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Cat. No. M2006-5E

Printed in Japan 120308U
This publication was made using recycled paper for the protection of forests.

GE6-Ⅱ SERIES

Large CNC General Purpose Cylindrical Grinders

GE6-160Ⅱ
GE6-250Ⅱ
GE6-320Ⅱ
GE6-400Ⅱ

JTEKT
JTEKT CORPORATION

Presenting the pioneer in large workpiece grinding.

A high performance machine,
featuring the ultimate in“User-friendliness”and“Flexibility”

Large CNC general purpose cylindrical grinder

GE6-160Ⅱ/250Ⅱ/320Ⅱ/400Ⅱ

Large workpieces

Various shafts for marine and construction equipment, power generation
Large rolls, spindle, gear shafts, etc.

Max. distance between centers	**4,000mm**
Max. loading mass between centers	**1,000kg**
Max. grinding dia.	**ϕ550mm**

U. S. Patents on the machine : 5,595,525 and others.
Photo of a GE6-400Ⅱ.
This machine features an elongated ball screw (optional).
(This photo includes special specifications
regarding painting color, Internal grinding unit, cover, etc.)
Standard Painting color: The machine body color
comes only in neo white.
The hydraulic pump unit, coolant supply unit, etc is dark gray.

Proven technology achieving the high accuracy grinding of large workpieces

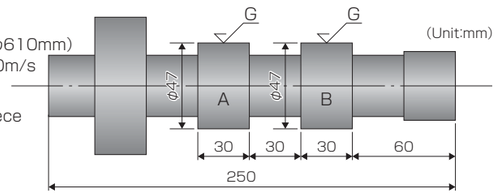
Accurate grinding

Example of plunge grinding

[Grinder] GE6-250II

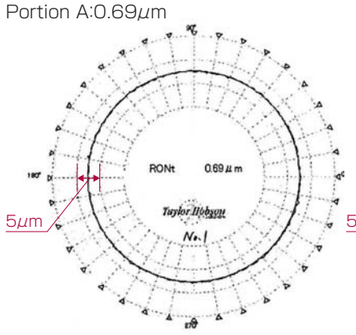
■Grinding conditions
[Grinding wheel] WA60K (φ610mm)
[Grinding wheel surface speed] 30m/s

■Workpiece
[Name] Standard test piece
[Material] SCM435

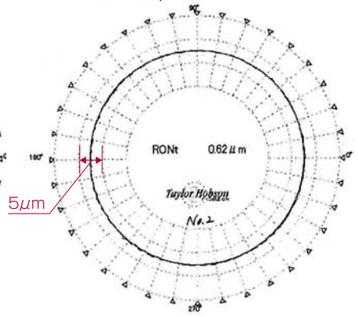


Roundness

Portion A:0.69μm



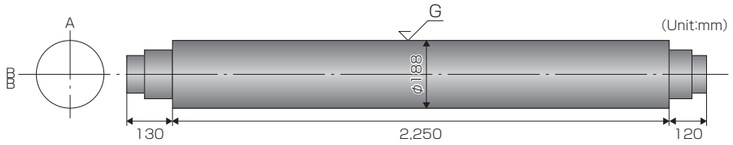
Portion B:0.62μm



Example of traverse grinding [Grinder] GE6-250II

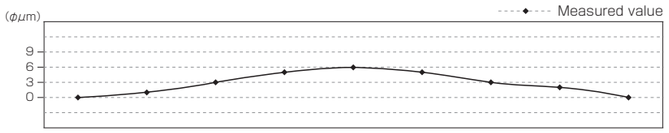
■Grinding conditions
[Grinding wheel] WA60K (φ610mm)
[Grinding wheel surface speed] 30m/s

■Workpiece
[Name] Standard test piece
[Material] SCM435



Cylindricity (microns)

	1	2	3	4	5	6	7	8	9
A	0.0	+1.0	+3.0	+5.0	+6.0	+5.0	+3.0	+2.0	0.0
B	0.0	+1.0	+3.0	+5.0	+6.0	+5.0	+3.0	+2.0	0.0

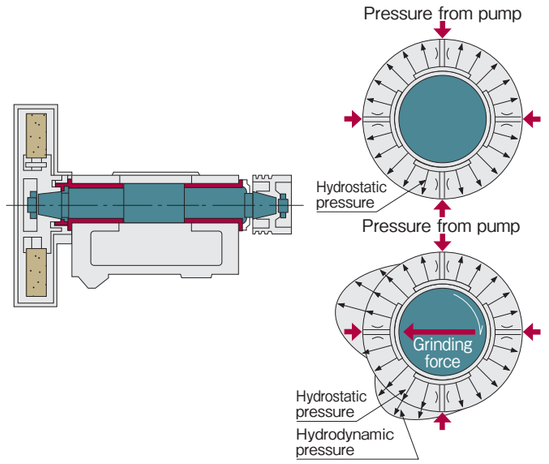


This is a grinding example using our standard TP. It is not the guaranteed accuracy of the machine.

High quality & high performance with JTEKT's proprietary technology

Featuring the JTEKT original TOYODA STAT BEARING as the wheel spindle, the heart of the machine

Equipped with the extremely rigid hybrid-type TOYODA STAT BEARING which provides no metal-to-metal contact and has a high vibration damping capacity, this grinder assures high accuracy and a long service life.
High accuracy grinding and longevity of the machine is achieved by using proven JTEKT spindle technology.

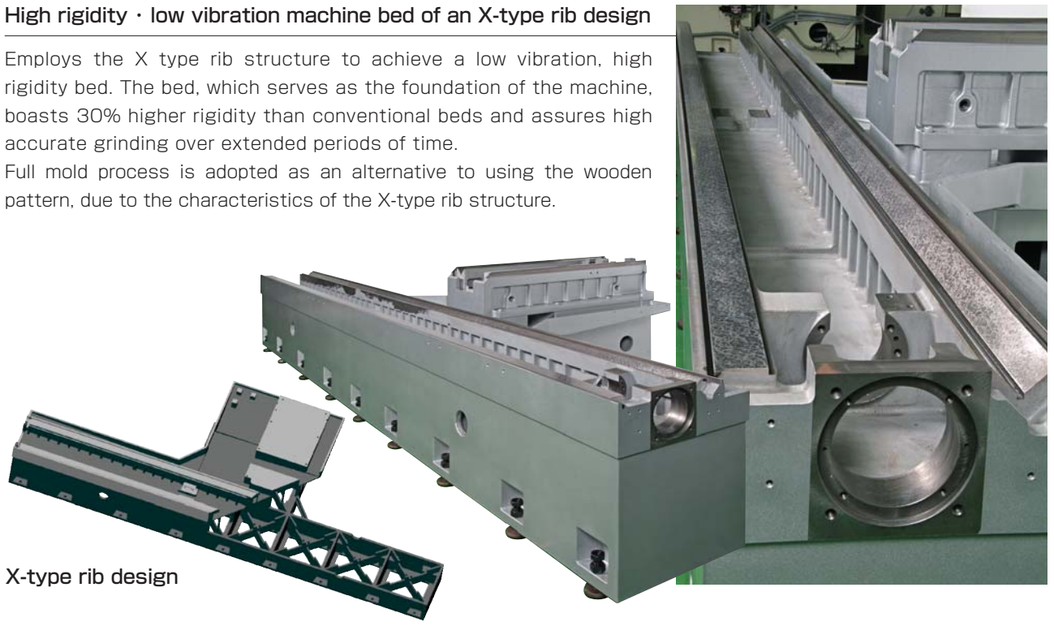


■Spindle at rest
Hydrostatic pressure lifts and holds the wheel spindle firmly at the bearing center position.

■Rotation spindle
Combination of hydrostatic and hydrodynamic pressures improves spindle rigidity and vibration absorbing performance.

High rigidity・low vibration machine bed of an X-type rib design

Employs the X type rib structure to achieve a low vibration, high rigidity bed. The bed, which serves as the foundation of the machine, boasts 30% higher rigidity than conventional beds and assures high accurate grinding over extended periods of time.
Full mold process is adopted as an alternative to using the wooden pattern, due to the characteristics of the X-type rib structure.



X-type rib design

Established technology for high accuracy grinding of large workpieces

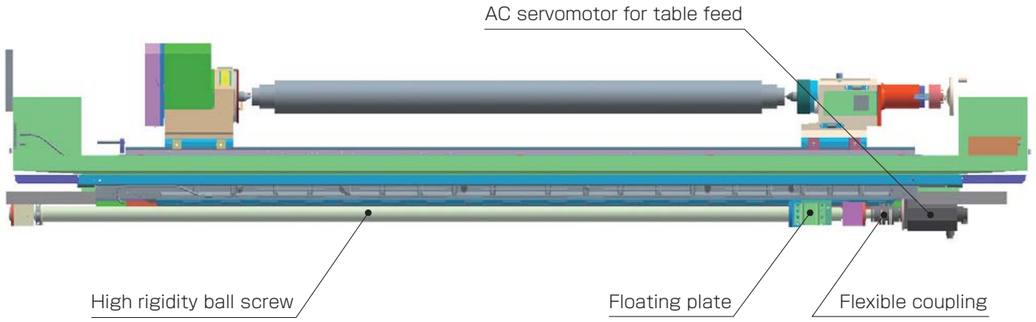
Machine tool manufacturing excellence

Master hand scraping

In order to provide a machine which can perform with peace of mind for a long period of time,"scraping"is carried out by skilled workers both on the wheelhead and the table slide.

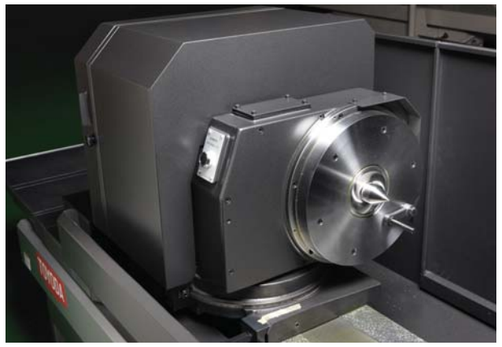
Unique “floating plate” ballnut ensures repeatability

In order to provide highly accurate grinding over a long period of time, we adopt a JTEKT original type of wheelhead feed mechanism. Accuracy of roundness and cylindricity are improved as the runout of the ball screw are absorbed..



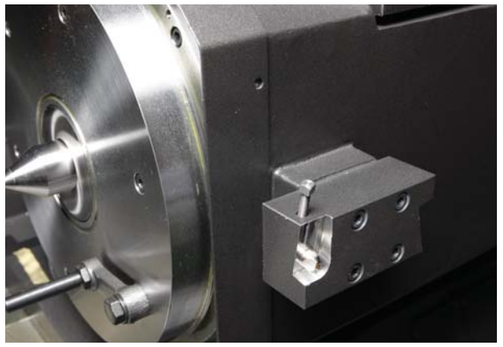
High rigidity・low vibration workhead

A high rigidity/low vibration workhead features a larger spindle diameter for optimum rigidity and performance.
This optimized spindle rigidity even when grinding heavy workpieces, contributes to the improvement of roundness and cylindricity accuracy.



High rigidity wheel dressing unit

The wheel dressing unit is attached to the high rigidity workhead, strengthening the rigidity of the wheel dressing unit. Due to the above, the surface character of the wheel surface is improved, contributing to the improvement in surface roughness, roundness and cylindricity accuracies.



Many options to choose from for large workpiece grinding characteristics

Radius crowning traverse grinding cycle

Option

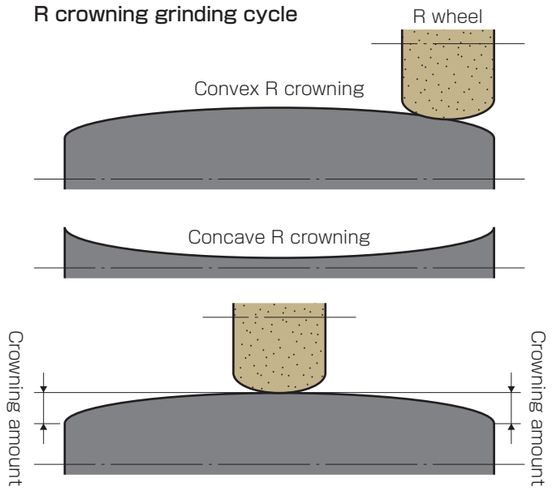
For rolls, etc where crowning is required, a skilled operator with grinding know-how must constantly attend the machine, in some cases sacrificing productivity.

To avoid this, the GE6-Ⅱ features a Radius crowning traverse grinding cycle that makes it possible for Operators of all skill levels to grind a crowning shape by simple input, using the 2-axis CNC function.

R crowning cycle procedure

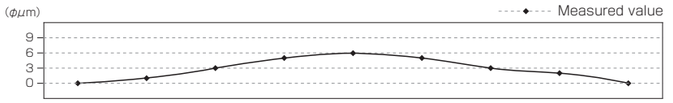
①Input the range for which crowning is to be done
②Input crowning amount data
③CNC calculates R crowning grinding data automatically and crowning grinding begins
④Crowning dimensions are measured
⑤Correct crowning amount data to be only the difference between the crowning dimension and the measured value
⑥CNC recalculates R crowning grinding data automatically

R crowning grinding cycle



Advantages of the crowning cycle

Overall workpiece length	3,500mm
Grinding diameter	ϕ220mm



※Carry out further grinding once completing trial grinding as the machining accuracy achieved by R crowning traverse grinding cycles differs depending on factors such as workpiece shape and heat displacement.

ϕ760mm wheel specifications

Option

ϕ760mm wheel OD workpieces for large diameter swing.

Heavy Duty 1,000kg

Option

We have prepared a heavy duty work head and tailstock that can accommodate a workpiece weight of 1,000kg

Remarkable operability

Man and machine unite when operability is taken to the ultimate

It is a fact that a machine cannot function without the aid of "people"
The superior operability of the high function CNC GC50 offers highly responsive operation

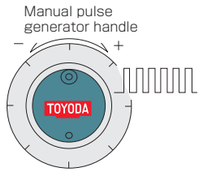
Manual intervention operation during grinding

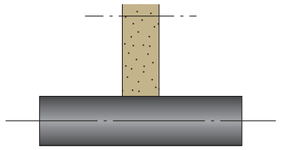
JTEKT's GE6-Ⅱ CNC is a CNC developed to enable grinding of unique work pieces with simple, operations. Easy programming allows for optimized workpiece setup and change over.

Introduction of the"Manual intervention operation"function(operations with the feel of a manual machine)

①Manual Pulse Generator intervention during automatic operation

MPG operations are possible even during automatic operation, giving the feel of a manual machine.

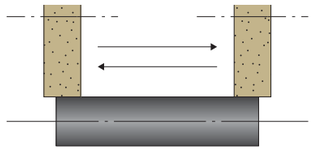




②Automatic infeed stop

Infeed can be stopped with the press of a button, even during automatic cycle.
During traverse grinding, a speak-out (zero infeed) is quickly set without interruption of the traverse motion.

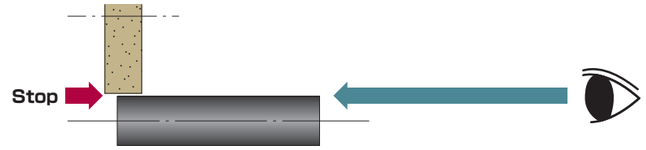
Automatic infeed stop



Traverse grinding

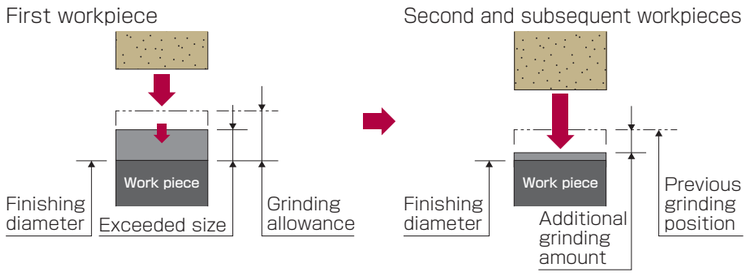
③Stop before grinding

Machine can be stopped automatically before rough grinding or finish grinding.
If the machine is stopped before finish grinding, dimensions can be checked before grinding begins.



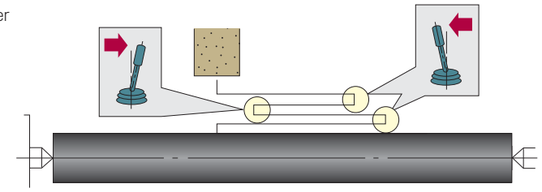
④Additional grinding

Work piece is pre-ground as oversize, and can then be repeated several times with a close eye kept on the dimension.



⑤Manual table reversing(traverse grinding)

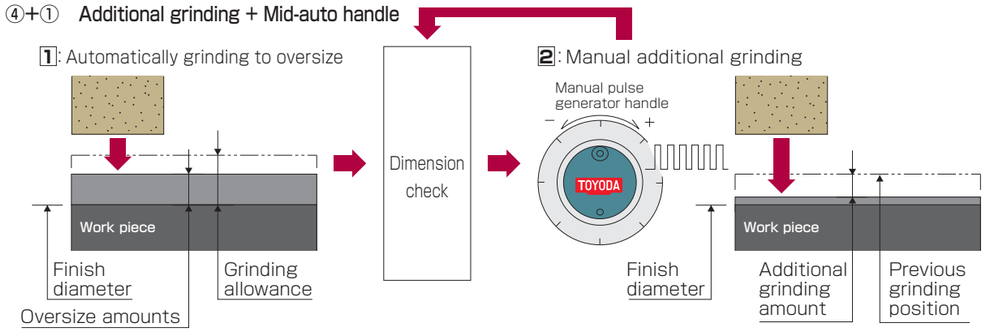
Table right advance and left advance can be changed by lever operation during automatic operation.



Various combinations of manual grinding are possible.

Example:Grinding the remaining stock manually, manual dimension inspection before final finish grinding

④+①　Additional grinding + Mid-auto handle



In pursuit of 'user-friendliness' Supporting the customer with easy programming

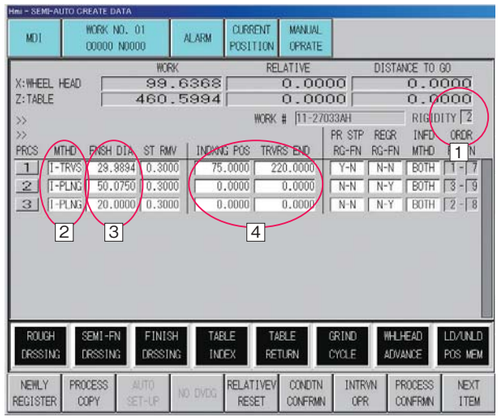
We offer trouble-free operations to customers new to grinding or customers who have switched from hydraulic type general-purpose machines but wish to improve production efficiency by ensuring that accuracy is still easily achieved and the machine is still easy to use.

The user friendly GE6-Ⅱ features simplified data entry for easy operation. The CNC can automatically determine grinding conditions that utilize the know-how of JTEKT's grinding specialists.

Efficiency of single workpiece grinding improved by simplified operation

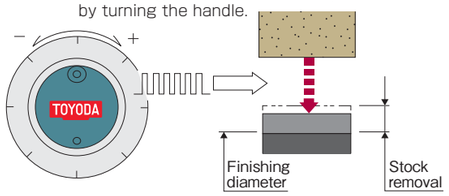
■No time-consuming set ups. The grinding conditions are automatically determined with minimal data input (reduced by 90% in an in-house comparison).

■Up to 8 steps can be entered at a time on one screen; even a beginner can quickly learn how to operate the machine.



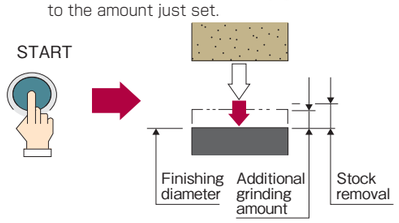
■Automatic grinding is possible from the first workpiece with no need of mastering.

Step 1 ●Grind the green face of the workpiece by turning the handle.



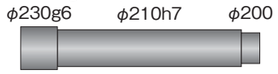
Step 2 ●Measure the workpiece and set the additional stock removal.

Step 3 ●Start the grinding cycle. The workpiece is automatically ground to the amount just set.

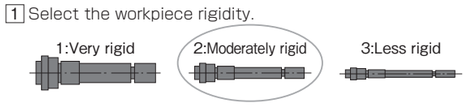


■Programming is completed while the first workpiece is ground. The second and subsequent workpieces can be ground automatically.

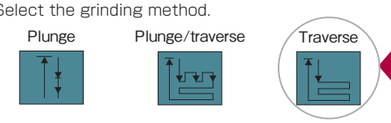
●To grind the following workpiece.



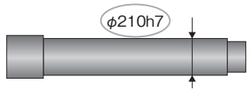
1 Select the workpiece rigidity.



2 Select the grinding method.



3 Enter the finishing diameter.



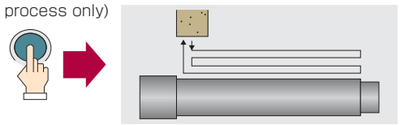
●This complates auto-matic determination of the grinding conditions.

●Modify the stock remo- val amount, if necessary.

4 Enter the table position.

●Simplified data entry with position memory button

Press the start button to start automatic grinding (1 process only)



To the next grinding steps

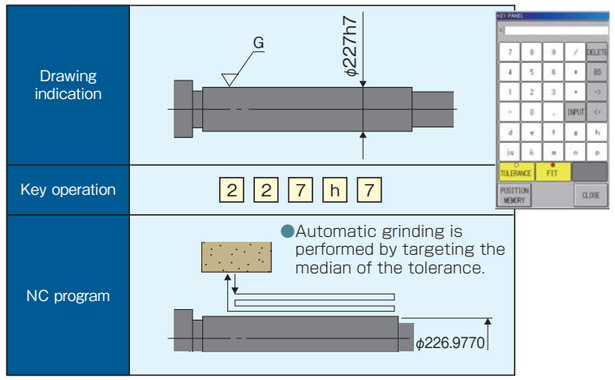
Drawing marks can be directly entered as they are!

■Fitting marks and dimensional tolerances frequently used in drawing can be entered directly.

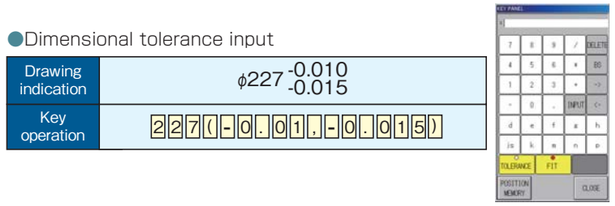
Entry is completed in a short time without referring to conversion tables or use of a calculator.

(Extended data entry function)

●Fitting mark input

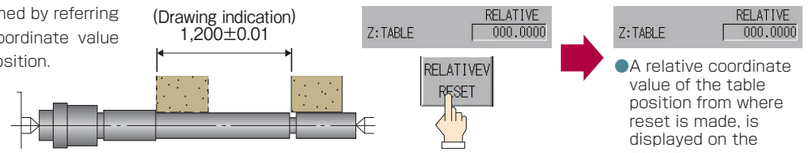


●Dimensional tolerance input



Easy longitudinal sizing with displayed coordinate values

■Manual infeed can be performed by referring to the displayed relative coordinate value which can be reset at any position.

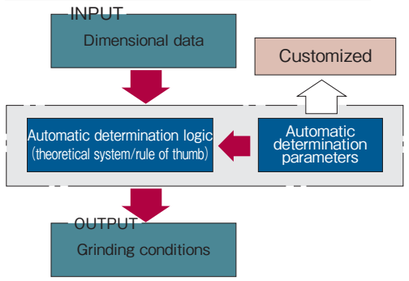


●A relative coordinate value of the table position from where reset is made, is displayed on the screen.

Operator's experience reflected in the automatic determination system

■Parameters for automatic determination can be modified based on the operator's know-how.

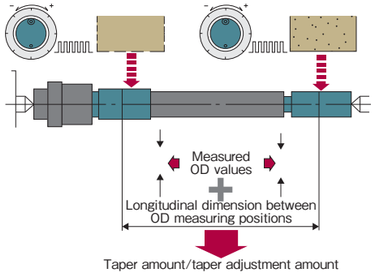
Simplified automatic determination system



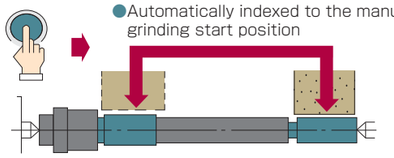
In pursuit of 'user-friendliness' Supporting the customer with convincing operations

Easy taper adjustment

■By entering measured values, the taper adjustment amount is displayed on the screen.

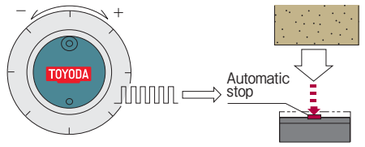


■As automatic indexing is performed for the second and subsequent workpieces, no MGP interruption is required.



Safety handle infeed

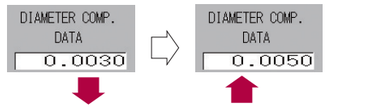
■In the case of MPG infeed, the wheelhead automatically stops if fed to a prior set position. The machine can be operated safely even if by a beginner.(software positive stop function)



Easy size compensation

■Entry by pressing a single button avoids grinding data entry mistakes. (Extended entry function)

●To make the finishing diameter greater by 2μm:



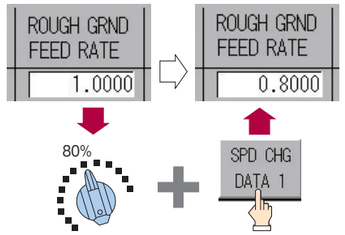
Move the cursor to the data you want to modify and press:

ADD (twice)

Straight forward data entry without calculations

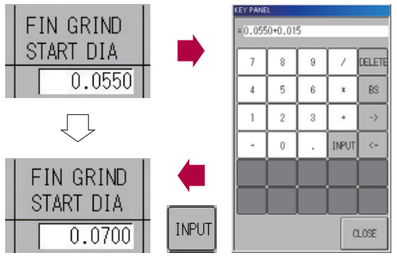
■Speed data can be entered the way the operator desires, using the override selector switch. (Speed data proportional compensation function)

●To reduce the rough grinding speed slightly:

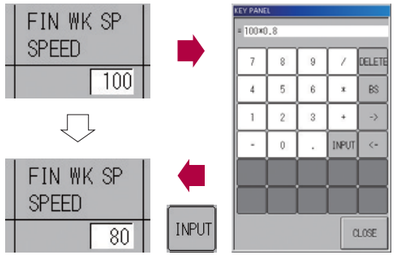


■Addition, subtraction, multiplication and division are possible during data entry / modification without requiring a calculator. (Extended entry function)

●To make the fine grinding start position greater by ϕ0.015mm.:



●To reduce the fine grinding workpiece speed slightly:

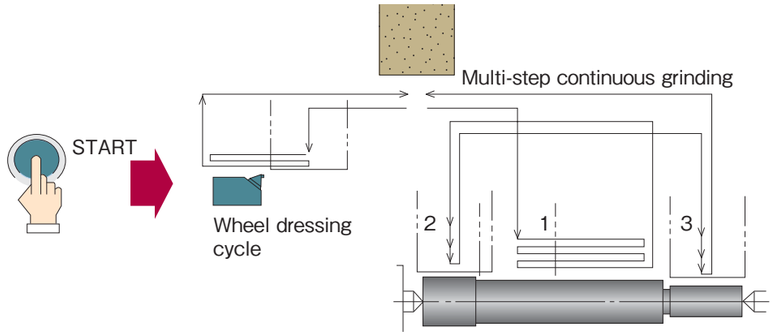


Multi-step continuous grinding Multi-step continuous grinding possible with simple operations

More efficient multi-step grinding.

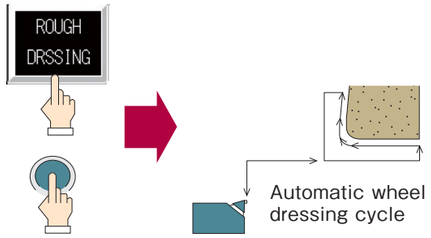
■Automatic operation, from multi-step continuous grinding to wheel dressing, is performed by only pressing the start button.

■Up to 64 kinds of grinding data can be stored.



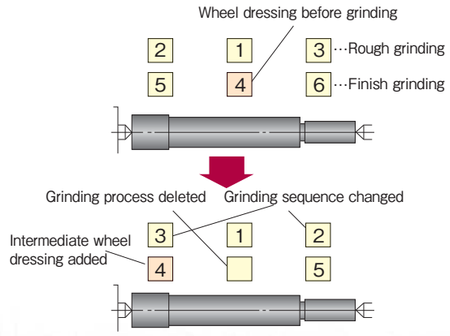
Wheel dressing performed by simplified operation

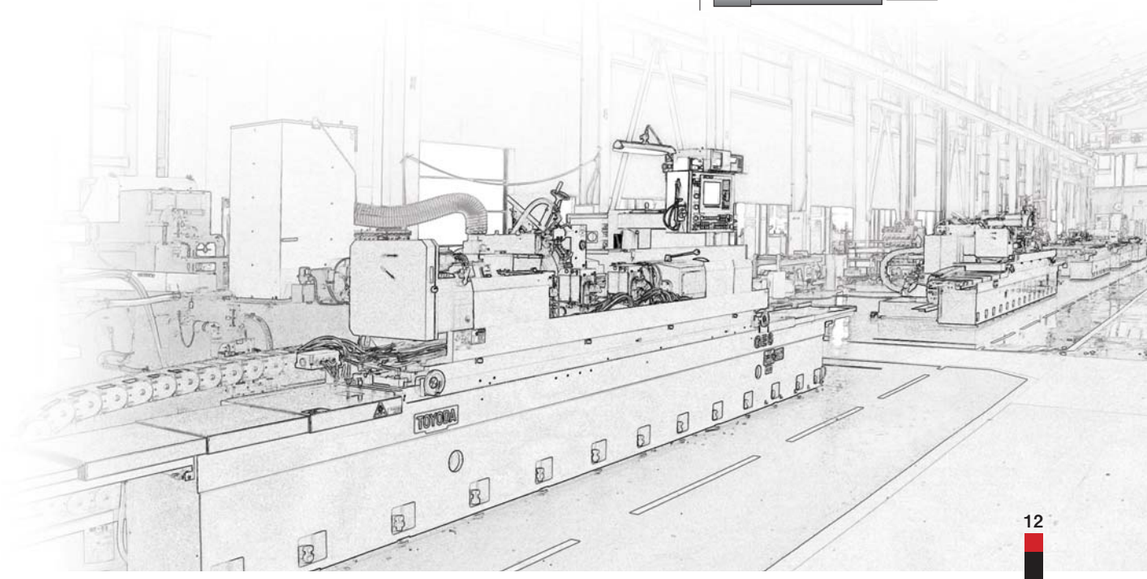
■No set-up operations, such as diamond holder mounting/removal, wheelhead/table positioning, or table speed adjustment-required.



Flexibility for process changes

■Changes such as grinding sequence adding/deleting intermediate wheel dressing are simple and easy.





Options further improving ease of use

Using air pressure to simplify work head and tailstock movement

Option

The GE6P-Ⅱ uses air to aid movement of the work head and tailstock and reduce the burden on the operator during set-up changeover.

Due to this feature, labor is not only simplified but wear on the table top face is also reduced.

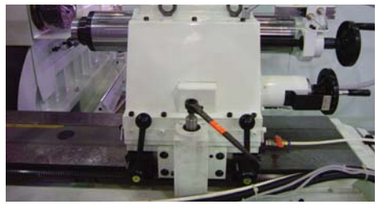
The photo is of a tailstock with 1,000kg specifications

Tailstock body movement device(rack & pinion type)

Option

The GE6P-Ⅱ features a tailstock body movement device(rack & pinion type) in order to make movement of the tailstock quick and trouble-free at the time of set-up changeover.

If the air-assisted tailstock movement is used together with these specifications, movement is simplified and table top wear is reduced.



Manual tailstock with pushing force adjustment simplification

Option

When grinding a range of work pieces from light(100kg)to heavy(1,000kg), the tailstock center force for heavy work pieces is too great for light work pieces

The GE6P-Ⅱ features a manual tailstock with easily adjustable center pressure force and equipped both with pressure mechanisms for 500kg tailstocks and 1,000kg tailstocks

Internal grinding unit

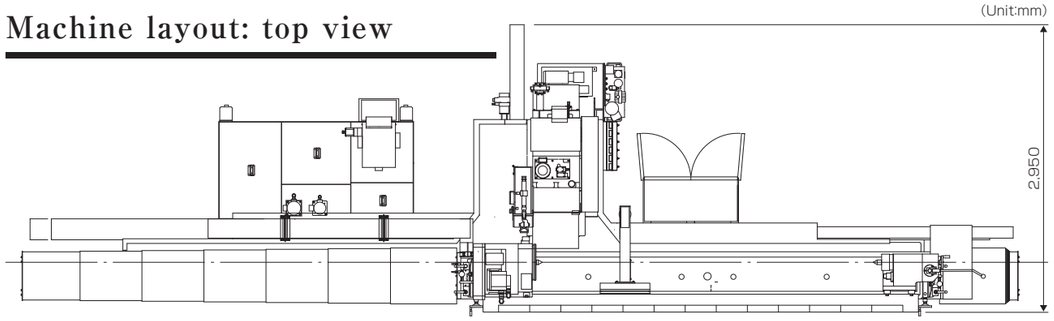
Option

We have prepared an internal grinding unit to make wheelhead attachment, and OD to internal grinding changeover, a breeze.

Equipped with a highly-rigid, single-piece spindle, GE6II is also capable of grinding deep holes.

Machine layout: top view

(Unit:mm)



Machine specifications

Item		Unit	Specifications	GE6-160Ⅱ	GE6-250Ⅱ	GE6-320Ⅱ	GE6-400Ⅱ
Distance between centers		mm	500kgspecifications	1,600	2,500	3,200	4,000
		mm	1,000kgspecifications	1,475	2,375	3,075	3,875
Swing over table		mm	Common	φ560			
Grinding diameter		mm	Common	φ0～φ550			
Wheel	Wheel OD × ID	mm	Standard	φ610xφ254			
		mm	Option	φ760xφ304.8			
	Max. wheel dia.	mm	φ610specifications	75(Wide specification 125)			
		mm	φ760specifications	75(Wide specification 100)			
	Surface speed	m/s	Standard	30			
		m/s	Option	45			
Wheelhead feed	Rapid feed rate	m/min	Common	φ15			
Table feed	Rapid feed rate	m/min	Common	13	8	6	6
	Swiveling angle※1 (CCW～CW)	°	Common	+3.0～0.0	+2.0～0.0	+1.6～0.0	+1.4～0.0
Max. load between centers		kg	Standard	500			
		kg	Option	1,000			
Workhead	Type		Standard	Dead spindle			
			Option	Swivel type live spindle			
	Center taper		500kgspecifications	MT No.5			
			1,000kgspecifications	MT No.6			
	Spindle speed	min-1	Common	7～140			
Footstock	Type		Standard	Manual lever type			
			Option	Hydraulic			
	Center taper		500kgspecifications	MT No.5			
			1,000kgspecifications	MT No.6			
	Quill stroke	mm	MT No.5 Manual lever type	Manual lever 32 + Manual handle type 30			
			Hydraulic	hydraulic 32 + Manual handle type 30			
			MT No.6 Manual handle type	Manual handle type 45			
			Hydraulic	hydraulic 32 + Manual handle type 30			
Electrical equipment		V	Common	Power supply voltage 200 Control circuit DC24			
Drive motors	Wheel spindle	kW	Common	11(4P)			
	Work spindle	kW	Common	3.5(brushless servomotor)			
	Wheelhead feed	kW	Common	3.1(brushless servomotor)			
	Table feed	kW	Common	5.0(brushless servomotor)			
	Wheel spindle bearing oil pump	kW	Common	0.5(2P)			
	Lubricant pump	kW	Common	0.2(2P)			
	Working oil pump unit	kW	Common	0.75(2P)			
	Coolant pump	kW	Common	0.25(2P)			
	Wheel spindle cooling unit	kW	Common	0.08			
	Magnetic coolant separator	kW	Common	0.025(4P)			
Tank capacities	Wheel spindle bearing oil	L	Common	14			
	Lubricant oil	L	Common	20			
	Working oil	L	Common	20			
	Coolant	L	Common	350			
Floor space(width × depth)		m	Common	5.9×2.95	8.2×2.95	9.8×2.95	11.5×2.45
Machine weight		kg	Common	10,000	12,000	14,000	17,000

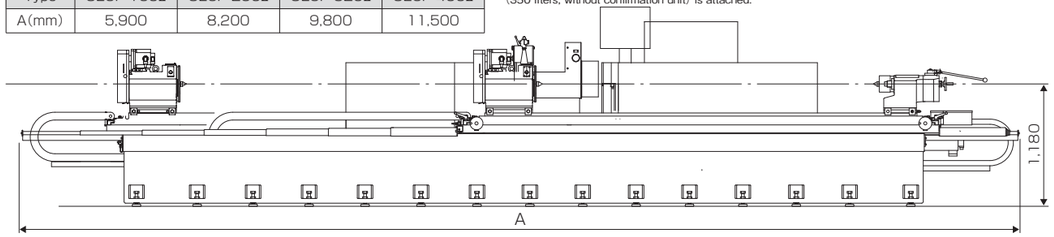
※1:In case footstock except manual footstock (standard accessory) in furnished, swiveling angle shall be limited.

Machine layout: front view

Type	GE6P-160Ⅱ	GE6P-250Ⅱ	GE6P-320Ⅱ	GE6P-400Ⅱ
A(mm)	5,900	8,200	9,800	11,500

※The left dimensions assume that the standard coolant supply unit (350 liters, without confirmation unit) is attached.

(Unit:mm)



GE6-Ⅱ List of accessories

1. Accessories per specification type

●: Standard accessory ○: Standard accessory □: Optional B accessory —: Unable to be included
(When an optional A accessory is chosen, the corresponding standard one is not supplied.)

1.Max. load between centers	No.	Unit name / Center taper	Max. load between centers(kg) 500 MT No.5	1,000 MT No.6	Necessary item Section 4-4	Section 1-10	Remarks
Workhead	1	Dead spindle workhead with infinitely variable speed(including center)	●	○			Spindle rpm(7～140min^{-1})
	2	Swivelling-type live spindle workhead(including center)	○	—			Spindle rpm(7～140min^{-1})
	3	Dead spindle and live spindle workhead(including center)	○	○			Spindle rpm(7～140min^{-1})
Footstock	4	Manual footstock Manual lever type(including center)	●	—			Stroke(manual lever 32mm + manual adjustment 30mm)
	5	Manual footstock Manual handle type(including center)	—	○			Stroke(manual handle adjustment 45mm)
	6	Manual type tailstock(including center) with easily adjustable pushing force	—	○			Stroke(For 500kg - lever 40mm + handle 50mm) (For 1,000kg - handle 90mm)
	7	Hydraulic footstock(including center)	○	○	●		Stroke(hydraulic stroke 32mm + manual handle adjustment 30mm)
	8	Pedal operation for hydraulic tailstock	□	□			
Easy set-up changeover	9	Easy traveling of workhead by air type	□	□			Including air device
	10	Easy traveling of footstock by air type	□	□			Including air device
	11	Tailstock moving unit(rack type)	□	□		●	Max. stroke 2,000mm

2.Wheel diameter	No.	Unit name	Wheel diameter(mm) φ610	φ760	Necessary item Section 2-4	Section 2-7	Remarks
Wheelhead, wheel spindle	1	Wheelhead, wheel spindle	●	○			Becoming φ610mm/φ760mm specific
Wheel guard	2	φ610mm standard width specifications	●	—			Max. wheel width75mm
	3	610mm wide width specifications	○	—			Max. wheel width125mm
	4	φ760mm specifications Combination of standard and wide width specifications	—	○			Max. wheel width100mm
Wheel surface speed	5	30m/s 1-speed specifications	●	○			
	6	30m/s 2-speed specifications	○	○			
	7	45m/s 1-speed specifications	○	○			
	8	Variable speed control unit(inverter control, manual adjustment, reducing speed control)	□	□		●	Only when equipping wheel surface speed 45m/s specifications
Wheel flange	9	Wheel flange for φ610mm(round nut: width 33～80mm)	●	—			
	10	Wide width wheel flange for φ610mm(round nut: width 75～125mm)	□	—			
	11	Wheel flange for φ760mm(round nut: width 50～75mm)	—	○	●		
	12	Wide width wheel flange for φ760mm(round nut: width 75～100mm)	—	○	●		
Wheel	13	Wheel(φ610x75x φ254mm)for 30m/s 1 set	●	—			Operating surface speed 30m/s 1 set
	14	Wheel(φ610x75x φ304.8mm)for 45m/s 1 set	□	—		●	Operating surface speed 45m/s 1 set
	15	Wheel(φ610x125x φ254mm)for 30m/s 1 set	□	—			When selecting φ610mm wide width specification in section 2-3
	16	Wheel(φ610x125x φ254mm)for 45m/s 1 set	□	—		●	When selecting φ610mm wide width specification in section 2-3
	17	Wheel(φ760x75x φ304.8mm)for 30m/s 1 set	—	○	●		Operating surface speed 30m/s 1 set
	18	Wheel(φ760x75x φ304.8mm)for 45m/s 1 set	—	○	●	●	Operating surface speed 45m/s 1 set
	19	Wheel(φ760x100x φ304.8mm)for 30m/s 1 set	—	○	●		Operating surface speed 30m/s 1 set
	20	Wheel(φ760x100x φ304.8mm)for 45m/s 1 set	—	○	●	●	Operating surface speed 45m/s 1 set
Parts related to wheel	21	Wheel balance arbor	□	□			
	22	Wheel balancing stand	□	□			
	23	Wheel hoist	□	□			

Photo is of a GE6-320Ⅱ.
The machine colors shown in this photo is standard.
Standard painting color - The machine body comes only in neo white.
The hydraulic pump unit, coolant supply unit, etc is dark gray.
Note. Painting color shall be specified by mutual agreement.

2. Common accessories

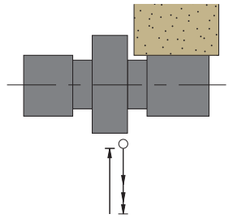
●: Standard accessory ○: Standard accessory □: Optional B accessory —: Unable to be included
(When an optional A accessory is chosen, the corresponding standard one is not supplied.)

3.Operability・workability	No.	Unit name	Common	Necessary item Section*	Section*	Remarks
Cycle	1	R crowning cycle	□			
Pulse generator	2	Corresponding to manual grinding simplification(2-handle spec)	□			X-axis and Z-axis simultaneous movement is possible. A manual pulse generator on the operation panel is not provided.

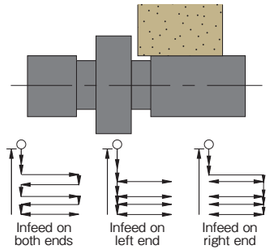
4.Unit related	No.	Unit name	Common	Necessary item Section 4-4	Section 4-11	Remarks
Table	1	Front table cover(fixed type)	●			
	2	Front table cover(insert type)	○			
Pump unit	3	Lubricant pump unit(20 liters, without confirmation function)	●			
	4	Hydraulic oil pump unit(20 liters, without confirmation function)	□			
Coolant supply unit	5	Coolant supply unit(350 liters, without confirmation function)	●			No washing pump
	6	Coolant supply unit with paper filter(350 liters, without confirmation function)	○			No washing pump
	7	Magnetic coolant separator(processing capacity 80 L/min)	□			
	8	Magnetic coolant separator(processing capacity 120 L/min)	□			
	9	Magnetic coolant separator(processing capacity 150 L/min)	□			
	10	Coolant lower limit confirmation device	□			
	11	Additional coolant pump(for bed washing and sizer cooling)	□			
	12	Bed and table washing	□		●	
	13	Auto-sizer cooling	□		●	
Coolant nozzle	14	Flexible coolant nozzle	●			
	15	One port coolant nozzle(for standard wheel width)	○			
Wheel dresser	16	Wheel dresser(mounted on workhead)	●			
	17	Wheel dresser(mounted on table)	□			
	18	Wheel dresser(mounted to the tailstock)	□			
	19	Formed diamond tool	□			
	20	Single-point diamond tool	□			
Driving dog	21	Manual screwed type driving dog(φ22～φ80mm)	□			6 pieces in the range as 1 set.
	22	Manual screwed type driving dog(φ80～φ190mm)	□			7 pieces in the range as 1 set.
	23	Cam-locked type driving dog(φ20～φ80mm)	□			4 pieces in the range as 1 set.
Chuck	24	3-jaw scroll chuck	□			Chuck load mass 80kg(including chuck)
	25	Independent 4-jaw chuck	□			Chuck load mass 80kg(including chuck)
	26	4-slot face plate(φ410mm)	□			
Tool	27	Standard service tool kit	●			
	28	Tools(wrench/spanner)	□			
	29	Jib crane for wheel changes(for 100kg)	□			
Auto sizer	30	Sizing unit for large diameter cylinder(JTEKT-made, CNC built-in amplifier, 3P, φ10～φ160mm)	□	●		
Lateral locator	31	Automatic lateral locator(mounted on wheelhead)	□	●		
Work supporting device	32	Work supporting device	□			
	33	Contact shoe:φ150～φ180mm	□			Select the contact shoe with the required diameter. (Work piece holder base required)
	34	Contact shoe:φ180～φ220mm	□			
	35	Contact shoe:φ220～φ260mm	□			
	36	Contact shoe:φ260～φ300mm	□			
Work holder	37	Work holder(one for each R and L φ20～φ190mm)	□			
Steady rest	38	Manual pulse generator(mounted on operation panel)	□			
Control unit	39	Manual pulse generator(mounted on operation panel)	●			
	40	Table direction selection lever(mounted on operation panel)	●			
	41	100V outlet(mounted on inside - of control box)	●			
	42	USB flash drive for GC50(JTEKT-made, one piece of stored backup data)	●			
	43	USB flash drive for GC50(JTEKT-made)	□			
	44	Lighting unit(fluorescent lamp)	□			
Overseas specifications	45	Language support(NC screen, etc.)Languages: English, Chinese	□			
	46	Supporting different voltage	□			
Machine color	47	The body comes only with standard color of neo-white. Pump unit, coolant supply unit and the like are painted dark gray.	●			
	48	Special color other than standard color Pump unit, coolant supply unit and the like are painted dark gray.	○			Please contact our sales dept. when changing the color of the pump unit, coolant tank and control cabinet
Customer run-off	49	Our standard test piece abrasive(special option)	□			
Instruction manual	50	One set each of machine specifications, operation manual and maintenance manual	●			
Internal grinding unit	51	Internal grinding unit is available. Please refer to the "Internal grinding unit"brochure.	□			It is required to use a dead spindle and live spindle workhead (Item 1-3).

Grinding cycles

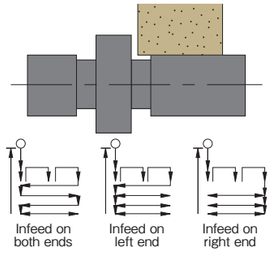
1. Plunge (indirect sizing)



2. Traverse (indirect sizing)

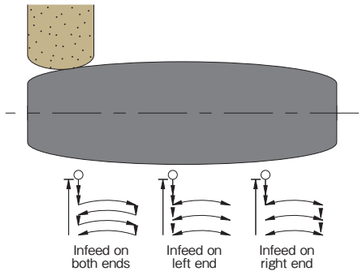


3. Plunge/traverse (indirect sizing)

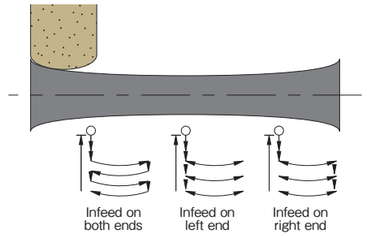


4. R crowning traverse Option

Convex R crowning

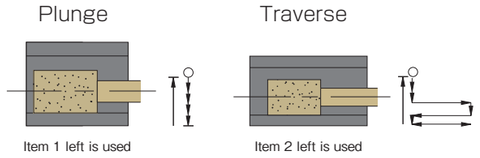


Concave R crowning



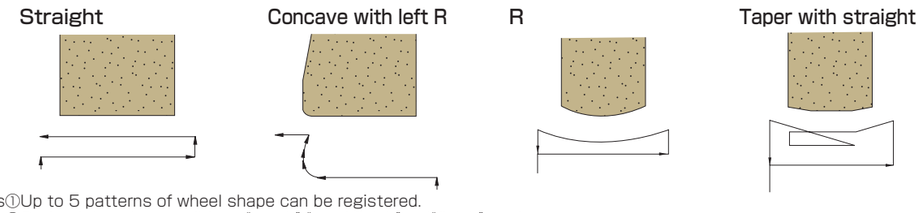
5. Internal grinding

(OD grinding cycle is used)



Notes①The above grinding cycles can be divided into rough and finish grinding cycles by using the cycle dividing function.
②Face grinding can be performed by manual interrupting operations and manual table axis compensation.
③Direct sizing plunge, direct sizing traverse or direct sizing plunge/traverse grinding cycles are optionally available.
④Please carry out the grinding of the R crowning traverse (option) after performing the R wheel dressing.
⑤Only indirect sizing cycle is available (direct sizing cycle is not available) for the internal grinding cycle.
⑥Displayed coordinates for internal grinding do not correspond with the workpiece.
⑦Internal multi-step grinding can be performed manually.

Wheel dressing cycles



Notes①Up to 5 patterns of wheel shape can be registered.
②3 wheel dressing conditions;"rough","semi-finish"and"finish"can be set.
③The automatic dressing function for internal griding wheels is not provided.
Dress them manually using an internal/external diamond tool holder to be mounted on the table.

CNC unit specifications

CNC specifications (GC50)

●: Standard ○: Option

Item	No.	Specifications	Accessories
CNC unit	1	GC50	●
Controlled axes	2	X-axis(wheelhead feed axis), Z-axis(table feed axis)	●
CRT display	3	Color LCD(Japanese)	●
	4	Color LCD(English)	○
File management	5	Structured data management (pregrinding, grinding and maintenance)	●
	6	Grinding data patterns: Max. 64 (30processes/pattern, Max. 1,920 processes)	●
Coordinate setting	7	Position memory(various)	●
	8	Relative coordinates	●
Compensation function	9	Backlash compensation	●
	10	Size compensation	●
Display	11	Operation monitor display	●
	12	Lamp display	●
	13	Operation procedure display	●
	14	Inspection, maintenance items	●
	15	Metric display	●
	16	Inch display	○
Operation	17	Canned cycle	●
	18	Test cycle	●
	19	Wheel dressing cycle	●
	20	Return cycle	●
	21	Single block	●
	22	Grinding step skip	●
	23	Rapid feed override 0, 10, 50, 100%	●
	24	Grinding feed override(X-axis)0-150%, in units of 10%	●
	25	Grinding feed override(Z-axis)0-150%, in units of 10%	●
	26	Work spindle override 50~200%, in units of 10%	●
	27	Handle during automatic operation	●

Item	No.	Specifications	Accessories
Manual intervention operation	28	Taper corrector	●
	29	Cycle division function	●
	30	Cycle interruption and manual size compensation	●
	31	Cycle interruption and infeed function	●
	32	Software positive stop function	●
	33	Manual table reverse turning function	●
	34	Auto-sizer manual additional grinding function	○
Auto-sizer	35	Auto-sizer control unit	○
Programming function	36	Simplified automatic determination (only for OD grinding cycle)	●
	37	Speed data proportional compensation function	●
	38	Extended data entry function	●
	39	Operation entry function	●
	40	Process editing function	●
Maintenance	41	Wheel change prediction display	●
	42	Min. wheel dia. display	●
	43	Self diagnosis	●
	44	Alarm history display	●
	45	Batch saving	●
Counter	46	Production counter	●
	47	Wheel dressing interval counter	●
Cycle time display	48	Machine operation hours	●
	49	Processing cycle time	●
	50	Grinding cycle time	●
	51	Wheel dressing time	●
Others	52	Corresponding to USB memory	●

Description of main functions

1	Position memory	The wheel dia., diamond tool position, and longitudinal workpiece position can be stored by one touch of a button.
2	Handle during automatic operation	M.P.G. operation is validat during automatic operation.
3	Taper corrector	By entering values measured at 2 points after manual grinding, the taper compensation amount is displayed on CRT. Automatic indexing to the grinding start position is performed for the second and subsequest workpieces.
4	Cycle division function	A workpiece is automatically ground by dividing the grinding cycle into rough and finish grinding cycles.
5	Cycle interruption and manual size compensation	Automatic operation is suspended to allow table position compensation and manual shoulder grinding.
6	Cycle interruption and infeed function	Automatic operation is suspended to allow finishing dia. compensation by entering the additional infeed amount obtained through comparision with the measured grinding dia.
7	Software positive stop function	The wheelhead and table automatically stopped at the preset positions when fed using the M.P.G.
8	Auto-sizer manual additional grinding funtion	Manual infeed can be performed while referring to the values output from the auto-sizer amplifer.
9	Speed data proportional compensation function	The infeed speed and traverse speed can be changed using the override selector switch.
10	Extended data entry function	Drawing mark entry, additional taper grinding amount calculation, addition/subtraction/division /multiplication, and entry by one touch of a button are possible.
11	Operation entry function	The wheelhead and table positioning data can be entered by pressing buttons.
12	Grinding cycle editing function	The grinding sequence can be changed and intermediate wheel dressing can be addad/deleted with an easy operation.