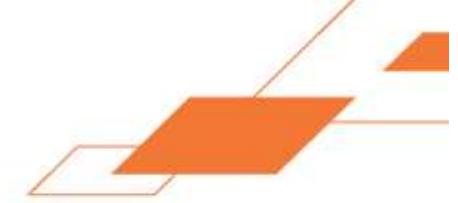


Introduction to fully automatic honing machine

i|4.0



SiRUBA®
Sew Reach

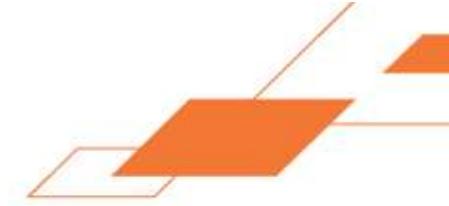


NO	Introduction
1	Specification
2	Excellent Mechanical Design and Manufacturing
3	Precision and Effectiveness
4	Exquisite Appearance Design



(1) Specification

i4.0 Advantages:



SIRUBA fully automatic honing machine was the most advanced equipment. It had the following advantages:

- ※ The guide frame was made by cast iron material (FC250 & FCD400)with excellent shock absorption to ensure stability.
- ※ The spindle motion adopts nitrogen balance system to connect the universal joint to make spindle motion more stable.
- ※ Adopting THK high strength guide rail and precision screw mechanism components, adopting automatic forced centralized lubrication system, the machine tool is not easy to wear and tear, durable to ensure the service life of the machine.
- ※ Advanced screw anti loosing design makes machine tool more stable.
- ※ Adopting FANUC servo control system and Japanese SANKYO high precision rotary table to meet flexible manufacturing.
- ※ Powerful spindle motor provides powerful power for large aperture machining. :
- ※ The automatic size detection system (gas electric conversion measurement) has the functions of automatic checking, calculating and correcting.

(1) Specification

Machine Specification

Item	unit	Specification
Honing Diameter Range	mm	φ3 ~ φ50
Z-axis travel	mm	100
Tool storage capacity	pcs	6
Max Spindle working distance	mm	300
Speed range of spindle	rpm	0 ~ 2000
Rapid traverse rate	m/min	35
Distance from spindle to worktable	mm	400 ~ 800
Size of revolving disk	mm	φ690
Type of revolving disk	0.75kw	Electric
Number of workplaces	step	8
Working time of single workplace	s	2
Power of spindle driver motor	kw	5.5
Speed range of spindle driver motor	rpm	300 ~ 1100
Power of elevating motor	kw	1.6
Speed range of elevating motor	rpm	0 ~ 3000
Power of cooled motor	kw	1.5
Required precision :		
①dimensional accuracy±	mm	0.001
②Circularity ○	mm	0.001
③Cylindricity /○/	mm	0.002
④Roughness √	μm	Ra0.2
Machine size	mm	L3000×W2240×H2650

(1) Specification

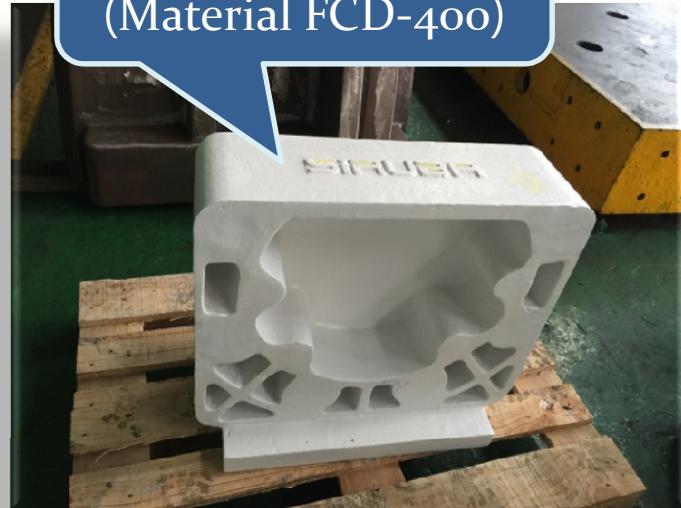
FANUC Specifications

	Brand	FANUC
	Model	ROBOT LA Mate 200iD
	Controlled axes	6 axes
	Reach	717mm
Motion range (Maximum speed)	J1 axis	340°/s · 5.93rad/s
	J2 axis	245°/s · 4.28rad/s
	J3 axis	420°/s · 7.33rad/s
	J4 axis	380°/s · 6.63rad/s
	J5 axis	250°/s · 4.36rad/s
	J6 axis	720°/s · 12.57rad/s
	Max load capacity at wrist	7kg
Allowable load moment at wrist	J4 axis	16.6 N·m
	J5 axis	16.6 N·m
	J6 axis	9.4 N·m
Allowable load inertia at wrist	J4 axis	0.47 kg·m ²
	J5 axis	0.47 kg·m ²
	J6 axis	0.15 kg·m ²
	Mass	25kg

(2) Excellent Mechanical Design and Manufacturing



① Machine tool base
(Material FC-250)



(2) Excellent Mechanical Design and Manufacturing

Multi Spindle
machining



5-Axis Machine Tools
(6000×2800×800)

Guide frame
machining



5-Axis Machine Tools

SIRUBA
Sew Ready

(2) Excellent Mechanical Design and Manufacturing



Checked by
3D CMM

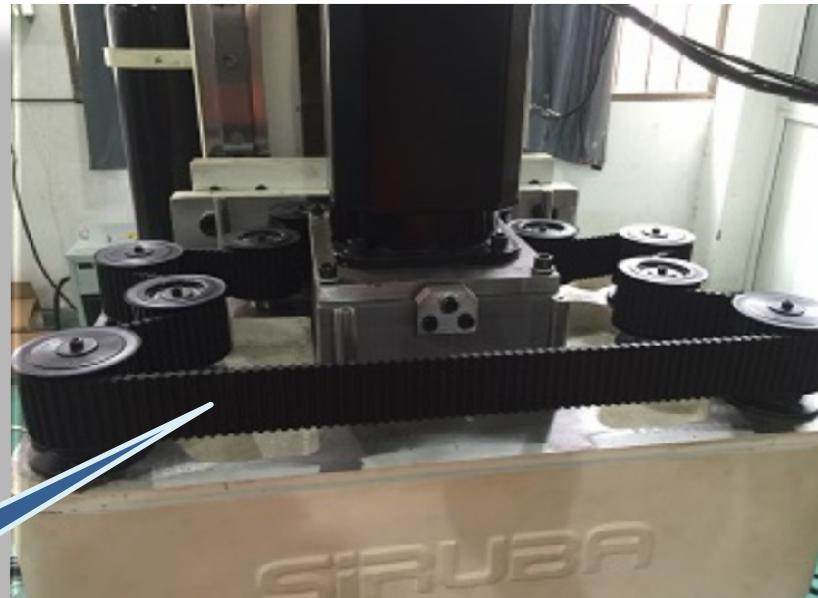
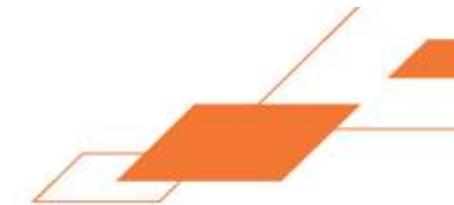
3D
Coordinate Measuring Machine



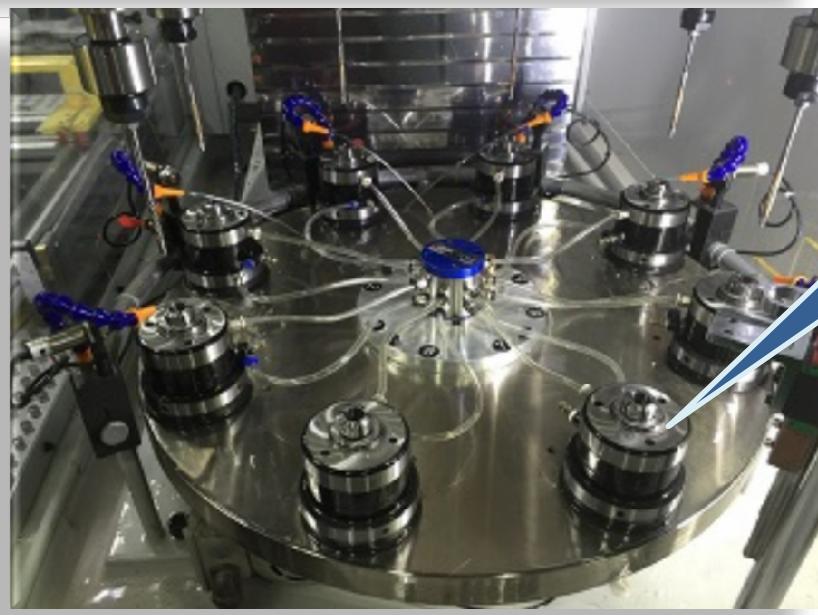
Italy
HEXAGON
3D CMM



(2) Excellent Mechanical Design and Manufacturing

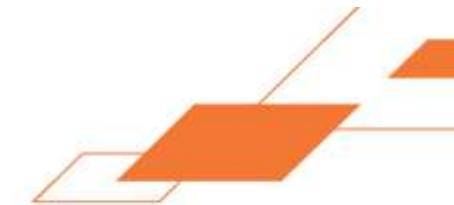


Timing belt
drivers

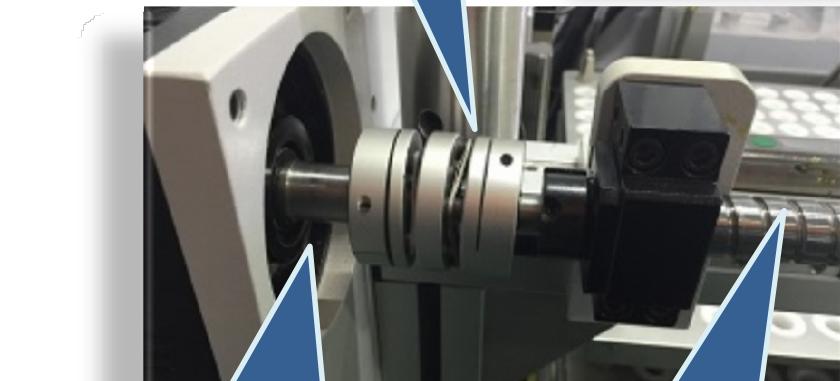
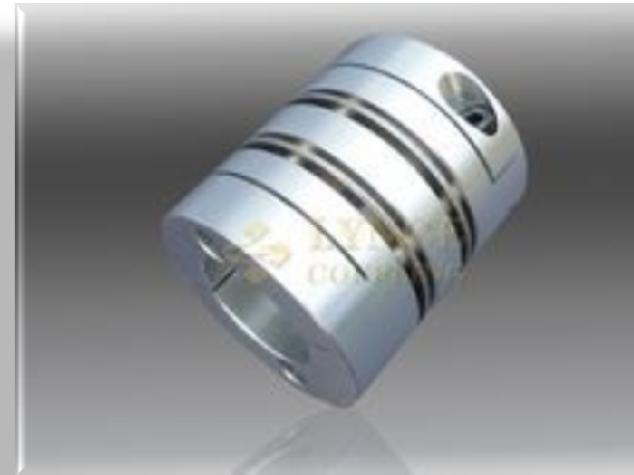


6-axis and
8-stations

(2) Excellent Mechanical Design and Manufacturing

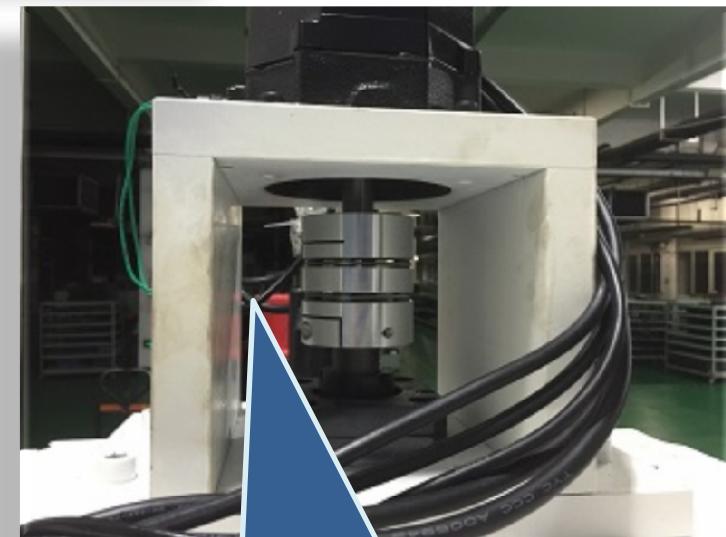


Double diaphragm coupling



Servo motor

Ball Screw



Double diaphragm coupling

(2) Excellent Mechanical Design and Manufacturing

Air universal joint



Spindle motion balancing system
(nitrogen type)

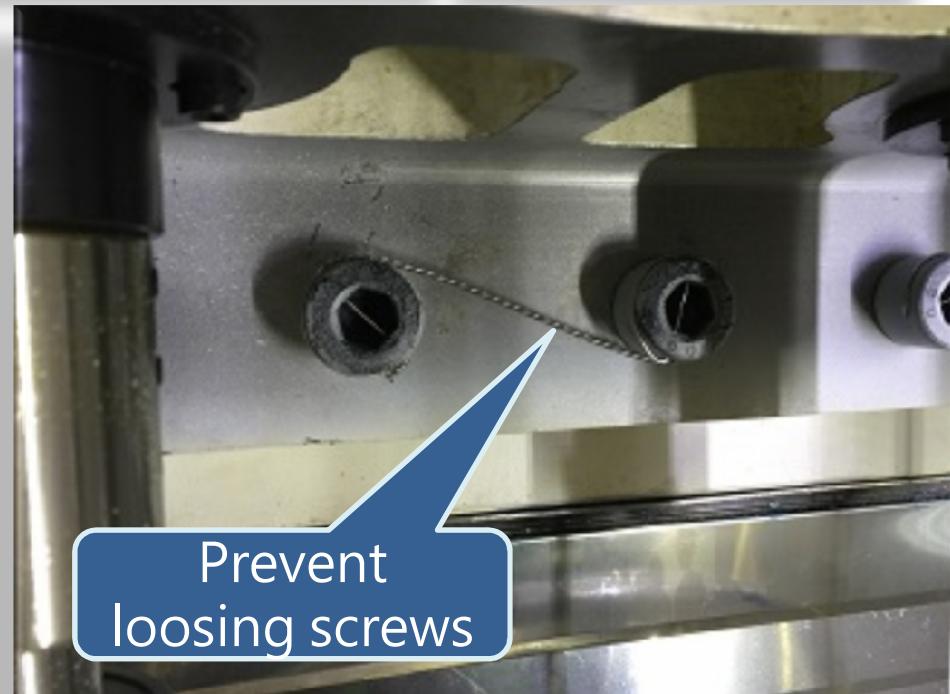


Balance cylinder



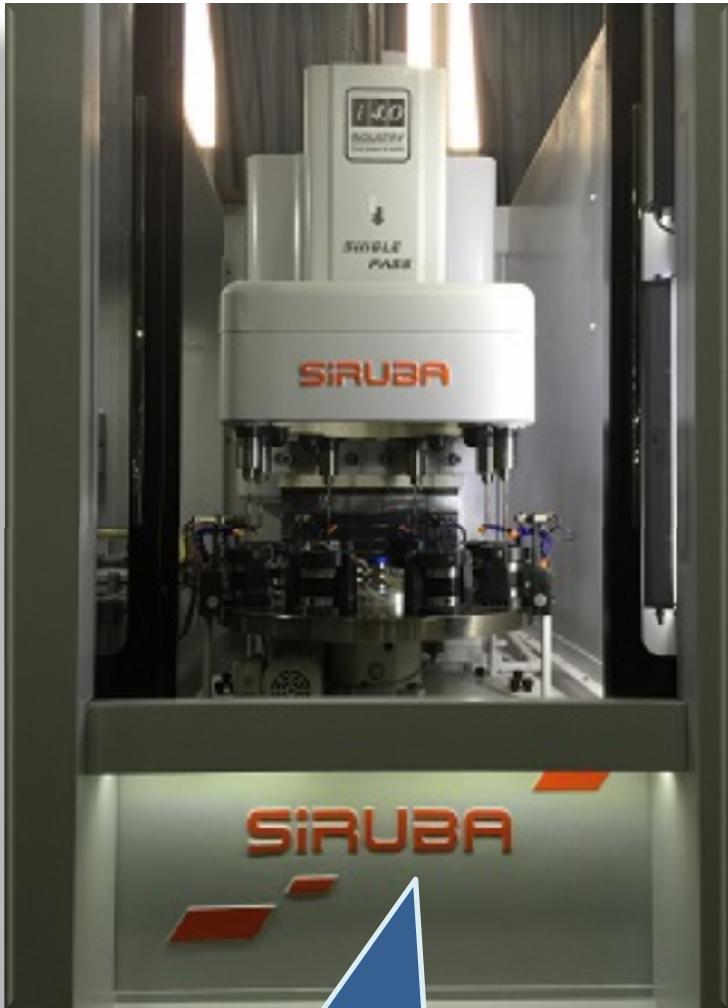
(2) Excellent Mechanical Design and Manufacturing

SUS-304 Stainless steel wire
& Pliers



(2) Excellent Mechanical Design and Manufacturing

Industry 4.0 logo



SIRUBA
Sew Reach

Machine operation
surface view



Single -Pass
Single Stroke Honing

(2) Excellent Mechanical Design and Manufacturing

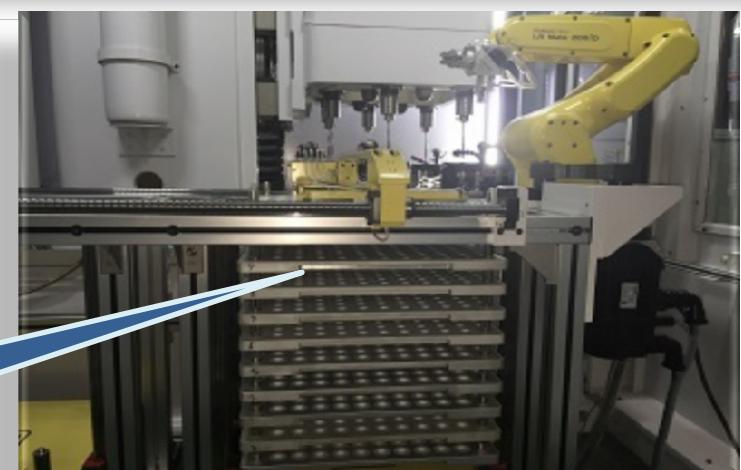
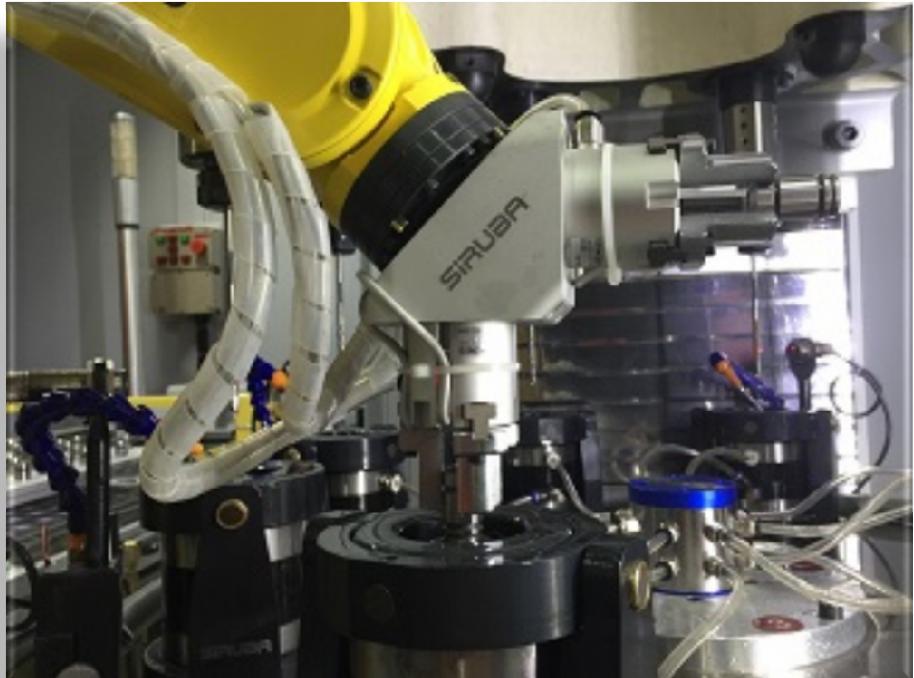
FANUC 6-axis robot



SMC 3 Finger
Gripper Pneumatic

SiRUBA®
Sew Reach

Automatic
loading/unloading



(2) Excellent Mechanical Design and Manufacturing



① Automatic size measurement
『gas measuring instrument』

② Intelligent control instrument with automatic checking, calculating and correcting functions

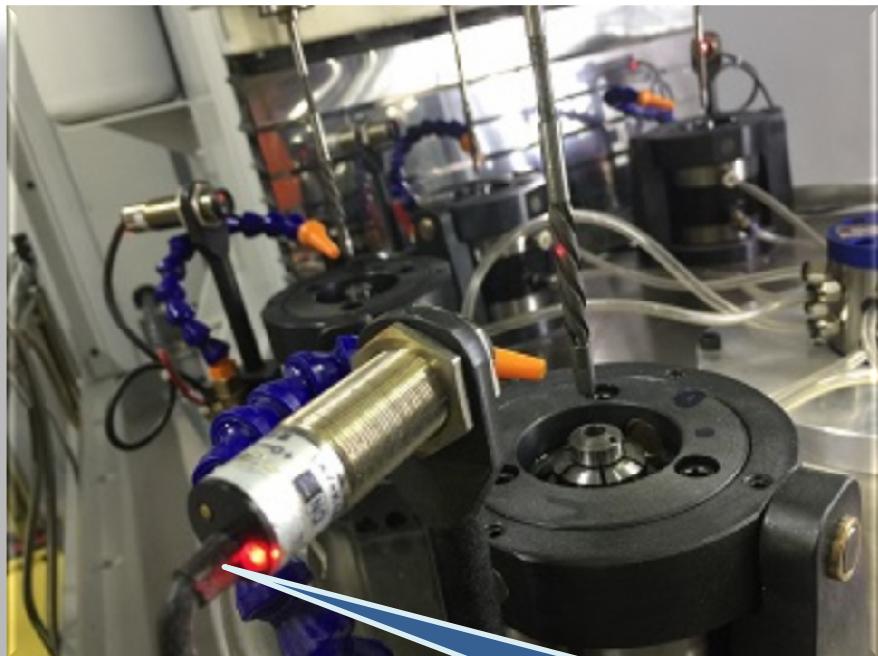


④ Defective collection area



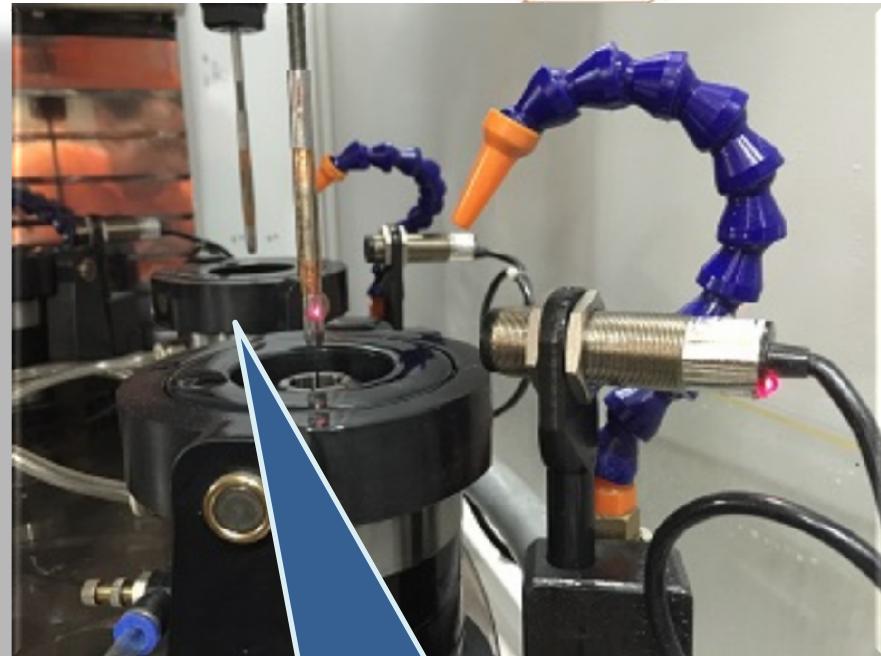
③ Display the number of defective products

(2) Excellent Mechanical Design and Manufacturing



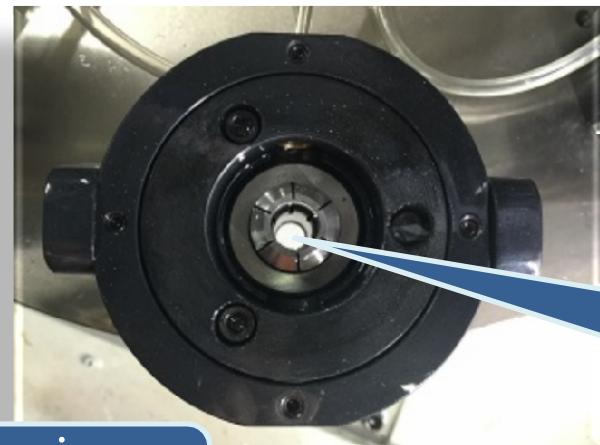
Infrared tool detection
system(6-AXIS)

SiRUBA®
Sew Reach



Infrared tool detection
system(6-AXIS)

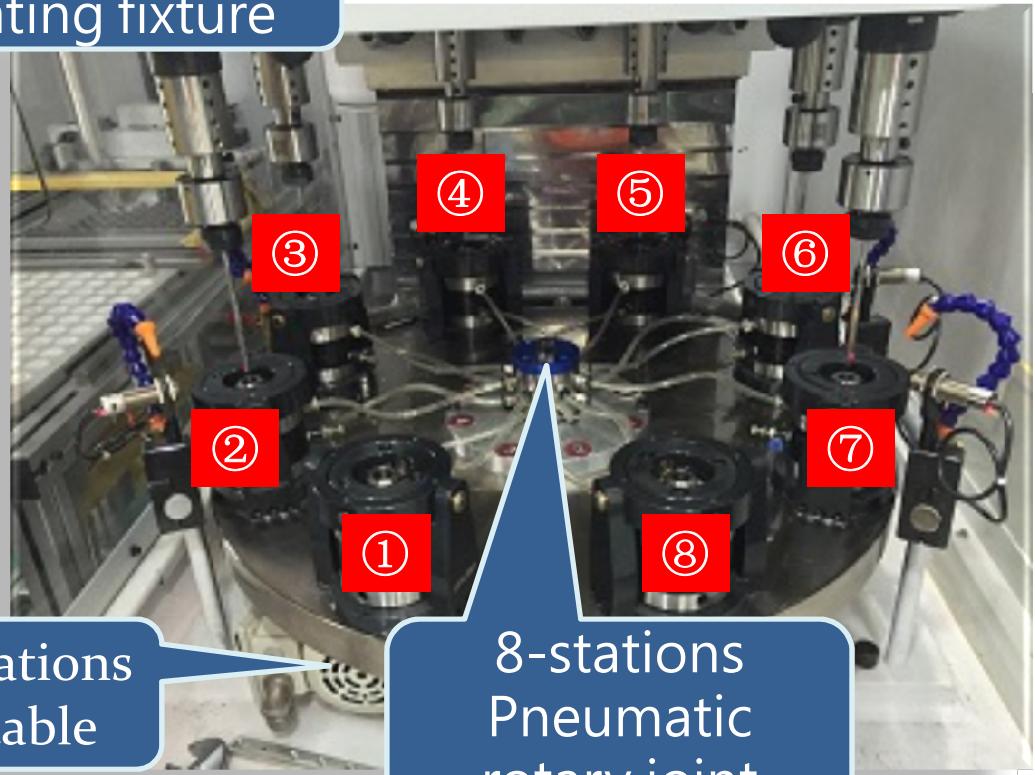
(2) Excellent Mechanical Design and Manufacturing



① X/Y axis floating fixture



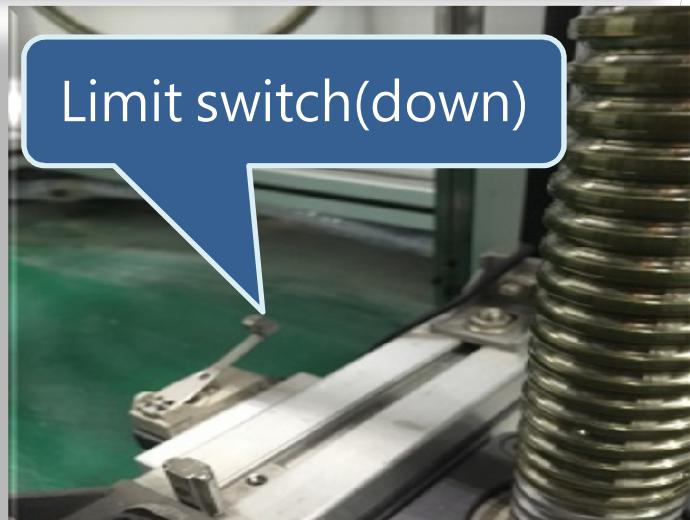
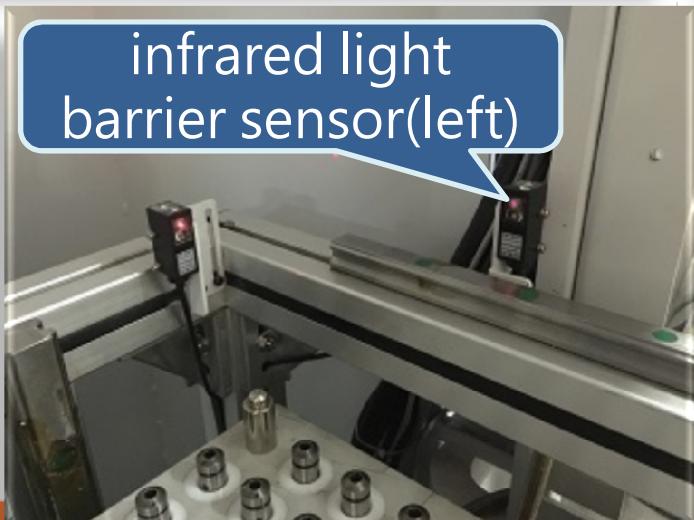
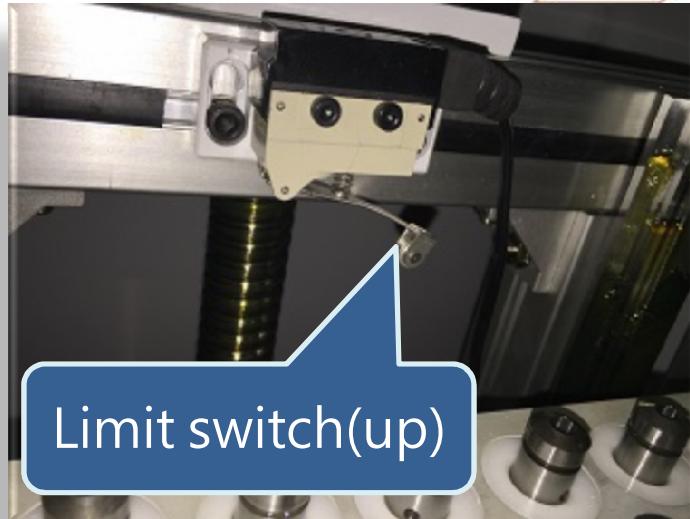
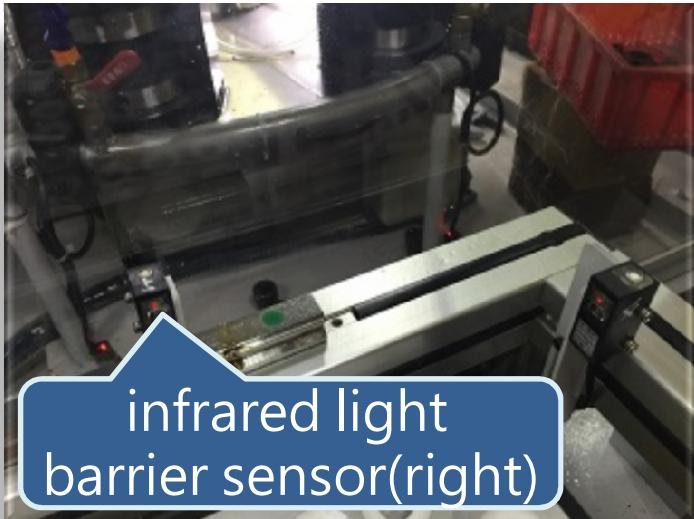
② Fixed jig



SANKYO 8-stations electric turntable

SIRUBA®
Sew Reach

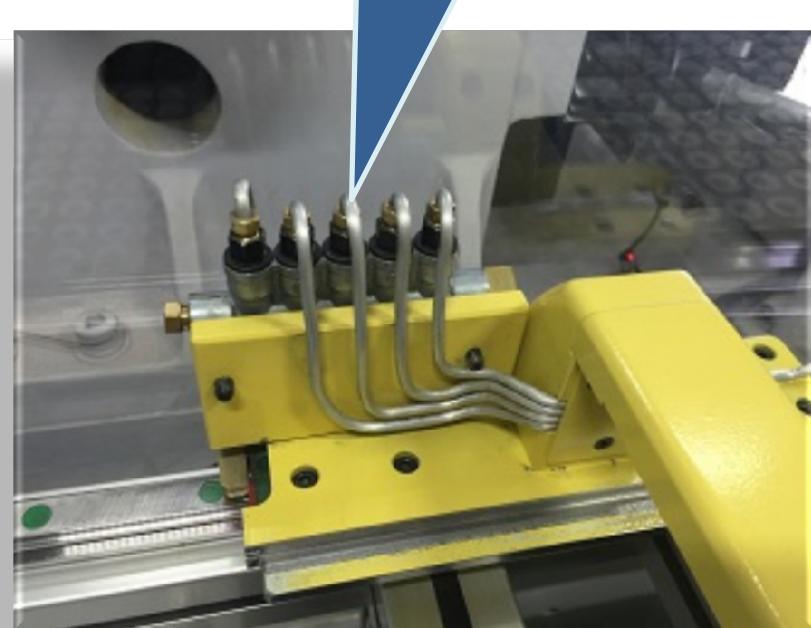
(二) 優異的機械設計&製造



(2) Excellent Mechanical Design and Manufacturing



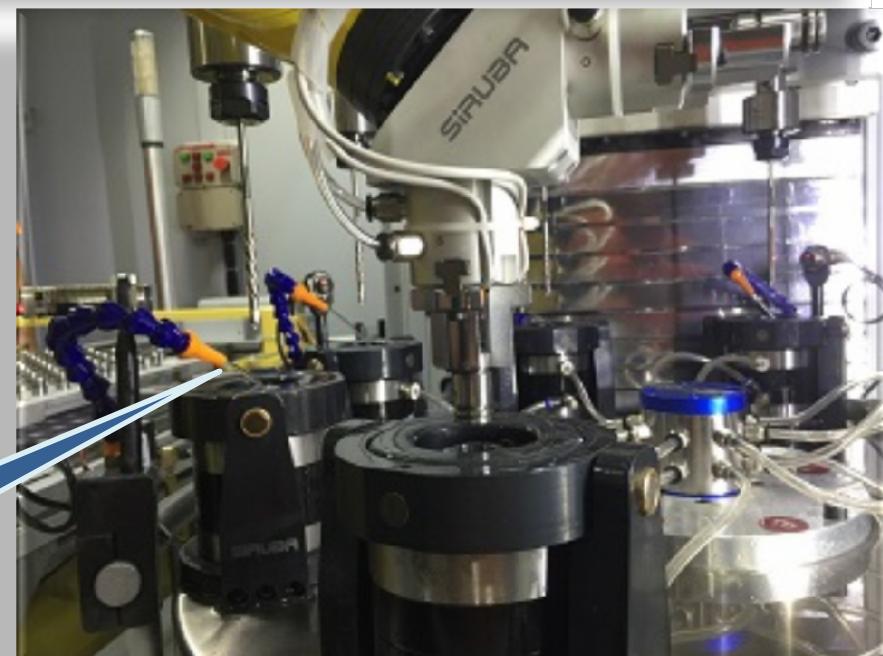
Lubricating oil pipeline



(2) Excellent Mechanical Design and Manufacturing

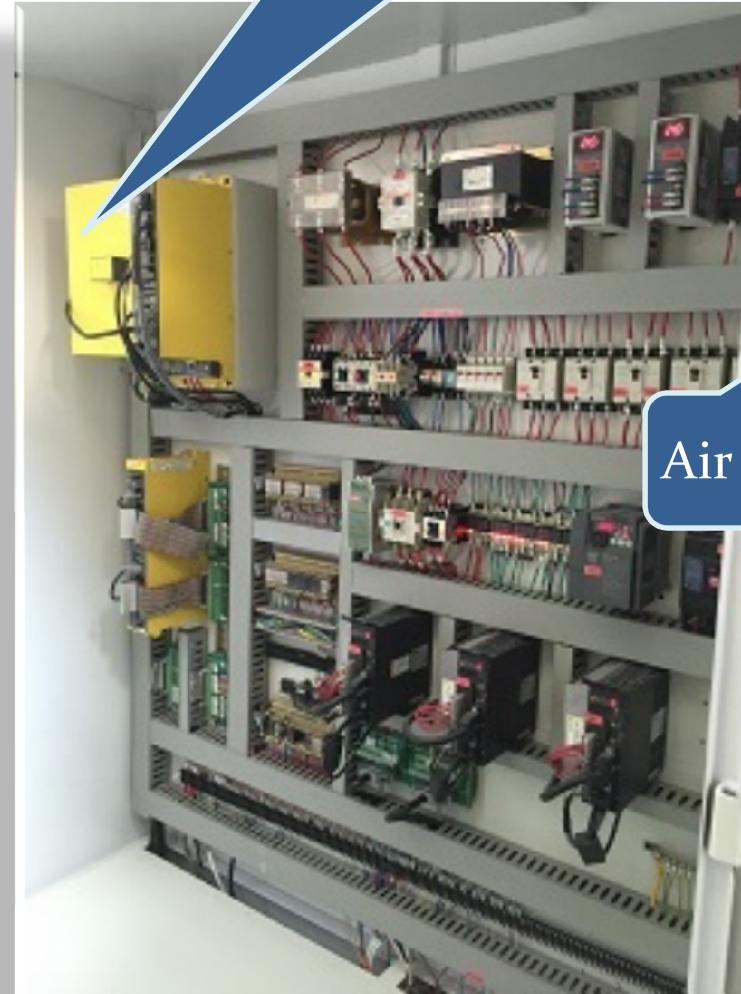


Design of Honing Coolant Temperature Control System
±1°C



(2) Excellent Mechanical Design and Manufacturing

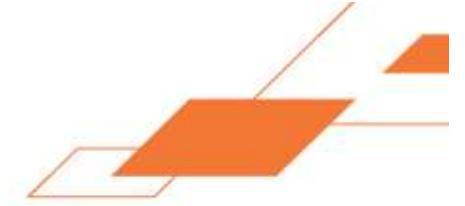
electric closet power distribution cabinet



Air conditioning



(3) Precision and Effectiveness



(3) Precision and Effectiv

I Detection data

KF-214 ($\phi 6.5 +0.009$ $+0.003$)		NO.	①dimensional accuracy $\pm 0.001\text{mm}$	②Circularity \bigcirc 1μ	③Cylindricity $/\bigcirc/$ 2μ	④Roughness \checkmark $Ra0.2$
	#1	$\phi 6.506$	0.22	1.22	0.053	
	#2	$\phi 6.505$	0.14	0.86	0.042	
	#3	$\phi 6.507$	0.22	1.33	0.062	
	#4	$\phi 6.506$	0.19	1.38	0.076	
	#5	$\phi 6.506$	0.17	1.11	0.041	
	#6	$\phi 6.505$	0.19	0.97	0.123	
	#7	$\phi 6.506$	0.21	1.25	0.048	
	#8	$\phi 6.506$	0.14	1.27	0.047	
	#9	$\phi 6.505$	0.25	1.73	0.035	
	#10	$\phi 6.506$	0.12	1.02	0.036	

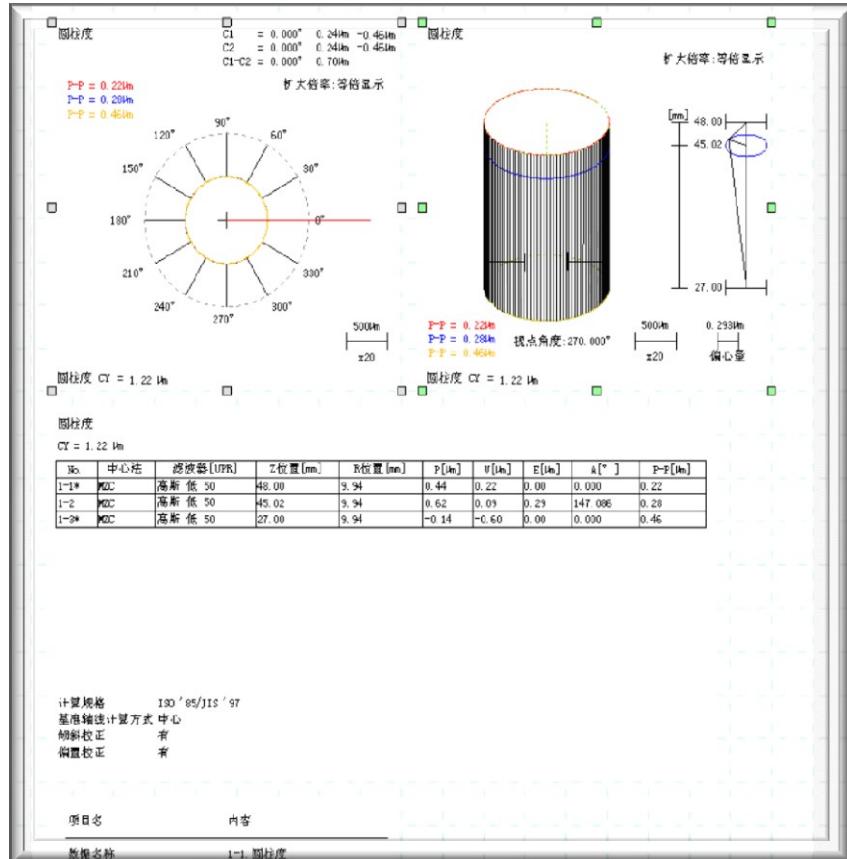
MD-41 ($\phi 15 +0.003$ -0.002)	NO.	① dimensional accuracy $\pm 0.001\text{mm}$	② Circularit \bigcirc 1μ	③ Cylindricity $/\bigcirc/$ 2μ	④ Roughness \checkmark $Ra0.2$
	#1	$\phi 15.001$	1.9	2.93	1.962
	#2	$\phi 15.002$	1.45	2.16	1.863
	#3	$\phi 15.001$	1.07	2.06	1.968
	#4	$\phi 15.000$	0.93	2.53	1.875
	#5	$\phi 15.003$	1.88	2.92	1.628
	#6	$\phi 15.001$	1.30	2.27	1.988
	#7	$\phi 15.001$	1.50	2.64	1.991
	#8	$\phi 15.002$	1.96	2.47	1.852
	#9	$\phi 15.000$	1.72	2.33	1.793
	#10	$\phi 15.001$	1.43	2.58	1.872

KL-208 ($\phi 10 +0.005$ $+0.010$)	NO.	① dimensional accuracy $\pm 0.001\text{mm}$	② Circularity \bigcirc 1μ	③ Cylindricity $/\bigcirc/$ 2μ	④ Roughness \checkmark $Ra0.2$
	#1	$\phi 10.005$	1.5	2.5	0.243
	#2	$\phi 10.007$	2.0	3.5	0.155
	#3	$\phi 10.005$	1.5	3.0	0.204
	#4	$\phi 10.005$	1.5	3.5	0.189
	#5	$\phi 10.008$	2.5	2.0	0.165
	#6	$\phi 10.007$	1.5	4.0	0.211
	#7	$\phi 10.008$	2.0	3.5	0.232
	#8	$\phi 10.006$	1.5	2.0	0.265
	#9	$\phi 10.006$	1.5	2.0	0.144
	#10	$\phi 10.008$	2.0	2.5	0.200

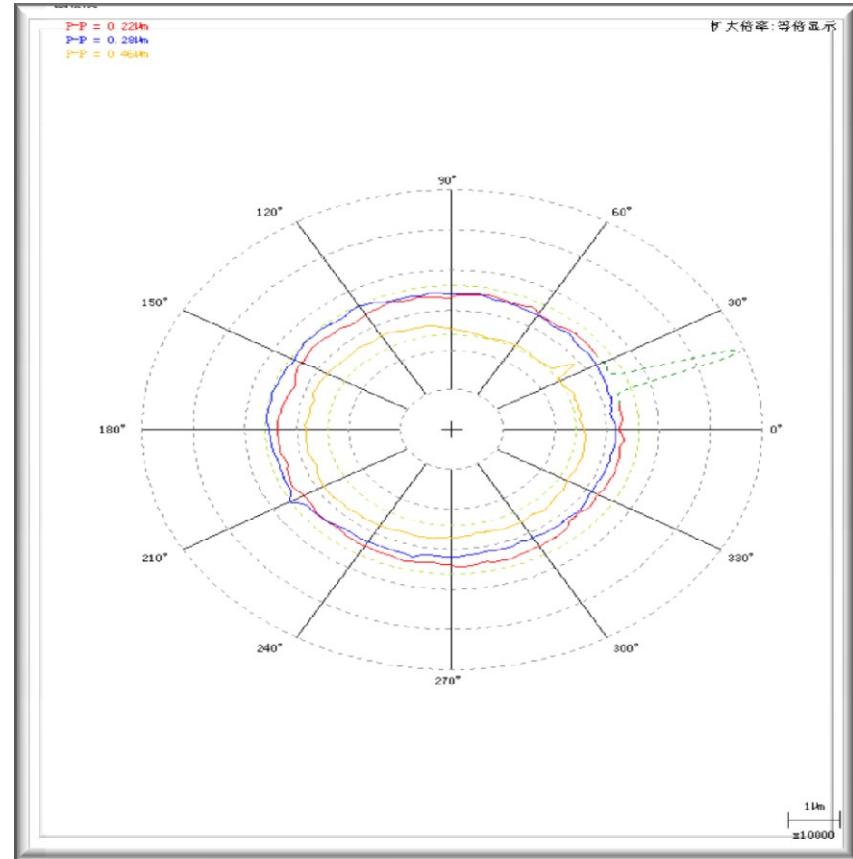
(三)精度及效益分析

Cylindricity analysis diagram

Cylindricity 3D analysis diagram

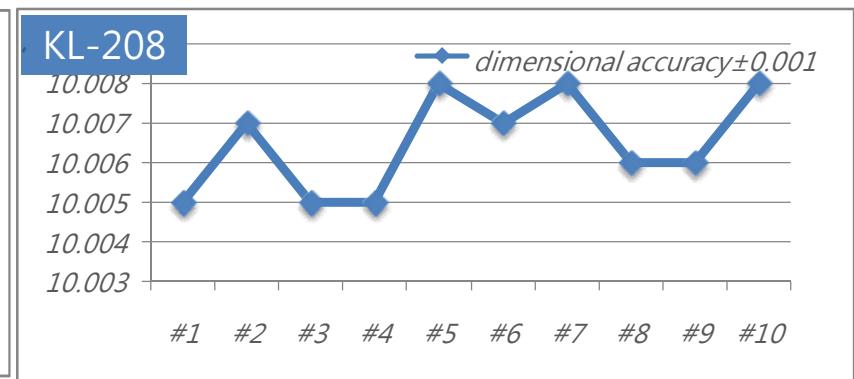
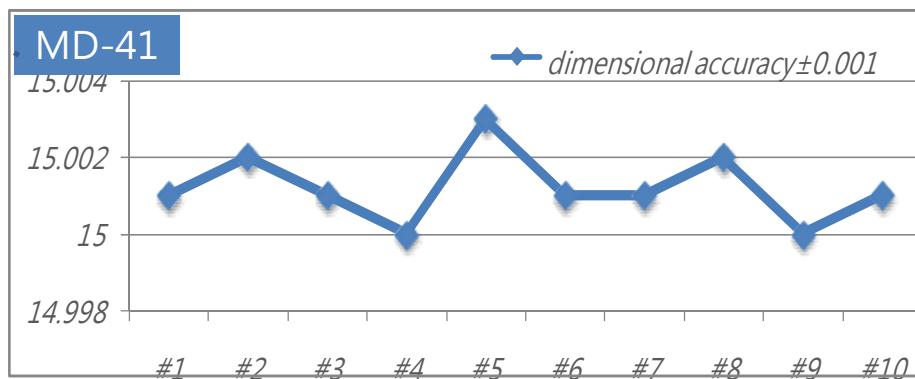
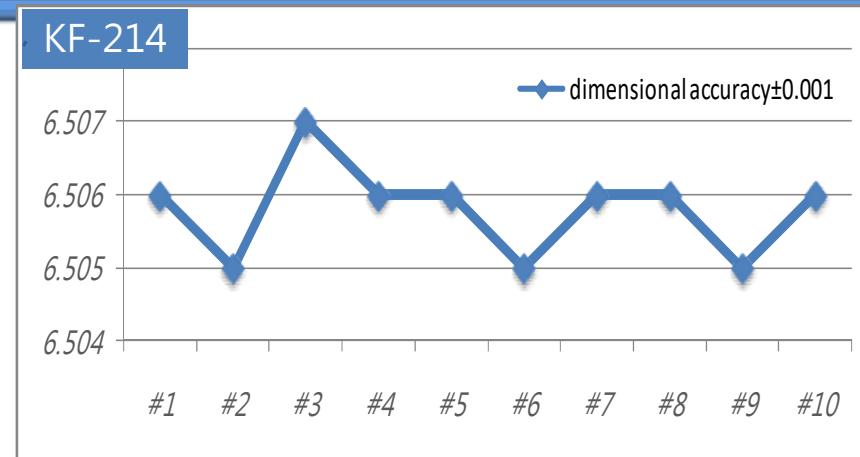


Cylindricity 2D analysis diagram



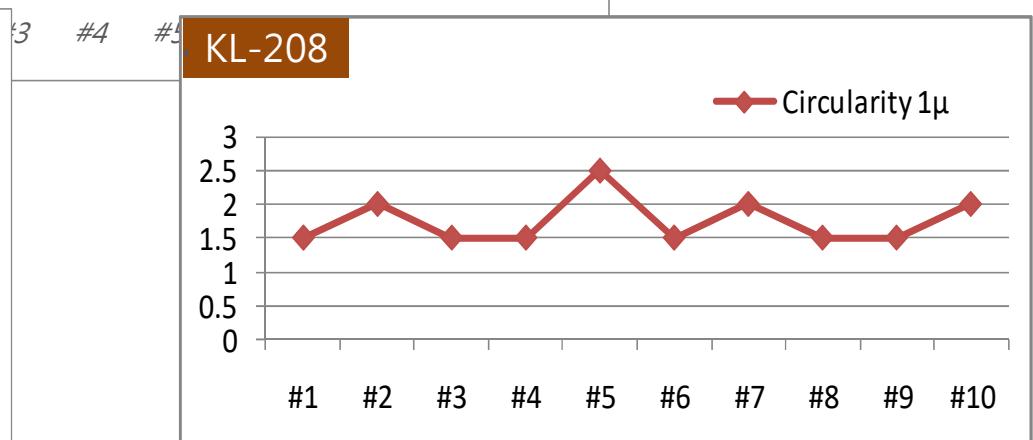
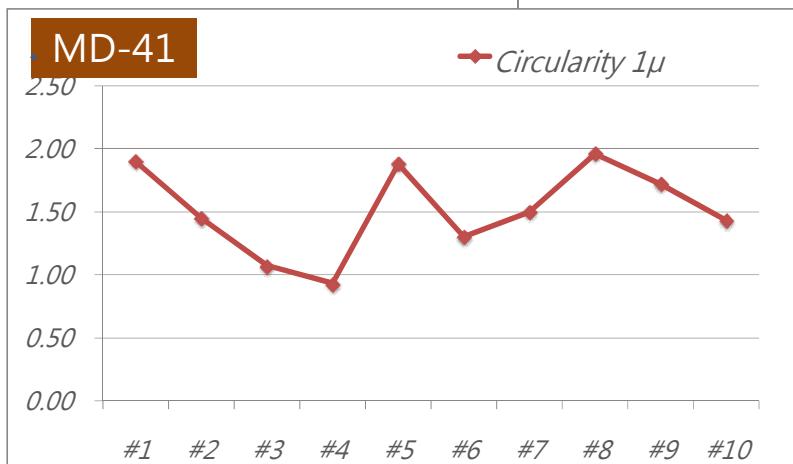
(3) Precision and Effectiveness

① 《dimensional accuracy±》



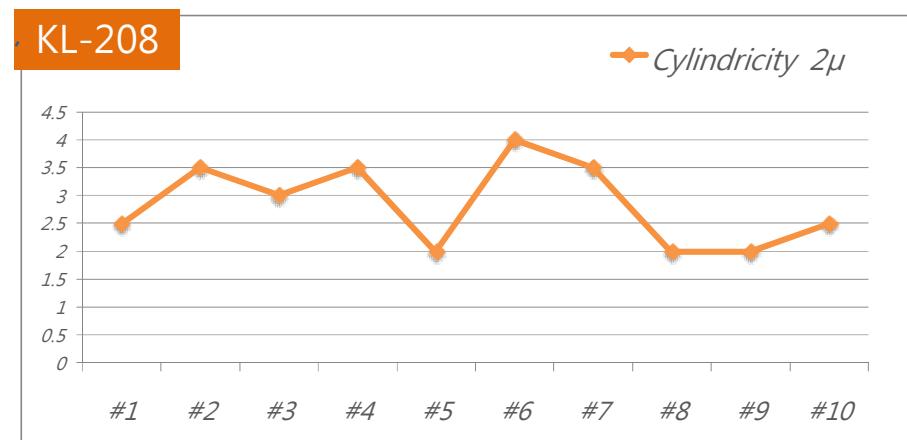
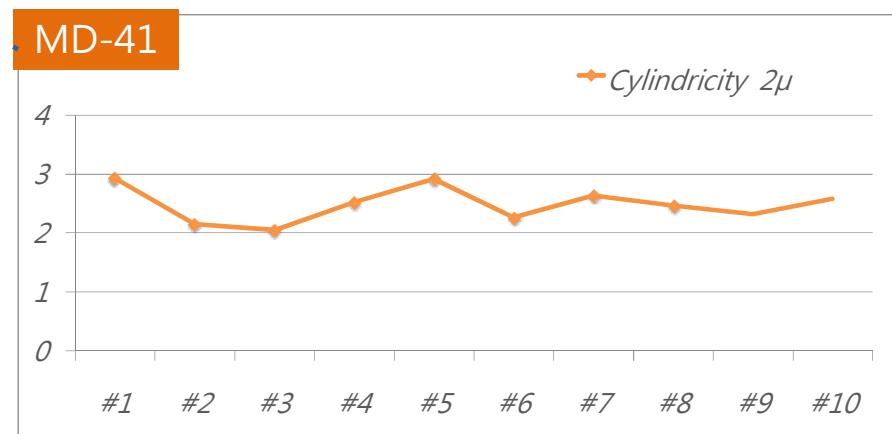
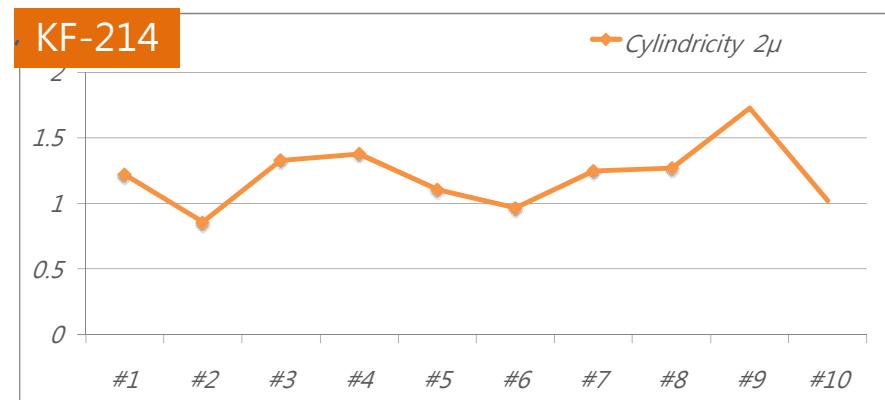
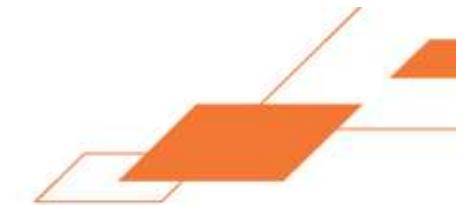
(3) Precision and Effectiveness

② 《Circularity ○》

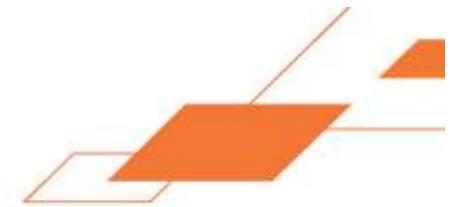


(3) Precision and Effectiveness

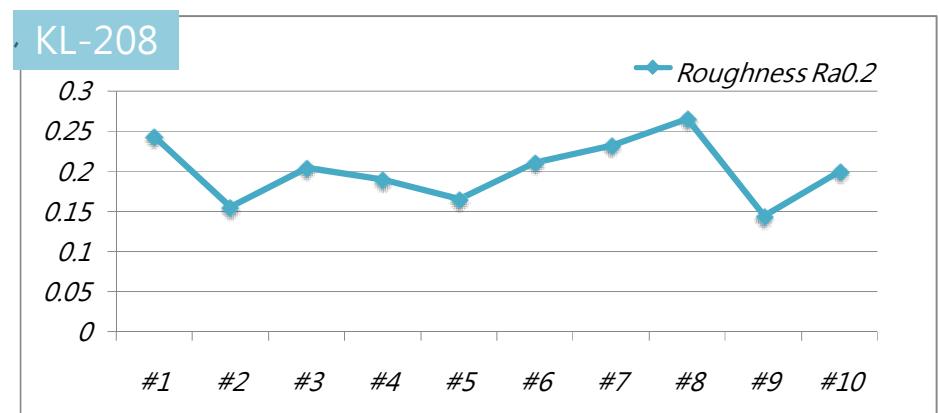
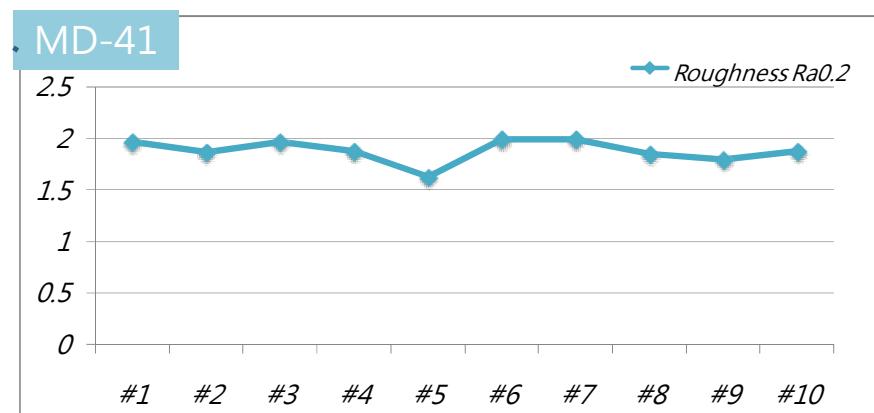
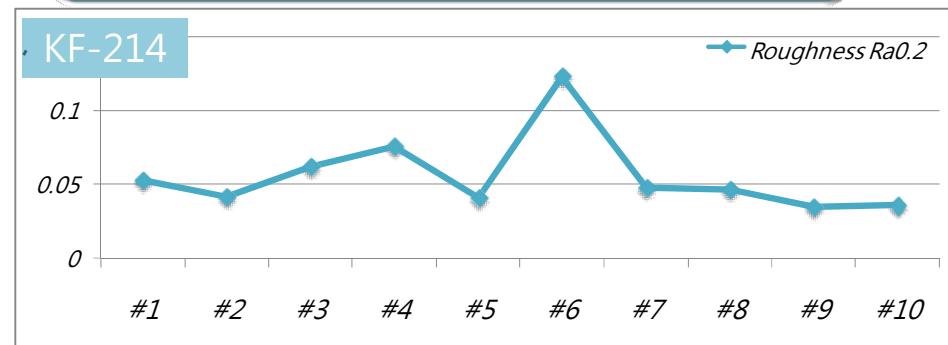
③ 《Cylindricity /○/》



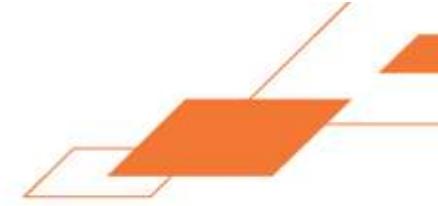
(3) Precision and Effectiveness



④ 《Roughness √》

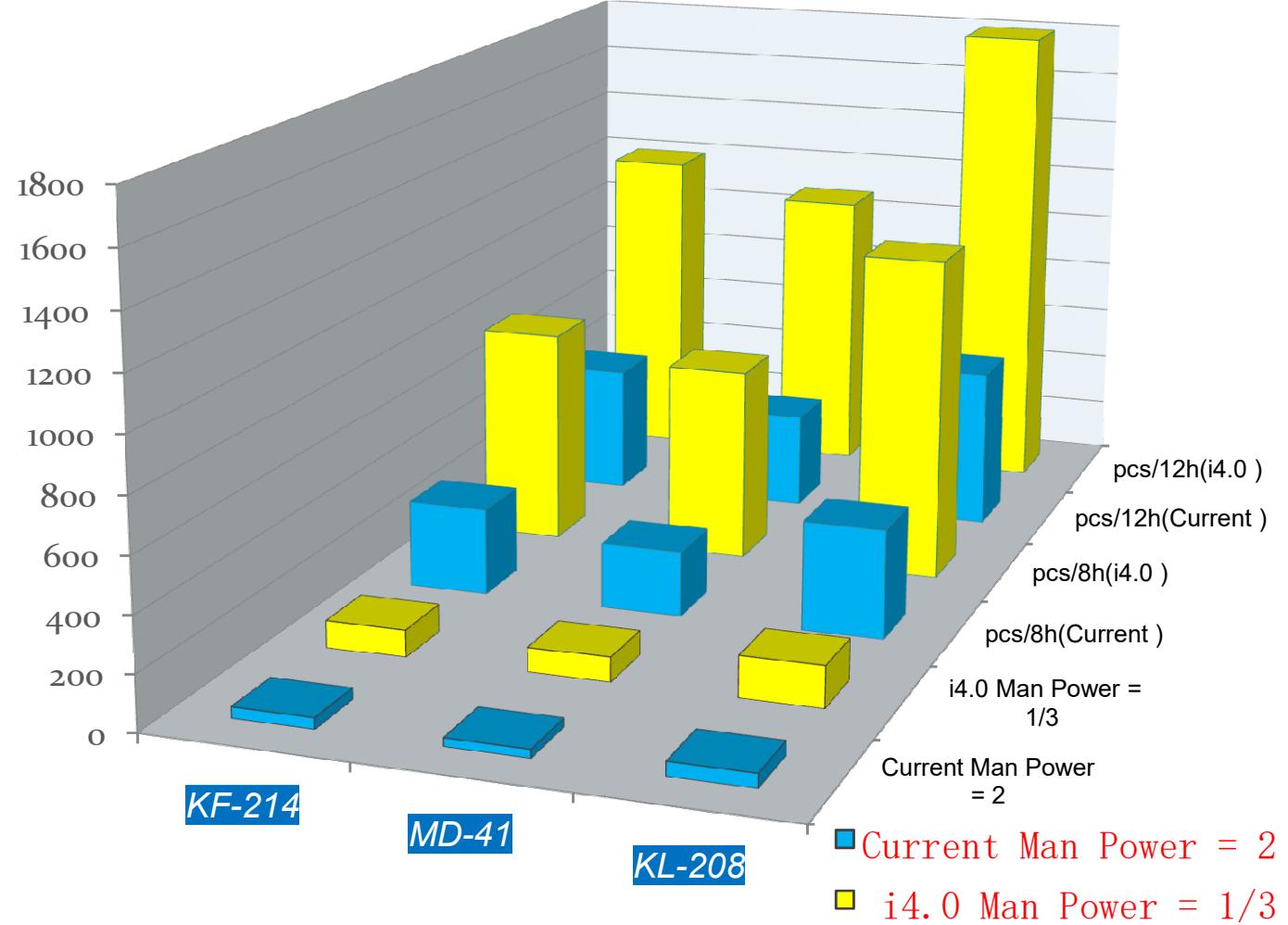


(3) Precision and Effectiveness

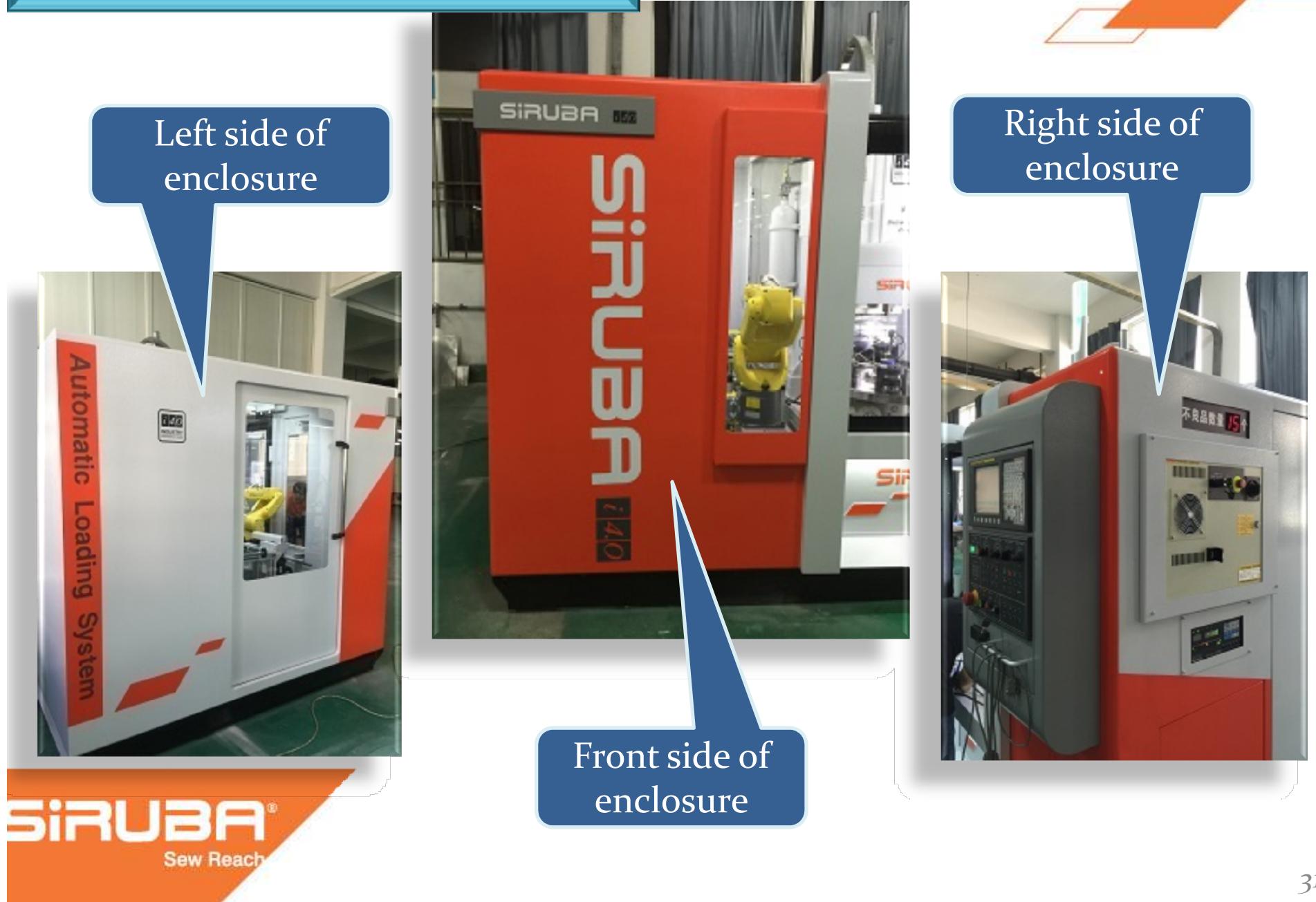


Comparison	Machining	Tool	Process				Man Power	unit	production pcs/8h	production pcs/11h				
Vertical - honing machine	honing	Honing strip	(1) harsh honing	(2) finish honing	(3) harsh reaming	(4) finish reaming	2	2pcs	250	350				
			40s/pcs	40s/pcs	14s/pcs	14s/pcs								
			Total cycle time : 108s											
			<i>i 4.0</i> Fully automatic honing machine											
<i>i 4.0</i>	Fully automatic honing machine	Reaming and honing	Electroplating-diamond reamer	30s/Cycle time				1/3	1pcs	900	1260			

(3) Precision and Effectiveness



(4) Exquisite Appearance Design



(4) Exquisite Appearance Design





*The intelligent
factory solution is
your best choice*

