

CNC Spindle Turret
Precision Lathe

XC series / XL

CNC PRECISION LATHE XC-100 XL-100 XC-150

TAKAMAZ

CNC 1 Spindle 1 Turret Precision Lathe

XC series / XL

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.

Compact low-Cost Creativity

"Surprise the World with Hidden Creativity"



XC-100

Chuck size **6** inch

Max. turning diameter **φ180mm**
 Max. turning length **175mm**
 Max. bar diameter **φ26mm**
 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**

XL-100

Chuck size **6** inch

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

XC-150

Chuck size **8** inch

Max. turning diameter **φ290mm**
 Max. turning length **204mm**
 Max. bar diameter **φ42mm**
 Tool post type **8-station turret**
 Rapid traverse rate **X: 18 / Z: 24 m/min**
 Spindle motor **AC 11/7.5kW**
 Dimensions (L×W) **1,250×1,525mm**
 Controller **TAKAMAZ & FANUC**

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

XC-100

Only 1,150 mm machine width

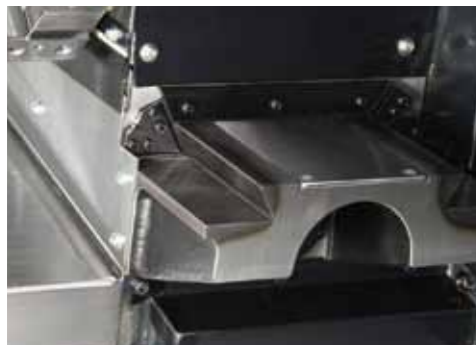
Pursue the World's Smallest Lathe

High Precision Structure

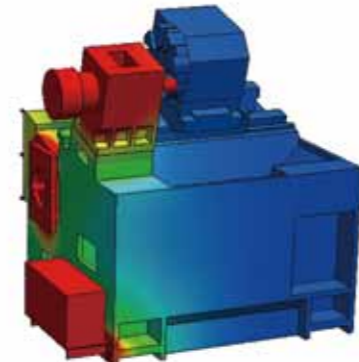
The X-Axis has a pre-tensioned structure. As a result, dimensional variation due to thermal displacement is suppressed and a design with stable machining accuracy is achieved. In addition, the X-axis slide is made larger resulting to a more robust slide. Furthermore, to find a flawless

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)



Improved Rigidity and Straightness of Dovetail Slide through Slide Size Increase

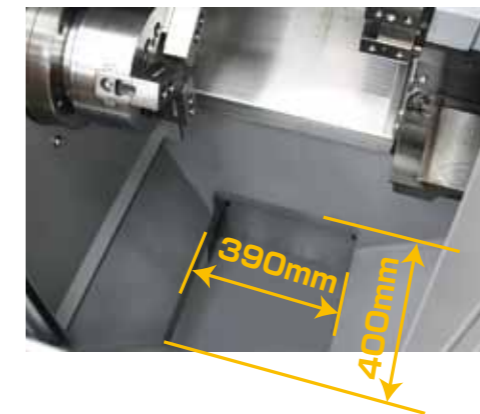


Achieved Excellent Thermal Displacement Countermeasure through CAD (Computer Aided Design)



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.



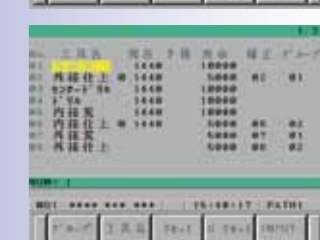
Increased Operation Efficiency through Fully Loaded Features

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

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
- Sigma loader Adjustment
- Lubrication Pump

Floor Space **1.56m²**

1,360mm (depth) x 1,150mm (width)

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.

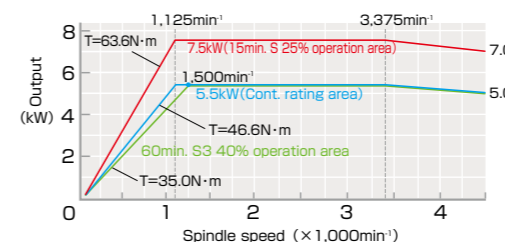
(As compared to the previous model:25% reduction)

Reduced Material Use -200kg

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

XC-100 Spindle motor torque diagram

■ Max.4,500min⁻¹ standard type (AC 7.5/5.5kW)



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.

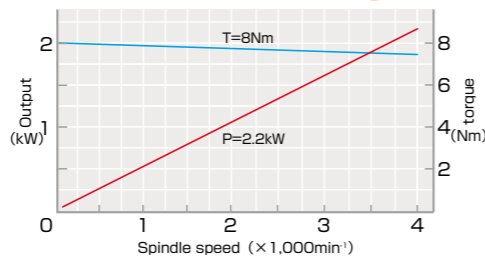


Face milling



Side milling

Power Tools Motor Diagram



Power tools	Item	Unit	
Power tools	Tool storage capacity	pcs.	Max.6
	Max. rotating speed	min ⁻¹	3,400
	Drill(short)	mm	φ4~φ10
	Clamping Capability	mm	φ4~φ10
Clamping Capability	Endmill	mm	φ4~φ10
	Tap	mm	M4~M6
Spindle orientation	Type A : 5°Minimum Split Indexing Angle	deg.	5
	Type B: C Axis Rapid Traverse Rate	min ⁻¹	37.5

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

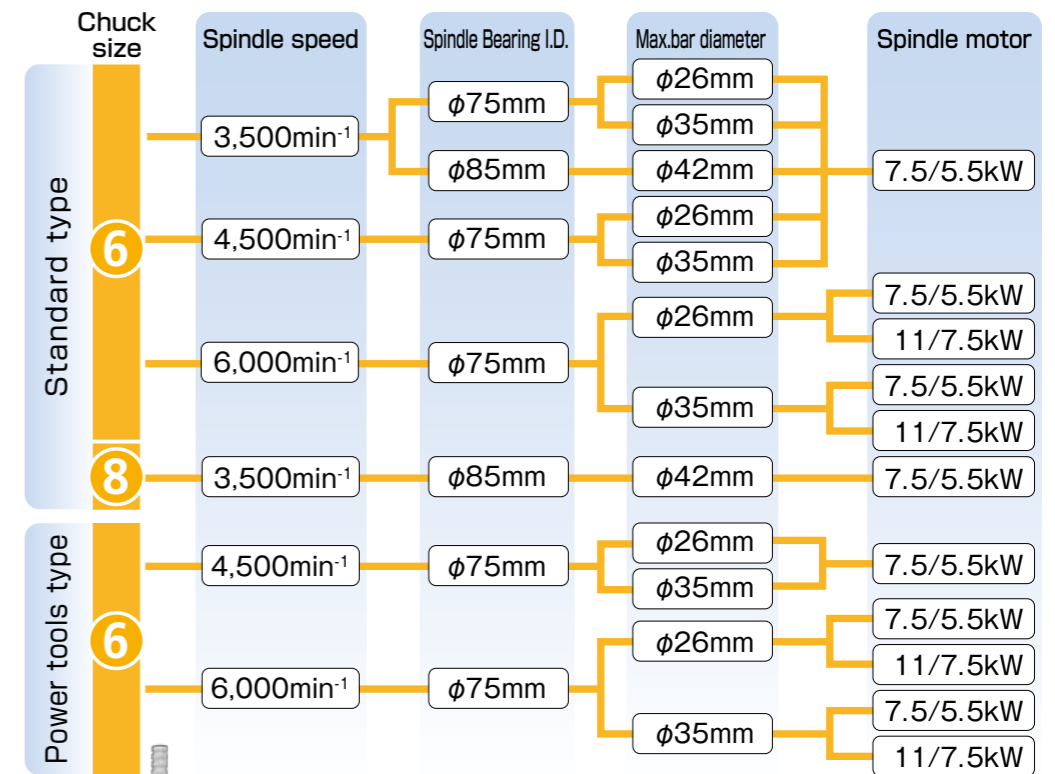
※12-station : for reverse (□20) for normal (□16)

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.

Tailstock (Option)	Item	Unit	
Tailstock (Option)	Pointed End	MT	MT-3
	Quill stroke	mm	80
	Tailstock stroke	mm	170

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



1,360mm Floor Space is only **1.85m²**
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 1.85m² 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.

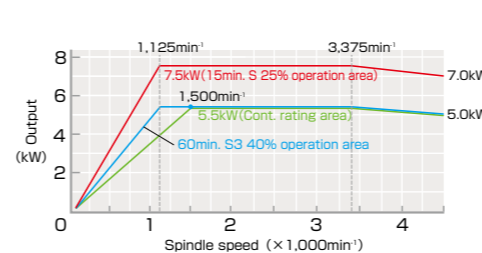
Spindle Acceleration Tune Parameter

By setting the parameter spindle speed, spindle speed reduces the time, helping to reduce cycle time (Comparison with the past machines)

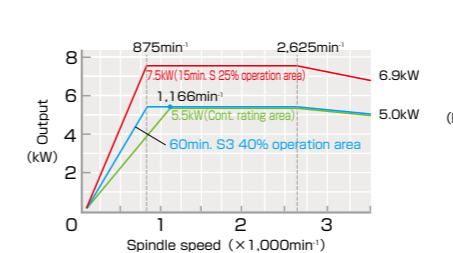
Acceleration Time(0→4,500min⁻¹) : **60% Decreased**

Deceleration Time(4,500→0min⁻¹) : **47% Decreased**

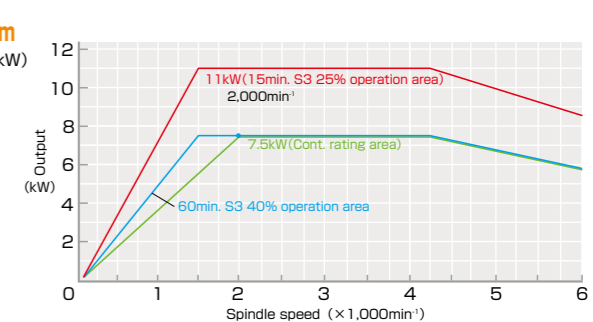
XL-100 Spindle motor torque diagram
■ Max.4,500min⁻¹ standard type (AC 7.5/5.5kW)



XL-100 Spindle motor torque diagram
■ Max.3,500min⁻¹ standard type (AC 7.5/5.5kW)



XL-100 Spindle motor torque diagram
■ Max.6,000min⁻¹ standard type (AC 11/7.5kW)



XC-150

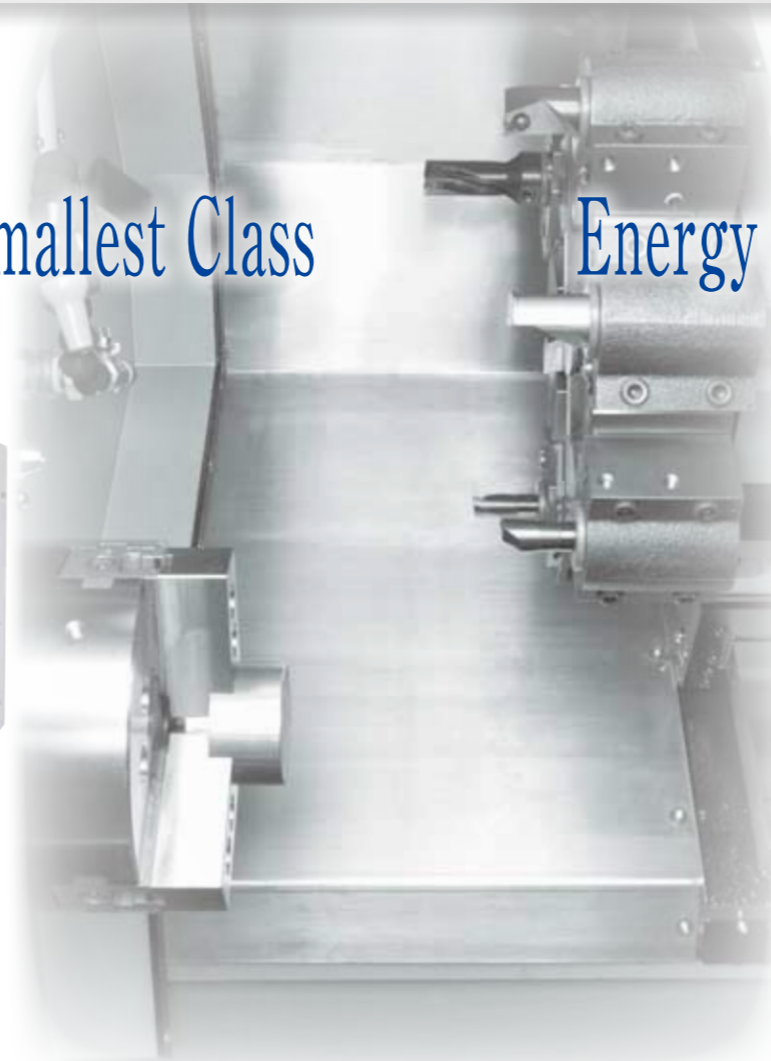
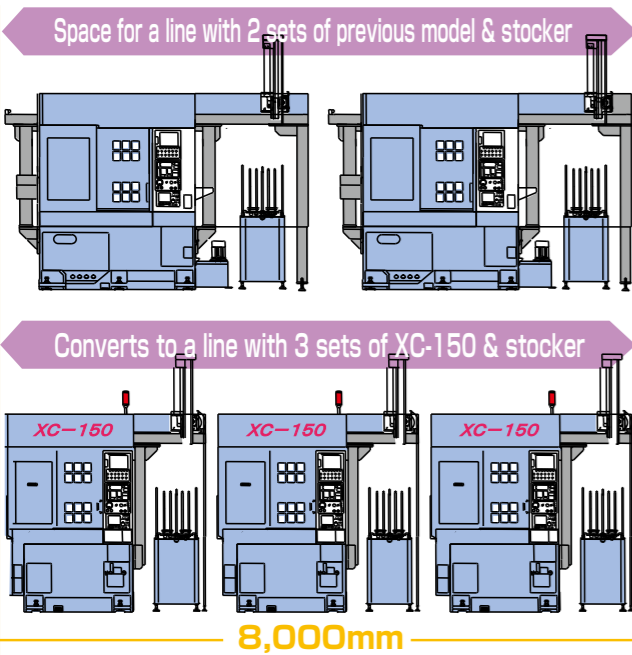
Space Saver in Turning Machine Industry's Smallest Class

Energy Saver as Environment Friendly

Achieve Space-Saving Comparable to 6-inch Class

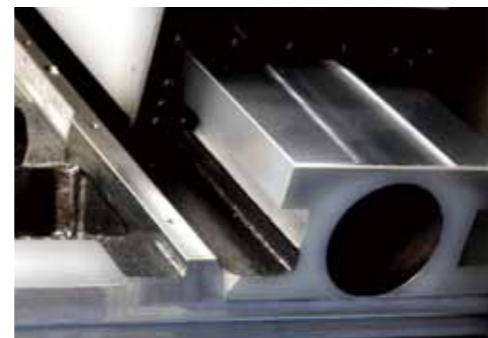
The machine width is 1,250mm. The floor space is 1.91m², about 20% less than previous model, making it the smallest machine with an 8-inch chuck among the same class in the industry. In our products, the space needed for [2] x [Set of Previous Model & Stocker] is enough for [3] x [Set of XC-150 & Stocker]. Arrangement of lines requiring only small spaces is possible leading to increased efficiency in operation and improvement in manufacturing.

Floor space 20% reduction



Adoption of Rigid Slide

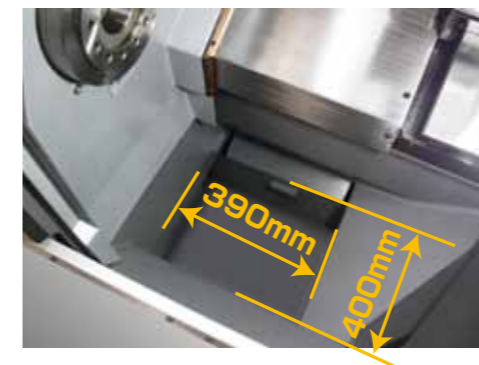
Just like the other models, the Z-Axis slide applies square box-way slide that is known for rigidity. The X-Axis is designed for increased rigidity than previous model that can be used for heavy cutting.



X-Axis Slide that is Focused on Rigidity

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 (0.15m²) 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

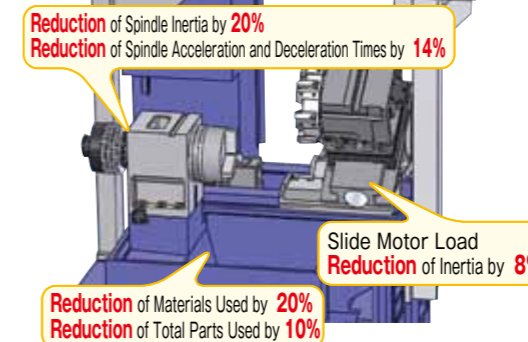
Designed with a concept of saving space with a door opening of 470mm without compromising the workability inside the machine. In addition, the space until the spindle center is the same as that of [X-100] at 300mm, focusing on ease of operation.



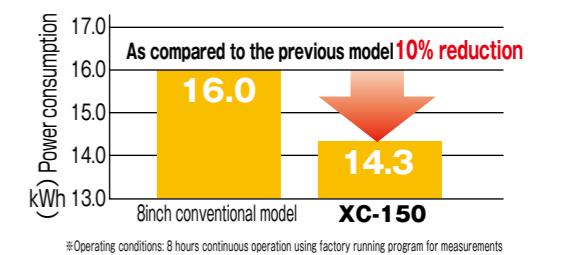
Energy Saving Machine

As compared with previous models, there are 20% reduction on the spindle inertia and 36% reduction on the spindle acceleration and deceleration time (0-3,500min⁻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

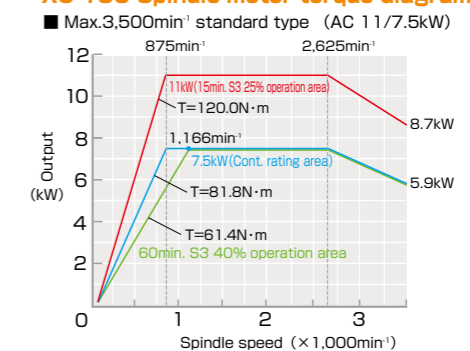
Ensure the Reduction Of Materials Used



Effect of Power Consumption Reduction per Machine



XC-150 Spindle motor torque diagram

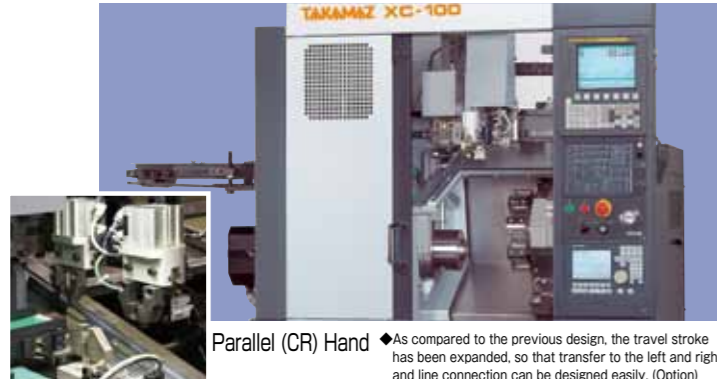


Equipped with the [Speed] and [Small Footprint] Servo Loader [Σseries]

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 **TAKAMAZU**, will benefit the customer on different aspects.

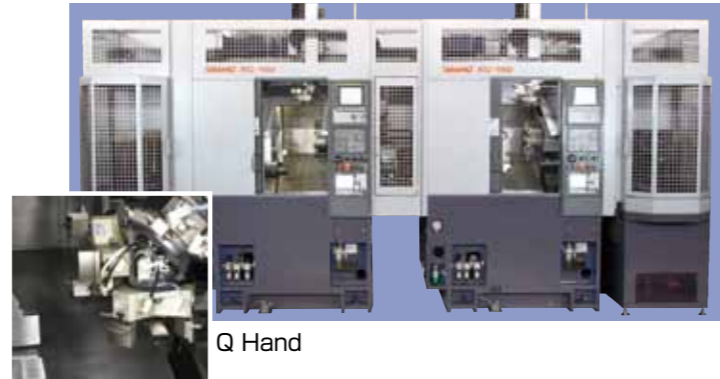
- ◆The rate for each moving point, acceleration and deceleration, and in-position width can be set in detail to achieve a shorter cycle time.
- ◆High Speed Shutter opens and closes in 1.4 seconds, faster than the conventional model. This results in reducing loading time. (XC-100)
- ◆To improve usability, 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 Σ



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 ΣGH



Q Hand

Loader transfer capacity

		Type	Compact(2 axes)		Gantry(2 axes)		
		Model	XC-100	XL-100	XC-100	XL-100	XC-150
Loader			ΣC60		ΣGH80		ΣGH150
Workpiece dimension	Diameter	mm	60		80		150
	Weight (One side)	kg	1.0		1.5		
Shoulder (Traverse axis:Z)	Drive system		Servomotor		Servomotor		
	Stroke	mm	390	(Depends on spec.)	(Depends on spec.)		
	Rapid traverse rate	m/min	84		155		
Arm (Vertical axis:Y)	Drive system		Servomotor		Servomotor		
	Stroke	mm	300	460	580		
	Rapid traverse rate	m/min	71		125		
Hand rotation	Drive system		Air cylinder		Air cylinder		
	Angle	deg.	90		180		
	Jaw stroke	mm	10(One side)		10	20	
	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

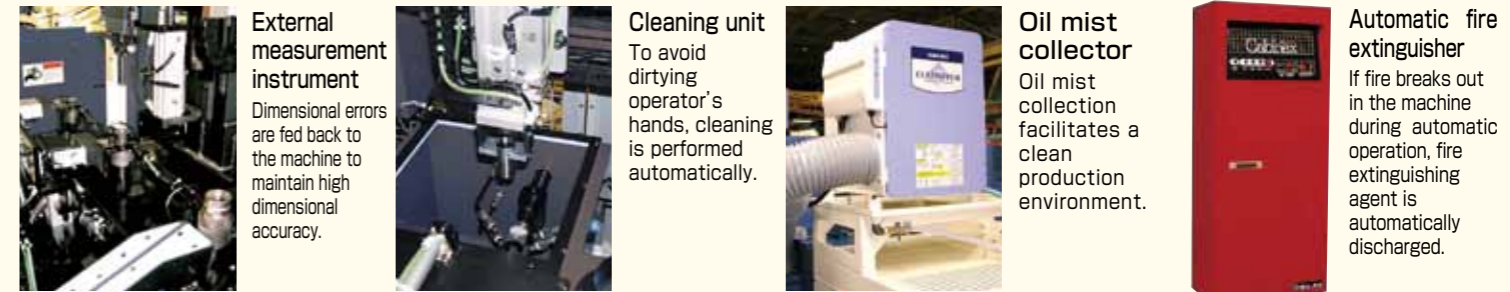
8-inch chuck

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



Allied Clamp Holder for vibration suppression

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

Chip conveyor (Spiral type)

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

Chip conveyor (Floor type)

Chips are reliably discharged outside the machine.

High-pressure coolant

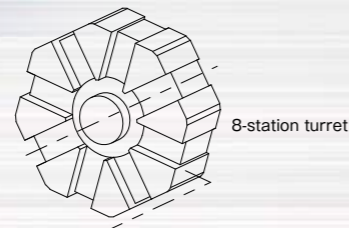
Constantly cooled coolant is discharged at high pressure so that the tool life is significantly prolonged.

Semi-dry machining

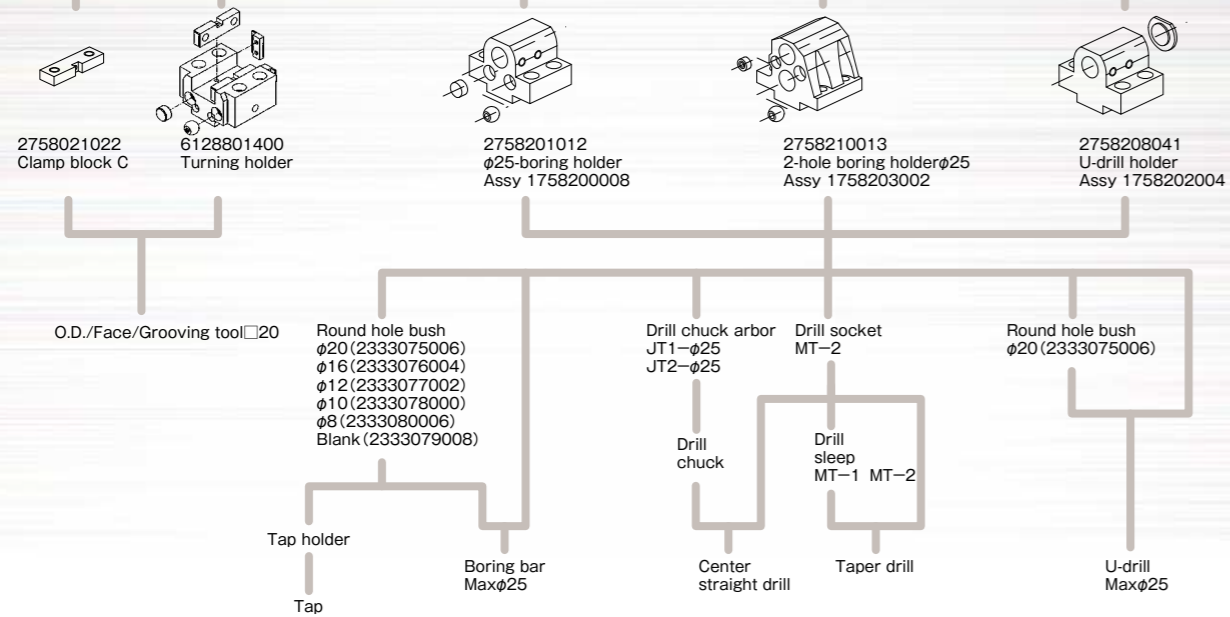
Ultratrace, highly-lubricating vegetable coolant is applied to the correct point on the cutting edge, realizing semi-dry machining.

Tooling system

XC-100

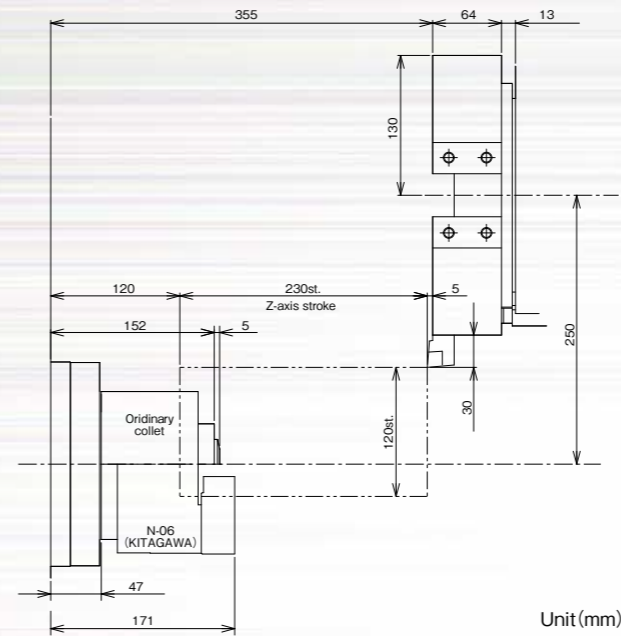


2758016006
O.D. nozzle



Stroke-Related Diagram

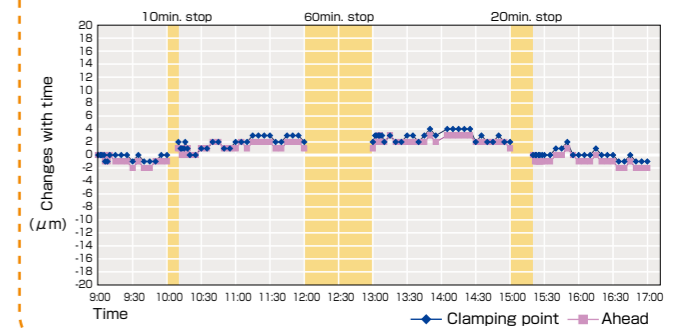
XC-100



Precision reference work [XC-100]

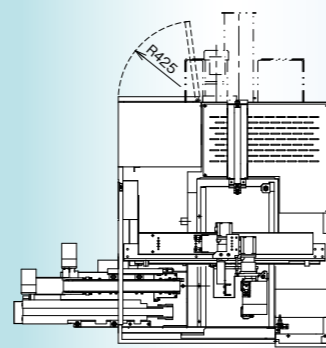
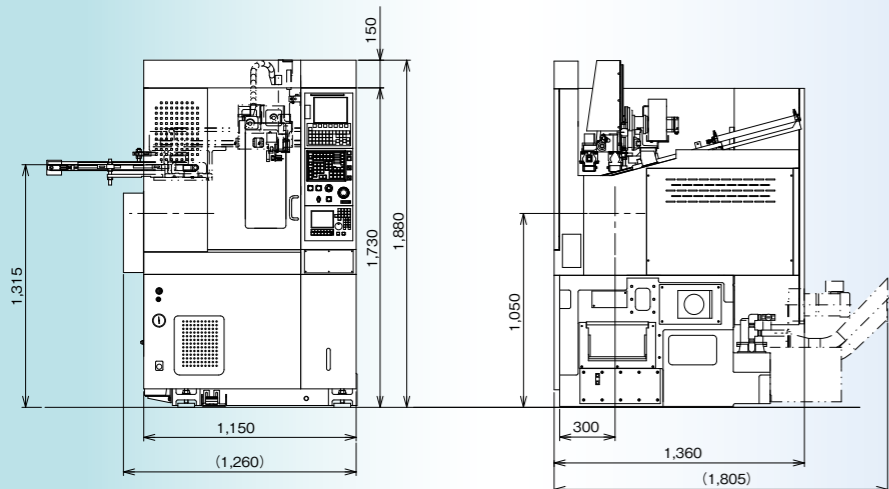
- ▶ Roundness **0.25 μm**
- ▶ Surface Roughness **0.26 μm**
- ▶ Changes with time **5.0 μm** (in 8 hours)

Tool	Sintered Diamond	Tool	Sintered Diamond
Material	C3604BD $\phi 40$	Material	C3604BD $\phi 40$
Spindle speed	500 ~ 3,500 min^{-1}	Spindle speed	2,000 min^{-1}
Feedrate	0.1 mm	Feedrate	0.1 mm
Cutting amount	0.2 ~ 0.002 mm	Cutting amount	2.0 mm



TURRET

Floor Space (Equipped with $\Sigma C60$)

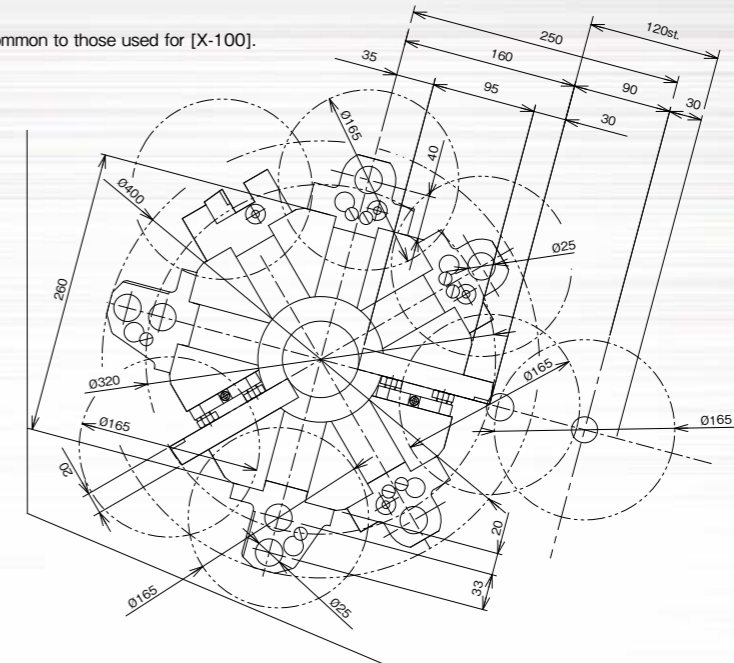


Unit (mm)

Turret Interference Drawing

XC-100

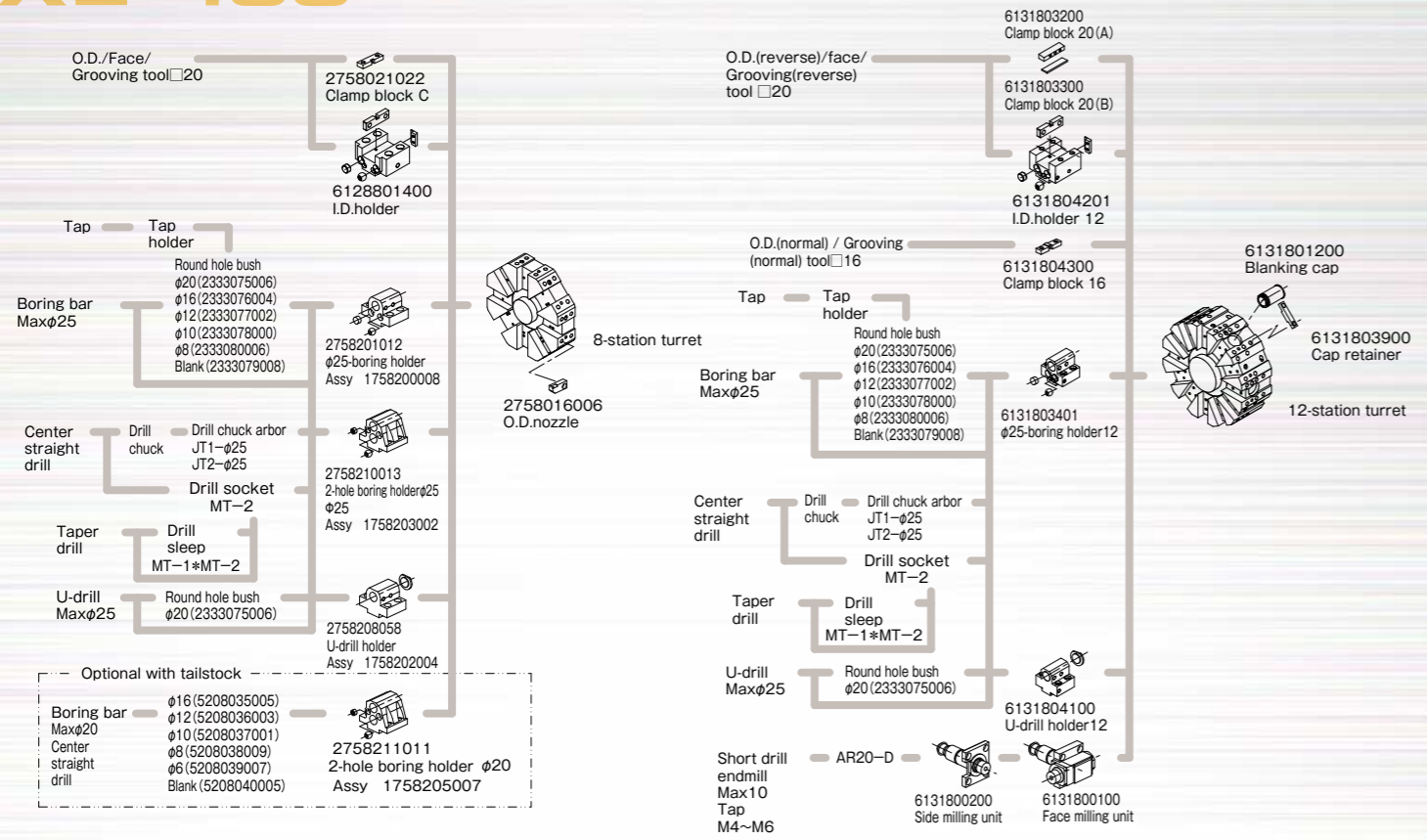
All turret holders except I.D. turning holder are common to those used for [X-100].



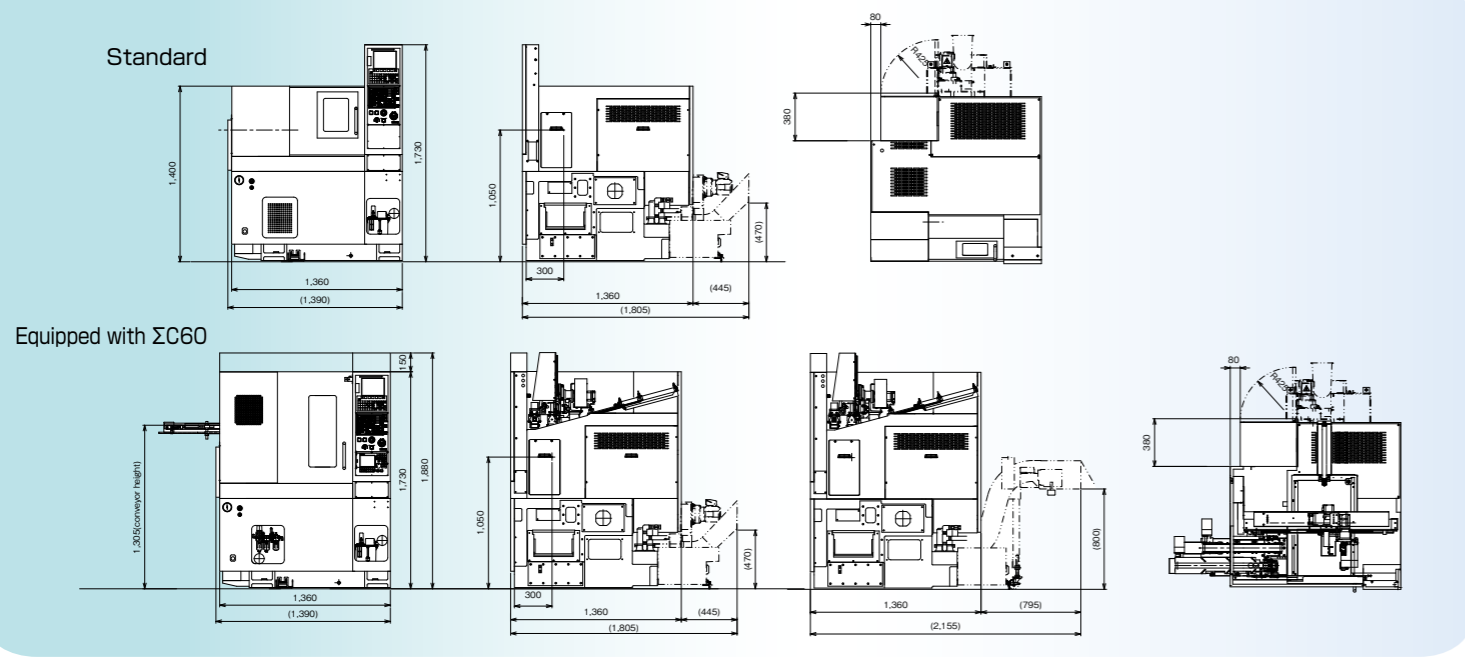
Unit (mm)

Tooling system

XL-100



Floor Space



単位 (mm)

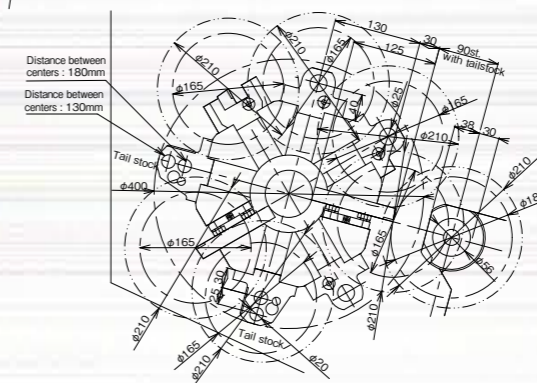
Stroke-Related Diagram

XL-100

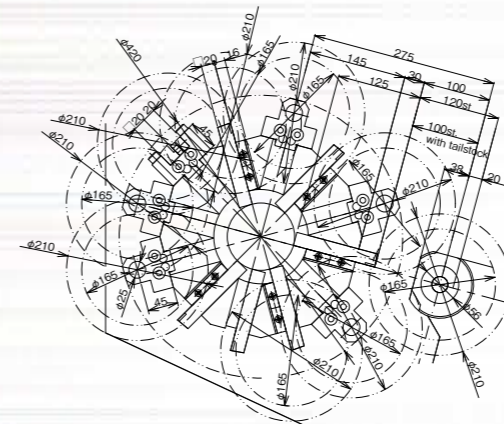
8-station turret



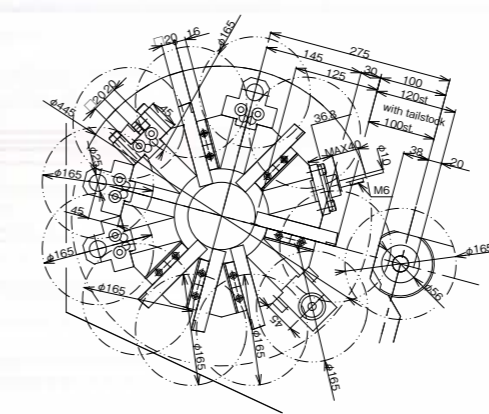
Tail stock



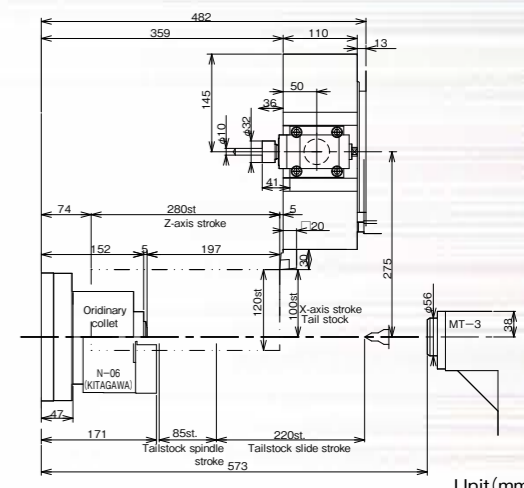
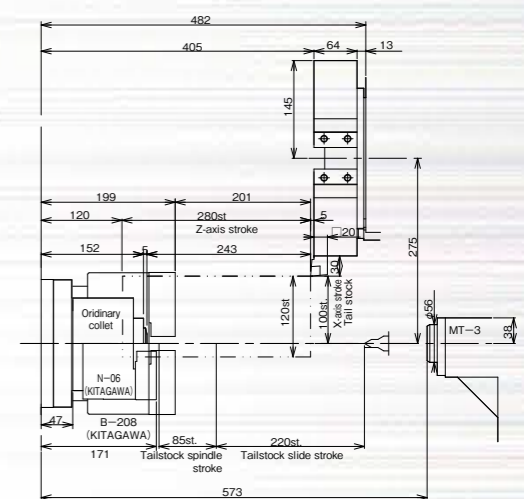
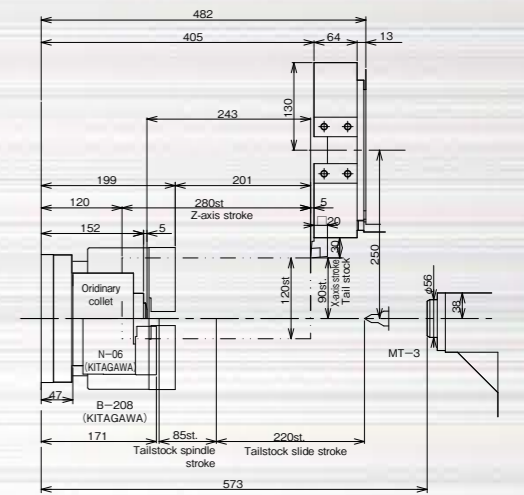
12-station turret



Power tool type(12-station)



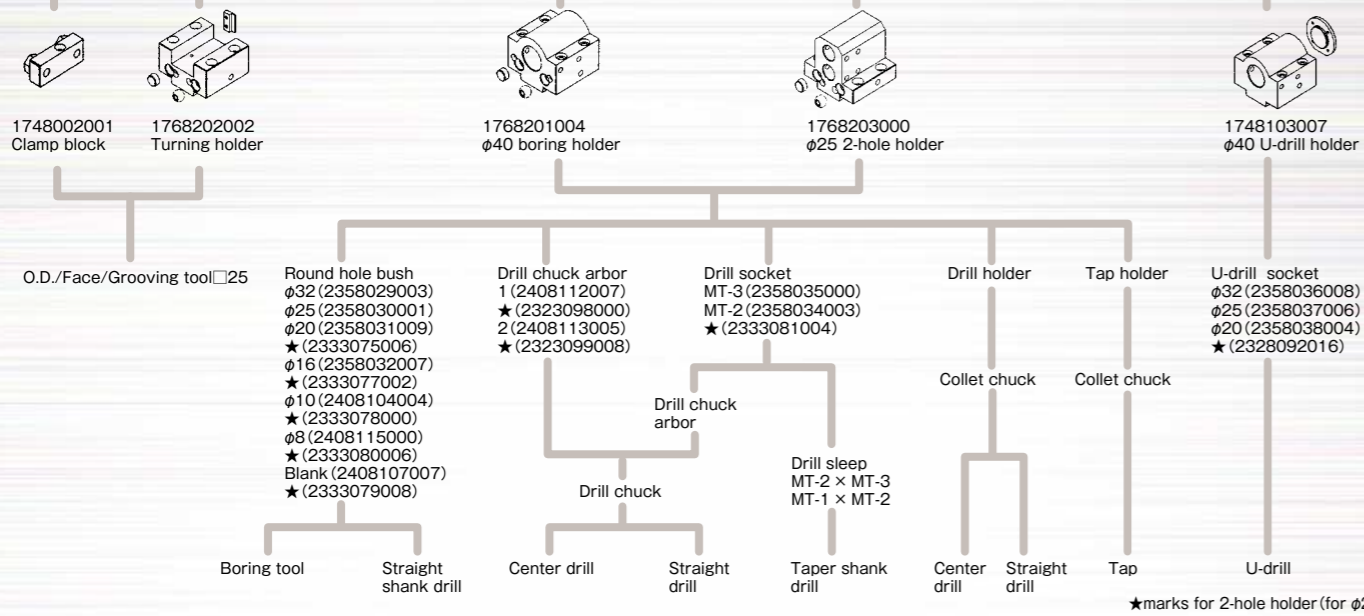
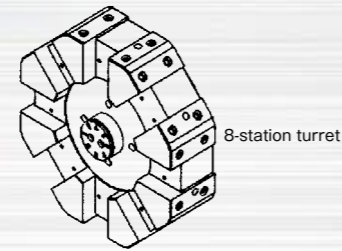
Turret Interference Drawing



Unit(mm)

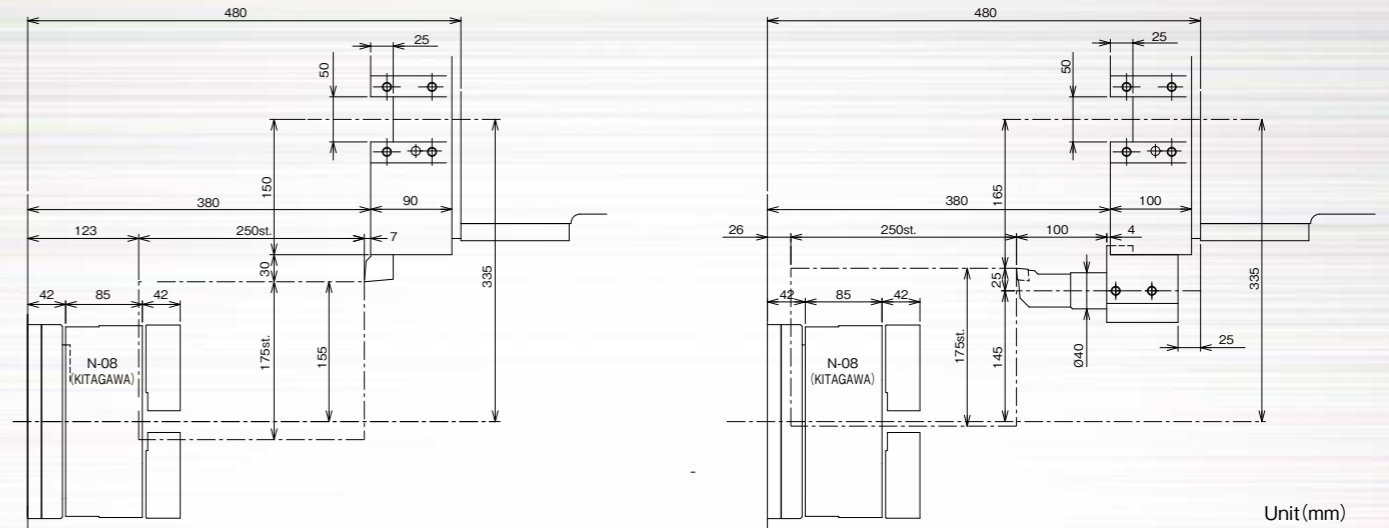
Tooling system

XC-150



Stroke-Related Diagram

XC-150

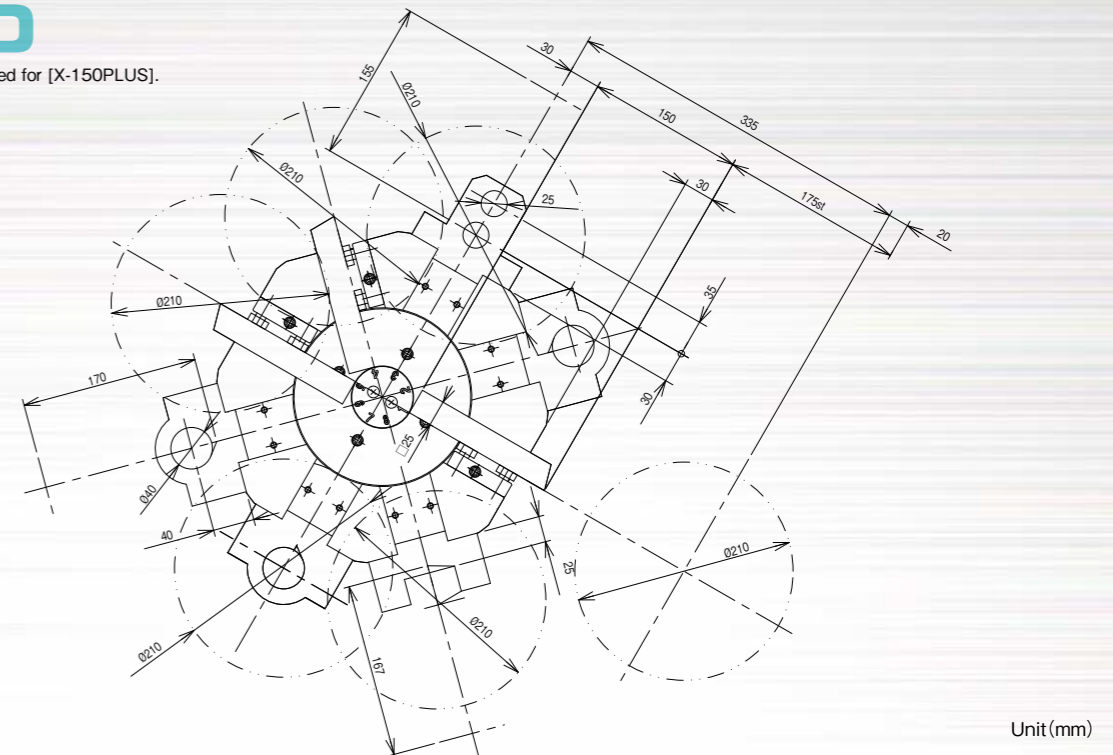


TURRET

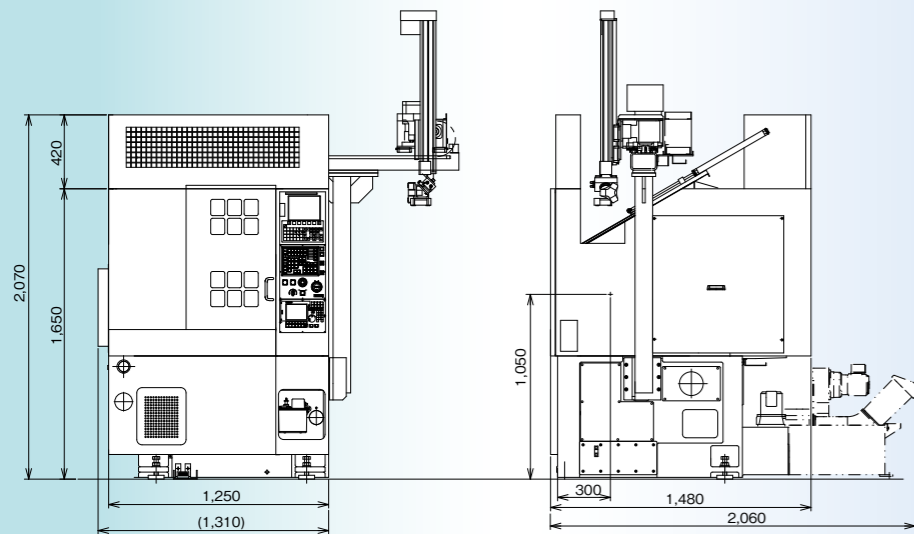
Turret Interference Drawing

XC-150

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



Floor Space (Equipped with Σ GH150)



SPECIFICATION

Machine Specifications

Item	Unit	XC-100	XL-100		XC-150
			Standard	(Power tools type)	
Capacity	Max. turning diameter	mm	φ180	φ180	φ290
	Max. turning length	mm	190	240	180
	Max. bar diameter	mm	Solid (φ26)	Solid (φ26, φ35, φ42*)	Solid (φ26, φ35)
	Chuck size	inch	6	6 (8*)	6
Spindle	Spindle nose	JIS	A2 - 5	A2 - 5	φ170 Flat
	Spindle Bearing I.D.	mm	φ75	φ75 (φ85)	φ75
	Spindle speed	min ⁻¹	Max.4,500	Max.4,500 (6,000) (3,500)	Max.4,500 (6,000)
	Spindle indexing	deg/min	—	—	Cs 18,000
Tool post	Type		8-station turret	8-station turret (12-station)	12-station turret
	Tool shank	mm	□20	8-station turret : □20, 12-station turret : □16)*2	□25
	Boring holder I.D.	mm	φ25	φ25	φ40
	Max. stroke	mm	X : 120 Z : 230	X:120 (tailstock:90) Z:280	X:120 (tailstock:100) Z:280
Power tools	Rapid traverse rate	m/min	X : 12 Z : 18	X:12 Z:18	X : 18 Z : 24
	Tool storage capacity		—	—	6
	Max. rotating speed	min ⁻¹	—	—	Max.4,000
	Max. capacity	mm	—	—	φ10 M4-M6
Motors	Spindle motor	kW	AC7.5/5.5	AC7.5/5.5 : φ75 spindle 4,500min ⁻¹ AC11/7.5 : φ75 spindle 6,000min ⁻¹ AC7.5/5.5 : φ85 spindle 3,500min ⁻¹	AC11/7.5
	Feed motor	kW	X: AC 0.75 Z: AC 1.2	X : AC 0.75 Z : AC 1.2	X : AC1.2 Z : AC1.8
	Coolant motor	kW	AC 0.25	AC 0.25	AC 0.25
	Hydraulic motor	kW	AC 0.75	AC 0.75	AC 0.75
	Power tools motor	kW	—	—	AC 2.2 (4,000min ⁻¹ 時)
Size	Spindle center height	mm	1,050	1,050	1,050
	L×W×H	mm	1,150×1,360×1,730	1,360×1,360×1,730	1,480×1,360×1,730
	Machine weight	kg	1,900	2,100	2,300
Total electric capacity	KVA	15	15 (Depends on spec)	18 (Depends on spec)	20

*1 Bar Diameter of 42mm. 8 inch chuck can only use an 85 mm diameter spindle. (): Option
*2 For the 12 station turret, the □20 square shank toolholder is mounted on the opposite direction while the □16 (option) square shank toolholder is mounted positive.

Standard Accessories

	XC-100	XL-100	XC-150
□Boring holder	2sets		
□Clamp block	8sets		
□Collet flange	1set	(Option)	(Option)
□Coolant block	(Option)	8sets (For reverse cutting tools)	
□Hydraulic power chuck	(Option)	1set (8")	
□Hydraulic chucking cylinder(Solid)	1set		
□Hydraulic unit	1set		
□Thread cutting unit (Including constant surface speed control)	(Option)	(Option)*	1set
□Spindle Cs-axis indexer	—	1set*	—
□Power tools drive unit	—	1set*	—
□Coolant unit	1set (130 lit.)	1set (125 lit.)	1set (140 lit.)
□Tool kit	1set		
□TAKAMAZ Instruction manual	1set		

*These are standard accessories for Power Tools Specification only.

Optional Machine Specifications

Item	Unit	XL-100
Taper size		MT-3
Quill O.D.	mm	φ56
Quill stroke	mm	85
Tailstock stroke	mm	220
Max. thrust	kN	3.5

Optional Accessories

	XC-100	XL-100	XC-150
□Tool holders		○	
□Tail stock (MT-3)	—	○	—
□Collet chucks		○	
□Hydraulic chucks by chuck manufacturers		○	
□Clamp holder (Vibration-suppressing alloy)	○	—	○
□Chuck clamp detector		○	
□Hollow chucking cylinder		○	
□TAKAMAZ loader system		○	
□Bar feeder system		○	
□Unloader		○	
□Work set detector		○	
□Spindle indexing device (Electrical)		○	
□Power tools	—	○*1	—
□Chip conveyor (Rear) (Floor type/Spiral type)		○ (XL-100 available right side)	
□Front air blower		○	
□Rear air blower		○	
□Rear coolant unit		○	
□Signal light(1-color/2-color/3-color)		○	
□Automatic fire extinguisher		○	
□Automatic power shut-off device		○	
□Automatic door system(Auto door/Shutter)		○	
□Special color		○	
□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	XL-100		XC-150
		TAKAMAZ&FANUC Oi-TD		
Controlled axes	2axes (X, Z)			
Simultaneously controllable axes	Simultaneous 2 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(B40) 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 digits			
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			
Canned drilling cycle	Standard			
Constant surface speed control	(Option)	Included in the thread cutting unit (G96, G97)*	G96, G97	
Continuous thread cutting	(Option)	Included in the thread cutting unit (G32)*	G32	
Variable lead thread cutting	(Option)	Included in the thread cutting unit (G34)*	G34	
Thread cutting retract	(Option)	Included in the thread cutting unit*	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, Memory card, Easer net			
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	
Polar coordinate interpolation	—		For Power Tools Specification only	
Cylindrical interpolation			For Power Tools Specification only	
FANUC set of manuals	CD-ROM			
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 function	(Option)			
Manual guide Oi	(Option)			
FANUC instruction manual	(Bound:Option)			

*These are standard for Power Tools Specification.



XC series / XL

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