven-tool station	12	
Tool shank	Straight holder φ1mm - φ16mm Cross holder φ1mm - φ16mm	
Drive motor		
L-spindle	15/11kW	
R-spindle	11/7.5kW (op.15/11kW)	
Driven tools	5.5/3.7kW	
General		
Height	2,200mm	
Floor space (L x W)	3,814mm x 2,218mm	
Machine weight (incl. control)	9,500kg	
Power requirements		
power supply	37.7kVA	
Air supply	360 - 410NL/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.

Control Specifications

Items	
Control type	FANUC 31i-B 2-PATH
Controlled axes	
Controlled axes	9axes
Least command increment	Upper : 4axes (X1, Z1, C1 [C2], Y1) Lower : 4axes (X2, Z2, C2 [C1], Y2, 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°, B2:0.001mm, Y:0.001mm
Max. programmable dimension	±999999.999mm / ±39370.0787inch, ±999999.999°
Absolute / incremental programming	X, Z, C, Y, B2 (absolute only for B2) / U, W, H
Decimal input	Standard
Inch / Metric conversion	G20 / G21
Programmable data input	G10
Feed function	feed / min X : 1 - 8000mm/min, 0.01 - 314in/min (1 - 4800mm/min, 0.01 - 188in/min) Z : 1 - 8000mm/min, 0.01 - 314in/min (1 - 4800mm/min, 0.01 - 188in/min) C : 1 - 4800°/min Y : 1 - 8000mm/min, 0.01 - 314in/min (1 - 4800mm/min, 0.01 - 188in/min) B2 : 1 - 8000mm/min, 0.01 - 314in/min (1 - 4800mm/min, 0.01 - 188in/min) feed / rev : 0.0001 - 8000.0000mm/rev (0.0001 - 4800.0000mm/rev) 0.000001 - 50.000000in/rev The maximum cutting feed rate is the value in AI contour control mode. It is also on with G316 command. The values in parentheses are normal values.
Cutting feed	
Dwell	G04
Feed per minute / Feed per revolution	G98 / G99
Thread cutting	G32F designation
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 accel./decel. After cutting feed interpolation	Standard
Rapidfeed override	F0, 25, 50, 100% (changeable to every 10% by switch)
Cutting feedrate override	0 - 150% (each 10%)
AI contouring control I	G5.1
Spindle override	50% - 120% Set every 10%
Program memory	
Part program storage length	256Kbyte (Total 640m)
Part program editing	delete, insert, change
Program number search	Standard
Sequence number search	Standard
Address search	Standard
Number of registerable programs	500 programs
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 (Replacement of word, address, cut & paste for word / character, cancel operation, copy or move the program)
Operation and 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 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	G71, G72
Canned cycle for drilling	G80 - G89
Axis recomposition	Standard (used for L C-axis control - R C-axis control from the lower side)
Sub program	Standard
Balance cut	G68, G69
Custom macro	Standard (common variable #100 - #149, #500 - #549)
Additional customer macro variables	Standard (After addition, #100 - #199, #500 - #999)
FS15 tape format	Standard
LucK-bei II NT Manual Guide i	Standard
Abnormal load detection function	Standard
NT Work Navigator	Standard (not including contact bar)
NT Nurse	Standard
NT Collision Guard	Standard
Mechanical support	
Rigid type	Standard
Spindle synchronised control	Standard
C axis synchronised control	Standard (G496 C1, fast forward positioning)
Spindle orientation	Standard
NT Smart X	
O/S	Windows Embedded 8.1 Industry PRO
Pointing device	Touch pad
Memory	8GB



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