SHIGIYA

CNC Angular Cylindrical Grinder

GAE-30B
-40B

Pursuing "higher accuracy grinding with easier operation," SHIGIYA MACHINERY WORKS has infused GAE-30B (GAE-40B) with its own, leading-edge technologies, while allowing no compromise at all in creating the Cylindrical Grinders. The greatest feature of the grinder is that it allows for face grinding to be carried out with the feel of a plain type cylindrical grinder by using an angle head type wheelhead, and this general-purpose CNC Angular Cylindrical Grinder puts priority on operability in its pursuit of ease of use. The wheelhead, workhead, and tailstock units are all modularly designed for rigidity and quality to allow for both heavy and precision grinding.

We provide detailed solutions
customers with our lineup of 6
250 mm to 2,000 mm and a wide
This is the key to SHIGIYA's high

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We offer a wide variety of options and proposals to better meet customer needs, and can also work with custom designs based on customer equipment specifications.
GAE-30B (GAE-40B) are standard models of SHIGIYA CNC Angular Cylindrical Grinders.

Reduced space requirements
Newly designed 250 mm center-distance model for short length workpiece 20% reduction in machine width over previous models thanks to the compact design of the workhead and tailstock
(applicable to 250, 500 and 750 mm center-distance models)

Higher productivity
Grinding wheel of Ø 510 mm (previously Ø 455 mm) equipped as standard

Higher rigidity
In addition to increasing the distance between the V and flat sliding guides by approximately 10%, the sliding surface area was also increased by approximately 15%

for the varied needs of our models with center-distance of variety of options. level of customer satisfaction.

GAE-30B•150

* The machine shown in the photo has some parts different from the standard specifications.

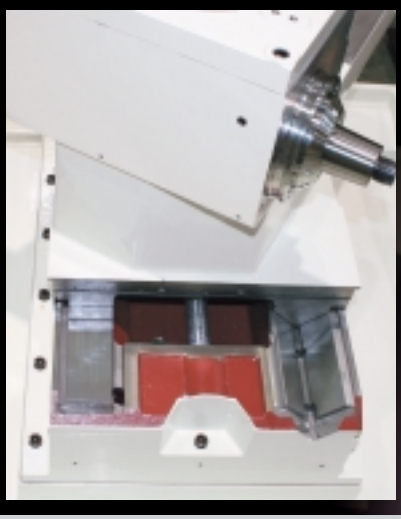
The GAE-30B (GAE-40B) are a high rigidity, high precision design capable of being used for custom grinding, and provides both ease of use and performance.

Maximum large-diameter ø 510 mm wheel equipped as standard

The wheelhead built with the high-rigidity main body and the large-diameter wheel spindle of heat-treated nitride steel has a large-diameter wheel of Ø 510 mm. Also, it can be upgraded to accommodate the wheel's peripheral speed of up to 80 m/sec. It provides grinding with high precision, high efficiency, and high productivity.

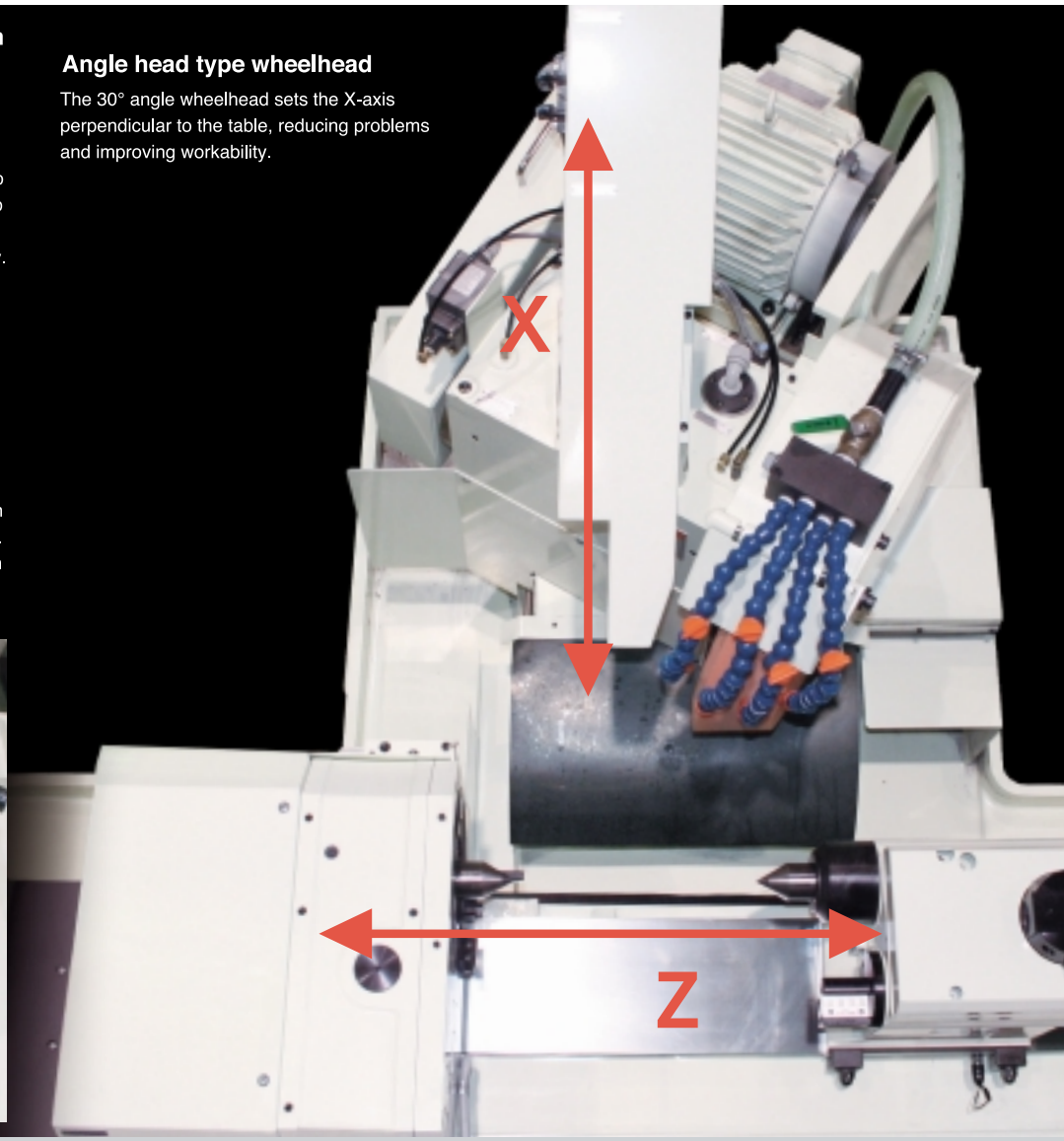
Wide V-flat sliding surfaces with high rigidity

The wheelhead and the table-feed sliding surfaces have wide, V-flat guiding surfaces that have sufficient rigidity and load capacity. Moreover, the high damping performance and equalization of the lubricant provided by oil film's squeezing effect help the Grinder maintain good precision and smooth operation for decades. To the wheelhead's sliding surface, a low-friction sliding PTFE material is applied, to enable a smooth fine infeed with high precision.



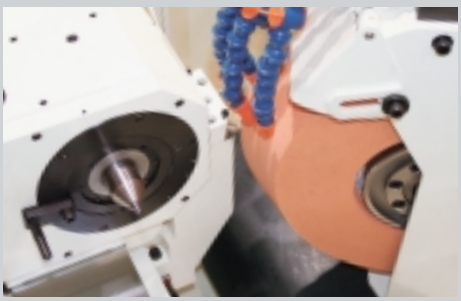
Angle head type wheelhead

The 30° angle wheelhead sets the X-axis perpendicular to the table, reducing problems and improving workability.



Wheel dressing device mounted on the lower table

The diamond tool holder is mounted on the lower table behind the workhead. Thanks to the 2-axis computer numeric control, you can make dressing into a great variety of shapes. Change the workpiece to work on, or let the table swivel for taper grinding or taper adjustment, and the diamond's position remains the same, which means there is no need to change the dressing coordinates, except when you change the wheel or the diamond tool.



Non-swivel dead spindle workhead, with high rigidity and low vibration

Thanks to the high-output servo motor employed in it, the Grinder can, in response to instructions from a NC unit, change the workpiece's rotational speed steplessly within the range of 15 to 600 min^{-1}. Furthermore, the interactive automatic programming system can automatically determine the optimal number of rotations for each particular workpiece.

Manual tailstock equipped with a large-diameter spindle, to enable high-precision heavy grinding

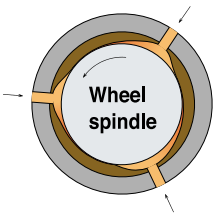
The large-diameter spindle, processed with precision, and the highly rigid tailstock enable high-precision heavy grinding. Also the workpiece's heat expansion during grinding is offset by the helical compression string, and the pressing force against the workpiece's center can be adjusted to any level you want.

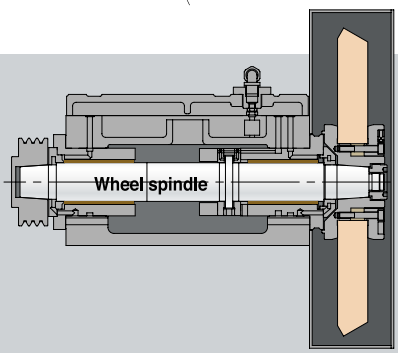
Safe design for power outages

Lubricating oil will automatically drop from a subtank for the wheel spindle, which will keep spinning due to inertia even during a power outage, in order to prevent seizure of the spindle due to lack of oil.

The non-concentric hydrodynamic bearings to provide a high-precision rotation of the wheel

The non-concentric hydrodynamic bearings, based on hydrodynamics, secure the optimal wedge angle. The bearings are ground to a high degree of precision with the grinder that SHIGIYA has developed exclusively for bearings, thus creating high-rigidity bearings and high-precision rotation.





Wheel spindle lubrication oil tank

The wheel spindle lubrication oil is stored in a tank isolated from the machine bed, so a rise in the oil's temperature does not cause thermal displacement to the machine. The wheel spindle begins to rotate only after the pressure switch has confirmed that the oil is supplied to the spindle unit.This eliminates the chance of seizure of the spindle due to lack of oil.

Compact specifications

Models with up to 750 mm center-distance have compact workhead and tailstock units equipped as standard specifications. The ability to have a long distance between both centers allows for an approximately 20% reduction in machine width compared to previous models. Contributes to saving space on production lines thanks to the variety of specifications available even for compact installation size.

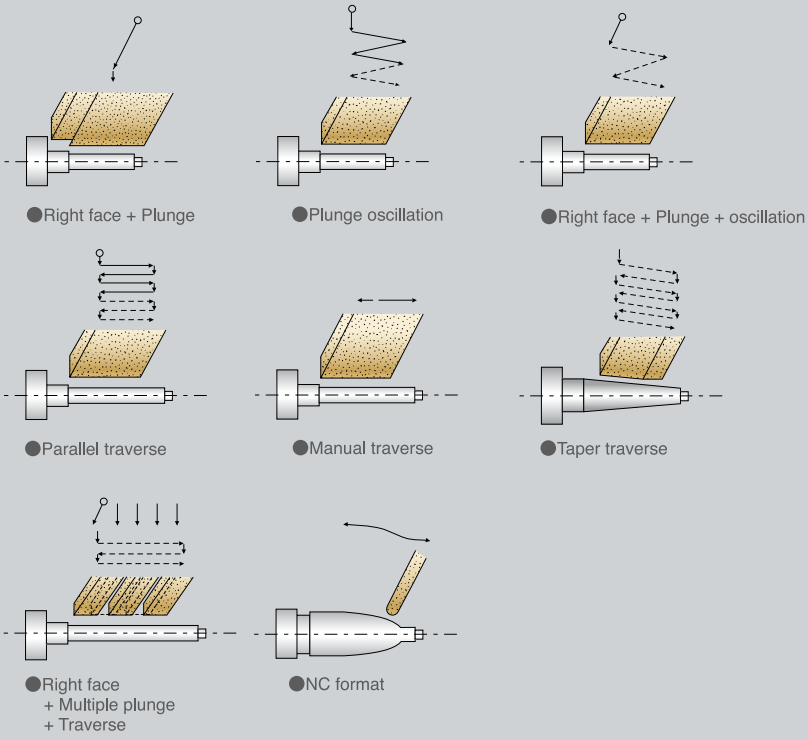
The automatic programming provides for excellent operability, and is very helpful.

Standard GAE-30B (GAE-40B) feature 8.4-inch color LCD display and “interactive automatic programming system”, which is appreciated by many for its ease of use.
Containing programs created upon know-how of experts in grinding, the system automatically sets up the optimum grinding conditions.
All you have to do is to enter information on the wheel and the workpiece, following the instructions on the screen. It also has a large memory capacity capable of registering 47 workpiece data (Max. 20 different diameters per piece).
Also suitable for contouring grinding and other special processes.

Main features

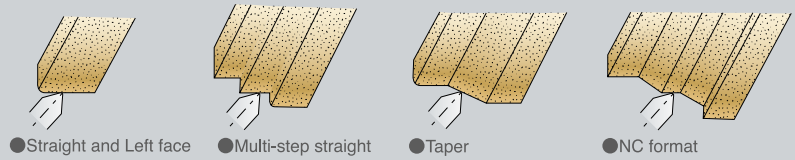
- Grinding process coordinates can be easily entered using the coordinate memory button.
- Grinding start position return allows for reductions in grinding preparation time and prevents the grinding wheel from colliding with workpiece.
- Use of an absolute pulse encoder eliminates the need for mechanical start position return.

Great variety of grinding patterns



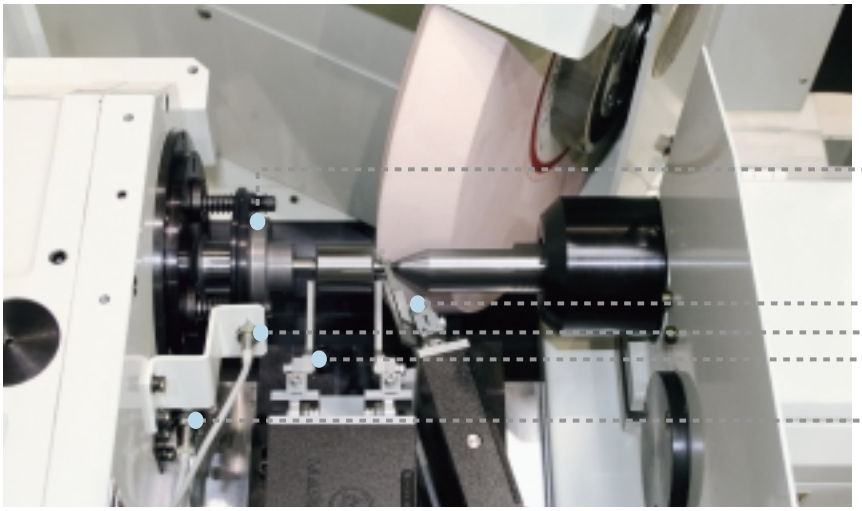
●Right face + Plunge
●Plunge oscillation
●Right face + Plunge + oscillation
●Parallel traverse
●Manual traverse
●Taper traverse
●Right face + Multiple plunge + Traverse
●NC format

Great variety of dressing patterns



●Straight and Left face
●Multi-step straight
●Taper
●NC format

We offer a wide variety of options for the GAE-30B (GAE-40B) in order to meet diverse customer needs and support custom and specialized designs.



Main Specifications

- Spline driving device (Spring spec.)
- In-process O.D. gauge
- Workpiece clamping confirmation detector
- In-process width gauge with workpiece shoulder locating
- Workpiece orientation device

Our wide selection of options makes upgrading possible.

■In-process O.D. gauge

Using this device eliminates variation in workpiece dimensions due to wheel wear and thermal displacement by controlling infeed while measuring the outer diameter of the grinding workpiece, allowing for more reliable control of dimensions.

■Workpiece shoulder locator (Wheelhead mounting)

In order to prevent collisions between the workpiece and grinding wheel from occurring as a result of variation in the longitudinal length from the previous process, the workpiece shoulder position is measured before grinding. As it is mounted on the wheelhead, there's no need for extra preparation even when the workpiece is changed.

■Non-swivel automatic jaw clamping dead spindle workhead

Works with automatic cycles by attaching specialized jaws for the workpiece outer diameter clamp. The clamp jaws is equipped with a floating mechanism which eliminates all force except rotating force allowing for the achievement of better roundness.

■Non-swivel automatic collet chucking live spindle workhead

The workpiece is held by the collet chuck for grinding. Swivel and non-swivel specifications are available and using the non-swivel type uses spindle with larger outer diameter to improve grinding rigidity.

■Non-swivel automatic vice chucking live spindle workhead

An automatic vice chuck mechanism is added to the non-swivel type live spindle workhead. Replacing the block in the vice allows for grinding of eccentric workpiece.

■Tailstock with manual fine taper adjustment

The taper of the workpiece at both centers is finely adjusted by rotating the tailstock spindle that has a taper hole of a center set in the eccentricity position. The taper adjuster (±0.05 mm) can be attached to tailstock units with tailstock spindle strokes of 30 mm (manual type) and 50 mm (hydraulic type).

(Manual)

(Automatic)

■Center-distance adjustable tailstock

This allows to process workpieces of different length by moving the spindle without moving the tailstock itself. We offer manual, hydraulic and NC operation types with a maximum stroke of 220 mm.
Because this allows for a dramatic decrease in the time required for process change preparation, it is optimal for plants that handle diverse kinds of products, small and medium production and for automatic lines.

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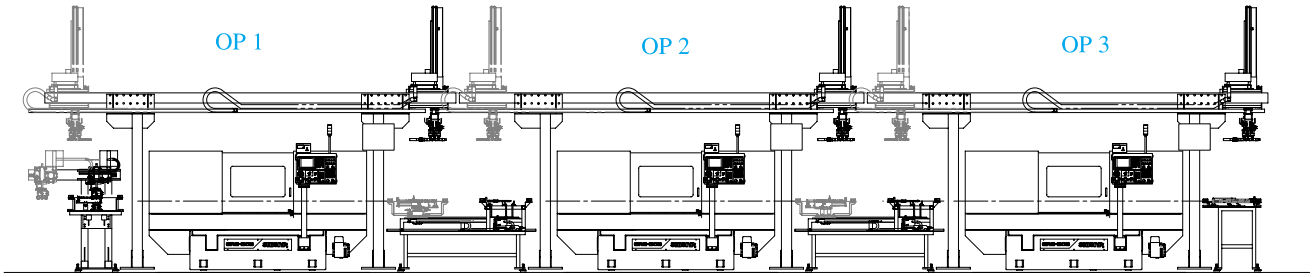
Automatic loading/unloading system

We offer a wide variety of specifications to meet our customers' needs.



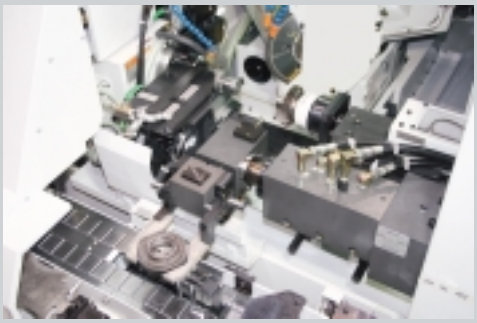
■Gantry type

■Robot system

■Workhead mounted type

■Bed mounted type

■90° index type



Meister handwheel system

Meister handwheel system increases work efficiency for precision grinding. Attaching manual handwheels on the apron allows for operation and work to be carried out in the same manner as manual machine operation, and combined use with NC functions allows for higher precision grinding.

Automatic grinding till mid-finishing, the high-quality, high-precision grinding for final finishing using the Meister handwheel system

Greatly reduces the non-processing time for single product processing

Craftsmanship

Because both handwheels can be operated simultaneously, workpiece can be moved to any desired position quickly. In addition to allowing for a significant reduction in time for single product processing and other processes, this also allows for easy face grinding.

Automatic dressing can be activated even during manual operations

Pressing the dressing button will carry out automatic dressing according to interactive data, even during manual operations. Once dressing is complete, the machine will return to its original position allowing for easy resumption of work.

Meister handwheel system allows operators to use their judgment and experience, improving their motivation toward work.

* See the GPH-30 catalog for detailed specifications.

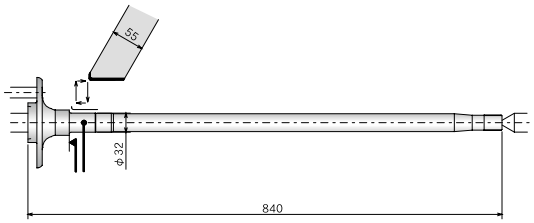
GAE-30B (GAE-40B) processing example

Even contouring grinding, crowning grinding and other specialized grinding processes are possible.




■Axle shaft

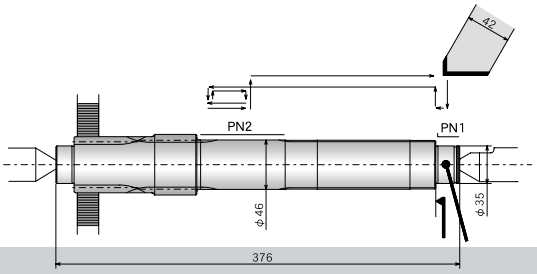
Model	GAE-30B•100
Grinding stock removal	ø 0.5 mm (O.D.)
	0.2 mm (Face)
Actual grinding time	39 secs.
Roundness	1.2 μm
Surface roughness (Ra)	0.43 μm



Main Specifications
- Wheel peripheral speed : 45 m/sec
- Wheel material : CBN120I
- Cradle type workpiece loading/unloading device
- In-process O.D. gauge
- Workpiece shoulder locator
- Automatic center-distance adjustable tailstock (Stroke: 125 mm)

■Counter shaft

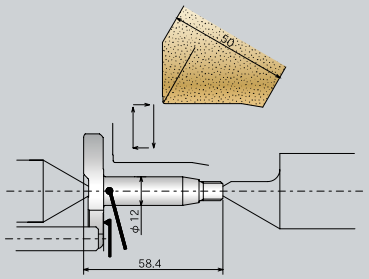
Model	GAE-30B•100
Grinding stock removal	ø 0.35 mm (O.D.)
	0.15 mm (Face)
Actual grinding time	25 secs. (PN1)
	43 secs. (PN2)
Roundness	1 μm
Cylindricity	2 μm
Surface roughness (Rz)	1.8 μm



Main Specifications
- Wheel peripheral speed : 80 m/sec
- Wheel material : CBN120F125
- Wheel O.D. : ø 350 mm
- NC center-distance adjustable workhead (Stroke: 100 mm)
- Manual center-distance adjustable tailstock [Stroke: 160 mm (Manual) + 50 mm (Hydraulic)]
- Size shift in-process O.D. gauge
- Workpiece shoulder locator

■Crankshaft

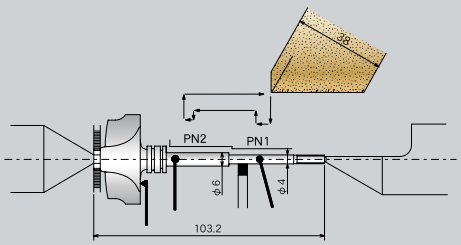
Model	GAE-30B•25
Grinding stock removal	ø 0.4 mm (O.D.)
	0.2 mm (Face)
Actual grinding time	26 secs.
Roundness	0.8 μm
Surface roughness (Rmax)	2.5 μm



Main Specifications
- Wheel peripheral speed : 45 m/sec
- Wheel material : 63A80/120H
- Hydraulic operated tailstock with manual fine taper adjustment
- In-process O.D. gauge
- Workpiece shoulder locator

■Turbine rotor

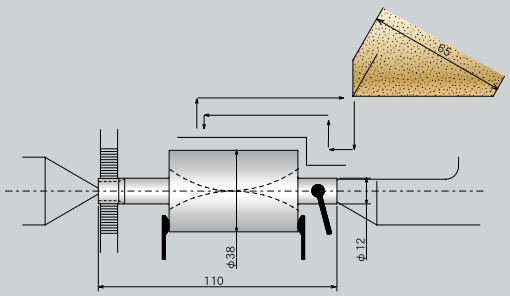
Model	GAE-30B•25
Grinding stock removal	ø 0.15 mm (O.D.)
	0.1 mm (Face)
Actual grinding time	20 secs. (PN1)
	13 secs. (PN2)
Roundness	0.5 μm
Cylindricity	1.2 μm
Surface roughness (Ra)	0.18 μm on ø 6 mm (O.D.)



Main Specifications
- Wheel peripheral speed : 60 m/sec
- Wheel material : WA100I
- Gantry type workpiece loading/unloading device
- In-process O.D. gauge
- Workpiece shoulder locator
- Automatic centerline adjustable steady rest

■Rotor

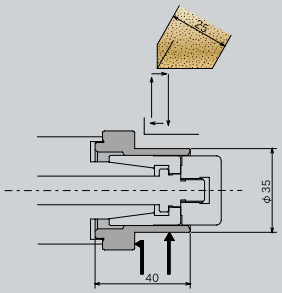
Model	GAE-30B•25
Grinding stock removal	ø 0.3 mm (O.D.)
	0.15 mm (Face)
Actual grinding time	69 secs.
Roundness	0.8 μm on ø 12 mm (O.D.)
Surface roughness (Ra)	0.3 μm on ø 12 mm (O.D.)
	0.2 μm (Face)



Main Specifications
- Wheel peripheral speed : 45 m/sec
- Wheel material : SA90J7
- Robot system workpiece loading/unloading device
- In-process O.D. gauge
- In-process width gauge with workpiece shoulder locating
- Hydraulic operated tailstock with manual fine taper adjustment

■Clutch inner

Model	GAE-30B•25
Grinding stock removal	ø 0.3 mm (O.D.)
	0.15 mm (Face)
Actual grinding time	22 secs.
Roundness	1.0 μm
Surface roughness (Rz)	1.4 μm (O.D.)



Main Specifications
- Wheel peripheral speed : 45 m/sec
- Wheel material : SH/WA120I
- Automatic collet chucking live spindle workhead
- 90˚ index workpiece loading/unloading device
- In-process O.D. gauge
- Workpiece shoulder locator

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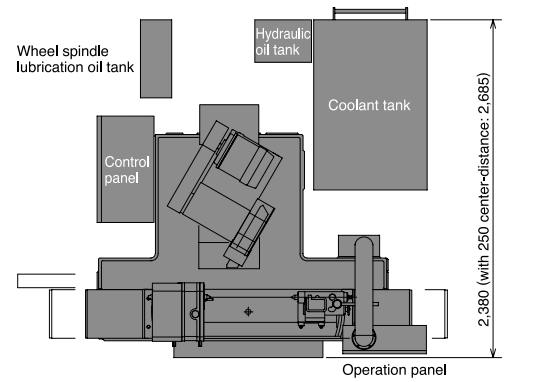
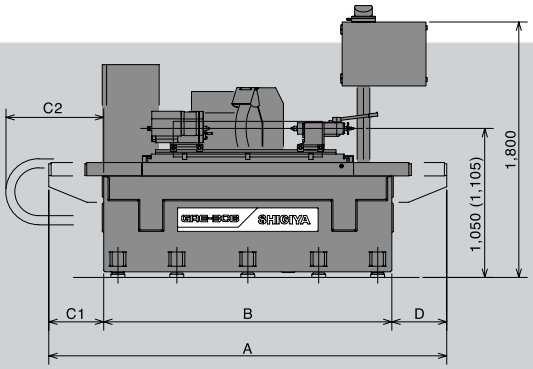
Machine half cover (Standard)

Model	A	B	C1	C2	D
GAE-30B·25	1,650	1,030	310	——	310
GAE-30B·50	2,400	1,530	440	——	440
GAE-30B·75	3,150	2,030	565	——	565
GAE-30B·100	4,140	2,800	670	800	670
GAE-30B·150	5,260	3,800	730	990	730
GAE-30B·200	6,510	4,800	855	1,230	855

(Unit: mm)

Floor plan





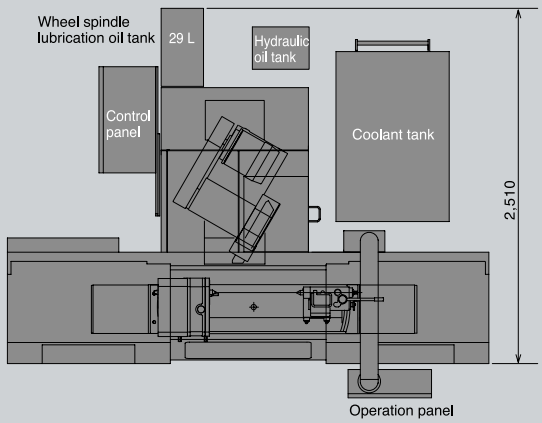
( ) denotes the dimension for the GAE-40B Series.

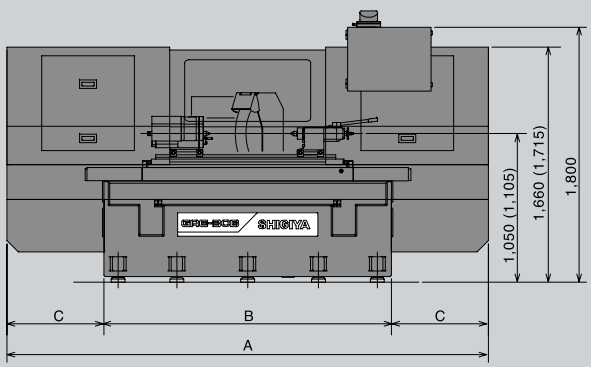
Machine full cover (Option)

Model	A	B	C
GAE-30B·25	2,400	1,030	685
GAE-30B·50	2,800	1,530	635
GAE-30B·75	3,400	2,030	685
GAE-30B·100	4,120	2,800	660
GAE-30B·150	5,400	3,800	800
GAE-30B·200	7,200	4,800	1,200

(Unit: mm)

Floor plan





( ) denotes the dimension for the GAE-40B Series.

GAE-30B(GAE-40B) SPECIFICATIONS

We offer a wide variety of specs, equipment and options.

Machine Specifications

Model			GAE-30B (GAE-40B)					
			25	50	75	100	150	200
Capacity	Swing over table		ø 300 (ø 410) mm					
	Distance between centers	GAE-30B	250 mm	500 mm	750 mm	1,000 mm	1,500 mm	2,000 mm
		GAE-40B	220 mm	470 mm	720 mm	970 mm	1,470 mm	1,970 mm
	Max. grinding diameter		ø 300 (ø 325) mm					
	Max. workpiece mass (when using both centers)		150 kg					
Wheelhead	Angle		30°					
	Wheel size (O.D. x W x I.D.)		ø 510 x 50 x ø 127 mm					
	Max. wheel peripheral speed		33 m/sec					
	Total feed amount		260 mm					
	Rapid feed amount		40 mm					
	Rapid feed speed		ø 0 to 10,000 mm/min (4-step)					
	Min. input increment		ø 0.0001 mm					
Workhead	Swivel angle		Non-swivel					
	Work spindle		Dead spindle					
	Rotational speed		15 to 600 min^{-1}					
	Taper hole		MT. No. 4					
Tailstock	Type		Manual lever type					
	Tailstock spindle stroke		30 mm					
	Taper hole		MT. No. 4					
Table	Swivel angle (C.C.W.)		12.5°	11°	9°	8.5°	5°	4°
	Swivel angle (C.W.)		0°	0°	0°	0°	0°	0°
	Rapid feed speed		0 to 10,000 mm/min (4-step)					
	Min. input increment		0.0001 mm					
Motor	Wheel spindle		5.5 kW 4 P					
	Work spindle (AC servo)		1.4 kW					
	Wheelhead infeed (AC servo)		1.2 kW					
	Table traverse (AC servo)		1.2 kW			2.5 kW		
	Wheel spindle lubrication pump		0.1 kW 4 P					
	Hydraulic pump		0.75 kW 4 P				0.4 kW 4 P	
	Coolant pump		0.18 kW 2 P					
Tank capacity (Viscosity grade)	Wheel spindle lubrication oil tank		12 L (ISO VG5*)					
	Hydraulic oil tank		20 L (ISO VG68)				30 L (ISO VG68)	
	Coolant tank		200 L					
Center height from floor			1,050 (1,105) mm					
Mass of machine (approx.)		GAE-30B	2,800 kg	3,500 kg	4,000 kg	4,500 kg	5,300 kg	6,100 kg
		GAE-40B	2,900 kg	3,600 kg	4,100 kg	4,600 kg	5,400 kg	6,200 kg

* Please use lubrication oil of ISO VG2 for wheel spindles if wheel peripheral speed is 80 m/sec or higher.

CNC Specifications (FANUC)

Item	Specifications
No. of registerable workpiece in interactive display	47 pcs. (Max.20 different diameters per pc.)
Program capacity	512 KB
Display	8.4-inch color LCD
Operation	Single block
	Manual handle interruption
Program input	Optional block skip (1)
	Custom macro B
	Circular interpolation by R programming
Tool function	Tool nose radius compensation
	Tool offset pairs (64 pairs)
Editing operation	Program protect
Setting and display	Self-diagnosis function
	Alarm display
	Alarm history display
	Operation history display
	Help function
Data input/output	Memory card

Standard Accessories

Item		Quantity
Wheel flange	ø 510 x 32 to 50 x ø127 mm	1 set
Wheel flange extracting nut		1 set
Carbide tipped center*		2 pcs.
Diamond tool holder*		1 set
Jack bolt & Foundation plate		Necessary pcs.
Tool set		1 set
Splash cover	Front splash cover : Insertion type	1 set

* These do not come with the Grinder, depending on its specifications.
● No oil or lubricant comes with the Grinder. Please prepare for yourself in advance.

* The specifications are subject to change without prior notice.

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Optional Specifications

Item	Remarks
Utility	
Machine full cover	
Machine color as specified by customer (1 color)	SHIGIYA Standard color: Munsell 5GY9/1
Meister handwheel system specification	Manual feed handwheels (X, Z axis)
Wheelhead	
Specification change of wheel cover	ø 510 x 100 mm (Type 5), 33 m/sec, 7.5 kW
Specification change of wheel cover	ø 510 x 100 mm (Type 5), 45 m/sec, 7.5 kW
Specification change of wheel cover	ø 510 x 50 mm, 60 m/sec, 7.5 kW
Specification change of wheel cover (CBN type)	ø 350 x 50 mm, 60 m/sec, 11 kW
Specification change of wheel cover (CBN type)	ø 350 x 50 mm, 80 m/sec, 11 kW
Inverter controlled wheel spindle motor	Manual change / Constant wheel peripheral speed function
Automatic wheel balancer	
Jib crane for exchanging wheel	Single arm, Manual
AE sensor for truing of CBN wheel	
Shutter guard for wheel face	
Wheel dressing device	
Rotary wheel dressing device	Lower table mounted
Rotary dresser	
Invertor controlled rotary dresser motor	Manual change
Workhead mounted diamond tool holder	
Wheelhead infeed	
Closed loop system of wheelhead infeed	
Gap eliminator device	
Tooling	
In-process O.D. gauge	Accretech / Marposs
Calculation type in-process O.D. gauge	Accretech / Marposs
Quick setup calculation type in-process O.D. gauge	Accretech / Marposs
Size shift in-process O.D. gauge	Accretech / Marposs
Workpiece shoulder locator	Mounting position: Wheelhead / Table
In-process width gauge with workpiece shoulder locating	
CNC automatic infeed 2-point steady rest	
Hydraulic operated 2-point steady rest	Manual adjustment / Automatic infeed
Table	
Slide front splash cover	Manual / Automatic
Table cable-veyor	It does not come with the Grinder, depending on its specifications.
Workhead	
Dead･live spindle workhead with swivel base	
Live spindle workhead with non-swivel	Spindle diameter: ø 100 mm
Automatic collet chucking live spindle workhead with non-swivel	Excluding collet main body
Automatic jaw clamping dead spindle workhead with non-swivel	
Automatic collet chucking & pull live spindle workhead with non-swivel	
Double drive live spindle workheads (AC servo)	
NC center-distance adjustable workhead	Stroke: 100 mm
Automatic vice chucking live spindle workhead with non-swivel	
Workpiece orientation stop device	
Work spindle center taper change (MT. No. 5)	Applicable to GAE-40B only
Air purge device of workhead	
Collet chuck set	
Automatic clamp jaws	

Optional Specifications

Item	Remarks
Tailstock	
NC tailstock positioning device	
Hydraulic operated tailstock	Stroke: 50 mm
High powered hydraulic operated tailstock	Center support mass: Up to 200 kg
Tailstock with manual fine taper adjustment	Taper adjustment: ± 0.05mm, Stroke: 30mm (Manual)/ 50mm (Hydraulic)
Hydraulic operated tailstock with automatic fine taper adjustment	Stroke: 50 mm
Automatic center-distance adjustable tailstock	Stroke: 125 mm (Manual / Automatic)
Manual center-distance adjustable tailstock	160 mm (Manual) + 50 mm (Hydraulic)
NC center-distance adjustable tailstock	Stroke: 150 mm / 220 mm
Manual lever operated center-distance adjustable tailstock	160 mm (Manual) + 20 mm (Lever)
Tailstock spindle center taper change (MT. No. 5)	Applicable to GAE-40B only
Tailstock spindle position detector with scale	
Hydraulic / Lubrication system	
Hydraulic oil cooler	
Wheel spindle lubrication oil cooler	
Coolant system	
Bed cleaning device	Including Splash gun
Oil-mist collector	
Capacity change of coolant tank	300 L
Magnetic coolant dust separator	60 L/min / 80 L/min / 120 L/min
Magnetic & Paper filter coolant dust separator	60 L/min / 80 L/min / 120 L/min
Magnetic & Hydro-cyclone coolant dust separator	
Coolant fluid temperature control device	
Capacity change of coolant pump motor	250 W
Loading/Unloading system	
Bed mounted twin arm workpiece loading/unloading device	
Gantry type twin arm workpiece loading/unloading device	
90° index workpiece loading/unloading device	Collet chucking
Cradle type workpiece loading/unloading device	
Floor mounted Robot	
Electric	
Specification change of operation panel	Stay type
Machine lighting equipment	Fluorescent lamp / Halogen lamp / LED
Temperature control device for control panel	
Lighting equipment in control panel	Including Socket
Signal tower	3 colors

Optional Accessories

Item	Remarks
Wheel balancing stand	Wheel size: ø 510 mm
Wheel lifting tool	Screw fix type
Wheel balancing arbor	Length: 280 mm
Spare wheel flange	ø 510 x 32 to 50 x ø 127 mm
Diamond tool (Shank diameter: ø 8 mm)	Forming
Table swivel angle measuring device	
2-point steady rest	ø 10 to 130 mm
Work rest	ø 20 to 130 mm
Scroll chuck set	#5 / #6 / #7
Work driving dog set (S-1 to S-6)	
	S-1 : ø 5 to 10 mm S-2 : ø 10 to 20 mm S-3 : ø 20 to 30 mm
	S-4 : ø 30 to 45 mm S-5 : ø 45 to 60 mm S-6 : ø 60 to 80 mm
Manual oil pump	

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