- **CNC series (B or B+H)**
  - RC-12CNC
  - RC-18CNC
  - RC-20CNC
  - RC-1812CNC
- **NC series**
  - RC-12NC
  - RC-18NC
  - RC-20NC
  - RC-1812NC
- **H series**
  - RC-18H
  - RC-20H
- **B series**
  - RC-12B
  - RC-16B
  - RC-18B
  - RC-20B
  - RC-1812B
- **S series**
  - RC-12S
  - RC-18S
- **Economical series**
  - RC-12
  - RC-18
  - RC-20
  - RC-1812

榮光機械股份有限公司

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JUL. 2017

PARAGON since 1968

www.paragoncnc.com

Unparalleled, Choice CNC Grinding Solutions

Centerless Grinding Machines

CNC Series
NC Series
H Series (Hydrostatic Bearing G.W.)
B Series (Ball and Roller Bearing R.W.)
S Series (Hydrodynamic Bearing R.W.)
E Series

CENTERLESS GRINDING MACHINE
CNC/NC SERIES

Advanced Design Concept
CNC/NC Centerless Grinding Machines

Every PARAGON centerless grinding machine is designed and manufactured based on the following management concepts: “Application of the newest technology and innovation” , “Endless improvement and progress” and “Customer satisfaction with accuracy and quality”.

The CNC series centerless grinding machines can be used for infeed grinding and thrufeed grinding to ensure accuracy and high productivity in workpieces with diameters between 1 mm and 50 mm.

The NC series centerless grinding machine features regulating wheel with ball and roller bearing and achieves 0.1μm grinding precision. The regulating wheel can rapidly approach workpiece and then speed down while initiating grinding. The grinding wheel comes with hydrostatic or hydrodynamic bearings for selection, and auto loading and unloading device is optional.

Example of Grinding Workpieces

Controller
FANUC(CNC)/MITSUBISHI(NC)

- ✓ Minimal removal amount comes to ±0.0001mm, and the rotational speed of servo motor reaches a minimum of 0.01mm/min while resolution achieves 0.0001mm.
- ✓ Equipped with infeed compensation and dressing position memory function, after power failure or restart, there is detection of safety position to avoid clashes between wheel and dresser.
- ✓ Dynamic adjustment in infeed speed during grinding operation.
- ✓ Compensation in workpiece dimension is dynamically corrected by adjusting the offset value.
- ✓ Manual Pulse Generator (MPG) hand wheel is used for easy tuning of the contact point between workpiece and grinding wheel.
- ✓ CNC - Complex mechanical machining can be programmed with high flexibility.
- ✓ NC - Parameterized and simplified conversational interface that is easy for configuration.

Applicable Industries:

- Aerospace parts
- Medical applications
- Precision bearings
- High precision machine parts
- Hydraulic & Pneumatic systems
- Electrical / Electronic equipments
- Automotive & motorcycle parts,etc...
- Cutting tools

Unparalleled Quality Assurance and Control

The systematic development, production and assembly are carried out in a process oriented manner and in strict compliance with ***ISO 9001*** directives.

PARAGON's Q.C. staff conducts rigorous quality control throughout the entire manufacturing process brfore shipment. Our quality control process includes:

a) Strict Incoming Materials Inspection.

b) Geometric Accuracy Inspection.

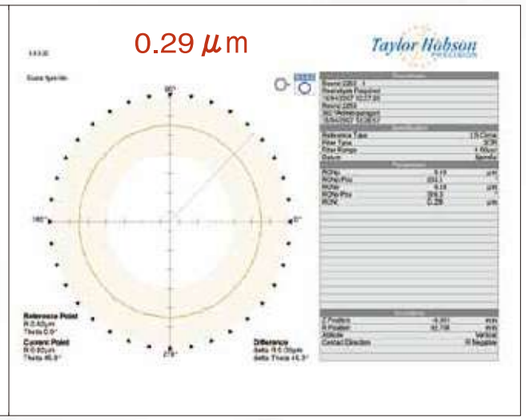
c) Unloaded Spindle Test.

d) Grinding Test.

Quality Assurance

Over and Over Again, PARAGON's Dedication to Quality Wins Customer's Satisfaction And Loyalty.

In order to produce the highest quality & value-added products, PARAGON has invested a great amount in purchasing up-to-date and sophisticated automatic manufacturing equipments and measuring devices, including a CNC Horizontal Machining Center, Roundness Measuring Instrument, Roughness Measuring Instrument, Coordinate Measuring Machine, etc., and a nearly 23,000 square meter air conditioned plant, all of which is to provide a controlled environment and to improve the quality assurance.



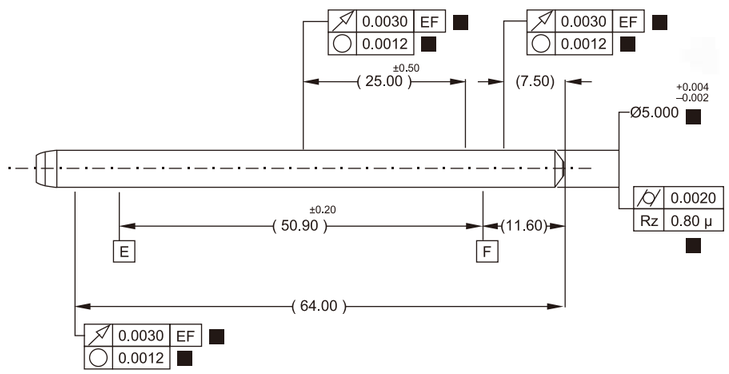
Roundness Measuring Instrument

Contour / Roughness

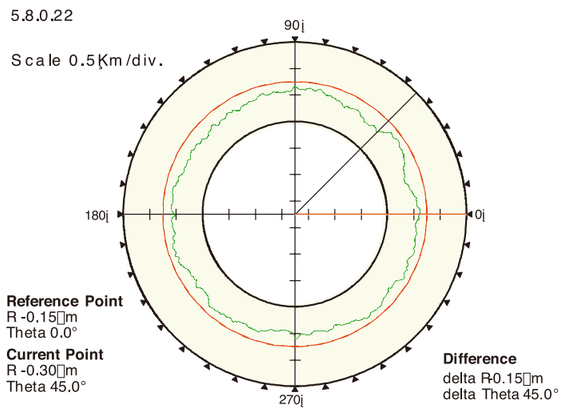
Coordinate Measuring Machine

PARAGON

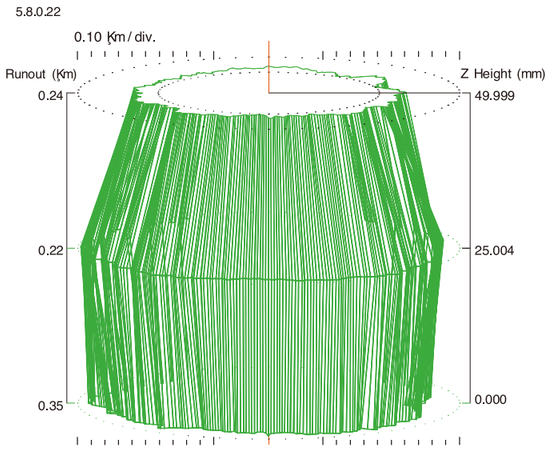
Grinding Test Report



- **KENNGROESSEN**
  PROGRAMM P1
  Rmax 0.72 µm
  Rz 0.47 µm
  Ra 0.040 µm
- **KENNGROESSEN**
  PROGRAMM P1
  Rmax 0.71 µm
  Rz 0.46 µm
  Ra 0.041 µm
- **KENNGROESSEN**
  PROGRAMM P1
  Rmax 0.86 µm
  Rz 0.43 µm
  Ra 0.038 µm



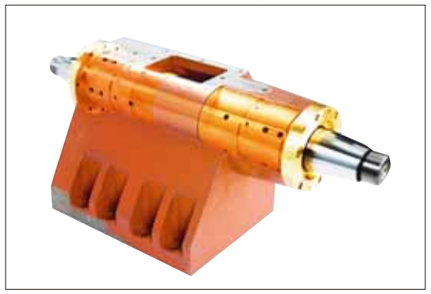
Cylinder Plane		
Cylinder-SHRIRAM-1-U		
Reanalysis Required		
10/06/2008 13:54:59		
Cylinder 330-03		
360°/Admin/PARAGON		
10/06/2008 13:54:46		
Specification		
Reference Type		LS Cylinder
Filter Type		2CR
Filter Range		1-50upr
Datum		Self
Parameters		
RONp	-0.09	µm
RONp Pos	89.9	°
RONv	0.33	µm
RONvPos	16.0	°
RONt	0.24	µm
Runout	0.24	µm
Conditions		
Zposition	49.999	mm
Rposition	56.919	mm
Attitude		Vertical
Contact Direction		R Negative



Cylindricity		
Cylinder-SHRIRAM-1		
CYL / LS Cylinder / 2CR / 1-50upr		
10/06/2008 13:54:59		
SHRIRAM		
10/06/2008 13:54:46		
Specification		
Reference Type		LS Cylinder
Filter Type		2CR
1-50upr		
Datum		Self
Number Of Planes	3	
Parameters		
CYLt	0.59	µm
Total Runout	0.59	µm
Conditions		
Vertical		
Contact Direction		R Negative

GRINDING WHEEL SPINDLE BEARINGS

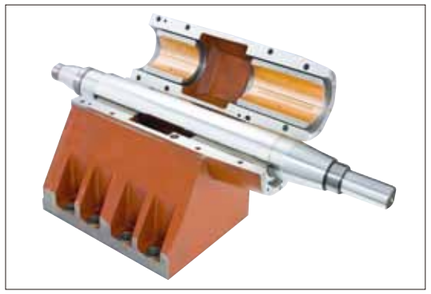
Hydrostatic Bearing Series (H series)



Unique Design

Hydrostatic bearings of the grinding spindle are surrounded by high pressure oil film, eliminating metal-to-metal contact, overheating, no oil leakage since no oil seals are utilized, providing less power consumption, high rigidity and high vibration damping performance.

Economical Series



Fine hand scraped hydrodynamic bearings made of steel and phosphor bronze alloy with oil lubrication, firmly maintain grinding spindle high precision rotation and rigidity to stand heavy duty grinding in a minimum gap.

Centerless Grinding Machine Configuration Table

Model	G.W. spindle	R.W. spindle	R.W. Transmission system
E series	Hydrodynamic bearing	Hydrodynamic bearing	Finite variable speed change (Gear box)
S series	Hydrodynamic bearing	Hydrodynamic bearing	S infinite variable speed change (servo motor+speed reducer+chain)
NC1 series	Hydrodynamic bearing	Hydrodynamic bearing	S infinite variable speed change (servo motor+speed reducer+chain)
NC2 series	Hydrodynamic bearing	Ball and roller bearing (dual-end support)	Infinite variable speed change (servo motor+worm and worm gear)
B series	Hydrodynamic bearing	Ball and roller bearing (dual-end support)	Infinite variable speed change (servo motor+worm and worm gear)
H series	Hydrostatic bearing	Ball and roller bearing (dual-end support)	Infinite variable speed change (servo motor+worm and worm gear)
CNC series	Hydrodynamic bearing	Ball and roller bearing (dual-end support)	Infinite variable speed change (servo motor+worm and worm gear)

Model	E/S series	B series	H series
Roundness	< 1.5 μm	< 1.0 μm	< 0.5 μm
Cylindricity	< 2.0 μm	< 1.5 μm	< 1.0 μm

Note:the precision data is based on test grinding of standard bar workpiece, precision varies according to defects in workpiece shape.

REGULATING WHEEL SPINDLE BEARINGS

Ball And Roller Bearing Series (B series)

No Flange, No Deflection

The innovative advanced regulating wheel spindle does not require a flange and utilizes precision angular contact bearings, and ball and roller bearings with dual-end supports that firmly maintain spindle super precision rotation and rigidity.

G.W. Spindle Comparison Chart (for high-speed)

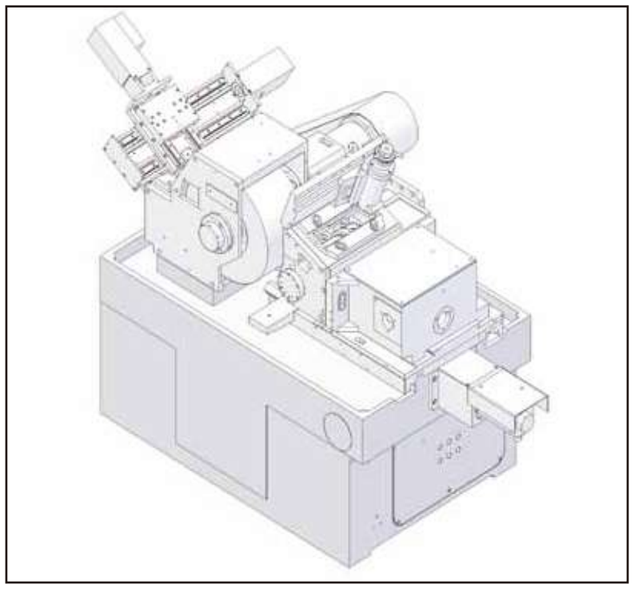
PARAGON	Hydrodynamic bearing	Hydrostatic bearing (H)
Friction coefficient	0.001 - 0.008mm	< 0.001mm
Rotation speed	Medium speed	All types of speed, great stability is demonstrated specially in low and high speed
Loading capacity	General	High
Rotation precision	General	Good
Life-expectancy	Short	Above 10 years
Cost	-	Higher

R.W. Spindle Comparison Chart (for low-speed)

PARAGON	Hydrodynamic bearing	Ball and roller bearing (B)
Rotation speed	Medium speed	Low to medium speed
Rotation precision	Roundness and size are unstable during low speed	Maintains good roundness and stable size during low speed
Spindle support	Single-end support	Dual-end support
Friction coefficient	0.001 - 0.008mm	0.001 - 0.003mm
Type and size	No standardization	Standardized
Maintenance	Hard to adjust, complex and specific technical maintenance	Easy to adjust, durable, simple maintenance
Replacement cost	High	Medium
Cost	-	Higher

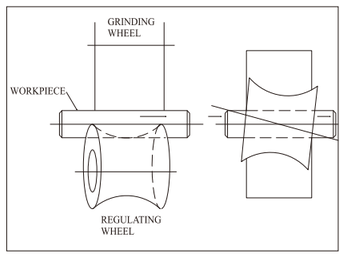
MACHINE BASE

New Structural Design Concepts



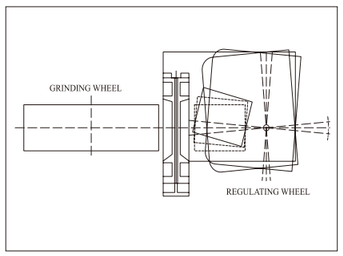
The machine base is manufactured from high quality Meehanite cast iron, low center of gravity, featuring rigidity over 10^8N/m and natural frequency over 150 Hz and analyzed by advanced Finite Element Method (FEM). Along with vibration stress release, these outstanding structural features assure high strength, maximum damping capability and longer service life.

The C1 class ballscrews feature hydrostatic lubrication, low friction coefficiency, and pretensioned for increased rigidity and high positioning accuracy, providing minimum feeding accuracy in 0.1μm (For CNC and NC Centerless Grinding Machine)



Regulating Wheel Dressing Unit

The angle of the regulating wheel dressing unit can be swiveled according to workpiece requirements in order to enhance accuracy.



Upper Slide

The upper slide can be rapidly and accurately swiveled up to ± 5 degrees for efficient grinding.

Guideways

- Machine Base has extra wide V guideways with great span in between and high frequency hardened surfaces, exhibiting outstanding stability during grinding operation.
- In combination with fine hand scraped slideways, the axis movement guarantees high accuracy and maximum durability.

Precision Spindles

Both grinding wheel and regulatng wheel spindles are made of high quality alloy steel (SNCM-439) and treated through: normalized, tempered, carburized hardening and then sub-zero treatment Then follows the precision grinding process: rough grinding, semi-finish grinding, finish grinding and lapping. The lapping process assures superior surface finish and greatly enhances spindle life and stability guaranteeing deformation free performance throughout its durable service life.

ACCESSORIES

Convenient Control & Customized Automation

Pressure Switch (Standard)

Safety feature integrated with grinding wheel spindle lubrication system so that the spindle motor won't rotate until pressure is reached. This prevents the spindle from dry running and getting damaged.

Dresser for Regulating Wheel and Grinding Wheel (Standard)

The dressing unit is hydraulic traversed, with adjustable speed. Dressing slides are made of special alloy cast iron and hand scraped.

Regulating Wheel Servo Motor (S, B and H Series)

Provides infinite variable speed change. This can reduce vibration during grinding and consequently achieve the best results.

Rotary-type Dressing Unit (Optional)

Two type of Rotary Dressing Unit can be supplied. One type is with small diamond wheel for dressing of normal grinding wheel. Another type is with small aluminum oxide wheel for truing the surface of new diamond grinding wheel to enhance grinding accuracy.

Automatic Loading and Unloading Attachment(optional)

Fully automatic grinding operation that saves labor while enormously upgrading production efficiency.

Inverter for Grinding Wheel Spindle

Multi-step variable speed change in the G.W. allows easy testing to enhance grinding efficiency and precision level. When G.W. is wearing out, it maintains constant peripheral speed, cutting efficiency and surface precision through the controller. Gradual activation and halt avoid affecting life-expectancy of hydrostatic spindle and eliminate strident noise caused by belt.

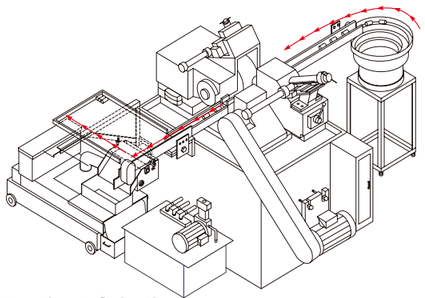
Electric Cabinet Air Cooler (Optional)

Automatic Lubricator for Guideways and Ballscrews (Optional)

Heidenhain Linear Scale (Optional)

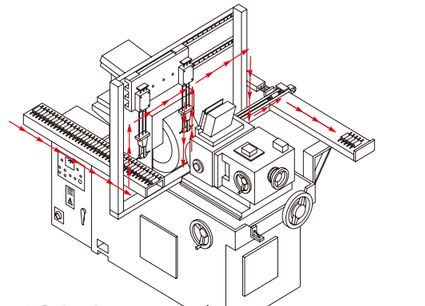
Automatic Infeed Attachment (Optional)

AUTOMATIC GRINDING PROCESS



Thrufeed Grinding

To meet increasing demands for Automation, various auto. Loading & unloading attachments can be designed for thrufeed grinding of round tubes, shafts and bars. The attachment is suitable for mass production. With the attachment, dependence on operator and production cost can be reduced consequently. This fully automatic attachment is a great help for increasing production volume.

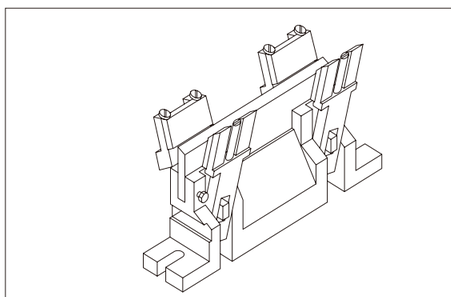


Infeed Grinding

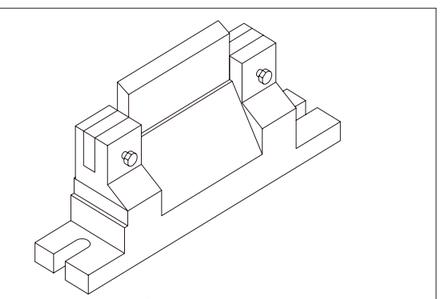
For components with heads, shoulder and multi diameters, different types of auto loading & unloading attachment for infeed grinding can be designed according to different shape and length of component. This fully automatic attachment can not only reduce operator error and save labor cost but also enhance production efficiency.

Selection Table of Blade

Workpiece Dia.	Carbide Blade Thickness	Workpiece Dia.	Carbide Blade Thickness
1.5-2.5mm	1mm	8-10mm	6mm
2.6-4mm	2mm	10-16mm	8mm
4-5mm	3mm	12-20mm	10mm
5-7mm	4mm	15-30mm	12mm
7-8mm	5mm	25mm up	20mm



Thrufeed Work Rest



Infeed Work Rest

H Series (Hydrostatic Bearing G.W.)

Specifications:

Model	Unit	RC-18H	RC-20H
Grinding range (dia.)	mm	2-50	2-50
Grinding wheel size (dia. x width x hole)	mm	455 x 205 x 228.6	510 x 205 x 304.8
Regulating wheel size (dia. x width x hole)	mm	280 x 205 x 139.7	305 x 205 x 177.8
Grinding wheel speed (Peripheral Speed)	m / min	2700	2700
Regulating wheel speed	R.P.M	10-300	10-300
Grinding wheel motor	kw	11.3	15
Regulating wheel motor (servo motor)	kw	1.8	2.9
Hydraulic pump motor	kw	0.75	0.75
Coolant pump motor	kw	0.19	0.19
Upper slide feed graduation	mm	3.5 (Rev.) 0.05 (Gra.)	3.5 (Rev.) 0.05 (Gra.)
Upper slide micro feed graduation	mm	0.1 (Rev.) 0.001 (Gra.)	0.1 (Rev.) 0.001 (Gra.)
Lower slide feed graduation	mm	10 (Rev.) 0.05 (Gra.)	10 (Rev.) 0.05 (Gra.)
Lower slide micro feed graduation	mm	0.2 (Rev.) 0.001 (Gra.)	0.2 (Rev.) 0.001 (Gra.)
Dressing device graduation	mm	2 (Rev.) 0.01 (Gra.)	2 (Rev.) 0.01 (Gra.)
Regulating wheel tilt angle	deg.	±5°	±5°
Regulating wheel swivel angle	deg.	±5°	±5°
Machine dimension (WxDxH)	mm	2,450 x 2,050 x 1,600	2,650 x 2,150 x 1,600
Machine weight	kg	3,100	3,800

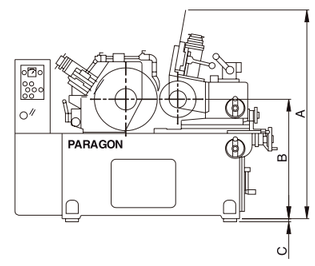
Economical / S / B Series (Ball and Roller Bearing R.W.)

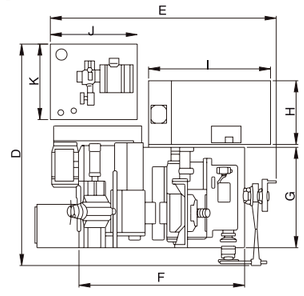
Specifications:

Model	Unit	RC-12 / RC-12B / RC-12S	RC-16B
Grinding range (dia.)	mm	1-30	2-40
Grinding wheel size (dia. x width x hole)	mm	305 x 150 x 120	405 x 205 x 203.2
Regulating wheel size (dia. x width x hole)	mm	205 x 150 x 90 230 x 150 x 127 (B series)	280 x 205 x 139.7
Grinding wheel speed (Peripheral Speed)	m / min	2000	2000
Regulating wheel speed	R.P.M	21-300 (7 steps) / 10-300 (B/S series)	10-300
Grinding wheel motor	kw	5.63	7.5
Regulating wheel motor	kw	0.75 / 1.3 (servo motor B/S series)	1.8 (servo motor)
Hydraulic pump motor	kw	0.75	0.75
Coolant pump motor	kw	0.09	0.19
Upper slide feed graduation	mm	3.5 (Rev.) 0.05 (Gra.)	3.5 (Rev.) 0.05 (Gra.)
Upper slide micro feed graduation	mm	0.1 (Rev.) 0.001 (Gra.)	0.1 (Rev.) 0.001 (Gra.)
Lower slide feed graduation	mm	10 (Rev.) 0.05 (Gra.)	10 (Rev.) 0.05 (Gra.)
Lower slide micro feed graduation	mm	0.2 (Rev.) 0.001 (Gra.)	0.2 (Rev.) 0.001 (Gra.)
Dressing device graduation	mm	1.25 (Rev.) 0.01 (Gra.)	1.75 (Rev.) 0.01 (Gra.)
Regulating wheel tilt angle	deg.	±5°	±5°
Regulating wheel swivel angle	deg.	±5°	±5°
Machine dimensions (W x D x H)	mm	1,900 x 1,550 x 1,420	2,000 x 1,590 x 1,450
Machine weight	kg	1,700	2,400

B Series: The ball and roller bearings for R.W. spindle instead of hydrodynamic bearings and servo motor for R.W., providing infinitely variable speed.

Economical / S / B Series Machine Layout





Model	A	B	C	D	E	F	G	H	I	J	K
RC-12/12B/12S	1420	935	25	1550	1900	1030	630	540	730	550	450
RC-16B	1450	980	25	1590	2000	1210	810	650	800	550	450
RC-18/18B/18S	1600	990	25	1800	2300	1450	930	800	1200	680	550
RC-1812/1812B	1600	975	25	2100	2300	1445	1010	800	1200	680	550
RC-20/20B	1600	1035	25	2150	2500	1650	930	800	1200	680	550

Unit:mm

Specifications:

RC-18 / RC-18B / RC-18S	RC-1812 / RC-1812B	RC-20 / RC-20B
2-50	2-50	2-50
455 x 205 x 228.6	455 x 305 x 228.6	510 x 205 x 304.8
255 x 205 x 111.2 280x 205 x 139.7 (B series)	255 x 305x 111.2 305 x 305 x 177.8 (B series)	305 x 205 x 127 305 x 205 x 177.8 (B series)
2000	2000	2000
13-308 (10 steps) / 10-300 (B series)	13-308 (10 steps) / 10-300 (B series)	13-308 (10 steps) / 10-300 (B series)
11.3	15	15
1.5 /.1 8 (servo motor B series)	1.5 / 2.9 (servo motor B series)	1.5 / 2.9 (servo motor B series)
1	1	1
0.19	0.19	0.19
3.5 (Rev.) 0.05 (Gra.)	3.5 (Rev.) 0.05 (Gra.)	3.5 (Rev.) 0.05 (Gra.)
0.1 (Rev.) 0.001 (Gra.)	0.1 (Rev.) 0.001 (Gra.)	0.1 (Rev.) 0.001 (Gra.)
10 (Rev.) 0.05 (Gra.)	10 (Rev.) 0.05 (Gra.)	10 (Rev.) 0.05 (Gra.)
0.2 (Rev.) 0.001 (Gra.)	0.2 (Rev.) 0.001 (Gra.)	0.2 (Rev.) 0.001 (Gra.)
2 (Rev.) 0.01 (Gra.)	2 (Rev.) 0.01 (Gra.)	2 (Rev.) 0.01 (Gra.)
±5°	±5°	±5°
±5°	±5°	±5°
2,300 x 2,050 x 1,600	2,300 x 2,100 x 1,600	2,500 x 2,150 x 1,600
3,200	3,800	3,900

Design and specifications are subject to change without prior notice.

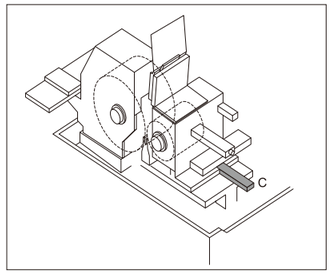
CNC Series / NC Series

Specifications:

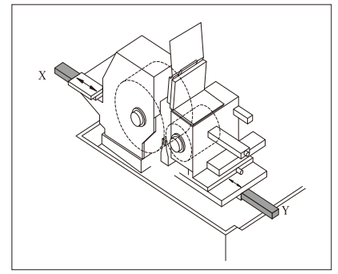
Model	Unit	RC-12CNC / NC	RC-18CNC / NC	RC-1812CNC / NC	RC-20CNC / NC
Grinding range (dia.)	mm	1-30	2-50	2-50	2-50
Grinding wheel size (dia. x width x hole)	mm	305 x 150 x 120	455 x 205 x 228.6	455 x 305 x 228.6	510 x 205 x 304.8
Regulating wheel size (dia. x width xhole)	mm	230 x 150 x 127	280 x 205 x 139.7	305 x 305 x 177.8	305 x 205 x 177.8
Grinding wheel speed (Peripheral Speed)	m / min	2000	2000	2000	2000
Regulating wheel speed	R.P.M.	10-300	10-300	10-300	10-300
Regulating wheel swivel angle	deg.	±5°	±5°	±5°	±5°
Regulating wheel tilt angle	deg.	±5°	±5°	±5°	±5°
Grinding wheel motor	kw	5.6	11.3	15	15
Regulating wheel motor (servo motor)	kw	1.3	1.8	2.9	2.9
Hydraulic pump motor	kw	0.75	0.75	0.75	0.75
Coolant pump motor	kw	0.09	0.19	0.19	0.19
Machine dimension (WxDxH)	mm	2,460 x 2,300 x 1,700	3,000 x 2,830 x 1,730	3,200 x 2,830 x 1,730	3,250 x 3,010 x 1,730
Machine weight	kg	2,100	4,200	4,500	4,800

CNC Series: The ball and roller bearings for R.W. spindle instead of hydrodynamic bearings and servo motor for R.W., providing infinitely variable speed.
3-6 axes for G.W.dressing, R.W. dressing and R.W. infeed compensation.
NC Series: 1-2 axes for G.W.dressing and R.W. infeed compensation.
Design and specifications are subject to change without prior notice.

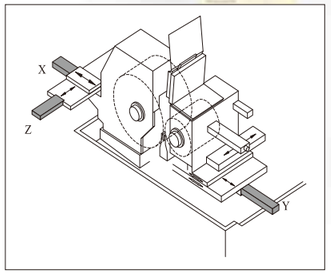
CNC Series
Axes Combination



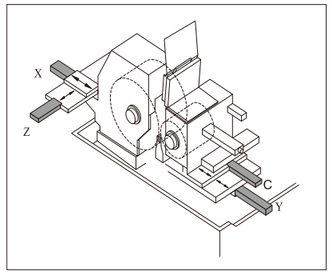
1 AXIS
Regulating wheel upper slide or lower slide auto Infeed



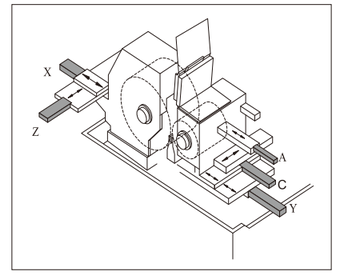
2 AXES
X: Grinding wheel auto dressing (vertical)
Y: Regulating wheel lower slide auto infeed and compensation.



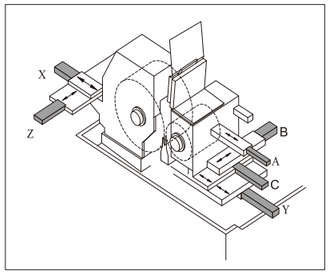
3 AXES
X: Grinding wheel auto dressing (vertical)
Z: Grinding wheel auto dressing (horizontal)
Y: Regulating wheel lower slide auto infeed and compensation.



4 AXES
X : Grinding wheel auto dressing (vertical)
Z : Grinding wheel auto dressing (horizontal)
C : Regulating wheel upper slide auto infeed
Y : Regulating wheel lower slide auto infeed and compensation.

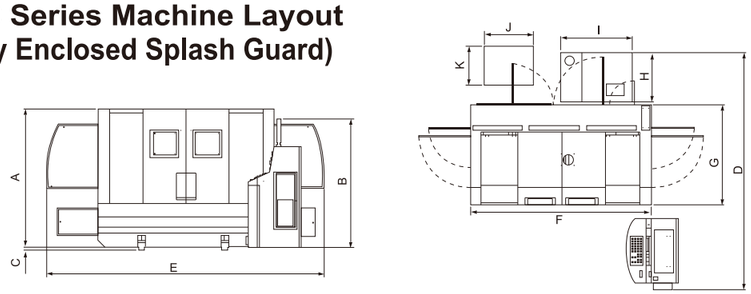


5 AXES
X : Grinding wheel auto dressing (vertical)
Z : Grinding wheel auto dressing (horizontal)
A : Regulating wheel auto dressing (horizontal)
C : Regulating wheel upper slide auto infeed
Y : Regulating wheel lower slide auto infeed and compensation.



6 AXES
X : Grinding wheel auto dressing (vertical)
Z : Grinding wheel auto dressing (horizontal)
A : Regulating wheel auto dressing (vertical)
B : Regulating wheel auto. dressing (horizontal)
C : Regulating wheel upper slide auto infeed
Y : Regulating wheel lower slide auto infeed and compensation.

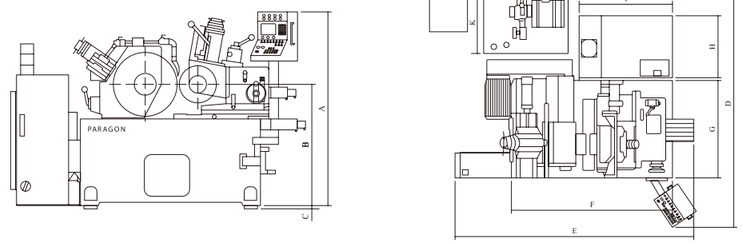
CNC Series Machine Layout (Fully Enclosed Splash Guard)



Model	A	B	C	D	E	F	G	H	I	J	K
RC-12CNC/NC	1715	1848	25	2922	3060	2000	1110	485	730	550	450
RC-18CNC/NC	1700	1848	25	3329	3780	2520	1325	700	1000	680	550
RC-1812CNC/NC	1998	1848	25	3417	3980	2520	1405	700	1000	680	550
RC-20CNC/NC	1850	1848	25	3386	4110	2850	1445	700	1000	680	550

Unit:mm

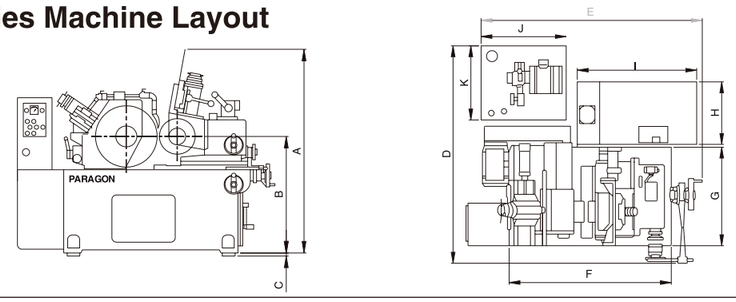
CNC / NC Series Machine Layout



Model	A	B	C	D	E	F	G	H	I	J	K
RC-12CNC / NC	1700	935	25	2300	2460	1030	630	485	730	550	450
RC-18CNC / NC	1730	990	25	2830	3200	1450	930	700	1000	680	550
RC-1812CNC / NC	1730	975	25	2830	3200	1445	1010	700	1000	680	550
RC-20CNC / NC	1730	1035	25	3010	3250	1650	930	700	1000	680	550

Unit:mm

H Series Machine Layout



Model	A	B	C	D	E	F	G	H	I	J	K
RC-18H	1600	990	25	2050	2450	1450	930	800	1200	680	550
RC-20H	1600	1035	25	2150	2650	1650	930	800	1200	680	550

Unit:mm

Centerless Grinding Machine

ACCESSORIES

	CNC Series	NC Series	H Series	B Series	Economical / S Series
Controller （FANUC/MITSUBISHI）	O	X	X	X	X
NC Controller (MITSUBISHI)	X	O	X	X	X
Inverter (Grinding Wheel)	△	△	△	△	△
Linear Scale for Upper Slide	△	△	△	△	△
Linear Scale for Lower Slide	△	△	△	△	△
Coolant Tank with Pump	O	O	O	O	O
Work Lamp	O	O	O	O	O
Tools + Kits	O	O	O	O	O
Wheel Flange Extractor	O	O	O	O	O
Oil Mist Separator	△	△	△	△	△
Paper Filter	△	△	△	△	△
Magnetic Coolant Separator	△	△	△	△	△
Hydrocyclone Coolant Separator	△	△	△	△	△
Automatic Lubricator	O	O	△	△	△
Electrical Cabinet Air Cooler	△	△	X	X	X
Electrical Cabinet Heat Exchanger	O	O	X	X	X
Wheel Balancing Stand & Arbor	△	△	△	△	△
Servo Motor for Regulating Wheel	O	O	O	O	(E)X / O(S)
Automatic Infeed Attachment	X	X	△	△	△
Automatic Loading Attachment for Infeed Grinding	△	△	△	△	△
Automatic Unloading Attachment for Infeed Grinding	△	△	△	△	△
Manual Workpiece Feeder for Infeed Grinding	△	△	△	△	△
Workpiece Ejector (Hydraulic / Air)	△	△	△	△	△
Unloading Attachment for Thrufeed Grinding	△	△	△	△	△
Auto. Loading Attachment for Thrufeed Grinding (Hopper Type)	△	△	△	△	△
Auto. Loading Attachment for Thrufeed Grinding (Vibratory Feeder)	△	△	△	△	△
Auto. Loading Attachment for Thrufeed Grinding (Magazine Type)	△	△	△	△	△
Supporter for Long Bar Grinding	△	△	△	△	△
Vibration Meter	△	△	△	△	△
Grinding Wheel	O	O	O	O	O
Grinding Wheel Flange	O	O	O	O	O
Regulating Wheel	O	O	O	O	O
Regulating Wheel Flange	X	X	X	X	O
Jig Crane for Grinding Wheel	△	△	△	△	△
Jig Hook for Grinding Wheel	△	△	△	△	△
Jig Hook for Regulating Wheel	△	△	△	△	X
Grinding Wheel Face Dressing Unit	△	△	△	△	△
Rotary-type Dressing Unit	△	△	△	△	△
Diamond Dresser	O	O	O	O	O
Hydraulic Tank with Pump	O	O	O	O	O
Hydraulic Oil Cooler	O	(H)O / △(B)	O	△	△
Fully Enclosed Splash Guard	△	△	△	△	△
Infeed Work Rest + Carbide Blade	O	O	O	O	O
Thrufeed Work Rest + V shape Front Supporter + Carbide Blade	O	O	O	O	O
Profile template (Grinding Wheel)	X	△	△	△	△
Profile template (Regulating Wheel)	△	△	△	△	△
Special Thrufeed Work Rest (Small Type)	△	△	△	△	△
Workpiece Pressor	O	O	O	O	O

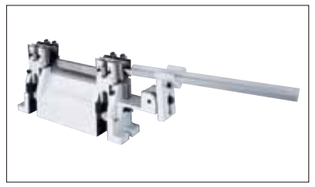
O Standard Equipment　△ Optional Equipment　X Not Applicable

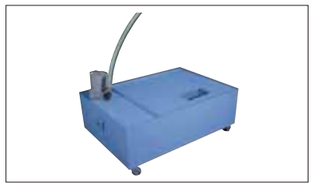
STANDARD ACCESSORIES:


Grinding Wheel + Flange


Regulating Wheel + Flange (B & H series don't use flange)


Infeed Work Rest 1set + Carbide Blade


Thrufeed Work Rest + V shape Front Supporter + Carbide Blade


Coolant Tank with Pump.


Hydraulic Tank with Pump


Diamond Tool for Truing


Hydraulic Cooling Fan


Work Lamp


Tools + Kits

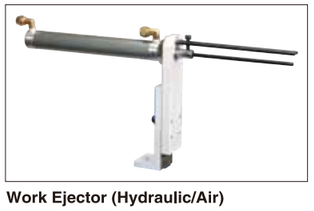

Wheel Flange Extractor


Workpiece Pressor

OPTIONAL ACCESSORIES:


Vibration Meter


Manual Work Feeder for Infeed Grinding


Work Ejector (Hydraulic/Air)


Oil Mist Separator


Jig Crane with Hook for Grinding Wheel


Grinding Wheel Face Dressing Unit

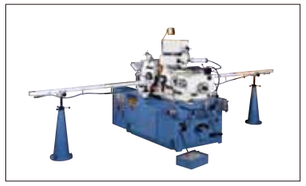
OPTIONAL ACCESSORIES:


Hydrocyclone Coolant Filter


Paper Filter


Magnetic Coolant Separator


Profile Template

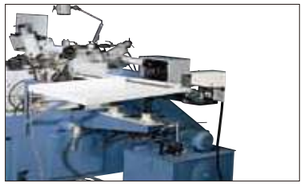

Supporter for Long bar Grinding


Hydraulic Oil Cooler


Rotary-Type Dressing Unit


Special Thrufeed Work Rest (Small Type)


Wheel Balancing Stand & Arbor


Auto. Unloading Attachment for Thrufeed Grinding


Auto. Loading Attachment for Thrufeed Grinding (Hopper Type)


Auto. Loading Attachment for Thrufeed Grinding (Vibratory Feeder)


Auto. Loading Attachment for Thrufeed Grinding (Magazine Type)


Auto. Loading Attachment for Infeed Grinding


Auto. Unloading Attachment for Infeed Grinding


Auto. Infeed Attachment