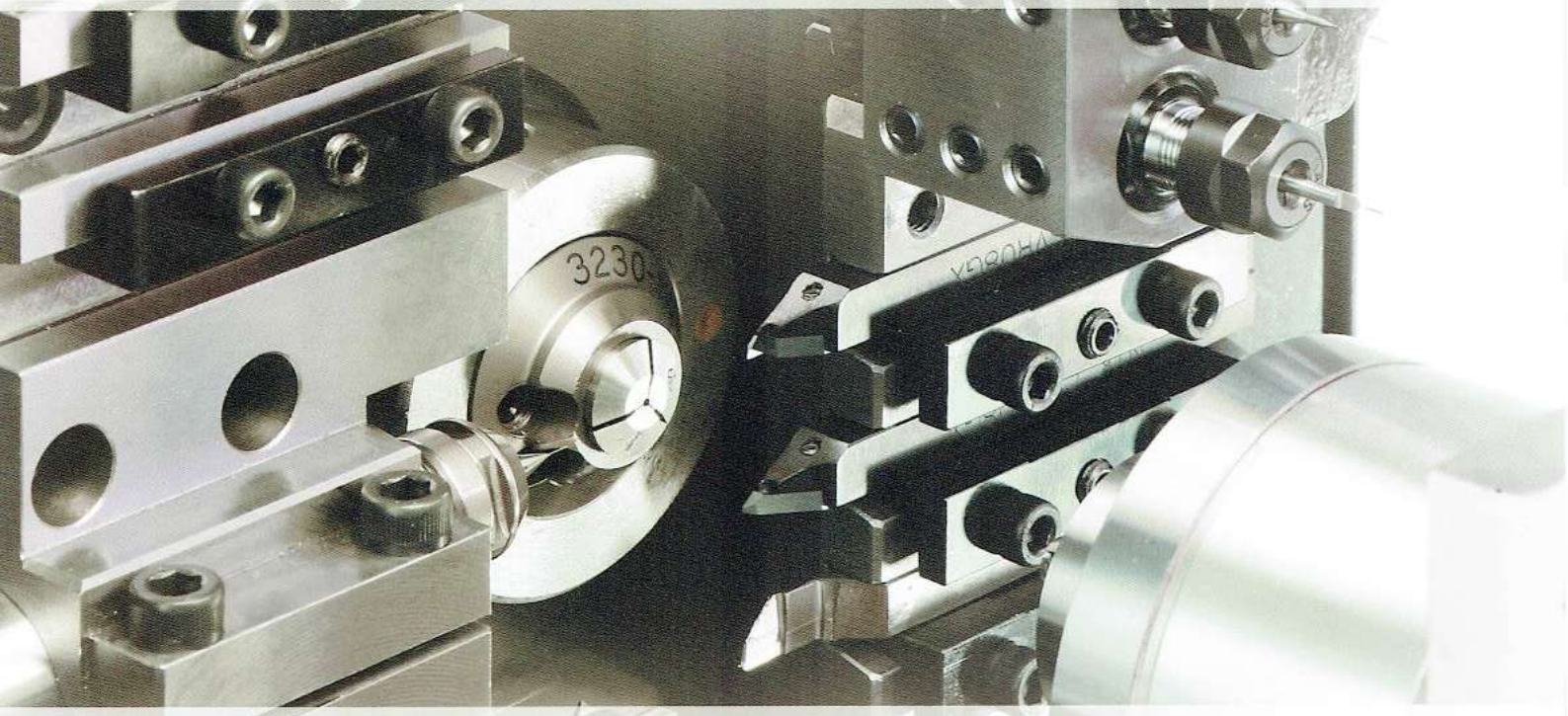
PRECISION TSUGAMI

TSUGAMI

CNC Precision Automatic Lathe

P013/P014
P033/P034



A machine tool dedicated to fine precision parts
Correspond to severe dimensional tolerance
without warm-up operation

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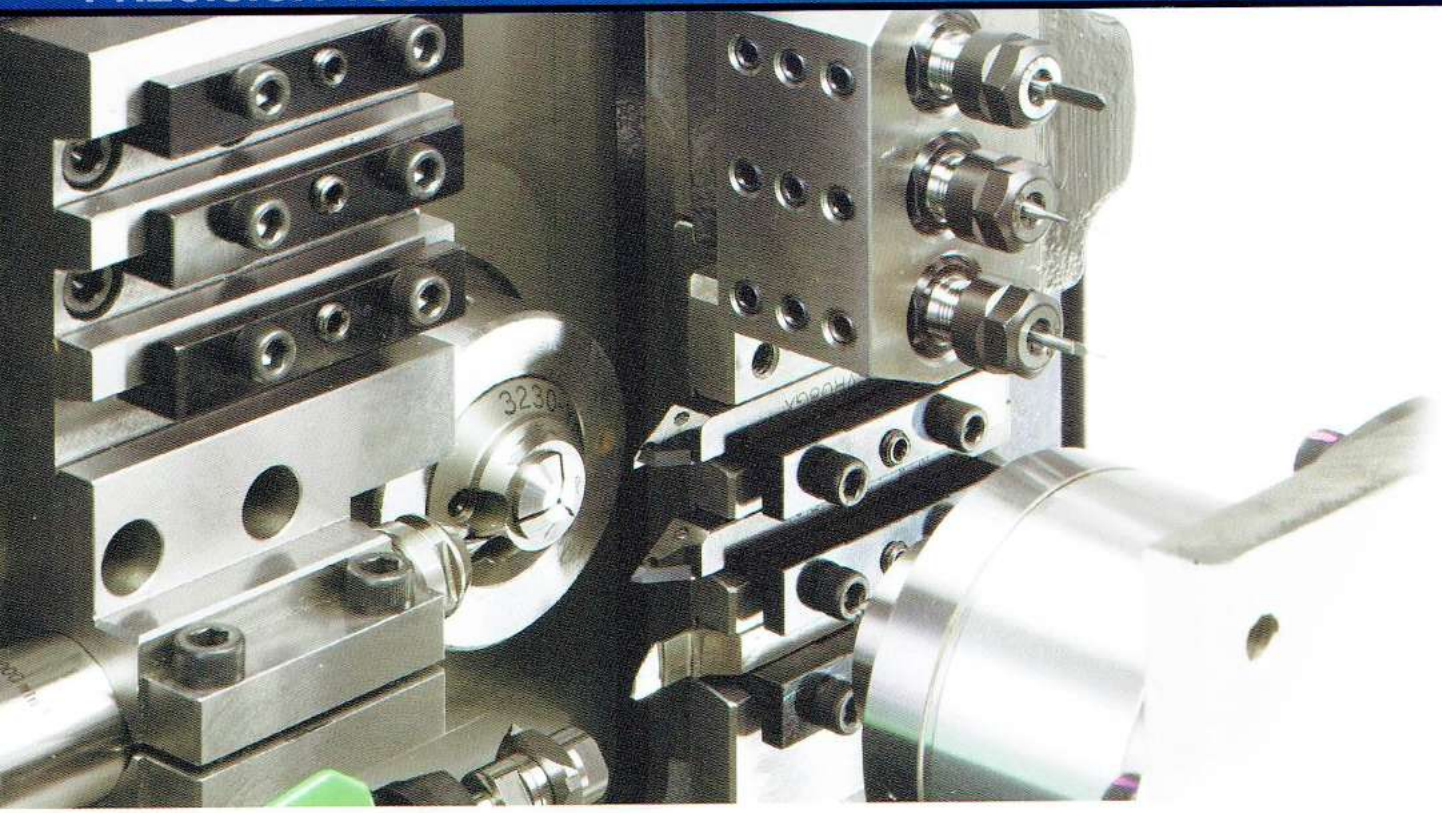


(1) Thanks to the measures for thermal displacement and the automatic compensation system, dispersion from the non-warmup status is reduced.
- ■ Increasing coolant capacity
- ■ Fan cooling for coolant, X- and Y-axis motors and tool-height displacement compensation function are provided as standard.

(2) High-speed 25,000 min^{-1}/20,000 min^{-1} spindle is used for both the main spindle and back spindle. **Patented**

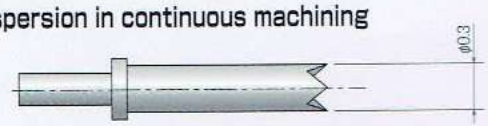
(3) Fine precision parts are clamped gently using chucks with adjustable clamping force in both the main spindle and back spindle.

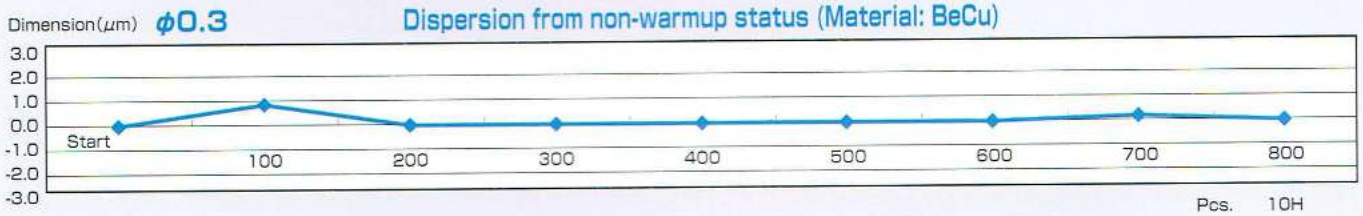
(4) Easy-to-use software for turning fine precision parts is installed. (Tool-height compensation function) **Patented**

(5) Constructed for high accuracy, with high-rigidity base and symmetrical configuration.

(6) Space savings with a floor space requirement of 0.8 m^2

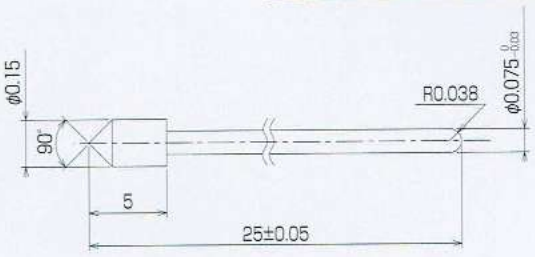
Dispersion in continuous machining





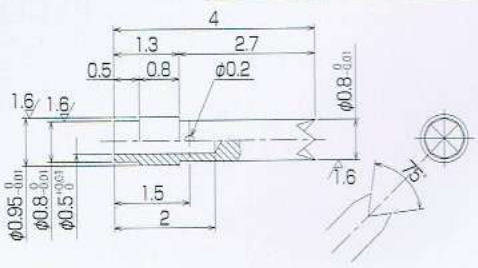
Example

Cycle time	69 seconds
Material	SK4
Workpiece	φ1.0h7 × 2,000 mm



Example

Cycle time	34 seconds
Material	BeCu (berylium copper)
Workpiece	φ1.0h7 × 2,000 mm

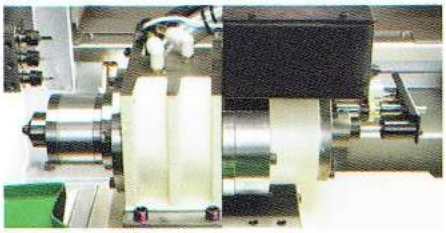


Turning fine precision parts with diameter of under 0.05 mm at high speed and with high accuracy

High-speed turning

■25,000 min^{-1} (P013/P014)
20,000 min^{-1} (P033/P034) high-speed spindles (main spindle, back spindle)

Turning can be done under the optimum conditions, substantially reducing the cycle time for extremely small workpieces.
Clamping and unclamping is possible even during high-speed rotation.



High-accuracy turning

■Main spindle / back spindle

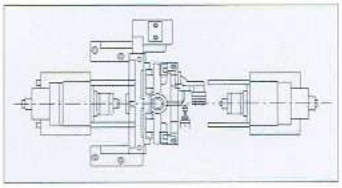
The main spindle and back spindle have no chuck lever, toggles, or disc springs. Tsugami's unique chuck opening/closing mechanism helps to improve roundness at high spindle speeds.

■Air-tube integrated spindle (air piping for the chuck)

Since there is no contact, the spindle accommodates high speed.
The spindle is integrated with a rotary joint.

■High-rigidity base and symmetrical construction

Base with a symmetrical construction to suppress the effects of thermal displacement



■Tool-height displacement compensation

"Tool-height displacement compensation" is a system that automatically applies offsets upon measuring the center height displacement once every few cycles with a touch switch mounted on the slide that moves in the center height direction.

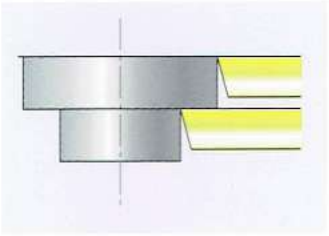
Improved operating convenience

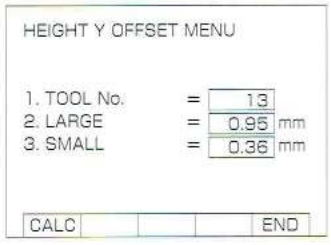
■More convenient operation thanks to chucks with adjustable gripping force (main spindle, back spindle)

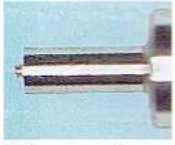
The gripping force of the chucks can be adjusted with an air pressure reducing valve. Adjustment of the gripping force is very simple.
Thin pipe material can also be clamped gently. Clamping force is transmitted directly from the air cylinder to the collet chuck.

■Tool-height compensation function

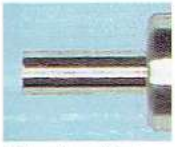
By entering the actually achieved values for O.D. at two locations after cutting, the center height difference is calculated and is automatically set in the tool data.







Before the offset



After the offset

■Cross drilling (optional)

Enhanced variation

2-spindle cross drill	1 pos. Brashless motor
	1 pos. Servo motor
2-spindle cross drill (1 pos. cartridge)	1 pos. Servo motor
	1 pos. cartridge — Tool spindle / Multiplied tool spindle / Polygon spindle

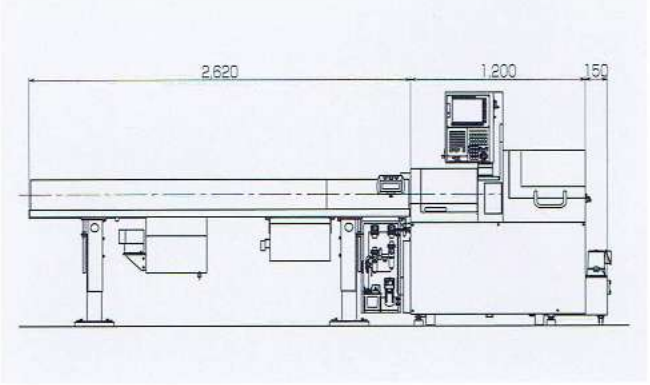
■Dedicated bar feeder "OS1UT"
"OS1U-3T"

Main characteristics

(1) Compatible with spindle speeds up to 25,000 min^{-1}.
(2) Quiet operation thanks to use of an oil bath system.
(3) Delivery force can be adjusted by servomotor feed in accordance with the machining conditions.
Corresponding to the small size bar stock by suppressing the twist or jam of the bar.

Main Specifications

Barstock diameter	ϕ1.0 mm / ϕ3.0 mm
Barstock length	2,000 mm
Barstock storage capacity	66 in case of ϕ1.0 mm bars
Floorspace requirement	2,680 x 550 mm
Weight	200 kg



Machine specifications

Item			P013	P014	P033	P034
Machining range / Machining capacity	Working barstock diameter		ϕ1 mm		ϕ3 mm	
	Max. machining length		When the stationary guide bushing is used 35 mm (Restriction in using work catcher) When the retractable guide bushing is used 30 mm (Restriction in using work catcher)			
	Cross drilling chucking dia (Optional)	T04: Brashless motor	ϕ0.5 to ϕ6.0			
		T05: Servo motor	ϕ0.5 to ϕ7.0 ϕ20-cutter mountable			
Machine	Main spindle speed		200 to 25,000 min-1		200 to 20,000 min-1	
	Back spindle speed		–	200 to 25,000 min-1	–	200 to 20,000 min-1
	Cross drill speed (Optional)	T04: Brashless motor	5,000 to 50,000 min-1			
		T05: Servo motor	200 to 8,000 min-1			
	Total tool storage capacity		11	14	11	14
	Tool size		8 mm x 8 mm x 100 to 120 mm			
	Rapid traverse rate		20 m/min			
Motors	Main spindle		0.75/1.1 kW			
	Back spindle		–	0.75/1.1 kW	–	0.75/1.1 kW
	X-, Z1-, Z2-axis		0.5 kW			
	Y-axis		0.75 kW			
	Cross drill (Optional)	T04: Brashless motor	0.125 kW			
		T05: Servo motor	0.2 kW			
	Coolant pump		0.1 kW			
	Lubricating pump		3 W			
Power source, etc.	Net weight		950 kg	1,000 kg	950 kg	1,000 kg
	Power source requirement		7 KVA	9 KVA	7 KVA	9 KVA
	Compressed air requirement		0.5 MPa or above			
	Air discharge rate		30 NL/min			
	Width x depth x height		1,690 x 600 x 1,600 mm			

NC unit (standard specifications)

Item	Specification	
	P013 / P033	P014 / P034
NC unit	FANUC 32i-B	
Axis designation	X, Z1, Y	X, Z1, Z2, Y
Least input increment	0.0001 mm (X axis: Diametrical designation)	
Least command increment	0.0001 mm (X axis: 0.00005 mm)	
Max. programmable value	±8 digits	
Interpolation method	Linear/Circular	
Rapid traverse rate	20 m/min	
Feedrate	1 to 6,000 mm/min	
Feedrate override	0 to 150%, 10% step	
Dwell	G04 0 to 99999.999	
Absolute/Incremental command	X, Z, Y: Absolute, U, W: Incremental	
Number of tool offsets	32 pairs (sum of main and back spindle NCs)	
Data display	8.4" color LCD	
Display language	English	
Part program storage size	32 Kbytes (in tape length 80 m, sum of main and back spindle NCs)	

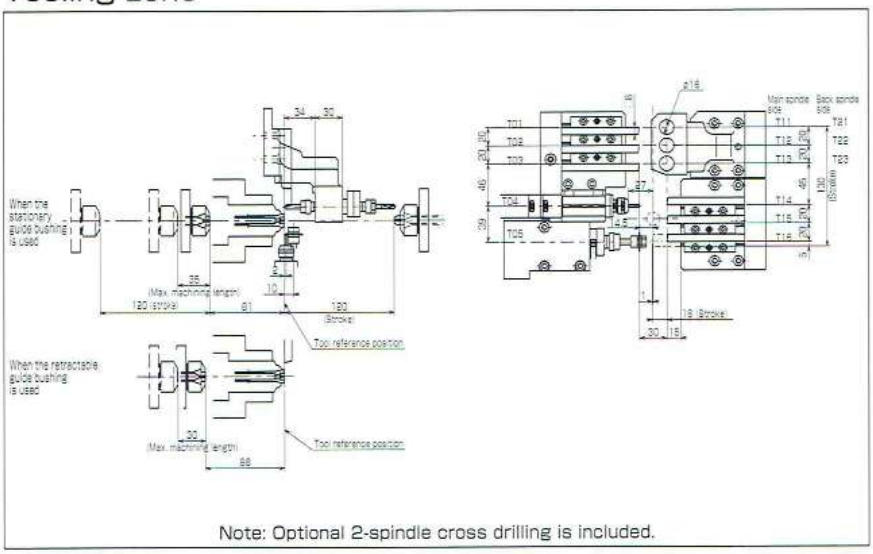
Chasing function, Continuous thread cutting, Manual pulse generator, Memory card input/output interface, Background editing, Run time & parts number display, Custom macro, Constant surface speed control, Spindle synchronous control, Tool geometry/wear offset, Chamfering corner R, Extended program editing, Spindle speed fluctuation detection, Tool nose radius compensation, HRV control

Package options

Package spec. (Some options below are not included depending on the model.)

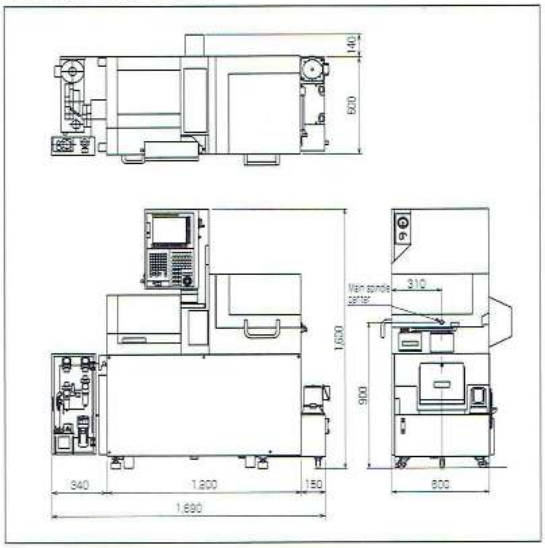
Main spindle and back spindle chuck units	Work catcher
Guide bushing holder	Front work discharge (oil blow)
Drill holders	Work light
Double heads drill holder	Bar feeder interface
Fixed spindle liner	Signal tower (triple)

Tooling zone



Note: Optional 2-spindle cross drilling is included.

External View



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