

# JX-250

**NAKAMURA-TOME**  
PRECISION INDUSTRY CO.,LTD.

# JX-250

In pursuit of  
genuine Multitasking

Innovation  
Technology

~ Creation of new values ~

# JX-250

State-of-the-art Multitasking machine with tool spindle, ATC and two lower turrets\* with Y-axis.

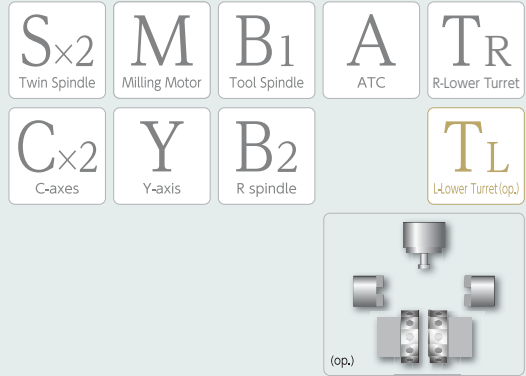
Featuring a rich software portfolio and "Smart Cube", the world's most-compact Tool Spindle in its class, this machine responds to the most complex machining needs.

\* L side turret (op.)




# Multitasking machine with ATC, Tool spindle and twin-turrets

- "NT Smart Cube" is the World's Shortest Tool-Spindle in its class
- ATC tool spindle motor 22/15kW  
Tool spindle speed 12,000min<sup>-1</sup> (op. 20,000min<sup>-1</sup>)
- Number of tools 80 (op. 40,120)
- X-axis travel below spindle center is 125mm  
Y-axis travel is +/-125mm from the spindle center
- Milling and Y axis are standard on the left and right side lower turrets (left side lower turret is op.)  
The two-turret machine features a lower Z-axis cross-over stroke (R:490mm, L:140mm), responding to a wider machining range, especially for longer parts.
- 5.5/3.7kW milling motor on the lower turret  
Rotation speed 6,000min<sup>-1</sup>
- Floor space 5,550mm × 3,257.7mm  
(including standard coolant tank)
- Substantial software lineup



## JX-250



Having the world's most-compact tool spindle in its class, this machine is featuring phenomenal machining capabilities

With NT Smart Cube, the world's most compact tool spindle in its class, this machine was developed to make effective use of a wide machining area. Additionally, it is featuring high performance Tool Spindle motors with up to 22/15kW (op.), an ATC with a capacity of up to 120 tools (op.), twin-turrets\* (2nd turret op.) equipped with Y-axis as standard, as well as crossover stroke on the lower Z-axis, which together contribute to unprecedented machining capabilities for a wide range of complex parts.

In addition, the user friendly "NT Thermo Navigator AI" provides precise thermal compensation settings, resulting in stable high-accuracy machining.

Nakamura-Tome multitasking machines are not only known for high machining capabilities, but are also admired for their "high rigidity" and "high precision".

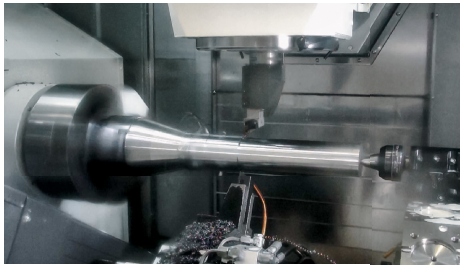
※ (L side turret op.)



# Machining Capabilities



## Turning



### L-Spindle

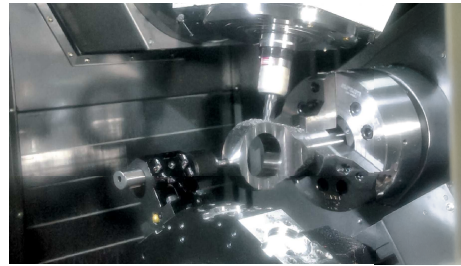
- Spindle motor **15/11kW**  
**18.5/15kW(op.)**
- Spindle speed **4,500min<sup>-1</sup>**  
**3,500min<sup>-1</sup>(op.)**

### R-Spindle

- Spindle motor **15/11kW**
- Spindle speed **4,500min<sup>-1</sup>**

- 
- Cutting cross section **3.3mm<sup>2</sup>/rev**
  - Depth of cut **6mm**
  - Feed **0.55mm/rev**
  - Cutting speed **120m/min**

## Milling



### Tool spindle

- Spindle motor **22/15kW**
- Tool spindle speed **12,000min<sup>-1</sup>**  
**20,000min<sup>-1</sup>(op.)**
- B-axis swivelling range **±120°**
- Y-axis travel **±125mm**

### Lower turret

- 
- Motor power **5.5/3.7kW**
  - Milling spindle speed **6,000min<sup>-1</sup>**



The World's Machine Structure Tool-Spindle\*

# NT Smart Cube

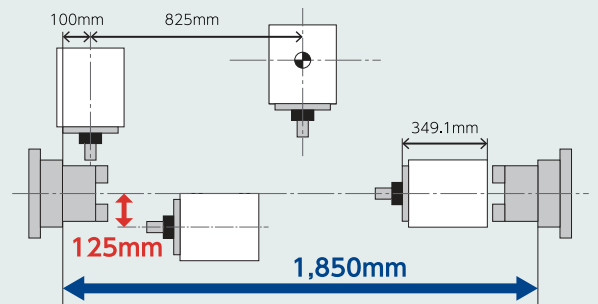
The world's shortest tool spindle in its class. Thanks to the ultra-compact size of the Tool Spindle, interference is reduced, and a wider machining area is ensured.  
\* Based on our survey in the multitasking machine market

■ Tool Spindle (NT Smart Cube)

Length **349.1mm**

Tool spindle motor **22/15kW**  
**12,000min<sup>-1</sup>**  
**20,000min<sup>-1</sup>(op.)**

Max.tool diameter (without adjacent tool): **Φ130mm**  
Max.tool length: **300mm**



■ L-spindle Φ65 / Φ71 (op.) / Φ80mm (op.)

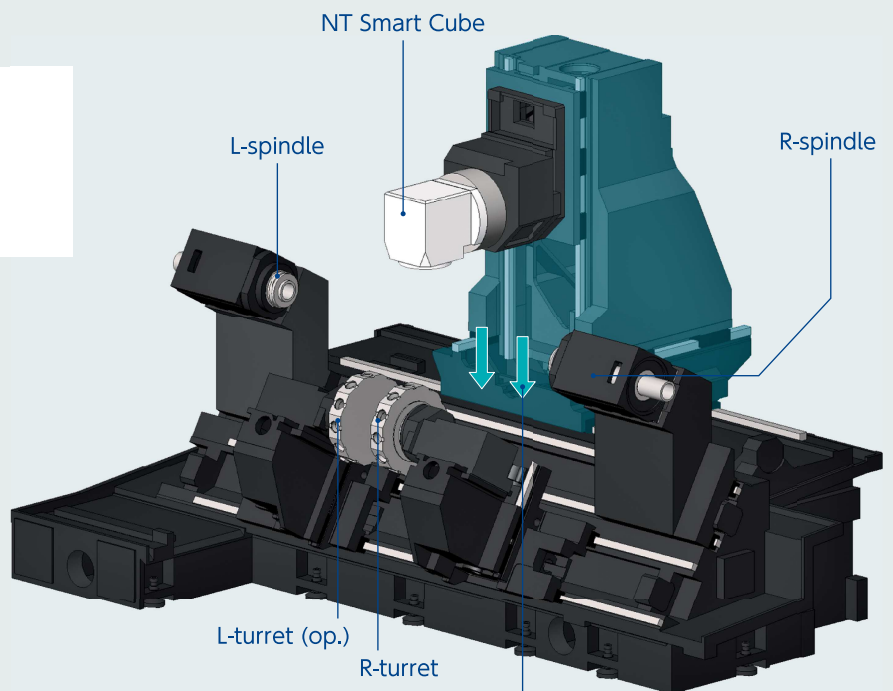
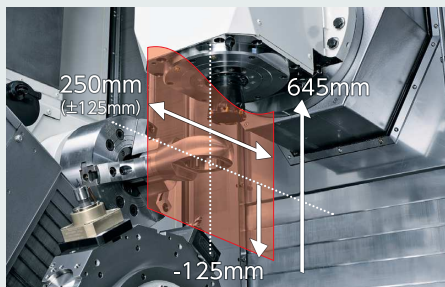
L-spindle motor **15/11kW**  
**18.5/15kW(op.)**  
\*For φ80, only 18.5/15kW.  
**4,500min<sup>-1</sup>**  
**3,500min<sup>-1</sup>(op.)**

■ R-spindle Φ65 / Φ71mm (op.)

R-spindle motor **15/11kW**  
**4,500min<sup>-1</sup>**

■ L-lower turret(op.) & R-lower turret

Milling spindle motor **5.5/3.7kW**  
**6,000min<sup>-1</sup>**



### High accuracy milling

Thanks to large Y-axis travel and 125mm X-axis travel beyond the spindle center, various machining operations can be performed without rotating the C-axis, such as square milling in the X-Y plane or deep hole drilling in the X-axis direction, ensuring faster cycle time and higher precision.

### Vertical column structure

Strong and stable structure, where the load is evenly applied.

# Machine Structure

168 stations

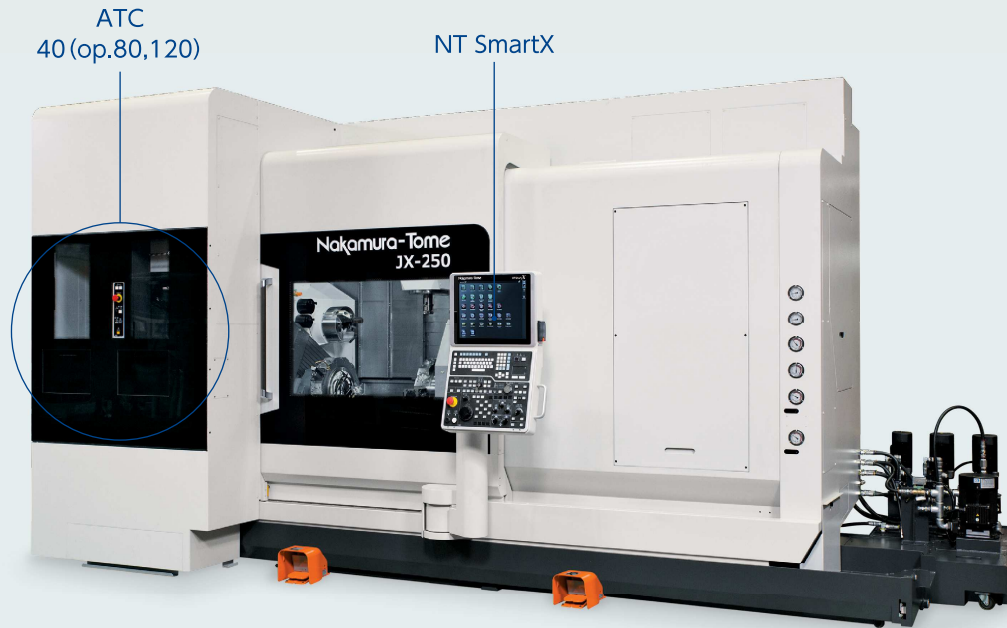
Up to 168 tools available !

In addition to 120 qualified ATC tools (op.) for the Tool Spindle, up to 24x2 tools can be mounted on the lower turrets.



## ATC Maintenance Navigator

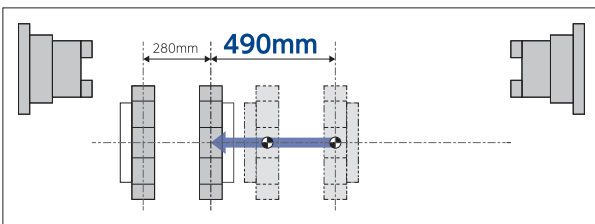
In addition to information about the ATC status and position of the Alarm, the step by step ATC recovery guidance screen ensures fast ATC recovery and shorter machine down time.



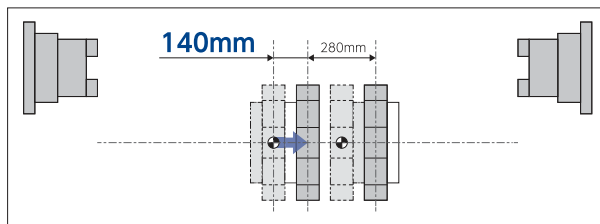
## Cross Over Travel for Lower Z-axis (op. L lower turret)

When one turret is retracted in the Z-axis direction, the other turret can be advanced beyond its Z-Axis reference point, ensuring a larger Z-axis travel. This greatly increases the machining range of the lower turrets.

### R-lower turret / Z2 stroke



### L-lower turret / Z3 stroke



## Various Options to Meet Customers Needs. Total Provider for Peripheral Equipment.

Whether it is machine set up, cutting chip management, higher efficiency or improved productivity, Nakamura-Tome offers top class peripheral equipment, which boosts the performance of our Multitasking Machines. As a total solution provider with numerous achievements, Nakamura-Tome offers complete solutions, including Multitasking Machines complemented with a variety of peripheral equipment.

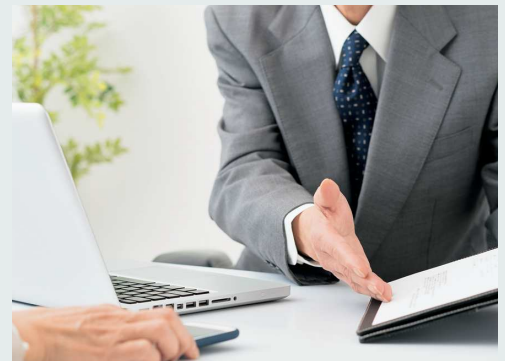
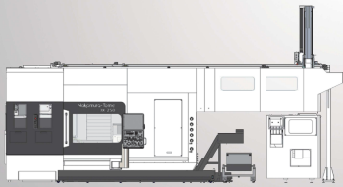


Image steady rest is optional



# Option lineup

The image is under development.



Gantry Loader (GR-210 High-Speed)  
\*Right outlet only



Work stoker(WS-442W/445W)

and many others ...

For not Listed Items, please contact your Nakamura-Tome representative.



Fire protection damper



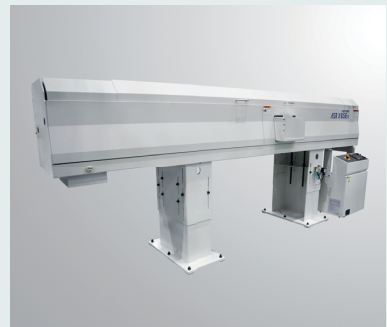
Connection Duct for Oil Mist Collector



Han-Bei (In-process measuring system)



Chip conveyor



Bar feeder



Signal tower



Coolant pump



Tool setter

## NT Smart X

Full Operator Support from  
Ease of Use to Reliability

### 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
- 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

19 inch color LCD touch panel  
QWERTY keyboard  
PC memory 8 GB

Original Menu screen  
Voice Guidance  
Multiple-Touch screen  
Touch pad



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



Cut in check



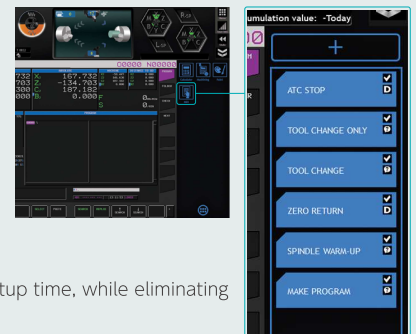
### Digital Chuck Interlock

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.



# Control system ①

## 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

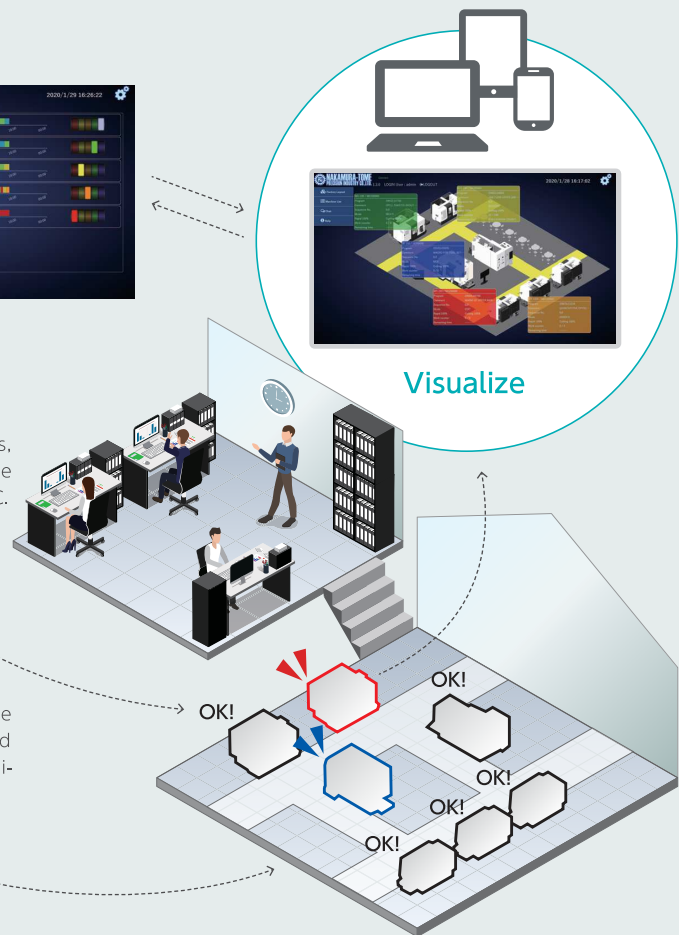


Input and output programs, tool data and other machine data from the monitoring PC.

### 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 Navigator AI



Compensation model built using AI machine learning.



### Powered by AI

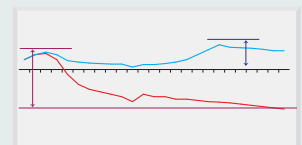
Time and measured dimension data are input into a dedicated AI Learning software, to build an optimized thermal growth compensation model.



### 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.

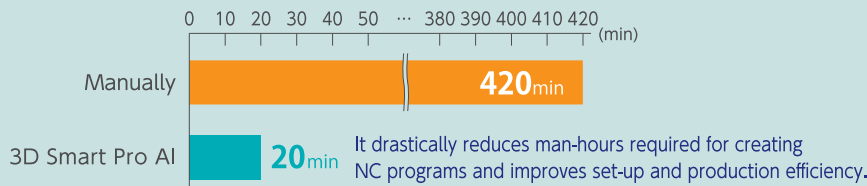
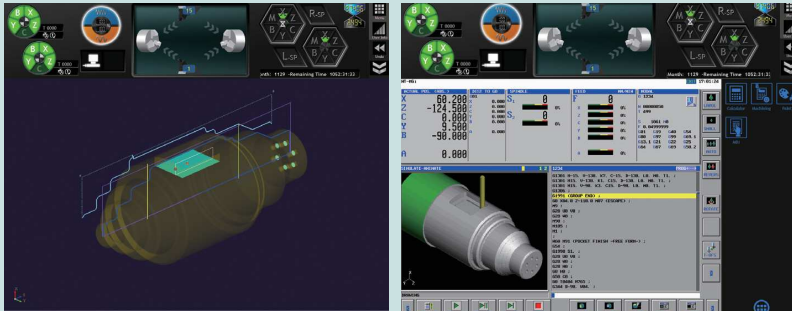


— Pre-correction thermal displacement data  
— Thermal displacement data after correction



## 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.



## Double safety features for maximum protection

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

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

### NT Machine Simulation

#### Preventive safety technology - Machine collisions are avoidable!

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.



Image shown here is of a 2-turret machine

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

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

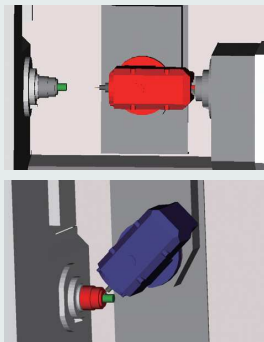
By process  
Single feed

### NT Collision Guard

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.



Image shown here is of a Tool spindle machine





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.



## 3. Tolerance setting

Once tolerance value is input, target value for machining can be set.



## 2. Optimization of machining processes

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



## NT Work Navigator



Advanced 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.

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.

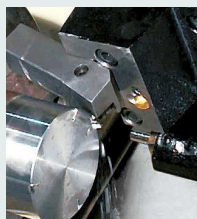
## Airbag (Overload detection)

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 !

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

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.



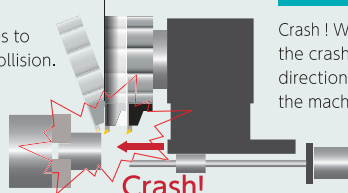
With Airbag

Retraction within 0.001 sec

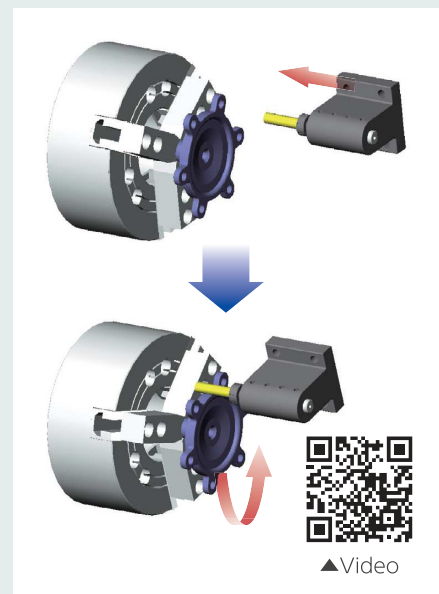
Crash ! Within 1 milliseconds after the crash, servo motor-feeding direction is reversed and the machine stops in EMG mode.



▲Video



\* This feature does not mean zero impact



▲Video

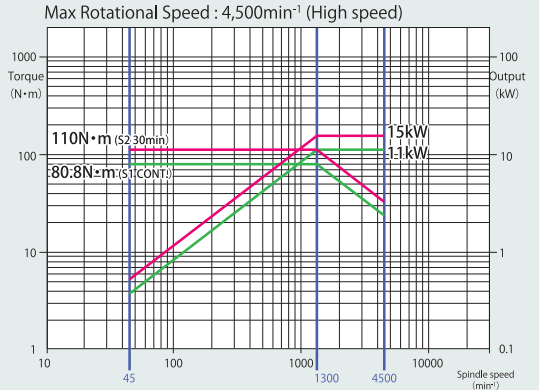
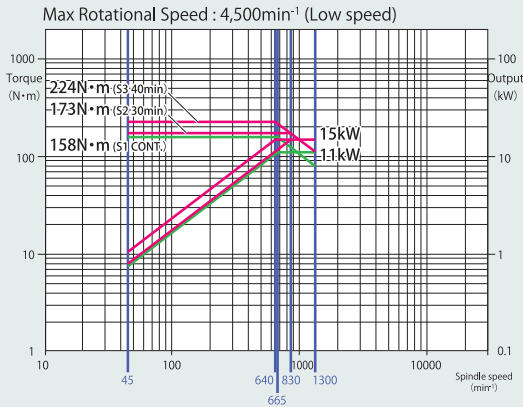
Barrier? Even with barrier function, machine collisions may occur

## Torque/Output Chart

### L- Spindle motor

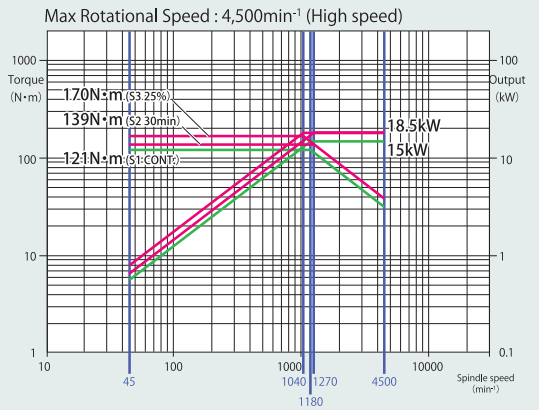
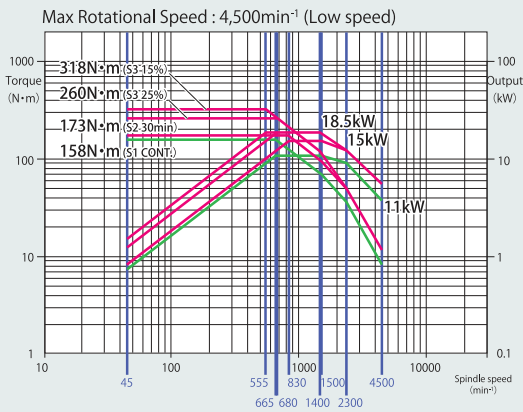
Bar capacity  
 $\phi 65,71\text{mm}$   
 15/11kW

Standard



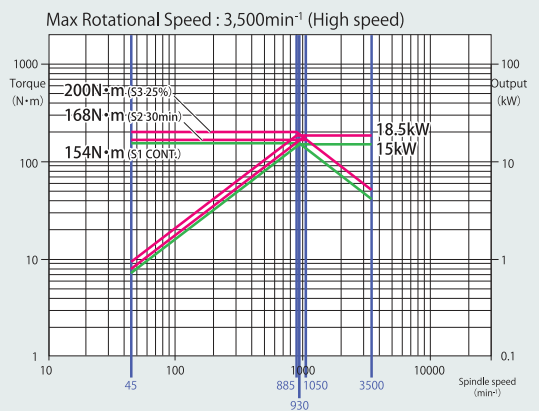
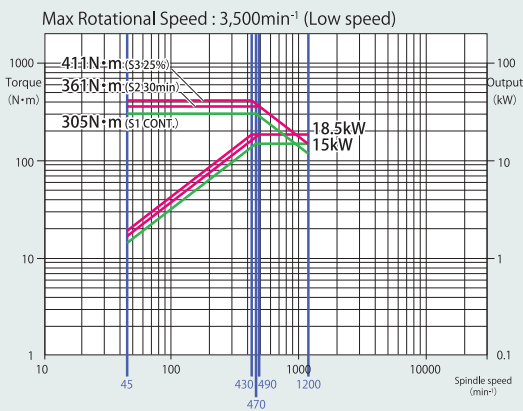
Bar capacity  
 $\phi 65,71\text{mm}$   
 18.5/15kW

Option



Bar capacity  
 $\phi 80\text{mm}$   
 18.5/15kW

Option

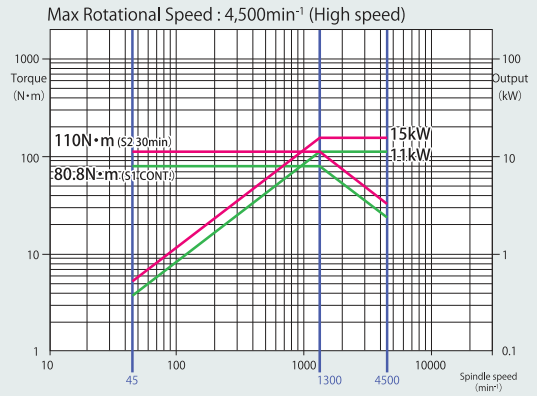
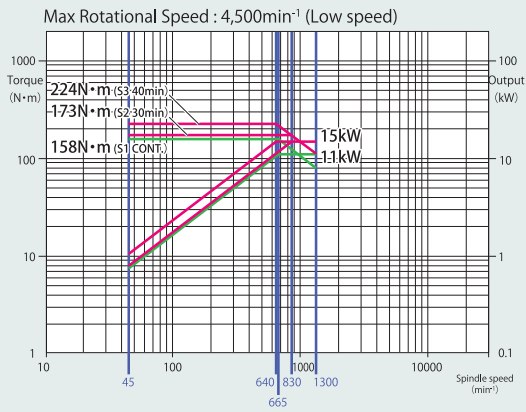


# Torque / Output Chart

## R- Spindle motor

Bar capacity  
 $\phi 65,71\text{mm}$   
 15/11kW

Standard

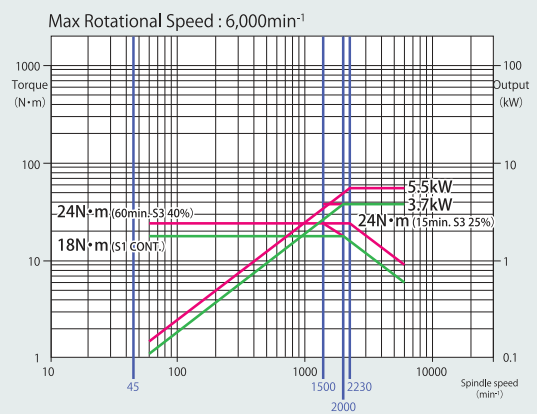
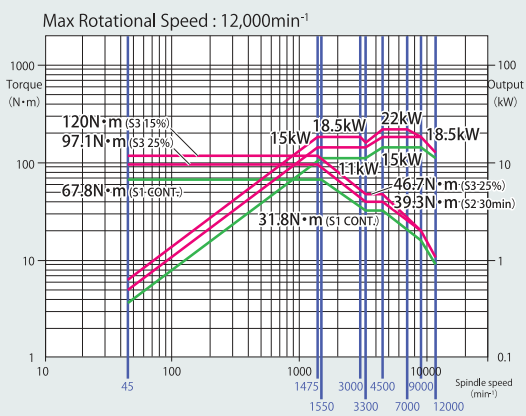


## Tool spindle motor

Standard

## Milling motor








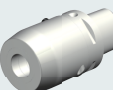


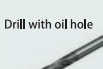













Standard



Tooling System

Sandvik Coromant Capto C6

★Alps tool type AS-AC

<p>φ50-100 Milling cutter</p> 	<p>Face milling adapter C6-391.05C-22 025M (0.9kg) C6-391.05C-27 025M (1.0kg) C6-391.05C-32 025M (1.1kg)</p>			
<p>φ50-100 Side cutter</p> 	<p>Side cutter arbor C6-391.10-27 030 (1.1kg) C6-391.10-32 025 (1.1kg)</p>			
<p>End mill</p> 	<p>Straight collet</p>  <p>393.CG-20xx52 (φ3-16 Without shields) 393.CG-25xx56 (φ3-20 Without shields) 393.CG-32xx60 (φ6-25 Without shields) 393.CG5-20xx52 (φ3-18 With shields) 393.CG5-25xx56 (φ3-20 With shields) 393.CG5-32xx60 (φ8-25 With shields)</p>	<p>Hydro chuck adapter (CoroChuck® 930) For heavy cutting 930-C6-HD-20-084 (1.7kg) 930-C6-HD-25-087 (2.1kg) 930-C6-HD-32-091 (2.6kg)</p>		
<p>Chamfering cutter</p> 			<p>Slim type 930-C6-S-12-084 (1.2kg) 930-C6-S-20-091 (1.4kg) 930-C6-S-25-098 (1.7kg)</p>	
<p>Drill</p> 	<p>Straight collet</p>  <p>★AS 16-d (φ6-12) ★AS 20-d (φ6-16) ★ASS 20-d (φ6-16 including adjust bolts)</p>	<p>Pencil type 930-C6-P-06-091 (0.9kg) 930-C6-P-12-107 (1.0kg) 930-C6-P-12-142 (1.1kg) 930-C6-P-12-192 (1.4kg) 930-C6-P-20-155 (1.6kg)</p>		
<p>Drill with oil hole</p> 			<p>Milling chuck adapter ★AC6-TRX16-70 (1.2kg) ★AC6-TRX20-75 (1.4kg) ★AC6-TRX25-80 (1.7kg) ★AC6-TRX32-90 (2.4kg) ★AC6-TRX40-100 (3.5kg)</p>	
<p>Reamer</p> 	<p>ER/AR collet</p>  <p>393.14-16/20/25/32d (φ1-20) 393.15-16/20/25/32d (φ3-20 With shields) ※Commercially available ER/AR collets can be used instead.</p>	<p>Collet chuck adapter C6-391.14-20 060 (0.8kg) C6-391.14-25 060 (0.9kg) C6-391.14-32 060 (0.9kg) C6-391.14-40 065 (1.2kg)</p>		
<p>Tap</p> 	<p>Tap collet</p>  <p>393.14-20 Dxxxxxxx (M3-M14) 393.14-25 Dxxxxxxx (M5-M20) 393.14-20 Dxxxxxxx (M20-M22) ※Commercially available ER/AR collets can be used instead.</p>	<p>Tap adapter (CoroChuck® 970) 970-C6-20-105 (1.2kg) 970-C6-25-124 (1.6kg) 970-C6-40-154 (2.8kg)</p>		
<p>Tap (with coolant hole)</p> 			<p>Weldon shank adapter C6-391.20-20 065 (1.5kg) C6-391.20-25 080 (1.9kg) C6-391.20-32 090 (2.4kg)</p>	
<p>End mill</p> 	<p>ISO9766 shank adapter C6-391.27-16 070 (1.1kg) C6-391.27-20 070 (1.1kg) C6-391.27-25 070A (1.1kg) C6-391.27-32 070 (1.3kg) C6-391.27-40 085 (1.7kg)</p>	<p>Extension adapter C6-391.01-63 100A (2.3kg) C6-391.01-63 140A (3.3kg) C6-391.01-63 185 (3.8kg) C6-391.01-62 060 (1.3kg short type / Bolt type not possible.)</p>		
<p>CORO MILL 390</p> 			<p>Reduction adapter C6-391.02-32 070A (1.1kg) (C6→C3) C6-391.02-32 185 (2.8kg) (C6→C3) C6-391.02-40 080A (1.3kg) (C6→C4) C6-391.02-40 185 (3.0kg) (C6→C4) C6-391.02-50 080A (1.5kg) (C6→C5) C6-391.02-50 110 (2.2kg) (C6→C5)</p>	
<p>Delta Drill</p> 				
<p>Coromant U drill</p> 				



# Tooling System

**Cutting head "CoroTurn® Prime" for OD Face turning**  
 C6-CP-30AR/L-45065-11C (1.3kg)  
 C6-CP-25BR/L-45065-11B (1.3kg)

**CORO TURN® RC**  
 C6-DCLNR/L-45065-12/16/19 (1.3kg)  
 C6-PCLNR/L-45065-12HP/16HP/19HP (1.3kg)  
 C6-DDJNR/L-45065-1504 (1.1kg)  
 C6-PDJNR/L-45065-1504HP (1.2kg)  
 C6-SCLNR/L-45065-09/12 (1.1kg)  
 C6-SDJNR/L-45065-12HPA (1.2kg)  
 C6-SDJCR/L-45065-11 (1.1kg)  
 C6-SDJCR/L-45065-11HPA (1.2kg)

**Cutting head for grooving / cut off turning**  
**CORO CUT® 1-2**  
 C6-R/LF123G10-45065B (3.0kg)  
 C6-R/LF123H13-45065B (4.0kg)  
 C6-R/LF123J13-45065B (4.0kg)  
 C6-R/LF123K16-45065B (5.2kg)  
 C6-R/LF123L16-45065B (5.5kg)

**Cutting head for OD thread**  
 C6-266R/LFG-45065-16/22/27 (1.3kg)

**Cutting head for ID boring**  
 C6-DCLNR/L-27240-12/-27140-16 (0.9/1.7kg)  
 C6-PCLNR/L-27240-12HP/-27140-12HP (1.0/1.7kg)  
 C6-DDUNR/L-27140-15 (1.7kg)  
 C6-DDUNR/L-27140-15HP (1.7kg)

**Cutting head for ID thread**  
 C6-266R/LKF-14070-16 (1.0kg)  
 C6-266R/LKF-17075-16 (1.0kg)  
 C6-266R/LKF-22090-16 (1.2kg)  
 C6-266R/LKF-27105-16 (1.6kg)

**Head cartridge type boring bar (steel)**  
 C6-570-2C 16 056 (0.9kg)  
 C6-570-2C 20 068 (1.0kg)  
 C6-570-2C 25 082 (1.0kg)  
 C6-570-2C 32 081 (1.2kg)  
 C6-570-2C 40 092 (1.5kg)  
 C6-570-2C 40 105 (2.4kg)

**Head cartridge type boring bar (vibration absorption)**  
 C6-570-3C 16 088 (1.0kg)  
 C6-570-3C 20 108 (1.0kg)  
 C6-570-3C 25 230 (1.7kg)  
 C6-570-3C 32 224 (2.1kg)  
 C6-570-3C 40 198 (2.6kg)  
 C6-570-3C 50 239 (4.2kg)

**Adapter for cylindrical shank with flat**  
 C6-131-00098-25 (2.4kg)  
 C6-131-00112-40 (3.5kg)

**Rectangular shank adapter (type B)**  
 A C6-ASHR/L-105-20HP (2.3kg)  
 C6-ASHR/L-122-25HP (2.9kg)  
 B C6-ASHA-070-20HP (1.8kg)

**MDI adapter (\*MDI = Modular Drilling Interface)**  
 C6-DM20-N-033 (1.0kg)  
 C6-DM25-N-030 (1.0kg)  
 C6-DM32-N-030 (1.0kg)  
 C6-DM40-N-040 (1.4kg)

**Extension adapter**  
 C6-391.01-63 100A (2.3kg)  
 C6-391.01-63 140A (3.3kg)  
 C6-391.01-63 185 (3.8kg)  
 C6-391.01-62 060 (1.3kg short type / Bolt type not possible.)

**Reduction adapter**  
 C6-391.02-32 070A (1.1kg)(C6→C3)  
 C6-391.02-32 185 (2.8kg)(C6→C3)  
 C6-391.02-40 080A (1.3kg)(C6→C4)  
 C6-391.02-40 185 (3.0kg)(C6→C4)  
 C6-391.02-50 080A (1.5kg)(C6→C5)  
 C6-391.02-50 110 (2.2kg)(C6→C5)

**Cutting head R/L 570 type**

**Steel cutting tool for ID**

**Carbide cutting tool for ID Exxx-STFCR/L xx-R**

**Sleeve**  
 132N-25xx (φ 6,8,10,16,20)  
 132N-40xx (φ 20,25,32)

**CoroDrill® DS20**  
 DS20-DxxxxDMxx-xx (φ 15-40, MDI size, L/D 04 OR 07)

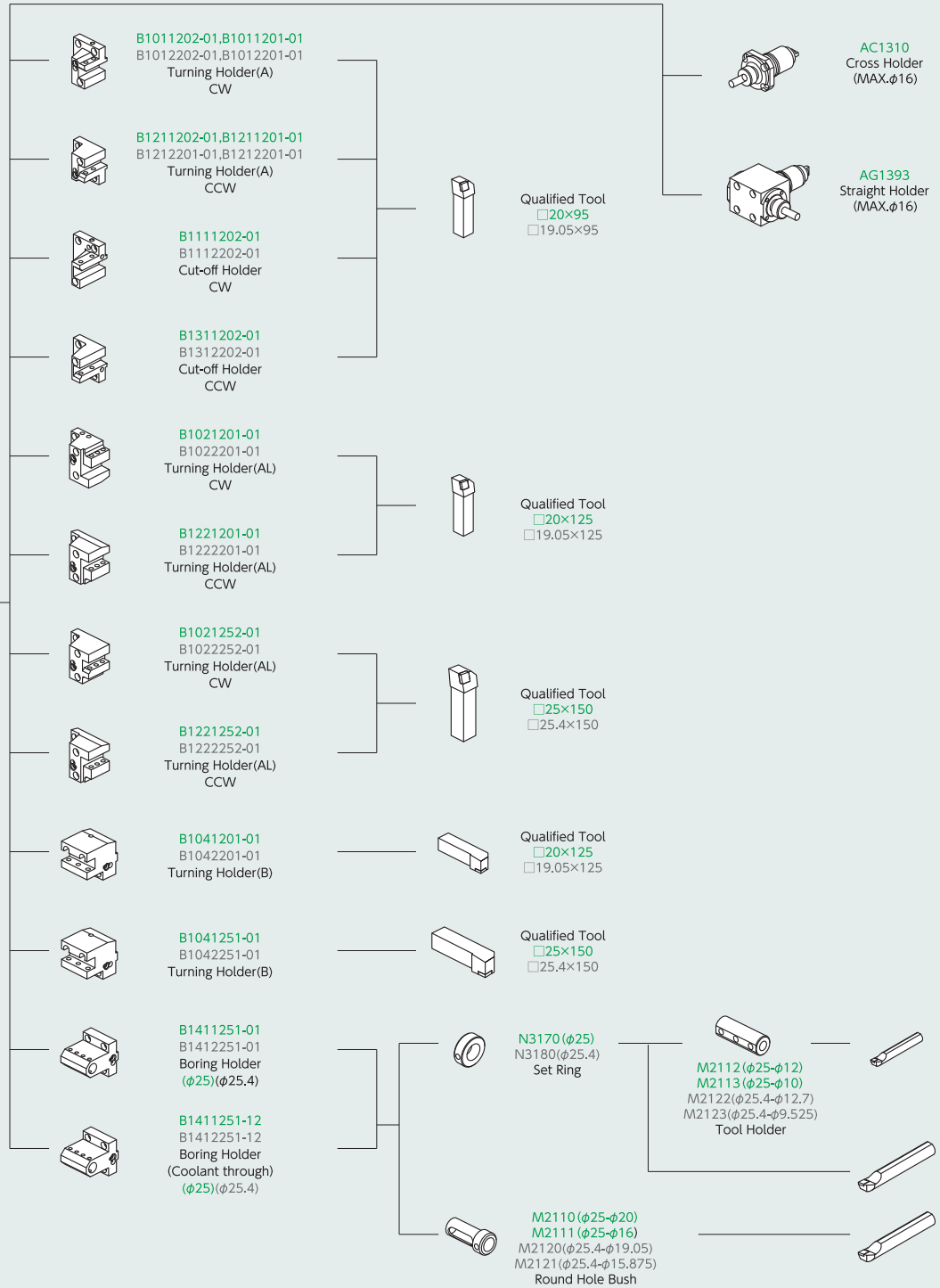
\* For details, refer to the Sandvik Coromant Tooling Catalog.

Tooling System

Metric  
Inch



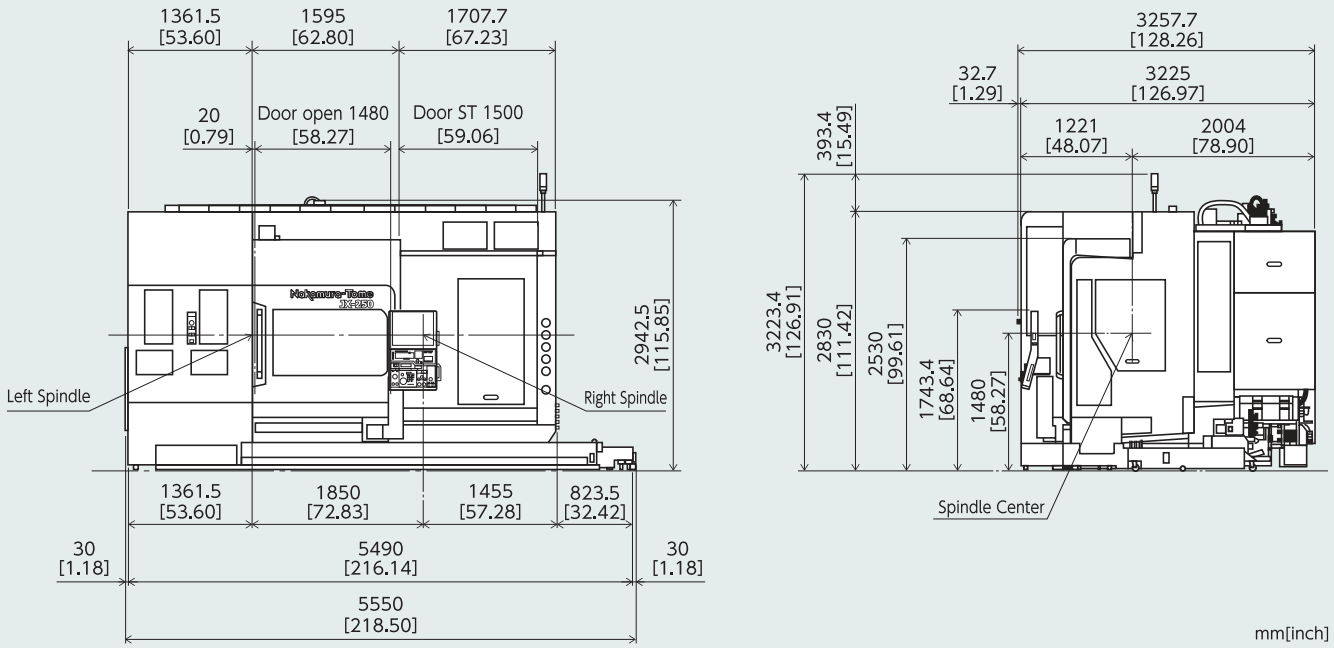
Turret Head



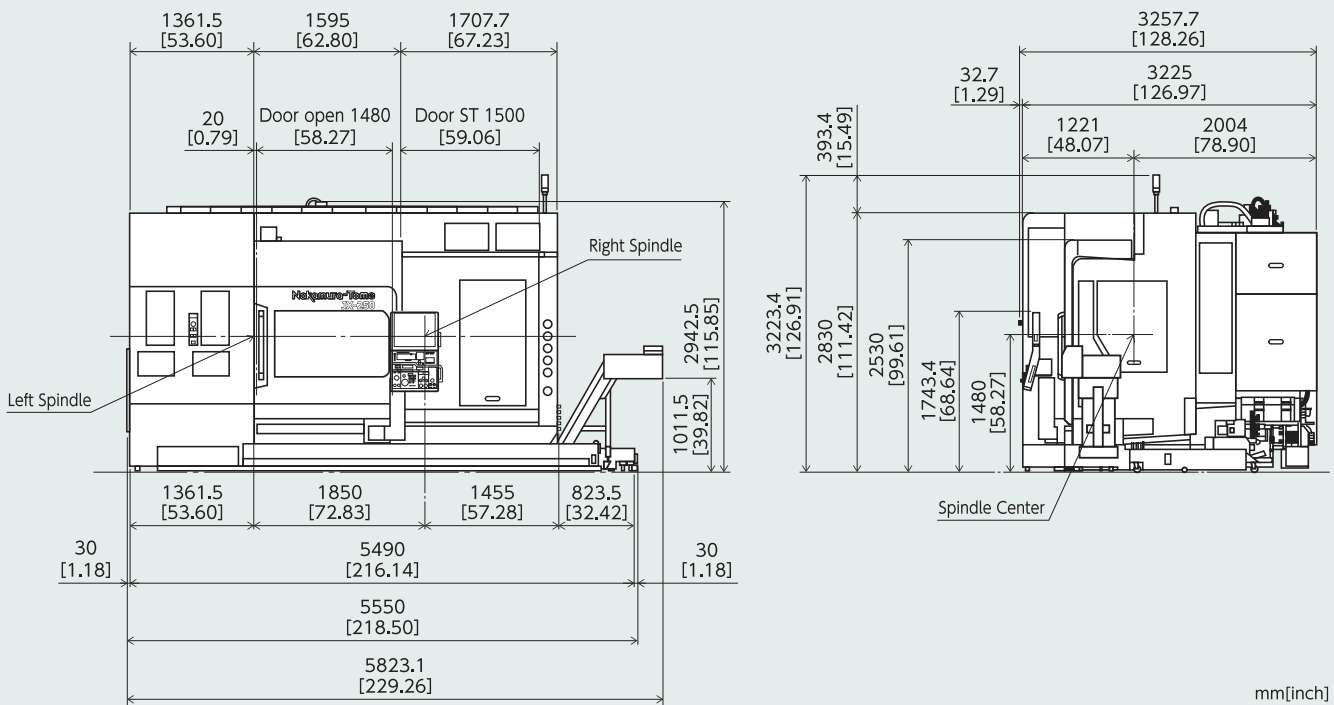
# Tooling System / Floor Space

## Floor Space

### Standard

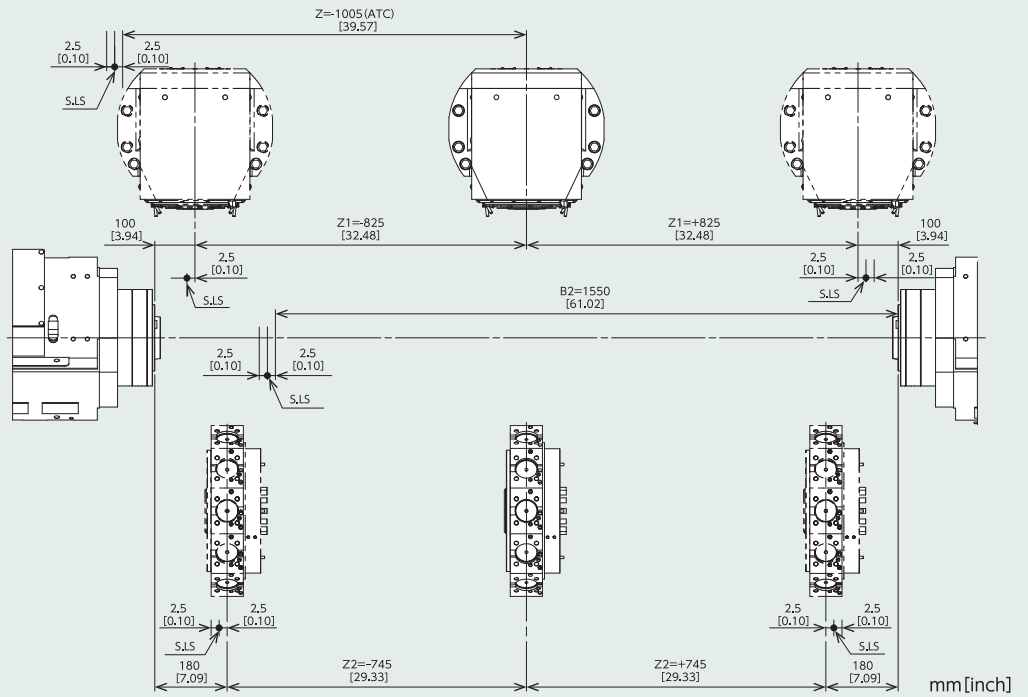


### Chip conveyor right side outlet type

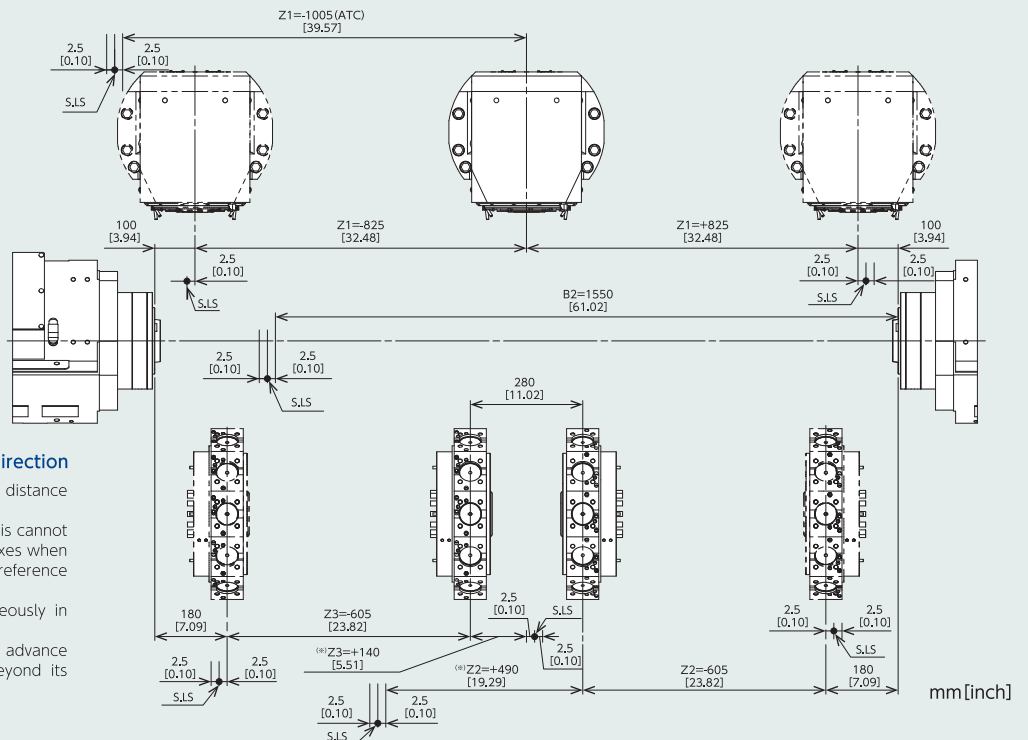


## Travel Range

### Single turret



### Twin turret



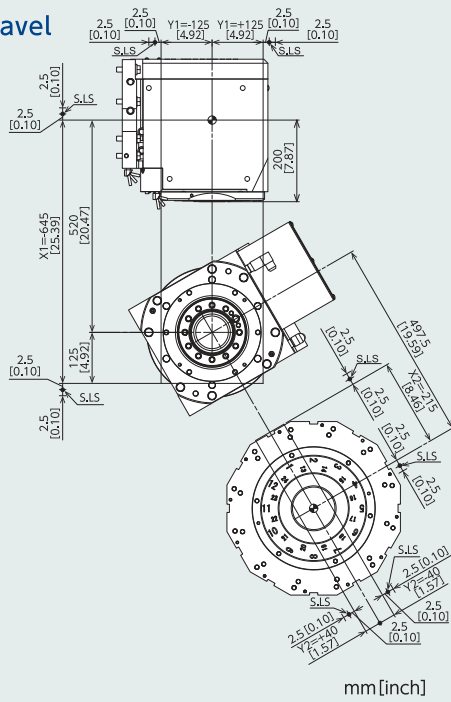
#### ※Z2-axis and Z3-axis travel in plus direction

An interlock is applied to keep a relative distance between Z2-axis and Z3-axis. The distance between the Z2-axis and Z3-axis cannot get closer than the distance between both axes when they are at 2.5mm beyond their respective reference points. Z2-axis and Z3-axis cannot move simultaneously in plus direction. Z3-axis shall be moved in minus direction in advance before moving Z2-axis in plus direction beyond its reference point, and vice versa.

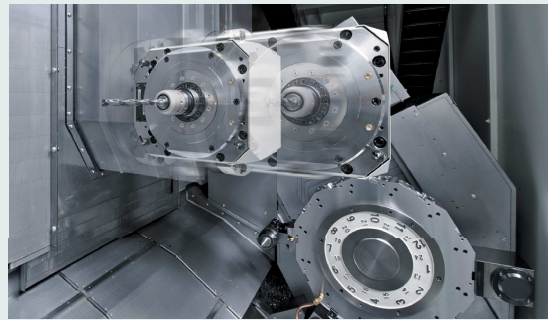
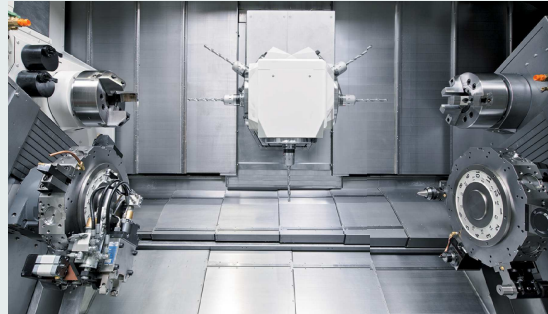


# Travel Range / Tool Interference

X-Y Axis slide travel

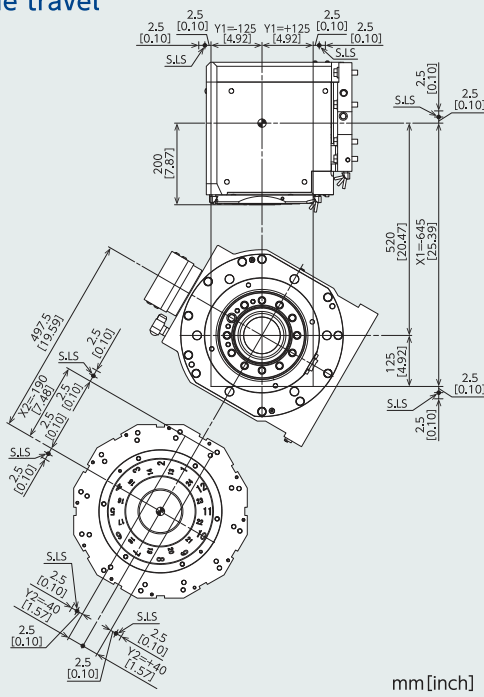


mm[inch]

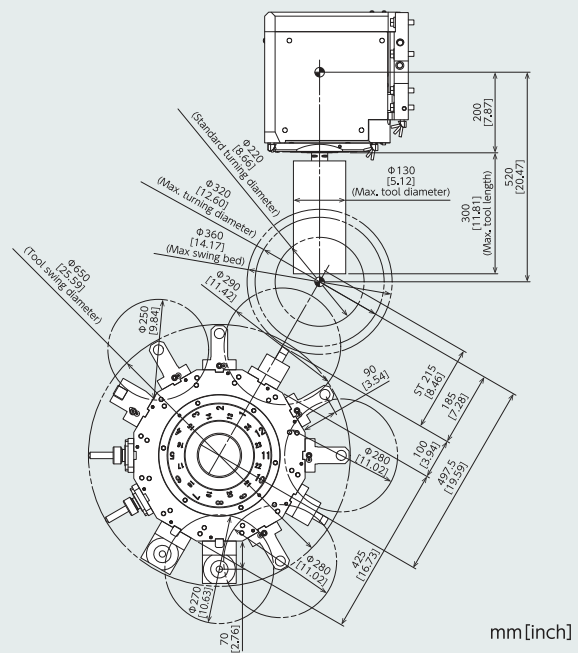


Tool Interference

X-Y Axis slide travel  
(L side  $\phi 80$ )



mm[inch]



mm[inch]

# JX-250

## Capacity

Max. turning diameter	320mm
Distance between spindles	max.1,850mm / min.300mm
Max. turning length	1,650mm
Bar capacity	φ65mm / φ71mm(op.) / φ80mm(op. Only L)
Chuck size	8" (φ65, φ71) / 10" (φ80)

## Axis travel

X1-Axis slide travel	645mm
X2/X3(op.)-Axis slide travel	215mm / 215mm *For φ80, X3 stroke is limited.
Z1-Axis slide travel	±825mm (at ATC+1,005mm)
Z2/Z3(op.)-Axis slide travel	1,490mm(Without Z3), 1,095mm(With Z3) / 745mm
Y1-Axis slide travel	±125mm
Y2/Y3(op.)-Axis slide travel	±40mm / ±40mm
B2-Axis slide travel	1,550mm

## Left spindle

	φ65	φ71(op.)	φ80(op.)
Spindle speed	4,500min <sup>-1</sup>	4,500min <sup>-1</sup>	3,500min <sup>-1</sup>
Spindle speed range	Stepless	Stepless	Stepless
Spindle nose	A2-6	A2-6	A2-8
Hole through spindle	80mm	80mm	100mm
I.D. of front bearing	120mm	120mm	130mm
Hole through draw tube	66mm	72mm	81mm

## Right spindle

	φ65	φ71(op.)	
Spindle speed	4,500min <sup>-1</sup>	4,500min <sup>-1</sup>	-
Spindle speed range	Stepless	Stepless	-
Spindle nose	A2-6	A2-6	-
Hole through spindle	80mm	80mm	-
I.D. of front bearing	120mm	120mm	-
Hole through draw tube	66mm	72mm	-

## ATC Tool spindle

Tool spindle speed	12,000min <sup>-1</sup> / 20,000min <sup>-1</sup> (op.)	
Swiveling range	240° (±120°)	
Tool coupling type	CAPTO C6 / HSK-A63(op.)	
Number of tools	80, (40, 120 op.)	
Max. tool diameter / Without adjacent tool	90mm / 130mm	
Max. tool length	300mm	
Long Tool (op.)	Number of tools	2
	Max. diameter × length	φ65 × L450mm

## 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 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.

## R-lower turret

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

## Milling : R-lower turret

Rotary system	Individual rotation
Milling spindle speed	6,000min <sup>-1</sup>
Spindle speed range	Stepless
Number of milling stations	12
Tool size	Straight holder φ1mm ~ φ16mm
	Cross holder φ1mm ~ φ16mm

## L-lower turret (op.)

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

## Milling : L-lower turret (op.)

Rotary system	Individual rotation
Milling spindle speed	6,000min <sup>-1</sup>
Spindle speed range	Stepless
Number of milling stations	12
Tool size	Straight holder φ1mm ~ φ16mm
	Cross holder φ1mm ~ φ16mm

## Drive motor

L-spindle	15/11kW / 18.5/15kW(op.) *For φ80, only 18.5/15kW.
R-spindle	15/11kW
Tool Spindle	22/15kW
Milling (Lower turret)	5.5/3.7kW

## General

Height	2,942.5mm
Floor space (L x W)	5,550mm × 3,257.7mm
Machine weight (incl. control)	25,000kg

## Power requirements

Power supply	Without L-lower turret	65.7kVA (L-spindle 15/11kW, R-spindle 15/11kW)
		69.3kVA (L-spindle 18.5/15kW, R-spindle 15/11kW)
	With L-lower turret	70.7kVA (L-spindle 15/11kW, R-spindle 15/11kW)
		74.3kVA (L-spindle 18.5/15kW, R-spindle 15/11kW)

## 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, expanding 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.

# Machine • Control Specifications

## ■ Items

Control Type	Without L-lower turret	FANUC 31i-B (2-PATH)
	With L-lower turret	FANUC 31i-B (3-PATH)

## ■ Controlled axes

Controlled axes	Without L-lower turret	10 axes	
	With L-lower turret	14 axes	
Simultaneously Controlled axes	Without L-lower turret	Upper	5axes(X1, Z1, C1(C2), Y1, B1axis)
		R-lower turret	4axes(X2, Z2, C2(C1), Y2, B2axis)
	With L-lower turret	Upper	5axes(X1, Z1, C1(C2), Y1, B1axis)
		R-lower turret	4axes(X2, Z2, C2, Y2, B2axis)
	L-lower turret	4axes(X3, Z3, C1, Y3axis)	

## ■ Input command

Least input increment	X,Z,Y,B2:0.001mm/0.0001inch (diameter for X-axis), C,B1:0.001°
Least command increment	X:0.0005mm / Z,Y,B2:0.001mm / C,B1:0.001°
Max. programmable dimension	±999999.999mm / ±39370.0787in , ±999999.999°
Absolute/ Incremental programming	X, Z, Y, C, B(absolute only for B) / U, W, V, H
Decimal input	Standard
Inch / Metric conversion	G20 / G21
Programmable data input	G10

## ■ Feed function

Cutting feed	feed/min X, Z: 1 ~ 8000mm/min, 0.01 ~ 315inch/min (1 ~ 4800mm/min, 0.01 ~ 188inch/min)
	Y1: 1 ~ 8000mm/min, 0.01 ~ 315inch/min (1 ~ 4800mm/min, 0.01 ~ 188inch/min)
	Y2,Y3: 1 ~ 6000mm/min, 0.01 ~ 236inch/min (1 ~ 4800mm/min, 0.01 ~ 188inch/min)
	C: 1 ~ 4800°/min
	B1: 1 ~ 8000° /min (1 ~ 4800° /min)
	B2: 1 ~ 8000mm/min, 0.01 ~ 315inch/min (1 ~ 4800mm/min, 0.01 ~ 188inch/min)
	feed / rev 0.0001 ~ 8000.0000mm/rev (0.0001 ~ 4800.0000mm/rev) 0.000001 ~ 50.00000inch/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
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 screen)
Cutting feedrate override	0 ~ 150%, 10% (each 10%)
AI contouring control I	G5.1
L- Spindle override	50%~ 120% Set every 10%
R-Spindle override	50%~ 120% Set every 10%
Tool Spindle override	50%~ 120% Set every 10%

## ■ Program memory

Part program storage length	Without L-lower turret	1Mbyte Total 2560m (Upper / Lower : Each 1280m) 2Mbyte Total 5120m (op.) 4Mbyte Total 10240m (op.) 8Mbyte Total 20480m (op.)
	With L-lower turret	2Mbyte Total 5120m (Upper / R-Lower / L-Lower : Each 1706m) 4Mbyte Total 10240m (op.) 8Mbyte Total 20480m (op.)
Parts program editing	delete, insert, change	
Program number search	Standard	
Sequence number search	Standard	
Address search	Standard	
Number of registerable programs	Without L-lower turret	Total 2,000 programs (Upper / Lower : Each 1,000 programs) Total 4,000 programs (op.)
	With L-lower turret	Total 4,000 programs (Upper / R-Lower / L-Lower : Each 1,333programs)
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
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
Tool spindle orientation	Standard : 4 positions (90° × 4) (M785/ M786/ M787/ M788)
	Maximum : 12 positions (12×30° ) (G419)

## ■ ECO functions

Servo motor power off	Standard (Switch on Power Saving Mode in NT Setting screen)
Control of motor output during acceleration and deceleration	Standard (Switch on Power Saving Mode in NT Setting screen)
G code for servo motor energy-saving during acceleration and deceleration	G356/G357
Automatic light off	Standard (Switch on Power Saving Mode in NT Setting screen)
Automatic monitor off	Standard (Switch on Power Saving Mode in NT Setting screen)



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