- **CNC Series**
  - RIG-150CNC
  - RTG-100CNC
- **NC Series**
  - RIG-150NC
- **Economical Series**
  - RIG-150

榮光機械股份有限公司

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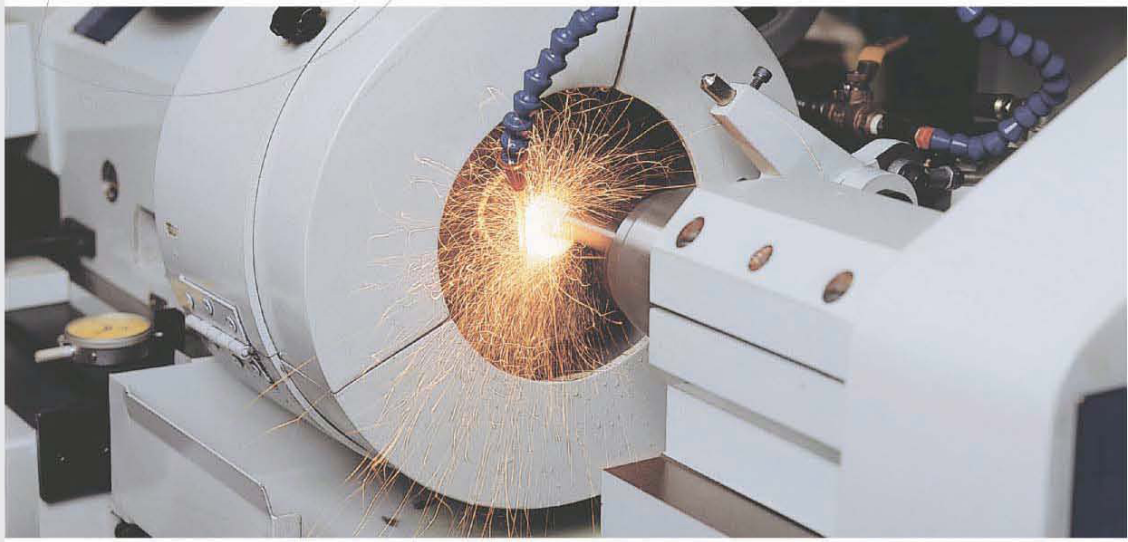
Aug. 2014

www.paragoncnc.com

PARAGON since 1968

Unparalleled, Choice CNC Grinding Solutions



Internal Grinding Machines

CNC Series
NC Series
Economical Series

ID/OD Twin-Spindle Grinding Machines

CNC INTERNAL GRINDING MACHINE

INTERNAL GRINDING MACHINES CNC SERIES

Flawlessly Designed for the Most Meticulous Machining Operations

PARAGON reaches new dimensions with the latest generation of CNC internal grinding machines. The Internal Grinding machine has efficient and reliable programming of grinding and dressing cycles suitable for mass production of shaft ,rods ,bushing and cylindrical workpieces with precise concentricity on inner diameters. The other main features are:

- Nimble and precise positioning wheelhead
- Multi- function and manual adjustable workhead
- Highly rigid machine base with hydrostatic lubrication on guideways on Z axis.
- X and Z axes have high torque servo motor directly coupled to the ballscrew class C1.
- Heidenhain sub- μm linear scale with closeloop feedback on X axis.

PARAGON

Applicable Industries:

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

Controller

FANUC (Standard)

- ✓ PARAGON CNC series internal grinding machines have digital control that is designed to easily automate, each with a LCD screen display system.
- ✓ PARAGON provides operating interface for easy datainput,and programming that reduce set-up time and increase efficiency.
- ✓ Programs can be downloaded by RS-232 interface or input from a flash-card through a PCMCIA port.
- ✓ Servo motors directly driven by C1 class ballscrews, minimizing backlash.
- ✓ Maintenance function such as a diagnosis function and alarm message is provided to quickly identify the cause of a failure.
- ✓ The amount of dressing during grinding compensate for grinding wheel cutting and dressing in canned cycles.
- ✓ Manual Pulse Generator (M.P.G.) handwheel is provided for adjustment.
- ✓ Emergency stop button.

CNC INTERNAL GRINDING MACHINE

Unparalleled Quality Assurance and Control

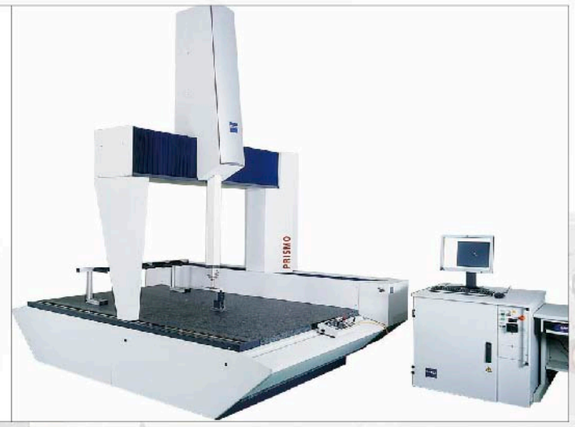
The systematic development, production and assembly are carried out in a process oriented manner and in strict compliance with ***ISO 9001*** directives.

PARAGON's Q.C. staff conducts rigorous quality control throughout the entire manufacturing process before shipment. Our quality control process includes: **a)** Strict Incoming Materials Inspection; **b)** Geometric Accuracy Inspection; **c)** Spindle Test and **d)** Practica Grinding Test.

Quality Assurance

Over and Over Again, PARAGON's Dedication to Quality Wins Customer's Satisfaction and Trust.
In order to produce the highest quality and value-added products, PARAGON has invested a great amount in purchasing up-to-date and sophisticated automatic manufacturing equipments and measuring devices, including CNC Horizontal Machining Center, Roundness Measuring Instrument, Coordinate Measuring Machine, etc., and a nearly 23,000 square meter air conditioned plant, all of which to provide a controlled environment and to assure the quality.

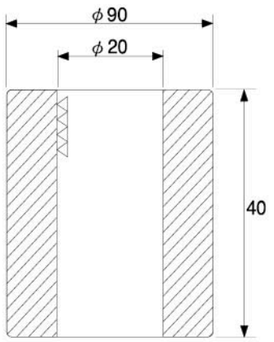
Roundness Measuring Instrument

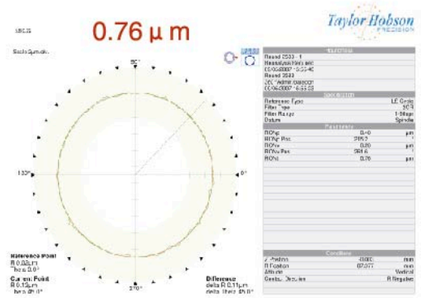


CMM

Grinding Test Report

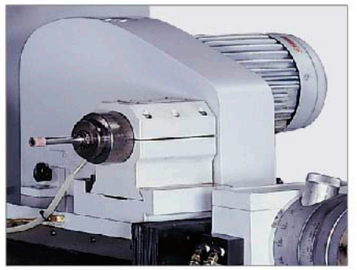
Work sample	Bush
Dimensions	ϕ90 x 40 x ϕ20
Workpiece material	SCM415 (JIS)
Hardness	HRC 50°~±5°
Stock removal	0.2mm
Grinding time	50 sec
Tolerance	5 μm
Spindle speed	30,000r.p.m
Roundness	<1 μm
Cylindrical	<2 μm



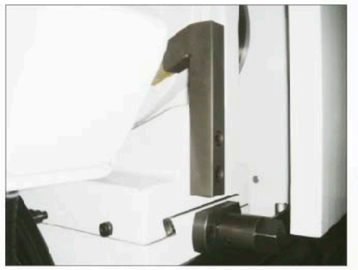


PARAGON

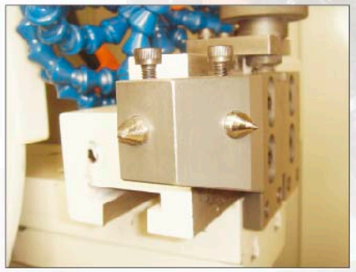
WHEELHEAD



Slide Table
The wheelhead motion (X-axis) is driven by servo motor with C1 class ballscrews, resulting in rapid motion and accurate positioning for internal grinding.



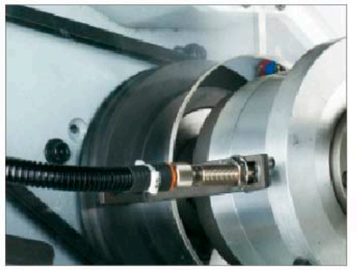
Automatic Belt Tension Adjustment
Eliminates the need for manual adjustment to reduce maintenance time, also assure full power transmission to additionally extend the service life of precision bearings inside the spindle.



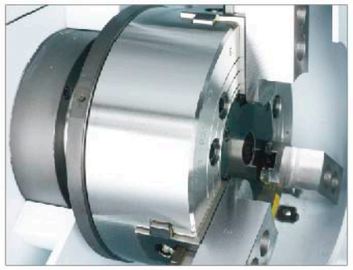
Grinding Wheel Dressing Device
One unique dresser device combined with touch sensor technology features constant coordinate position that offers precision profile dressing.

WORKHEAD

Workhead Swivel Angle
Workhead utilizing precision taper roller bearings and ball bearings on both sides can take both radial and axial large loads due to greater contact area to compensate for spindle thermal expansion and operate with zero radial clearance rigidity.



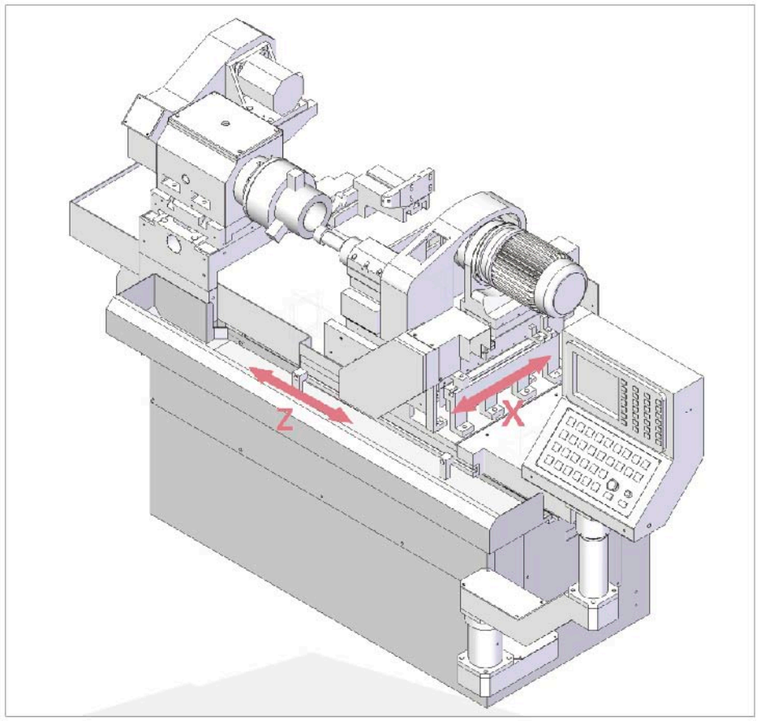
Sensor
The sensor mounted on workhead is designed for (a) easy set-up of grinding wheel and workpiece (b) monitor rotation rpm (c) belt status indication.



Multi-Function Workhead
Workhead can be equipped with rotary cylinder, chuck applications or fixture for varied workpieces.
Workhead will swivel forward 13 degrees and backward 5 degrees for taper grinding.

MACHINE BASE

New Structural Design Concepts

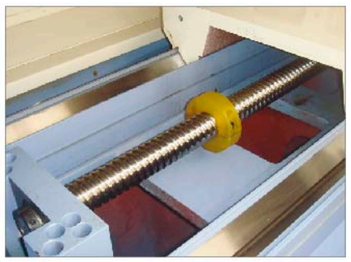


The machine base is manufactured from high quality Meehanite cast iron, low center of gravity, featuring rigidity over 10^8 N/m and natural frequency over 150 Hz, analyzed by advanced Finite Element Method (FEM). Along with vibration stress release, these outstanding structural features assure high strength,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

Wheelhead Guideways (X-axis)

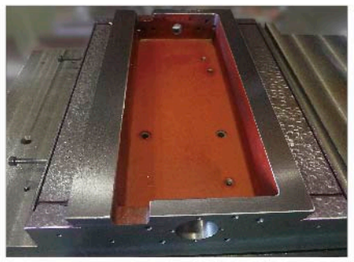
The table motion (CNC series),driven by servo motor , features with high rigidity and durability to extend service life.

C1 class ballscrews feature automatic lubricator , low friction coefficiency, and are pretensioned for increased rigidity and high positioning accuracy, providing minimum feeding accuracy in 0.1 μm on X axis and Z axis.



Guideways (Z-axis)

Extra wide V guideways on base combined with great span in between and constant hydraulic lubrication, exhibit outstanding stability during grinding operation and micro-feed accuracy. The table motion (CNC series) is driven by servo motor with C1 class ballscrews.

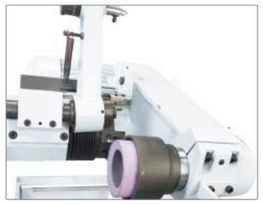


Hand-Scraping

Extra fine hand scrapped over the entire contact surface of guideways guarantees high accuracy and maximum durability for axes movement.

CNC INTERNAL GRINDING MACHINE

Optional Accessories for Optimized Performance and Automation

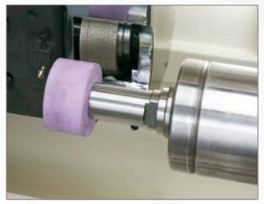


Face Grinding Attachment

Grinding wheel is driven by powerful motor (1HP) for grinding end face at the edge of workpiece.

ID In-process Gauge

This device automatically and continuously measures the workpiece being machined and compares the actual size to pre-set values, bringing the workpiece to the accurate dimension.
(Optional for CNC Series)



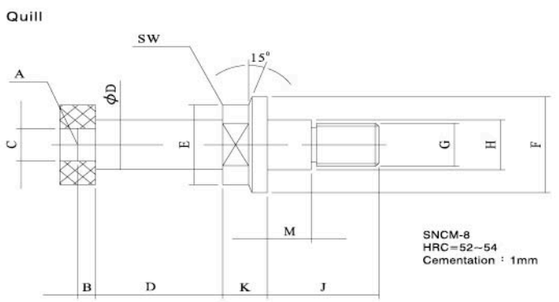
Rotary-type Dressing Unit

Two types of rotary dressing unit can be supplied. One type is with small diamond wheel for dressing of normal grinding wheel. The other is with small aluminum oxide wheel for truing the surface of new diamond grinding wheel to enhance grinding accuracy.
(Optional for CNC Series)

Intelligent Robot Solutions

The robot arm is the intelligent solution for flexible manufacturing systems. They can easily change applications with speed and accuracy and be quickly reprogrammed that meet your requirements, for now and in the future.
(Optional for CNC Series)

GREASE-PACKED BELT DRIVEN TYPE



NOTE: The ratio of grinding hole diameter to length is 1:3. Maximum length is 150 mm.

HOLE φ	SPINDLE TYPE (r.p.m.)	SIZE											
		A	B	C	D	E	F	G	H	J	K	SW	M
80-150	grease-8,000	M8	12	12	φ 40 x 50 φ 40 x 106	50	57	M26 x 2.0P	28	42	16	41	18
40-80	grease-10,000 oil mist-20,000	M8	10	10	φ 20 x 50 φ 25 x 70 φ 30 x 90	32	38	M16 x 1.5P	17	29	15	24	12
25-40	grease-20,000 oil mist-30,000	M6	8	8	φ 16 x 40 φ 20 x 58 φ 24 x 80	24	32	M14 x 1.5P	15	27	10.5	19	11
16-25	grease-30,000 oil mist-40,000	M4	8	6	φ 10 x 25 φ 13 x 30 φ 16 x 40	21	26	M10 x 1.5P	10.5	21	9.5	17	9
13-16	grease-40,000 oil mist-50,000	M4	/	/	φ 8 x 25 φ 10 x 30 φ 12 x 40	17	23	M8 x 1.25P	8.5	19	8.5	14	7
10-13	grease-50,000 oil mist-60,000	M4	/	/	φ 6 x 20 φ 7 x 25 φ 8 x 30	15	20	M7 x 1.0P	7.5	18	7	11	7

NC SERIES

RIG-150NC

- Dialogue type interface, the latest graphic control and digital control technology.
- Self diagnostic function for trouble shooting.
- Automatic memory while power failure.
- Memory function of infeed and dressing compensation.
- Multi-dressing can be set up during grinding.
- Dressing compensation can be adjusted on-line.

ECONOMICAL SERIES

RIG-150

- Hydraulic driven automatic wheel infeed.
- Hydraulic lubrication features low friction coefficiency, and is pretensioned for increased rigidity and high positioning accuracy.
- Tapered roller bearing in wheelhead handles both axial and radial loads to maintain the stability of high precision during high-speed rotation.

Totally New Design Concepts RTG-100CNC

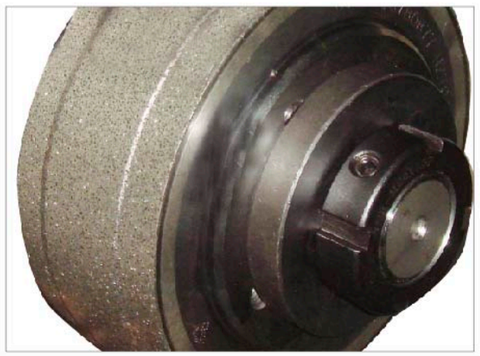
CNC ID/OD Twin-Spindle Grinding Machine
Designed to Fully Meet Your Rigorous Requirements for Parts Accuracy

No matter what end face perpendicularity and concentricity between inner and outer diameters, the RTG-100CNC from PARAGON will offer the accuracy you've come to expect. The RTG-100CNC is equipped with a high performance CNC control combined with conversational interfacing for easy operation.

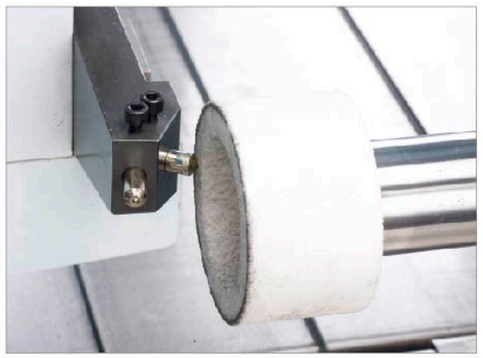
- Excellent for mass production lines.
- Guaranteed accuracy, circularity and concentricity.
- Maximum 8 faces grinding in one cycle.
- Fully enclosed splash guard.
- Twin Grinding spindles configuration for internal and cylindrical grinding.
- Eliminates repetitive chucking error of workpiece.
- High repeatability accuracy. Greatly upgrades production efficiency.
- Reduces cycle time.
- Maximum cylindrical grinding diameter: ϕ320 mm
- Range of internal grinding diameter: ϕ6 - ϕ100 mm.

Versatile, Multi-face Machining
RTG-100CNC permits various grinding types
Maximum 8 faces to be accomplished in one cycle.

FANUC Controller



Diamond Roller Dresser

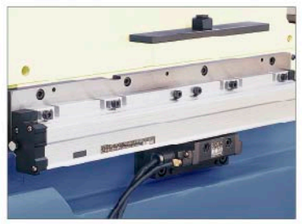


2-Direction Diamond Dresser

Exceptional Rigid Base Built for Stability!

- Extra fine craftsmanship of scraping on both sides guarantees high accuracy and maximum durability for axes movements.
- Powerful FANUC servo ABS system with auto. memory and $\alpha$is strong with high efficiency servomotor directly drives ball screw for high feeding accuracy.
- The grinding wheel dressing feed is driven by FANUC high precision servomotor for added positioning accuracy.
- The X-axis is equipped with a Heidenhain precision linear scale for close loop feed - back.This high precision linear scale eliminates ballscrews pitch error with back-lash while ensuring dependable feeding accuracy.
- The high precision class C1 ball screw features low friction coefficiency, and is pretensioned for increased rigidity.high positioning accuracy, providing minimum feeding accuracy in 0.1um.
- The 2-direction single point diamond dresser exhibits accurate forming performance for both dressing or sharpening.

X.Y.Z.-axis Driven by Servomotor



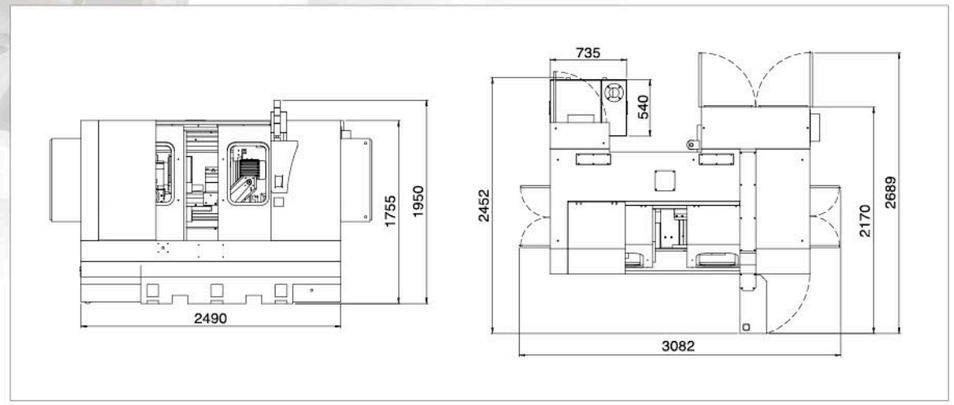
Heidenhain Liner Scale

Applicable Industries:

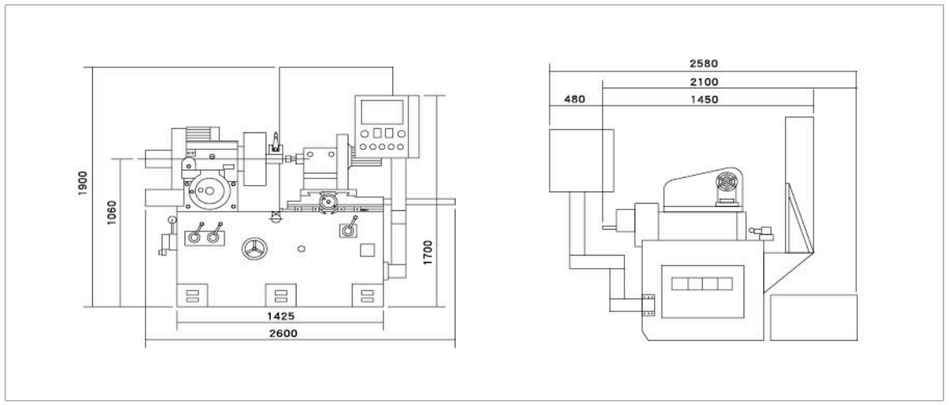
- Aerospace parts
- Medical applications
- Precision bearings
- High precision machine parts
- Electrical / Electronic equipments
- Automotive & motorcycle parts, etc...
- Cutting tools

MACHINE LAYOUT

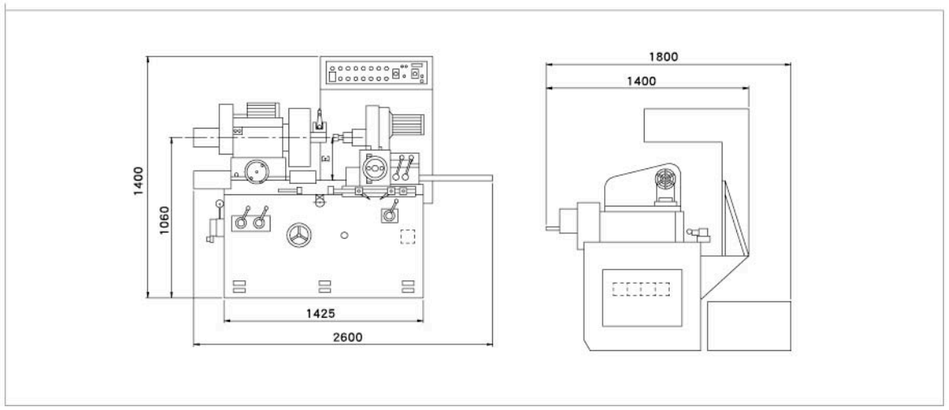
RIG-150CNC



RIG-150NC

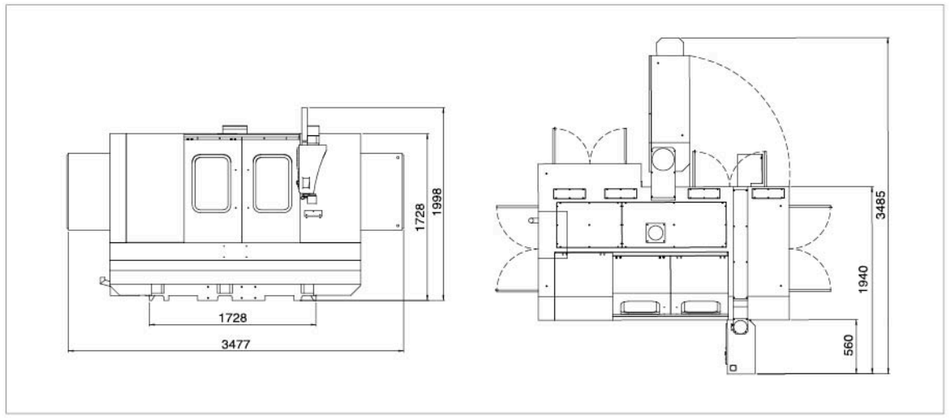


RIG-150



MACHINE LAYOUT

RTG-100CNC



OPTIONAL ACCESSORIES

Magnetic coolant separator

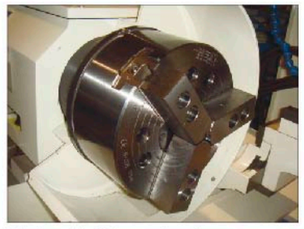
Paper filter

Hydraulic oil cooler

Scroll 3-jaw chuck with back plate

Electrical cabinet air cooler

Soft jaw machining attachment



Hydraulic 3-jaw chuck

Rotary cylinder

Oil Mist Separator

ACCESSORIES

ACCESSORIES	RIG-150CNC	RIG-150NC	RIG-150	RTG-100CNC
CNC Controller (FANUC/SIEMENS/MITSUBISHI)	O	X	X	O
NC Controller	X	O	X	X
Inverter (Workhead)	O	O	O	X
Inverter (Z-axis, Wheelhead)	X	X	X	△
Inverter (Y-axis, Wheelhead)	X	X	X	△
Linear Scale for X-axis	O	X	X	O
Linear Scale for Z-axis	△	X	X	X
ID In-process Gauge	△	X	X	X
Coolant Tank with Pump	O	O	O	O
Work Lamp	O	O	O	O
Tools + Kits	O	O	O	O
Wheel Flange Extractor (OD G.W.)	X	X	X	O
Oil Mist Separator	△	X	X	△
Paper Filter	△	△	△	△
Magnetic Coolant Separator	△	△	△	△
Automatic Lubricator	O	O	O	O
Electrical Cabinet Air Cooler	△	X	X	△
Automatic Belt Tension Adjustment Unit	O	O	O	X
Electrical Cabinet Heat Exchanger	O	X	X	O
Balancing Stand & Arbor(OD G.W.)	X	X	X	△
Soft Jaw Machining Attachment	△	△	△	△
Servo Moter (Workhead)	X	X	X	O
Servo Motor (X axis)	O	O	X	O
Servo Motor (Y axis)	X	O	X	O
Servo Motor (Z axis)	O	X	X	O
Hydraulic Dresser Holder	X	O	O	X
Fixed type Dresser Holder	O	X	X	O
Vibration Meter	X	X	X	△
Grinding Wheel(OD)	X	X	X	△
Grinding Wheel Flange (OD G.W.)	X	X	X	O
ID Spindle (Grease Packed 8,000-50,000RPM)	O	O	O	O
OD Spindle	X	X	X	O
Face Grinding Attachment	△	△	△	X
Diamond Dresser	O	O	O	O
Oil Mist ID Spindle Lubricator	△	△	△	△
Hydraulic Tank with Pump	O	O	O	O
Hydraulic Oil Cooler	△	△	△	△
Fully Enclosed Splash Guard	△	△	X	O
Scroll 3-jaw chuck with Back Plate	△	△	△	△
Scroll 4-jaw chuck with Back Plate	△	△	△	△
Hydraulic 3-jaw Chuck	△	△	△	△
Rotary Cylinder	△	△	△	△
Pneumatic Chuck	△	△	△	△

○ Standard Equipment △ Option Equipment ✕ Not Applicable

SPECIFICATION

MODEL	UNIT	RIG-150CNC	RIG-150NC	RIG-150	RTG-100CNC
CAPACITY					
Grinding range (ID)	mm	6~150	6~150	6~150	6~100
Grinding depth (max.)	mm	150	150	150	100
Max. grinding diameter(OD)	mm	-	-	-	320
Outer grinding wheel	mm	-	-	-	305*25*127
Max length of outer grinding	mm	-	-	-	70
Max.clamping length	mm	150	150	150	150
Swing over table	mm	520	520	520	630
Swing in chuck guard	mm	320	320	320	290
CONTROL SYSTEM					
Controller		FANUC/SIEMENS/ MITSUBISHI	-	-	FANUC/SIEMENS/ MITSUBISHI
WORKHEAD					
Spindle speed	rpm	0~800	0~800	0~800	0~ 800
X-axis rapid movement	m/min	6	-	-	10
X-axis minimum increment	mm	0.0001	0.001	0.001	0.0001
X-axis minimum resolution increment	mm	0.0001	0.0001	-	0.0001
Workhead swivel	deg	+13°~ -5°	+13°~ -5°	+13°~ -5°	+15°~ -5°
TABLE					
Max. table speed Z-axis	m/min	20	≒9	≒9	18
Max. table traverse	mm	400	540	540	400+250 (Manual)
Z-axis minimum stroke	mm	0.0001	10~14	10~14	0.0001
X-axis minimum stroke	mm	0.0001	0.001	0.001	0.0001
Y-axis minimum stroke	mm	-	0.001	-	0.0001
Height from wheel spindle to floor	mm	1290	1180	1180	1150
HYDRAULIC SYSTEM					
Capacity of hydraulic oil tank	ℓ	32	90	90	40
COOLANT SYSTEM					
Capacity of coolant tank	ℓ	90	90	90	90
DRIVER MOTORS					
Hydraulic pump	KW	0.75	1.5	1.5	0.75
Coolant pump	KW	0.18 (1/4HP)	0.18 (1/4HP)	0.18 (1/4HP)	0.18 (1/4HP)
X-axis servo motor	KW	1.0	0.4	-	1.6
Z-axis servo motor	KW	2.5	-	-	2.5
Y-axis servo motor	KW	-	0.4	-	2.5
Grinding wheel motor	KW	1.5	1.5	1.5	OD2.25 / ID1.5
Workhead motor	KW	0.75	0.75	0.75	1.2
OTHERS					
Auto. lubricator	ℓ	2	2	2	2
Machine dimensions(W*D*H)	mm	2,500*2,170*1,950	2,600*1,950*1,800	2,600*1,800*1,400	2,600*2,000*2,000
Machine weight	kg	3000	2400	2,200	5,000

*Design and specifications are subject to change without prior notice.

*The machine dimension and weight are based on standard equipment.