

TOYODA

JTEKT

e500G SERIES

CNC Cylindrical Grinders

e500GP
e500GA



<http://www.jtekt.co.jp>

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Type of Machinery: Grinder
Model Number: e500G

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Koyo TOYODA

CNC Cylindrical Grinders

e500GP e500GA

Optimum compact machine
for the mass production



Long-term grinding accuracy

- TOYODA STAT BEARING
- High rigidity - low vibration bed
- High accuracy filtering coolant unit **Option**

The grinder in this photo has special specifications.
Note: Painting color shall be specified by mutual agreement.

High Productivity

- Abundant variation
- Abundant grinding cycles
- All-step grinding due to being driving dog-free **Option**
- Improved productivity through adoption of a CBN wheel **Option**
- Min. space in class

Easy operation

- Improved reliability with TOYOPUC-GC70



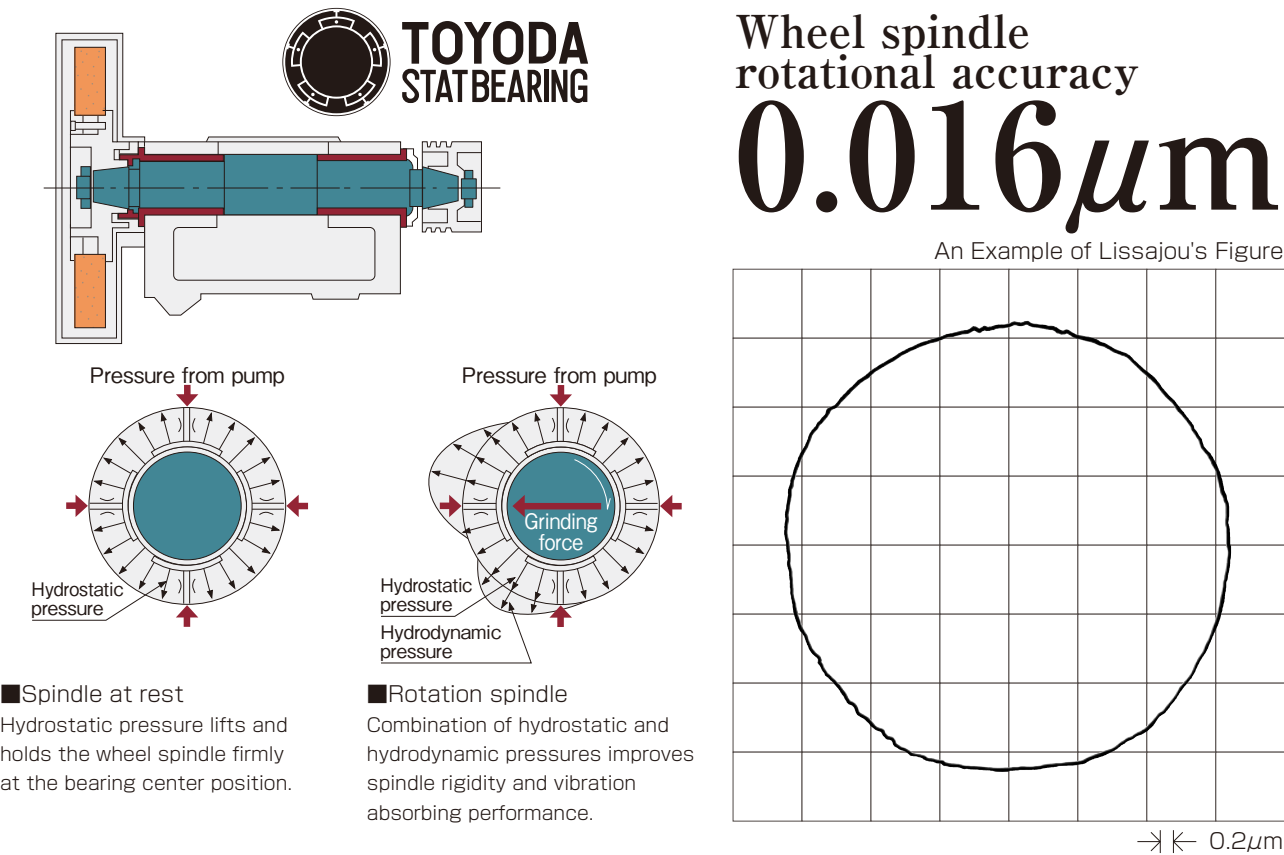
Photo is an example of CBN wheel specification.

Long-term grinding accuracy

High rotation accuracy and feed accuracy

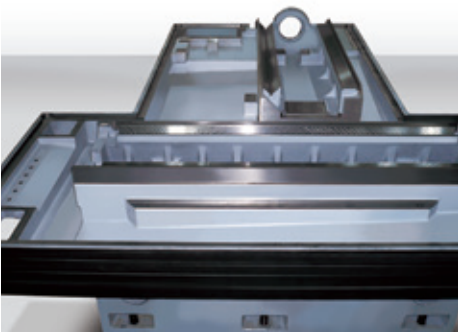
JTEKT's proprietary TOYODA STAT BEARING

The heart of our wheel spindle is the TOYODA STAT BEARING. This bearing is uniquely designed as a hybrid bearing that combines static and dynamic pressure. Eliminating all metal-to-metal contact in the bearing reduces wear for machining longevity. It also features a highly rigid structure with excellent damping performance, which gives the spindle high rotational accuracy.



High rigidity, low-vibration bed

To achieve high-accuracy grinding over a prolonged period, the support bed has been designed and analyzed to provide sufficient rigidity and to suppress unnecessary vibration during grinding.



Heat symmetry structure reducing the effect of heat

JTEKT's original high accuracy technology cultivated over several years is used to create a machine structure that reduces the effect of heat. By avoiding the twisting of the table, the workhead and footstock are held in a single position, resulting in a structure where accuracy is stabilized.

Minimizing grinding faults and equipment breakage through high accuracy filtering at 30 ppm

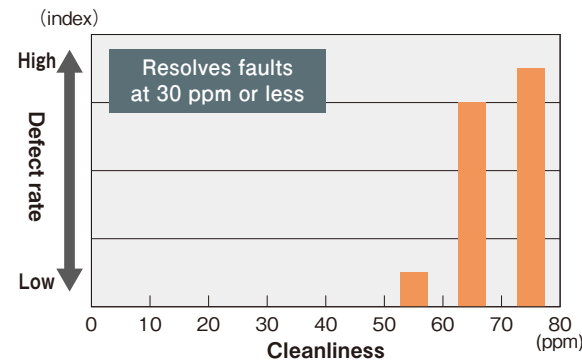
Option



Minimizes grinding faults

Quality improvement

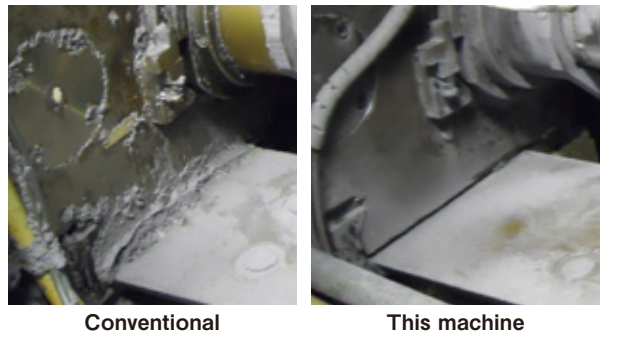
Solves grinding defects caused by chip biting on sections making contact with the auto sizer.



Minimizes equipment breakages

Maintainability improvement

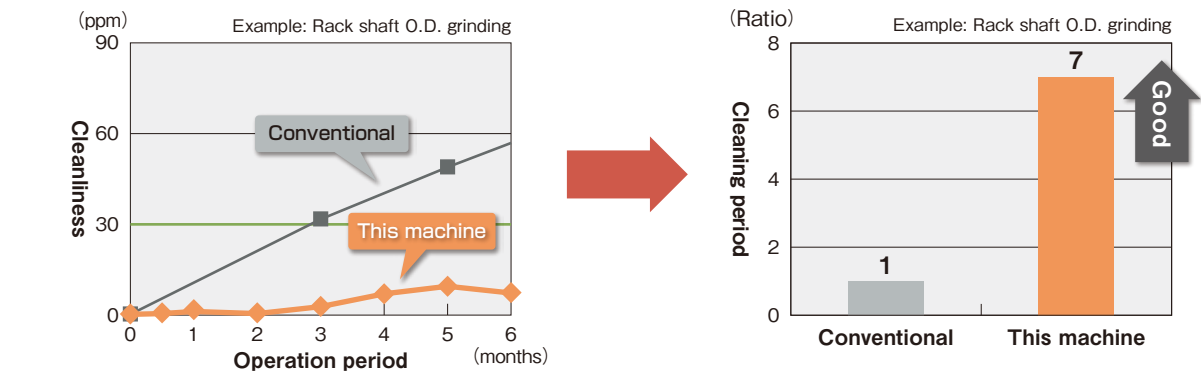
Improves equipment longevity through the reduction of chip accumulation



Longer interval between coolant replacement in the coolant tank

Maintainability improvement

Cleanliness is improved and liquid replacement interval is extended.



High productivity

Abundant variation

Wheel	Wheelhead	Type	Wheel OD × max. width × ID (mm)	Swing on table (φ mm)	Distance between centers (mm)
Normal wheel	Straight	e500GP	φ510×125×φ203.2	φ200	280
	Angular	e500GA	φ510×125×φ203.2		
(CBN wheel)	Straight	e500GP	(φ350×50×φ180)		
	Angular	e500GA	(φ370×50×φ180)		

(): option

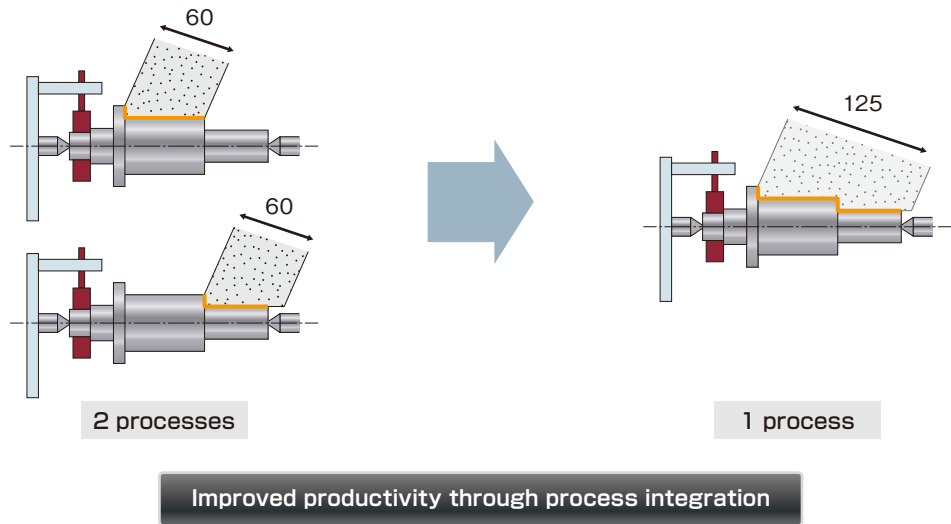
Abundant grinding cycles

From an abundance of grinding cycles incorporating JTEKT's thorough knowledge of grinding, we propose the ultimate grinding cycle to suit your workpiece. We have many more grinding cycles available apart from those shown below. Please consult with our sales staff for details.

	Plunge grinding	Multi-step plunge grinding	Multi-plunge/traverse grinding
Straight type			
Angular type			

High efficiency grinding using max. wide-width wheel 125mm

One plunge grinding is available by a wide-width wheel.



Grinding example

→ Workpiece driving portion

■ Workpiece to be ground
[name] Armature shaft
[material] S48C

■ Workpiece to be ground
[name] EPS pinion shaft
[material] SCM420

■ Workpiece to be ground
[name] Blank shaft
[material] S48C

■ Workpiece to be ground
[name] Countershaft
[material] SCr420H

■ Workpiece to be ground
[name] Gear
[material] SCr420

■ Workpiece to be ground
[name] Differential side gear
[material] SNCM220H

■ Workpiece to be ground
[name] Input shaft
[material] SCM25

■ Workpiece to be ground
[name] Rear shaft drive
[material] SCr420H

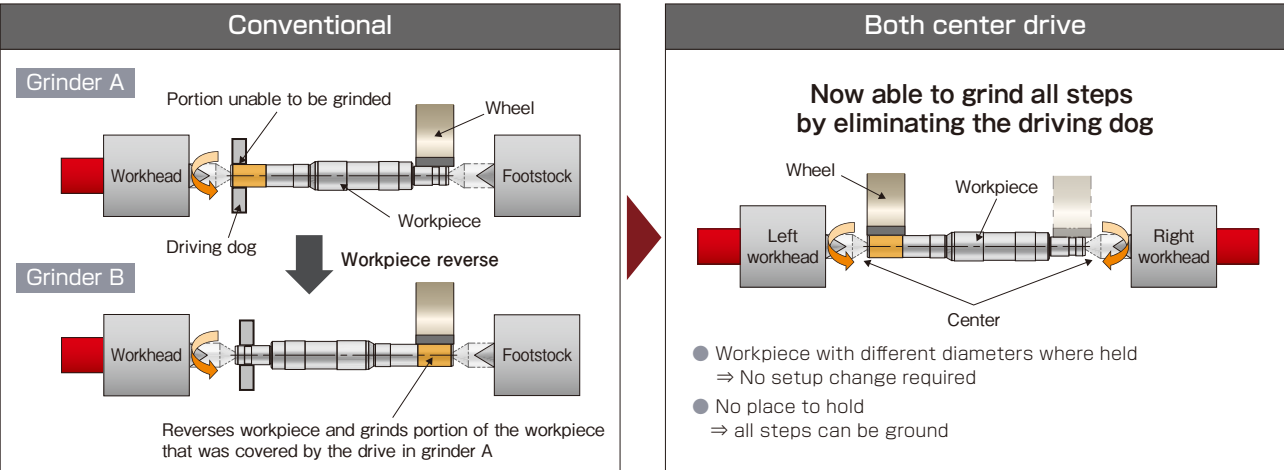
■ Workpiece to be ground
[name] Output shaft
[material] SCM20

■ Workpiece to be ground
[name] Drive shaft
[material] SCM415

High productivity

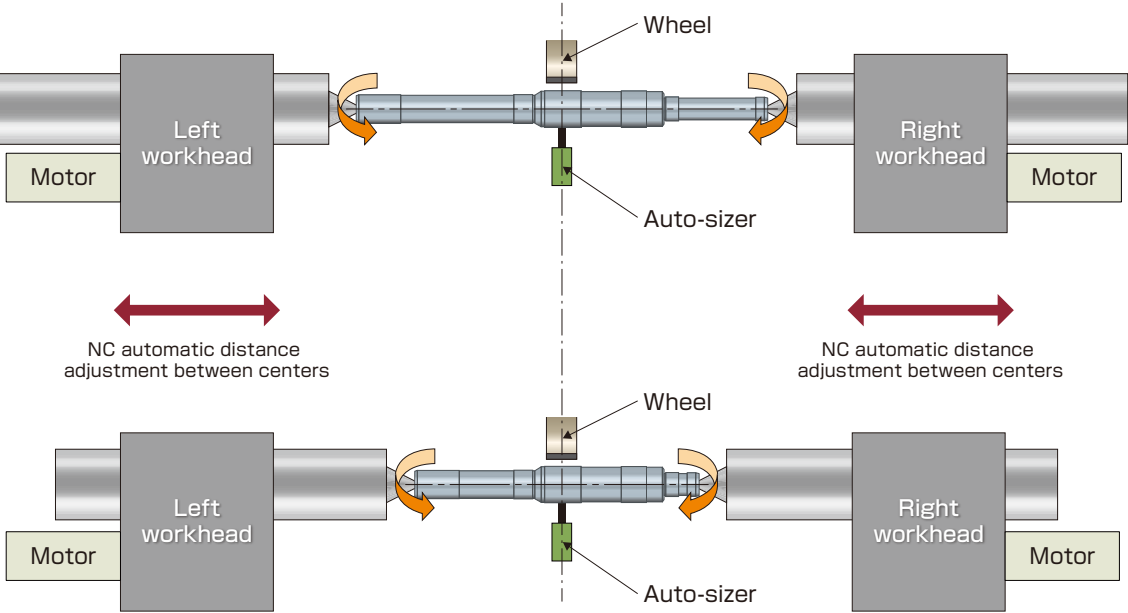
All-step grinding due to being driving dog-free Option

We have prepared a both center drive workhead that drives workpieces using the friction force of both centers. With this device, all-step grinding of outside diameters is possible without a driving dog.



Improved productivity without performing setup changeover Option

The NC automatic distance adjustment between centers supports workpieces of different length automatically.

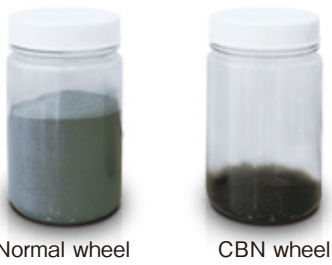


Productivity improved with the adoption of a CBN wheel Option

Through the adoption of CBN wheel, the dress (wheel dressing) interval extends. Furthermore, the dimension accuracy and surface roughness stabilize, and improves productivity.

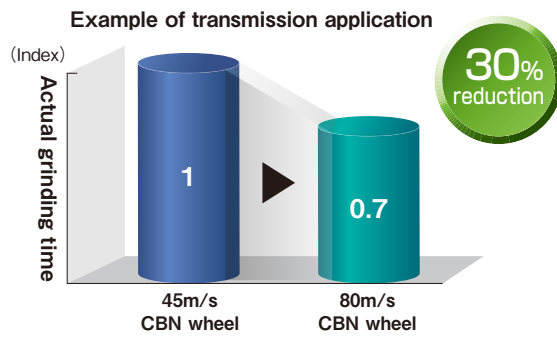
- Less quality check processes associated with wheel diameter change
- Reduction of wheel change frequency
- Reduction of wheel dressing time per workpiece
- Less coolant tank maintenance processes caused by grain infiltration

Comparison of abrasive amount (amount generated in 1 day)



Wheel peripheral speed options are 45 m/s, 60 m/s and 80 m/s

With the peripheral speed of 45 m/s, the benefits of adopting a CBN wheel are obtained at the same equipment cost as a normal wheel. The shortening of cycle time can be achieved by selecting peripheral speed 60 m/s or 80 m/s.

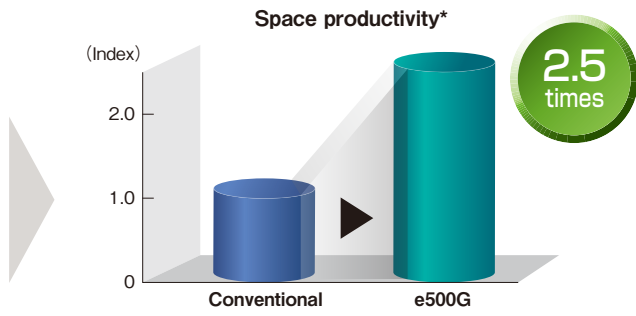
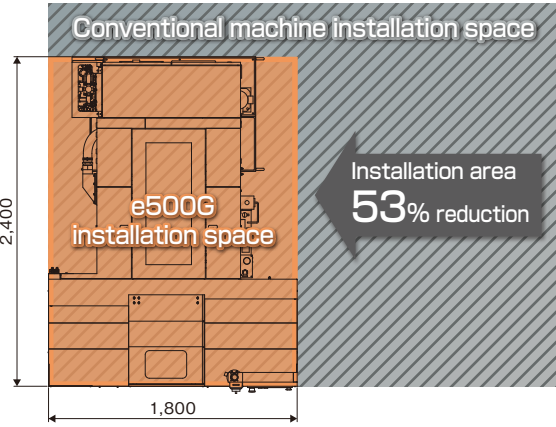


*The data listed does not show guaranteed figures.

Min. space in class

We achieved the min. level in class in machine installation space and frontage. Furthermore, we shortened non-grinding time through the improvement of rapid feedrate, the shortening of idle time, etc. By these efforts, we achieved remarkable productivity per unit area.

Min. space in class



*Space productivity = 1/ (cycle time ratio × installation area ratio)

Shortening of non-grinding time

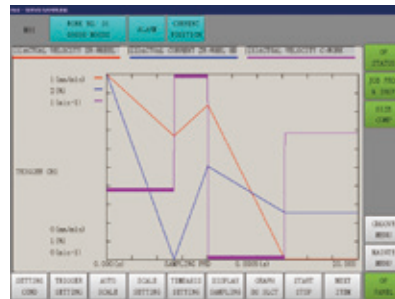
Shortens non-grinding time by the improvement of rapid feedrate (wheelhead feed: 2 times, table feed: 1.5 times Vs. conventional machine), and idle time reduction, etc.
Ref) Example of 6 processes machining Grinding time/part 15% reduction

Easy operation

Improved reliability with TOYOPUC-GC70.

Visualized system that can support IoE* in the future (Application example: Servo sampling function)

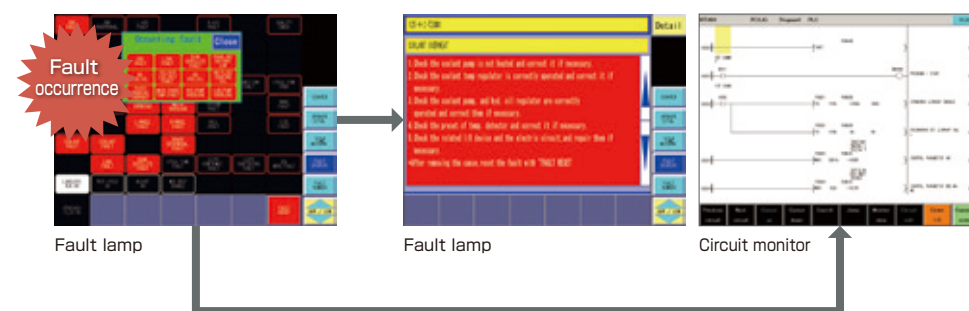
Defective workpieces and machine malfunctions can be discovered early by comparing normal values sampled from electrical current, position deviations, speed data, etc.



JTEKT do not apply "IoT", but apply "IoE" (Internet of Everything) that connects people, things, information and services.

Simple fault diagnostics

Fault locations are diagnosed directly on the CNC screen from the error display and the circuit monitor.

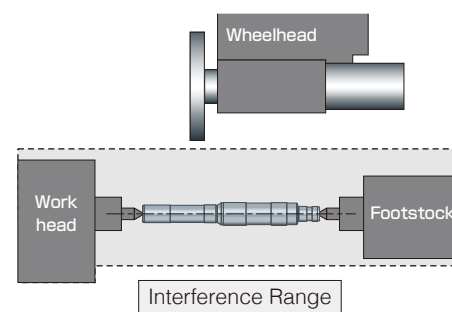


Data batch backup function

Allows the batch saving of all data, including grinding conditions, compensation data, parameters, etc. This function can also be of use in fault analysis of machine stoppage.

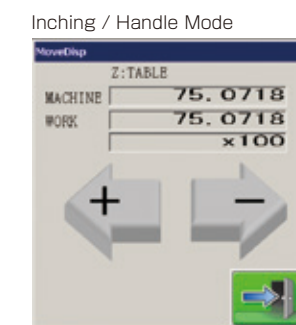
Safety manual handle operation, debugging made easier

During manual handle operation, automatically changes to low magnification when in the interference range. For initial part grinding, the feedrate in the interference range automatically decelerates to support debugging work.

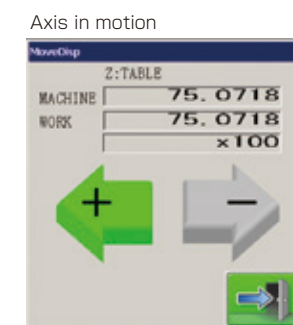


Prevention of incorrect manual operation

A support function that displays the direction of movement during manual operation and alerts of operational errors is equipped.



Displays motion direction
before operation



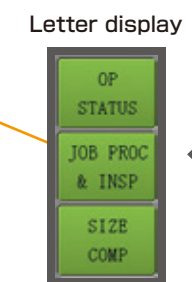
Shows motion direction in color

Iconized operation buttons

Operations can be easily recognized through iconized operation buttons. Buttons can be switched from icons to letters.

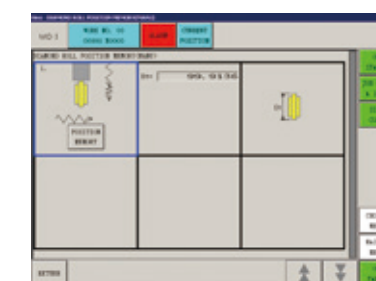


Screen in
operation status



Perfect guidance function

Setup change, maintenance details, input data explanation, etc. can be easily understood from the graphical operation screen, and operations can be carried out smoothly.



Position memory screen

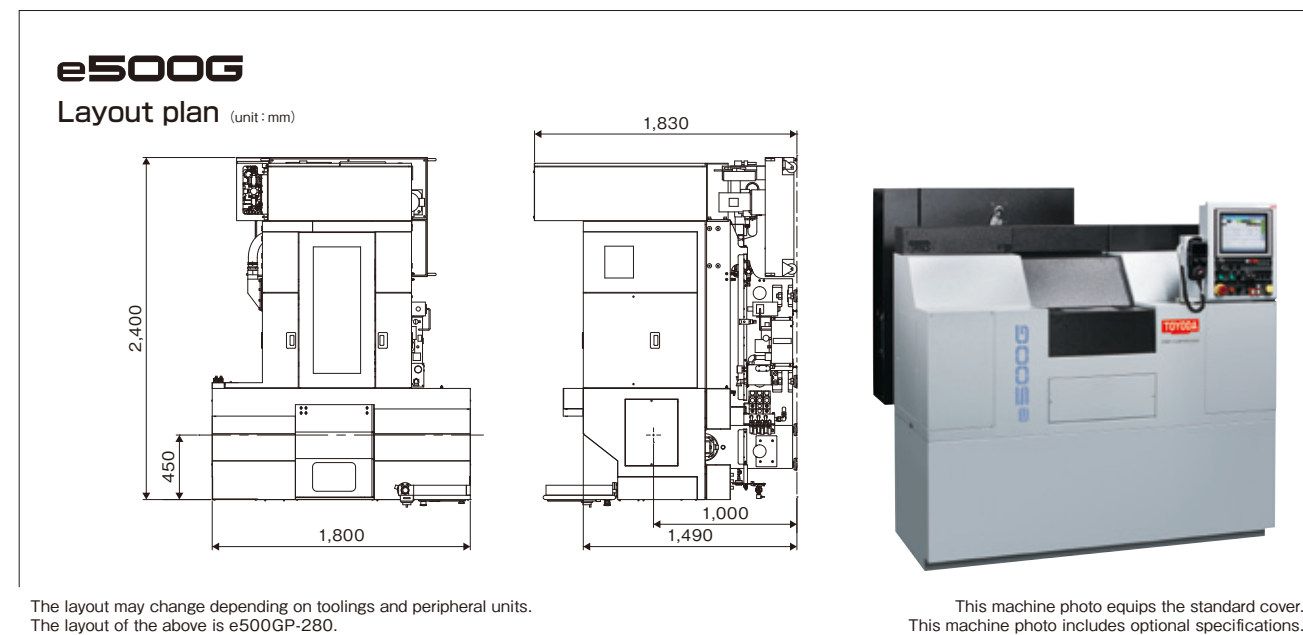
Machine specifications

[]: option

Item		Unit	e500GP-280		e500GA-280	
			Normal wheel Specifications	CBN wheel Specifications	Normal wheel Specifications	CBN wheel Specifications
Distance between centers		mm	280		280	
Swing over table		mm	φ200		φ200	
Grinding diameter		mm	0~φ80		0~φ80	
Load between centers		kg	5		5	
Center height from floor		mm	1,000		1,000	
Wheel	Bearing		TOYODA STAT BEARING		TOYODA STAT BEARING	
	O.D. × width (max.) × I.D.	mm	φ510×125×φ203.2	φ350×50×φ180	φ510×125×φ203.2	φ370×50×φ180
	Surface speed	m/s	45 [60]	45 [60] [80]	45 [60]	45 [60] [80]
Wheelhead	Feed method		V-flat slide, ball screw drive		V-flat slide, ball screw drive	
	Rapid feedrate	m/min	φ40		φ40	
	Minimum input increment	mm	φ0.0001		φ0.0001	
Table traverse	Feed method		V-flat slide, ball screw drive		V-flat slide, ball screw drive	
	Rapid feedrate	m/min	30		30	
	Minimum input increment	mm	0.0001		0.0001	
Workhead	Type		Fixed axis		Fixed axis	
	Center		MT No.3		MT No.3	
	Rotation speed	min ⁻¹	22~500		22~500	
Footstock	Type		Hydraulic type with manual taper adjustment		Hydraulic type with manual taper adjustment	
	Center		MT No.3		MT No.3	
	Stroke	mm	60		60	
Electric unit		V	Supply voltage AC200V, control voltage DC24V		Supply voltage AC200V, control voltage DC24V	
Electric motor	Wheel spindle	kW	5.5 [7.5] (4P)	5.5 [7.5] [11] (4P)	5.5 [7.5] (4P)	5.5 [7.5] [11] (4P)
	Wheelhead feed	kW	1.6 (Servomotor)		1.6 (Servomotor)	
	Table traverse feed	kW	1.6 (Servomotor)		1.6 (Servomotor)	
	Work spindle	kW	1.6 (Servomotor)		1.6 (Servomotor)	
	Hydraulic oil pump	kW	0.75 (4P)		0.75 (4P)	
	Wheel spindle bearing oil pump	kW	0.25 (2P)	0.25 [0.5] (2P)	0.25 (2P)	0.25 [0.5] (2P)
	Lubrication oil pump	kW	0.04 (2P)		0.04 (2P)	
	Grinding fluid pump	kW	0.25 (2P)		0.25 (2P)	
Tank capacity	Hydraulic oil	L	10		10	
	Wheel spindle bearing oil	L	15		15	
	Lubrication oil	L	6		6	
	Coolant	L	165		165	
Machine weight		kg	4,000	4,000	4,000	4,000

*The specifications may be limited depending on the tooling of customer.

Machine layout & dimensions



CNC specifications

●: Standard □: Optional ×: Not allowed to equip

Item	No.	Specification	CNC specifications	
			TOYOPUC-GC70	FANUC 0i
Control	1	CNC unit	JTEKT	FANUC
	2	Servomotor, amplifier	FANUC	FANUC
Controlled axes	3	X axis (wheelhead feed)	●	●
	4	Z axis (table feed)	●	●
	5	Multi axes specification	□	□
Display unit	6	12 inch color TFT	●	×
	7	8.4 inch color TFT	×	●
File management	8	Structured data management	●	×
	9	Maximum of 64 grinding data (30 processes/part, max. 1920 processes)	●	×
	10	Maximum of 64 grinding data	×	●
Coordinate setting	11	Position memory (various type)	●	●
Compensation function	12	Dimension compensation	●	●
Display	13	Operation monitor	●	●
	14	Sequence circuit monitor	●	●
	15	Sequence circuit edit	●	●
	16	Operation procedure display (touch panel screen)	●	×
	17	Operation procedure display (operation panel hard switch)	×	●
	18	Inspection, Maintenance data	●	×
	19	Metric display	●	●
	20	Inch display	□	□
Operation	21	Canned cycle	●	●
	22	Test cycle	●	●
	23	Wheel dressing cycle	●	●
	24	Return cycle	●	●
	25	In-process startup function	●	□
	26	Single block	●	●
	27	Rapid feed override	●	●
	28	Feed override	●	●
	29	Grinding step skip	●	×
Auto sizing	30	Autosizer control section	□	□
Maintenance	31	Wheel replacement prediction/min.wheel dia. display	●	●
	32	Self-diagnosis function	●	●
	33	Alarm history display	●	●
	34	Batch backup function	●	×
	35	Servo sampling function	●	×
Counter (display in the display screen)	36	Production counter	●	●
	37	Quality check counter	●	□
Cycle time display (display in the display screen)	38	Machine operation time	●	●
	39	Processing cycle time	●	●
	40	Grinding cycle time	●	×
	41	Wheel dressing time	●	×
Others	42	MDI on/off key switch	●	●
	43	USB flash drive I/F	●	●

Package suitable for to customer's workpiece

●: Package standard accessory □: Optional accessory

Item		Unit name	A package (Both centers)	B package (Collet chuck)	C package (Both-center drive)
Main accessory	Workhead	Dead center spindle workhead (MT No. 3)	●	—	—
		Live spindle workhead (MT No.4, with manual taper adjustment)	—	●	—
		Live spindle both center drive workhead	—	—	●
	Footstock	Hydraulic footstock with manual taper adjustment (MT No. 3)	●	—	—
		Pusher unit	—	●	—
		Live spindle both center drive workhead (R) with manual distance between centers adjustment	—	—	●
	Wheelhead	Wheel dia. φ510mm specification (normal wheel)	●	●	●
		Wheel surface speed 45m/s specification (normal wheel)	●	●	●
		Front guard manual adjustment type wheel guard (normal wheel)	●	●	●
	Hydraulic/pneumatic	Spindle bearing oil pump unit (wheelhead built-in type)	●	●	●
		Hydraulic oil pump unit (without no-oil detection device)	●	●	●
		Lubrication oil pump unit (with no-oil detection device)	●	●	●
	Coolant supply unit	Coolant supply unit (tank capacity: 165L, with magnetic separator, processing capacity: 40L/min)	●	●	●
	Wheel dresser	Formed diamond specification (mounted on workhead)	●	●	●
	CNC	JTEKT-made CNC unit TOYOPUC-GC70 Motor: FANUC	●	●	●
	Coolant splash prevention cover	Manual open/close type (rear ceiling open)	●	●	●

Optional accessory	Workhead	Dead center spindle workhead (MT No.3, with chuck cylinder)	□	—	—
		Live spindle both center drive workhead (with hydraulic shift)	—	—	□
		Live spindle both center drive workhead (with NC shift)	—	—	□
	Footstock	Automatic center distance adjustable type footstock	□	—	—
		Live spindle both center drive workhead (R) with NC automatic distance between centers adjustment	—	—	□
		Wheel dia. φ350mm (P) / φ370mm (A) specification (CBN wheel)	□	□	□
	Wheelhead	Wheel surface speed 60m/s specification (normal wheel)	□	□	□
		Wheel surface speed 80m/s specification (CBN wheel)	□	□	□
		Front guard automatic adjustment type wheel guard (normal wheel)	□	□	□
		Variable wheel surface speed unit (inverter control, 3-step switch)	□	□	□
	Hydraulic/pneumatic	Oil skimmer	□	□	□
		Pneumatic devices	□	□	□
	Coolant supply unit	Coolant unit (tank capacity 165L, with magnetic separator, processing capacity: 80L/min)	□	□	□
		Coolant unit (tank capacity 230L, with magnetic separator, processing capacity: 120L/min)	□	□	□
		High accuracy filtering coolant unit (30 ppm)	□	□	□
		(tank capacity: 410 L, with magnetic separator, processing capacity: 95 L/min)	□	□	□
	Wheel dresser	Bed washing unit (with washing pump)	□	□	□
		Wheel dresser for rotary diamond	□	□	□
		Truing unit (mounted on workhead face plate)	—	—	□
	CNC	Truing unit (mounted on workhead rear portion)	□	□	□
		FANUC 0 i	□	□	□
	Coolant splash prevention cover	Automatic open/close type	□	□	□
		Auto sizer for single diameter mounted on table	□	□	□
		Auto sizer for single diameter mounted on bed	□	□	□
		Auto sizer automatically supporting diameter difference mounted on bed	□	□	□
	Tooling-related devices	Automatic lateral locator	□	□	□

These may be limited by the equipped accessories and tooling.

Loader corresponding to automation system

We supply effective production system that supports workpiece and line structure.

Weight capacity		kg	1.5(0.7+0.7) *1
Travel range	X axis	mm	1,800 *2
	Y axis	mm	250 *3
	Z axis	mm	600
Speed	X axis	m/min	100
	Y axis	m/min	60 *3
	Z axis	m/min	90
Electric device		V	Supply voltage: AC200V, control voltage: DC24V
Electric motor	X axis	kW	0.5
	Y axis	kW	0.5 *3
	Z axis	kW	0.5
Electrical capacity		kVA	12
Repeatability		mm	±0.05

*1: We also have a load capacity 3 kg (1.5 + 1.5) type.

*2: This is the case of specification of left side unloading specification. In right side unloading specification: 1900 mm, in thru specification: 3100 mm

*3: This is the case of 3-axis specification.



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