Tongtai

Trust & Technology

CNC Lathe

MS/MT Series

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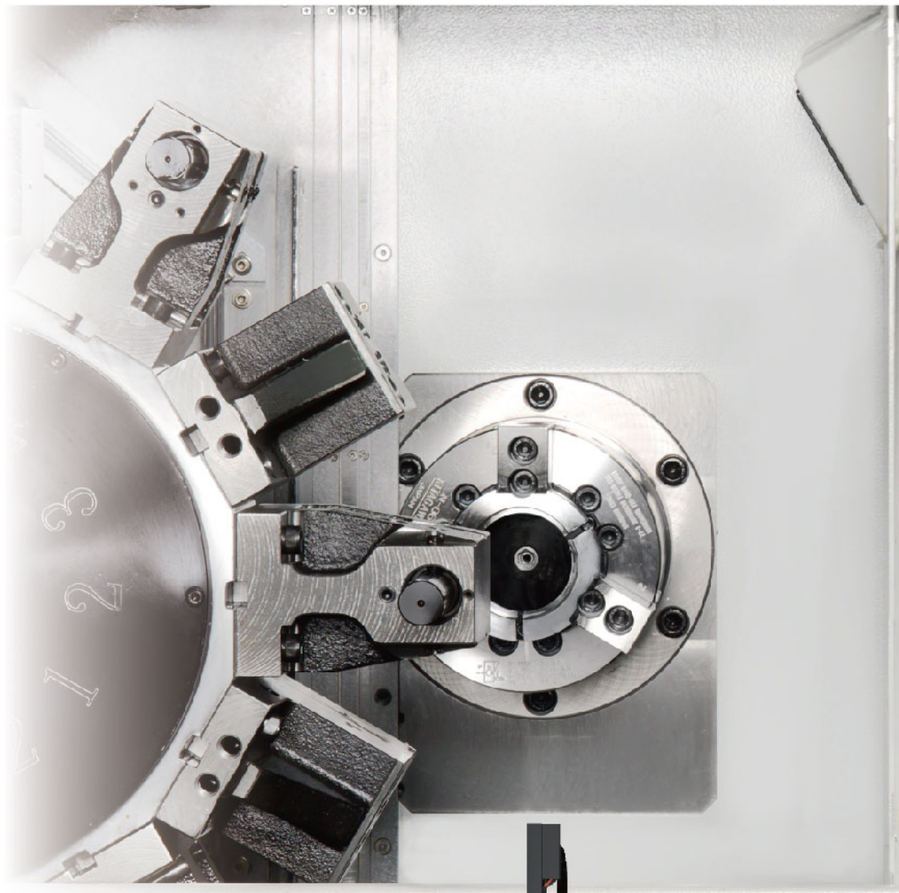

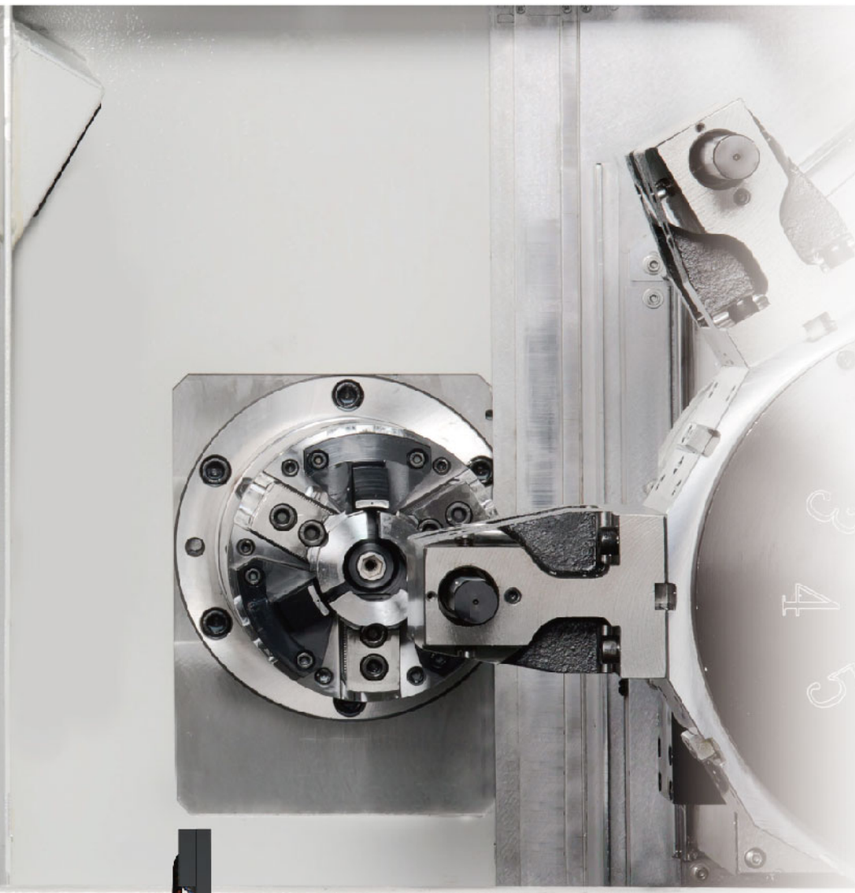

Development Concept

In the beginning, Tongtai started out from the manufacturer of customized machine tools and therefore customization and turnkey projects are the core value of Tongtai. We have wealth of customers around the world, especially in the automotive parts manufacturing industry. Mostly, the cycle time of turning processes of automotive small parts is within 60 sec, so improving availability and decreasing non-cutting time are the most important topic of these type parts. For this reason, Tongtai developed MT series, which have features of precision turning, high production volume, automatic production, and fitting in mass production line.
MT series is launched base on many years' experience of automotive industry and customers' need. With this model, Tongtai has one more high durability and high benefits product for turnkey projects in automotive industry.

Compact structure design

MT series has twin spindles and two individual machining areas. The turrets and spindles are designed parallel to each other. This design makes parts which need two processes be finished on one machine. Moreover, by applying gantry type robot on this model, It not only improves the utilization of floor, but decreases labor cost.

Standard accessories in automation production

Depend on cycle time, single robot arm/single stock and twin robot arms/twin stocks are both available on MT series to increase automatic production efficiency.

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06 Automation system
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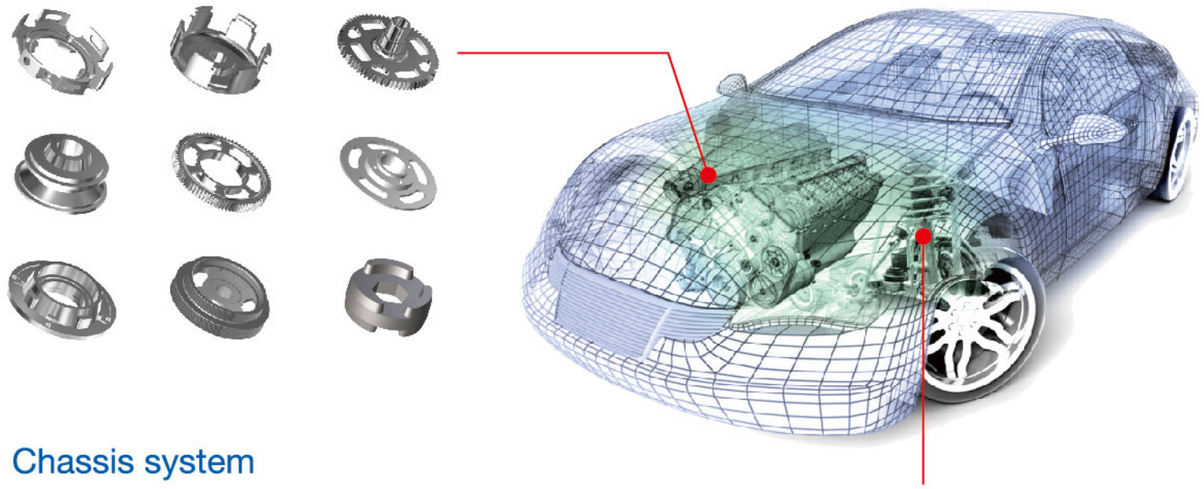
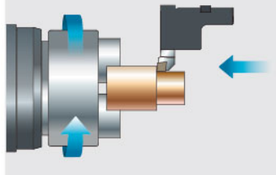
Industry applications and machining ability

Engine system

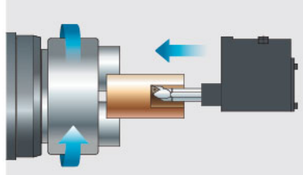


Chassis system

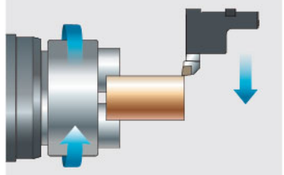
Milling ability Materal:S45C



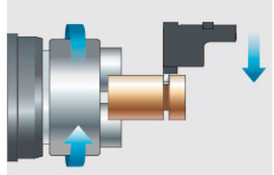
O.D. cutting	
Material removal rate	270 cm³/min
Cutting depth	5 mm
Spindle speed	1,194 rpm
Feedrate	0.45 mm/rev
Cutting speed	120 m/min



I.D. cutting	
Material removal rate	240 cm³/min
Cutting depth	5 mm
Spindle speed	1,194 rpm
Feedrate	0.4 mm/rev
Cutting speed	120 m/min



Milling	
Material removal rate	270 cm³/min
Cutting depth	5 mm
Spindle speed	1,194 rpm
Feedrate	0.45 mm/rev
Cutting speed	120 m/min

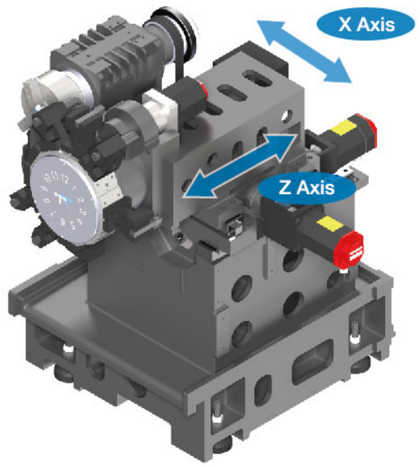


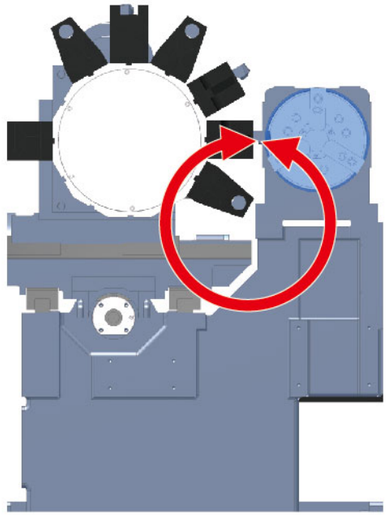
Grooving	
Cutting depth	6 mm
Spindle speed	776 rpm
Feedrate	0.1 mm/rev
Cutting speed	120 m/min

※Note: Above data are the test result of MT-2000

Main structure

MS Series

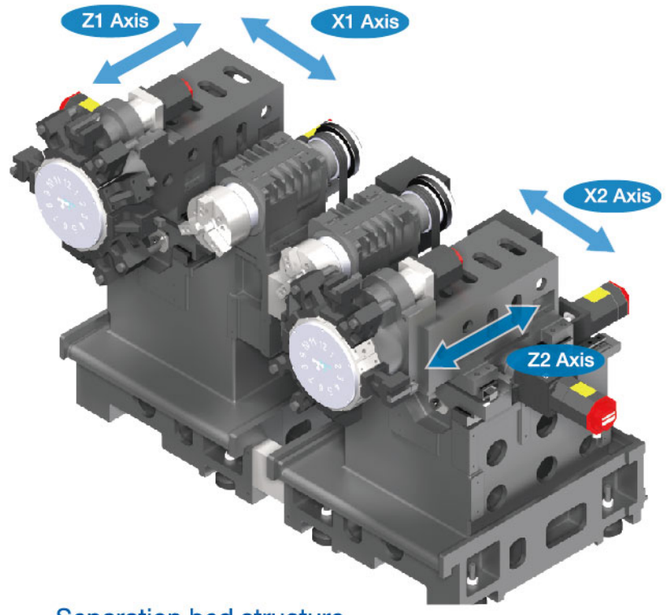




Short force flow route

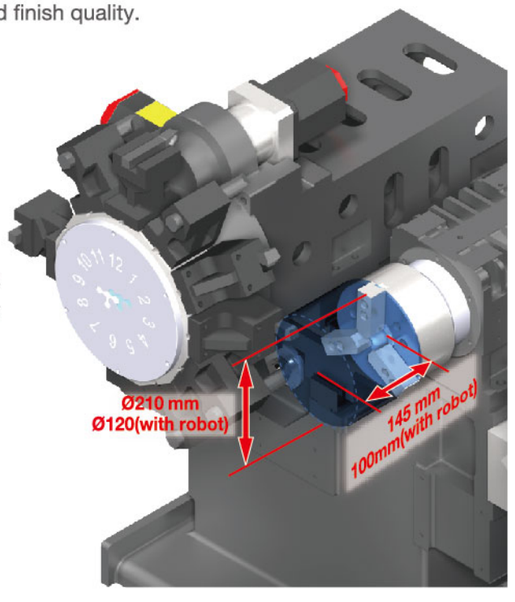
Compact structure design allows MT series to have a short force flow route. That enhances machining rigidity and heavy cutting ability.

MT Series



Separation bed structure

MT series adopt separation bed structure and two individual working areas. This design decreases the transferring of harmonic vibration and provides excellent machining accuracy and finish quality.



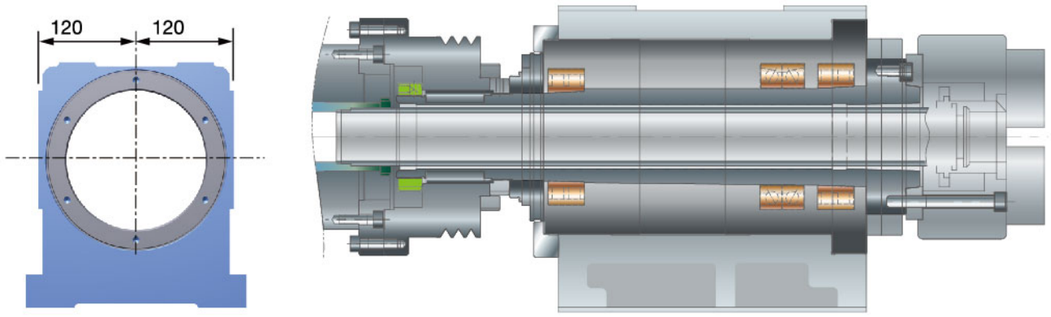
Working area

Max. swing diameter	Ø210 mm
Max. machining diameter	Ø210 mm/ Ø120 (with robot)
Max. machining length	145 mm/ 100 mm (with robot)

Main structure

High precision spindles

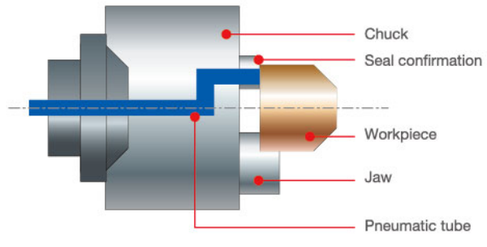
Model	MT-1500	MT-2000
Spindle diameter	Ø80 mm	Ø100 mm
Chuck size	6”	8”
Max. spindle speed	4,500 rpm (opt. 6,000 rpm)	4,500 rpm (opt. 3,000 rpm)
Spindle motor	11/7.5/5 kW	15/11/7.5 kW
Output torque	91/62/45.5 Nm(opt. 70/48/35 Nm)	124/91/62 Nm(opt. 191/140/95 Nm)
Driven type	Driven by belt	Driven by belt



- Spindle box with symmetric design eliminates thermal distortion. Furthermore, two pairs of roller type bearing and one pair of angular contact ball bearing provide rigidity during the heavy duty cutting and ensure the precision during high speed machining.
- Sleeve type spindle facilitates the installing and maintaining. When spindle broken, it is able to be uninstalled and replaced rapidly for shortening the down time.

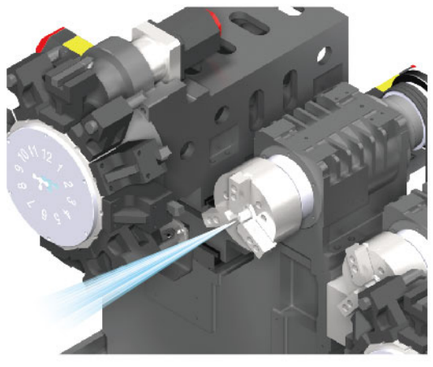
Workpiece positioning detection

During automatic production, if the workpiece is not clamped firmly, it will lose the machining precision or even damage the machine units. MT series standard equip with workpiece positioning detection device for ensuring the sealing between workpiece surface and chuck. If pneumatic pressure leaks are detected, the robot arm will reload the workpiece.



Coolant Through Spindle

MT series is equipped with coolant through spindle, the maximum 70 bar high pressure coolant helps chips removing in deep drilling and boring to improve the finishing quality. Furthermore, it can avoid the sticking of chips on workpiece surface to influence the clamping of robot arm.

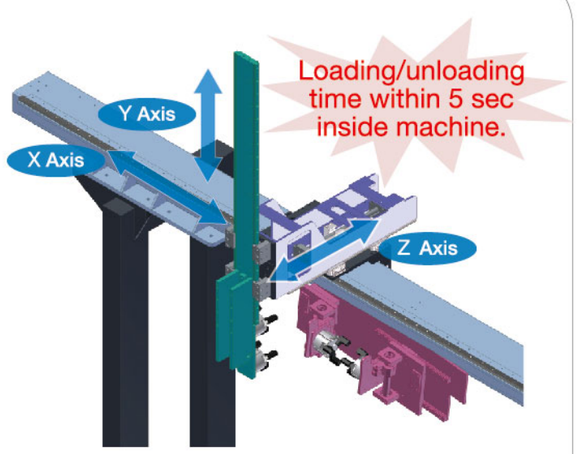


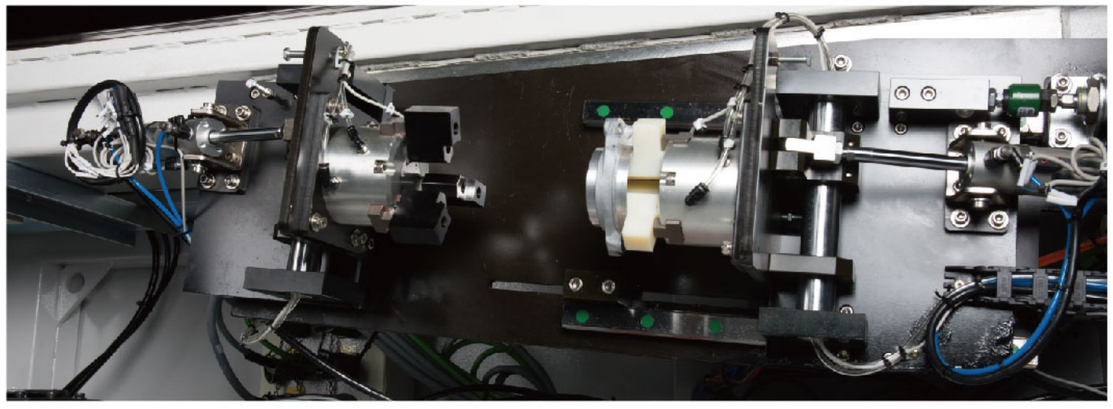
Automation system

Gantry type robot arm

Clamping ability of robotic arm	Workpiece weight	3.0 kg x 2
	Clamping size	Ø120 x 100 mm
X axis rapid traverse	160 m/min	
Y axis rapid traverse	120 m/min	
Z axis rapid traverse	35 m/min	
Rotary axis	1 sec/180°	

The robotic arm is able to process 3 axes movement and is driven by servo motor. Depending on different workpiece's shape, the programmable robotic arm allows the operator to adjust positioning points and moving routes.

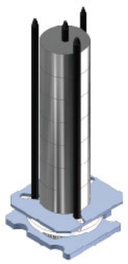




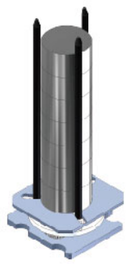
Turnaround unit (OP10 →OP20)

Pallet stacking type part feeder

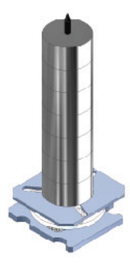
No. of pallet	Max. height	Allowable diameter
10	450 mm	Ø30~Ø150
14	450 mm	Ø30~Ø150
16	450 mm	Ø30~Ø150



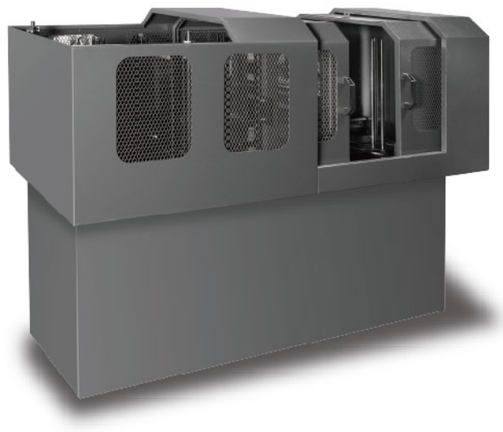
3 poles & center type



3 poles type

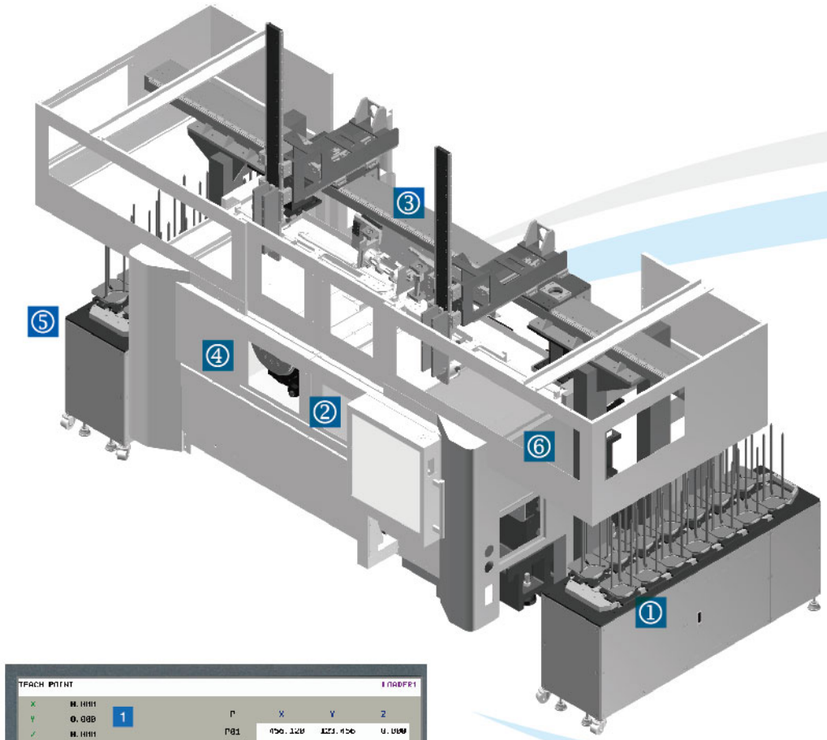


Central pole type



Automation System

Robot arm cycle



①The robot arm clamps the raw material from the part feeder.

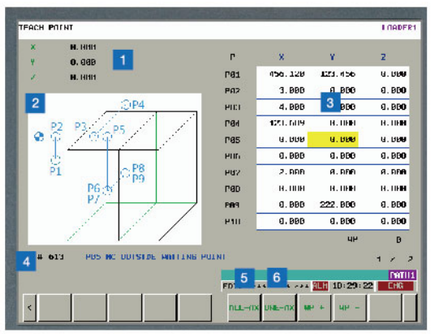
②Unloading of 1st operation workpiece and loading of new raw material.

③Loading of 1st operation workpiece to turnaround unit. Turnaround and workpiece transfer to 2nd operation.

④Unloading of 2nd operation workpiece and loading of 1st operation workpiece.

⑤Unloading of 2nd operation workpiece to part stock.

⑥Defective production station

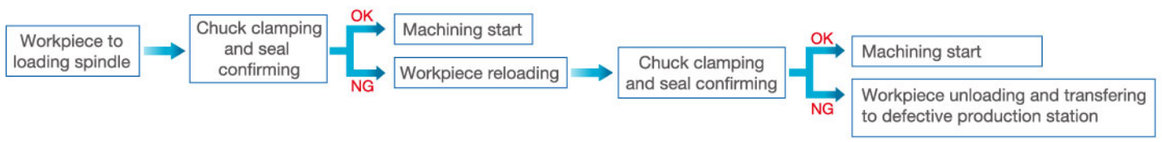


Teaching of robot arm

MT series offer robot arm teaching function, operator can adjust the positioning point through simple windows.

1. Coordinates of robot arm
2. Position diagram
3. Input coordinates
4. The number and name of positions
5. Three axes setting
6. Single axis setting

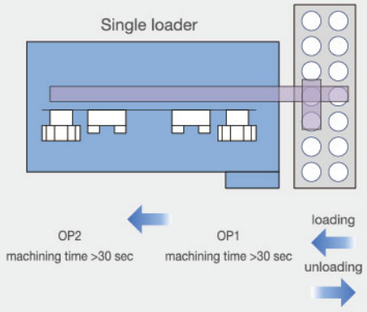
The flow of defective production disposing



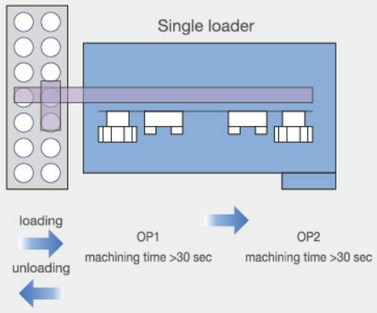
Automation applications in single machine

According to the requirements of manufacturing procedures, MS/MT series is able to flexibly select different machine arrangements, including single/twin spindles or turret/power turret type. Furthermore, each machine is able to connect with vertical machining centers by gantry type robotic arm and turnaround unit for processing various manufacturing procedures. The features of MS/MT series include: compact floor space, flexible machines arrangement, and especially suitable for automatic machining line.
Dpend on cycle time need and floor plan, there are varies applications.

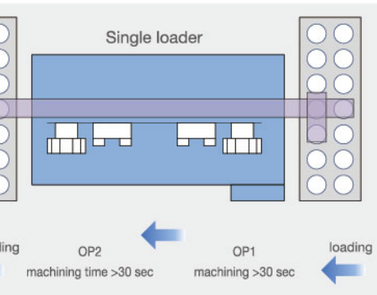
Type 1: Single loader.
Right side loading/unloading



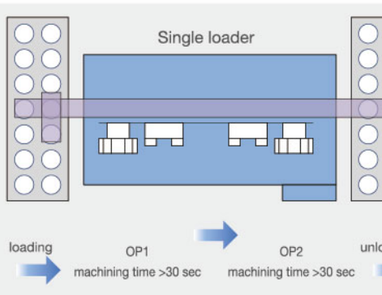
Type 2: Single loader.
Left side loading/unloading



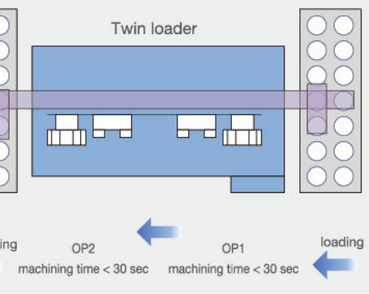
Type 3: Single loader.
Right side loading/Left side unloading



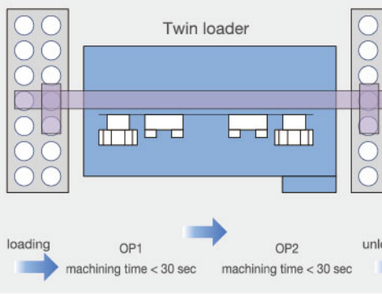
Type 4: Single loader.
Left side loading/ Right side unloading



Type 5: Twin loader.
Right side loading/ Left side unloading

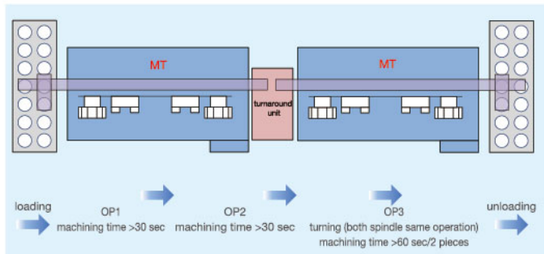


Type 6: Twin loader.
Left side loading/ Right side unloading

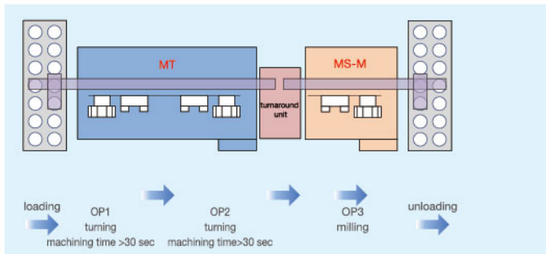


Automation applications in various machines

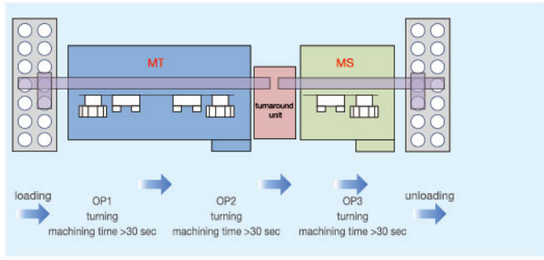
Type1 : OP1, OP2 turnaround turning
OP3 turning (both spindle same operation)



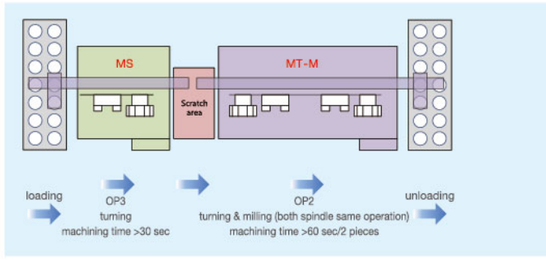
Type5 : P1, OP2 turnaround turning
OP3 milling



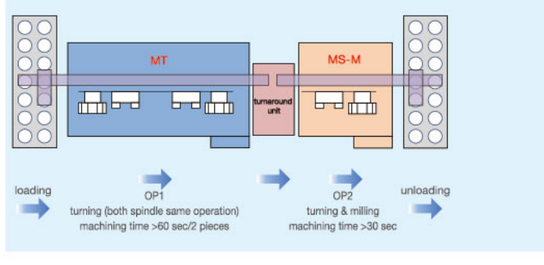
Type 2 : OP1, OP2 turnaround turning
OP3 turning



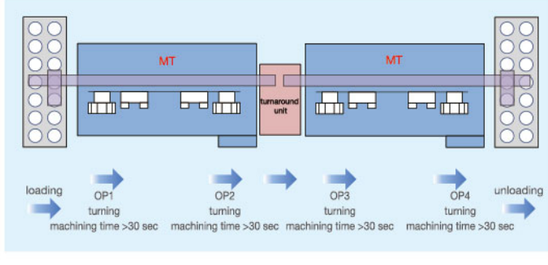
Type6 : OP1 turning
OP2 turning & milling (both spindle same operation)



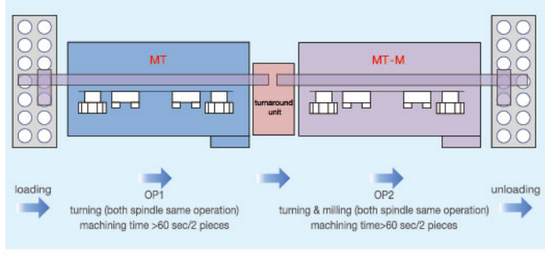
Type3 : OP1 turning (both spindle same operation)
OP2 turning & milling



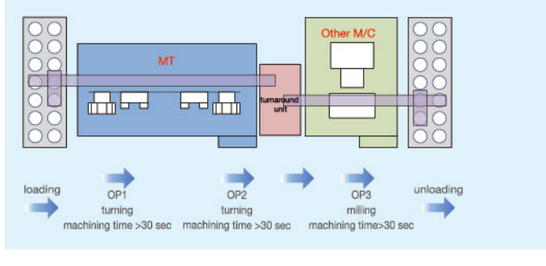
Type7 : OP1, OP2 C
OP3, OP4 turnaround turning



Type4 : OP1 turning (both spindle same operation)
OP2 turning & milling (both spindle same operation)



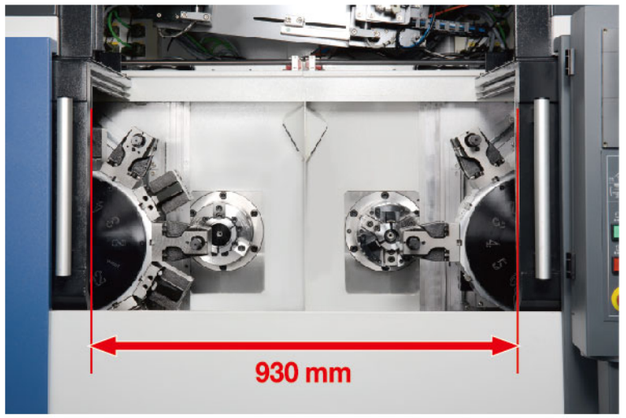
Type8 : OP1, OP2 turnaround turning
OP3 milling (other types: M/C)



For green future

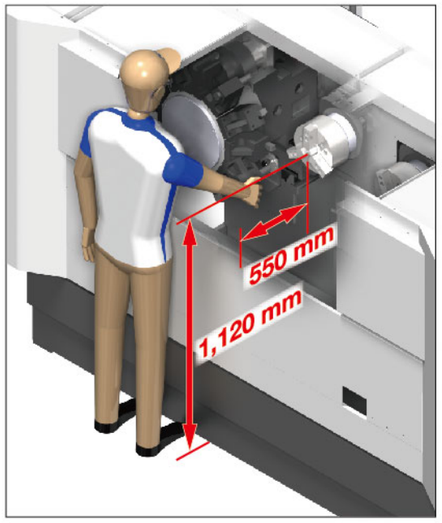
Operation

Door opening width



The wide door opening makes machine operation and maintenance more convenient.

Accessibility



The access to spindles or turrets is short and comfortable to operator.

Front-pull coolant tank

Coolant tank is able to be pulled from the front of the machine. It saves floor space and facilitates the maintenance.

Swivel-type operation panel

The swivel panel makes operator easy to operate and inspect during operation.

TIMS Tongtai Intelligence Manufacturing System(Opt.)

Considering productivity improvement, better machining precision, operating facilitation, as well as protection and maintenance assistance, TIMS includes four management functions: production management, intelligent monitoring, tool management, and workpiece management. These provide customers a comprehensive intelligence manufacturing system and a friendly human-machine interface.

Production management

Cutting Load Monitoring
The spindle and feeding axis motor loads are able to be monitored from the operation panel directly. The tool number is also shown during machining.

APC Information
The operator is able to assign the program codes of A/B pallet in the operating interface directly and the system will call the corresponding programs of workpiece automatically.

Machine Alarm Messages Record
Alarm messages will be recorded in detail during machine processing.

Troubleshooting and Maintenance Support
Graphical display interface assists operators to understand detail alert and warning information.

Intelligent monitoring

Motor Load Monitoring
Monitoring and retrieving the motor load data during machining from the operation panel. In addition, according to the setting values, the system will show the alarm messages or shut down the machine.

Machining Adaptive Control
Monitoring the spindle loads and the system enables automatic feeding adjustment to protect tools and ensure machining efficiency.

Crush Protection
With the real-time detection of servo loads during feeding, the electrical brake is activated when a crash happens to minimize the damage.

Tool management

Tool Usage Time Tracking
Record the information of last machining date, time, and accumulated machining time in each tool.

Tool Compensation
When the machining process needs tool length compensation, the operator is able to key in the compensation data for the tools.

Tool Life Management
Display the tool life information and reminds the operator to check workpiece before tool life almost approaching its maximum.

Tool Overload Protection
Display the information tool loads, spindle loads, machining time, abnormal data, and overload value of tools. When overload value reached, system will shut down the machine and show the alarm message.

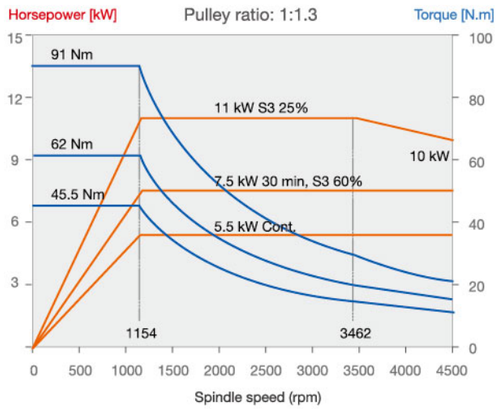
Workpiece management

Workpiece positioning
The CCD camera is used to monitor the characteristics of workpiece, and then the system will calculate and compensate program coordinates for increasing machining precision.

Spindle output and torque chart

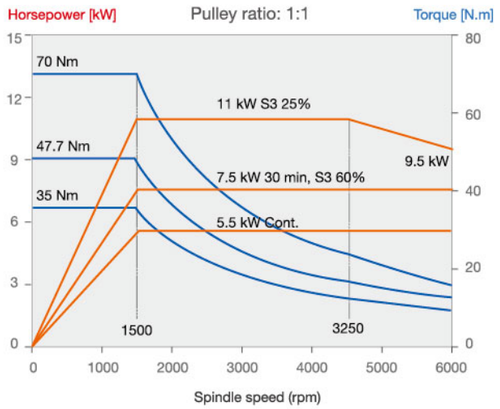
MS/MT-1500 spindle motor (std.)

Spindle diameter: Ø80 mm Spindle speed: 4,500 rpm



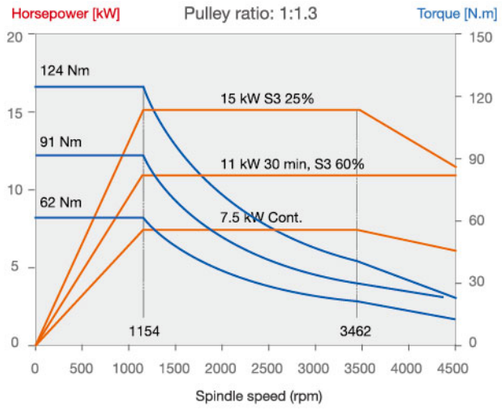
MS/MT-1500 spindle motor (opt.)

Spindle diameter: Ø80 mm Spindle speed: 6,000 rpm



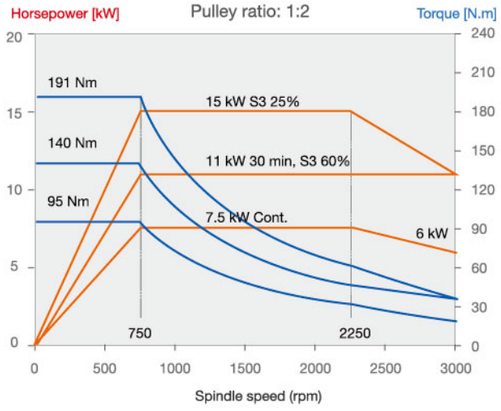
MS/MT-2000 spindle motor (opt.)

Spindle diameter: Ø100 mm Spindle speed: 4,500 rpm

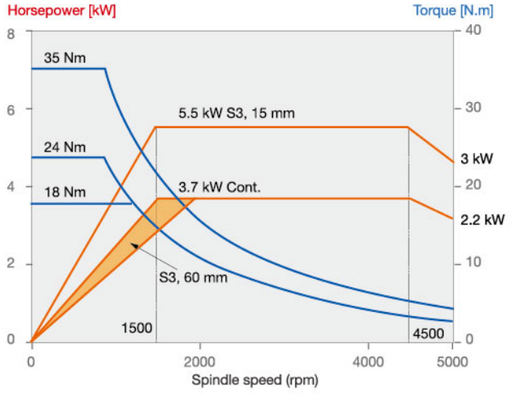


MS/MT-2000 spindle motor (opt.)

Spindle diameter: Ø100 mm Spindle speed: 3,000 rpm

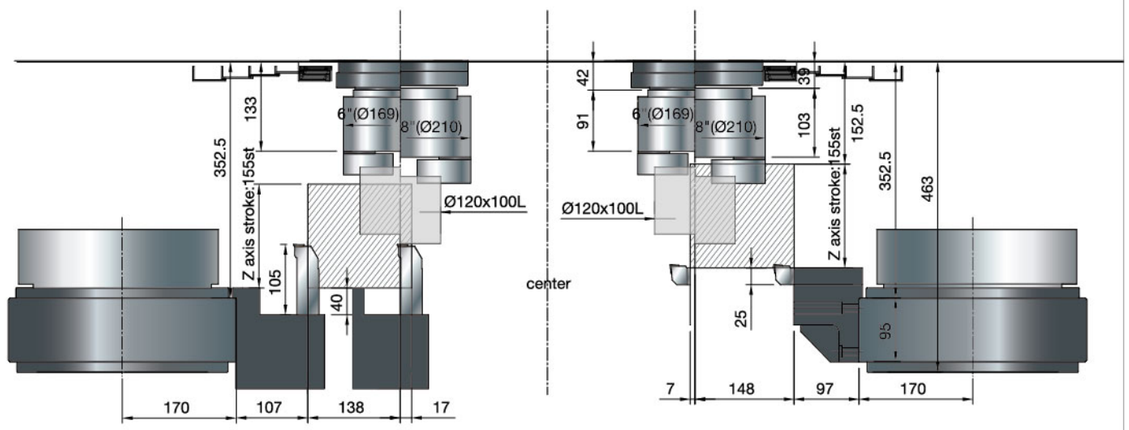


Live tool spindle motor (opt.)



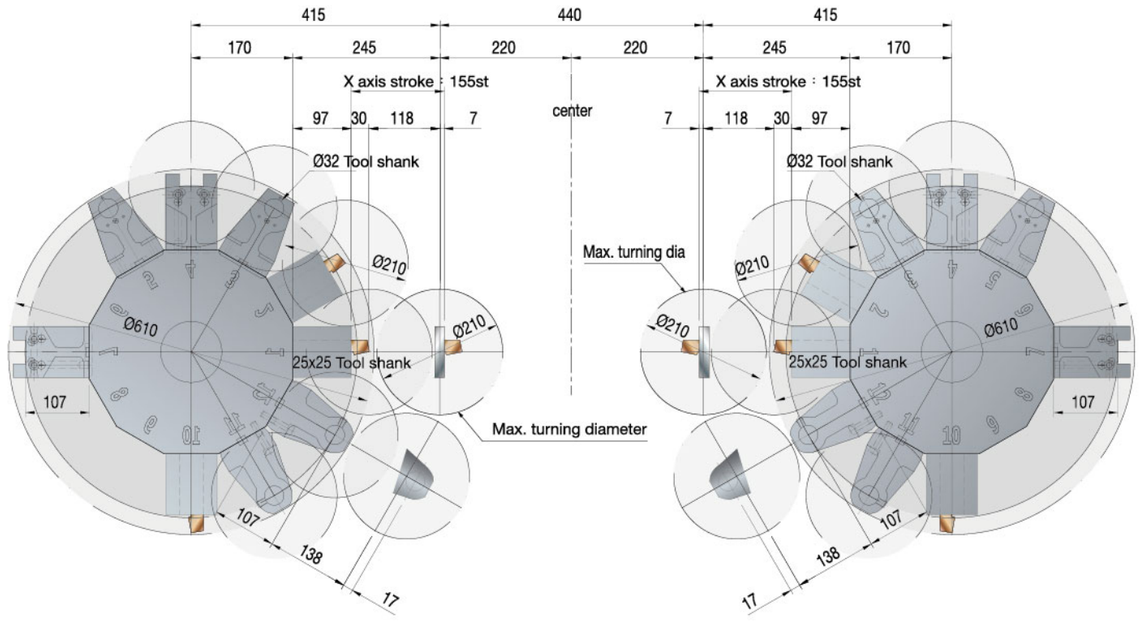
Working area / Tool interference

Working area



Unit : mm

Tool interference



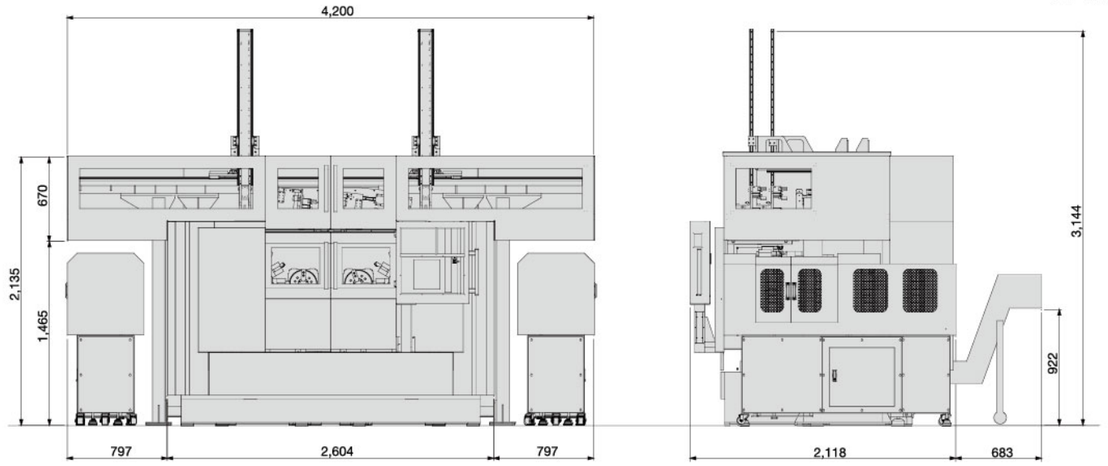
Unit : mm

Standard / Optional accessories

			Standard	Optional
Spindle	Spindle bearing dia.Ø80 mm		● (MT-1500)	
	Spindle bearing dia.Ø100 mm		● (MT-2000)	
Chuck	3 Jaws through hole chuck		●	
	Collet type through hole chuck			O
Turret	12V servo turret		●	
	8V servo turret			O
Tool holder	Gasket		16	
	□25 O.D tool holder		4	
	□25 Facing tool holder		4	
	Ø32 I.D. tool holder		12	
	I.D. tool sleeve Ø8,Ø10,Ø12,Ø16,Ø20,Ø25		2	
	Drilling tool sleeve MT#1, MT#2, MT#3		2	
Chip conveyor	Hinge type conveyor		●	
	Scraper type conveyor			O
	Magnetic scraper type conveyor			O
Lubrication system	General lubrication system		●	
	LHL integrated lubrication system			O
Hydraulic unit	General type oil pump		●	
	variable-frequency oil pump			O
Automatic loading / unloading unit	robot arm	Single robot arm(right side)	●	
		Twin robot arms		O
	Part feeder	10 pallets	●	
		14 pallets		O
		16 pallets		O
	Flow direction	left side loading, left side unloading		O
		left side loading, right side unloading		O
		right side loading, right side unloading	●	
		right side loading, left side unloading		O
	Automatic door			O
	Seal confirmation		●	
Coolant & airblow	Coolant through spindle		●	
	Coolant on spindle side			O
	Air blow on spindle side		●	
Others	Air conditioner for electrical cabinet			O
	Air gun			O
	Coolant gun			O
	Oil skimmer			O
	Oil mist collector			O
Controller	FANUC 0i-TF		●	

Machine dimensions / Specification

Unit : mm



Specification

Item	Specification	Unit	MT-1500	MT-1500M	MT-2000	MT-2000M
Turning capacity	Pitch of two spindles	mm	440		440	
	Max. swing diameter	mm	Ø210		Ø210	
	Max. swing diameter over saddle	mm	Ø230		Ø230	
	Max. turning diameter	mm	Ø210 (with robot Ø120)		Ø210 (with robot Ø120)	
	Max. turning length	mm	145 (with robot 100)		145 (with robot 100)	
Spindle	Spindle nose		A2-5		A2-6	
	Spindle speed	rpm	4500 (Optional 6,000)		4500 (Optional 3,000)	
	Chuck size	inch	6"		8"	
	Through-spindle hole diameter	mm	Ø56		Ø66	
	Spindle bearing diameter	mm	Ø80		Ø100	
	Min. CS axis indexing increment	deg	-	0.001°	-	0.001°
Turret	Tool capacity	pc	12 (Optional 8)		12 (Optional 8)	
	O.D. tool	mm	25x25	-	25x25	-
	I.D. tool	mm	Ø32		Ø32	
Power turret	Tool capacity	pc		12(VDI-40)		12(VDI-40)
	Motor	kW		5.5/3.7		5.5/3.7
	O.D. tool	mm	-	25x25	-	25x25
	I.D. tool	mm		Ø32		Ø32
	Max. speed	rpm		5,000		5,000
Stroke	X/Z axis stroke	mm	155/155		155/155	
Feed	X/Z axis rapid traverse	m/min	30/30		30/30	
	Cutting feedrate	mm/min	0.001-5,000		0.001-5,000	
Hydraulic unit	Hydraulic tank capacity	L	30		30	
	Hydraulic motor	kW	1.5		1.5	
Coolant unit	Coolant tank capacity	L	220		220	
	Coolant motor	kW	0.55x2		0.55x2	
	Spindle motor	kW	11/7.5/5.5		15/11/7.5	
Motor	X/Z axis servo motor	kW	1.8/1.8		1.8/1.8	
Machine size	Width × Depth × Height	mm	4,200×2,845×3,120		4,200×2,845×3,120	
	Weight	kg	5,500	5,700	5,500	5,700

◎Spencifications may be changed without prior notice.