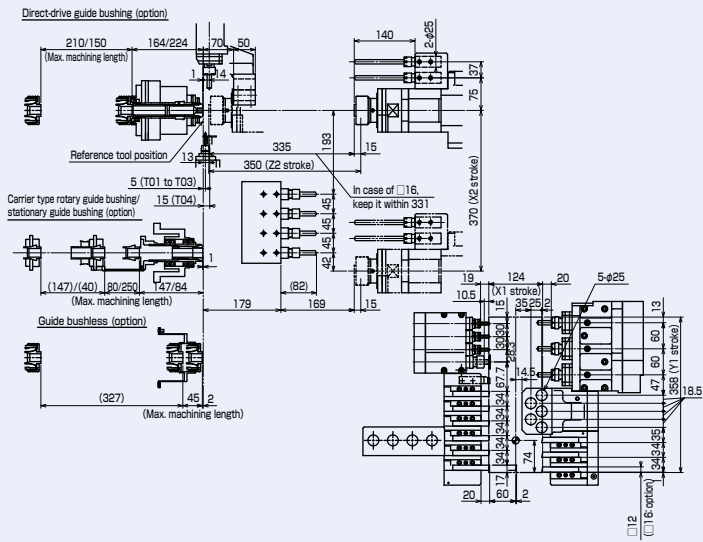
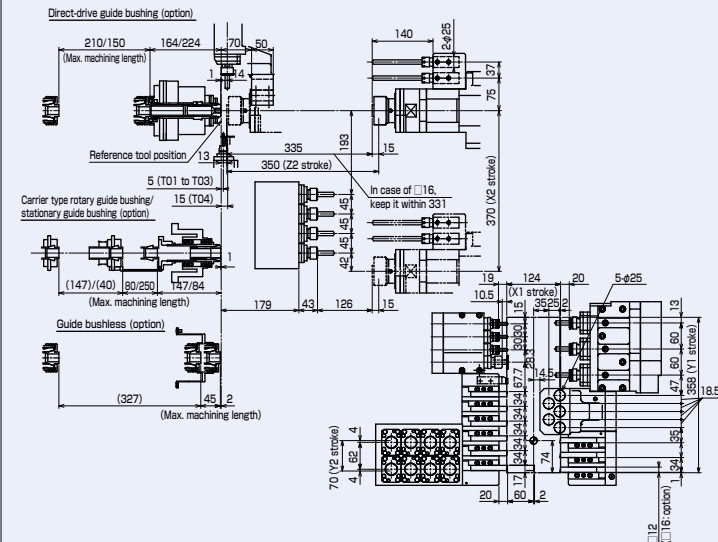


Tooling zone

S205-II

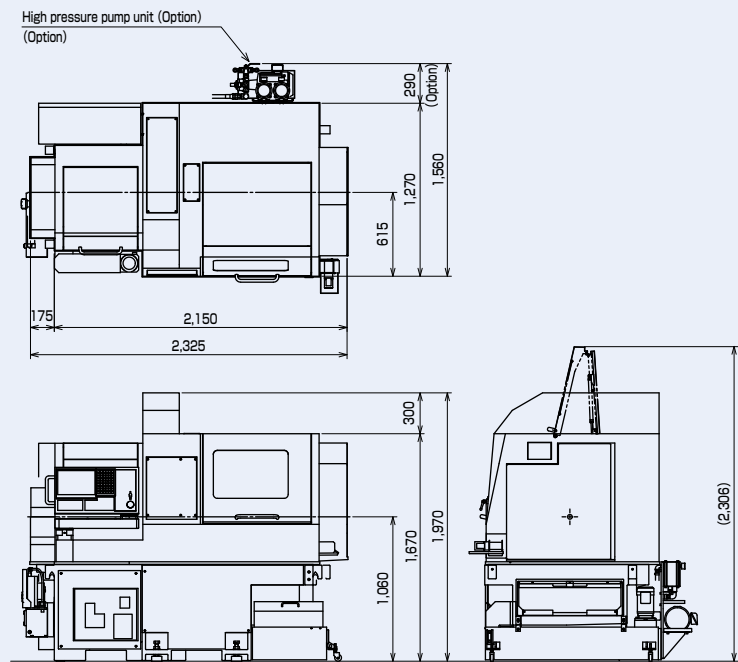


S206-II



Layout

S205-II/S206-II



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The specifications of this catalogue are subject to change without prior notice.

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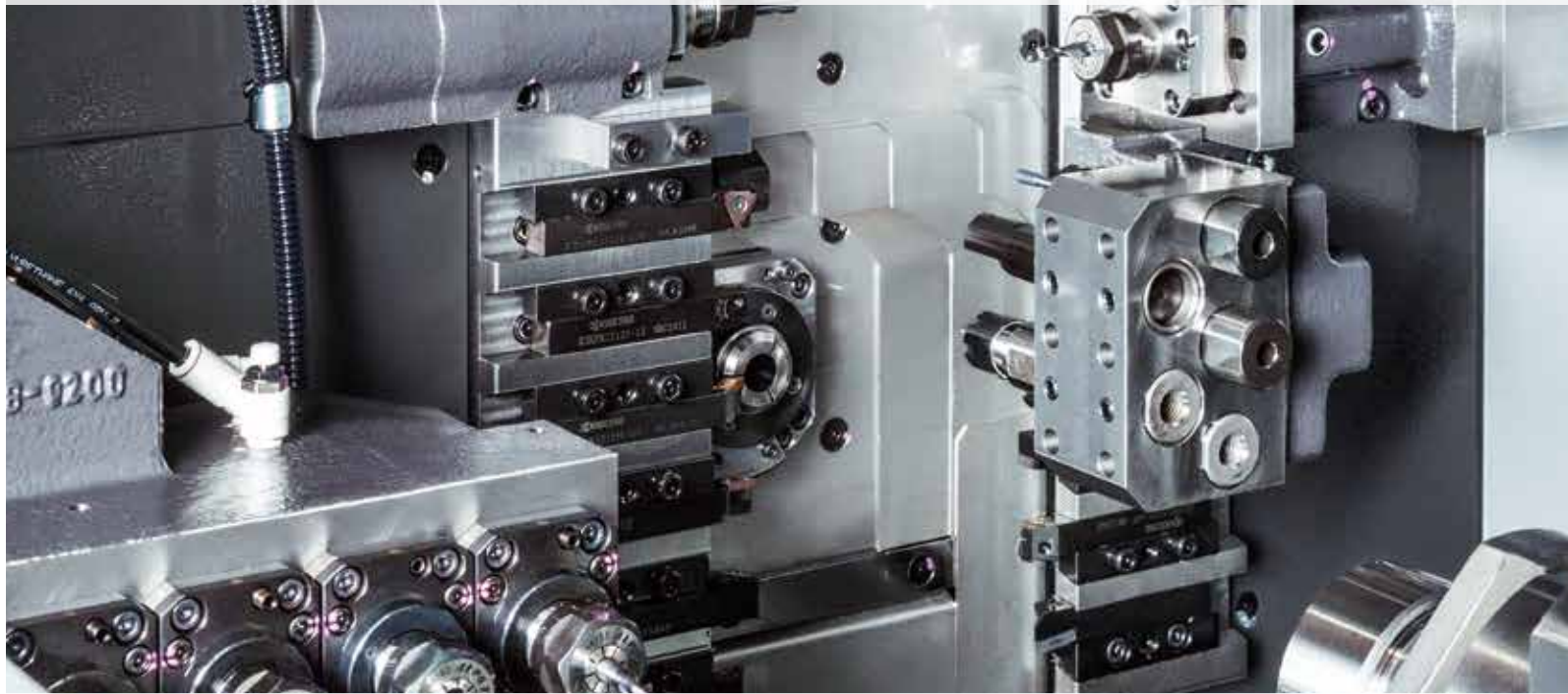
CAT.NO.E119845.SEP.1T(H)

PRECISION TSUGAMI

TSUGAMI

CNC Precision Automatic Lathe

S205-II
S206-II



Various tool selection enables the production of various type or volume of complicated workpiece.





(S205-II)

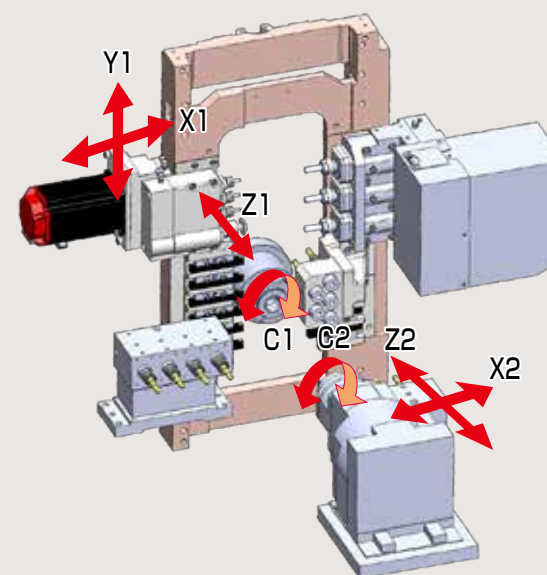
(S206-II)

Various tool selection enables the production of various type or volume of complicated workpiece.

Front & back simultaneous machining

S205-II

Standard

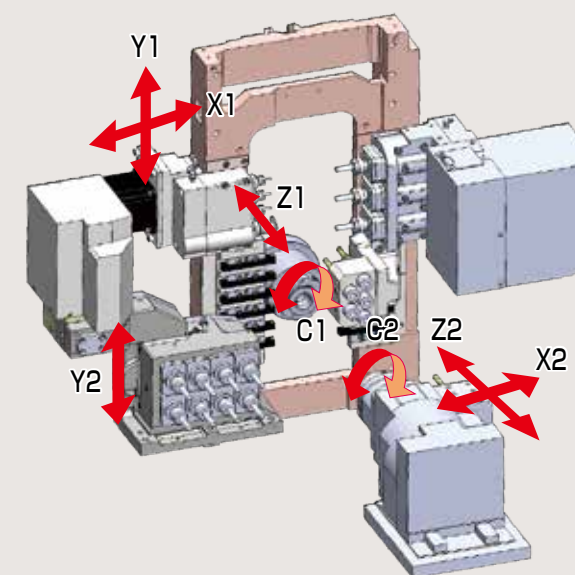


Total tool storage capacity	41
OD tool storage capacity	9
Cross rotary tool	7
Front rotary tool (Option)	0 to 6
Front drill (standard)	5
Front drill (deep hole)	2 (100 mm)
Back tool	4 to 15 (back 4 + front drill 5 + double face 6)

Front and back simultaneous processing including milling with Y2 axis control

S206-II

With Y axis of back tool post



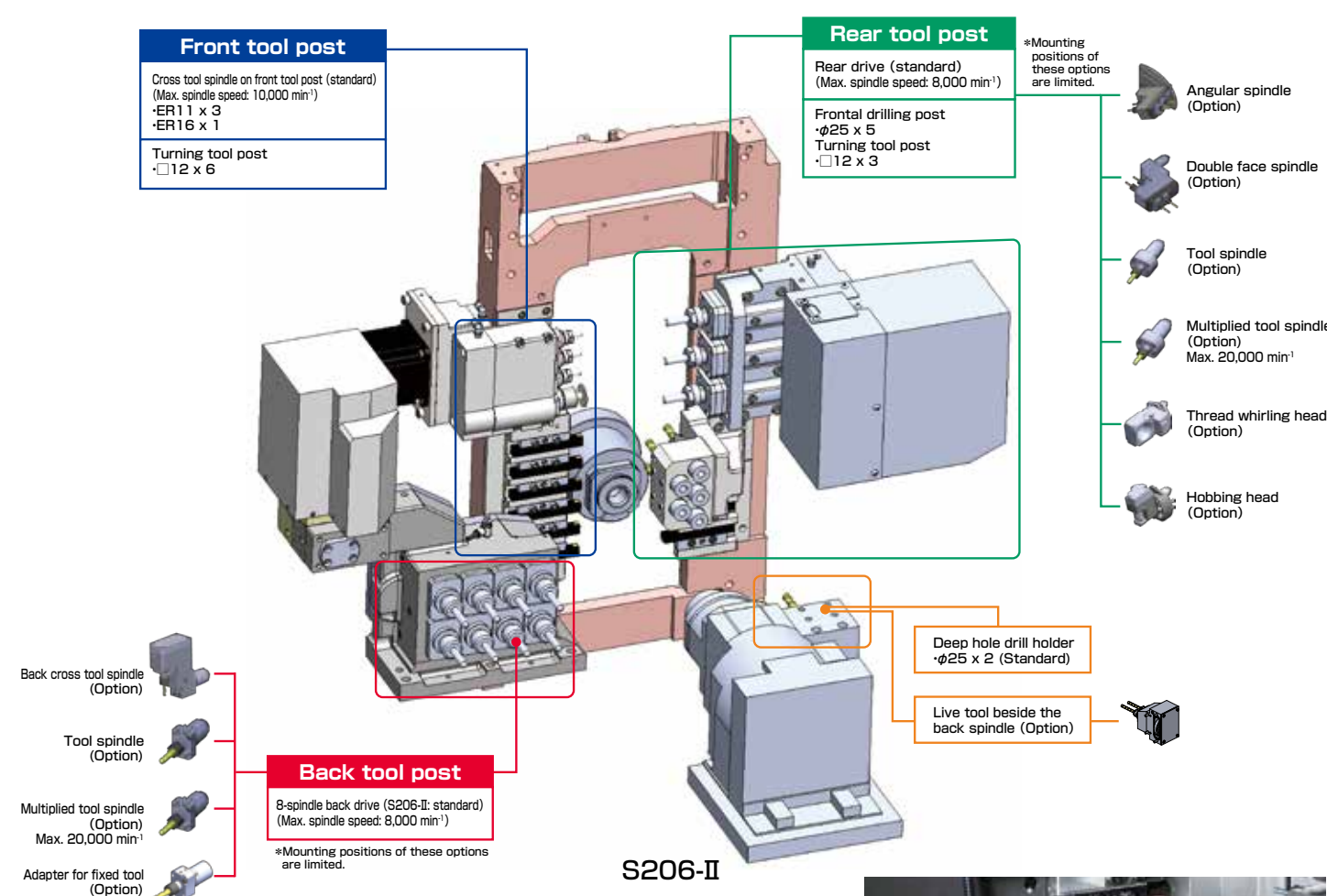
Total tool storage capacity	45
OD tool storage capacity	9
Cross rotary tool	7
Front rotary tool (Option)	0 to 6
Front drill (standard)	5
Front drill (deep hole)	2 (100 mm)
Back tool	8 to 19 (back 8 + front drill 5 + double face 6)

- Powered up live tools improve combined machining capability.
- Modular type live tools can be arranged onto the rear tool post and the back tool post. The suitable tool and position can be selected according to the workpiece.
- By increasing gripping force of the spindles, the cutting capability is increased by 30% compared to current models.
- 1-axis oscillation cutting (optional) improves chip disposal.
- Thanks to the thermal displacement compensation function provided as standard, the long-term stable production is realized.
- Automatic programming system is prepared as standard.

*Pictures and figures contain options.

Modular tooling

Various arrangement of live tools, ID holders and turning holders



On S206-II simultaneous machining including milling such as off-center drilling, off-center tapping, endmilling, or cross drilling on back side is possible by adding Y-axis on the back tool post. Flexibly respond to workpieces requiring complex back machining.

Live tools on rear tool post and back tool post are modular type, and optimum tool allocation is possible.

- Cross tool spindle on rear tool post: 3pos
- Cross tool spindle on back tool post: 8pos (S206-II)

Rear tool post	Back tool post
Tool spindle	Tool spindle
Double face spindle	Back cross tool spindle
Angular drilling head	Multiplied tool spindle
Thread whirling head Various types of attachments	Adapter for fixed tool

Optional direct-drive rotary guide bushing provides high-speed and accurate machining.

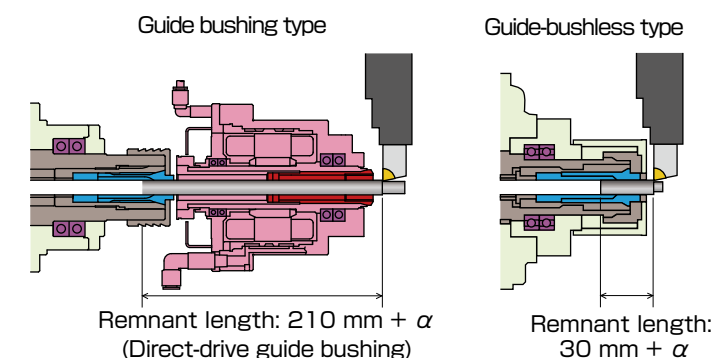
- Max. speed: 10,000 min⁻¹

- Max. machining length: 210 mm

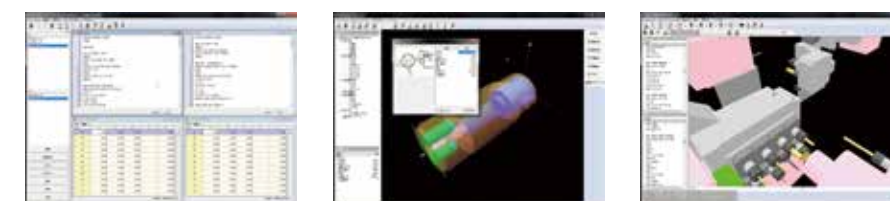
The stable geometrical accuracy, the dimensional accuracy and the surface roughness are secured by the quiet operation even on high speed.

Guide-bush type or guide-bushless type is selectable according to the workpiece (option)

- Possible to switch between the guide-bush type and guide-bushless type. Most suitable system for the workpiece can be chosen.
- The guide-bushless type does not require ground bars, enabling high speed and high precision machining from cheap cold-drawn bars.



Minimum tool change time is achieved with the optimized tool path made by the automatic programming system.



The program created by the automatic programming system allows an optimum matching of both paths, and shortens the cycle time. The 3D simulation function enables the user to check the operations of the main/back spindles from any angle.

Since our know-how (on machining process, cutting conditions, and such) has been applied, anyone can create high quality and standardized program for complicated and high precision workpieces.

1-axis oscillation cutting X1/Z1 (Option)

- Chips breaks into small pieces, and do not entangled on tools or workpieces.
- Small pieces of chips do not take up much space.

■Oscillation cutting by servo learning (option)

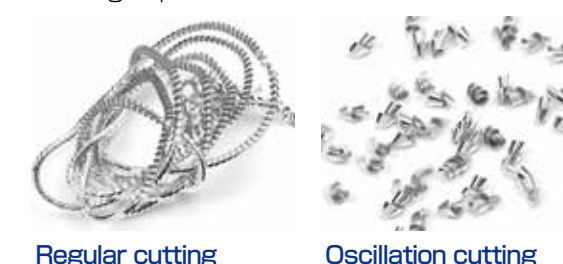
- In case of NC is 31i or 32i, oscillation cutting by servo learning can be selected.
- With this option, cutting tool follows correctly to the command, and minimize the time for fine tuning.
- Correspond to circular interpolation.

*Oscillation cutting by servo learning has some restrictions on NC, consult Tsugami.

Z axis direction (OD turning)

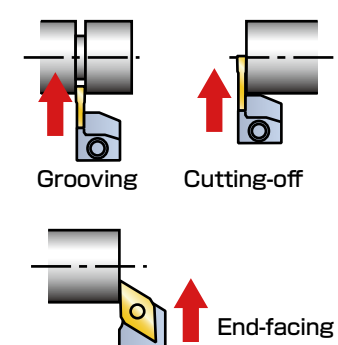
Material: Aluminum (A5056)
Cutting depth 2.0 mm

Oscillation cycle: 1.5
Feedrate: 0.05 mm/rev

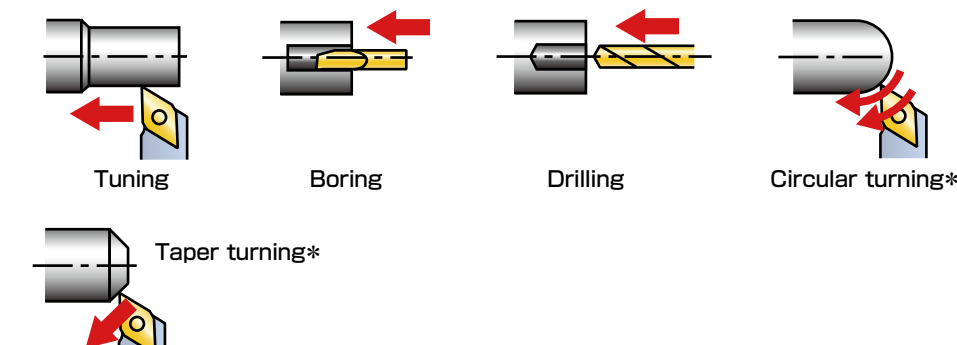


Machining using oscillation cutting

Machining with oscillating X1 axis



Machining with oscillating Z1 axis



*Not possible to perform machining as oscillating X1 and Z1 axes simultaneously.

Standard Specifications of Machine

Item		S205-II	S206-II
Machine capacity, Machining range	Working barstock diameter	φ3 to φ20 mm	
	Max. machining length	210 mm (direct-drive rotary guide bushing), 250 mm (stationary guide bushing), 80 mm (carrier type rotary guide bushing), 45 mm (guide-bushless)	
	Max. main spindle drilling diameter	φ12	
	Max. main spindle tapping diameter	M10	
	Max. deep hole drilling diameter	φ8	
	Max. back spindle chucking dia.	φ20	
	Max. back spindle drilling diameter	φ12	
	Max. back spindle tapping diameter	M10	
	Max. cross drilling diameter	φ8 (Front tool post/Rear tool post/Back tool post)	
	Max. cross tapping diameter	M6 (Front tool post/Rear tool post/Back tool post)	
Machine	Max. tool spindle slotting cutter dia.	φ30 (T04)	
	Main spindle speed	200 to 10,000 min ⁻¹	
	Back spindle speed	200 to 10,000 min ⁻¹ *1	
	Rotary guide bushing speed *2	200 to 10,000 min ⁻¹ (Direct-drive)	
	Tool spindle speed	Cross tool spindle on front tool post: 200 to 10,000 min ⁻¹ Rear drive / Back drive: 200 to 8,000 min ⁻¹ *3	
	Total tool storage capacity (Standard/Max.)	27/41	31/45
	Tool size	□12 mm	
	Rapid traverse rate	35 m/min (X1,Y1,Y2: 24 m/min)	
Motors	Main spindle	2.2/3.7 kW	
	Back spindle	2.2/3.7 kW	
	Cross drill	1.0 kW (Front tool post), 1.0 kW (Rear tool post), 1.0 kW (Back tool post)	
	Rotary guide bushing	0.75/1.1 kW (Direct-drive rotary guide bushing)	
	X1/Y2-axis	0.5 kW	
	Y1/Z1//X2/Z2-axis	0.75 kW	
	Coolant pump	0.4 kW	
	Lubricating oil pump	3 W	
Power supply and others	Net weight	3,750 kg	
	Power source requirment	12.1 kVA	
	Compressed air requirement	0.4 MPa or above	
	Air discharge rate	100 NL/min	
	Width x depth x height	2,325 x 1,270 x 1,970 mm	

*1 When the rotary tool beside the back spindle (option) is used, the maximum back spindle speed is restricted to 8,000 min⁻¹

*2 Optional

*3 Rated tool spindle speed is 6,800min⁻¹ for front tool post, 5,300min⁻¹ for rear tool post/back tool post.
In case of exceeding the rated spindle speed, the rotation should be limited in the short period of time.

NC Specifications

Item	S205-II	S206-II
Controlled axes	X1, Z1, Y1, X2, Z2, C1, C2	X1, Z1, Y1, X2, Z2, Y2, C1, C2
Least input increment	0.001 mm (X1,X2 in diameter)	
Least command increment	X1, X2: 0.0005 mm, other axes: 0.001 mm	
Maximum programmable value	±8 digits	
Interpolation method	Linear, circular	
Feedrate	1 to 6,000 mm/min	
Feedrate override	0 to 150 % in 10 % increments	
Dwell	G04 0 to 99999.999	
ABS/INC command	X,Y,Z,C: absolute, U,V,W,H: Incremental	
Tool offset pairs	99	
LCD/MDI	10.4" color LCD	
Display language	English	
Part program storage size	512 kbyte (equivalent to 1,280 m tape length)	
Registerable programs	1,000 (sum of main and back spindle NCs)	
Miscellaneous functions	Main: M5-digits Back: M3-digits	
Spindle function	S5-digits	
Tool function	T4-digits	

Standard Accessories

Item	Item
Cross tool spindle on front tool post	Door interlock
Rear drive	Coolant level detector
Deep hole drill holder (φ25 x 2)	Spindle cooling unit
Main spindle: C axis / Back spindle: C axis	Standard tools
Automatic programming software	Transit clamps
Tool height compensation	Automatic power shut off
Tool life counter	Main spindle/back spindle air purge
Periodic maintenance screen	Cross drill air purge
Main spindle adapter	Back drive (S206-II only)
Back spindle adapter	Main spindle brake
Internal work light (Tooling zone)	Thermal displacement compensation

NC standard accessories

Item	Item
Chasing function	Programmable data input
Continuous thread cutting	Chamfering & corner R
Manual pulse generator	Tool nose radius compensation
Memory card input/output interface	HRV control
Back ground editing	Multiple repetitive cycle
Run time & parts number display	Extended program editing
Custom macro	Canned drilling cycle
Constant surface speed control	Rigid tap (Main spindle, back spindle, cross, back)
Spindle synchronous control (rotation/phase)	Cut-off detection (Speed Differential type)
Z1-Z2 synchronous control	Spindle speed fluctuation detection
Tool geometry/wear offset	Stored stroke check 2,3

Options

Item		Item		Item	
Guide bushing	Stationary guide bushing	Coolant related	M code oil blow	NC functions	Variable-lead thread cutting
	Carrier type rotary guide bushing		Mist collector		Thread cutting cycle retract
	Direct-drive guide bushing		WAVY coolant nozzle		Polar coordinate interpolation
	Guide-bushing-less		Work conveyor		Cylindrical interpolation
Advanced function system	Back spindle brake	Workpiece discharge system	Work catcher	Safety and other	Display language
	Back spindle 15°index		Work tray		Automatic fire extinguisher
	Live tool beside the back spindle		Work unloader		Internal work light (Main spindle side)
	0.1 μm resolution		Front discharge		Bar feeder interface
Live tools (Rear tool post)	Tool spindle	Chip disposal	Rear discharge		Manual handle retrace function
	Double face spindle		Chip conveyor		RS232C input/output interface
	Angular spindle		Oscillation cutting (X1/X2 axis)		Inch/metric conversion
	Thread whirling head	Machine maintenance and monitoring functions	Signal indicator		
	Hobbing head		Adapter for non-round bar (main spindle)		
	Multiplied tool spindle		Adapter for non-round bar (back spindle)		
Live tools (Back tool post)	Back drive (S205-II)	Tooling related	Collet chuck with carbide lining		
	Tool spindle		Tool set gauge		
	Back cross tool spindle		Spindle liner		
	Adapter for fixed tool		Drill holder		
	Multiplied tool spindle		Abnormal load detection		
Coolant related	High pressure pump unit	NC functions	Direct drawing dimension program		



Angular spindle
Used for inclined drilling



Back cross tool spindle



Thread whirling head
Used for machining bone screws and long screws