

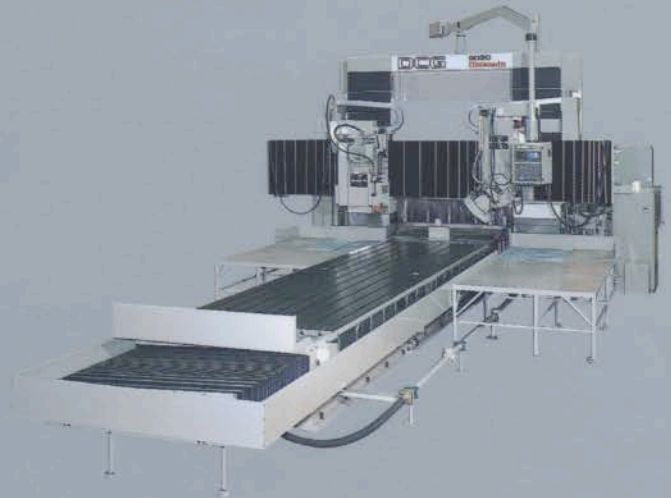
# Double Column Type CNC Surface Grinding Machine

Travelling Crossrail Type

**DCG-NC**

Stationary Crossrail Type

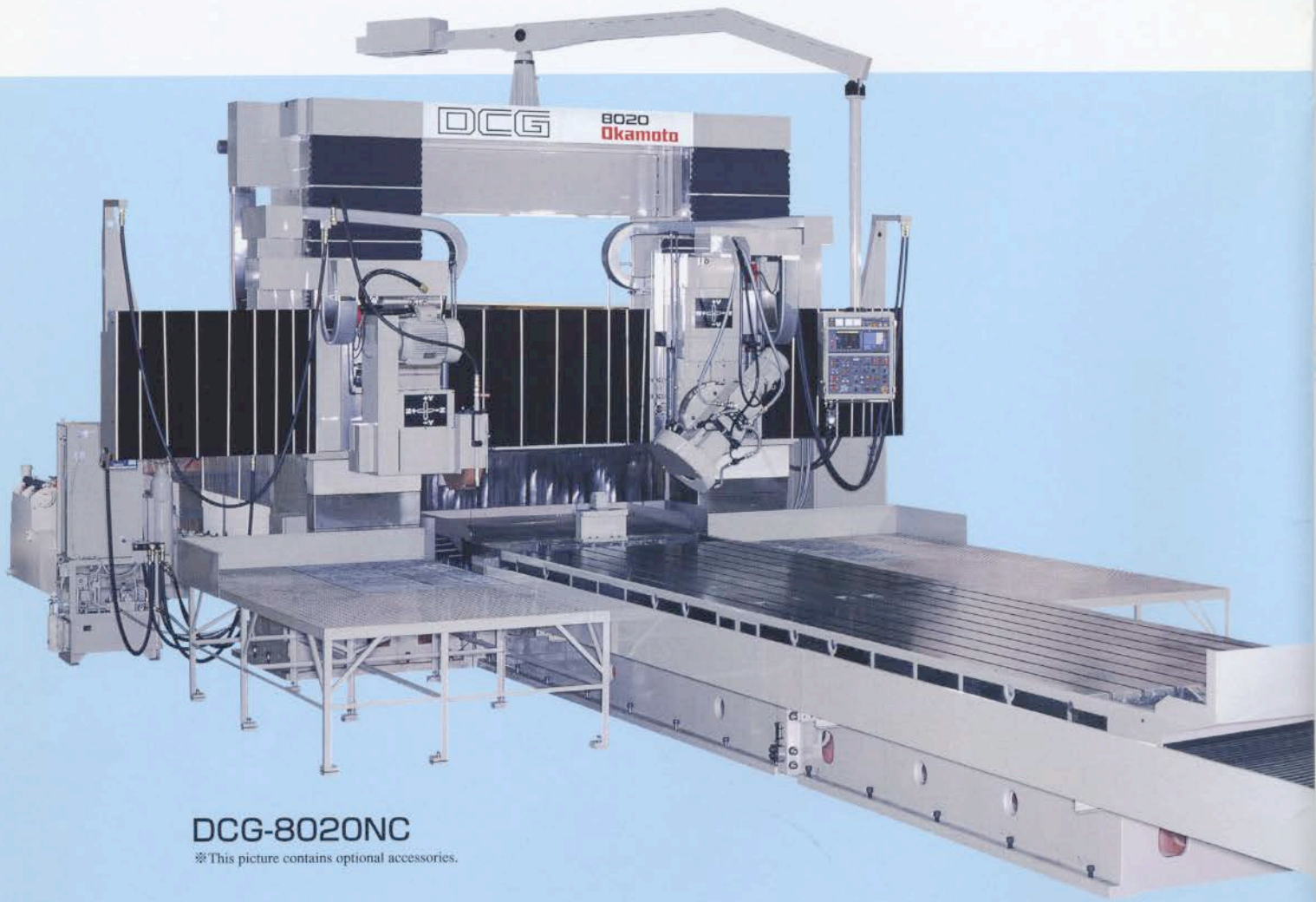
**PSG-CHNC**  
SERIES



**Okamoto**  
HIGH-PRECISION

# *Carried all the demand of the bed grinding machine*

Suitable to machine tool structure parts exceeding 800mm high and work of compound guideway grinding



**DCG-8020NC**

※ This picture contains optional accessories.

## **DCG-nc** SERIES

-4015NC	-6015NC	-8015NC	-10015NC
-4020NC	-6020NC	-8020NC	-10020NC

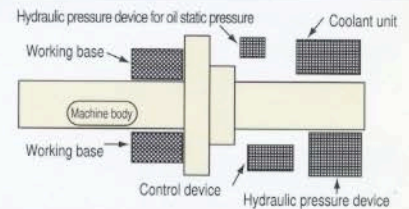


# Travelling Crossrail Type DCG-NC Series

## Space-saving specification

In order to use machine layout effectively, control unit, hydraulic unit and coolant unit is ideally arranged and secured working platform.

## Machine layout



## Table longitudinal feed

A slideway adopted V-V type that is able to be superior of straightness. After grinding process, a slideway is finished precisely by hand scraping without correcting working by anchor-bolt.

### Straightness of table movement

Ultra precision specified machine	Actual Measurement
Longitudinal and vertical movement	0.010mm/4m
Horizontal movement	0.006mm/4m

All surface supply system has been adopted to slideway lubrication, and temperature controlled oil is supplied to the slideway.

## Hand scraping work



## Crossrail cross feed

wide crossrail width made by the high rigidity design, realized less than 1/2 of straightness JIS standard.

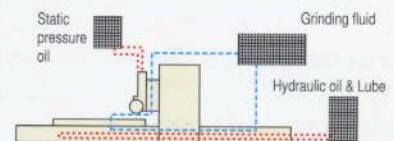
## Straightness of cross feed of horizontal grinding head

Ultra precision specified machine  
0.003mm/m

## Heat displacement countermeasure

Oil temperature regulator is equipped as a standard, in order to minimize heat displacement of machine becoming neck of high precision grinding. Coolant unit with water temperature regulator is also available as optional accessories.

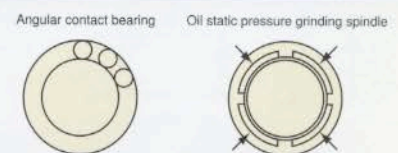
## Heat control diagram



## Horizontal grinding head specification

Adopt ultra precision Angular contact ball bearing which has minimum expansion of axis direction and effective for side grinding and form grinding is adopted to wheel spindle. Hydro-static grinding spindle (option) be recommended for high dignity surface grinding work.

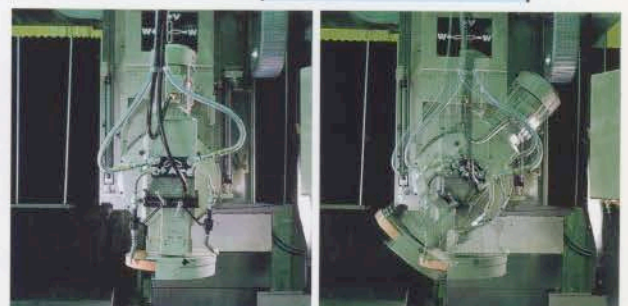
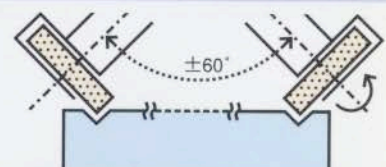
## Spindle bearing cross-sectional view



## NC universal grinding head

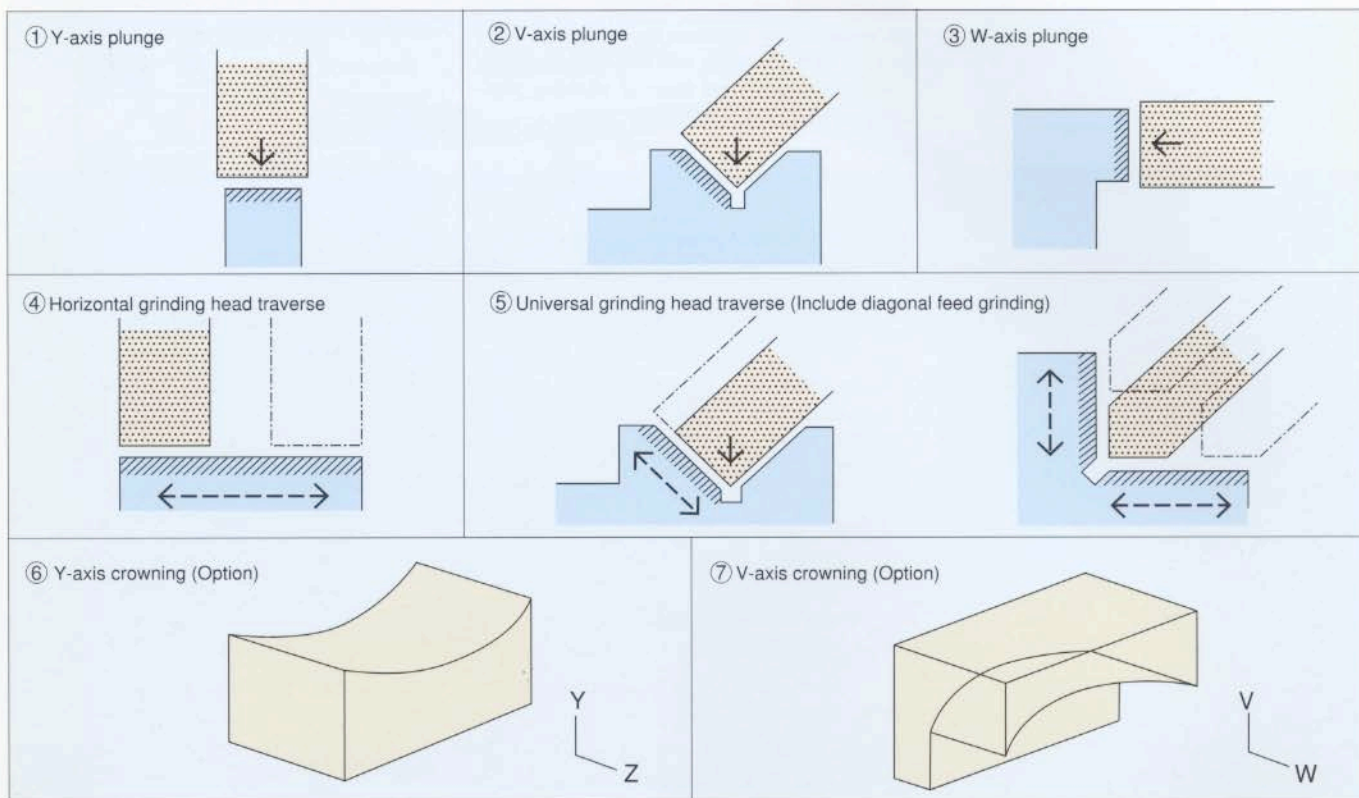
Swing angle could be set by switch on control panel and effective for minimize preparation time and enhance accuracy.

## A trace of universal grinding head



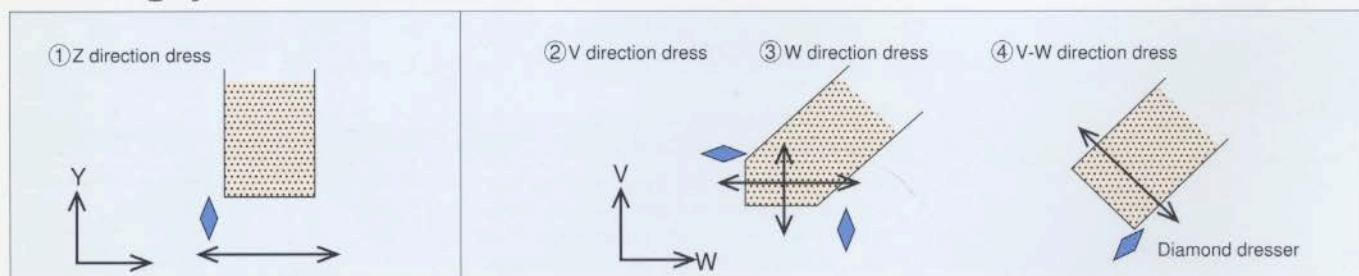
## ■ Automatic dressing and grinding cycle

### 1. Grinding cycle (Patternized fixed cycle)

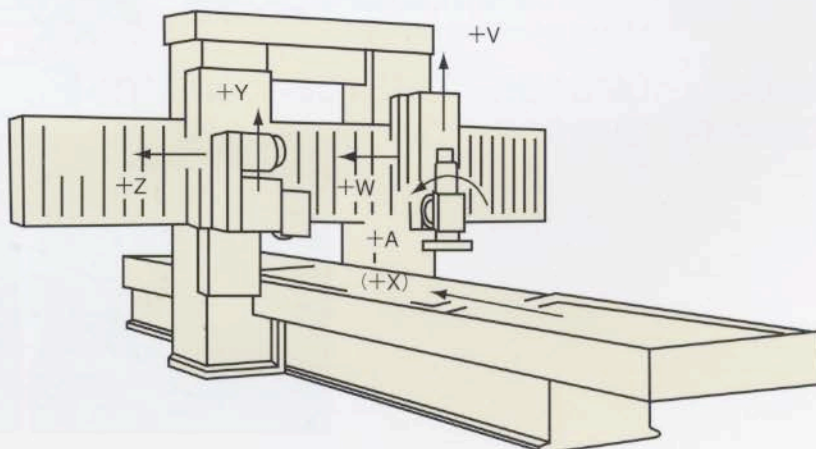


※ Grind compound processing by a combination of fixed cycle

### 2. Dressing cycle (Patternized fixed cycle)



## ■ Double Column type Precision Surface Grinding Machine - Name of Axis





# Travelling Crossrail Type DCG-NC Series

## Machine Specification

			4015NC	6015NC	8015NC	10015NC	4020NC	6020NC	8020NC	10020NC
Capacity	Max. grinding height	mm	1500				1600(standard) 1800(option)			
	Table working length	mm	4050	6050	8050	10050	4050	6050	8050	10050
	Table working width	mm	1500				2000			
	Max. pass width	mm	2000				2500			
	Table load capacity	kg	12000	10000	13000	16000	14000	12000	18000	18000
	T-slot (width x No.)	mm/No	28×7				28×9			
Longitudinal Feed	Max. travel	mm	4500	6500	8500	10500	4500	6500	8500	10500
	Longituinal feed rate	m/min	5~30							
Cross Feed	Max. rapid feed	mm/min	3000							
	Minimum increment	mm	0.0001							
Grinding wheelhead	Y-axis vertical travel	mm	250							
	V-axis vertical travel	mm	500							
	Max. rapid feed	mm/min	1000							
	Minimum increment	mm	0.0001							
Universal grinding wheelhead	Max. travel	deg	±60°							
	Max. rapid feed	min <sup>-1</sup>	2							
	Minimum increment	deg	0.001°							
Crossrail vertical movement	Max. travel	mm	1550				1650			
	Feed rate (50Hz/60Hz)	mm/min	510							
Main grinding wheelhead	Wheel size	mm	φ 610X150X φ 304.8							
	Speed	min <sup>-1</sup>	940							
	Motor	kW	15(standard), 22(option)							
Universal grinding wheelhead	Wheel size	mm	φ 510X50X φ 127, φ 610X50X φ 250(option)							
	Speed	min <sup>-1</sup>	900~3000							
	Motor	kW	7.5							
Machine Space	Length	mm	13400	17500	21700	26500	13400	17500	21700	26500
	Width	mm	6700	7900			8400			
	Height	mm	5800				6000			
Power supply		kVA	95				120		150	
Machine Net Weight		kg	74000	80000	88000	105000	79000	85000	95000	115000

※ Standard machine color is brownish light gray (MUNSEL No. 5Y6/1). Designed color shall be otherwise estimate.

## NC Specification

1	NC unit	FANUC 15iM
2	Controlled axis	5 axes (CRT 10.4 inch color LCD)
3	Main grinding wheelhead	Cross (Z axis), Vertical (Y axis)
4	Universal grinding wheelhead	Cross (W axis), Vertical (V axis), Universal (A axis)
5	Table	Longitudinal temporary axis (X-axis : Option)
6	Simultaneously controlled axes	2 axes (Manual 2 axes)
7	Manual option angle feed	±30° ±45° ±60°
8	Interpolation	Positioning, (Simultaneously 2 axes), Linear, Free angle, Circular 0° ~ 360° circle
9	Minimum increment	Z, Y, W, V axis : 0.0001mm A axis : 0.001° X axis : (Option) 0.05mm
10	Tape memory	320m (customer area)





## Standard accessories

1	Wheel adaptor for horizontal wheelhead	1	11	Dresser tand with diamond tool (3 directions $-45^{\circ}$ , $0^{\circ}$ , $+45^{\circ}$ )	1
2	Wheel adaptor for universal wheelhead	1	12	Slideway automatic oil charge device (include oil tank for table)	1
3	Grinding wheel for horizontal wheelhead $\phi 610 \times 150 \times \phi 304.8 \text{mm}$	1	13	Working light	1
4	Grinding wheel for universal wheelhead $\phi 510 \times 50 \times \phi 127 \text{mm}$	1	14	Spark-out device (1~ 16 times)	1
5	Necessary tools (include hook for lifting wheel)	1	15	Traverse grinding (with Automatic dressing and automatic dress compensation system)	1
6	NC unit : FANUC 15MB 5 axes (simultaneously 2 axes)	1	16	Automatic dressing for horizontal wheel (Dress speed, Dress infeed NC program)	1
7	Oil pressure unit with automatic oil temperature regulator	2	17	Automatic dressing for universal wheel (Dress speed, Dress infeed NC program)	1
8	Crossrail lifting clamp device	1	18	Universal wheel guard with automotic universal device	1
9	Auto circuit breaker with buzzer (Work in cycle cessation)	1	19	Coolant nozzle for table	1
10	Inverter for universal wheel spindle	1	20	NC automatic universal device for wheelhead	1

## Optional accessories

1	Spare wheel adaptor (for horizontal wheel and dynamic balance)	11	Manual pulse interrupt device
2	Spare wheel adaptor for universal wheel	12	Tape memory length and edit 1280m
3	Horizontal spindle dynamic wheel balancing system	13	Calender timer
4	Grinding wheel balancing system with universal wheelhead adaptor (Max. OD wheel $\phi 510 \text{mm}$ )	14	Automatic circuit breaker
5	Horizontal grinding wheel $\phi 610 \times 100 \times \phi 228.6 \text{mm}$ or $\phi 610 \times 150 \times \phi 304.8 \text{mm}$	15	Signal tower, 3 color Green : Cycle Yellow : Cycle stop Red : Alarm
6	Universal grinding wheel $\phi 510 \times 50 \times \phi 127 \text{mm}$ or $\phi 610 \times 50 \times \phi 250 \text{mm}$	16	Horizontal spindle motor capacity up 22kW 4P Y- $\Delta$ start up
7	Temporary NC control unit for table logitudinal direction HEIDENHAIN scale for table logitudinal direction Add 1 axis of NC control axis , and is total axis number 6 axes. Vertical axis : Simultaneous 2 axes for V axis and Y axis Control programming travel	17	Universal spindle motor capacity up 11kW 4P Invertor
8	Oil static pressure spindle bearing for horizontal spindle bearing Oil pressure unit for automatic oil temperature regulator (with pressure interlock circuit)	18	Dressing device Manual vertial travel type Dressing range 560mm~760mm from table top
9	Coolant system with separator Tank capacity : 1500 $\ell$ , 1700 $\ell$ , 1900 $\ell$ , filler type 3,000 $\ell$ Separator disposal capacity 180 $\ell$ /min. Coolant pump 1.5kW (100 $\ell$ /min) , 0.75kW (60 $\ell$ /min) X2sets, 0.18kW 0.2kW 2 sets With automatic water temperature regulator	19	Block for dressing devicce (Please inform the height of installation side)
10	Coolant system with separator and paper filter Paper filter disposal capacity 180 $\ell$ /min Other category is same as No.9	20	Spare diamond tool
		21	Specified machine color (Please supply No. of MUNSEL or sampel color)
		22	GRIND-X hydraulic oil (1100 $\ell$ , 1300 $\ell$ , 2000 $\ell$ )
		23	GRIND-X grinding fluid 20 $\ell$ Water-soluble type
		24	Crossrail equilibrium adjustment
		25	Order made accuracy for longitudinal axis
		26	Order made accuracy for crossrail vertical axis

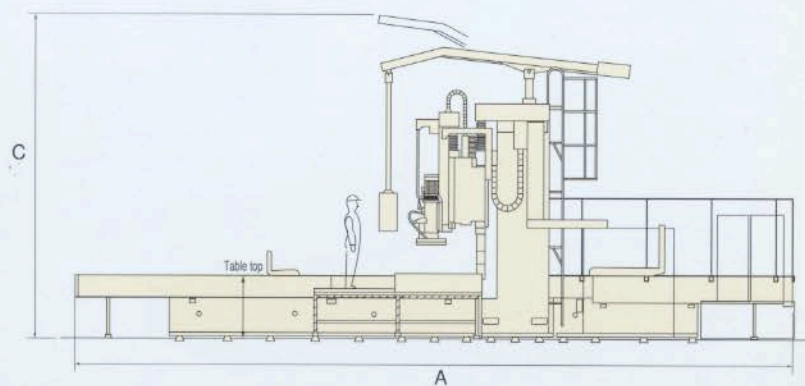
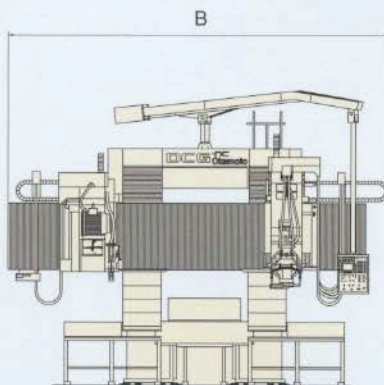
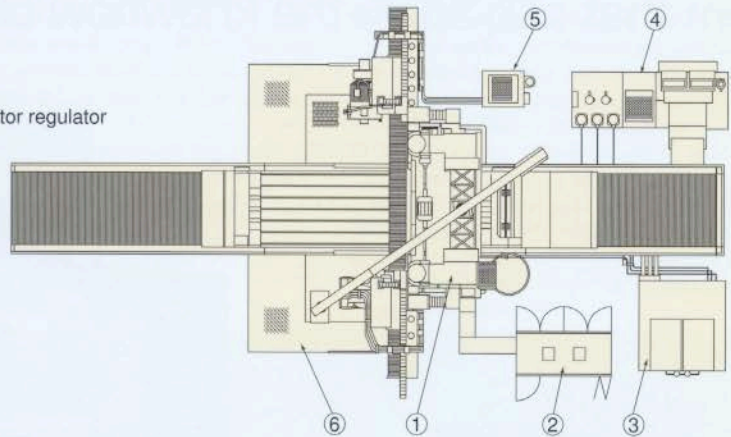
※ As for a installation foundation work, these is specied construction.  
Please conduct the construction in your factory.



# Travelling Crossrail Type DCG-NC Series

## external view

- ① Main body
- ② Control box
- ③ Oil pressure unit with automatic oil temperature regulator
- ④ Coolant system (Option)
- ⑤ Oil pressure unit for static pressure with automatic oil temperature regulator
- ⑥ Bench



	4015NC	6015NC	8015NC	10015NC	4020NC	6020NC	8020NC	10020NC
A	13400	17500	21700	26500	13400	17500	21700	26500
B	7900				8400			
C	5900				6100			



DCG-4020NC



# Pursuit for high performance and precise grinding of

Capable with large size surface-grinding of the workpiece more than 800mm wide. Easy operation by conversational input system that can apply the knowhow of abundant surface-grinding.



**PSG-2015CHNC**

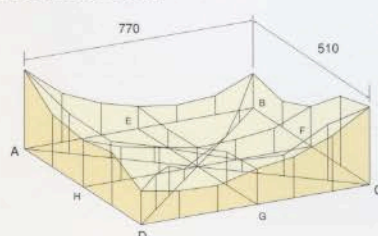
※This picture contains optional accessories.

## PSG-CHNC series

-2010CHNC   -3010CHNC  
 -2015CHNC   -3015CHNC   -4015CHNC  
 -3020CHNC

### Grinding example

Flatness data



Max Peak : 2.6  $\mu$ m at AB 0  
 (Measuring range 770x510)

### Grinding condition

Wheel	Size	$\phi$ 510X100X $\phi$ 203.2mm
	Name	GRIND-X wheel
Dress	Method	Tabletop dresser
	Grinding fluid	GRIND-X grinding fluid
Grinding method	Crisscross (continuous feed grinding)	
Setting method	Permanent electro magnetic chuck	



### Wide-size workpiece

- A double column type and high rigidity structure is suitable for large workpiece exceeding 800mm wide and high precision and high perform efficiency grinding of machine parts.
- The continuity uninhabited grinding operation of different maximum eight kinds of workpiece in cross direction be possible.
- By electric automatic dynamic balancing apparatus (option), adjustment of grinding wheel balance can be done simply and just in time on the machine. And there is no balance change even if it stops, therefore the work reopening is reliable.

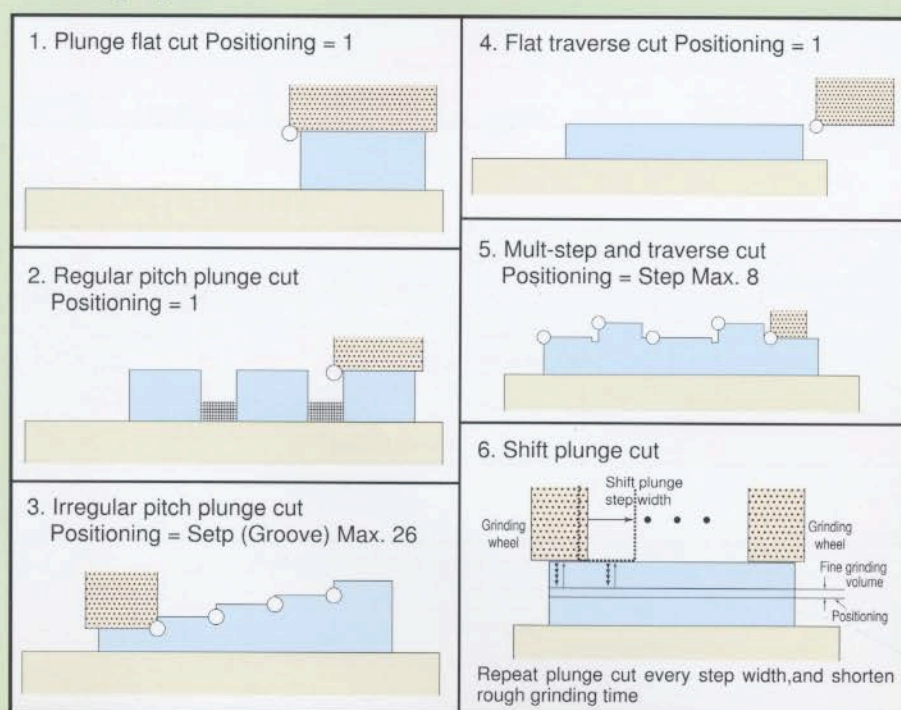
### High precision specification

- V-V guideway is adopted to table longitudinal slide way, and prepares highly precise scraping finish as an option.
- Adopted ultra precise angular ball bearing for wheel spindle bearing. Hydro-static spindle bearing is also available as an option.
- Automatic oil temperature regulator is equipped as standard, and is countermeasure to heat displacement of machine body.

### Easy operation

- Built-in program of all automatic cycle from grinding to dressing
- [Form] [Flat] [Form /Regular pitch] [Form / Irregular pitch] [Convination] are equipped as a standard grinding pattern, and automatic cycle is ready for only input grinding data and dressing condition with conversational input.
- In the rough grinding cycle, grinding allowance is ground efficiently with shift plunge cut grinding cycle.
- Input the positioning for wheel stroke with teaching
- Input the positioning with teaching by table proceed position recognition system (During grant application)

### Grinding cycle



option panel

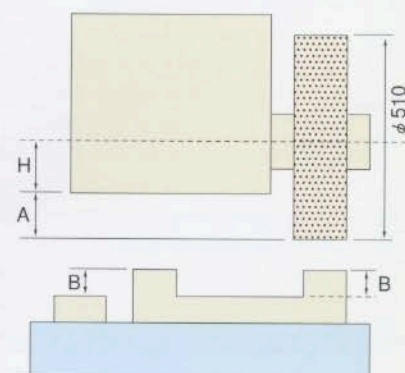
※ This picture contains option.

### Space-saving specification

- Arrange control unit, hydraulic pressure device and coolant unit suitably in order to use installation required space effectively. As space-saving type, oil temperature regulator is installed on oil pressure tank unit. (See external view)

### Cost reduction of grinding wheel

- Ensure the step depth of groove grinding and step grinding in 100mm or more by maximum wheel overhanging depth 115mm in O.D.  $\phi$  510mm grinding wheel. Reduce approx. 35% cost, when change from O.D.  $\phi$  610mm to O.D.  $\phi$  510mm of grinding wheel.



H : 140mm  
A : max 115mm  
A > B



## Machine specification

			1000series				1500series	
			1510CHNC	2010CHNC	2510CHNC	3010CHNC	2015CHNC	3015CHNC
Work*1	Max. grinding size	mm	1500X1050	2000X1050	2500X1050	3000X1050	2000X1550	3000X1550
	Max. grinding height	mm	700					
	Max. pass width	mm	1300					1800
Table*2	Working size	mm	1550X1050	2050X1050	2550X1050	3050X1050	2050X1550	3050X1550
	Table load capacity	kg	3450	4600	5750	6900	5400	8100
	Chuck weight	kg	1170	1560	1950	2340	2360	3540
Longitudinal	Max. travel	mm	1750	2250	2750	3250	2250	3250
	Table speed	m/min	2~30					
Cross	Max. travel	mm	1170					1670
	Rapid feed rate	mm/min	5000					
Vertical	Max. travel	mm	740					
	Rapid feed rate	mm/min	1500					
Wheelhead	Wheel size (Option)	mm	φ 510 ( φ 610 ) X100X φ 203.2					
	Spindle speed (Option)	min <sup>-1</sup>	980/980 (850/850)					
	Spindle motor (Option)	kW	22					
Weight		kg	17000	18500	19500	21000	21500	24500

\*1 without chuck condition \*2 including chuck

## NC unit specification

1	NC Unit	FANUC 21iMB	7	Tape memory length	320m	
2	No. of control axis	2 axes (CRT character display 10.4 inch color LCD)	8	Grinding program conversational software	Grinding mode	Grinding pattern
3	Spindle axis	Cross (Z-axis), Vertical (Y-axis)			1. Plunge cut grinding	1. Plunge flat
4	Simultaneous control	2 axes (manual by 1 axis)			2. Crisscross grinding	2. Regular pitch
5	Interpolation	Positioning (Simultaneously 2-axes ) Linear interpolation (Circular interpolation)			3. Step grinding	3. Irregular pitch
					4. Shift plunge cut (for rough grinding)	4. Flat grinding
6	Minimum increment	0.0001mm		5. Step grinding (Multi-flat traverse)		
					Grinding and table dressing automatic cycle	
					Interrupt dressing	

## Standard accessories

1	Grinding wheel adaptor	1	7	Tabletop dresser (with 3 pcs of diamond tool)	1
2	GRIND-X wheel ( φ 510x100x φ 203.2)	1	8	NC Unit FANUC 21iMB	1
3	Foundation plate or Anchor bolt	1	9	Conversational software	1
4	Necessary tools (with tool box)	1	10	Table full wide shower coolant system and pump	1
5	Working light	1	11	Manual pluse interruption device	1
6	Lifting bolt for grinding wheel adaptor	1			

## Optional accessories

1	Coolant system with magnetic dust separator	17	Oil static pressure spindle (include oil static pressure unit with oil temperature regulator)
2	Coolant system with magnetic dust separator and temperature regulator	18	Automatic circuit breaker
3	Coolant system with magnetic dust separator and paper filter attachment	19	Singal tower (3 color)
4	Coolant system with magnetic dust separator, paper filter and temperature regulator	20	Block for tabletop dresser (Please inform the height of installation side)
5	Electro-magnetic chuck for 1510CHNC 1000x500mm x 3 pcs	21	Calender timer
6	Electro-magnetic chuck for 2010CHNC 1000x500mm x 4 pcs	22	Spare diamond tool
7	Electro-magnetic chuck for 2510CHNC 1000x500mm x 5 pcs	23	Specified machine color painting
8	Electro-magnetic chuck for 3010CHNC 1000x500mm x 6 pcs	24	GRIND-X hydraulic oil 600L
9	Electro-magnetic chuck for 3020CHNC 2000x500mm x 6 pcs	25	Spindle oil for Oil static pressure spindle bearing 80L
10	Electro-magnetic chuck for 2015CHNC 1500x500mm x 4 pcs	26	GRIND-X grinding fluid 20L
11	Electro-magnetic chuck for 3015CHNC 1500x500mm x 6 pcs	27	Order made accuracy for longitudinal axis
12	Electro-magnetic chuck for 4015CHNC 1500x500mm x 8 pcs	28	Large size of wheel guard (for φ 610)
13	Automatic demagnetizing controller for electro-magnetic chuck	29	Spindle speed controller (Inverter)
14	Automatic dynamic balancing appartus (full auto.) [Electric balance weight travel type]	30	Table T groove grinding (Size of T groove and pitch are Okamoto standard)
15	Grinding wheel adaptor for auto. dynamic balancing apparatus	31	Pendant type operation panel
16	Permanent electric magentic chuck and demagnetizing controller		

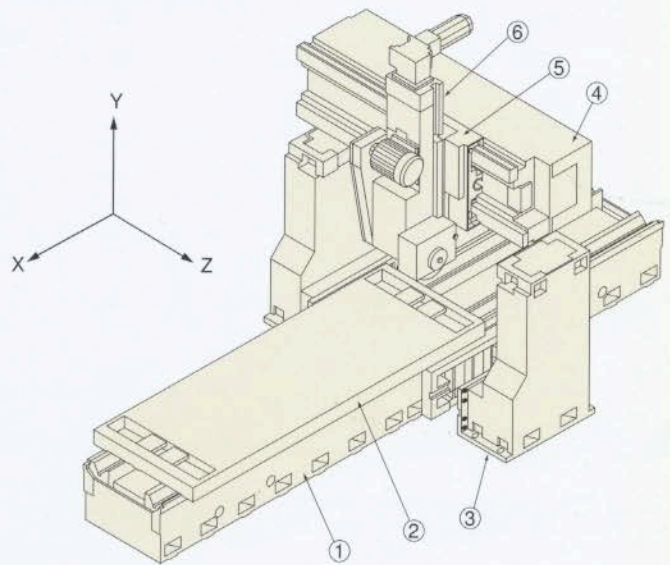


# Stationary Crossrail Type PSG-CHNC Series

	2000
4015CHNC	3020CHNC
4000X1550	3000X2000
	2300
4050X1550	3050X2050
10800	6300
4720	4910
4250	3250
	2170
28000	27000

## Structure and name of axis

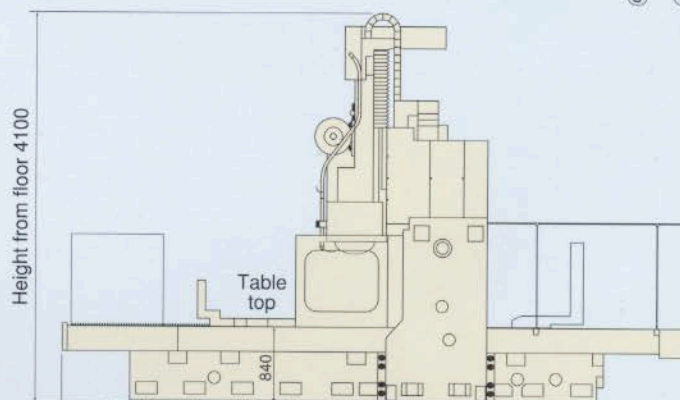
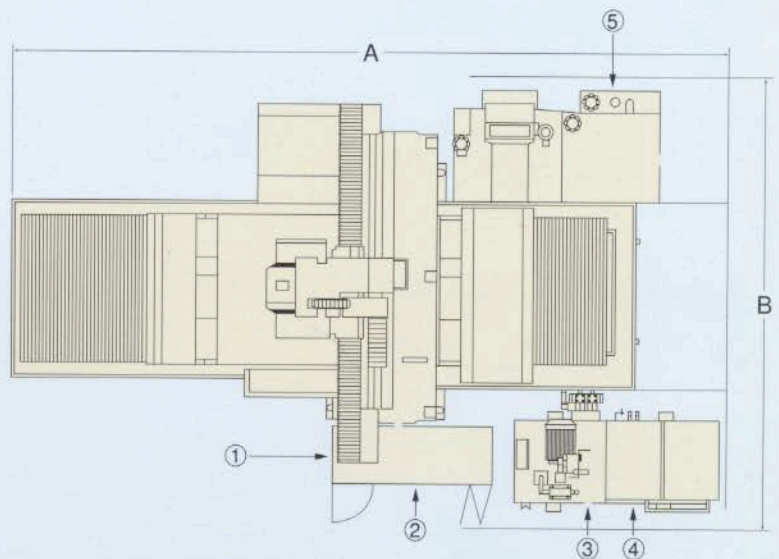
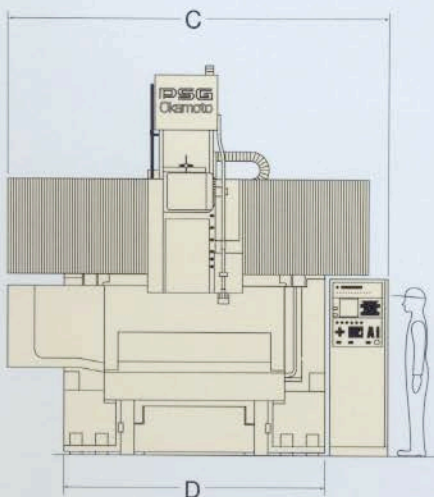
- ① Bed
- ② Table
- ③ Column
- ④ Crossrail
- ⑤ Saddle for horizontal axis
- ⑥ Wheelhead for horizontal axis



## External view

	1000series				1500series			
	1510	2010	2510	3010	2015	3015	4015	
A	7500	7300	7850	8650	7300	8650	10950	
B	4100				4600			
C	3450				3950			
D	2150				2670			

- ① Operation panel
- ② Electrical box
- ③ Hydraulic unit
- ④ Hydraulic oil temperature regulator
- ⑤ Coolant system (Option)



# GRIND-X

OKAMOTO · PRECISION · SYSTEMS

**Okamoto**

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URL: <http://www.okamoto.co.jp>

CNC Column Type Precision Surface Grinding Machine



PSG-125DXNC

CNC Ultra Precision Surface Grinding Machine



UPG-63NC

NC Saddle Type Precision Surface Grinding Machine



PSG-84EX

CNC Ultra Precision Form Grinding Machine



CNC-525R



### CAUTION

\*When and before using our products, you are requested to well go through the articles on danger, warning and attention for the sake of safety described in operation manual attached to the machine and also in the warning plates mounted on the machine.

\*Specifications subject to change without notice.

Printed in Japan.

2005041000 ASP-1