

CNC ■ Spindle ■ Turret  
Precision Lathe

# XC.XL series

CNC PRECISION LATHE

XC-100 XC-150 XL-100 XL-150 XL-200

**TAKAMAZ**

CNC 1 Spindle 1 Turret Precision Lathe

# XC series

Compact low-Cost Creativity



## XC-100

Chuck size (6) inch

Max. turning diameter	Ø180mm
Max. turning length	190mm
Max. bar diameter	(Ø26mm)
Tool post type	8-station turret
Rapid traverse rate	X: 12/Z: 18 m/min
Spindle motor	AC 7.5/5.5kW
Dimensions (L×W)	1,150×1,360mm
Controller	TAKAMAZ & FANUC

In 1976, **TAKAMAZ** developed CNC lathe with CRT, "TCC-8" from Japan. Since its development, TAKAMAZ has provided a total of 30,000 CNC lathes and has been providing CNC lathes worldwide. The core of the CNC lathe line up is the "X Series" that has one spindle and one turret structure. This is the most basic structure and yet it is through this structure that TAKAMAZ garnered confidence from valuable customers. In 2010, a more compact, less priced, and aimed at a more creative design, the new series [XC/XL] Series is born.



# XC-150

Chuck size **8** inch

Max. turning diameter	φ 290mm
Max. turning length	204mm
Max. bar diameter	(φ51mm)
Tool post type	8-station turret
Rapid traverse rate	X : 18/Z : 24 m/min
Spindle motor	AC 11/7.5kW
Dimensions (L×W)	1,250×1,480mm
Controller	TAKAMAZ & FANUC

( ) : Option

※The photo shows new TAKAMAZ standard color.Environmentally friendly powder coating is employed.



CNC **1** Spindle **1** Turret Precision Lathe

# XL series

## Long stroke+Compound Machining



### XL-100

Chuck size **6** inch

Max. turning diameter	<b>φ180mm</b>
Max. turning length	<b>240mm</b> (Power tools type:180mm)
Max. bar diameter	<b>(φ42mm)</b>
Tool post type	<b>8-station turret (12-station)</b>
Rapid traverse rate	<b>X: 12/Z: 18 m/min</b>
Spindle motor	<b>AC 7.5/5.5kW (11/7.5kW)</b>
Dimensions (L×W)	<b>1,360×1,360mm</b>
Controller	<b>TAKAMAZ &amp; FANUC</b>



### XL-150

Chuck size **8** inch

Max. turning diameter	<b>φ320mm</b> (For 8-Station Turret)
Max. turning length	<b>370mm</b>
Max. bar diameter	<b>(φ65mm)</b>
Tool post type	<b>8-station turret (12-station)</b>
Rapid traverse rate	<b>X: 18/Z: 24 m/min</b>
Spindle motor	<b>AC 11/7.5kW (15/11kW)</b>
Dimensions (L×W)	<b>1,600×1,535mm</b>
Controller	<b>TAKAMAZ &amp; FANUC</b>

# XC series / XL series

“Surprise the World with  
Hidden Creativity”



## XL-200

Chuck size **8** inch

Max. turning diameter	ø340mm
Max. turning length	720mm
Max. bar diameter	(ø65mm)
Tool post type	12-station turret
Rapid traverse rate	X: 18/Z: 24 m/min
Spindle motor	AC 11/7.5kW (18.5/15kW)
Dimensions (L×W)	2,900×1,845mm
Controller	TAKAMAZ & FANUC

( ): Option

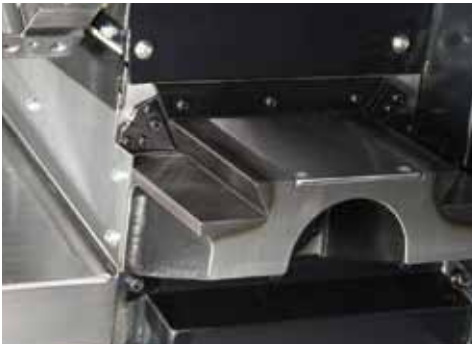
※ The photo shows new TAKAMAZ standard color. Environmentally friendly powder coating is employed.

# XC-100

## Only 1,150 mm machine width

### High Precision Structure

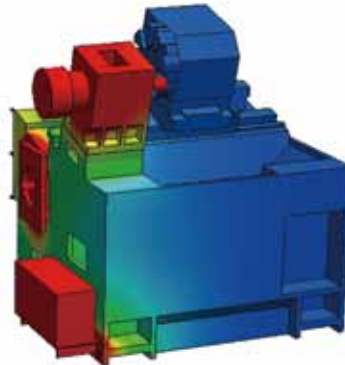
The X-Axis has a pre-tensioned structure. As a result, dimensional variation due to thermal displacement is suppressed and a design with stable machining accuracy is achieved. In addition, the X-axis slide is made larger resulting to a more robust slide. Furthermore, to find a flawless



Improved Rigidity and Straightness of Dovetail Slide through Slide Size Increase

countermeasure for thermal displacement, thermal displacement phenomenon is analyzed by computer achieving excellent thermal stability. Repeatability test for 8 hours shows change of  $\phi 5$  microns and only  $\phi 3$  microns after 1-hour machine stop.

(Based on TAKAMAZ designated cutting condition)



Achieved Excellent Thermal Displacement Countermeasure through CAD (Computer Aided Design)

### Only 1,150 mm machine width Ultra-Compact Design

The machine is a slim design with width of only 1,150mm and still comes with a 120mm stroke X-Axis and 230mm stroke Z-Axis. Even with a slim width, it is still designed with 450mm door opening. The machine accessories are placed in front or in accessible locations on the machine as emphasis to routine maintenance.

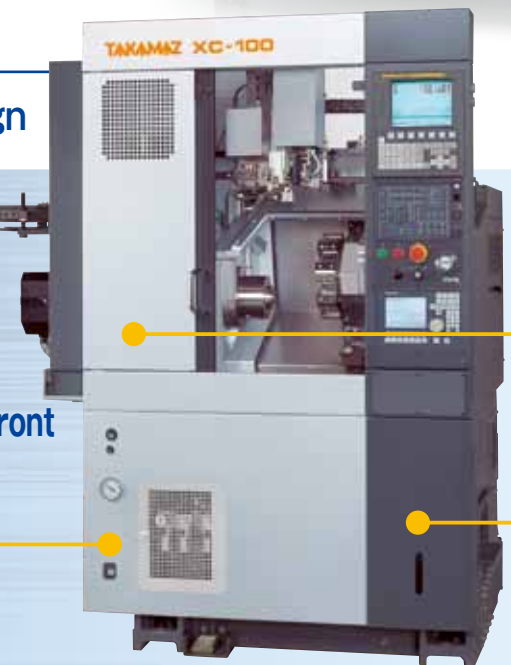


### Routine Maintenance Details are placed in front

Chuck Pressure Adjustment



Air Pressure Adjustment



1,360mm

Floor Space

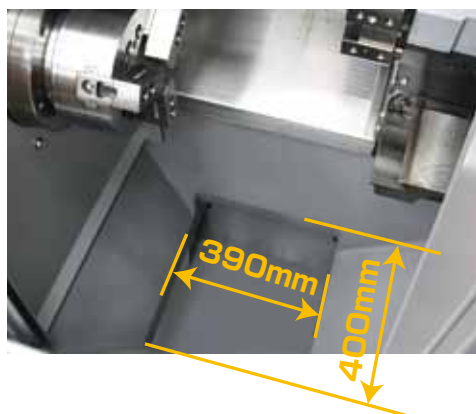
**1.56m<sup>2</sup>**

1,150mm

# Pursue the World's Smallest Lathe

## Improved Chip Discharge

Compared to the previous model, this machine has a bigger interior chip drop chute opening by 2.2 times in addition to the steep angle of bed chute. The chip discharge is excellent. By attaching rear chip conveyor (option), stoppages as a result of chip nesting on the interior bed is prevented.



## Increased Operation Efficiency through Fully Loaded Features

Safety program check done in advance with "Manual Handle Retrace Function", retrieving data loss with "Automatic Data Backup Capabilities," and "Counter Function" are some of the added features to improve maintenance, operation and ease of use.

### Manual handle trace



### Workpiece/Tool counter



### Notification for Routine Inspections



### Tool torque monitor

### Fixed wear

### Smart Alarm Diagnostic

### Over road check function

## Environmentally Friendly Energy Saving Design

As compared to the previous model, the spindle motor is upgraded to AC7.5/5.5kW but has much faster spindle acceleration and deceleration time. This contributes to power saving. The weight reduction for resource conservation and LED light adoption are contributing factors for power-saving and environmentally friendly structure.

**Spindle Acceleration Time 2.7sec.**

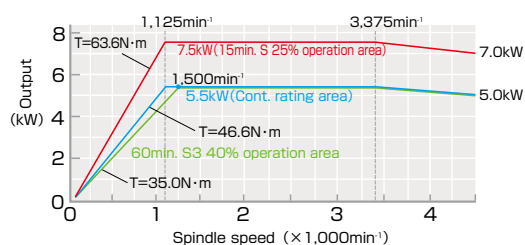
(As compared to the previous model:25% reduction)

**Reduced Material Use -200kg**

(As compared to the previous model:10% reduction)

### XC-100 Spindle motor torque diagram

■ Max.4,500min<sup>-1</sup> standard type (AC 7.5/5.5kW)



Sigma loader Adjustment



Lubrication Pump





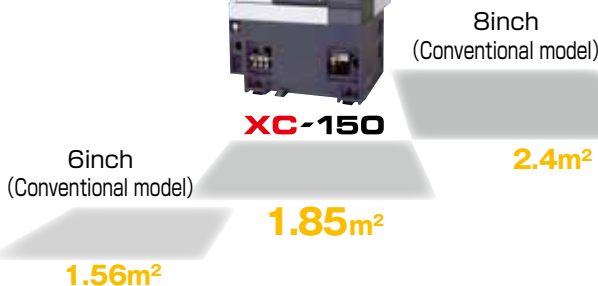
# XC-150

## Space Saver in Turning Machine Industry's Smallest Class

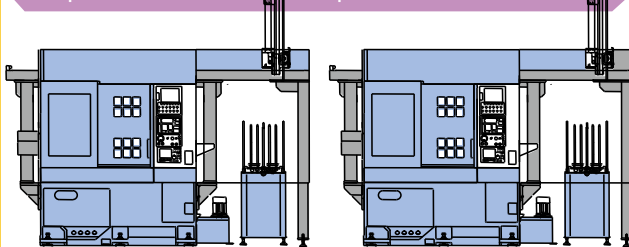
### Achieve Space-Saving Comparable to 6-inch Class

The machine width is 1,250mm. The floor space is 1.85m<sup>2</sup>, about 23% less than previous model, making it the smallest machine with an 8-inch chuck among the same class in the industry. In our products, the space needed for [2] x [Set of Previous Model & Stocker] is enough for [3] x [Set of XC-150 & Stocker]. Arrangement of lines requiring only small spaces is possible leading to increased efficiency in operation and improvement in manufacturing.

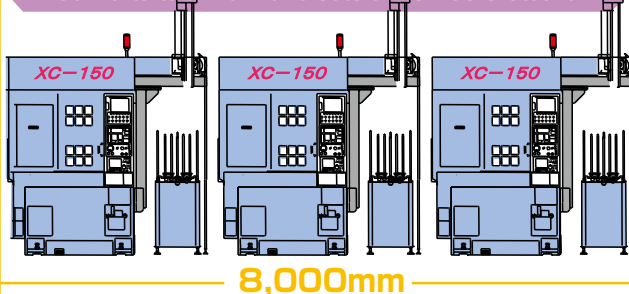
**Floor space 23% reduction**



Space for a line with 2 sets of previous model & stocker

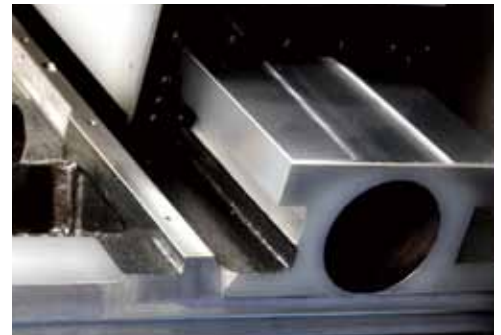


Converts to a line with 3 sets of XC-150 & stocker



### Adoption of Rigid Slide

Just like the other models, the Z-Axis slide applies square box-way slide that is known for rigidity. The X-Axis is designed for increased rigidity than previous model that can be used for heavy cutting.



X-Axis Slide that is Focused on Rigidity



# Energy Saver as Environment Friendly

## Energy Saving Machine

As compared with previous models, there are 20% reduction on the spindle inertia and 36% reduction on the spindle acceleration and deceleration time ( $0 \rightarrow 3,500 \text{ min}^{-1}$ ). In addition, X-Axis and Z-Axis have also reduction on the motor load inertia of approximately 8%. Per FEM Analysis for optimizing the design of

castings by eliminating unnecessary materials, as compared to previous models, there is a 20% reduction of materials used. This is good for the environment. Through these measures, the power consumption without compromising machine functions and processing performance is reduced by 10%.

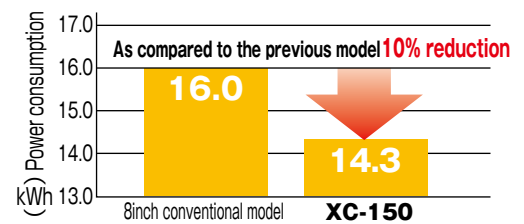
### Ensure the Reduction Of Materials Used

Reduction of Spindle Inertia by **20%**  
Reduction of Spindle Acceleration and Deceleration Times by **14%**

Slide Motor Load  
Reduction of Inertia by **8%**

Reduction of Materials Used by **20%**  
Reduction of Total Parts Used by **10%**

### Effect of Power Consumption Reduction per Machine



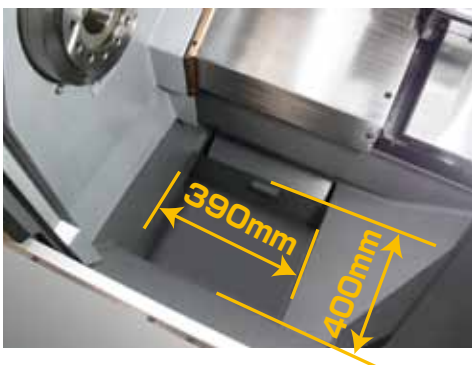
\*Operating conditions: 8 hours continuous operation using factory running program for measurements

## Improvement of Chip Discharge

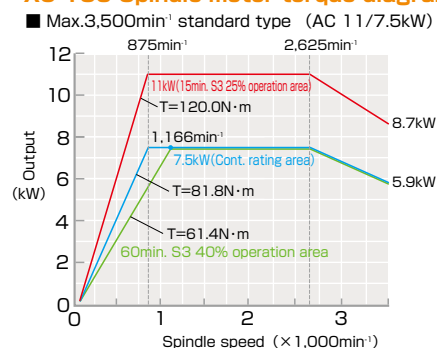
Machine has a width of 1,250mm with a compact body but chip discharge and workability are not inferior to other products. With keeping the same size of the interior chip drop chute opening ( $0.15 \text{ m}^2$ ) to the previous model with 8-inch chuck (rear chip conveyor specification), it also has a steep angle on bed chute. By attaching rear chip conveyor (option), stoppages as a result of chip nesting on the interior bed are prevented.

## Superior Workability

Designed with a concept of saving space with a door opening of 460mm without compromising the workability inside the machine. In addition, the space until the spindle center is the same as that of [X-100] at 300mm, focusing on ease of operation.



### XC-150 Spindle motor torque diagram



# XL-100

## Supports Milling and Shaft Machining!

### Capable of Mounting Six Power Tools as Maximum

This machine is equipped with high horsepower Power Tools that can perform a maximum of 10mm dia. milling. The ability to drill, tap and finish using one chuck and combined with possibility of performing variables and integrated process leads to flexible production.

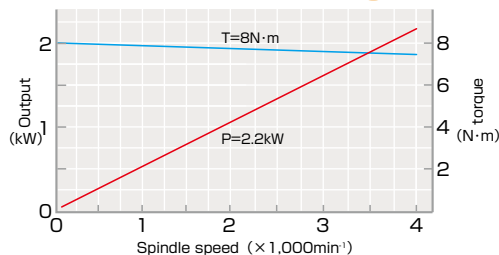


Face milling



Side milling

	Item	Unit	
Power tools	Tool storage capacity	pcs.	Max.6
	Max. rotating speed	min <sup>-1</sup>	4,000
	Drill(short)	mm	φ10
	Endmill	mm	φ10
	Tap	mm	M4~M6
Spindle orientation	Positioning accuracy	degree	±0.1

**Power Tools Motor Diagram**

### Extra Tools for 12 Station Turret Head

The 12 station turret head is available with either standard turret specifications or the power tools specifications. The power tooling is designed with high speed through servo control and clamp controlled robust coupling leading to a stable high accuracy machining.

The structure of the turret is also designed with cutting oil spray outlets for each tool for efficient cutting with coolant.



8 station turret head



12 station turret head

※ 12-station : for reverse (□20) for normal (□16)

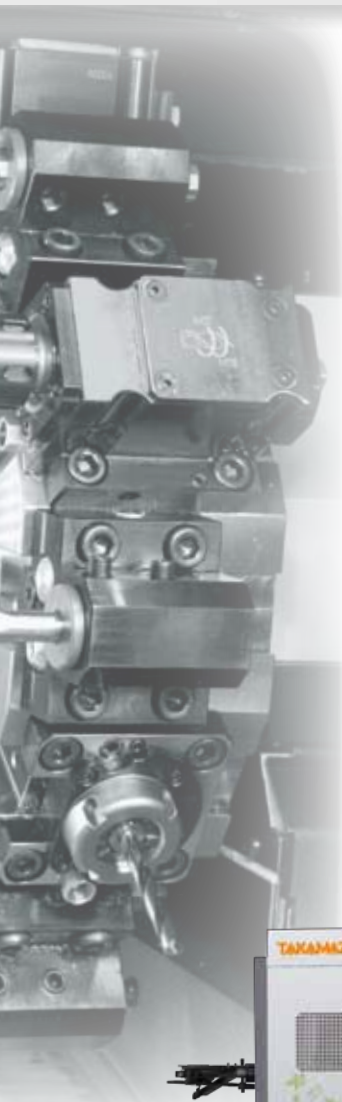


### Equipped with Tailstock for 280mm long stroke Z axis.

Maximum of 240mm shaft machining is possible with a Z axis stroke 280mm when equipped with a tailstock as an option. This is 50 mm longer than the XC-100.

※ Z axis is 250mm for power tool specification only.

	Item	Unit	
Tailstock (Option)	Pointed End	MT	MT-3
	Quill stroke	mm	85
	Tailstock stroke	mm	220



Chuck size

To comply with different requirements, a number of spindle specifications can be selected

	Spindle speed	Spindle Bearing I.D.	Max.bar diameter	Spindle motor	
Standard type	4,500min <sup>-1</sup>	φ75mm	φ26mm	7.5/5.5kW	
			φ35mm		
	6,000min <sup>-1</sup>	φ75mm	φ26mm	11/7.5kW	
			φ35mm		
	8	3,500min <sup>-1</sup>	φ85mm	φ42mm	7.5/5.5kW
		Power tools type	4,500min <sup>-1</sup>	φ75mm	φ26mm
φ35mm					
6	6,000min <sup>-1</sup>		φ75mm	φ26mm	11/7.5kW
				φ35mm	



1,360mm Floor Space is only  
**1.85m<sup>2</sup>**  
1,360mm

## Compact design continued on the XC-100

Like the XC-100, the XL-100 is designed as multi-function compact machine. It has the same 1.85m<sup>2</sup> floor space as XC-100 and with additional milling capability. This machine is also an energy-saving design, and with excellent features to enhance the working environment.

## Spindle Acceleration Tune Parameter

By setting the parameter spindle speed, spindle speed reduces the time, helping to reduce cycle time

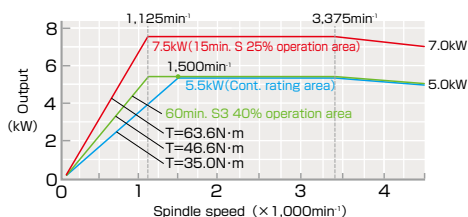
(Comparison with the past machines)

Acceleration Time(0→4,500min<sup>-1</sup>) : **60% Decreased**

Deceleration Time(4,500→0min<sup>-1</sup>) : **47% Decreased**

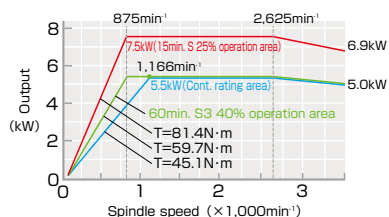
### XL-100 Spindle motor torque diagram

■ Max.4,500min<sup>-1</sup> standard type (AC 7.5/5.5kW) φ75



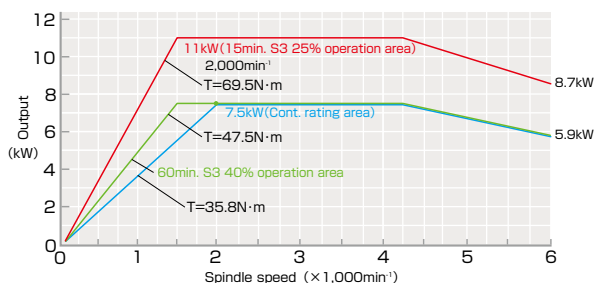
### XL-100 Spindle motor torque diagram

■ Max.3,500min<sup>-1</sup> standard type (AC 7.5/5.5kW) φ85



### XL-100 Spindle motor torque diagram

■ Max.6,000min<sup>-1</sup> standard type (AC 11/7.5kW) φ75





# XL-150

## Achieved Double Production Efficiency with Significantly Improved Cutting Capability!

### Spindle with Upgraded Capability

By using an AC11/7.5kw spindle motor which is a standard feature, a stress free hard turning process is possible. The production efficiency is further enhanced by significantly shortening the spindle start-up acceleration and deceleration times as compared to those of the conventional machine. This leads to shorter idling time. Furthermore, an AC15/11kW spindle motor can be installed as an option..

#### Improved Outer Diameter Cutting Capability



Cutting Cross Sectional Area( $t \cdot f$ )  
**1.80mm<sup>2</sup>**

Short Time Rating Result

**1.5times**  
(Comparison with the past machines)

#### Reduction in Spindle Acceleration and Deceleration Times

Acceleration Time  
4.0sec → **2.4sec**

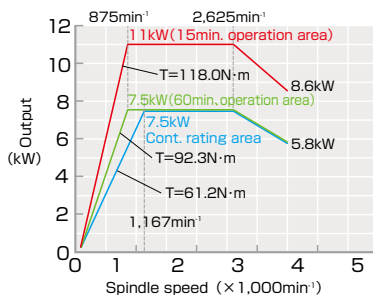
**40% Reduction**  
(Comparison with the past machines)

Deceleration Time  
3.8sec → **2.4sec**

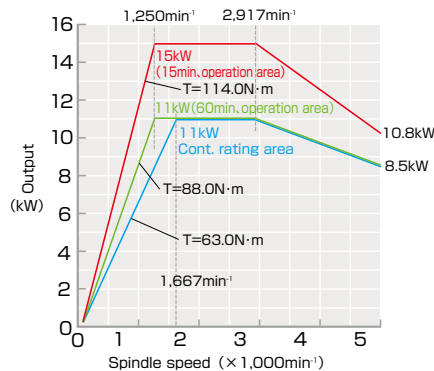
**40% Reduction**  
(Comparison with the past machines)

### XL-150 Spindle motor torque diagram

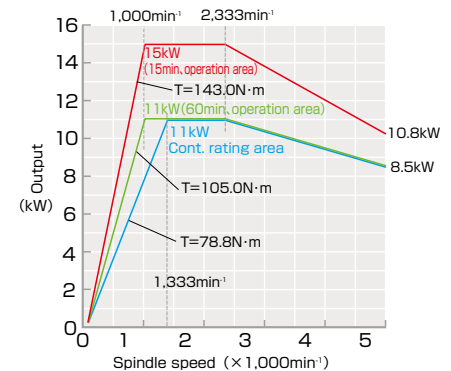
■ 8-station turret Max.3,500min<sup>-1</sup>  
(AC 11/7.5kW)  $\phi$ 100



■ 12-station turret Max.5,000min<sup>-1</sup>  
(AC 15/11kW)  $\phi$ 100



■ 12-station turret Max.4,000min<sup>-1</sup>  
(AC 15/11kW)  $\phi$ 120



### Live Tools with Further Enhanced Machining Capability

The torque is improved by using a more powerful motor than the one used in the conventional machines and the machining ability of the live tool drive is increased by using a bearing on the driving unit with better rigidity. Max.  $\phi$ 20mm tool can be mounted providing a wide range of tool selection. Live tools can be mounted on all stations of the turret of up to 12 live tools.

Drive motor AC5.5/3.7/2.2kW Motor Torque 35N·m

#### Performance Comparison (Drill Cutting)

- Drill :  $\phi$  12mm
- Cutting Conditions : Rim Speed 30m/min, Hole Depth 30mm



■ XL-150 :  $f$ 0.4mm/rev → **5.6sec**

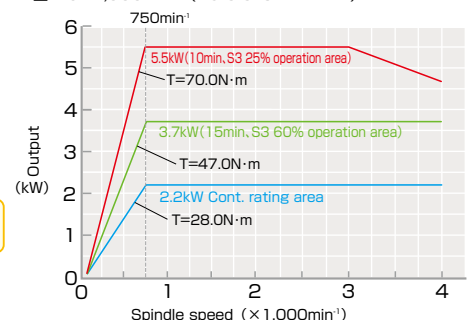
■ Conventional model :  $f$ 0.2mm/rev → **11.2sec**

**-5.6sec**

※Live Tool is an option.

#### Power Tools Motor Diagram

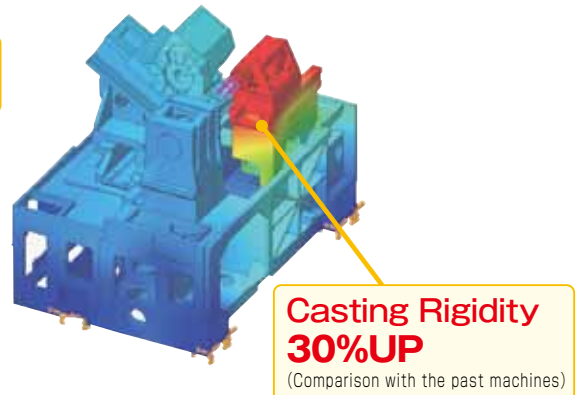
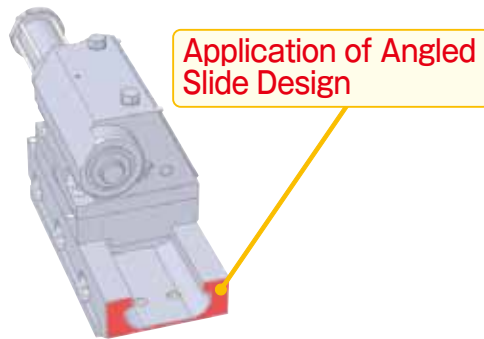
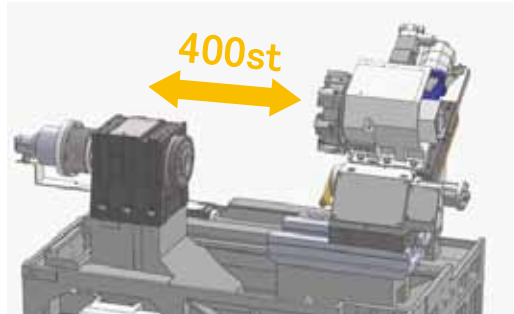
■ Max.4,000min<sup>-1</sup> (AC 5.5/3.7/2.2kW)



## Supports 370mm Long Shaft with Extended Z-Axis Stroke

Even though the machine width is the same as conventional machines, a shaft work of maximum length 370mm can be processed due to the Z-Axis stroke increased to 400mm which is an extra 1.2 times in length.

With the extension of the stroke, the rigidity of the tailstock is increased. By applying the angled slide design and increasing the casting rigidity by 30%, prevention of vibrations and uniform dimensional accuracy are achieved.



## Reasonable Maintenance for Workload Reduction

The points requiring routine maintenance (lubricating oil supply, chuck pressure adjustment, loader adjustment, etc.) are concentrated on the front of the machine, improving working convenience for the operator. New TAKAMAZ maintenance functions such as the battery replacement warning have been added too. The number of days remaining until a scheduled inspection, which had been hard to determine, can now be monitored at a glance thanks to the adoption of a graph display, assisting with reliable and safe equipment management.

Door Opening Width  
**520mm**



### Periodic Inspection Notice Function



Work Counter Display



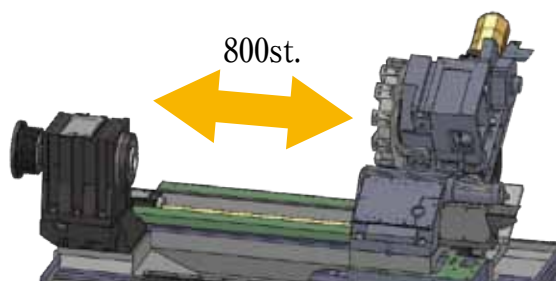
Soft Switch Display

# XL-200

## Max. Length 720 mm! Accommodates Long Shaftwork

### Extending the Z axis stroke gives the longest machining range in our X series

Increasing the length of the Z axis stroke by 40% compared to existing models has made it possible to handle a wide range of machining on large, long workpieces up to 720 mm in length and  $\phi 340$  mm in diameter. The floor space, which would naturally tend to increase with the extension of the Z axis stroke, has been kept as compact as with the existing machines by reviewing and optimizing the construction of components.



### Equipped for Heavy-duty Cutting + Versatile Complex Machining

Specifications can be chosen according to requirements, enabling versatile complex machining. Furthermore, heavy cutting requirements can be met with the high torque spindle motor and live tool motors.

Standard type

Power tools type

Tailstock type

Subspindle type

Power tools+  
Subspindle type

### Selectable Spindle Variations

**A**

$\phi 100$  Spindle  
AC 11/7.5kW  
3,500min<sup>-1</sup>

**B (Option)**

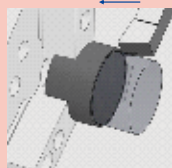
$\phi 100$  Spindle  
AC 18.5/15kW  
5,000min<sup>-1</sup>

**C (Option)**

$\phi 120$  Spindle  
AC 18.5/15kW  
4,000min<sup>-1</sup>

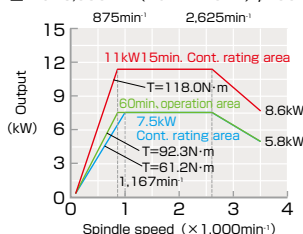
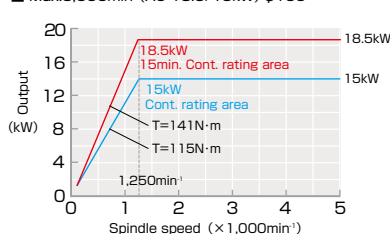
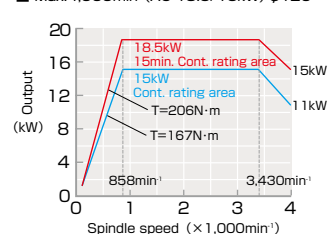
### Outer Diameter Cutting Capability

0.6mm/rev



Cutting Cross  
Sectional Area (t\*f)  
**3.0 mm<sup>2</sup>**

※The test results above  
are for the C type  
specifications.

■ Max.3,500min<sup>-1</sup>(AC 11/7.5kW)  $\phi 100$ ■ Max.5,000min<sup>-1</sup>(AC 18.5/15kW)  $\phi 100$ ■ Max.4,000min<sup>-1</sup>(AC 18.5/15kW)  $\phi 120$ 



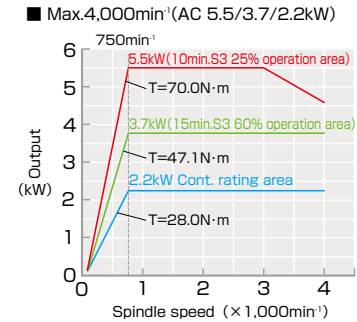


## High Productivity Achieved with Powerful Milling (Option)

From milling to hole drilling, high efficiency machining is realized.

Switchover from turret rotation to live tool rotation **shortened by 0.7 seconds**  
(comparison with existing models)

Item		Unit	
Power tools	Tool storage capacity	pcs.	12
	Max. rotating speed	min <sup>-1</sup>	4,000
	Motors	kW	AC5.5/3.7/2.2
	Drill(short)	mm	φ20
	Clamping Capability		
	Endmill	mm	φ20
	Tap	mm	M16

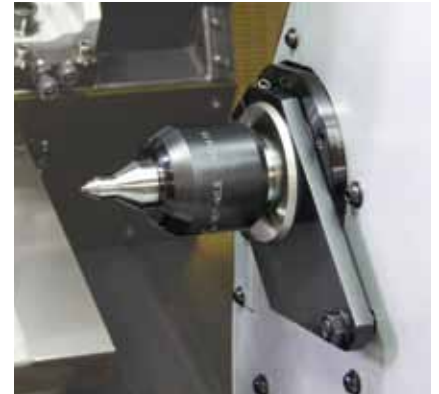


## Idle Time Shortened by Adopting a Servo-controlled Tailstock(Option)

The incorporation of a servo-controlled tailstock improves operating convenience and makes setup changes easier. Since the tailstock can be moved accurately to memorized positions using M code commands, even long workpieces can be machined with high accuracy. What is more, workpieces with multiple types can be handled with program changes alone, allowing substantial idle time reduction.

Item	Unit	
Pointed End		MT-5
Quill O.D.	mm	φ90
Quill stroke (hydraulic)	mm	120
Tailstock stroke (servomotor)	mm	500
Rapid traverse rate	m/min	12
Max. thrust	kN	5(7)*

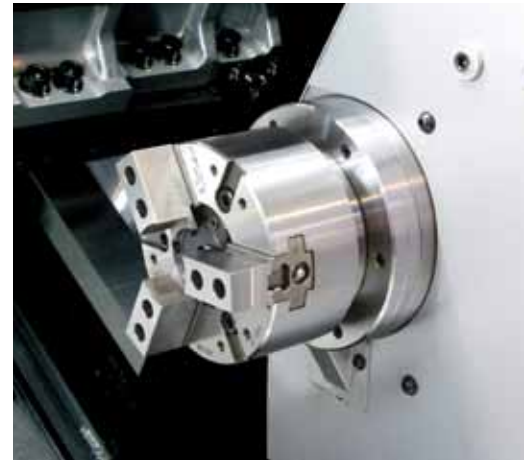
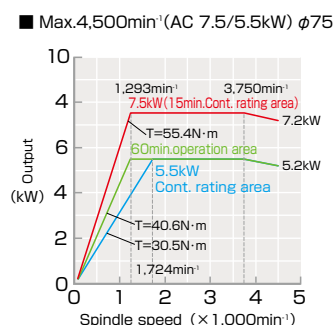
\*Selectable up to a maximum of 7 kN (Option)



## Completed Products Machinable on 1 Machine With the Subspindle(Option)

The incorporation of a subspindle allows this single machine to generate completed products from flange-like work to shaftwork.

Item	Unit	
Chuck size	inch	6
Max. bar diameter	mm	φ26
Subspindle speed	min <sup>-1</sup>	200~4,500
Subspindle motor	kW	AC7.5/5.5
Max. stroke	mm	700
Rapid traverse rate(A-axes)	m/min	30
Rapid traverse rate(B-axes)	deg/min	21,600
Synchronous system		Full
Machine dimension	mm	3,100(L)×1,845(W)×1,810(H)
Machine weight	kg	4,900

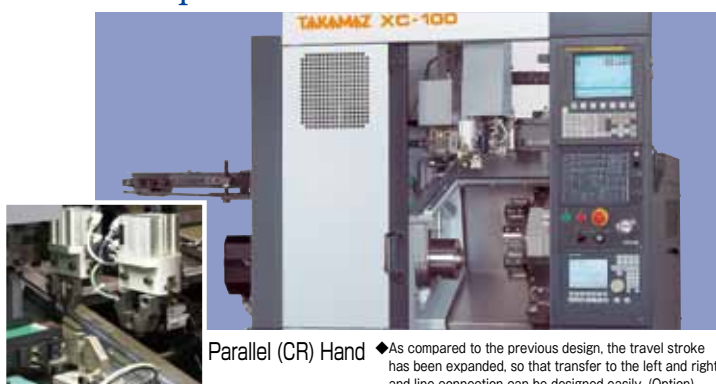


## Equipped with the [Speed] and [Small Footprint] Servo Loader[Σi series]

As a result of machine body and loader integrated as one unit, superiority in design balance is accomplished as well as high productivity and space savings, and with after-sale service by **TAKAMAZ**, will benefit the customer on different aspects.

- ◆The rate for each moving point, acceleration and deceleration, and in-position width can be set in detail to achieve a shorter cycle time.
- ◆High Speed Shutter opens and closes in 1.4 seconds, faster than the conventional model. This results in reducing loading time. (XC-100)
- ◆To improve usability, the conventional type of fixed operation panel or the new handheld type can be selected. As a result, the teaching points that have been difficult to see because of the safety covers can now be set with ease.
- ◆At each point, the interlock can be set to prevent accidental collision.
- ◆Abnormal Torque Detection is set standard function to reduce damage to minimum in the event of a collision.
- ◆All database, the servo parameter, the data tables, and timer setting can be downloaded from the memory card.

### Compact servo loader Σi



Parallel (CR) Hand

- ◆As compared to the previous design, the travel stroke has been expanded, so that transfer to the left and right and line connection can be designed easily. (Option)
- ◆IN / OUT conveyor, turn device, and handling are common with X-100.

### Gantry-type servo loader ΣiGH



Q Hand

### Loader transfer capacity

Item			Unit	Compact(2 axes)		Gantry(2 axes)		
Model				XC/XL-100	XL-150	XC/XL-100	XC/XL-150	XL-200
Loader				ΣiC60	ΣiC80	ΣiGH80	ΣiGH150	
Workpiece dimension	Diameter	mm	60	80	80	150		
	Weight (One side)	kg	1.0	1.5	1.5	5.0		
Shoulder (Traverse axis:Z)	Drive system		Servomotor			Servomotor		
	Stroke	mm	Depends on spec.			Depends on spec.		
	Rapid traverse rate	m/min	84			155		
Arm (Vertical axis : Y)	Drive system		Servomotor			Servomotor		
	Stroke	mm	300	500	460	580	800	
	Rapid traverse rate	m/min	71	84	125		85	
Hand rotation	Drive system		Air cylinder			Air cylinder		
	Angle	deg	90			180		
	Jaw stroke	mm	10			10		
	Hand type		Parallel (CR) hand			Q hand		

### Automation Peripheral Devices

A production line with different varieties of peripheral devices and loading variations can be designed.



Station stocker

Multi-layer stocker for flexible response to changes in workpiece diameter.



Flat stocker



Shaft work stocker



Parts feeder

A cylindrical stocker with minimum footprint for storing small workpieces.



Tray changer

Workpieces can be stored together with the tray.

## Wide variation supported by many years of experience

The following is just one example from among a substantial series of peripheral equipment backed up by the "X-100", with its delivery record of more than 6,000 units. Consult Takamatsu for details of turnkey systems with strategic flexibility.

※Some pictures show additional special specification.

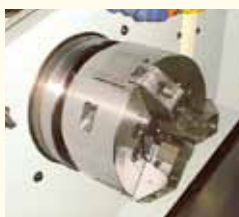
### Spindle/Tooling unit



Collet chuck



6-inch chuck



8-inch chuck



Unloader unit



Tool breakage detector

A wide range of choice from Takamatsu original collet chucks to 8-inch/3-jaw chucks to match user needs.

### Quality/Environment control unit



External measurement instrument

Dimensional errors are fed back to the machine to maintain high dimensional accuracy.



Cleaning unit

To avoid dirtying operator's hands, cleaning is performed automatically.



Oil mist collector

Oil mist collection facilitates a clean production environment.



Automatic fire extinguisher

If fire breaks out in the machine during automatic operation, fire extinguishing agent is automatically discharged.

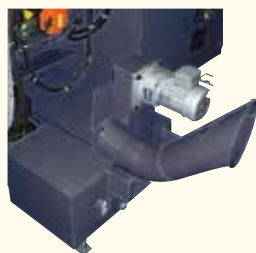
### Cutting efficiency/Chip disposal



Alloyed Clamp Holder for vibration suppression

Inhibiting the progression of wear boundary is expected to extend cutting tool life in high speed machining.

■ Mounted on the rear side



Chip conveyor (Spiral type)

Chip disposal is done semi-automatically in the minimum space.

■ Mounted on the rear side



Chip conveyor (Floor type)

Chips are reliably discharged outside the machine.



High-pressure coolant

Constantly cooled coolant is discharged at high pressure so that the tool life is significantly prolonged.



Semi-dry machining

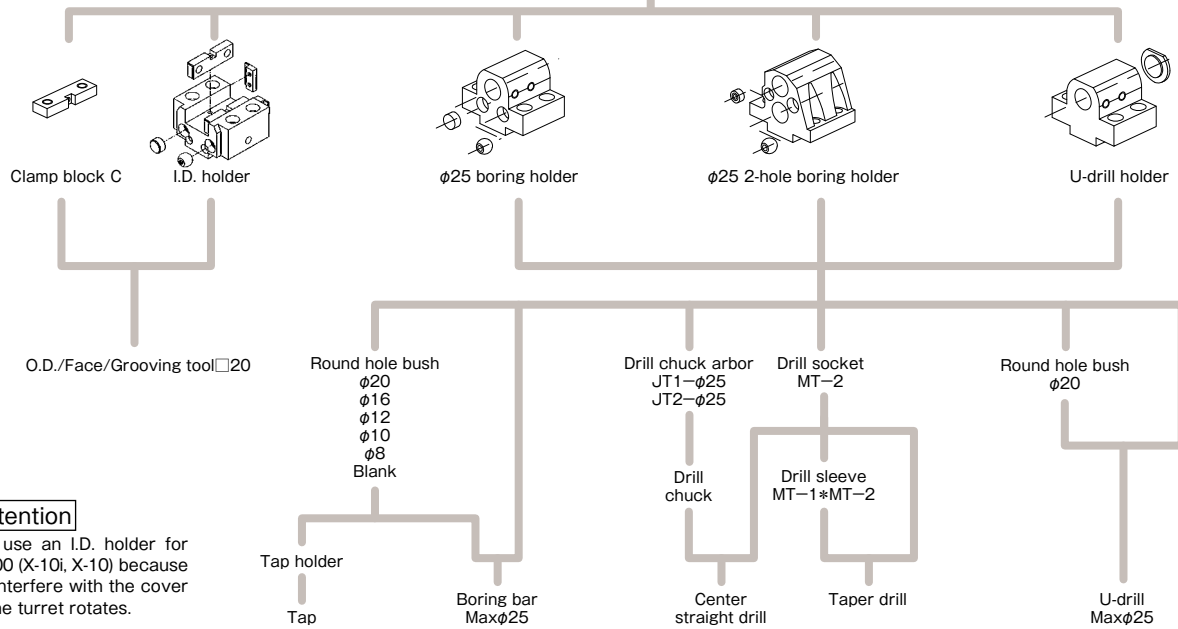
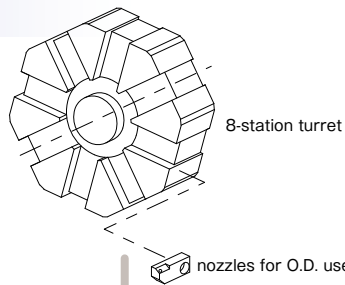
Ultratrace, highly-lubricating vegetable coolant is applied to the correct point on the cutting edge, realizing semi-dry machining.



# TOOLING SYSTEM & FLOOR SPACE

## Tooling system

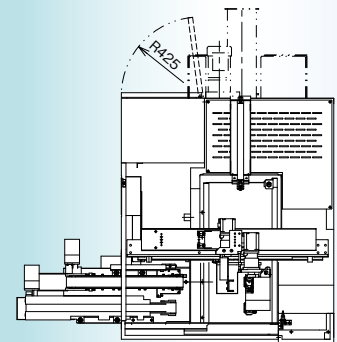
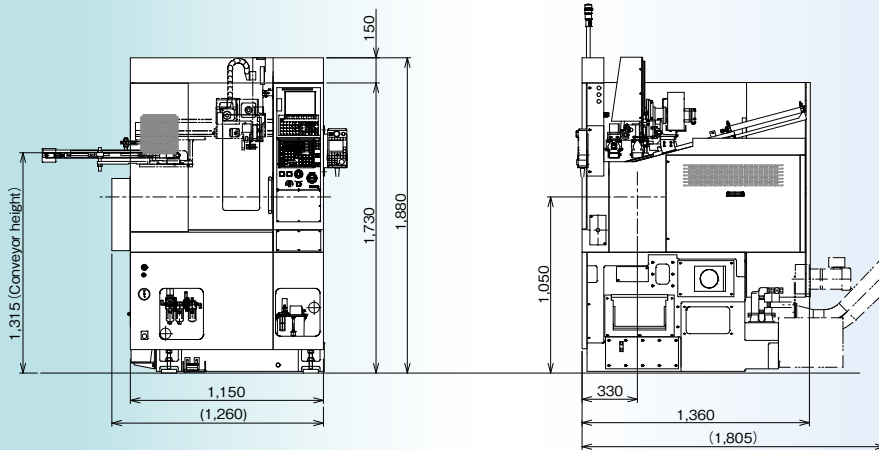
# XC-100



### Attention

Do not use an I.D. holder for the X-100 (X-10i, X-10) because it may interfere with the cover when the turret rotates.

## Floor Space Drawing (Equipped with $\Sigma$ iC60)



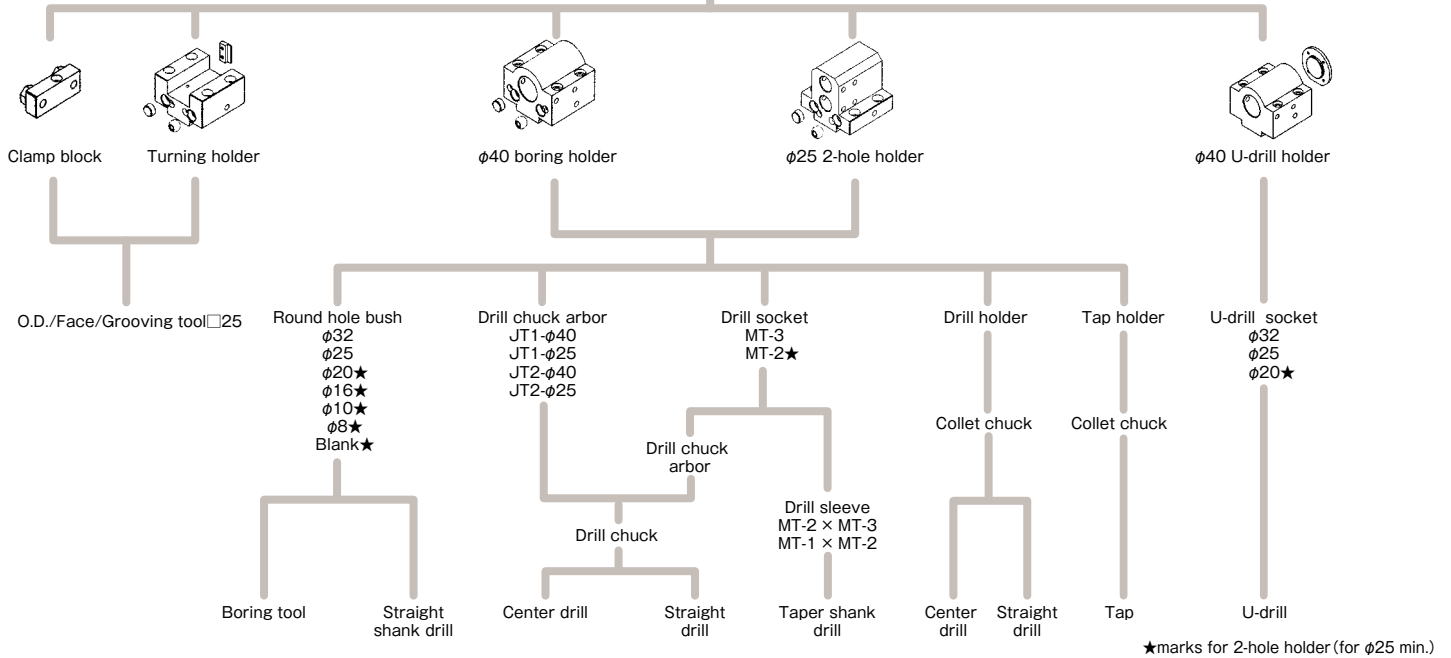
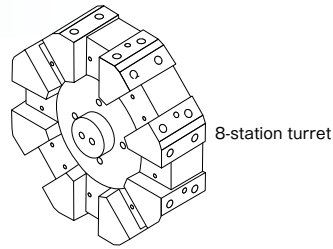
Unit(mm)



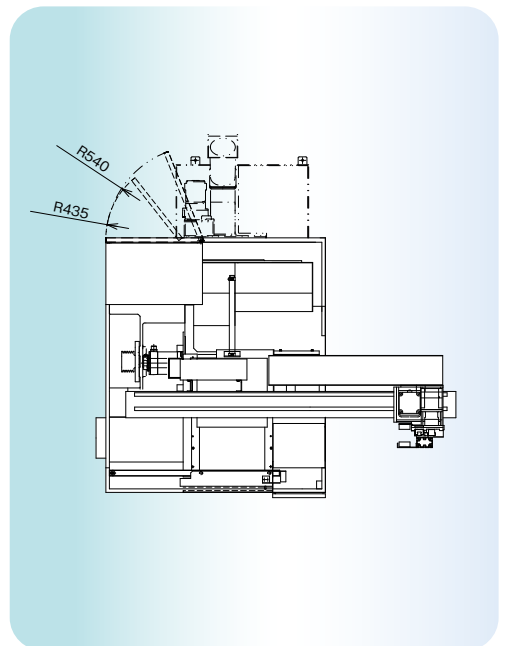
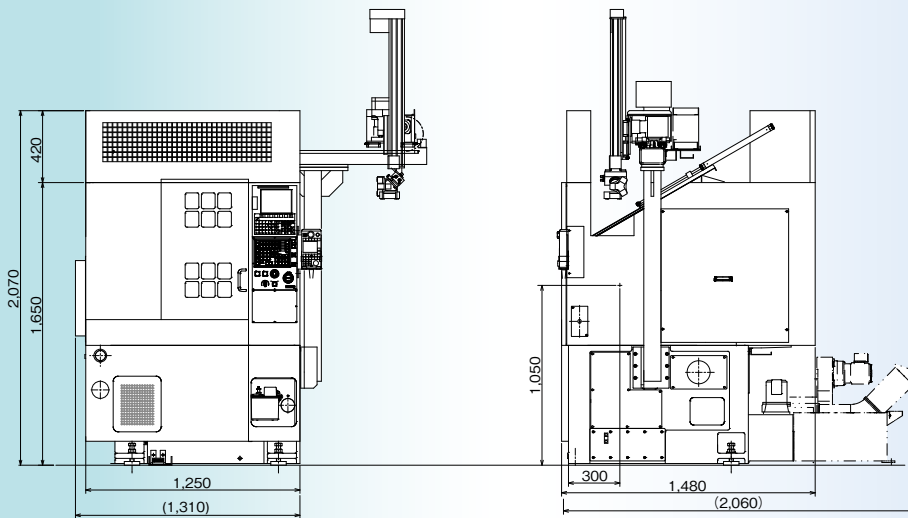
# TOOLING SYSTEM & FLOOR SPACE

## Tooling system

# XC-150



## Floor Space Drawing (Equipped with ΣIGH150)



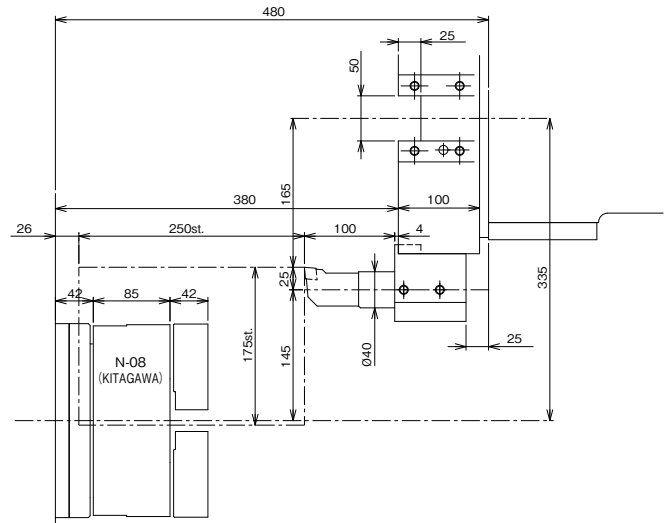
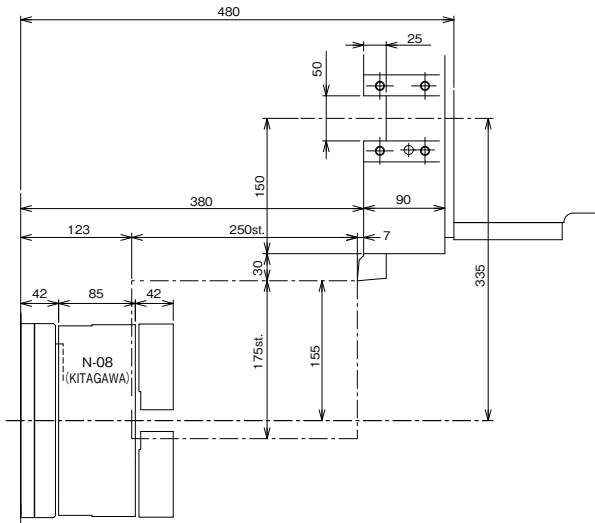
Unit(mm)



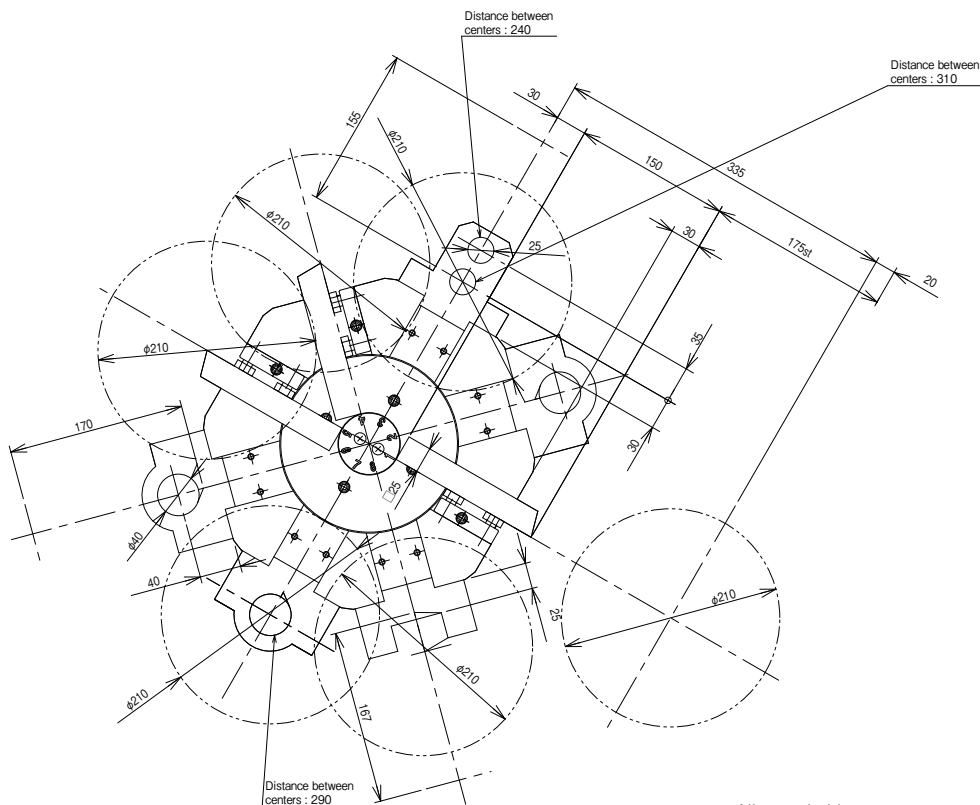
# STROKE & TURRET

## Stroke-Related Drawing

### XC-150



## Turret Interference



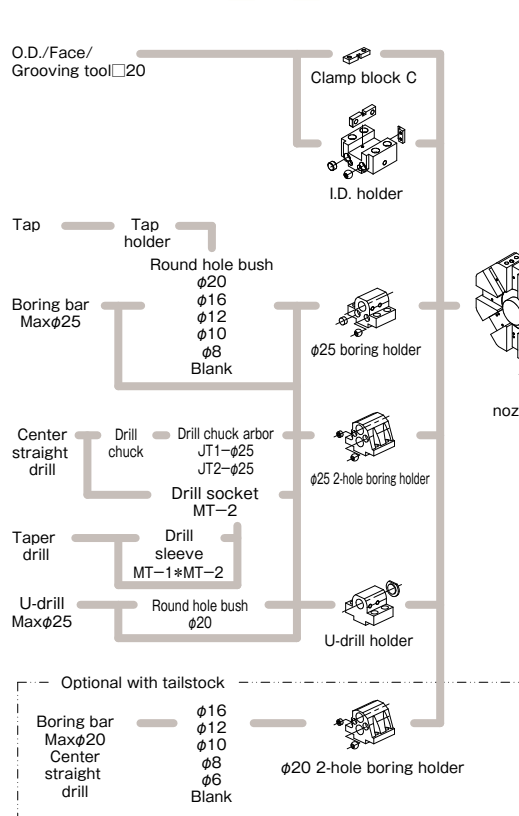
All turret holders are common to those used for [X-150PLUS].

Unit (mm)

# TOOLING SYSTEM & FLOOR SPACE

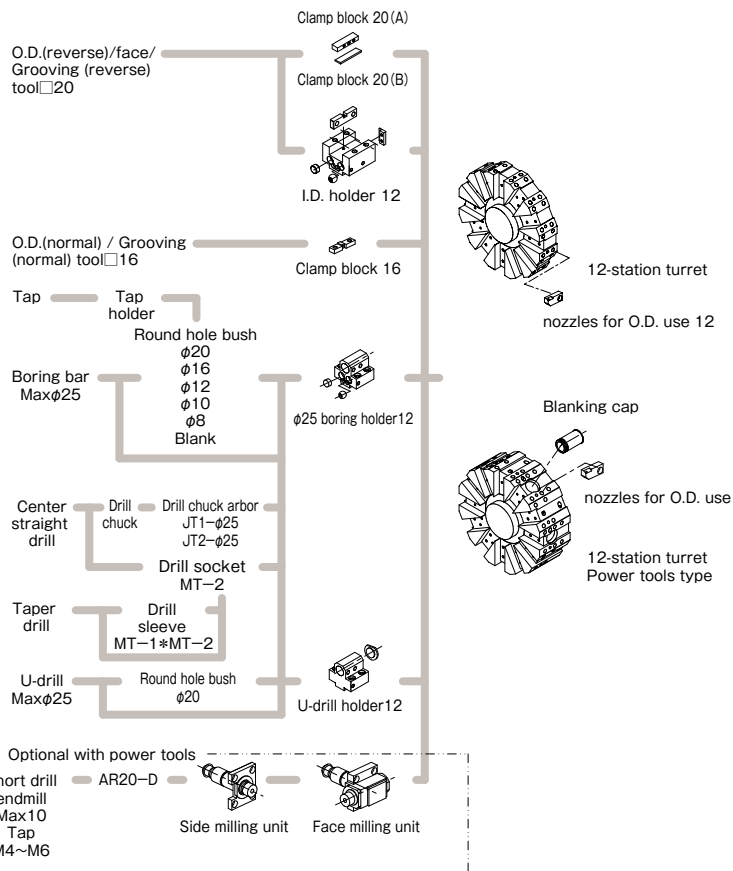
## Tooling system

### XL-100



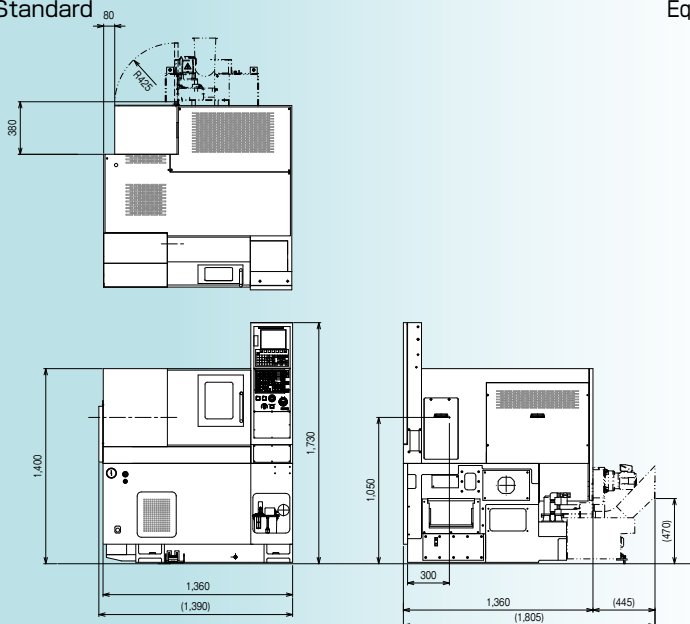
#### Attention

Do not use an I.D. holder for the X-100 (X-10i, X-10) because it may interfere with the cover when the turret rotates.

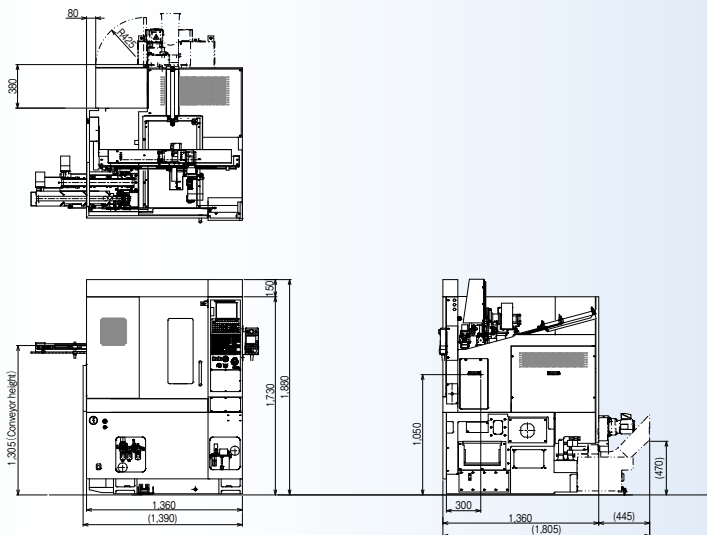


## Floor Space Drawing

### Standard



### Equipped with ΣiC60



Unit (mm)

## Stroke-Related Drawing

Technical drawings of the tailstock assembly for a lathe, showing three configurations (a), (b), and (c). The drawings include dimensions for overall size, stroke, and component placement.

**Configuration (a):** Shows the tailstock with an ordinary collet and N-06 KITAGAWA. Dimensions include overall width (482, 405, 64, 13), Z-axis stroke (280st), X-axis stroke (120st), and tailstock spindle stroke (85st). The total width is 573.

**Configuration (b):** Shows the tailstock with an ordinary collet and N-06 KITAGAWA. Dimensions include overall width (482, 405, 64, 13), Z-axis stroke (280st), X-axis stroke (120st), and tailstock spindle stroke (85st). The total width is 573.

**Configuration (c):** Shows the tailstock with an ordinary collet and N-06 KITAGAWA. Dimensions include overall width (482, 405, 64, 13), Z-axis stroke (280st), X-axis stroke (120st), and tailstock spindle stroke (85st). The total width is 573.

Technical drawing of a 3-station turret. The drawing includes a plan view (top) and a section view (bottom right).

**Plan View Dimensions:**

- Distance between centers: 200
- Distance between centers: 134
- Distance between centers: 160
- Dimensions: 130, 125, 30, 120st, 90, 30
- Circle diameters:  $\phi 210$ ,  $\phi 165$ ,  $\phi 400$ ,  $\phi 165$ ,  $\phi 210$ ,  $\phi 180$ ,  $\phi 210$ ,  $\phi 165$ ,  $\phi 210$ ,  $\phi 25$
- Standard
- 33.20
- 1 Standard

**Section View:**

- Shows the internal structure of the turret.
- Dimensions: 130, 125, 30, 120st, 90, 30
- Circle diameters:  $\phi 210$ ,  $\phi 165$ ,  $\phi 210$ ,  $\phi 180$ ,  $\phi 210$ ,  $\phi 165$ ,  $\phi 210$ ,  $\phi 25$
- Standard
- 33.20
- 1 Standard

[illegible][illegible][illegible]

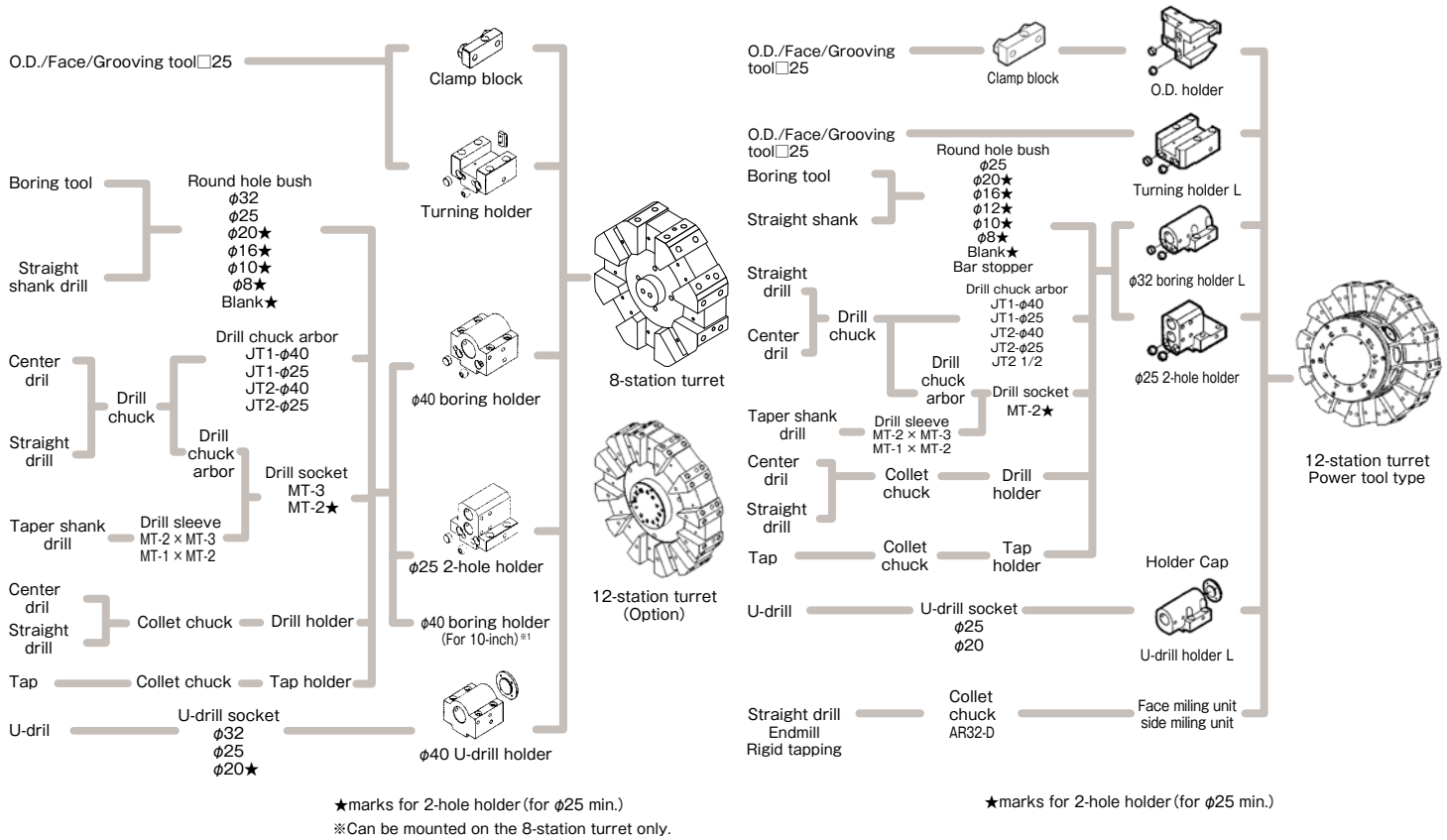
22



# TOOLING SYSTEM & FLOOR SPACE

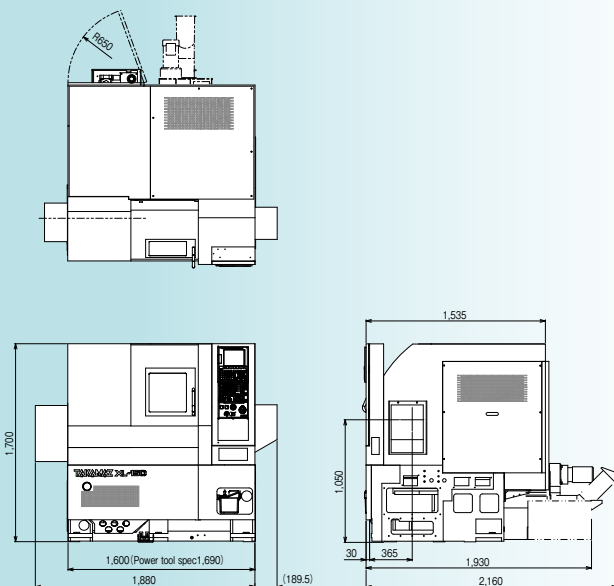
## Tooling system

### XL-150

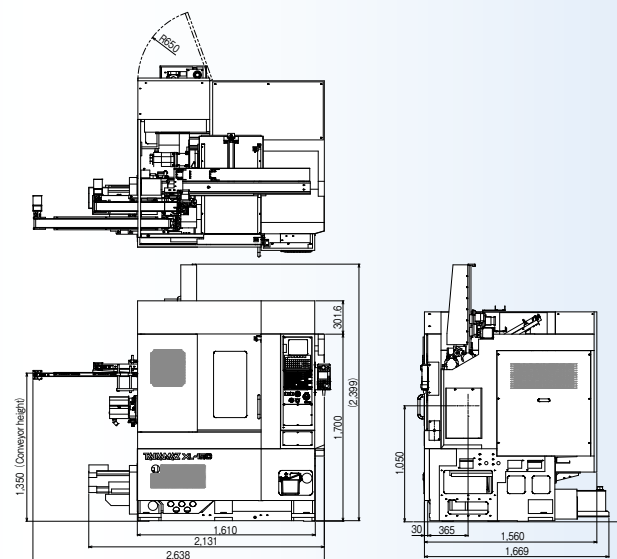


## Floor Space Drawing

### Standard



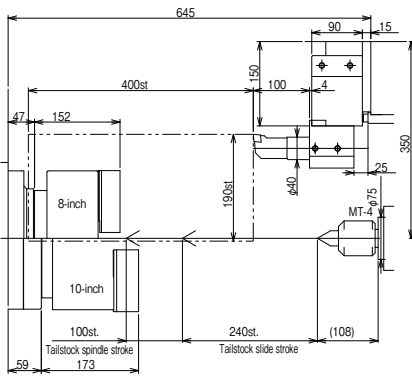
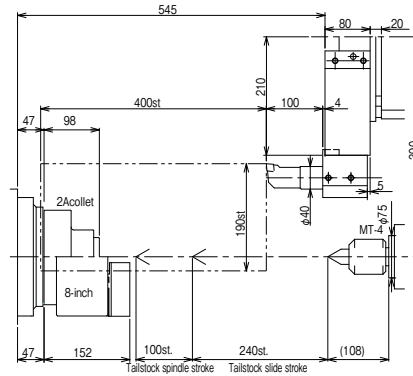
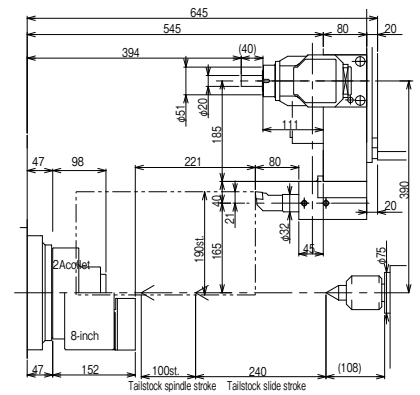
### Equipped with ΣiC80



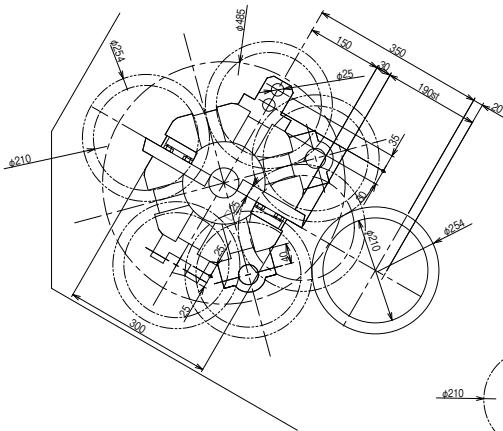
Unit (mm)

## Stroke-Related Drawing

8-station turret

[illegible][illegible]

## 8-station turret

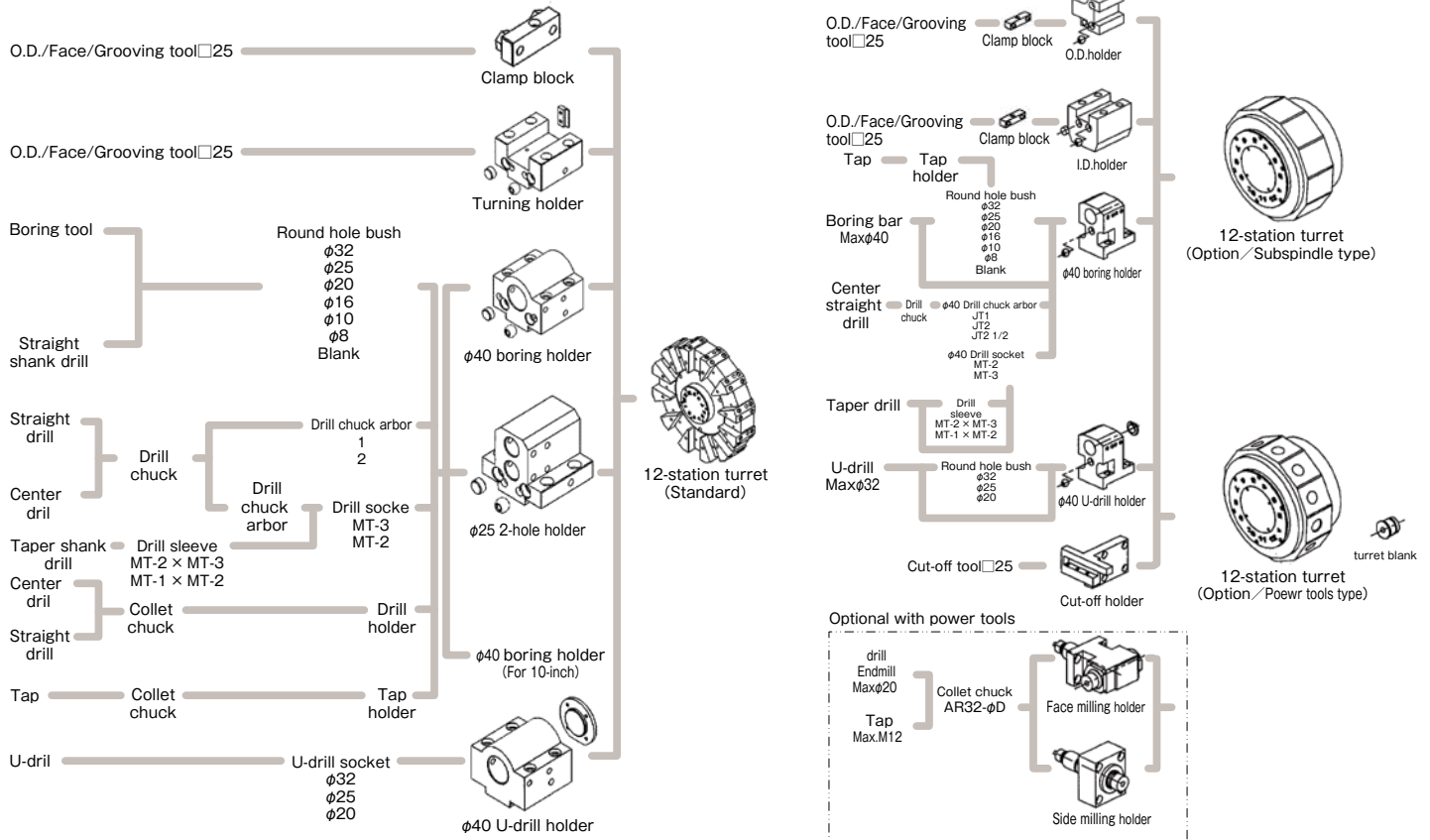
[illegible]

24

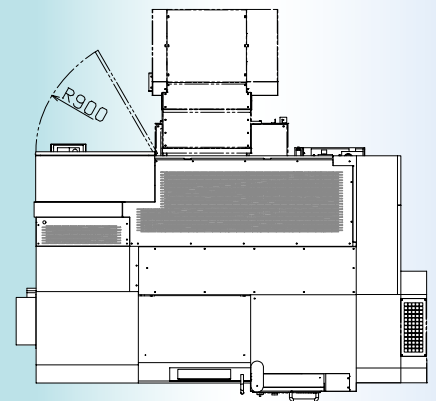
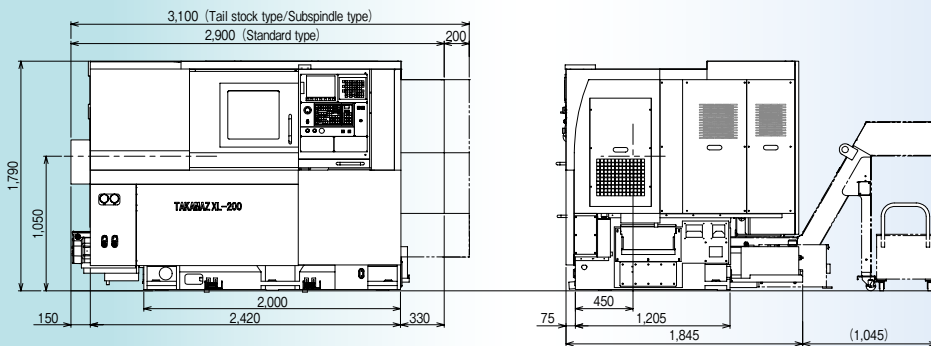
# TOOLING SYSTEM & FLOOR SPACE

## Tooling system

### XL-200



## Floor Space Drawing



Unit (mm)



## Stroke-Related Drawing

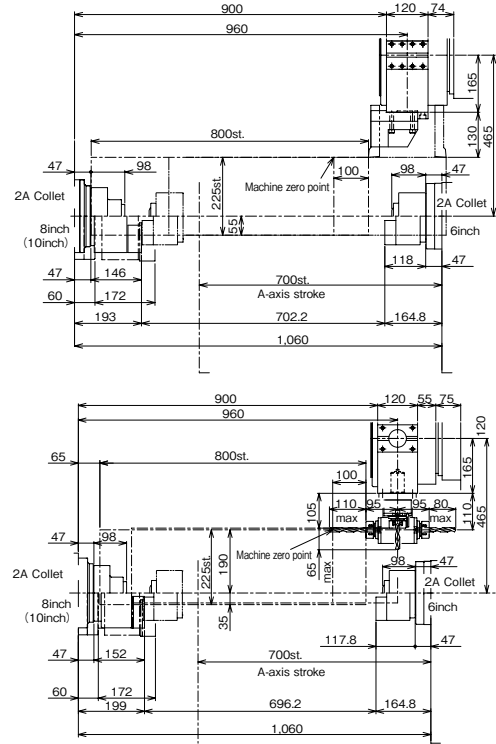
Technical drawing of the MT-5 machine, showing two views: a side view (top) and a front view (bottom).

**Side View (Top):**

- Overall width: 945
- Overall height: 455
- 2A Collet: 8 inch (10 inch)
- Tailstock spindle stroke: 120st
- Tailstock slide stroke: 500st
- Machine label: MT-5
- Dimensions: 138, 800st, 210, 7, 100, 30, 225st, 10, 47, 98, 152, 172, 717.2, 1,060.

**Front View (Bottom):**

- Overall width: 900
- Overall height: 465
- 2A Collet: 8 inch (10 inch)
- Tailstock spindle stroke: 120
- Tailstock slide stroke: 500
- Machine label: MT-5
- Dimensions: 960, 120, 55, 75, 65, 800st, 100, 105, 110 max, 95, 95, 80 max, 110, 65 max, 65, 98, 47, 190, 35, 120, 152, 172, 199, 717.2, 1,060, 143.8.



Technical drawing of a circular machine component, likely a motor or generator, showing a top view. The drawing includes the following dimensions and labels:

- Distance between centers : 430** (indicated at the top)
- φ210** (multiple instances indicating hole diameters)
- φ250** (indicating a larger hole diameter)
- φ570** (indicating the outer diameter of the main body)
- φ150** (indicating a smaller hole diameter)
- φ590 (10inch offset holder)** (indicating the offset holder diameter)
- 210**, **455**, **215**, **225st** (linear dimensions for mounting or spacing)
- 57**, **30**, **20** (smaller linear dimensions)
- Q<sub>2</sub>** (label for a specific feature or port)

Technical drawing of a turret lathe headstock showing dimensions and components:

- n turret**
- de type)**
- Distance between centers : 410**
- Distance between centers : 380**
- Spindle ( $8'' \times 10'$ ) Subspindle ( $6''$ )**
- Dimensions:** 165, 465, 130, 170, 225 $\phi$ , 55,  $\phi 210$ ,  $\phi 254$ ,  $\phi 600$ ,  $\phi 210$ ,  $\phi 254$ .

[illegible]

Distance between centers : 380

Distance between centers : 410

165

465

130

170

225 total

225

55

65

68

37

3/4

95

110

110

254

210

165

210

254

6

Distance between centers : 380

Spindle (8", 10")

Subspindle (6")

Uni

26

# SPECIFICATION

## Machine Specifications

Item		Unit	XC-100	XC-150
Capacity	Max. turning diameter	mm	φ180	φ290
	Max. turning length	mm	190	204
	Max. bar diameter	mm	Solid (φ26)	Solid (φ42, φ51)
	Chuck size	inch	6	8
Spindle	Spindle nose	JIS	A2 - 5	φ170 Flat
	Spindle Bearing I.D.	mm	φ75	φ100
	Through-hole on spindle	mm	φ46	φ61
	Spindle speed	min <sup>-1</sup>	Max.4,500	Max.3,500
Tool post	Type		8-station turret	8-station turret
	Tool shank	mm	□20	□25
	Boring holder I.D.	mm	φ25	φ40
	Max. stroke	mm	X : 120 Z : 230	X : 175 Z : 250
	Rapid traverse rate	m/min	X : 12 Z : 18	X : 18 Z : 24
Motors	Spindle motor	kW	AC7.5/5.5	AC11/7.5
	Feed motor	kW	X : AC0.75 Z : AC1.2	X : AC1.2 Z : AC1.8
	Coolant motor	kW	AC0.25	AC0.25
	Hydraulic motor	kW	AC0.75	AC0.75
Size	Spindle center height	mm	1,050	1,050
	L×W×H	mm	1,150×1,360×1,730	1,250×1,480×1,650
	Machine weight	kg	1,900	2,800
Total electric capacity		KVA	15	20

( ): Option

## Standard Accessories

Item	XC-100	XC-150
<input type="checkbox"/> Boring holder		2 sets
<input type="checkbox"/> Clamp block		8 sets
<input type="checkbox"/> Collet flange	1 set	(Option)
<input type="checkbox"/> Coolant block	8 sets (nozzles for O.D. use)	8 sets (For reverse cutting tools)
<input type="checkbox"/> Hydraulic power chuck	(Option)	1 set (8" )
<input type="checkbox"/> Hydraulic chucking cylinder(Solid)		1 set
<input type="checkbox"/> Hydraulic unit		1 set
<input type="checkbox"/> Thread cutting unit (Including constant surface speed control)	(Option)	1 set
<input type="checkbox"/> Coolant unit	1 set (130 lit.)	1 set (140 lit.)
<input type="checkbox"/> Service tool kit		1 set
<input type="checkbox"/> TAKAMAZ Instruction manual		1 set

## Optional Accessories

Item	XC-100	XC-150
<input type="checkbox"/> Tool holders		○
<input type="checkbox"/> Collet chucks		○
<input type="checkbox"/> Hydraulic chucks by chuck manufacturers		○
<input type="checkbox"/> Clamp holder (Vibration-suppressing alloy)		○
<input type="checkbox"/> Chuck clamp detector		○
<input type="checkbox"/> Hollow chucking cylinder		○
<input type="checkbox"/> TAKAMAZ loader system		○
<input type="checkbox"/> Bar feeder system		○
<input type="checkbox"/> Unloader		○
<input type="checkbox"/> Work set detector		○
<input type="checkbox"/> Spindle indexing device (Electrical)		○
<input type="checkbox"/> Thread cutting unit (Including constant surface speed control)	○	Standard
<input type="checkbox"/> Rear chip conveyor (Floor type / Spiral type)		○
<input type="checkbox"/> Front air blower		○
<input type="checkbox"/> Rear air blower		○
<input type="checkbox"/> Rear coolant unit		○
<input type="checkbox"/> Signal light(1-color / 2-color / 3-color)		○
<input type="checkbox"/> Automatic fire extinguisher		○
<input type="checkbox"/> Automatic power shut-off device		○
<input type="checkbox"/> Automatic door system(Auto door / Shutter)		○
<input type="checkbox"/> Special color		○
<input type="checkbox"/> Others		○*

\* For more information on attachments, consult our sales representative.

## Machine Specifications

Item		Unit	XL-100			XL-150		
			6-inch type	8-inch type	Power tool type	8-station turret	12-station turret	Power tool type
Capacity	Max. turning diameter	mm	φ180			φ320	φ280	φ240
	Max. turning length	mm	240			180	370	300
	Max. bar diameter	mm	Solid (φ26,φ35)	Solid (φ42)	Solid (φ26,φ35)	Solid (φ42,φ51,φ65)		Solid (φ42,φ51)
	Chuck size	inch	6	8	6	8 (10)	8	
Spindle	Spindle nose	JIS	A2 - 5			A2 - 6 (A2 - 8)		A2 - 6
	Spindle Bearing I.D.	mm	φ75	φ85	φ75	φ100 (φ120)		φ100
	Through-hole on spindle	mm	φ46	φ52	φ46	φ61 (φ80)		φ61
	Spindle speed	min <sup>-1</sup>	Max.4,500 (6,000)	Max.3,500	Max.4,500 (6,000)	Max.3,500 (5,000) (4,000)		Max.3,500 (5,000)
	Spindle indexing	deg/min	—			—		—
	—			—		—		
Tool post	Type		8-station turret (12-station)	8-station turret	12-station turret	8-station turret	12-station turret	
	Tool shank	mm	8-station turret : □20, 12-station turret : □20 (□16)※			□25		
	Boring holder I.D.	mm	φ25			φ40		φ32
	Max. stroke	mm	X:120 (tailstock:90) Z:280			X : 190 Z : 400		
	Rapid traverse rate	m/min	X:12 Z:18			X : 18 Z : 24		
Power tools	Tool storage capacity		—			—		12
	Max. rotaring speed	min <sup>-1</sup>	—			—		Max.4,000
	Max. capacity	mm	—			—		φ20 M4~M16
Motors	Spindle motor	kW	AC7.5/5.5 : φ75 spindle 4,500min <sup>-1</sup> (AC11/7.5 : φ75 spindle 6,000min <sup>-1</sup> ) (AC7.5/5.5 : φ85 spindle 3,500min <sup>-1</sup> )			AC11/7.5 : φ100 spindle 3,500min <sup>-1</sup> (AC15/11 : φ100 spindle 5,000min <sup>-1</sup> ) (AC15/11 : φ120 spindle 4,000min <sup>-1</sup> )		AC11/75 : φ100 spindle 3,500min <sup>-1</sup> (AC15/11 : φ100 spindle 5,000min <sup>-1</sup> )
	Feed motor	kW	X : AC0.75 Z : AC1.2			X : AC1.2 Z : AC1.8		
	Coolant motor	kW	AC0.25			AC0.25		
	Hydraulic motor	kW	AC0.75			AC0.75 (tailstock : AC1.5)		
	Power tools motor	kW	—			—		AC5.5/3.7/2.2
Size	Spindle center height	mm	1,050			1,050		
	L×W×H	mm	1,360×1,360×1,730			1,480×1,360×1,730		1,690×1,535×1,700
	Machine weight	kg	2,100			2,300		3,400
Total electric capacity		KVA	15~22 (depends on the specifications)			20~30 (depends on the specifications)		

\*For the 12 station turret, the  $\square 20$  square shank toolholder is mounted on the opposite direction while the  $\square 16$  (option) square shank toolholder is mounted positive.

( ) : Option

Item		Unit	XL-200	
			Standard	Power tool type
Capacity	Max. turning diameter	mm	$\phi 340 (\phi 300)$	
	Max. turning length	mm	720 (560)	
	Max. bar diameter	mm	Solid ( $\phi 42, \phi 51, \phi 65$ )	
	Chuck size	inch	8 (10)	
Spindle	Spindle nose	JIS	A2 - 6 (A2 - 8)	
	Spindle Bearing I.D.	mm	$\phi 100 (\phi 120)$	
	Through-hole on spindle	mm	$\phi 61 (\phi 80)$	
	Spindle speed	min <sup>-1</sup>	Max.3,500 (5,000) (4,000)	
Tool post	Spindle indexing	deg/min	—	
			(C-axis)	
Tool post	Type		12-station turret	
	Tool shank	mm	$\square 25$	
	Boring holder I.D.	mm	$\phi 40$	
	Max. stroke	mm	X : 225 Z : 800	
	Rapid traverse rate	m/min	X : 18 Z : 24	
Power tools	Tool storage capacity		—	
	Max. rotating speed	min <sup>-1</sup>	—	
	Max. capacity	mm	—	
Motors	Spindle motor	kW	AC11/7.5 : $\phi 100$ spindle 3,500min <sup>-1</sup> (AC18.5/15 : $\phi 100$ spindle 5,000min <sup>-1</sup> ) (AC18.5/15 : $\phi 120$ spindle 4,000min <sup>-1</sup> )	
	Feed motor	kW	X : AC1.8 Z : AC2.7	
	Coolant motor	kW	AC0.25	
	Hydraulic motor	kW	AC1.5	
	Power tools motor	kW	—	
Size	Spindle center height	mm	1,050	
	L×W×H	mm	2,900 (3,100) *1 × 1,845 × 1,790	
	Machine weight	kg	4,400	
Total electric capacity		KVA	24~51 (depends on the specifications)	

\*The XL-200subspindle specifications are given on page 14.

\*1 With Sub Spindle Mounted

( ) : Option

# SPECIFICATION

## Optional Machine Specifications

Item		Unit	XL-100	XL-150	XL-200
Tailstock	Taper size		MT-3	MT-4	MT-5
	Quill O.D.	mm	φ56	φ75	φ90
	Quill stroke	mm	85	100	120
	Tailstock stroke	mm	220	240	500
	Max. thrust	kN	3.5	5.3	5 (7)

( ): Option

## Standard Accessories

Item	XL-100	XL-150	XL-200
<input type="checkbox"/> Boring holder	2 sets		
<input type="checkbox"/> Clamp block	8 sets		12 sets
<input type="checkbox"/> Collet flange	1 set	(Option)	
<input type="checkbox"/> Coolant block	8 sets (nozzles for O.D. use)		12 sets
<input type="checkbox"/> Hydraulic power chuck	(Option)	1 set	
<input type="checkbox"/> Hydraulic chucking cylinder(Solid)	1 set		
<input type="checkbox"/> Hydraulic unit	1 set		
<input type="checkbox"/> Thread cutting unit (including constant surface speed control)	(Option)	1 set	
<input type="checkbox"/> Coolant unit	1 set (125 lit.)	1 set (140 lit.)	1 set (240 lit.)
<input type="checkbox"/> Service tool kit	1 set		
<input type="checkbox"/> TAKAMAZ Instruction manual	1 set		

## Optional Accessories

Item	XL-100	XL-150	XL-200
<input type="checkbox"/> Tool holders		○	
<input type="checkbox"/> Collet chucks		○	
<input type="checkbox"/> Hydraulic chucks by chuck manufacturers		○	
<input type="checkbox"/> Clamp holder (Vibration-suppressing alloy)		○	
<input type="checkbox"/> Chuck clamp detector		○	
<input type="checkbox"/> Hollow chucking cylinder		○	
<input type="checkbox"/> TAKAMAZ loader system		○	
<input type="checkbox"/> Bar feeder system		○	
<input type="checkbox"/> Unloader		○	
<input type="checkbox"/> Work set detector		○	
<input type="checkbox"/> Spindle C-axis indexer	Cs-axis		○
<input type="checkbox"/> Thread cutting unit (Including constant surface speed control)	○	Standard	
<input type="checkbox"/> Sub spindle		—	○
<input type="checkbox"/> Tailstock		○	
<input type="checkbox"/> Power tools drive unit		○	
<input type="checkbox"/> Power tools		○*1	
<input type="checkbox"/> Rear chip conveyor (Floor type/Spiral type)		○	
<input type="checkbox"/> Front air blower		○	
<input type="checkbox"/> Rear air blower		○	
<input type="checkbox"/> Rear coolant unit		○	
<input type="checkbox"/> Signal light(1-color/2-color/3-color)		○	
<input type="checkbox"/> Automatic fire extinguisher		○	
<input type="checkbox"/> Automatic power shut-off device		○	
<input type="checkbox"/> Automatic door system(Auto door/Shutter)		○	
<input type="checkbox"/> Special color		○	
<input type="checkbox"/> Others		○*2	

\*1 Different Power Tools are special accessories only for Power Tools specification.

\*2 For more information on attachments, consult our sales representative.



## Controller Specifications

Item	XC-100	XC-150	XL-100		XL-150		XL-200		
			Standard	Power tool type	Standard	Power tool type	Standard	Power tool type	
	TAKAMAZ&FANUC Oi-TD								
Controlled axes	2 axes (X,Z)			3 axes (X,Z,C)	2 axes (X,Z)	3 axes (X,Z,C)	2 axes (X,Z) 4 axes (X,Z,A,E)*1	3 axes (X,Z,C) 5 axes (X,Z,C,A,E)*2	
Simultaneously controllable axes	Simultaneous 2 axes			Simultaneous 3 axes	Simultaneous 2 axes	Simultaneous 3 axes	Simultaneous 2 axes	Simultaneous 3 axes	
Least input increment	0.001mm (X in diameter)								
Least command increment	X : 0.0005mm Z : 0.001mm								
Auxiliary function	M-code 3 digit								
Spindle function	S-code 4 digit								
Tool function	T-code 4 digit								
Tape code	EIA (RS232C) /ISO (840) automatic recognition								
Cutting feedrate	1~5,000mm/min								
Command system	Incremental / Absolute								
Linear interpolation	G01								
Circular interpolation	G02,G03								
Cutting feedrate override	0~150%								
Rapid traverse override	F0,100%								
Program number	4 digit								
Backlash compensation	0~9999μm								
Program memory capacity	512Kbyte (1,280m)								
Tool offsets	64 sets								
Registered programs	400 pcs.								
Tool geometry /Wear offset	Standard								
Canned cycle	G90, G92, G94								
Radius designation on arc	Standard								
Tool offset measurement input	Standard								
Background editing	Standard								
Direct drawing dimension programming	Standard								
Custom macro	Standard								
Additional custom macro common variables	#100~#199, #500~#999								
Pattern data input	Standard								
Nose R compensation	G40,G41,G42								
Inch/Metric conversion	G20 / G21								
Programmable data input	G10								
Run hour /Parts count display	Standard								
Extended part program editing	Standard								
Multiple repetitive cycle	G70~G76								
Multiple repetitive cycle II	Pocket-shaped								
Spindle synchronous control	—							Standard*1,2	
Sub-spindle torque skip	—							Standard*1,2	
Canned drilling cycle	Standard								
Constant surface speed control	(Option)	G96,G97	(Option)	G96,G97					
Continuous thread cutting	(Option)	G32	(Option)	G32					
Variable lead thread cutting	(Option)	G34	(Option)	G34					
Thread cutting retract	(Option)	Standard	(Option)	Standard					
Clock function	Standard								
Help function	Standard								
Alarm history display	50 pcs.								
Self-diagnosis function	Standard								
Sub-program call	Up to 10 loops								
Decimal point input	Standard								
2nd reference point return	G30								
Work coordinate system setting	G50,G54~G59								
Stored stroke check 1	Standard								
Stored stroke check 2,3	Standard								
Input /Output interface	RS232C,USB Memory,Memory card,Easernet*3				USB Memory,Memory card,Easernet				
Alarm message	Standard (Smart Alarm Diagnostic)								
Graphic display	Standard								
Conversational programming with graphic function	Standard								
Abnormal load detection	Standard								
Manual handle trace	Standard								
Automatic data backup	Max. 3								
Automatic screen deletion function	Standard								
Rigid tapping	—			For Power Tools only	—	For Power Tools only	—	For Power Tools only	
Polar coordinate interpolation	—			Standard	—	Standard	—	Standard	
Cylindrical interpolation	—			Standard	—	Standard	—	Standard	
FANUC set of manuals	CD-ROM (Bound:Option)								
TAKAMAZ option functions	Work/Tool counter,Tool load monitor,Others								
TAKAMAZ maintenance functions	Standard								
Tool life management	(Option)								
Multiple M codes in one block	(Max. 3:Option)								
Spindle orientation	(Option)								
Dynamic graphic display	(Option)								
Manual guide Oi	(Option)								
Helical interpolation	—						(Option)	—	(Option)
RS232C	Standard						(Option)		

\*1 Sub spindle specification

\*2 Power tool / Sub spindle specification

\*3 USB Memory is not standard for CE Specifications.



# XC·XL series

## TAKAMAZ

### TAKAMATSU MACHINERY CO.,LTD.

#### ■HEAD OFFICE & PLANT

1-8 ASAHIGAOKA HAKUSAN-CITY ISHIKAWA JAPAN. 924-8558 TEL +81-(0)76-274-1403 FAX +81-(0)76-274-8530

### TAKAMATSU MACHINERY USA INC.

#### ■CHICAGO HEAD OFFICE

1320 LANDMEIER ROAD ELK GROVE VILLAGE, IL 60007 USA TEL +1-(0)847-981-8577 FAX +1-(0)847-981-8599

#### ■CINCINNATI OFFICE

5233 MUHLHAUSER ROAD, WEST CHESTER TOWNSHIP, OH 45011 USA TEL +1-(0)513-870-9777 FAX +1-(0)513-870-0325

#### ■GREENVILLE OFFICE

506 MATRIX PARKWAY PIEDMONT, SC 29673 USA TEL +1-(0)847-981-8577

### TAKAMAZ MACHINERY EUROPE GmbH

INDUSTRIEGEBIET, DIEPENBROICH 27 D-51491 OVERATH, GERMANY

TEL +49-(0)2206-919-3960 FAX +49-(0)2206-865-123

TEL +49-(0)2206-866-150

[www.takamaz.co.jp](http://www.takamaz.co.jp)

### TAKAMAZ MACHINERY (HANGZHOU) CO.,LTD.

#### ■HANGZHOU HEAD OFFICE

NO.6800, JIANGDONG 3RD ROAD, JIANGDONG INDUSTRIAL PARK, XIAOSHAN, HANGZHOU, ZHEJIANG, CHINA  
TEL +86-(0)571-8287-9709 FAX +86-(0)571-8215-3732

#### ■GUANGZHOU OFFICE

ROOM 1316, NO.2, KEHUI FOURTH STREET, NO.99 OF SCIENCE ROAD, LUOGANG DISTRICT, GUANGZHOU  
TEL +86-(0)20-8210-9921 FAX +86-(0)20-8210-9921

### TAKAMATSU MACHINERY (THAILAND) CO.,LTD.

888/59 MOO 9, TAMBOL BANGPLA, AMPHUR BANGPLEE, SAMUTPRAKARN PROVINCE, THAILAND  
TEL +66-(0)2-136-7831-3 FAX +66-(0)2-136-7834

### TP MACHINE PARTS CO.,LTD.

128/345 MOO 1 THEPARAK ROAD BANGSAOTHONG SUBDISTRICT, BANGSAOTHONG DISTRICT, SAMUTPRAKARN 10540  
TEL +66-(0)2-706-4514 FAX +66-(0)2-706-4955

### PT.TAKAMAZ INDONESIA

JL. FESTIVAL BOULEVARD BLOK AA 11 NO.30.31 GRAND WISATA TAMBUN, BEKASI 17510  
TEL +62-(0)21-8261-6431 FAX +62-(0)21-8261-6430

●Distributed by:

#### Precautions Related to Foreign Exchange and Foreign Trade Control Laws

This product (machine and ancillary equipment) may fall under the category of controlled goods by the foreign exchange and foreign trade control laws.

As such, the exportation must be authorized by the Japanese government as stipulated in the laws

This product is manufactured in accordance with the regulations and standards that prevail in the country or region of destination.

The user must not export, sell, or relocate the product, to any country with different regulations or standards.

280



This brochure is made  
from 80% recycled paper.

16.09.3B(0)