

WY-100II

NAKAMURA-TOME
PRECISION INDUSTRY CO.,LTD.

WY-100II

High Productivity Multitasking Machine

From diversified small-lot production to mass production

Nakamura-Tome

Innovation Technology

Creating Value

Compact Machine with Powerful Machining Capabilities

One hit machining

Finished parts, complete in one set up

15

15-Station

12

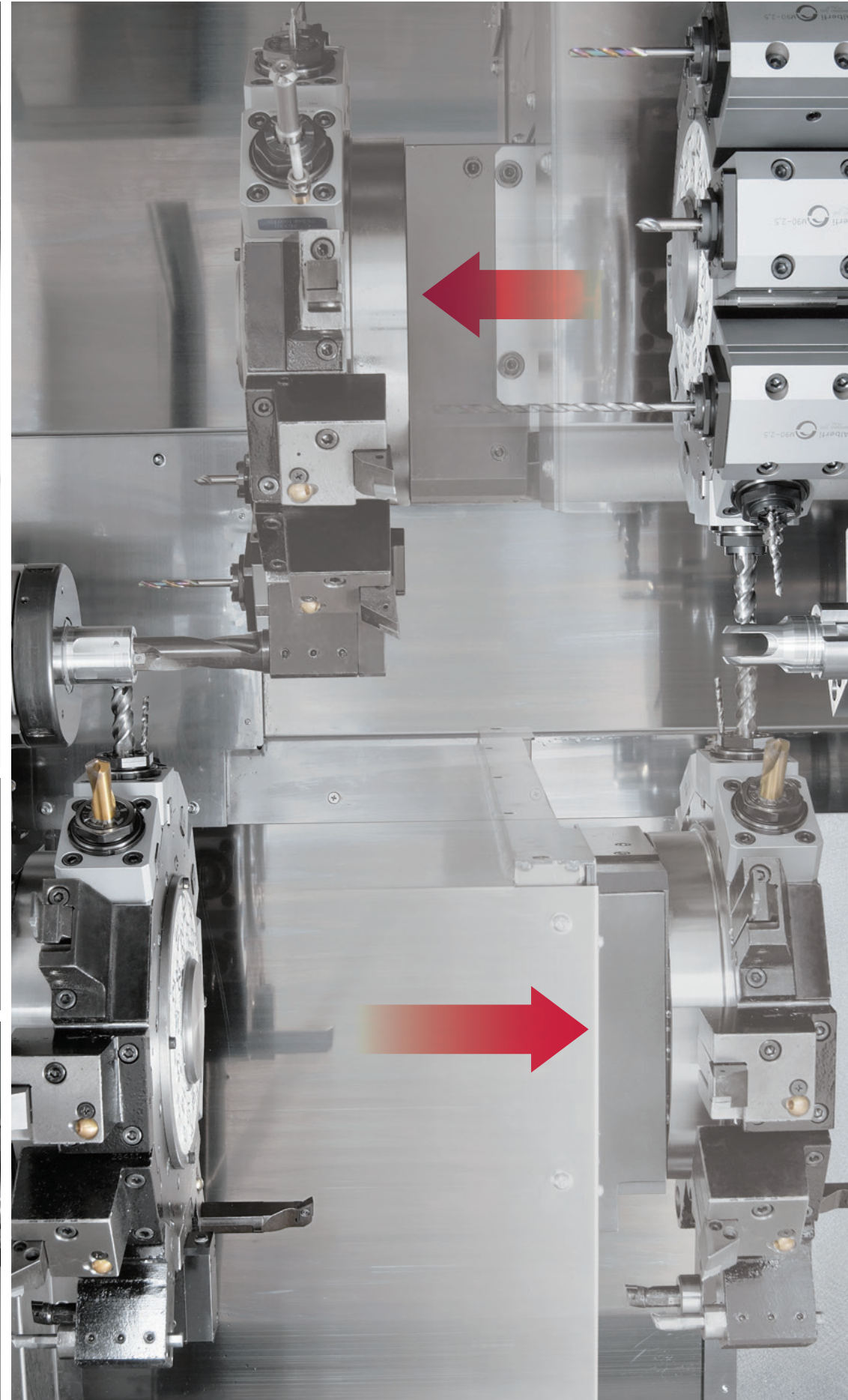
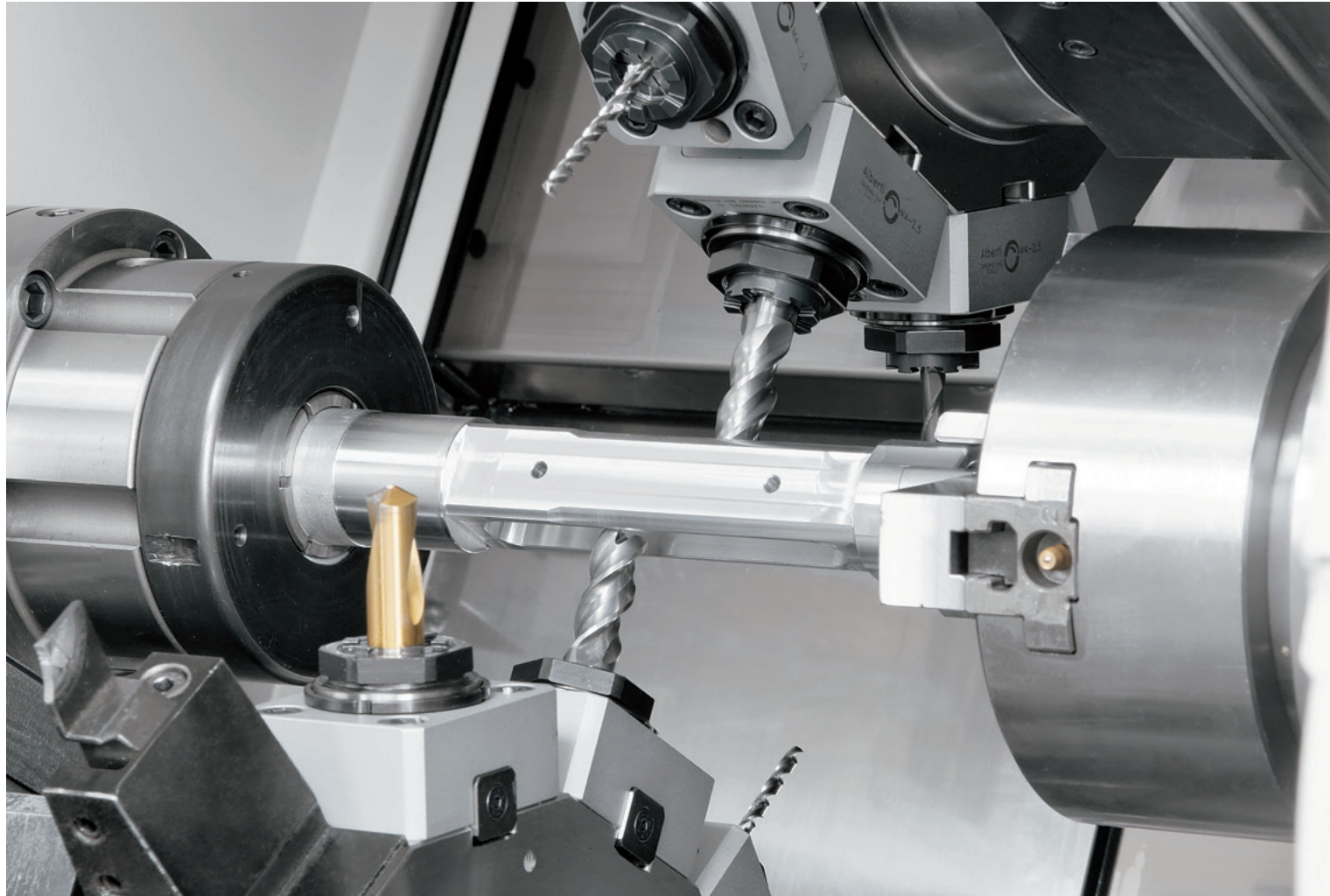
24-Station



M_{x2}
Double Milling Motor

Y_{x2}
Double Y-axes





12-Station Turret

48

12 / 24 - Station

24 + 24
(Half Index)

15-Station Turret

30

15 - Station

15 + 15

Double Performance!

$M_{\times 2}$

Milling-tool motor
7.1/2.2kW (6,000min⁻¹)

Milling-tool motor (op.)
5.5/2.2kW (8,000min⁻¹)

Y-axis on upper
and lower turrets

$Y_{\times 2}$

Y-axis travel
±42 / ±32.5mm (12st)
±31 / ±31mm (15st)

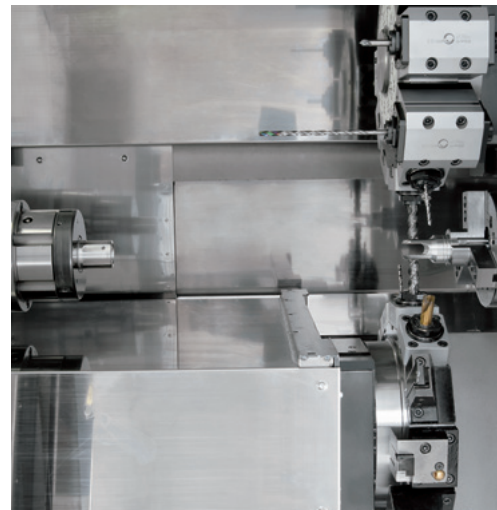
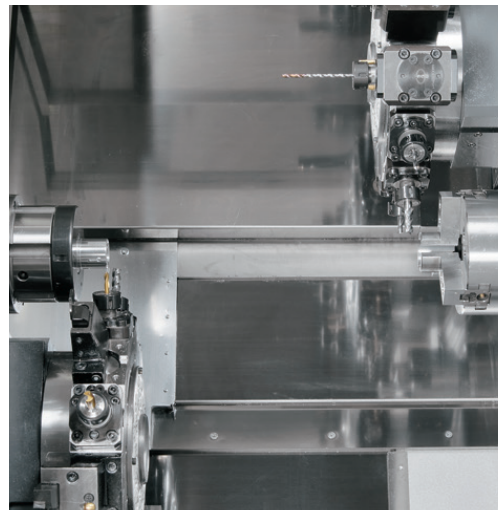
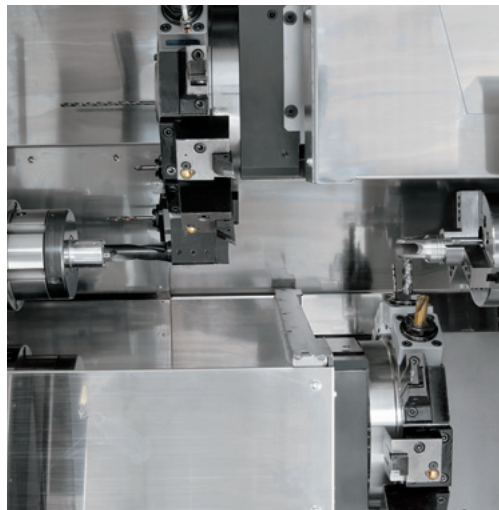
High Productivity

Top Leader of One-hit Machining

No Work in Process

Less setup time

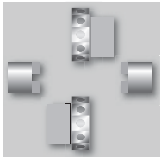
Complete in one setup





19"
Color LCD
Touch Panel

NT
Smart
X



T×2
Double turret

M×2
Double Milling Motor

Y×2
Double Y-axes

S×2
Twin-Spindle

C×2
C-axes

Capacity		φ 42mm	φ 51mm (op.)	φ 65mm (op.)
Max. turning diameter / Max. turning length	12st.	175mm / 588mm	200mm / 570mm	
	15st.		190mm / 570mm	
Distance between spindles		max. 820mm / min. 200mm		
Bar capacity		φ 42mm	φ 51mm	φ 65mm
Chuck size		165mm (6")		

Axis travel		12st.	15st.
Slide travel (X1 / X2)	12st.	150mm / 135mm	150mm / 141mm
	15st.	130mm / 130mm	
Slide travel (Z1 / Z2)	12st.	588mm / 560mm	570mm / 560mm
	15st.	570mm / 560mm	
Slide travel (Y1 / Y2)	12st.	±42mm / ±32.5mm	
	15st.	±31mm / ±31mm	
Slide travel (B)		620mm	

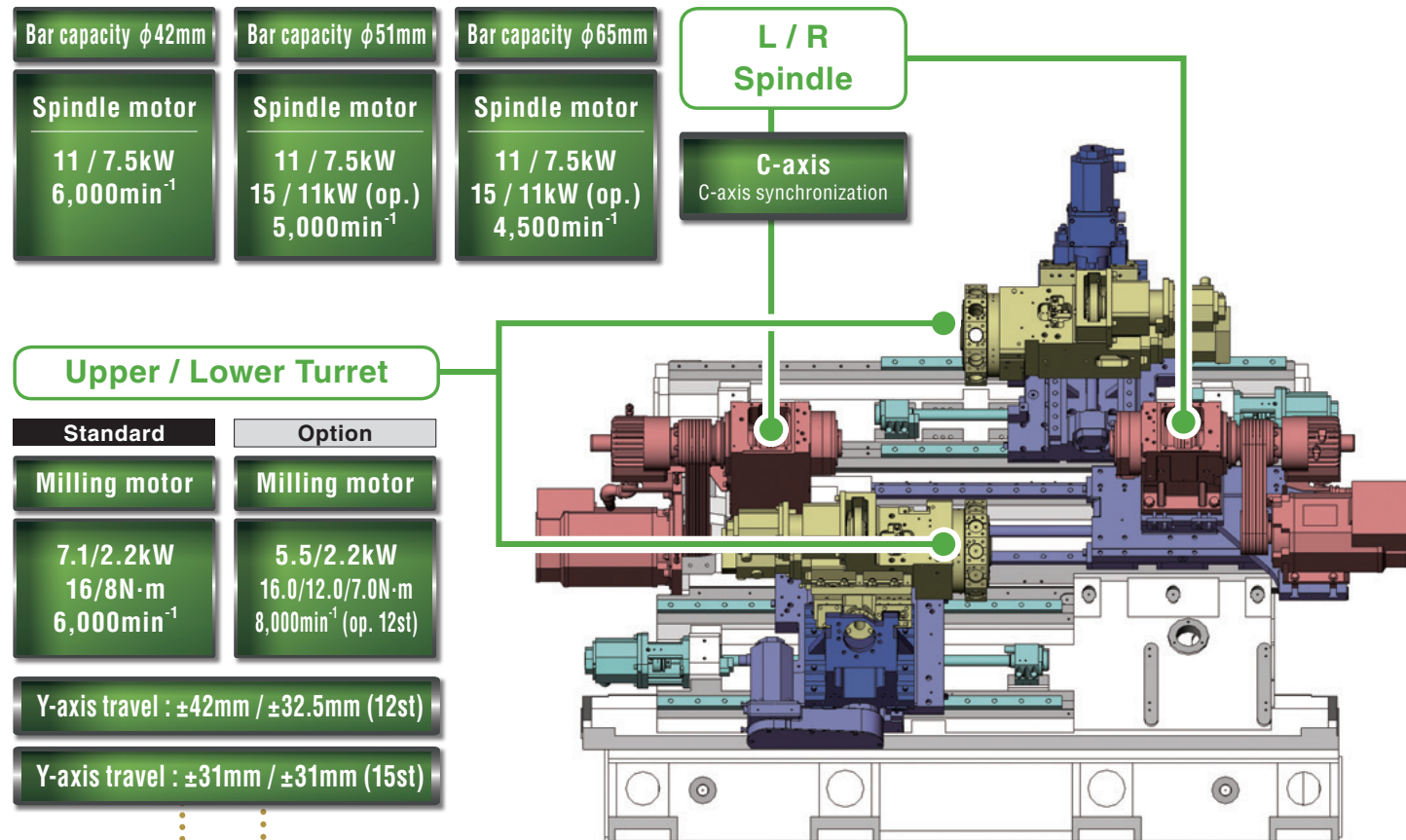
Spindle L, R		6,000min ⁻¹	5,000min ⁻¹	4,500min ⁻¹
Spindle speed		6,000min ⁻¹	5,000min ⁻¹	4,500min ⁻¹
Spindle motor output (L / R)		11/7.5kW	11/7.5kW	15/11kW (op.)
Spindle motor torque (L / R)		76/39N·m	77/39.4N·m	85/43N·m

Turrets		2
Number of turrets		2
Driven-tool spindle speed		6,000min ⁻¹ (op. 8,000min ⁻¹ Only for 12-station turret)
Drive motor		7.1/2.2kW (op. 5.5/2.2kW)
Type of turret head / Number of indexing pos.	12st.	Dodecagonal drum turret / 24
	15st.	15-station turret / 15
Drive type / Number of driven-tool stations	12st.	Individual rotation / 12
	15st.	Individual rotation / 15

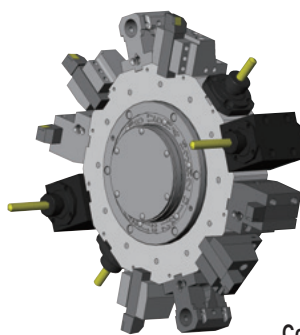
General		3,424mm × 2,257mm × 1,930mm
Floor space (L×W×H)		3,424mm × 2,257mm × 1,930mm
Machine Weight (incl.control)		8,500kg

Bar Capacity and spindle motor configurations				R Spindle motor				
Bar capacity				φ42	φ51		φ65	
Spindle motor output				11/7.5kW	11/7.5kW	15/11kW	11/7.5kW	15/11kW
				6,000min ⁻¹	5,000min ⁻¹		4,500min ⁻¹	
L Spindle motor	φ42	11/7.5kW	6,000min ⁻¹	○	—		—	
	φ51	11/7.5kW	5,000min ⁻¹	○	○	—	—	
		15/11kW		○	○	—		
	φ65	11/7.5kW	4,500min ⁻¹	○	—		○	—
		15/11kW		○	—		○	○

WY-100II Evolution into High Productivity Multitasking Machines



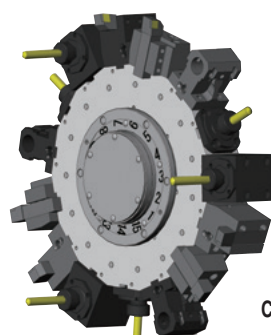
48 stations



12 / 24 - Station Turret

Turret type: Dodecagonal
Number of tools: 24
Number of indexing pos.: 24
Number of driven-tools: 12
Max. Speed of driven tools: 6,000min⁻¹ (op. 8,000min⁻¹)
O.D. turning tool: □ 20/16mm
I.D. Boring: dia.25mm
Collet diameter for driven tools: 1mm to 14mm

30 stations



15 - Station Turret

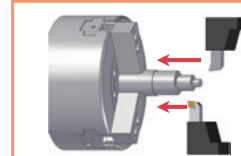
Turret type: 15 - station turret
Number of tools: 15
Number of indexing pos.: 15
Number of driven-tools: 15
Max. Speed of driven tools: 6,000min⁻¹
O.D. turning tool: □ 20/16mm
I.D. Boring: dia.25mm
Collet diameter for driven tools: 1mm to 14mm

WY-100II Various applications and increased productivity

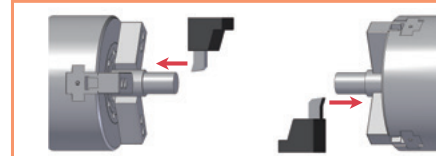
Perfect Flexibility!

Whether machining from bar stock, shaft work, castings or forged parts, the most suitable process combination can be made, thanks to maximum flexibility. In spite of its compact floor space, this machine priding itself for high productivity is the latest in multitasking technology.

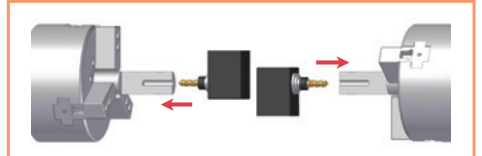
TURNING PROCESS



■ Balance cutting

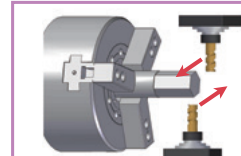


■ Individual OD machining

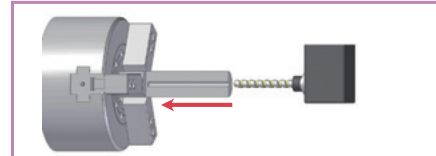


■ Individual ID machining

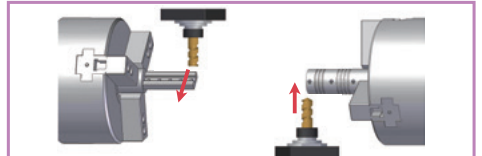
Milling



■ Simultaneous dual milling

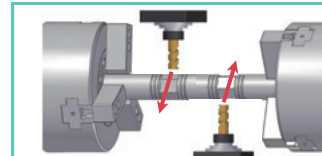


■ Deep drilling



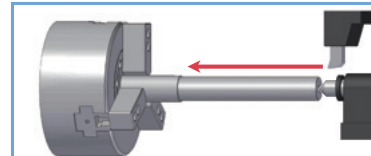
■ Individual milling on the left and right spindles

Work-holding with 2 chucks



■ Simultaneous Y-axis milling with upper and lower tools

Work-holding with Center support



■ OD cutting with Center support.

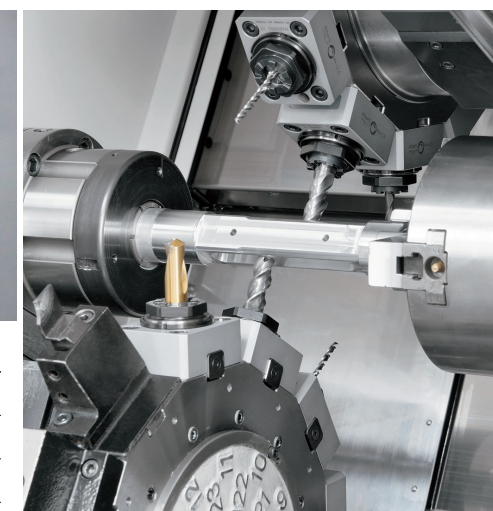


■ Increase work rigidity by PULL-Tension for Weak parts



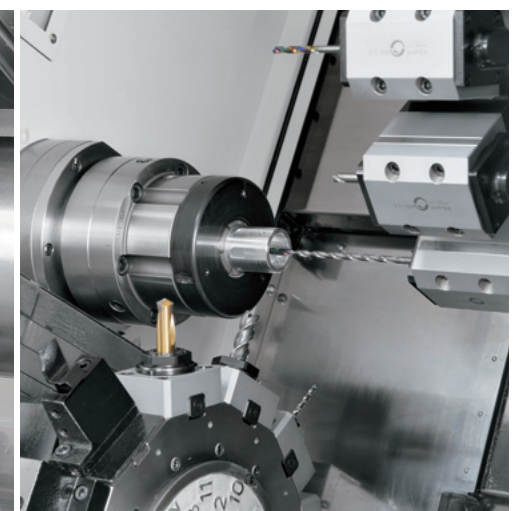
Description

Work name	Yoke
Type of industry	Aeronautics industry
Machining time	11 min 30 sec
Material	Duralumin
Material dimensions	$\phi 42\text{mm}$ bar stock



Upper & lower simultaneous Y-axis machining with main & sub spindle work-holding (Complete C axis synchronization)

● **Type:** Endmill EPP3160-CS
 ● **Dia:** $\phi 16\text{mm}$
 ● **rpm:** 1200min⁻¹
 ● **Feed:** 0.45mm/rev (Rough)
 ● **Cutting depth:** 5mm
 ● **Process time:** 90sec



deep hole milling operation

● **Type:** 20WHNSB0600-SD
 ● **Dia:** $\phi 6\text{mm}$
 ● **rpm:** 6000min⁻¹
 ● **Feed:** 0.35mm/rev
 ● **Speed:** 113m/min
 ● **Cutting depth:** 120mm(20D)
 ● **Process time:** 7sec



High-Performance Turning and

Milling Motors.

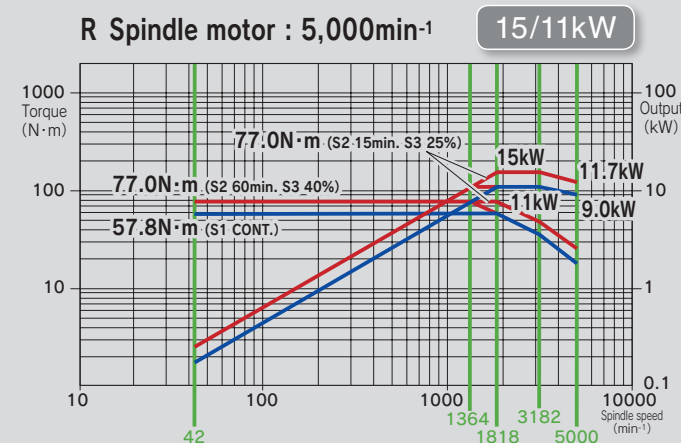
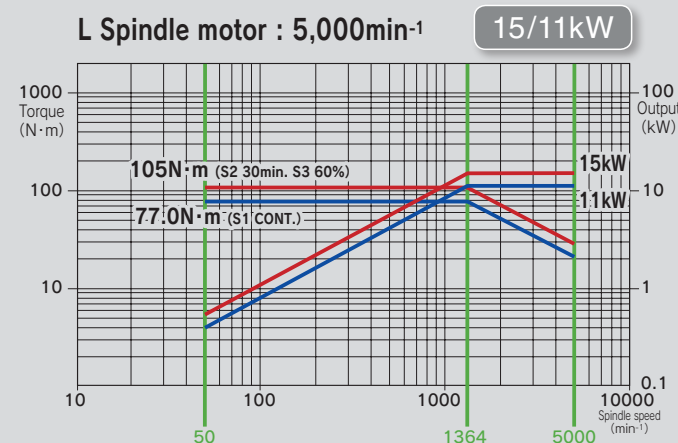
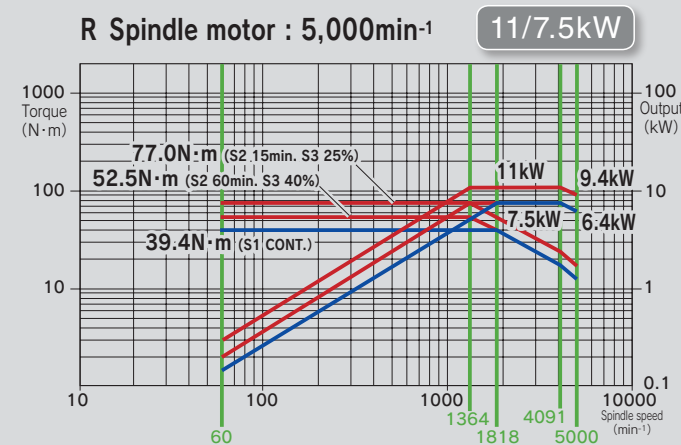
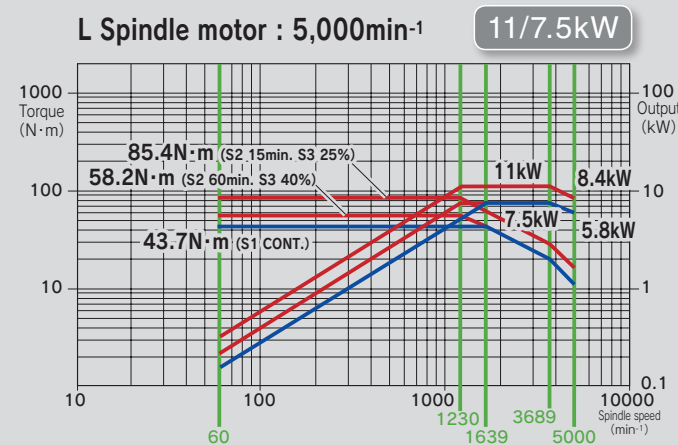
From simple to complex parts
One hit machining from raw material to finished part



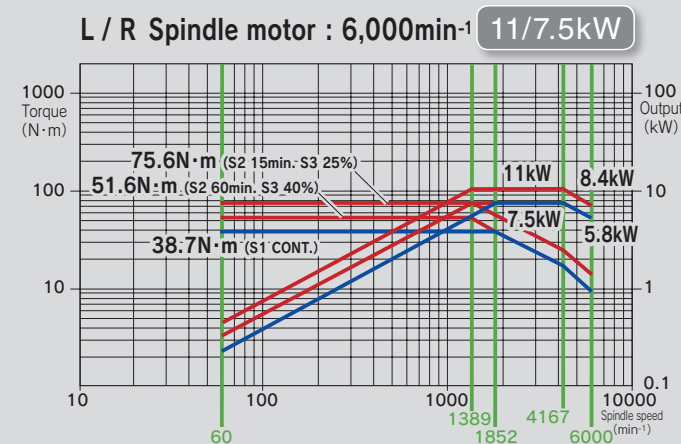
WY-100II

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

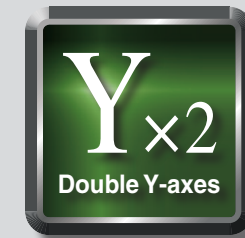
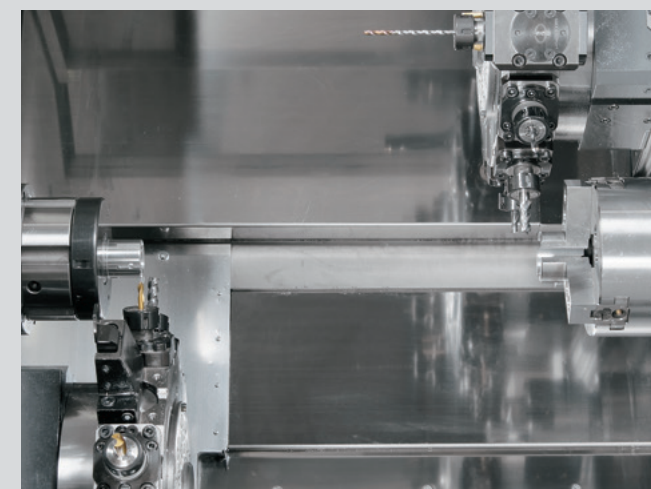
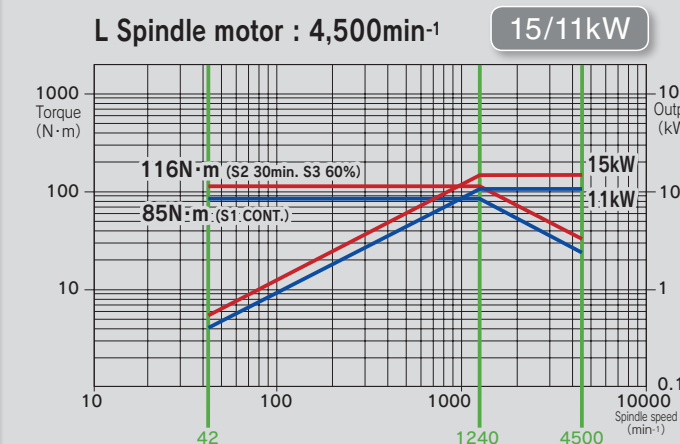
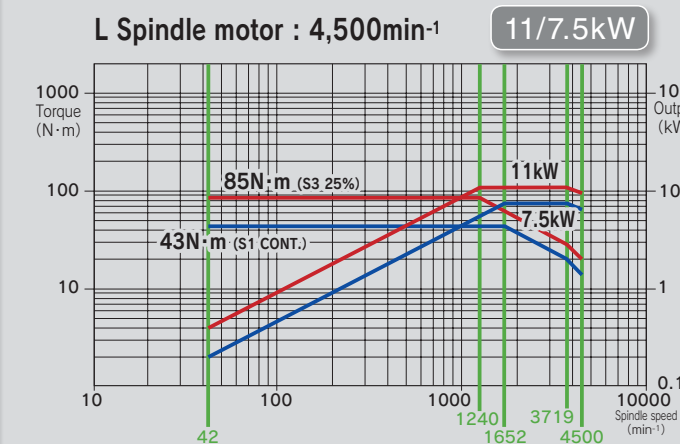
φ 51mm Option



φ 42mm Standard

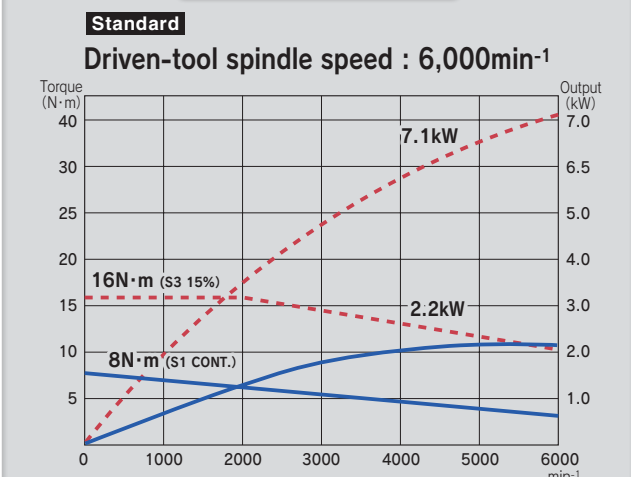


φ 65mm Option

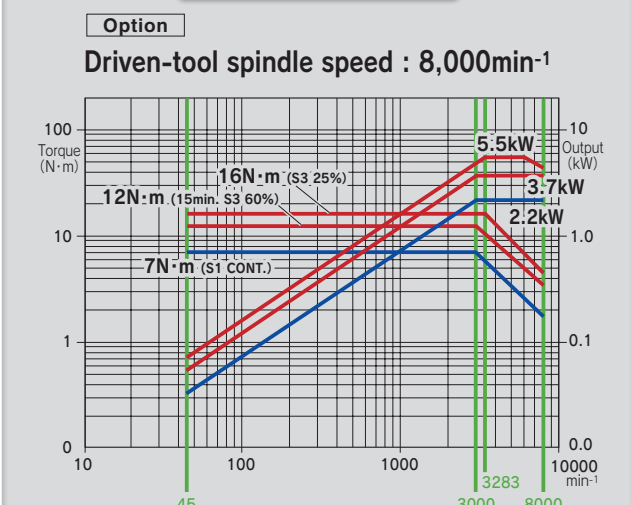


Upper & Lower Milling Motors

7.1 / 2.2kW



5.5 / 2.2kW



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

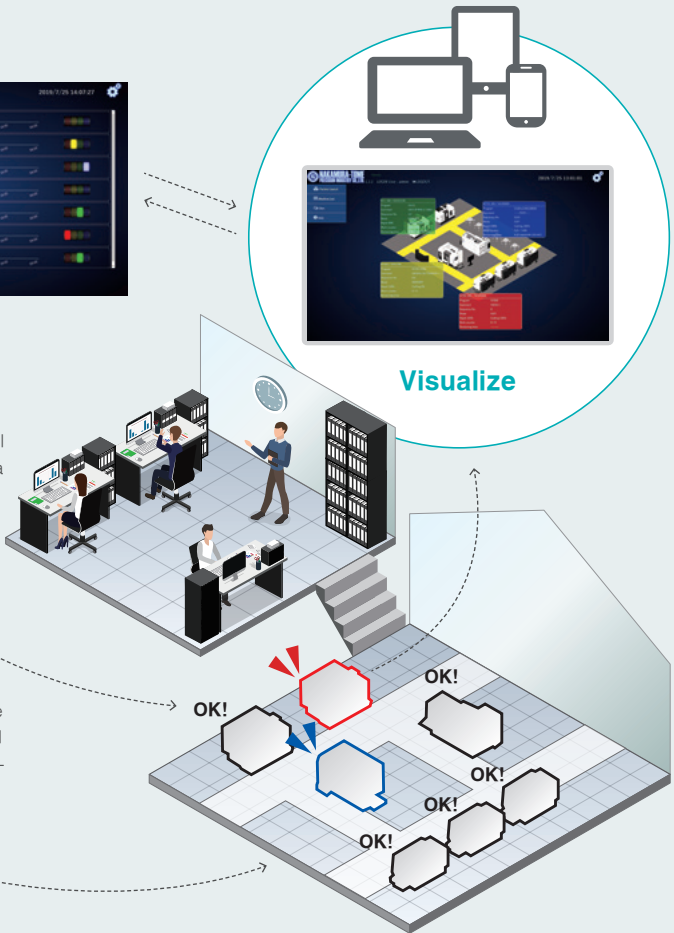


Input and output programs, tool data and other machine data from the monitoring PC.

Diagnosis



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



NT Thermo Navigator AI

Thermal Growth
Compensation using AI.



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

Acquired Data analyzed with NT Thermo Navi AI

Feedback

Compensation model built using AI machine learning.



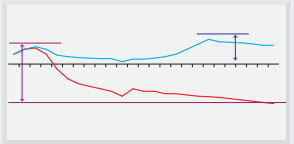
Standard for NT Smart X

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

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.



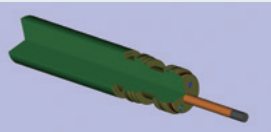
By checking in advance the chuck and the tool, the tool and the cover, etc., and checking the machining process etc., the risk of a machine collision when actually moving the machine can be reduced.

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

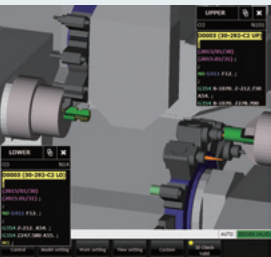
It can override the settings for fast feed and cutting feed individually. Simulation by process, single feed is possible.

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

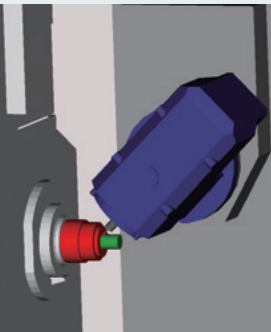
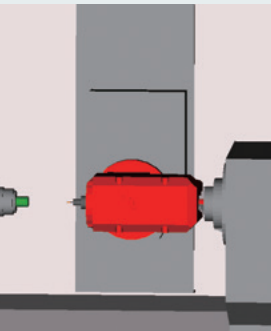
Preventive safety technology - Machine collisions are avoidable!



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)

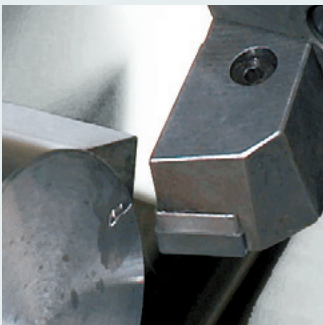
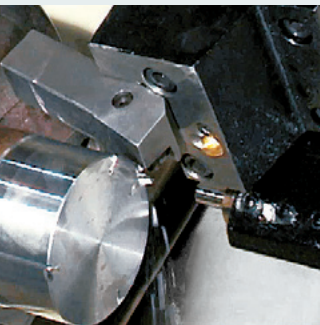
Compared to other machines, Nakamura-Tome machine will not break after the slightest collision. The "Airbag Function" minimizes the damage that may occur during a collision.

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.

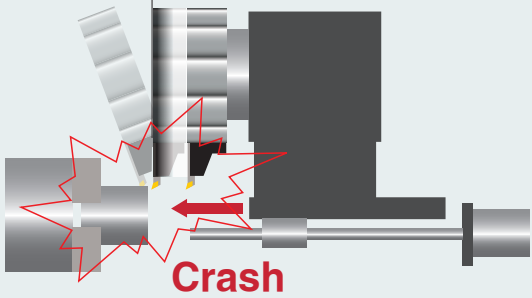
With Airbag

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

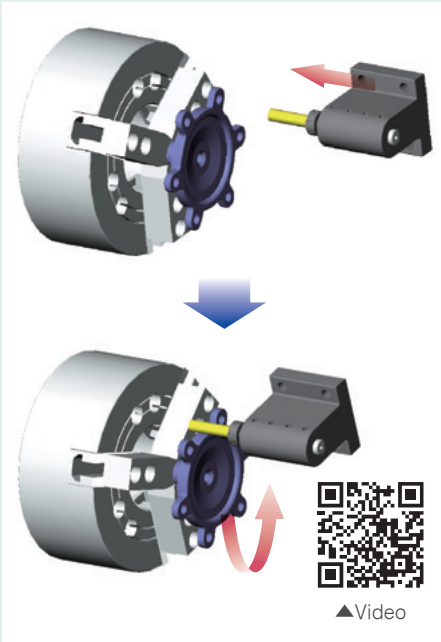


A new upgrade makes it possible to navigate with the X and Y-axes. Many parts with irregular outer surfaces, requiring coordinate recognition with X or Y-Axis, become within the range of NT Work Navigator.

Advanced NT Work Navigator !

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.

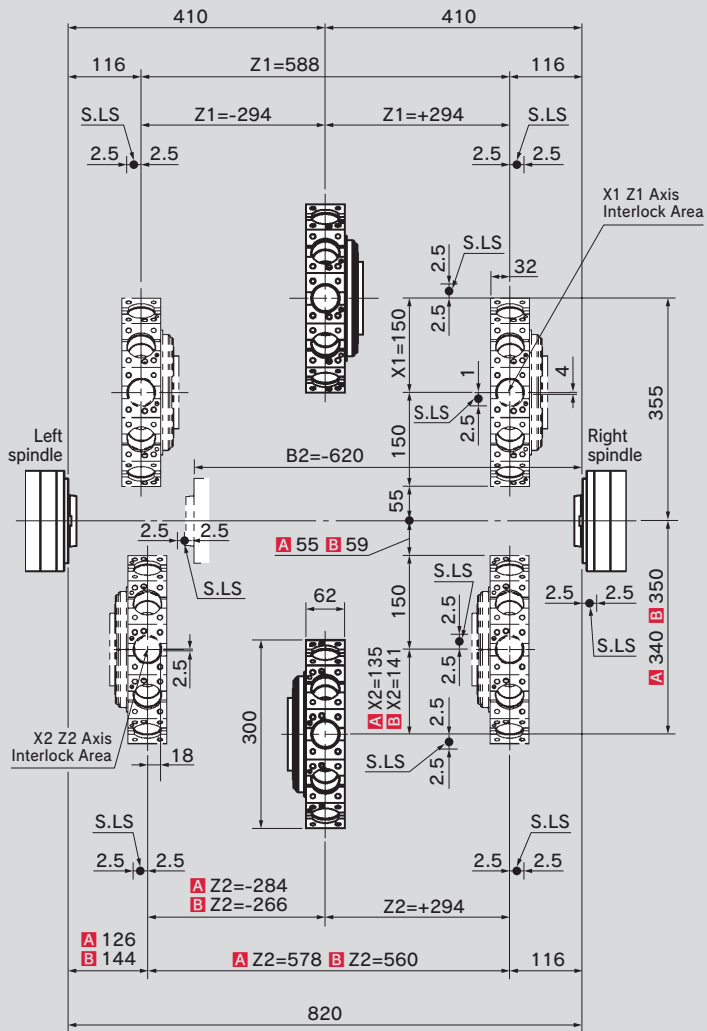
No fixtures required



▲Video

Slide Travel Range

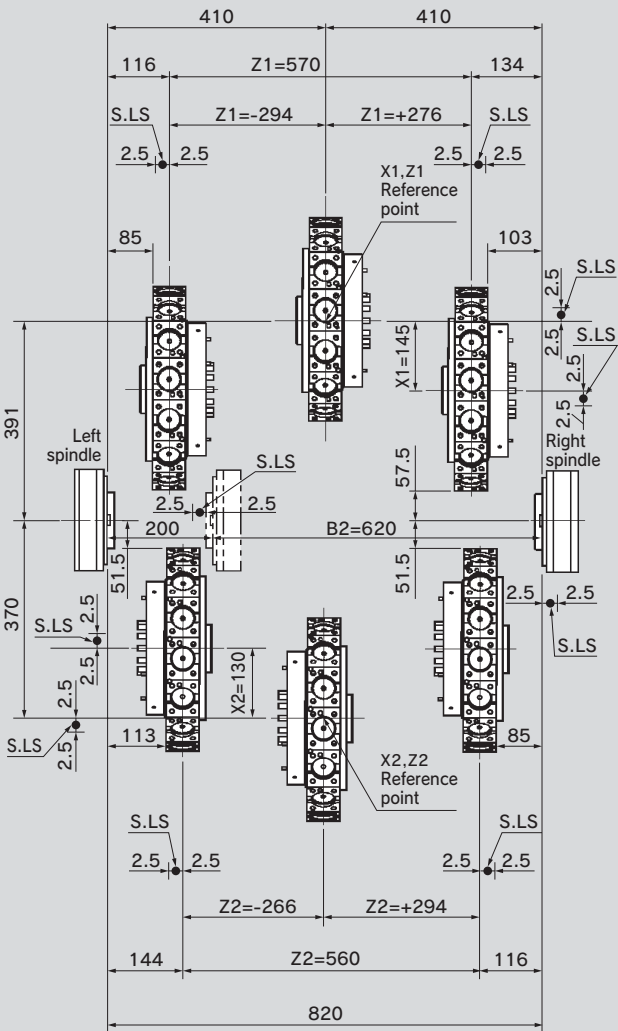
12 / 24 - Station



A : L, R $\phi 42$
B : L $\phi 51, \phi 65$ / R $\phi 42, \phi 51, \phi 65$

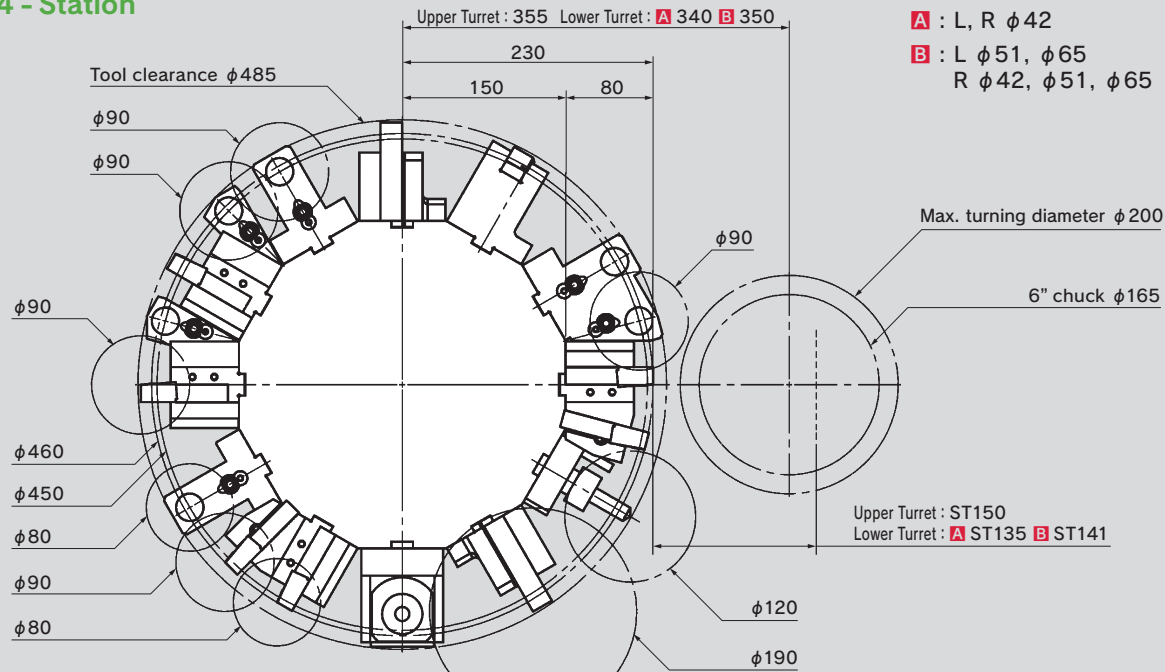
unit : mm

15 - Station



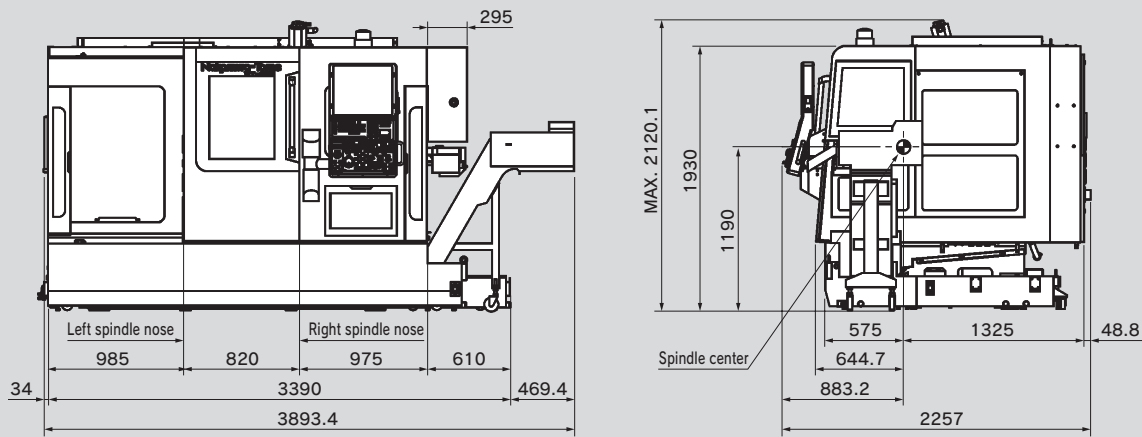
Tool Interference

12 / 24 - Station



unit : mm

Machine Dimensions



unit : mm

WY
SERIES
2 Turret
2 Spindle



WY-100II



WY-150



WY-250



WY-250L

$\phi 42$

6"

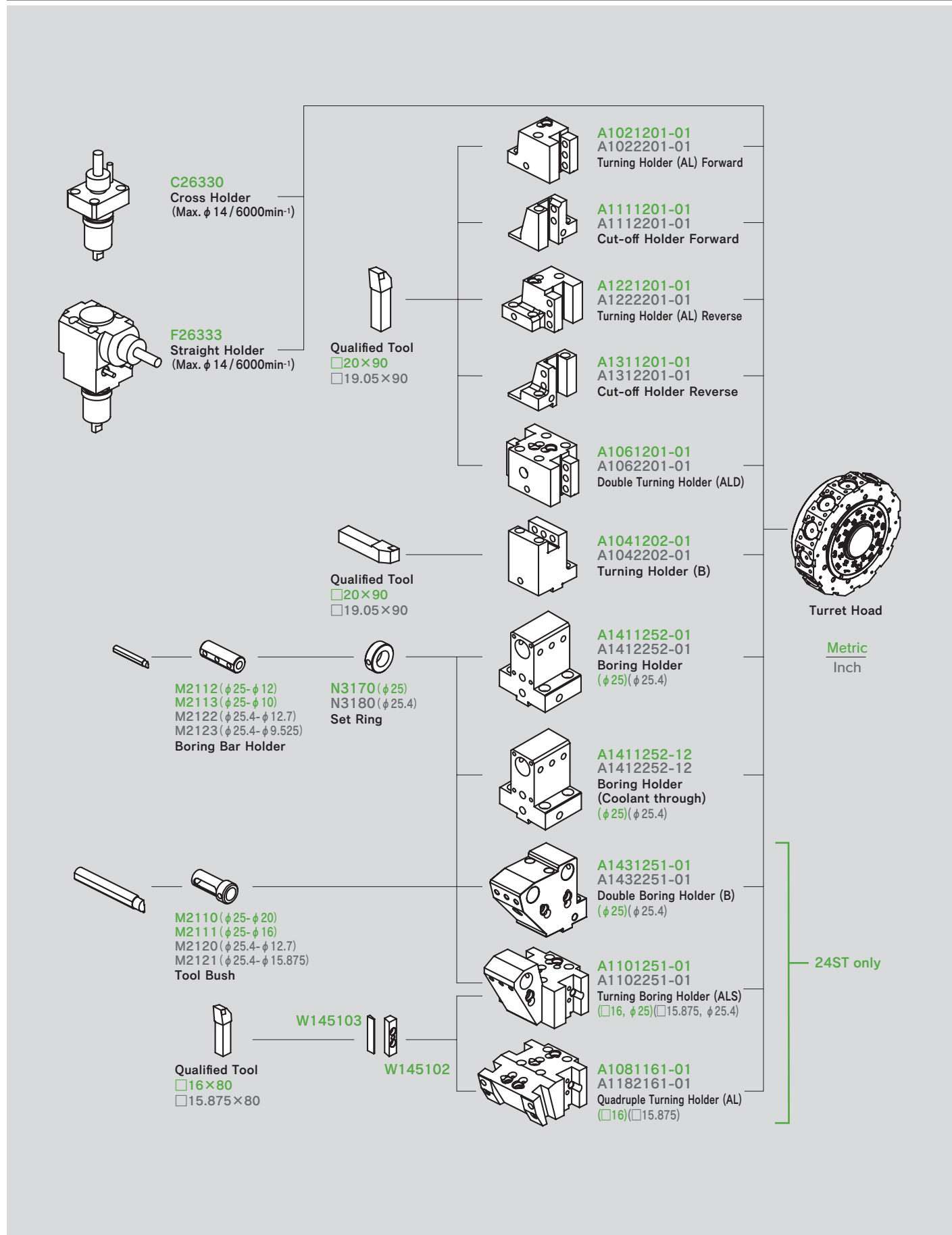
Standard Bar Capacity

Standard Chuck Size

$\phi 65$

8"

Tooling System Diagram (15/24 station)



Machine Specification

■ Capacity		φ 42mm	φ 51mm (op.)	φ 65mm (op.)
Max. turning diameter	12st	175mm	200mm	
	15st		190mm	
Standard turning diameter		170mm		
Distance between centers		max.820mm / min.200mm		
Max. turning length		588mm	570mm	
Bar capacity		42mm	51mm	65mm
Chuck size		165mm (6")		
■ Axis travel				
Slide travel (X1 / X2)	12st	150mm/135mm	150mm / 141mm	
	15st	130mm / 130mm		
Slide travel (Z1 / Z2)	12st	588mm/578mm	588mm / 560mm	
	15st	570mm / 560mm		
Slide travel (Y1 / Y2)	12st	±42mm / ±32.5mm		
	15st	±31mm / ±31mm		
Slide travel (B)		620mm		
Rapid feed X1 / X 2		20m/min		
Rapid feed Z1 / Z2		40m/min		
Rapid feed B axis		40m/min		
Rapid feed Y1 / Y2		8m/min		
■ Left and right spindles				
Spindle speed		6,000min ⁻¹	5,000min ⁻¹	4,500min ⁻¹
Spindle speed range		Stepless		
Spindle nose		A2-5	A2-5	A2-6
Hole through spindle		56mm	63mm	80mm
I.D. of front bearing		80mm	90mm	110mm
Hole through draw tube		43mm	52mm	66mm
■ C-axis				
Least input increment		0.001°		
Least command increment		0.001°		
Rapid index speed		600min ⁻¹		
Cutting feed rate		1- 4,800"/min		
C-axis clamp		Disk clamp		
C-axis connecting time		1.5sec.		
■ Upper & Lower turrets				
Type of turret head	12st	Dodecagonal drum turret		
	15st	15 station turret		
Number of driven-tool stations	12st	12		
	15st	15		
Number of index positions	12st	24		
	15st	15		
Tool size (square shank)		□20mm		
Tool size (round shank)		φ25mm		
■ Rotating tool				
Rotary system		Individual rotation		
Driven-tool spindle speed		6,000min ⁻¹ (op. 8,000min ⁻¹ available only for 12-station turret)		
Spindle speed range		Stepless		
Number of driven-tool stations	12st	12 × 2		
	15st	15 × 2		
Tool shank		Straight holder φ 1mm - φ 14mm		
		Cross holder φ 1mm - φ 14mm		
■ Drive motor				
Spindle motor output (L / R)		11/7.5kW	11/7.5kW (op. 15/11kW)	
Spindle motor torque (L / R)		76/39N·m	77/39.4N·m	85/43N·m
Driven tools		7.1/2.2kW (op. 5.5/2.2kW)		
■ General				
Height		1,930mm		
Floor space (L × W)		3,424mm × 2,257mm		
Machine weight (incl. control)		8,500kg		
■ Power requirements				
power supply		32.3kVA		
Air supply		360 - 410NL/min, 0.5 - 0.7MPa		

(NOTE) Both GR and Parts catcher G are not available on same machine.

● 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	
Controlled axes	9 axes
Least command increment	
Upper : 4 axes (X1, Z1, C1 [C2], Y1)	
Lower : 4 axes (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	
Cutting feed	feed / min X : 1 - 8000mm/min, 0.01 - 315in/min (1 - 4800mm/min, 0.01 - 188in/min)
	Z : 1 - 8000mm/min, 0.01 - 315in/min (1 - 4800mm/min, 0.01 - 188in/min)
	C : 1 - 4800°/min
	Y : 1 - 8000mm/min, 0.01 - 315in/min (1 - 4800mm/min, 0.01 - 188in/min)
	B2 : 1 - 8000mm/min, 0.01 - 315in/min (1 - 4800mm/min, 0.01 - 188in/min)
	feed / rev : 0.0001 - 8000.0000mm/rev (0.0001 - 84800.0000mm/rev)
	0.000001 - 850.00000in/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.
Dwel	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
Polar coordinate interpolation	Standard
Cylindrical interpolation	Standard
Helical interpolation	Standard
Axis recomposition	Standard (R side C-axis control from upper side / 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
Abnormal load detection function	Standard
NT Work Navigator	Standard (not including contact bar)
NT Nurse	Standard
NT Machine Simulation Functions	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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