METROLOGY®

Contour Measuring Instrument

SATISFACTION BEST CHOICE GUARANTEED

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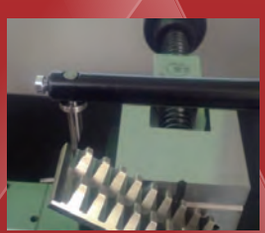
CMI-Z40
Contour

CMI-Z60R
Contour & Roughness

Contour Measuring Instrument

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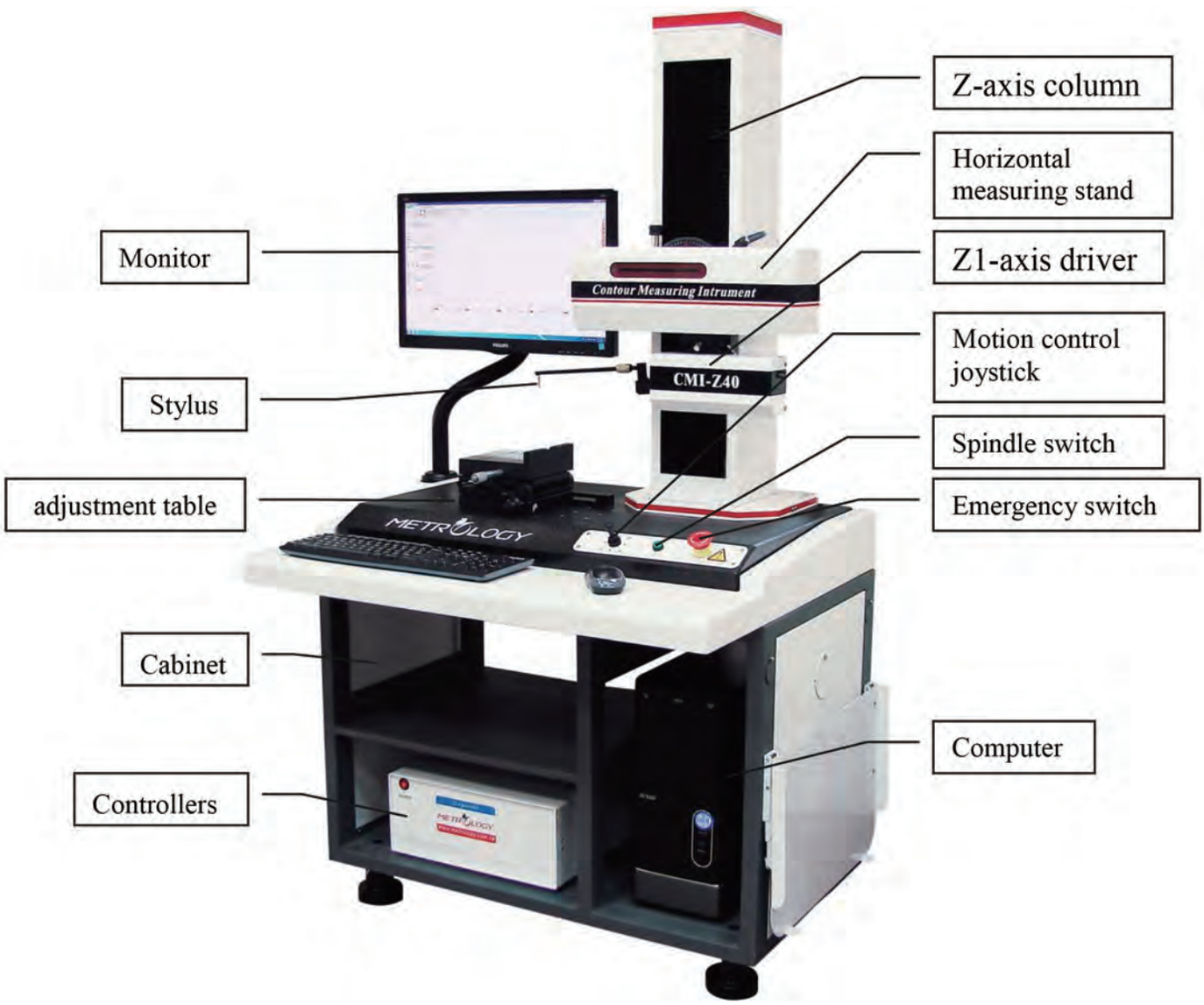
Technical features

- 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 use of X-direction and Z1-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

DIN00 Granite body components

Contour & Roughness Measuring Instrument

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Measuring principle

Contour measurement: The measuring principle of this instrument is the rectangular coordinate measuring method ,through X-axis, Z-axis sensor, mapping the surface contour coordinates point of the part under test, data transmission the coordinates point to the upper PC by electrical components.
To do the mathematical treatment on the original collected coordinate data by software, marked with the required engineering survey projects.

Roughness measurement: Using differential inductive roughness sensor, it is an advanced and high-sensitivity induction coil technology and structure design.
It still has extremely high linearity accuracy in a wide range of measurements.
the measuring device uses a design technology without a guide and uses a precision slideway as the measurement benchmark. , only the residual value of the contour is less than 0.005μm, and the measurement accuracy is high.
In addition to measuring the absolute position of the surface roughness of the part, it also has an advantage and outstanding measurement ability when measuring the roughness of the inclined surface and arc.

Measuring function

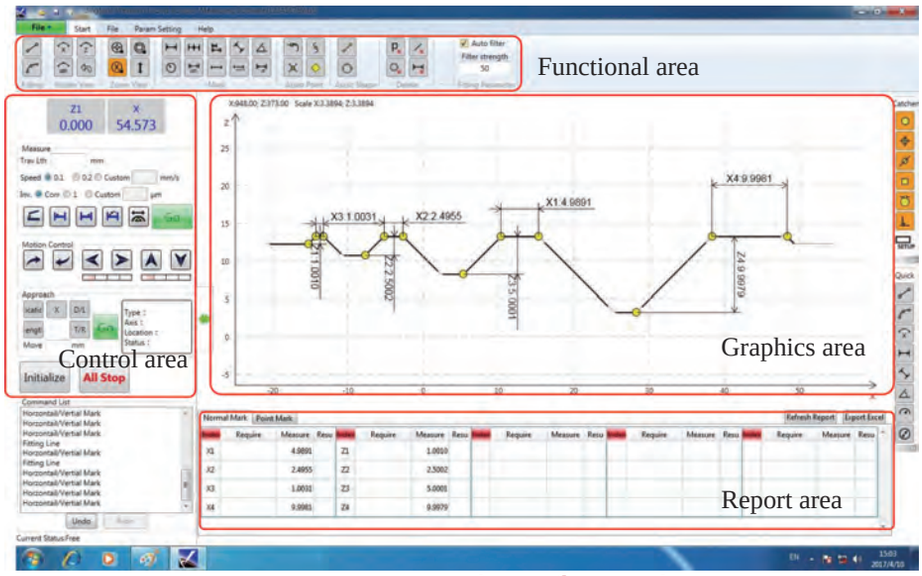
Contour measurement:

Size: contains the horizontal distance, vertical distance, linear distance, radius and diameter
Angle: horizontal angle and vertical angle, Angle
Position tolerance: contains the parallelism and perpendicularity
Shape tolerance: contains the straightness, crown, circular arc profile
Auxiliary generation: contains the auxiliary point, auxiliary line, auxiliary circle

Roughness measurement:

Roughness function：Ra、Rp、Rv、Rz、Rz（jis）、R3z、RzDIN、Rzj、Rmax、Rc、Rt、Rq、Rsk、Rku、Rsm、Rs、Rq、Rk、Rpk、Rvk、Mr1、Mr2、Rmr
Waviness parameter：Wa、Wt、Wp、Wv、Wz、Wq、Wsm、Wsk、Wku、Wmr
Original contour parameters：Pa、Pt、Pp、Pv、Pz、Pq、Psm、Psk、Pku、Pmr

Contour Measuring Instrument



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Contour software interface

Measuring functions

File description

Software function

- X and Z1 adopt electronic digital sensors, with large measuring range, high precision and strong repeatability
- Large range design, lever ratio is only 1:2.2, maintaining the original accuracy of the sensor
- Adopt high-speed data acquisition unit, hardware trigger and high-speed sampling, no delay, the calculation processing system provides the most powerful guarantee
- High rigidity, high precision linear guide, high precision digital linear sensor
- The software supports Chinese, English, and supports XP, win7, win8, win10 systems
- It has the functions of stylus automatic contact, automatic lifting and automatic retraction, which can capture the starting point and the end point, and can set the movement speed according to the needs

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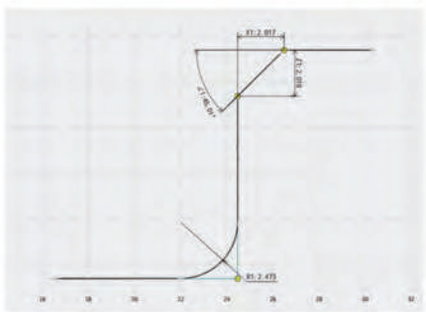
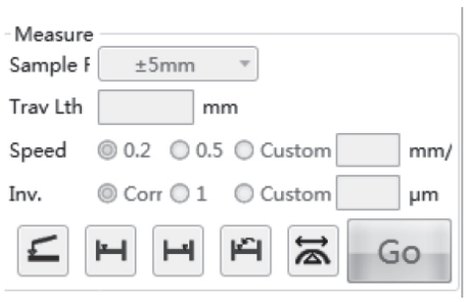
Contour Measuring Software functions

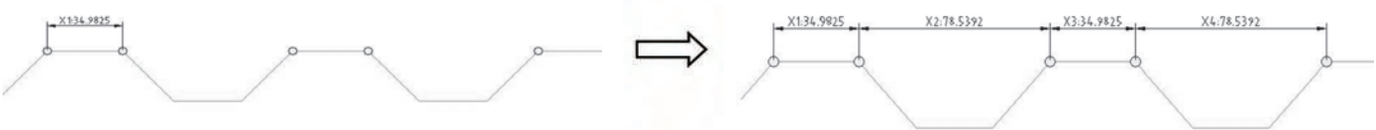
The length of the right lever is up to 280mm. When the measurement of the same height is achieved, the swing angle is small, so as to avoid the interference between the components on the surface of the part and the measuring rod

The marking method is the same as CAD, which is convenient and easy to learn. The measurement length, sampling speed and sampling interval can be set freely.



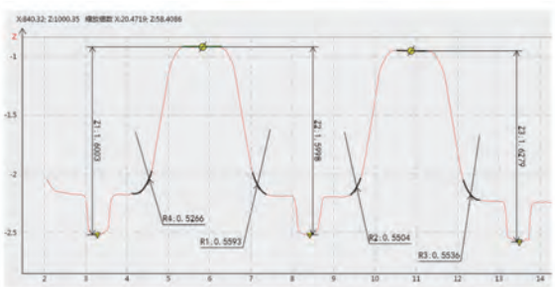


- Automatic identification of arcs and lines, point or frame selection for fitting
- The original data is automatically saved, which is convenient for multiple annotations, and supports free rotation of graphics and free rotation of coordinates
- Unnecessary feature points can be set in the feature point capture area to facilitate user's choice
- Support dimension, horizontal, vertical, linear, continuous, reference line, angle, arc, coordinate point, straightness, curve profile, peak value, arc area, verticality, etc.
- The software is equipped with quick keys to facilitate quick operation of the annotation of geometric element measurement



- Support collapsing the menu and control area to expand the effective area of the drawing area

Under non-proportionally enlarged state, normal angle, arc, horizontal, vertical, linear, etc. can also be marked



With unique features such as automatic labeling, intermittent measurement, data merge and other features (Z25 does not have this function)

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Technical specifications

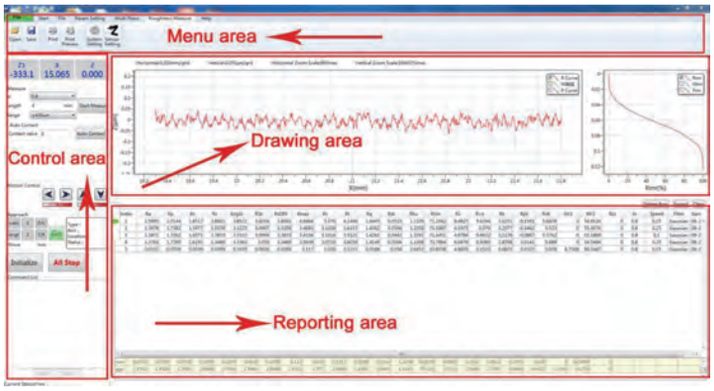
Item		CMI-Z25	CMI-Z40	CMI-Z60
Measuring range	X-axis	120mm		
	Z1-axis	25mm	40mm	60mm
	Z-axis	420mm		
Indication accuracy	Straightness	0.8μm/100mm	0.5μm/100mm	
	X-axis	±(3.0+0.02L)μm	±(1.5+0.025L)μm	
	Z1-axis	±(1.5+|0.2H|)μm	±(0.8+|0.15H|)μm	
	Arc	±(2+R/8)μm	±(1.5+R/12)μm	
	Angle	±2′	±1′	
Detection method	X-axis	0.2μm sensor	0.2μm Electronic digital sensor	
	Z1-axis	0.05μm sensor	0.05μm Electronic digital sensor	
Drive speed	X-axis	0.1-10mm/S	0.05-15mm/S	
	Z-axis	0.5-10mm/S	0.2-15mm/S	
	Z1-axis	0.1 · 0.2 · 0.5 · 1mm/s		
Drive mode	X-axis	Electric (Ultra quiet stepping motor and linear slide)		
	Z-axis			

Device Configuration

Part Name	Item	Quantity	Remarks
Host	Basic Workbench	1	DIN00 grade granite
	Column subsystem	1	High precision linear slide and electric stepper motor drive
	Horizontal system	1	High precision linear slide and electric stepper motor drive
	High precision guide system	1	British Renishaw raster count
	Swing arm system	1	Leverage ratio is 1:2.2, effectively ensuring the accuracy of the sensor
	Motion Control System	1	Integrated controller
Calculus system	computer	1	Standard PC system equipment
	software	1	English contour measurement software
Accessories	Stylus	1	Φ4*32mm single cut surface 17°
	Three-way adjustment table	1	Y direction ±6mm tilt -3°~60° rotation ±10°
	Precision sinus flat vise	1	Clamping length 60mm, adjusting angle 0°~45°

Contour & Roughness Measuring Instrument(2 in 1 model)

Roughness Measuring Software functions



Roughness Measuring interface

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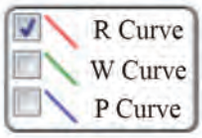
Curve display setting



P Curve: Display contour curve in the drawing area

R Curve: Display the roughness curve in the drawing area

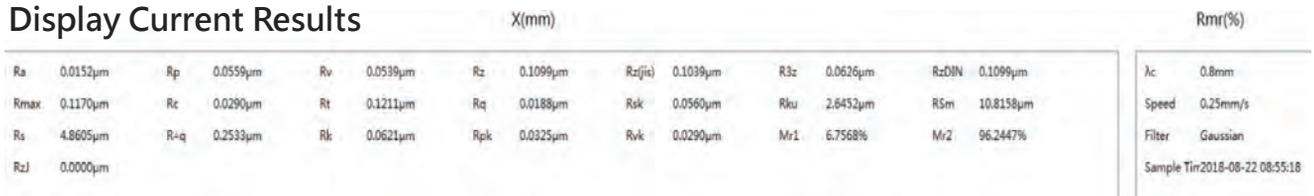
Raw Data: The acquired raw data curve is displayed in the drawing area.

Cutoff value and roughness parameter value comparison table

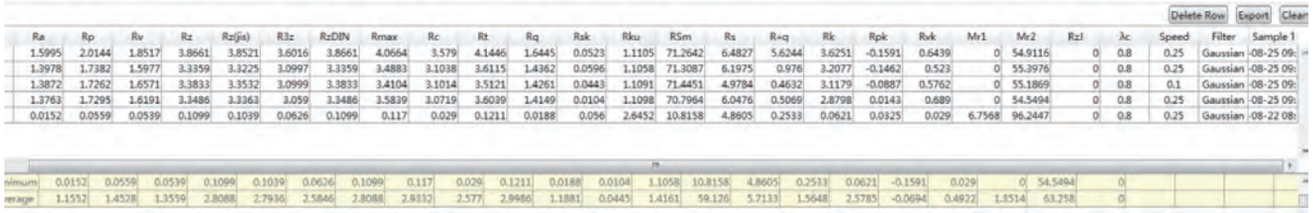
Arithmetic mean Ra			Maximum height Ry	Ten point average Rz	Ry · Rz Reference length ℓ (mm)	Processing symbol
Parameter value	Cutoff value λc (mm)	Roughness symbol	Parameter value			
0.012 a 0.025 a 0.05 a 0.1 a 0.2 a	0.08 0.25 0.8	0.012 ~ 0.2	0.05 s 0.1 s 0.2 s 0.4 s 0.8 s	0.05 z 0.1 z 0.2 z 0.4 z 0.8 z	0.08 0.25	
0.4 a 0.8 a 1.6 a		0.4 ~ 1.6	1.6 s 3.2 s 6.3 s	1.6 z 3.2 z 6.3 z	0.8	
3.2 a 6.3 a	2.5	3.2 ~ 6.3	12.5 s 25 s	12.5 z 25 z	2.5	
12.5 a 25 a	8	12.5 ~ 25	50 s 100 s	50 z 100 z	8	
50 a 100 a	—	50 ~ 100	200 s 400 s	200 z 400 z	—	

Data output function

Display Current Results



Display statistical report



Ra	Rp	Rv	Rz	Rz(jis)	R3z	RzDIN	Rmax	Rc	Rt	Rq	Rsk	Rku	RSm	Rs	R+q	Rk	Rpk	Rvk	Mr1	Mr2	RzJI	λc	Speed	Filter	Sample T
1.5995	2.0144	1.8517	3.8661	3.8521	3.6016	3.8661	4.0664	3.579	4.1446	1.6445	0.0523	1.1105	71.2642	6.4827	5.6244	3.6251	-0.1591	0.6439	0	54.9116	0	0.8	0.25	Gaussian	08-25 09:
1.3978	1.7382	1.5977	3.3359	3.3225	3.0997	3.3359	3.4883	3.1038	3.6115	1.4362	0.0596	1.1058	71.3087	6.1975	0.976	3.2077	-0.1462	0.523	0	55.3976	0	0.8	0.25	Gaussian	08-25 09:
1.3872	1.7262	1.6571	3.3833	3.3532	3.0999	3.3833	3.4104	3.1014	3.5121	1.4261	0.0443	1.1091	71.4451	4.9784	0.4632	3.1179	-0.0887	0.5762	0	55.1869	0	0.8	0.1	Gaussian	08-25 09:
1.3763	1.7295	1.6191	3.3486	3.3363	3.059	3.3486	3.3839	3.0719	3.6039	1.4149	0.0104	1.1098	70.7964	6.0476	0.5069	2.8798	0.0143	0.689	0	54.5494	0	0.8	0.25	Gaussian	08-25 09:
0.0152	0.0559	0.0539	0.1099	0.1039	0.0626	0.1099	0.117	0.029	0.1211	0.0188	0.056	2.6452	10.8158	4.8605	0.2533	0.0621	0.0325	0.029	6.7568	96.2447	0	0.8	0.25	Gaussian	08-22 08:

nimum	0.0152	0.0559	0.0539	0.1099	0.1039	0.0626	0.1099	0.117	0.029	0.1211	0.0188	0.0104	1.1058	10.8158	4.8605	0.2533	0.0621	-0.1591	0.029	0	54.5494	0			
erage	1.1552	1.4528	1.3559	2.8088	2.7936	2.5846	2.8088	2.8332	2.577	2.9986	1.1881	0.0445	1.4161	59.126	5.7133	1.5648	2.5785	-0.0694	0.4922	1.3514	63.258	0			

■ Contour & Roughness Measuring Instrument(2 in 1 model)

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Contour & Roughness Technical specifications

Item / Model NO.		CMI-Z30R	CMI-Z60R
Contour parameters	X-axis Measuring range	120mm	150mm
	X-axis Resolution	0.2μm	
	Z1 Measuring range	30mm	60mm
	Z1 Resolution	0.05μm	
	Z-axis	measuring range 420mm (electric)	
	Z1 accuracy [1]	± (1.5 +|0.2H|) μm	± (0.8+|0.15H|) μm
	Arc[2]	± (2+R/8) μm	± (1.5+R/12) μm
	angle [3]	±2′	±1′
	Straightness	0.8μm/100mm	0.5μm/100mm
Roughness parameter	accuracy	≤±(7nm±3.5%)	≤±(5nm±3%)
	Residual noise	No guide ≤0.025μm	No guide ≤0.005μm
	Repeatability	1δ≤2nm	1δ≤1nm
	Cutoff wavelength	0.025、0.08、0.25、0.8、2.5、8	
	Evaluation length	λc X1、2、3、4、5、6、7	
	Z1 Measuring range	±420μm	±620μm
	Z1 Resolution	65536:1	262144:1
sport control	X-axis Drive method	electric	
	Z-axis Drive method	electric	
	X-axis Drive speed	0.1~10mm/s	0.05~15mm/s
	Z-axis Drive speed	0.5-10mm/s	0.2-15mm/s

Remarks:
1. H is the measuring height on the horizontal position
2. For standard balls with 2mm < R < 10mm, the sampling arc angle is 120°
3. Angle block of 60° and 90°, the sampling length of the corner edge is 5mm
4. The specifications of the above measurement range can be customized and upgraded according to requirements

Contour & Roughness Measuring Instrument(2 in 1 model)

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Standard accessories

Machine: All-in-one-piece ergonomic machine with granite base, specification: 500*800 mm
Column: Max. moving speed: 20mm/S Min. moving speed: 0.2mm/s Positioning accuracy: 0.005mm
Sensor: Linear accuracy: ±(0.7+|0.05H|)μm Measuring force: 1.2g Roughness sensor without guide
Precision sine platform: jaw width 50mm, jaw depth 25mm, opening 60mm, adjustment angle 0-45°
Precision table: Size: 150*225*110mm Y : ±6mm Rotation: ±15° Inclination angle: -10°~ 60°(Z60R)
Standard table: Size: 150*150*86mm Y : ±6mm Rotation: ±10° Inclination angle: -3°~ 60°(Z30R)
Contour measuring rod: Material: carbon fiber Diameter: 8mm Length: 200mm
Contour Single section stylus: Diameter: 4mm Length: 32mm Angle: 17° Tip: 25μm
Roughness standard measuring rod: Diameter: 3mm Length: 90mm
Roughness stylus: Diameter: 1mm Length: 12mm Angle: 60° Tip: 5μm

Part name	Name	Quantity	Remarks
Main machine	Basic workbench	1	DIN00 grade granite
	Column system	1	High-precision linear slide and electric stepper motor drive
	Horizontal system	1	High-precision linear slide and electric stepper motor drive
	High-precision slide system	1	Renishaw scale
	Swing arm system	1	The leverage ratio is 1:2.2, which effectively guarantees the accuracy of the sensor
	Motion Control System	1	Integrated controller
Calculus system	computer	1	Standard PC system equipment
	software	1	Two-in-one measurement software for surface roughness and contour in Chinese and English

Equipment size

Lx*Ly*Lz：1400*850*1780mm Main machine weight：350 kg

Environmental conditions

Vibration source: no large vibration source Power supply: AC 110-220V±10% 50Hz
Temperature: On-site storage temperature: 15℃—35℃
The best operating temperature is 20±2℃ Relative humidity: less than 60%