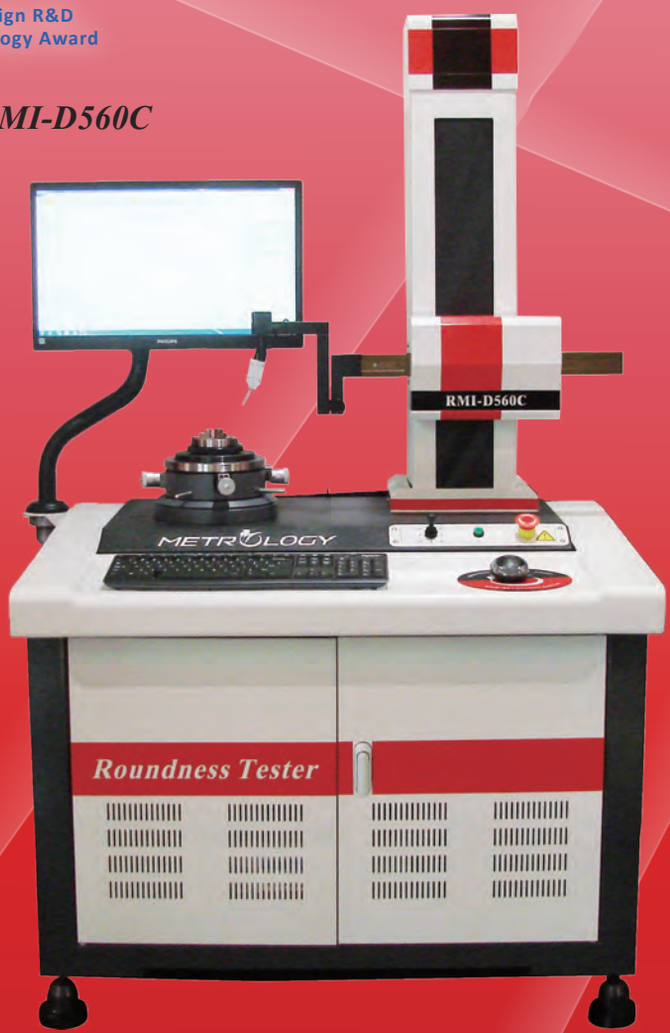
METROLOGY®

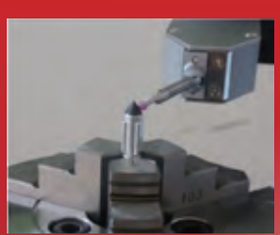
Roundness Measuring Instrument

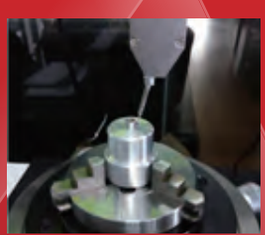
Innovation Design R&D
Patented Technology Award

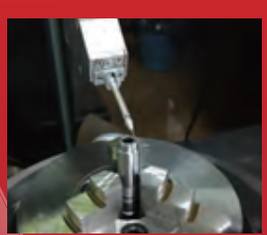
RMI-D420

RMI-D560C









Roundness Measuring Instrument RMI-D420

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Roundness Introduction

Roundness measuring instrument is benchmark against precision rotary center, the quantitative evaluation of the cross-section roundness is made by measuring the radius varitation of actual contour of workpiece in different angle position to rotary center by sensor. It is used to measure the cross-section roundness and coaxiality of internal rotation and external rotation and face runout, etc.

Measurement Capability:

Evaluation item: Roundness, concentricity, coaxiality, parallelism, perpendicularity, flatness, Single radial runout, Single axial runout

Analytical ability: Spectrum analysis, gap/burr automatically removed, waveform analysis

Roundness evaluation (4 methods): Minimum zone method (MZC), least square (LSC), minimum circum circle (MCC) and maximum inscribed circle (MIC)

Roundness filtering gear: 1-15upr,1-50upr,1-150upr,1-250upr,1-500upr,15-100upr,15-500upr,2-15upr

Filtering expression: Gaussian (ISO standard) Magnification: input range 1-100000

Technical specifications:

RMI-D420	Item	Parameter
Rotary table	Bearing Type	Gas bearing
	Rotation accuracy	(0.025+6H/10000)μm
	Rotating speed	6rpm
	Adjust table diameter	180mm
	Table loading capacity	15kg
	Rotation diameter	420mm
	Max measure diameter	250mm
Column (Z-axis)	Column transverse travel	320mm (electric)
	Max detection depth	100mm (min inner diameter): 30mm)
horizontal arm (X-axis)	Horizontal movement	150mm (manual)
	Protrusion amount	25mm
Detector	Acquisition device	Circle grating sensor
	Circumference of sampling points	4096 points
	Sensor type	Inductive Sensor
	Sensor range	±300μm
	Sensor resolution	0.001μm

*The above machine specifications can be customized and upgraded according to demand

Roundness Measuring Instrument RMI-D560C

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Cylindricity Introduction

Cylindricity measuring instrument is benchmark against precision rotary center and linear motion guide,the quantitative evaluation of the cylindricity is made by measuring the radius variation of actual contour of several cylindricity surface in different angle position to rotary center by displacement sensor in the guide. It is used to measure the error of contour shape of cylindricity workpiece (Roundness, cylindricity, planeness, straightness),position error (concentricity, coaxiality, run-out and perpendicularity)

Measurement Capability:

Evaluation item: Cylindricity module: Radial full jump, concentricity, taper, radius
Roundness module: Concentricity, radial single jump, wall thickness difference
Straightness module: Parallelism, verticality
Single section flatness module: Axial single jump, verticality and parallelism
Multi-section flatness module: parallelism, Axial full jump, verticality
Commutator module: Single contacts jump, Adjacent contacts jump, intermittent difference of contacts.
Reference standard for cylindricity evaluation: LSCY、MZCY、MICY、MCCY、OSCY

Technical specifications:

RMI-D560C	Item	Parameter
Rotary table	Bearing Type	Gas bearing
	Rotation accuracy	(0.025+6H/10000)μm
	Rotating speed	4,6,8,10rpm
	Adjust table diameter	180mm
	Table loading capacity	25kg
	Rotation diameter	560mm
	Max measure diameter	280mm
Column (Z-axis)	Column transverse travel	320mm (electric)
	Max detection depth	100mm (min inner diameter): 30mm)
	Column straightness	0.3μm /100mm
horizontal arm (X-axis)	Horizontal movement	165mm (electric)
	Protrusion amount	25mm
Detector	Acquisition device	Circle grating
	Circumference of sampling	14400 points
	Sensor type	Inductive Sensor
	Sensor range	±300μm
	Sensor resolution	0.001μm
	X raster	RENISHAW grating scale 0.5um
	Z raster	RENISHAW grating scale 0.5um

*The above machine specifications can be customized and upgraded according to demand

Roundness Measuring Instrument

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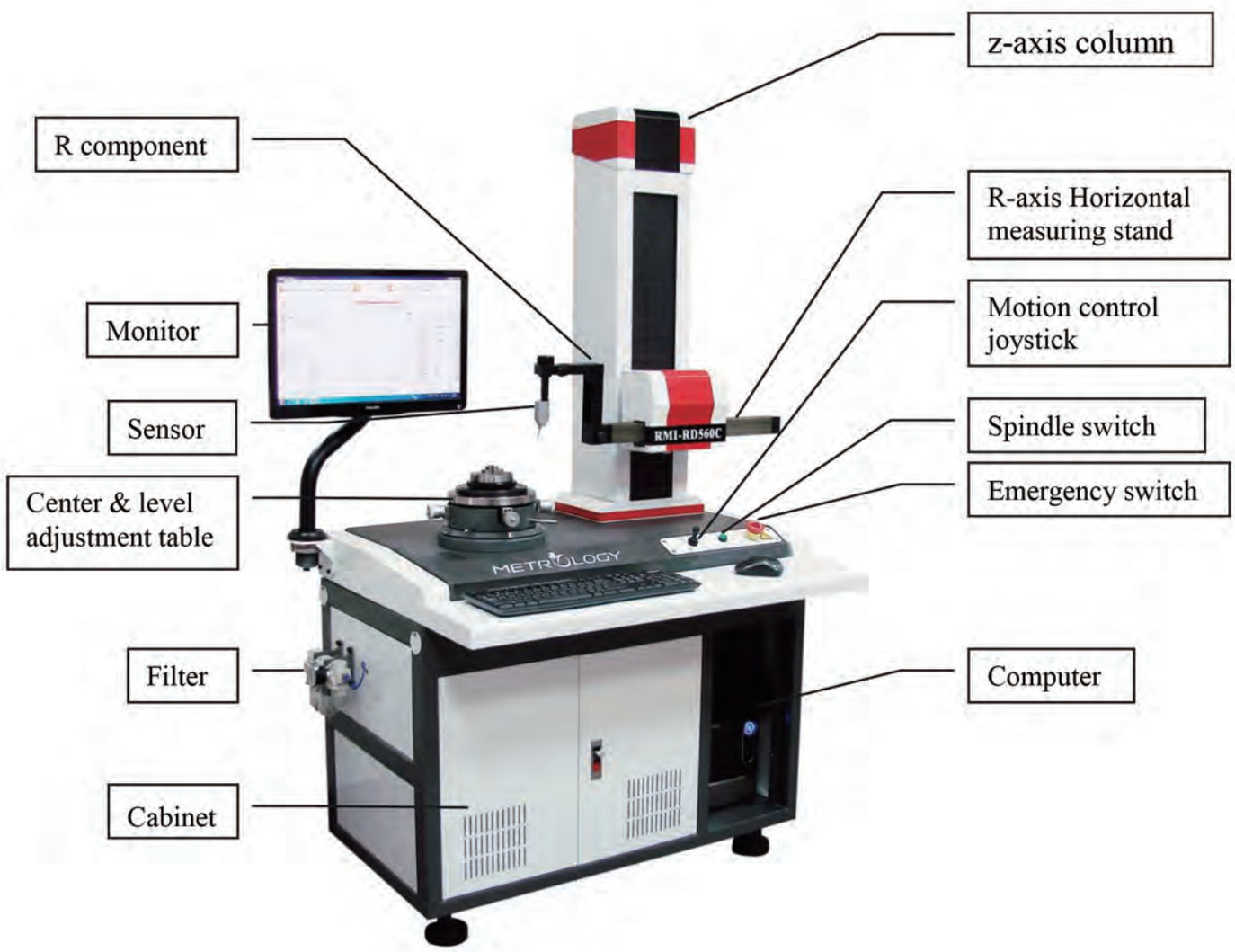
Technical features

- The machine reference table and Z-axis column material are made of natural granite, the structure is not deformed, and the performance is more stable and reliable
- The rotating spindle adopts a frictionless air-floating spindle, the accuracy is kept longer, and the rotation speed is stable
- The use of X-direction and Z-direction high-precision grating sensors improves the degree of automation and realizes the measurement function that the sensors can automatically contact
- The key components adopt special stress-relief alloy materials and special stress-relief treatment process, and the durability and accuracy are kept longer.

Structure Diagram



Assembly & inspection of the whole machine

Measurement & Control System

Ultra-quiet stepper motor drive

Air bearing & float balancing device

DIN00 Granite body components

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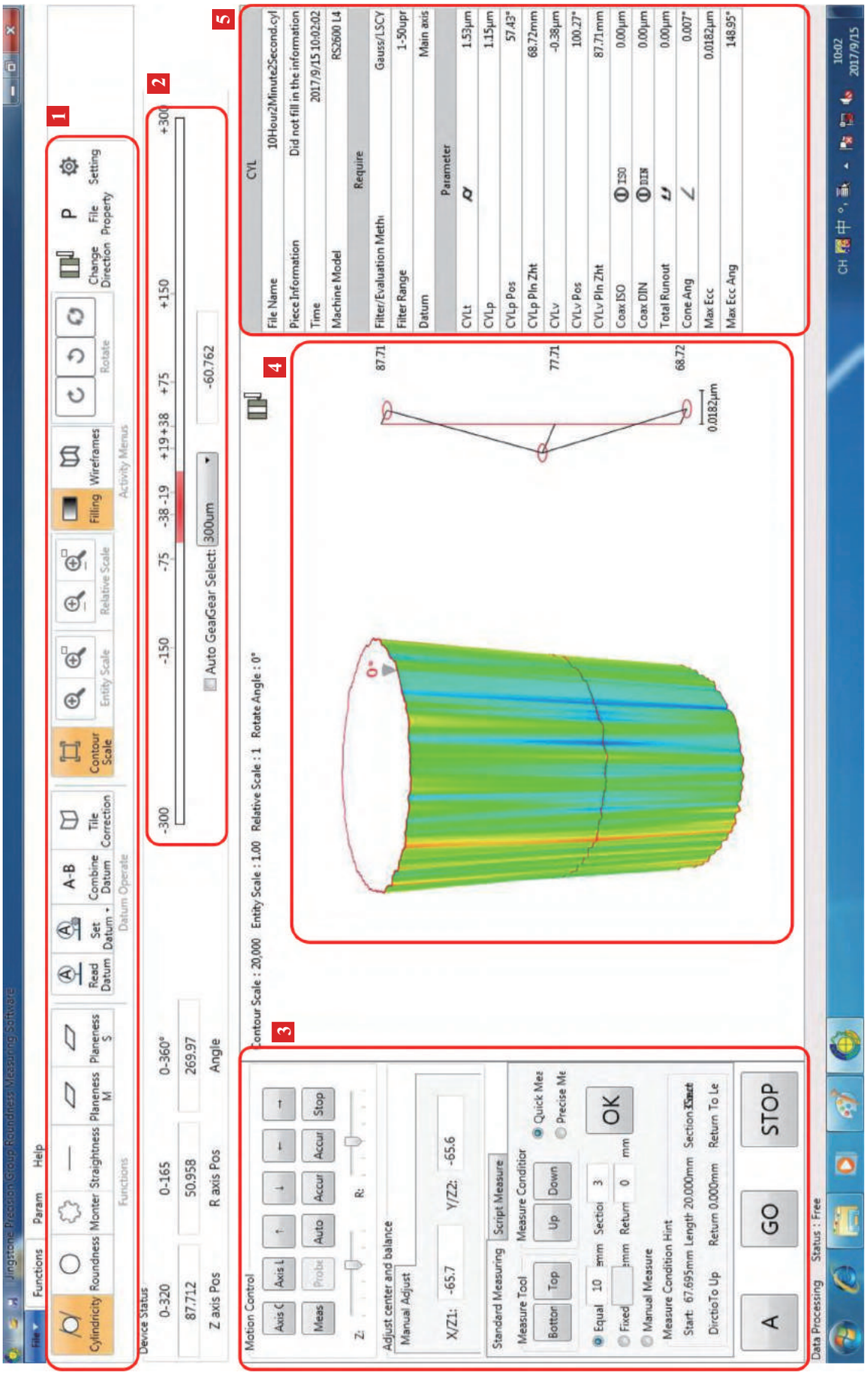
Roundness & Cylindricity software interface



1 Functional area 2 Sensor indication area 3 Control area 4 Graphics area 5 Report area

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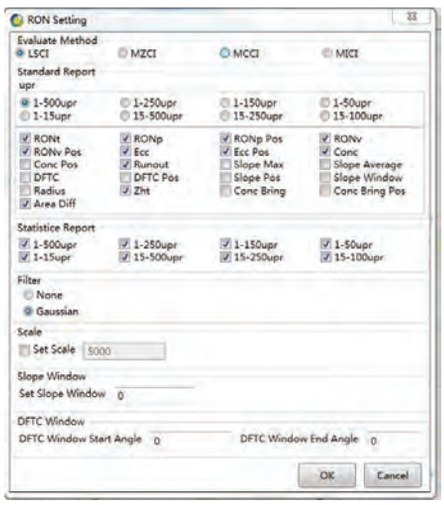
Software functions

- The software supports Chinese, English, and supports XP, win7, win8, win10 systems
- The standard report has various evaluation methods, and the parameters in the test report can be added and deleted as needed

RON		
File Name		Rs-ra1.ron
Piece Information		Did not fill in the information
Time		2018/11/26 17:02:06
Machine Model		RS1600 S2
Require		
Filter/Evaluation Met		Gauss/LSCI
Filter Range		1-500upr
Datum		Main axis
Parameter		
RONt	○	0.51μm
RONp		0.22μm
RONp Pos		123.37°
RONv		-0.29μm
RONv Pos		292.56°
Ecc	E	0.80μm
Ecc Pos	∠	337.49°
Conc	◎	1.19μm
Runout	↗	1.19μm
Zht		88.89mm
Area Diff		0.02mm²

ISO standard report (roundness)

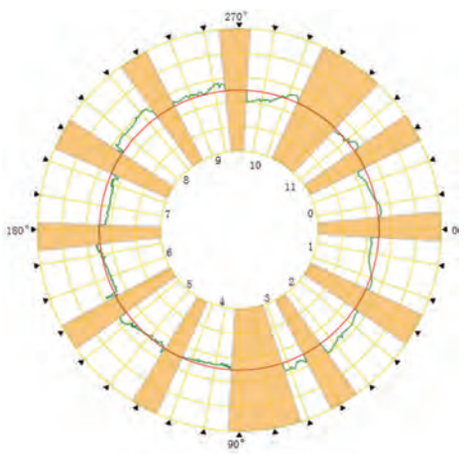


parameter settings

CYL		
File Name		17时1分49秒.cyl
Piece Information		Did not fill in the information
Time		2018/11/26 17:01:50
Machine Model		RS1600 S2
Require		
Filter/Evaluation Met		Gauss/MZCY
Filter Range		1-250upr
Datum		Main axis
Parameter		
CYLt	⌭	21.70μm
CYLp		10.85μm
CYLp Pos		223.70°
CYLp Pln Zht		88.89mm
CYLv		-10.85μm
CYLv Pos		10.08°
CYLv Pln Zht		215.88mm
Coax ISO	ⓘ ISO	0.00μm
Coax DIN	ⓘ DIN	0.00μm
Total Runout	⌰	0.00μm
CYLtt	∠	42.902μm
CYLtt Pos	∠P	171.00°

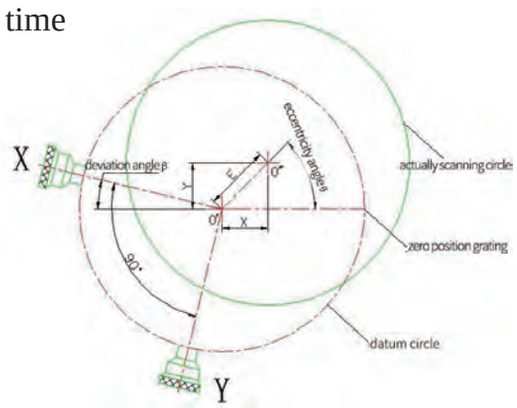
ISO standard report (cylindricity)

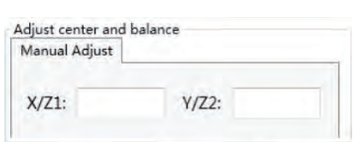
- With commutator module, it can evaluate single-chip true circle, adjacent segment difference and groove segment difference, and the measurement result can be deleted automatically or manually

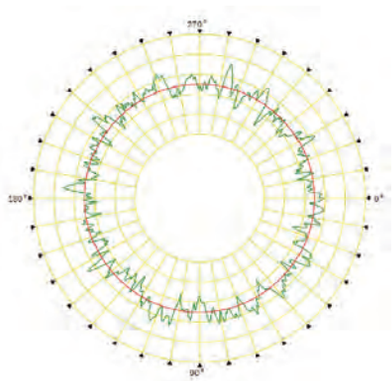


Mot					
File Name				16时1分27秒.mot	
Piece Information				Did not fill in the information	
Time				11/29/2018 16:01:28	
Parameter					
1-500upr		RON		6.51 um	
Index	Singal R	Piece Int	Piece Ac	P	V
0	0.39	0.16	5.60	-0.38	-0.77
1	5.24	0.55	5.62	4.83	-0.42
2	0.78	0.09	2.69	-0.01	-0.79
3	2.65	1.58	2.79	1.90	-0.74
4	0.84	0.03	1.59	-0.04	-0.88
5	0.72	0.39	0.77	0.71	-0.01
6	0.17	0.37	2.30	0.10	-0.07
7	2.35	0.58	3.03	2.23	-0.12
8	0.54	0.06	0.73	-0.25	-0.80
9	0.43	0.14	0.64	-0.07	-0.50
10	0.49	0.01	1.08	-0.21	-0.70
11	1.06	0.22	0.69	0.38	-0.68

- Software can assist the rotating spindle to adjust the center and level, improve efficiency and save time







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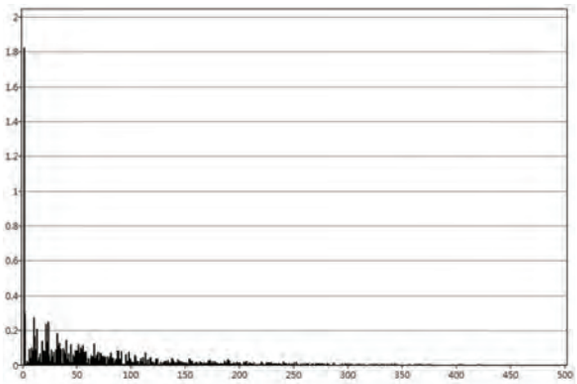
Software functions

- Measurement results can choose ISO statistical report or ISO standard report
- Can perform spectrum analysis on contour graphics

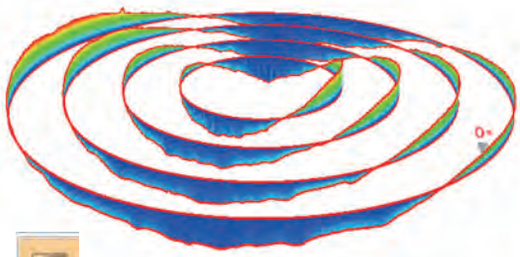
upr	RON	Standar	Result	RONp	RONv
1-500upr	0.51	0	NO	0.22	-0.29
1-250upr	0.50	0	NO	0.22	-0.28
1-150upr	0.47	0	NO	0.21	-0.26
1-50upr	0.37	0	NO	0.18	-0.19
1-15upr	0.23	0	NO	0.11	-0.12
15-500upr	0.42	0	NO	0.17	-0.24
15-250upr	0.40	0	NO	0.17	-0.24
15-100upr	0.35	0	NO	0.16	-0.19

ISO statistical report

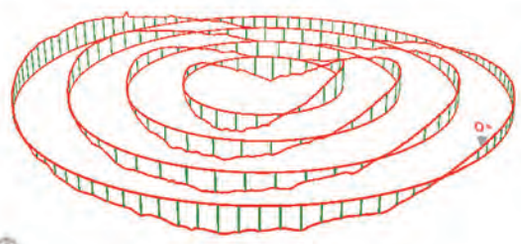


spectrum analysis

- Flatness measurement depending on the model can support single-section measurement (D420) or 2 to 15 multi-section measurements (D560C)
- In multi-section measurement, you can call, delete, and add to each section separately, and you can choose 2 sections at will defined as the reference of the workpiece, performing 2 combined operations not only avoids repeated measurements, but also improves the measurement efficiency

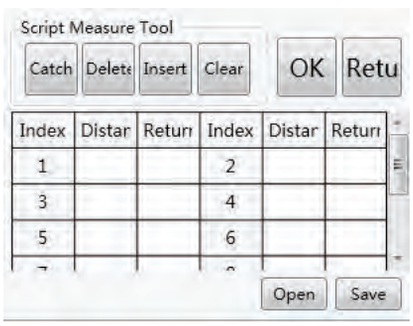


Filling View Drawing in the form of an entity



Wire frame View Draw a drawing in the form of a wireframe

- Cylindricity is calculated by multiple axes, and each axis is corrected by software to minimize the error between the axis systems (D560C)
- 3D graphics display, and the graphics can be rotated, beautiful and easy to read. And observe the overall contour of the workpiece through relative zoom
- The software is programmable, automatic measurement, and the original measurement data is automatically saved



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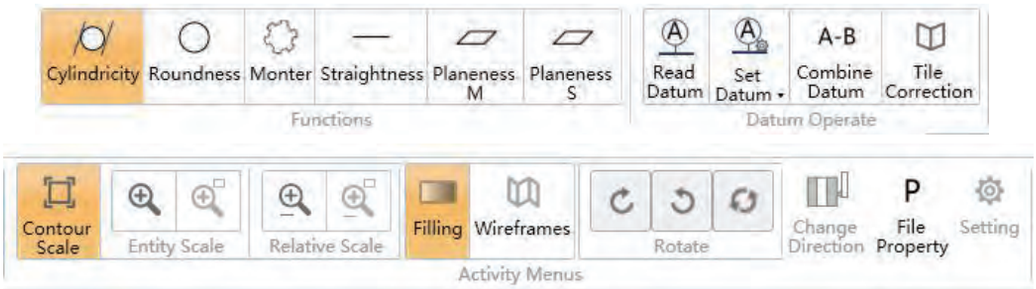
Measurement function and operation



Parameter setting function

Device Configuration

Part Name	Item name	Quantity	Remarks
Main machine	Basic Workbench	1	Natural granite
	High-precision air float spindle	1	Rotation accuracy (0.025+6H/10000)μm
	Column system	1	Natural granite
	Horizontal system	1	Steel structure
	Precision alignment and leveling table	1	Alignment: ±3mm Leveling: ±2°
computer	Data capture and processing system	1	Integrated controller
	computer	1	Standard PC system
	software	1	Roundness or cylindricity measurement software
Accessories	Stylus	1	Φ2*10mm ruby
	Sensor	1	Inductive sensors
	Precision three-jaw chuck	1	Taiwan Chandox Chuck
	Precision degreasing mist pressure regulating device	1	Japan SMC
	Calibration block	1	Breach standard parts

Operational environment:

Vibration source：Without vibration source

Power：AC 220V±10% 50Hz Separate ground

Temperature：in site temperature：12℃—26℃ ideal temperature 20±2℃ Relative humidity：＜60%

Air supply：Air compressor air pressure：0.5-0.8Mpa Air compressor air flow：≧0.2m³/min

Air pressure dew point at instrument inlet ≤10℃ Oil mist detector ≤0.5mg/m³,SOLID ≤3um

Content of solid particles ≤5mg/m³