NTY³-150

NTY³-150

High Productivity Multitasking Machine

From diversified small-lot production to mass production

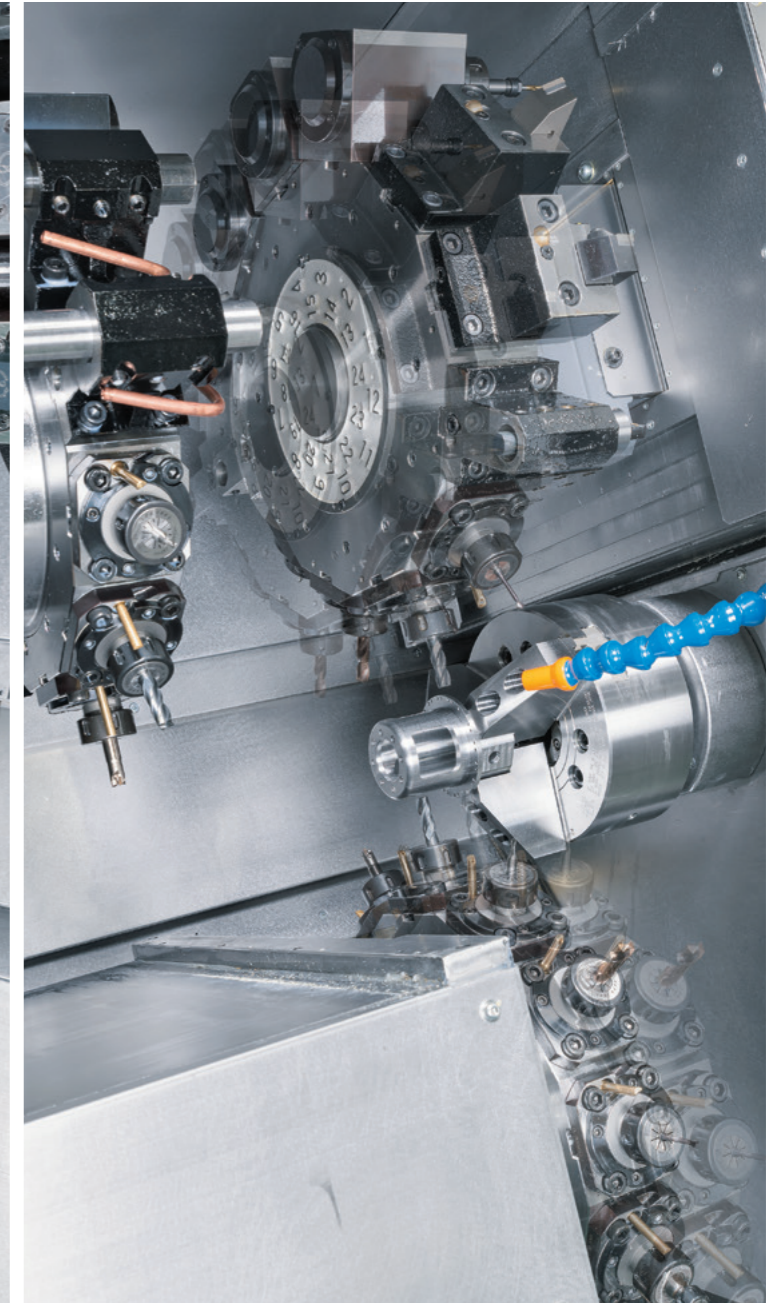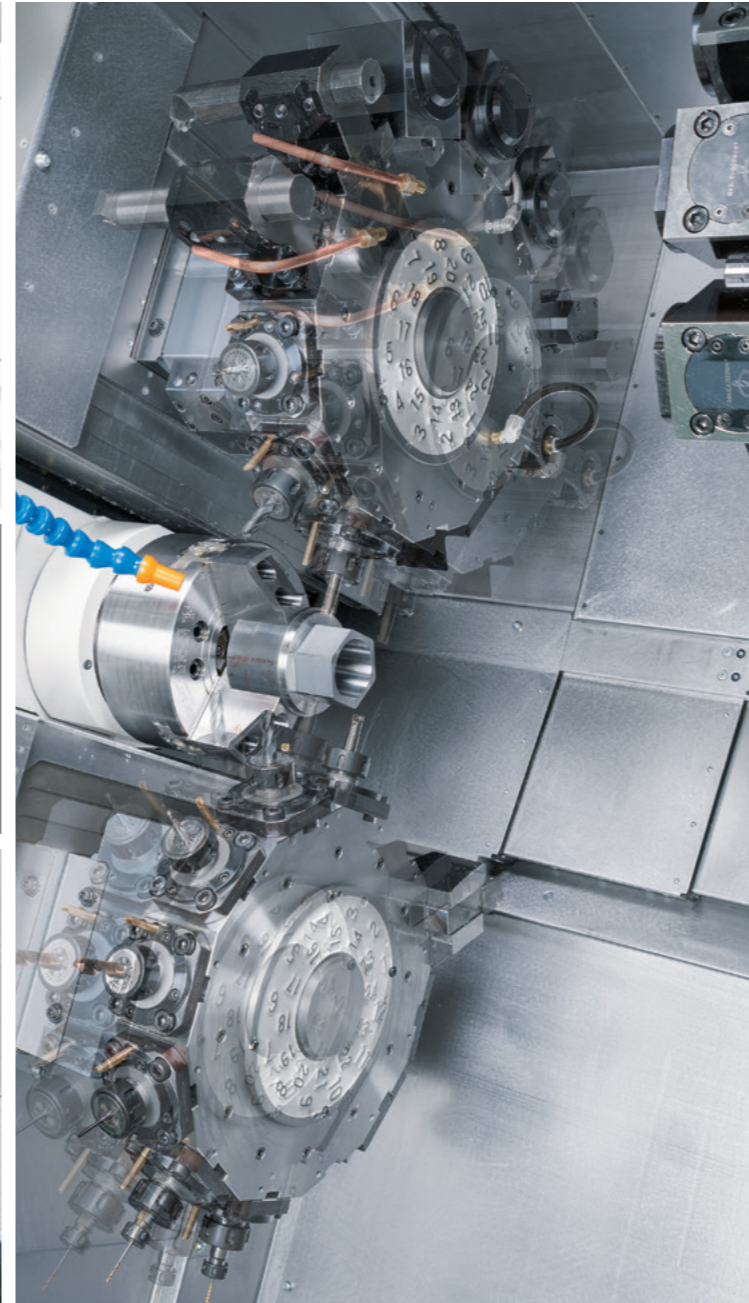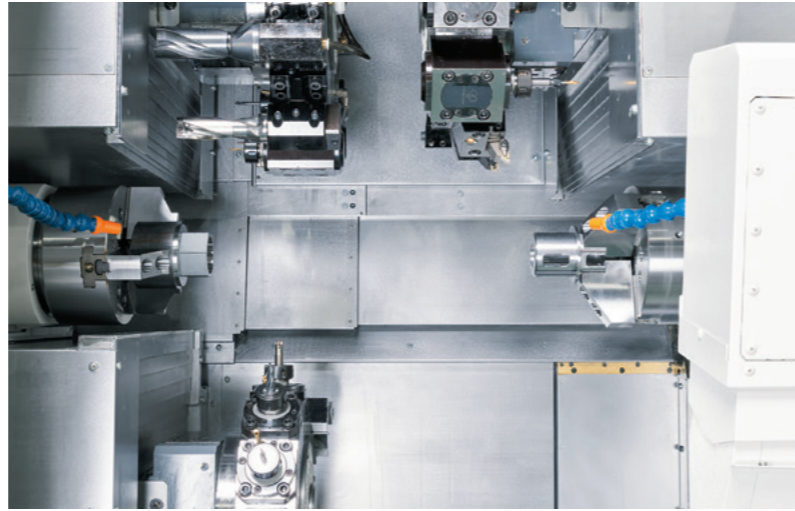## Wider working range with L/R Z-axis Cross-over travel

3 Turrets 3 Y-axes

One hit machining
Finished parts, complete in one setup

M×3
Three Milling Motors

Y×3
Three Y-axes
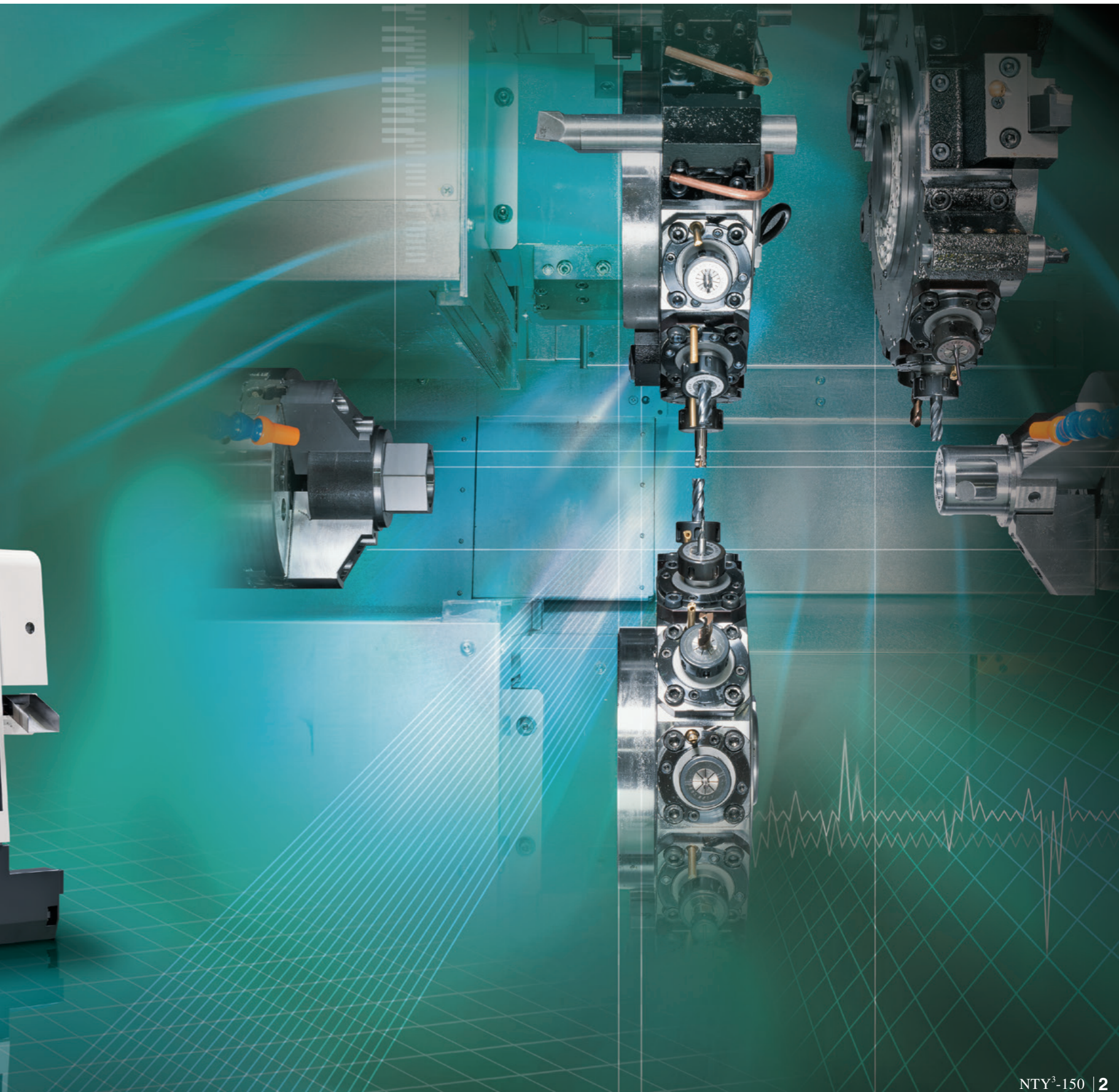
High Productivity

Top Leader of One-hit Machining

- No work in process
- Less setup time
- Complete in one setup

L/R Z-axis Cross-over travel

New   New

115mm   115mm
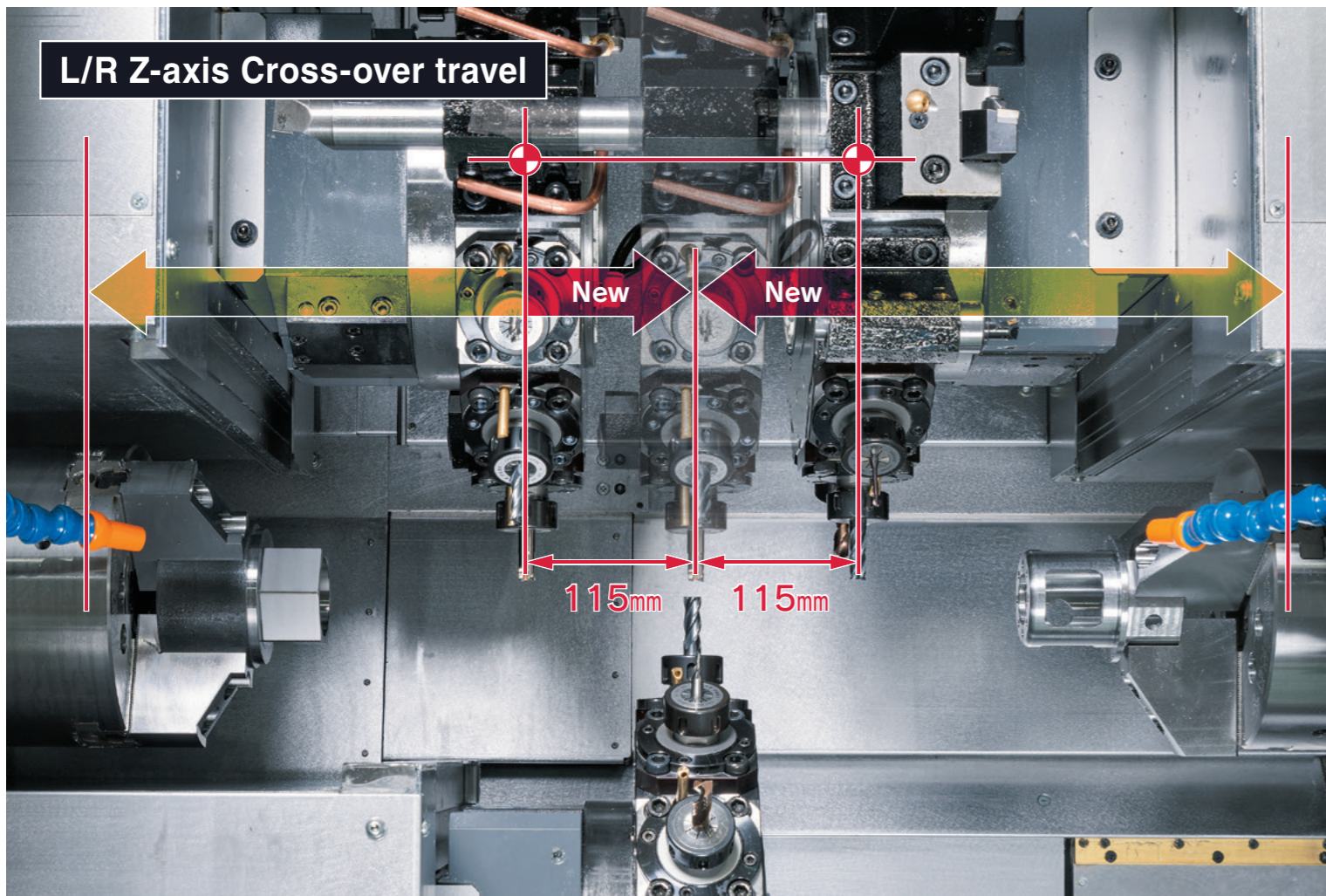
Simultaneous Milling with upper / lower tools on left spindle.

L/R Z-axis Cross-over travel

Simultaneous Milling with upper / lower tools on right spindle.

72

12 / 24 - Station Turret

24 + 24 + 24

Up to 72 tool stations for turning tools, and up to 36 tool stations for milling tools.

Double Performance!

M×3

Milling-tool motor
5.5/3.7kW × 3

Y-axis on upper and lower turrets

Y×3

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

High Performance   State-of-the-art Multitasking machine

19"
Color LCD
Touch Panel

NT
Smart
X

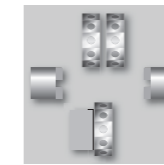$T_{\times 3}$ Three turrets $M_{\times 3}$ Three Milling Motors $Y_{\times 3}$ Three Y-axes $S_{\times 2}$ Twin-spindles $C_{\times 2}$ C-axes B_2 B-axis

■Capacity	ϕ51mm	ϕ65mm (op. Only L)
Max. turning diameter	225mm	
Max. turning length	685mm	
Distance between spindles	max. 970mm / min. 200mm	
Bar capacity	ϕ51mm	ϕ65mm
Chuck size	165mm (6")	

■Axis travel		
Slide travel (X1 / X2 / X3)	160.5 / 160.5 / 160.5mm	
Slide travel (Z1 / Z2 / Z3)	235 / 235 / 685mm	
Slide travel (Y1 / Y2 / Y3)	±45 / ±45 / ±35mm	
Slide travel (B)	770mm	

■Spindle L, R		
Spindle speed	5,000min⁻¹	4,500min⁻¹
Spindle motor output (L / R)	15/11kW, 11/7.5kW (op.15/11kW)	

Spindle speed: $5{,}000\,\mathrm{min}^{-1}$ / $4{,}500\,\mathrm{min}^{-1}$

■Turrets		
Number of turrets (Upper / Lower)	2 / 1	
Driven-tool spindle speed	6,000min⁻¹	
Drive motor	5.5/3.7kW 24/16N·m	
Type of turret head / Number of indexing pos.	Dodecagonal drum turret / 24	
Drive type / Number of driven-tool stations	Individual rotation / 12	

Driven-tool spindle speed: $6{,}000\,\mathrm{min}^{-1}$

■General		
Floor space (L×W×H)	3,814mm × 2,257mm × 2,200mm	
Machine Weight (incl.control)	10,500kg	

NTY³-150

72 stations

High-rigidity turrets

Upper Turrets × 2

Lower Turret × 1

Bar capacity φ51mm

Spindle motor

15 / 11kW
5,000min⁻¹

C-axis
C-axis synchronisation

Standard

Bar capacity φ65mm

Spindle motor

15 / 11kW
4,500min⁻¹

C-axis
C-axis synchronisation

Option

Left Spindle

Upper Turrets ×2

---

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

Milling motor | **5.5/3.7kW**
24/16N·m
6,000min⁻¹

Y-axis travel ±45mm

Standard

Larger window ensures better visibility

Nakamura-Tome
NTY³-150

Right Spindle
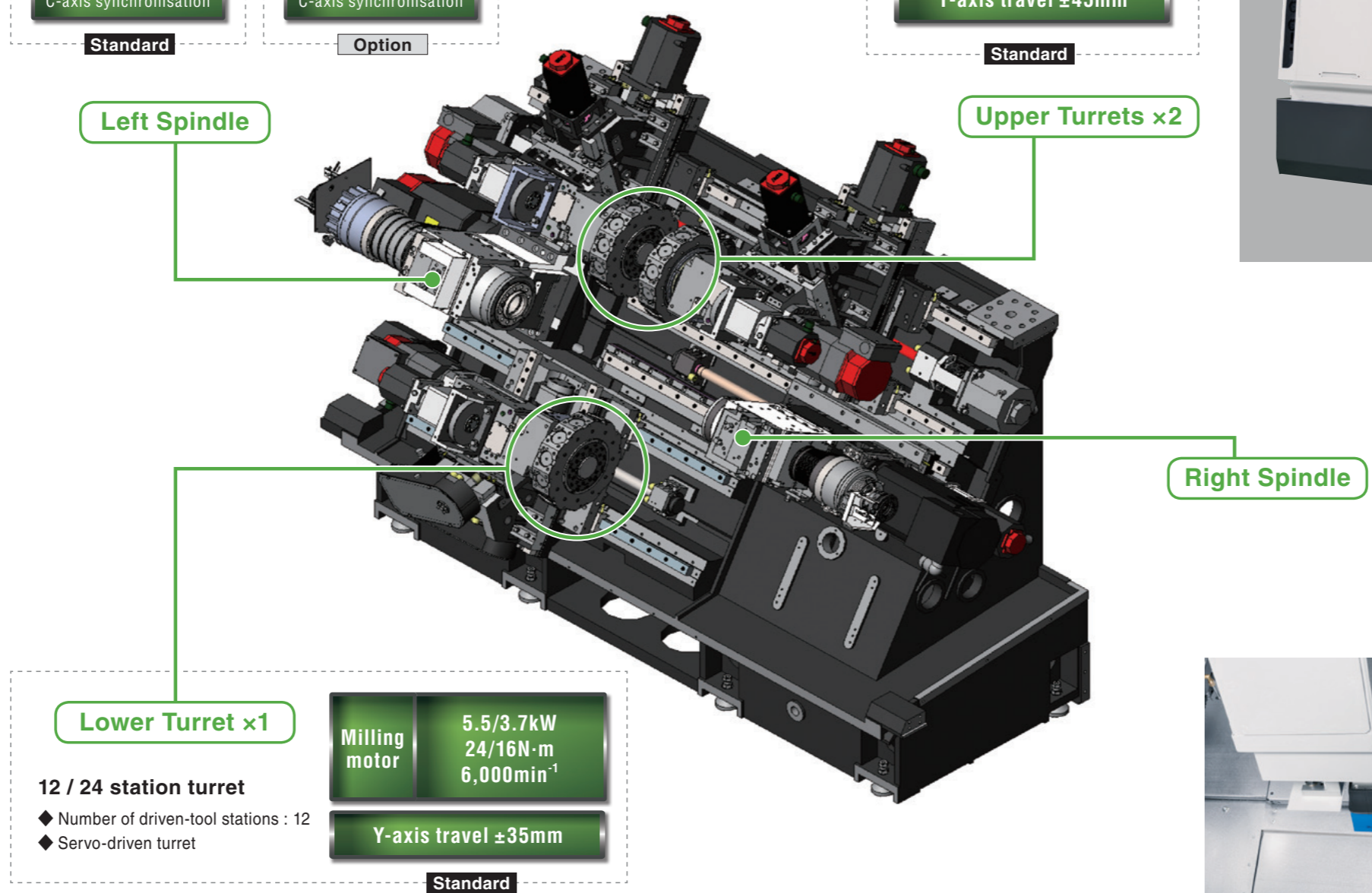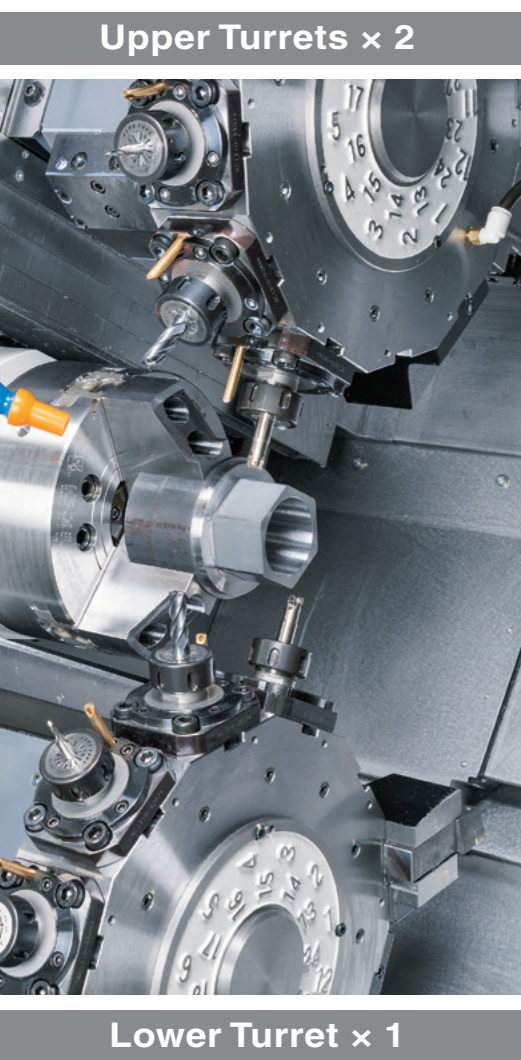
Bar capacity φ51mm

Spindle motor

11 / 7.5kW
5,000min⁻¹

C-axis
C-axis synchronisation

Standard

Bar capacity φ51mm

Spindle motor

15 / 11kW
5,000min⁻¹

C-axis
C-axis synchronisation

Option

Lower Turret ×1

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

Milling motor | **5.5/3.7kW**
24/16N·m
6,000min⁻¹

Y-axis travel ±35mm

Standard
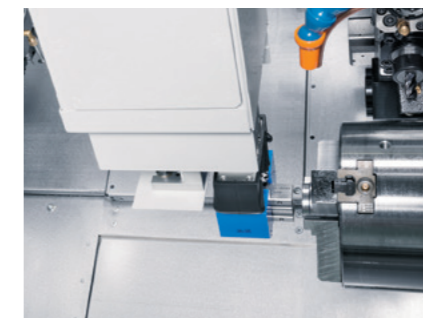
Parts catcher G		Option
Unloading method		Swing / Gripper
Workpiece size	Diameter [mm]	φ 12 - 65
	Length [mm]	15 - 150
	Weight [kg]	3.0
Ejecting method		Belt conveyor & Chute

High-Performance Turning and Milling Motors.

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

S×2 Twin-Spindles

NTY³-150

Simultaneous machining with synchronized
left and right spindles contribute to faster cycle times.
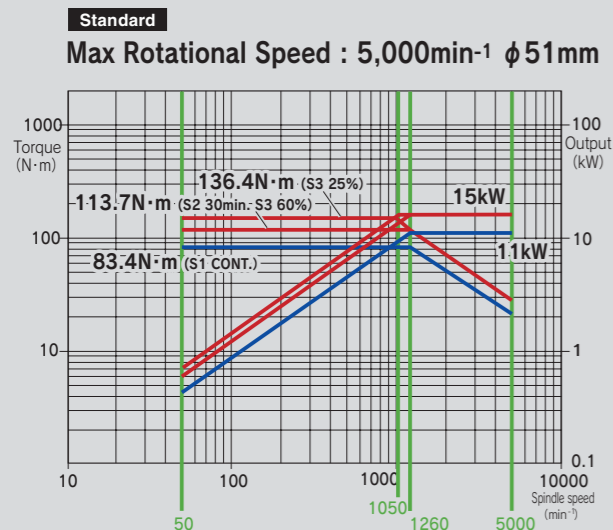
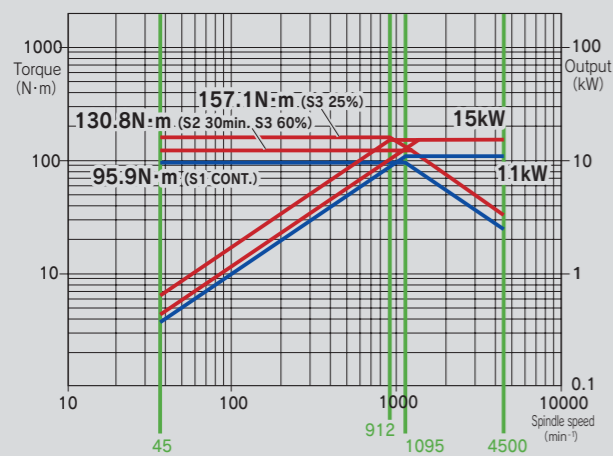## Y×3 Three Y-axes   M×3 Three Milling Motors

NTY³-150

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

Left Spindle Motors

15 / 11kW

Standard
Max Rotational Speed : 5,000min⁻¹ φ51mm

1000 Torque (N·m)
136.4N·m (S3 25%)
113.7N·m (S2 30min. S3 60%)
83.4N·m (S1 CONT.)
15kW
11kW
100 Output (kW)
50   1050   1260   5000
Spindle speed (min⁻¹)

Option
Max Rotational Speed : 4,500min⁻¹ φ65mm

1000 Torque (N·m)
157.1N·m (S3 25%)
130.8N·m (S2 30min. S3 60%)
95.9N·m (S1 CONT.)
15kW
11kW
100 Output (kW)
45   912   1095   4500
Spindle speed (min⁻¹)

Right Spindle Motors

11 / 7.5kW

Standard
Max Rotational Speed : 5,000min⁻¹ φ51mm

1000 Torque (N·m)
89.3N·m (S3 25%)
83.4N·m (S2 30min. S3 60%)
56.8N·m (S1 CONT.)
11kW
7.5kW
100 Output (kW)
50   1176   1260   5000
Spindle speed (min⁻¹)

15 / 11kW

Option
Max Rotational Speed : 5,000min⁻¹ φ51mm

1000 Torque (N·m)
113.6N·m (S2 15min, S3 25%)
83.3N·m (S2 60min, S3 40%)
62.5N·m (S1 CONT.)
15kW   10.9kW
11kW   8.6kW
100 Output (kW)
50   1261   1681 2941   5000
Spindle speed (min⁻¹)
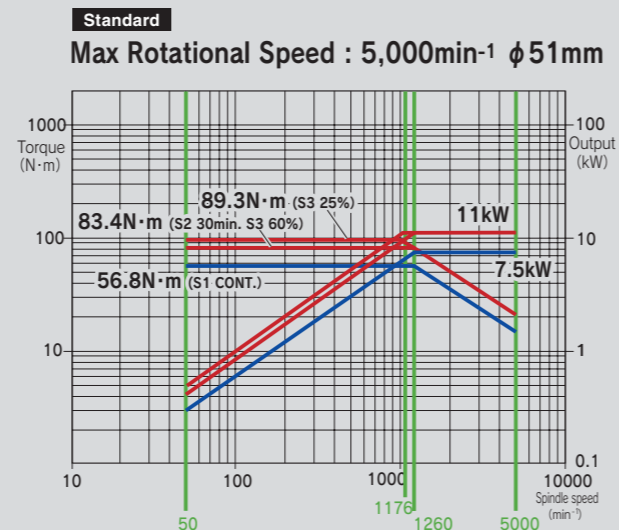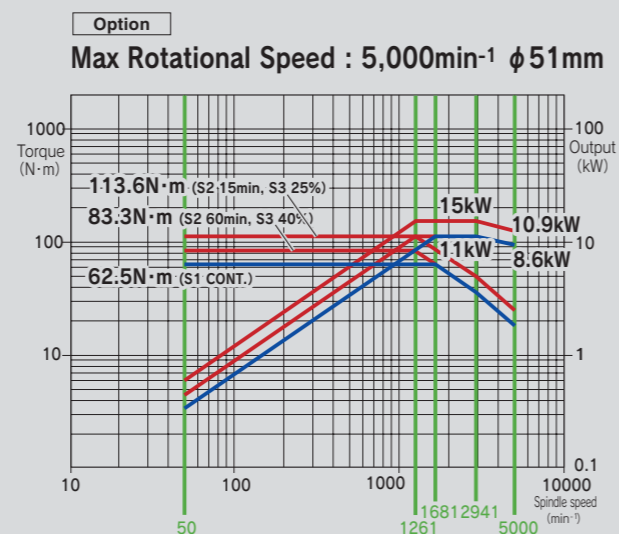
Upper & Lower Milling Motors

5.5 / 3.7kW

Standard
Max Rotational Speed : 6,000min⁻¹

1000 Torque (N·m)
24.0N·m (S2 30min. S3 60%)
16N·m (S1 CONT.)
5.5kW
3.7kW
100 Output (kW)
60   2230 6000
Rotating speed (min⁻¹)

NTY³-150
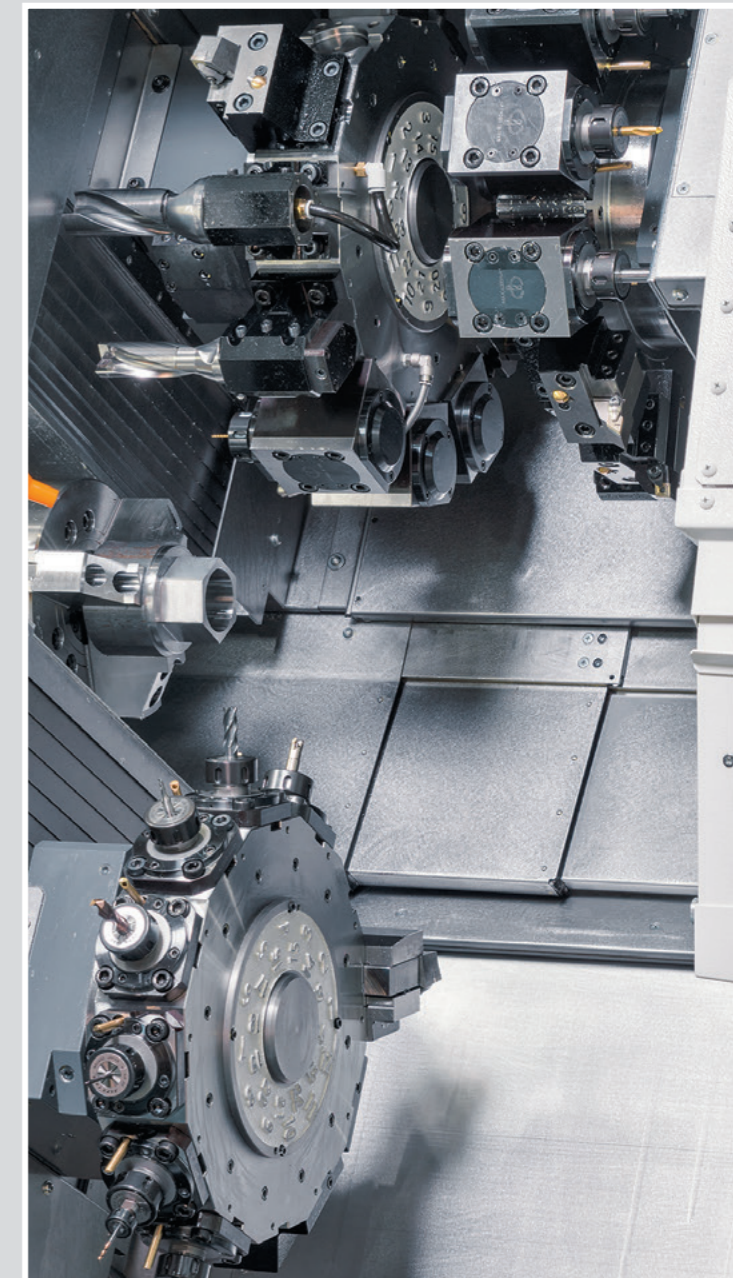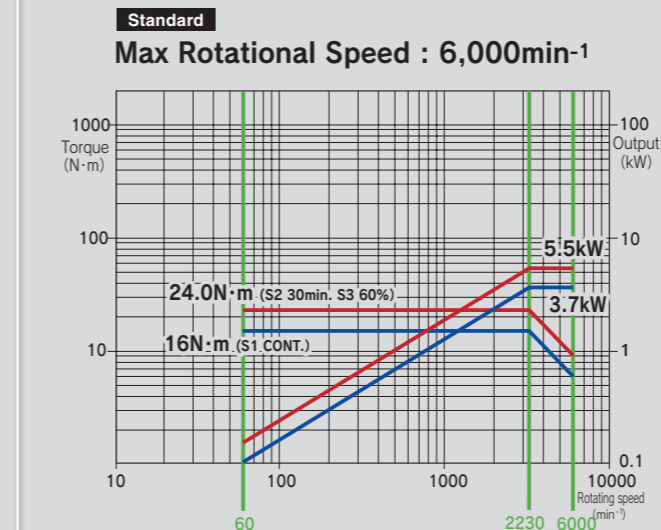
NT SmartX

Full Operator Support from Ease of Use to Reliability

Main features of NT SmartX

Standard

- NT WORK NAVIGATOR
- Airbag (Overload detection)
- NT NURSE
- Status Display Function
- Setup Display
- Trouble Guidance
- Productivity Function
- Warm up Function
- Smart Support
- Drop Converter
- Cut in check
- Program Optimizer
- NT Machine Simulation
- NT Collision Guard
- NT Thermo Navigator AI
- Digital Chuck Interlock
- NT Manual Guide i
- One touch MDI
- 3D Smart Pro AI

19 inch color LCD touch panel	Original Menu screen
QWERTY keyboard	Voice Guidance
PC memory 8 GB	Multi-Touch Screen
	Touch pad

Nakamura-Tome AI

■ Powered by AI as standard equipment
・NT Thermo Navigator AI
・3D Smart Pro AI

Cut in check

Digital Chuck Interlock

Set the Chuck Open and Close detection position easily.
The chuck open / close position is set up on the NT SmartX screen.
Setup time and machining cycle time are reduced.

One Touch MDI

This function is to register frequently used program blocks or cycles, such as zero return or tool change, and call them again with one touch.

Reduce programming and setup time while eliminating input errors.
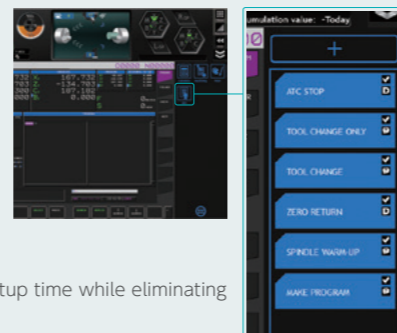
NT Smart Sign

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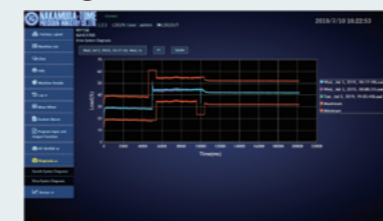
Diagnose problems with the machine servo drives and spindle drives, using a dedicated program.

Visualize

OK! OK! OK! OK! OK! OK!
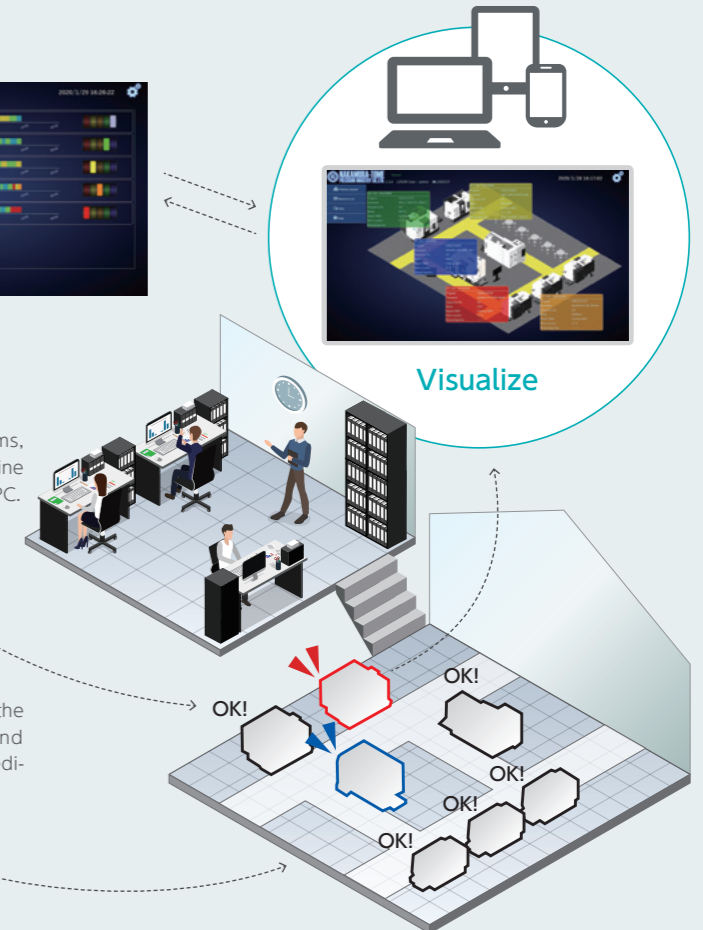
NT Thermo Navigator AI

Thermal Growth Compensation using AI.

Compensation model built using AI machine learning.

① Time
② Measured Dimensions
③ Retrieval of Wear Offset Data

Acquired Data analyzed with NT Thermo Navigator AI

Feedback

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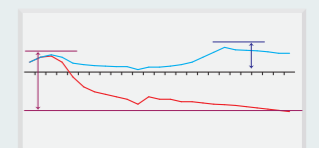
—— Pre-correction thermal displacement data
—— Thermal displacement data after correction

3D Smart Pro AI
AI analysis NC programming support function

From the 3D CAD drawing, AI automatically analyzes "model geometry", "machining path", "machining tools", "machining conditions", and "machining process sequence", to create NC programs for all processes from raw material to finished product.

0 10 20 30 40 50 ⋯ 380 390 400 410 420 (min)

Manually — **420**min

3D Smart Pro AI — **20**min It drastically reduces man-hours required for creating NC programs and improves set-up and production efficiency.

3 useful features available with 3D Smart Pro AI

1. Transfer setting
Once the transfer position is set, the machining area and transfer program are created.

2. Optimization of machining processes
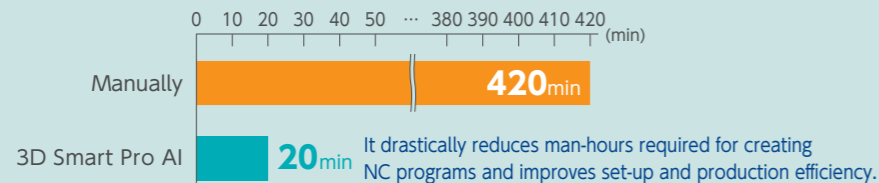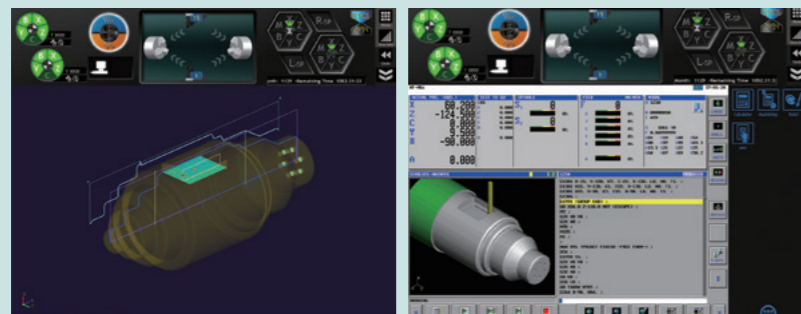In addition to defining the required machining processes, AI proposes a suitable machining process sequence.

3. Tolerance setting
Once the tolerance value is input, the target value for machining can be set.

NT WORK NAVIGATOR

X Y Z B C

Machining parts with non-round shapes, such as forgings or castings require that the raw part coordinates be recognized by the CNC control.
It works just by touching the part with a simple inexpensive probe (mostly a 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 WORK NAVIGATOR is eliminating the need for positioning fixtures and special clamping devices.

No fixtures required

▲Video
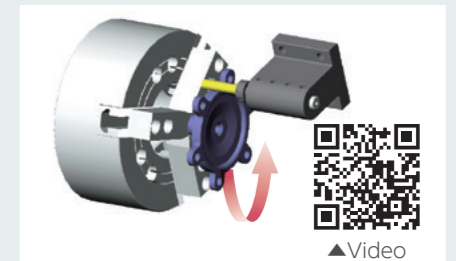
Double safety features for maximum protection

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

NT Machine Simulation / NT Collision Guard **+** Airbag (Overload detection)

NT Machine Simulation

Machine collisions are avoidable with Preventive safety technology!
By checking in advance for interference between chucks and tools, or between tools and covers, etc, in addition to checking the machining processes, the risk of a machine collision is drastically reduced, and the machining processes can be optimized.

Simulation is performed while checking the remaining movement amount and modal information.

It is possible to override the settings for rapid and cutting feed individually.
Additionally, simulation by process or by single block is possible.

— By process
— Single feed

Image shown here is of a 2-turret machine

NT Collision Guard

Available in automatic or manual mode. Using the built-in 3D models on the 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.

Image shown here is of a Tool spindle machine

Airbag (Overload detection)

Compared to other machines, Nakamura-Tome machines 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 confident: Airbag !

When the machine collides, there is no reason to panic.

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

Barrier? Even with barrier function, machine collisions may occur
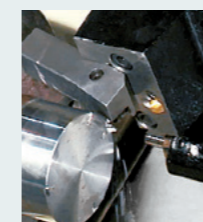
Without Airbag
Machines will not stop immediately. The slide continues to move even after a collision.

▲Video

With Airbag
Retraction within 0.001 sec
Crash? Within one millisecond after a collision, the servo motor direction is reversed, and the machine stops in EMG mode.

Crash!

* This feature does not mean zero impact

Chatter Canceller

Reduce the chatter and vibration by changing the spindle speed up/down continuously during cutting. This function can be turned ON/OFF simply by M code.

OFF → ON
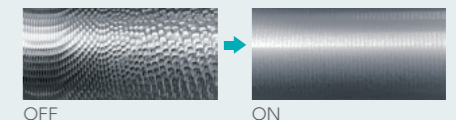
* It does not guarantee that the function works without chatter and vibration.
* Chatter and vibration reduction depend on the setup and the cutting condition.

Oscillation cutting (op.)

By oscillating the tool for a certain period, the chips are cut into small pieces. It can be activated easily by using a simple Fanuc G-code and resolve workpiece damage issues caused by chips twined around the part.

Material : Aluminum
Cutting speed : 200mm/min
Cutting feed : 0.1mm/rev
Cutting depth : 1.0mm

Machine Dimensions

2147.7 [84.55]

742.5 [29.23]   1372.5 [54.04]   32.7 [1.29]

Spindle center

Dimensions : when control panel is stored away for transport.

3814 [150.16]

34 [1.34]   1050 [41.34]   1000 [39.37]   1050 [41.34]   680 [26.77]

Door ST 885 [34.84]   Door opening 865 [34.06]   20 [0.79]

2256.5 [88.84]

2295.3 [90.37]   MAX 2271.5 [89.43]   2200 [86.61]   2010 [79.13]   1270 [50.00]

218.5 [8.60]   492 [19.37]

620 [24.41]   1372.5 [54.04]   32.7 [1.29]

695.1 [27.37]

851.3 [33.52]

Spindle center

1040 [40.94]   970 [38.19]   1090 [42.91]

Left spindle nose   Right spindle nose

Unit : mm[inch]

Slide Travel Range

370 [14.57]   230 [9.06]   370 [14.57]

350 [13.78]   350 [13.78]

135 [5.31]   2.5 [0.10]   2.5 [0.10]   Z2=-235 [-9.25]   135 [5.31]

Z1=-235 [-9.25]   S.LS   2.5 [0.10]   Z2=+115 [+4.53]   2.5 [0.10]   2.5 [0.10]

2.5 [0.10]   Z1=+115 [+4.53]   2.5 [0.10]   S.LS

S.LS   2.5 [0.10]

90 [3.54]

Y1/Y2=+45 [+1.77]   Y1/Y2=-45 [-1.77]

95 [3.74]   2.5 [0.10]   S.LS   S.LS   2.5 [0.10]   95 [3.74]

X1=-160.5 [-6.32]   X2=-160.5 [-6.32]

385 [15.16]

170 [6.69]   2.5 [0.10]   80 [3.15]   150 [5.91]   80 [3.15]   S.LS   170 [6.69]   2.5 [0.10]

S.LS   2.0 [0.08]   S.LS   2.0 [0.08]

1.5 [0.06]   1.5 [0.06]

54.5 [2.15]   B2=770 [30.31]   54.5 [2.15]

2.5 [0.10]

Left spindle A2-5

S.LS   2.5 [0.10]

54.5 [2.15]

Right spindle A2-5

1.5 [0.06]   1.5 [0.06]

2.0 [0.08]   2.0 [0.08]

S.LS   S.LS

385 [15.16]

110 [4.33]   80 [3.15]   2.5 [0.10]   170 [6.69]   95 [3.74]

X3=-160.5 [-6.32]   2.5 [0.10] [0.10]

485 [19.09]   2.5 [0.10]   S.LS

2.5 [0.10]   2.5 [0.10]   685 [26.97]   2.5 [0.10]   2.5 [0.10]

S.LS   S.LS

150 [5.91]   Z3=-335 [-13.19]   Z3=+350 [+13.78]   135 [5.31]

Y3=-35 [-1.38]   Y3=+35 [+1.38]

70 [2.76]

970 [38.19]

Unit : mm[inch]

NTY3

3T 3Y 3M

S E R I E S

NTY³-100

NTY³-150

NTY³-250

φ42   Bar Capacity   φ80

6"   Chuck Size.   8"

AC1310 / AR1390
Cross Holder (Std.)
(MAX. φ16)
(6,000min⁻¹)

AC1313 / AR1393
Straight Holder (Std.)
(MAX. φ16)
(6,000min⁻¹)

Qualified Tool
□25×100
□25.4×100

Qualified Tool
□20×95
□19.05×95

Qualified Tool
□20×125
□19.05×125

Qualified Tool
□25×130
□25.4×130

Qualified Tool
□20×125
□19.05×125

M2112(φ12)
M2113(φ10)
M2122(φ12.7)
M2123(φ9.525)
Tool Holder

M2110(φ20)
M2111(φ16)
M2120(φ19.05)
M2121(φ15.875)
Round Hole Bush

N3170(φ25)
N3180(φ25.4)
Set Ring

Qualified Tool
□20×102
□19.05×102

HS130(φ6) HS131(φ8) HS132(φ10)
HS133(φ12) HS134(φ16)
M2682(φ12.7) M2688(φ9.525)
Tool Holder

N1150(φ20) N1151(φ25)
M2885(φ19.05) M2886(φ12.7)
M2887(φ15.875)
Round Hole Bush

N3171(φ32)
N3181(φ31.75)
Set Ring

*B1021252-01 / B1022252-01
Turning Holder (AL) Forward

*B1221252-01 / B1222252-01
Turning Holder (AL) Reverse

*B1031251-01 / B1032251-01
Turning Holder (AS)

*B1031201-01 / B1032201-01
Turning Holder (AS)

*B1011202-01 / B1012202-01
Turning Holder (A) Forward

*B1211202-01 / B1212202-01
Turning Holder (A) Reverse

B1111202-01 / B1112202-01
Cut-off Holder Forward

B1311202-01 / B1312202-01
Cut-off Holder Reverse

*B1021201-01 / B1022201-01
Turning Holder (AL) Forward

*B1221202-01 / B1222202-01
Turning Holder (AL) Reverse

*B1041251-01 / B1042251-01
Turning Holder (B)

*B1041201-01 / B1042201-01
Turning Holder (B)

*B1411254-01 / B1412254-01
Boring Holder
(φ25)(φ25.4)

*B1411254-12 / B1412254-12
Boring Holder (Coolant through)
(φ25)(φ25.4)

*B1421253-01 / B1422253-01
Double Boring Holder (A)
(φ25)(φ25.4)※There are restrictions on work transfer.

B1441252-01 / B1442252-01
Triple Boring Holder
(φ25)(φ25.4)

B1091252-01 / B1092252-01
Turning Boring Holder (AL)
(φ25)(φ25.4)

B1051201-01 / B1052201-01
Double Turning Holder (AL)

*B1411321-01 / B1412321-01
Boring Holder
(φ32)(φ31.75)

*B1411321-12 / B1412321-12
Boring Holder (Coolant through)
(φ32)(φ31.75)

R145103 / R145102

R145103 / R145102

Turret Head
(Upper / Lower)

Metric
Inch

24ST

For * Marked tools, coolant comes out from the tool holders on both sides, when cutting on either left or right side spindle.

As for other tool holders, additional coolant piping mounted on holders or turret face is necessary.

■Capacity

	φ51mm	φ65mm (op.)
Max. turning diameter	225mm	
Max. turning length	685mm	
Distance between spindles	max.970mm / min.200mm	
Bar capacity	φ51mm	φ65mm(L-side only)
Chuck size	6"	

■Axis travel/Rapid feed

X1/X2/X3 axis slide travel	160.5mm / 160.5mm / 160.5mm	
Z1/Z2/Z3 axis slide travel	235mm / 235mm / 685mm	
Y1/Y2/Y3 axis slide travel	±45mm / ±45mm / ±35mm	
B-axis slide travel	770mm	
X1/X2/X3 axis rapid feed rate	20m/min	
Z1/Z2/Z3 axis rapid feed rate	40m/min	
Y1/Y2/Y3 axis rapid feed rate	8m/min	
B-axis rapid feed rate	40m/min	

■L-spindle

Spindle speed	5,000min⁻¹	4,500min⁻¹
Spindle speed range	Stepless	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

■R-spindle

Spindle speed	5,000min⁻¹	—
Spindle speed range	Stepless	—
Spindle nose	A2-5	—
Hole through spindle	65mm	—
I. D. of front bearing	90mm	—
Hole through draw tube	52mm	—

■C-axis

Least input increment	0.001°
Least command increment	0.001°
Rapid speed	600min⁻¹
Cutting feed rate	1-4,800°/min
C-axis clamp	Dsik clamp
C-axis connecting time	1.5s

■Upper/Lower turret

Type of turret head	Dodecagonal drum turret
Number of tool stations	12
Number of indexing positions	24
Tool size (square shank)	□25mm
Tool size (round shank)	φ32mm

■Milling

Rotary system	Individual rotation
Spindle speed	6,000min⁻¹ (op. 8,000min⁻¹)
Spindle speed range	Stepless
Number of milling stations	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)
Milling spindle	5.5/3.7kW

■General

Machine height	2,200mm
Floor space	3,814mm×2,257mm
Machine weight (incl. control)	10,500kg

●**Safety quality specifications**

Various interlocks, such safety fences, auto extinguisher devices, and other safety related equipment may be required. These have to be selected during the configuration of the machine.
① Safety devices include electromagnetic door lock, chuck interlock, hydraulic pressure switch, air pressure switch, short circuit breaker and quill interlock. (Door interlock and chuck interlock are standard equipment.)
② In the case of automation, various safety fences may be required, such as work stocker safety fences, robot safety fences, etc.
During the configuration of machine specifications, please discuss these requirements with the Nakamura-Tome machine sales representative.

●**Precautions on the use of cutting fluids and lubricating oils**

Some types of cutting fluids (coolant) are harmful to machine components, causing damages such as peeling of paint, cracking of resin, expansion of rubber, corrosion, and rust build-up on aluminum and copper.
To avoid causing damage to the machine, never use synthetic coolants, or any coolants containing chlorine. In addition, never use coolants and lubricating oils which contain organic solvents such as butane, pentane, hexane, and octane.

■Itemsa

Control type	FANUC 31i-B 3-PATH

■Controlled axes

Controlled axes	13 axes	
Simultaneously controlled axes	L-upper	4axes (X1, Z1, C1, Y1)
	R-upper	4axes (X2, Z2, C2, Y2)
	Lower	4axes (X3, Z3, C3 [C1, C2], Y3, 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, V, 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 - 4800.0000mm/rev)
	0.000001 - 50.000000in/rev
	The maximum cutting feed rate is the value in AI contour control mode. In normal operation, It is enabled with G316 command. The values in parentheses are normal values.
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
Rapid feed override	Low/25/50/100% (can be set from 0-100 in 10% intervals on NT Setting)
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 / Number of registrable programs	512byte Total 1280m	1000
	1Mbyte Total 2560m(op.)	1000
		2000
	2Mbyte Total 5120m(op.)	1000
		4000
	4Mbyte Total 10240m(op.)	1000
		4000
	8Mbyte Total 20480m(op.)	1000
		4000
Part program editing	delete, insert, change	
Program number search	Standard	
Sequence number search	Standard	
Address search	Standard	
Program storage memory	Battery backup	
Background editing	Standard	
DNC operation through memory card	Standard(not including memory card)	
Extended part program editing	Standard	

■Operation and display

HMI (Human Machine Interface)	NT SmartX
Operation panel : Display	19-inch color SXGA LCD touch panel
Operation panel : Keyboard	QWERTY keyboard

■Programming assist functions

Circular interpolation R programming	Standard
Direct drawing dimension programming or Chamfering/Corner R	Standard(Direct drawing dimension programming is standard)
Canned cycles	G90, G92, G94
Multiple repetitive canned cycles	G70-G76
Multiple repetitive canned cycles II	G71, G72
Canned cycles for drilling	G80-G89
Axis recomposition	Standard (used for L C-axis control · R C-axis control from the lower side)
Sub program	Standard
Custom macro	Standard(common variables #100-#149, #500-#549)
Additional customer macro variables	Standard(After addition, #100-#199, #500-#999)
Luck-bei Ⅱ / NT Manual Guide i	Standard
Abnormal load detection function	Standard
NT WORK NAVIGATOR	Standard(not including contact bar)
NT NURSE	Standard

■Machine support functions

Rigid tapping	Standard
Spindle synchronised control	Standard
C axis synchronised control	Standard(G496 C1. rapid feed positioning)
Spindle orientation	Standard

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