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## Chapter I Equipment operating procedure

### 1. 1. Equipment installation and training process

The serial number	Steps	Instructions
1	Verification of environment	Confirm the installation according to <b>【1.2. Requirements for Device Installation Environment】</b>
2	Confirmation of outer packing	
3	devanning	
4	Equipment component configuration check and test	Check and test according to the 《Packing List》
5	Installation	
6	Device connection cable check Device motion check	
7	The calibration	
8	Equipment principle and structure introduction	
9	Turn on and off	
10	Software installation and use	Installation, swith on, calibration, measurement and other functions are introduced
11	sensor, R-shaped component adjustment	
12	Equipment inspection and maintenance	

13		Issue Training Certificate	
14	Acceptance procedure		The signature of the person in charge of the equipment user is required

## 1.2. Requirements for device installation environment

Project	Requirements and Conditions	Instructions
The power supply	AC 220V±10% 50Hz Single ground power: 500W	If the voltage is too high, it will burn the electronic components. If the voltage is too low, the signal will be unstable. If there is no separate bottom line, the signal will be interfered and the measurement will be unstable.
The temperature	The on-site temperature ranges from 12 ° C to 26 ° C Ideal temperature 20±2°C Step temperature does not exceed 1°C/h	Large temperature deviation will lead to data deviation.
Humidity	Relative humidity: < 85% (no condensation)	The equipment will rust easily if the humidity is too high
The source of vibration	Maximum ground vibration RMS < 50HZ 2.5μm/s > 50HZ 5.0μm/s	Environmental vibration sources affect measurement accuracy.
Air supply	Air source pressure: 0.5-0.8Mpa Air flow rate: > 0.2m <sup>3</sup> /min	When the flow rate and pressure are insufficient, the air float bearing will not be able to suspend smoothly, resulting in loss of rotation accuracy or damage caused by friction between the shaft core and sleeve.
	Solid impurity and liquid water treatment system: Filtration accuracy: 3μm Filtration capacity: > 0.25m <sup>3</sup> /min Solid particle content: <	Air floating bearing, that is, the gas high pressure makes the shaft shaft sleeve separate and produce gas film, so as to reach suspension. If there is water, oil and particulate matter in the air

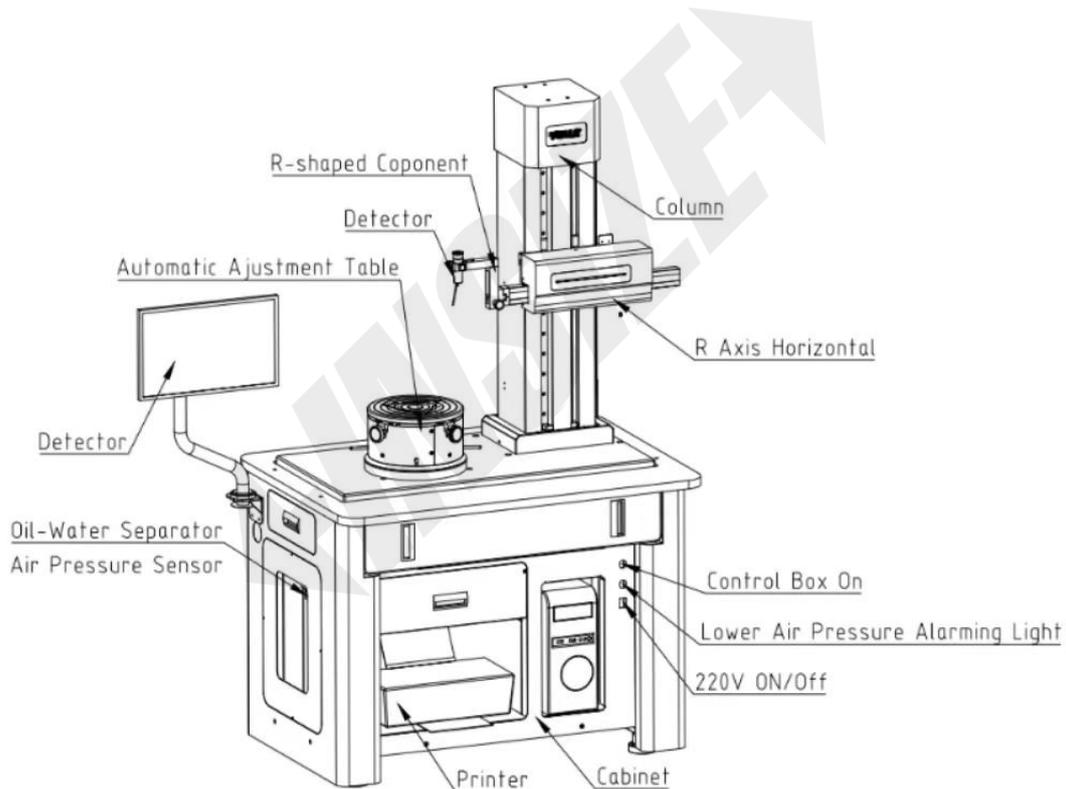
	5mg/m <sup>3</sup>	source, it will damage the air film, increase damping and damage the rotation accuracy. If the situation is serious, it will cause friction and damage to the shaft core and sleeve.
	Cold drying machine: Processing capacity: > 0.25m <sup>3</sup> /min Pressure dew point: < 10°C (no condensation)	
	Precision oil mist removal and pressure regulating device: Pressure regulating range: 0-0.8mpa Oil mist removal accuracy: 0.01μm Export oil mist concentration: 0.5mg/m <sup>3</sup>	Standard equipment (SMC brand) Filter replacement cycle: one year If the pressure drops to 0.1mpa, please contact SMC directly
Equipment Size (mm)	1656 * 820 * 1904	
Equipment weight (kg)	450	
Transportation of equipment	One forklift truck with a load of 1 ton. 1-2 people are needed to assist.	
<p>Note:</p> <ol style="list-style-type: none"> <li>1, the equipment should not be placed in the window, so as not to rain caused by equipment rust, affecting the accuracy;</li> <li>2, the equipment should not be placed at the door, so as not to open and close the airflow affect the measurement;</li> <li>3, the equipment should not be placed in the fan, air conditioning outlet, so as not to affect the airflow measurement;</li> <li>4. Do not place strong magnetic tooling near the equipment so as not to affect the measurement;</li> <li>5. the equipment is not placed next to the processing equipment, so as not to affect the vibration of the processing equipment measurement.</li> </ol>		

### 1. 3. Principle of Equipment

The cylindricity meter is a measuring instrument for quantitative evaluation of cylinder surface cylindricity based on precision rotary center line and precision linear motion guide. The displacement sensor located on the linear motion guide is used to measure the radius change from the actual contour of several sections of the cylinder surface at different Angle positions to the rotary center line. It can be used to measure the shape error (roundness, cylindricity, flatness and straightness), position error (concentricity, coaxiality, runout and verticality) of cylindrical workpiece surface profilometer.

### 1. 4. Equipment structure and components

#### 1. 4. 1. Schematic diagram of structure



#### 1. 4. 2. Main components Introduction

##### 1. 4. 2. 1. Mechanical parts

(1) Column : guide the transverse drive to move up and down to realize longitudinal data acquisition.

(2) R Axis horizontal : through the left and right movement of the sliding sleeve on the precision guide rail (the sliding sleeve is installed with a reading head) to achieve the instrument X axis direction data acquisition.

- (3) R-type component: adjust the measurement direction of the sensor.
- (4) sensor: the part of the instrument to collect signals.
- (5) Automatic aligning and leveling table: the workpiece aligning and leveling, aligning range  $\pm 3$  mm, leveling range  $\pm 1^\circ$ .
- (6) Three grip chuck: workpiece clamping, with the adjustment table used.

### 1. 4. 2. 2. Electrical components

(1) Air pressure protection system: to ensure clean and stable air source, to provide stable air pressure for the rotation of the air float spindle. When the pressure is low, a low pressure alarm will appear.

**Note: Do not rotate the spindle when the air pressure is off, otherwise it will cause friction damage to the spindle.**



(2) Operation panel: as shown in the picture, the left end is the emergency stop button and speed control knob; The middle is the key area; The right end is the rocker.



a. Emergency stop button



Emergency stop press, cut off all the driving power, the device stops moving; Rotate the button in the direction of the arrow, so that the emergency stop button can be used normally;

b. Speed control knob



When the rocker is used to control the movement of the equipment, the speed can be controlled by the speed regulating knob;

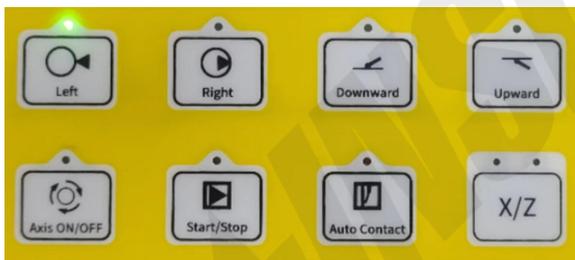
c. The rocker



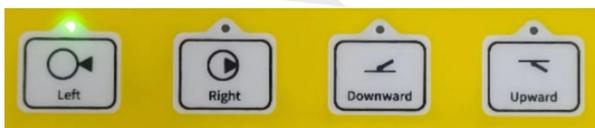
The rocker is an analog rocker that controls the up and down motion of the column and the left and right motion of the R-axis horizontal

d. Button area

As shown in the picture, carry out attitude selection, spindle motion control, measurement control, automatic contact control, and lateral/longitudinal drive motion control.



① Posture measurement:



Left, right, down, up, for the orientation of measurement, when the indicator light is selected;

② Spindle switch:



After pressing the indicator light on, spindle rotation; Press the indicator light out again, and the spindle stops rotating;

③ Automatic contact:



After pressing, the indicator light will turn on, and the sensor (R-axis) will start feeding movement according to the current measurement attitude. When the sensor reaches the range set, the indicator light will be off; After the indicator light is on, press again to stop the function directly and the indicator light is off;

④ Start measuring:



Press the indicator light to start the measurement (after one measurement cycle is completed, the measurement stops and the indicator light goes out); After the measurement begins, press again to stop the measurement directly, and the indicator light is off;

⑤ X/Z locking:



After pressing, the corresponding key indicator lights up. The rocker can be used to control the vertical drive moving up and down, and the horizontal drive moving left and right.

(3) Motion control system: control equipment up and down around the movement, spindle rotation movement;

(4) high-precision conditioning box: processing the signal collected by the sensor;

(5) Computer monitor, host: support equipment software system operation, data storage.

## 1.5. Boot /shutdown steps

### 1.5.1. Boot Steps

Step 1: Check the air source, turn on the air source switch, observe the ventilation status of the main shaft, and display the air source pressure;



Step2: open the main switch of the instrument (located in front of the machine), the whole machine power supply;



Step 3: Shoot the emergency stop switch (cut off the power supply of the control box) ;



Step 4: Start the computer;

Step 5: Reset the emergency stop after computer startup (clockwise rotation).



## 1.5.2. Shutdown Steps

Measuring the surface of the needle moving parts -- shut down software ---- Shut down the computer -- off the power -- off the air source switch -- oil rust prevention

## 1.6. Installation and operation of equipment components

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## 1.6.1. Component Installation

Note: All parts shall be installed and disassembled by the after-sales engineer or under the guidance of the after-sales engineer.

## 1.6.2. Software Installation

In normal cases, the software required for system running has been installed on the device and can be used directly. If the system cannot work properly due to an irresistible problem, reinstall the required software according to the following instructions.

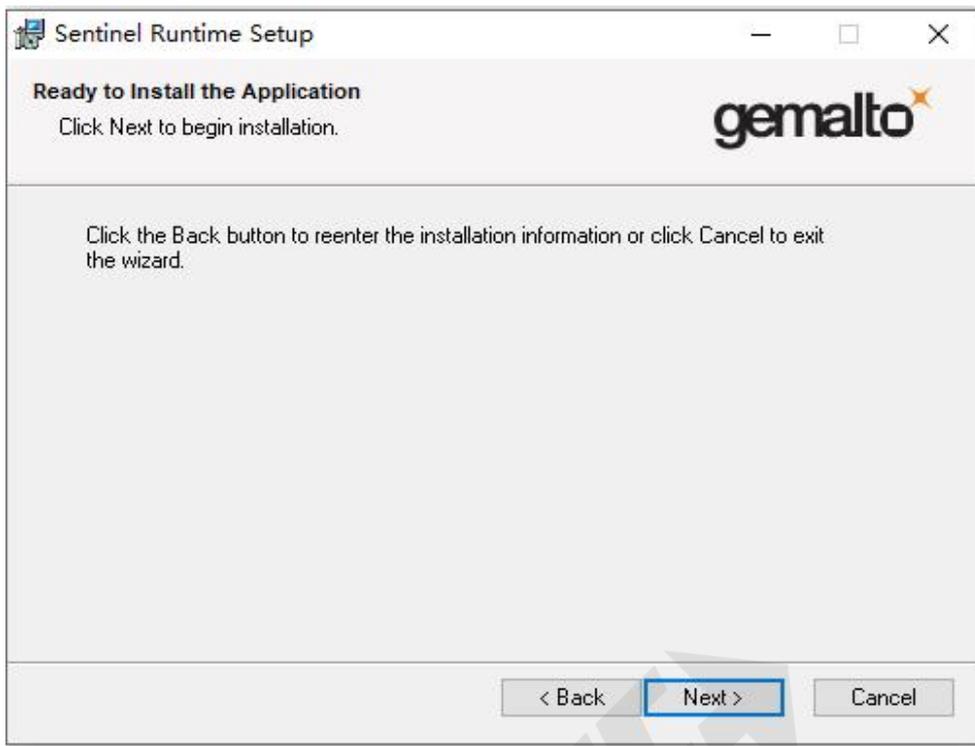
### 1.6.2.1. Install Required Files

- (1) Roundness instrument software  Roundness Instrument Software
- (2) Dongle driver installation package  Encryption dog
- (3) Collection card driver installation package  USB 1808 Driver
- (4) Motion Controller Driver  GTN-PCIE

### 1.6.2.2. Installation Procedure

- (1) Dongle driver installed  HASPUserSetup

Step 1: Open the Dongle folder and click the dongle driver icon. The following page will pop up:

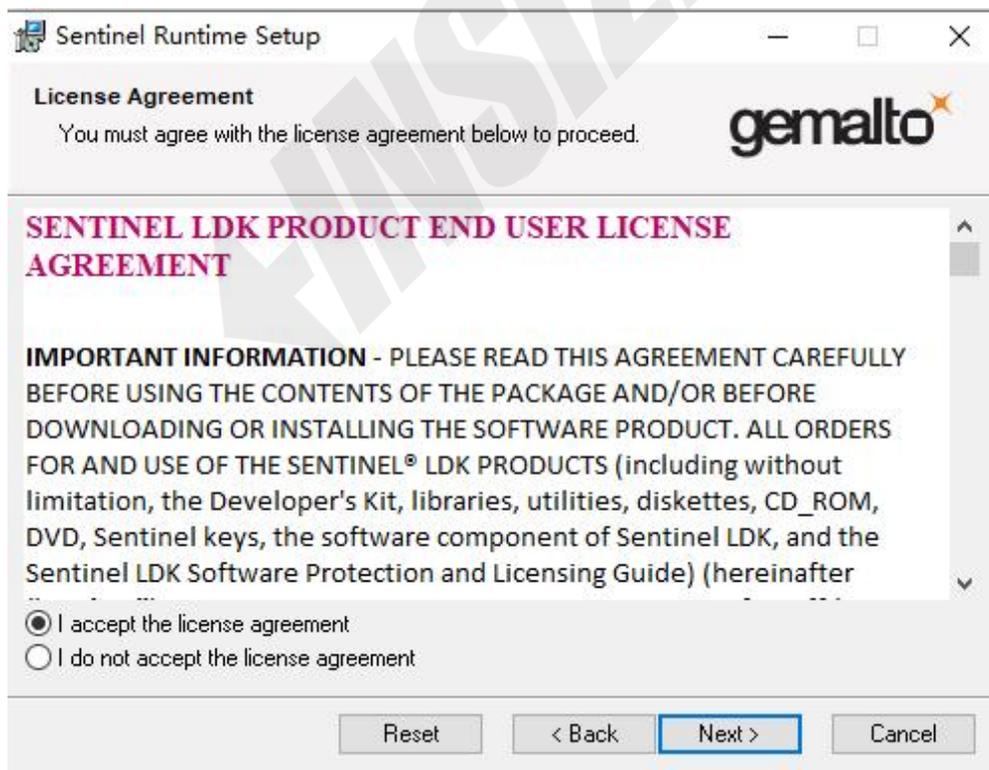


Step 2: Click **Next >** Button, the following page will be displayed:

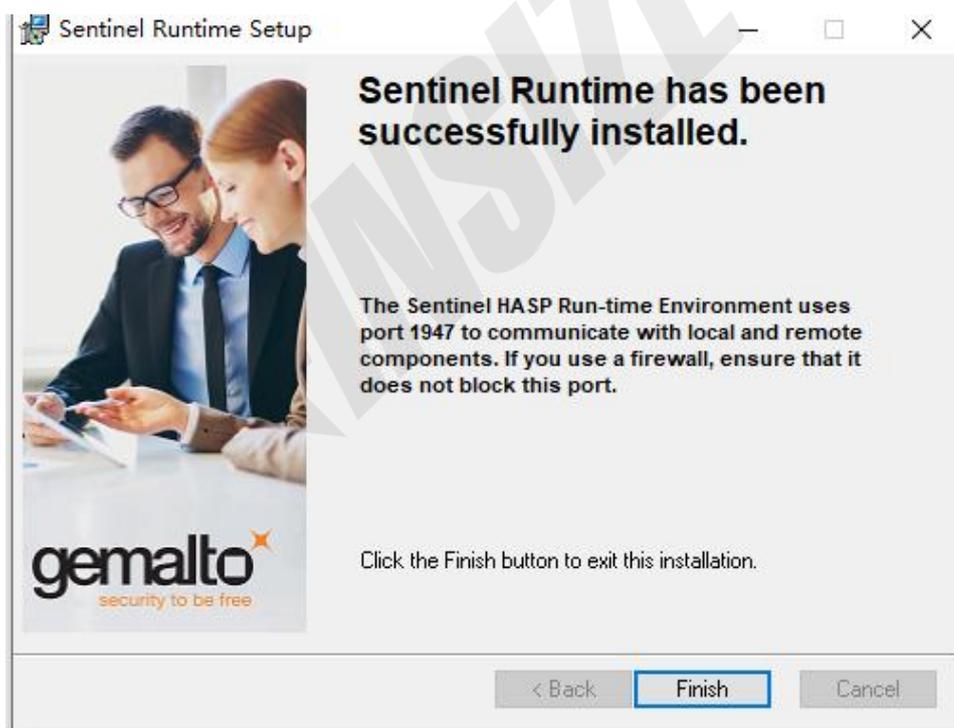
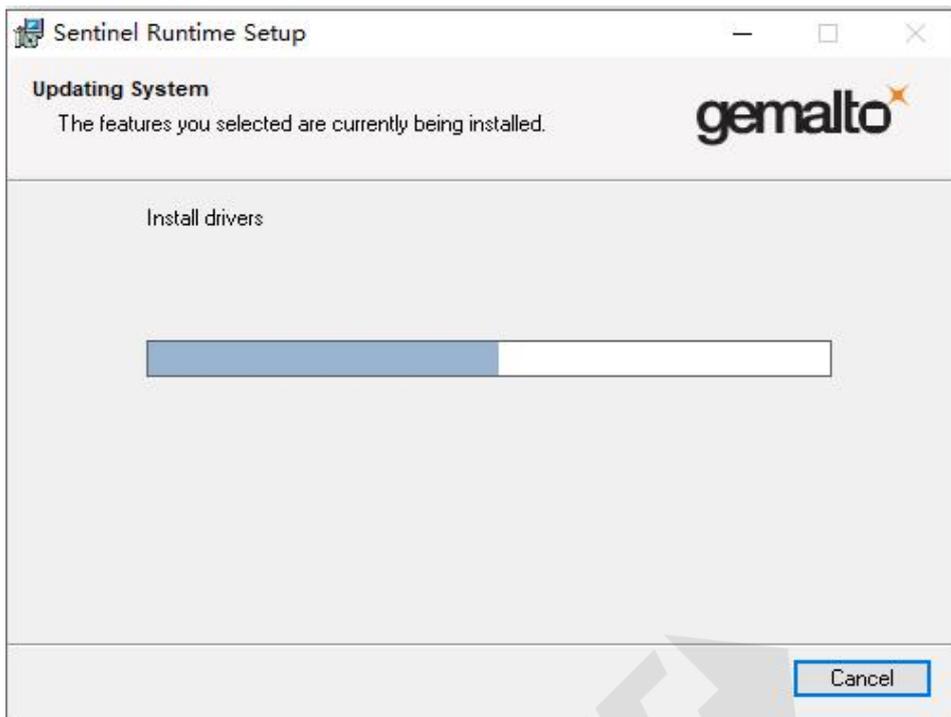




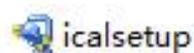
Step 3: Keep clicking  Button, the following page will be displayed:



Step 4: Select  I accept the license agreement and click on it  Key, the following page is displayed:



Step 5: Click  Button to complete the installation of dongle driver.

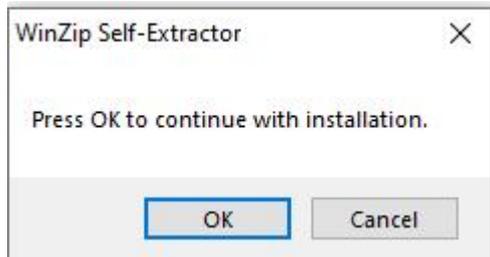


(2) Acquisition card driver installation

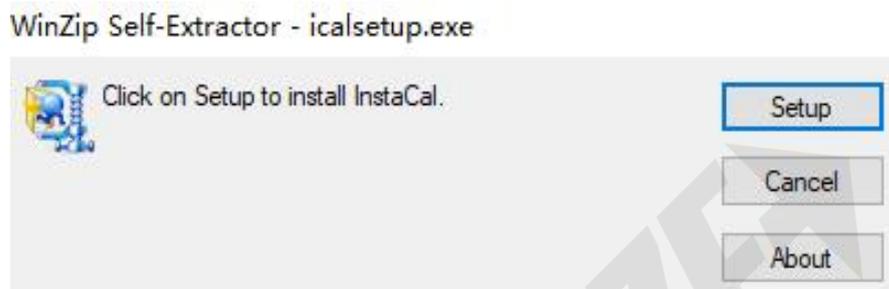
Step 1: Open the USB1808 driver and click the driver icon. The following

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interface will pop up:



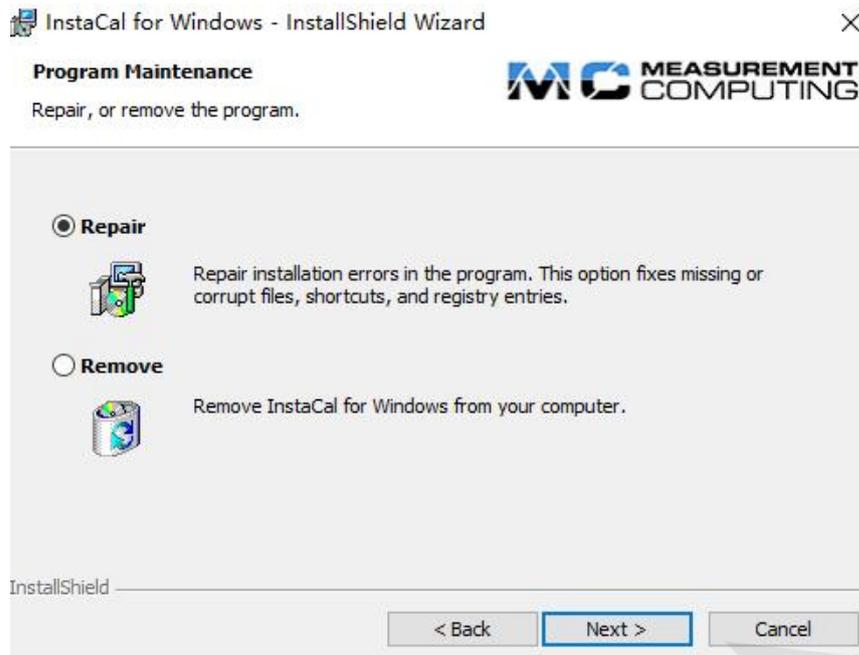
Step 2: Click **【OK】** and the following interface will be displayed:



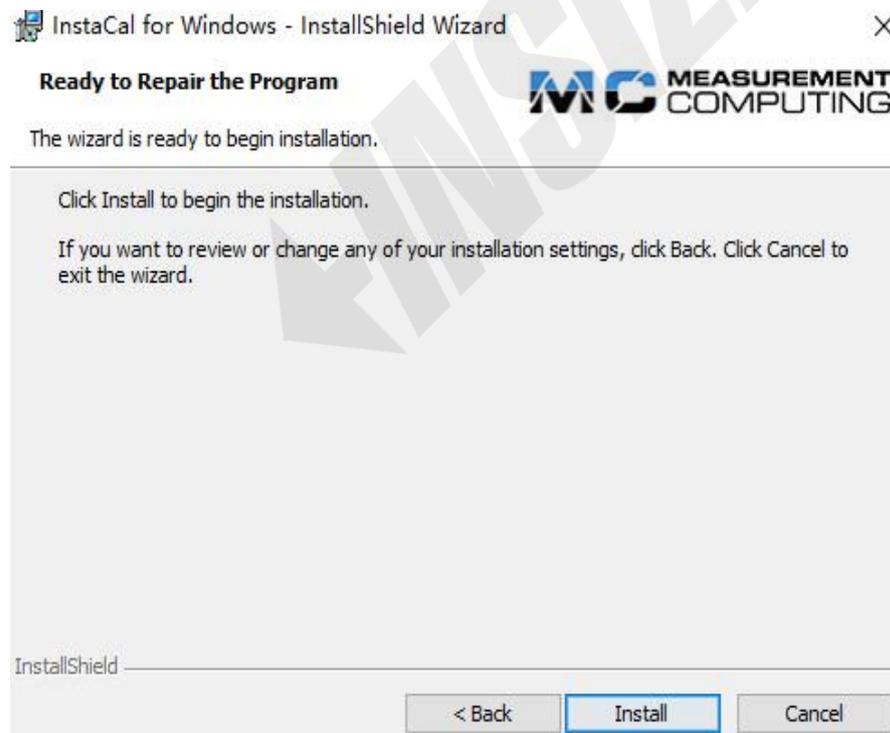
Step 3: Click **Setup** to display the following interface:



Step 4: Click **Next >**, the following interface will be displayed:



Step 5: Select **Repair** and click **Next >**. The following interface is displayed:



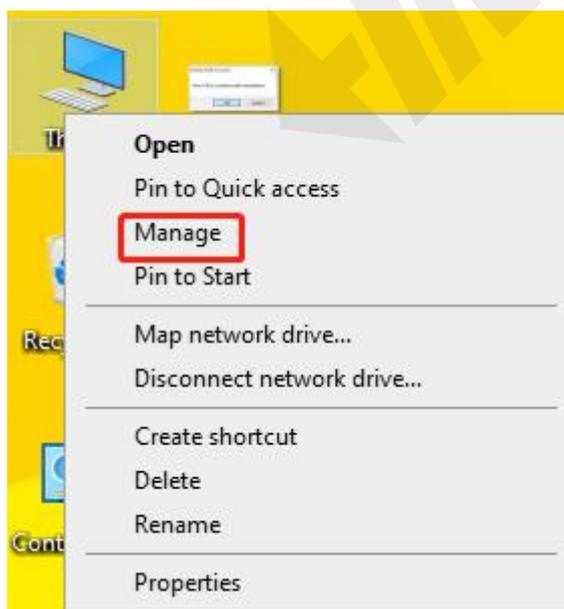
Step 6: Select **Install**. The following interface is displayed:



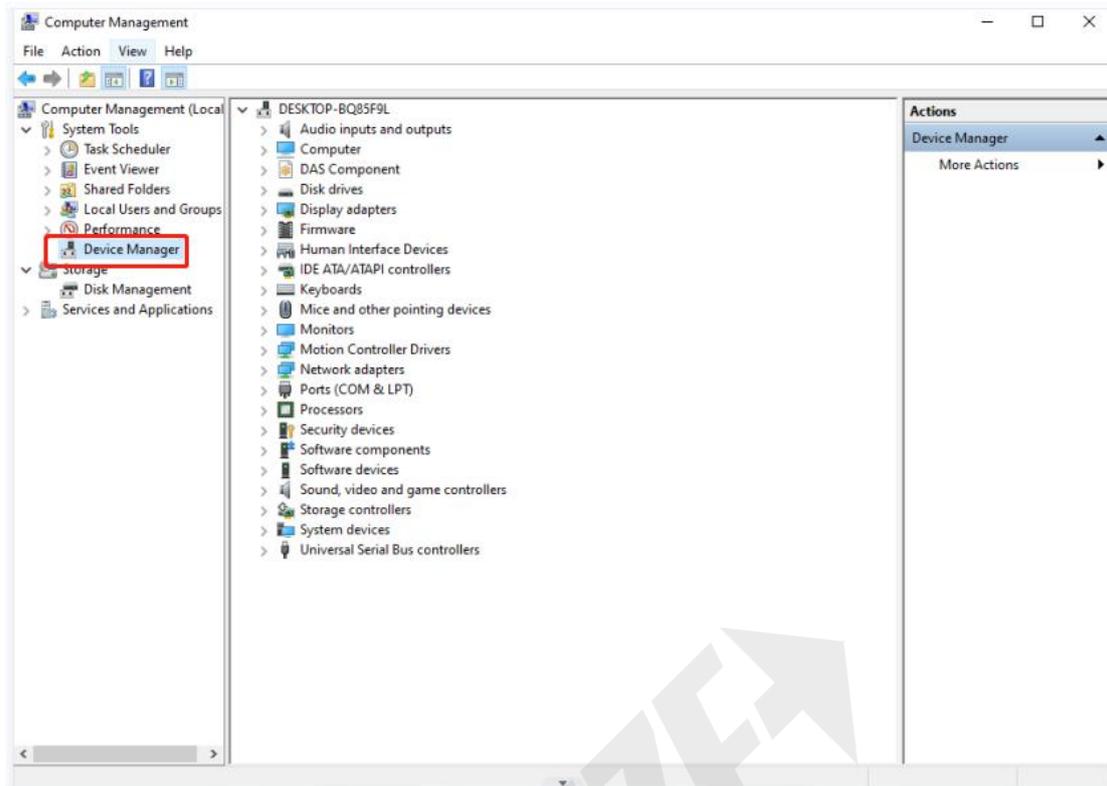
Step 7: Select **Finish**. The driver installation is complete.

### (3) Motion controller driver installation

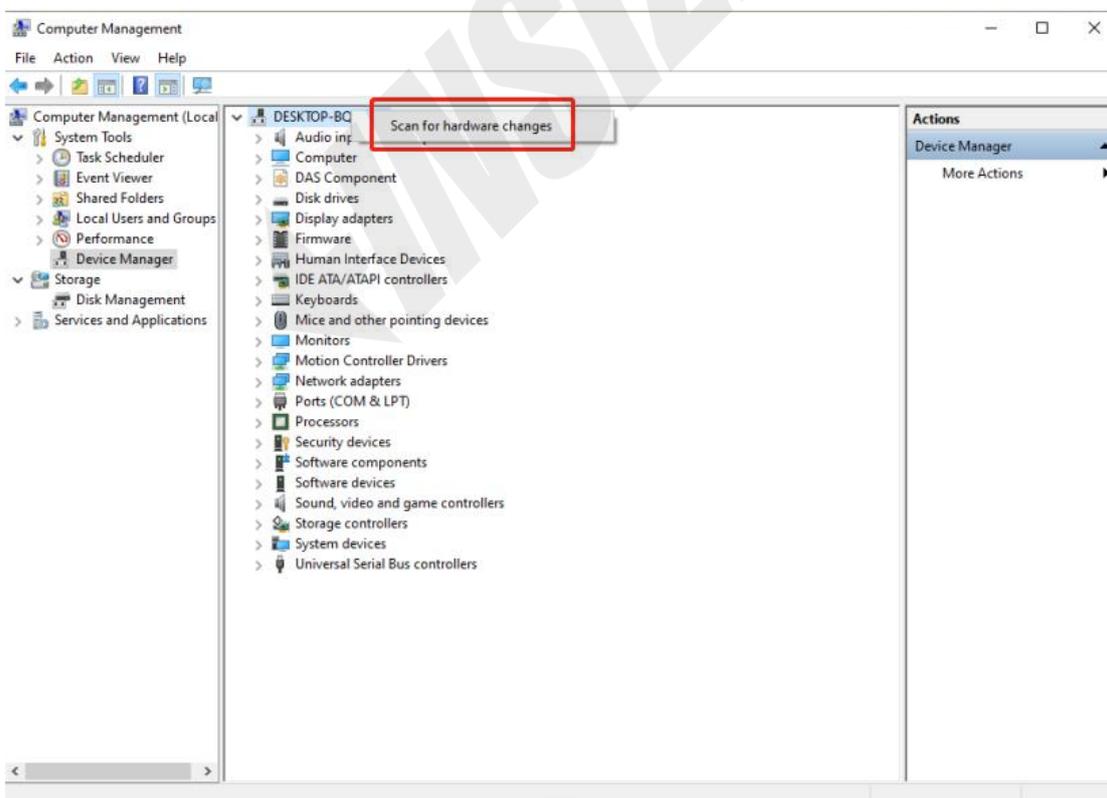
Step 1: Right-click [this computer] and choose [Management]. The operation interface is as follows:



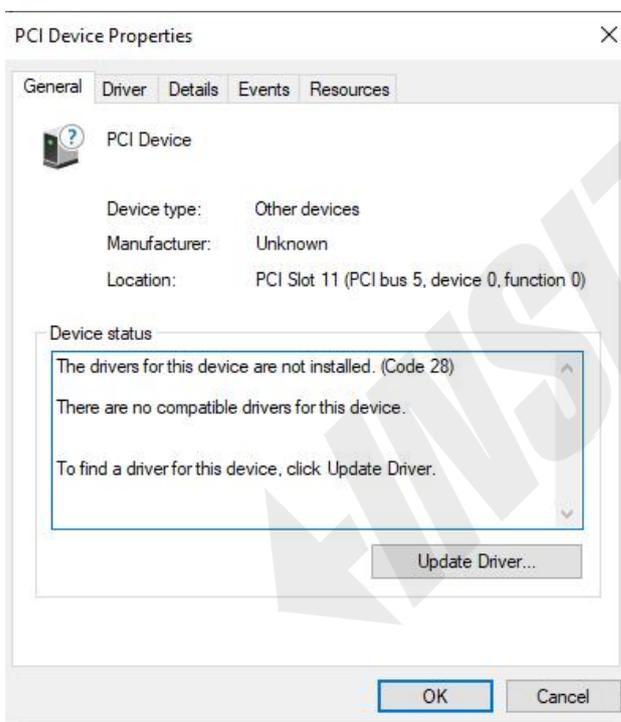
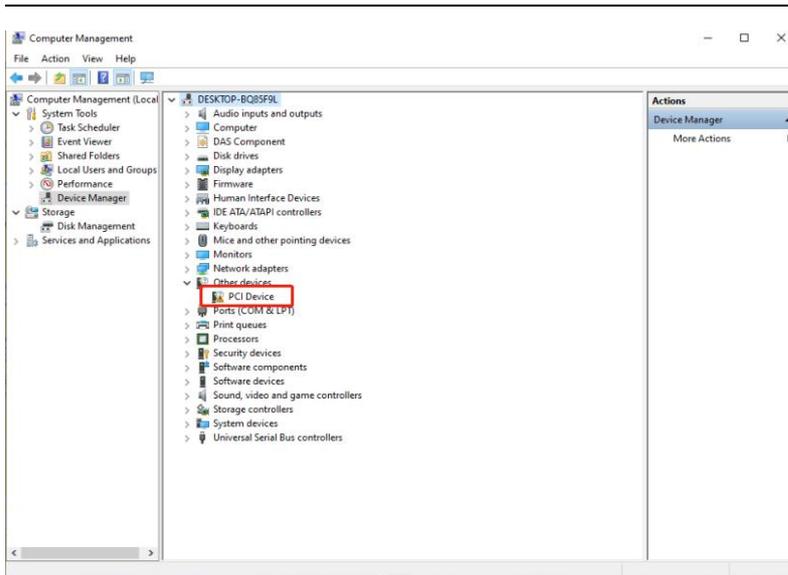
Step 2: After clicking [Device Manager], the interface will be displayed as follows:



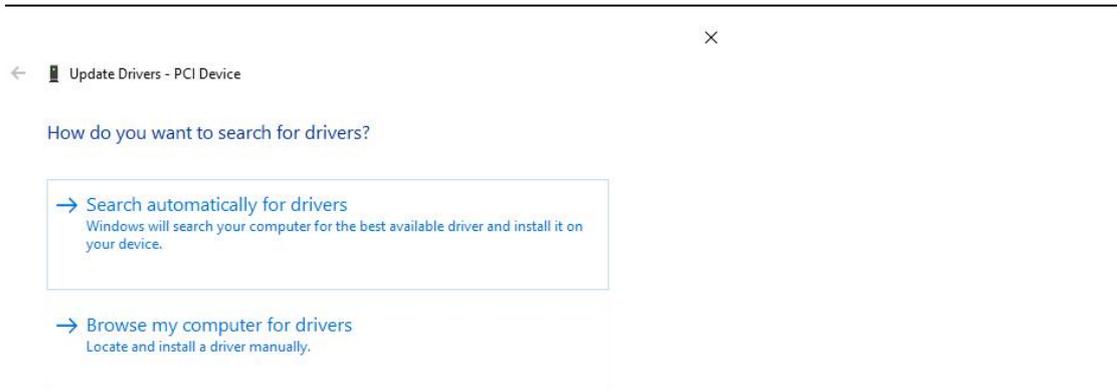
Step 3: Click "Scan for Hardware Changes (A)" to display the following interface:



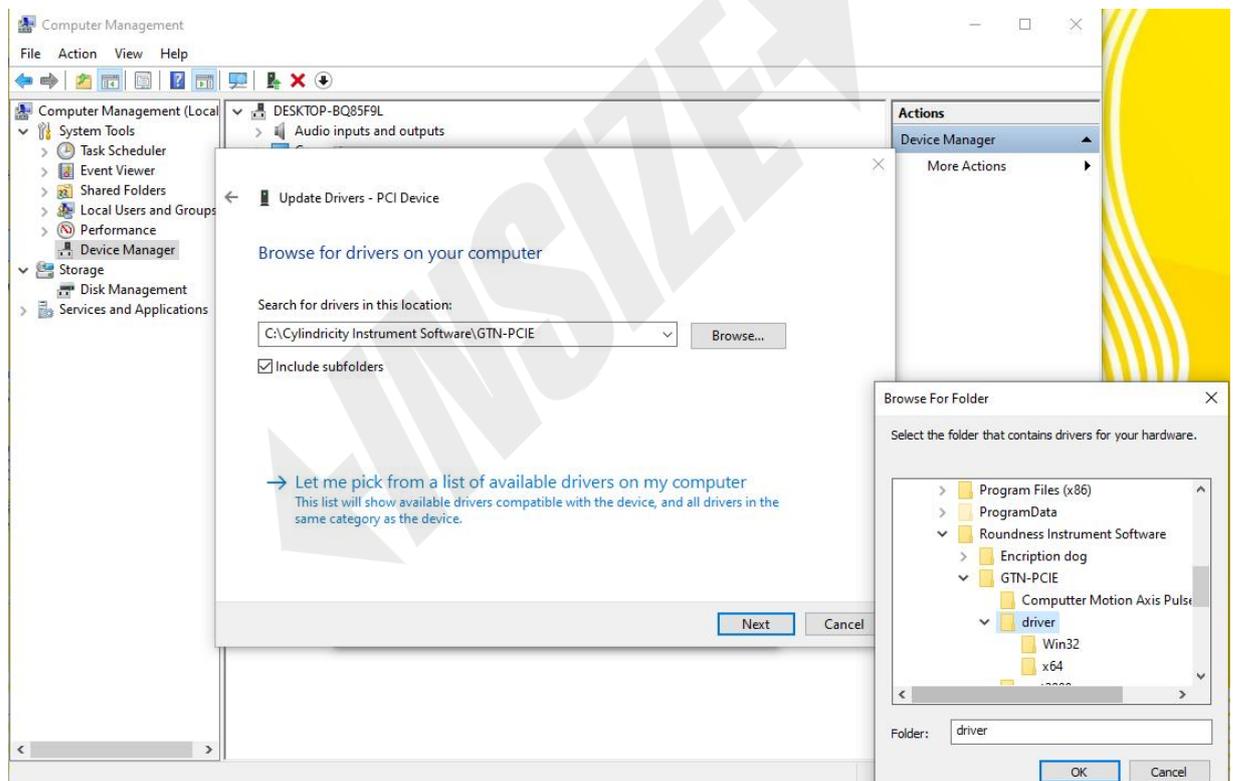
Step 4: Click [PCI device], and the interface will be displayed as follows:



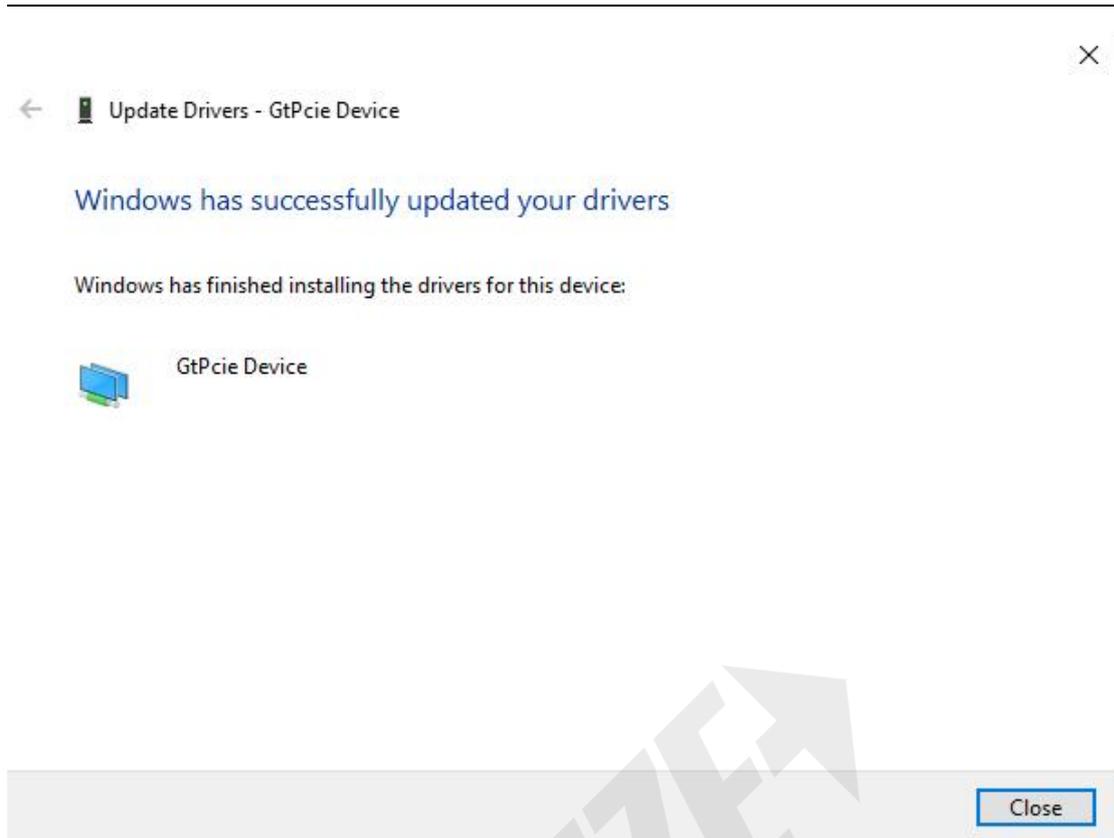
Step 5: Click "Update Driver" and the interface will be displayed as follows:



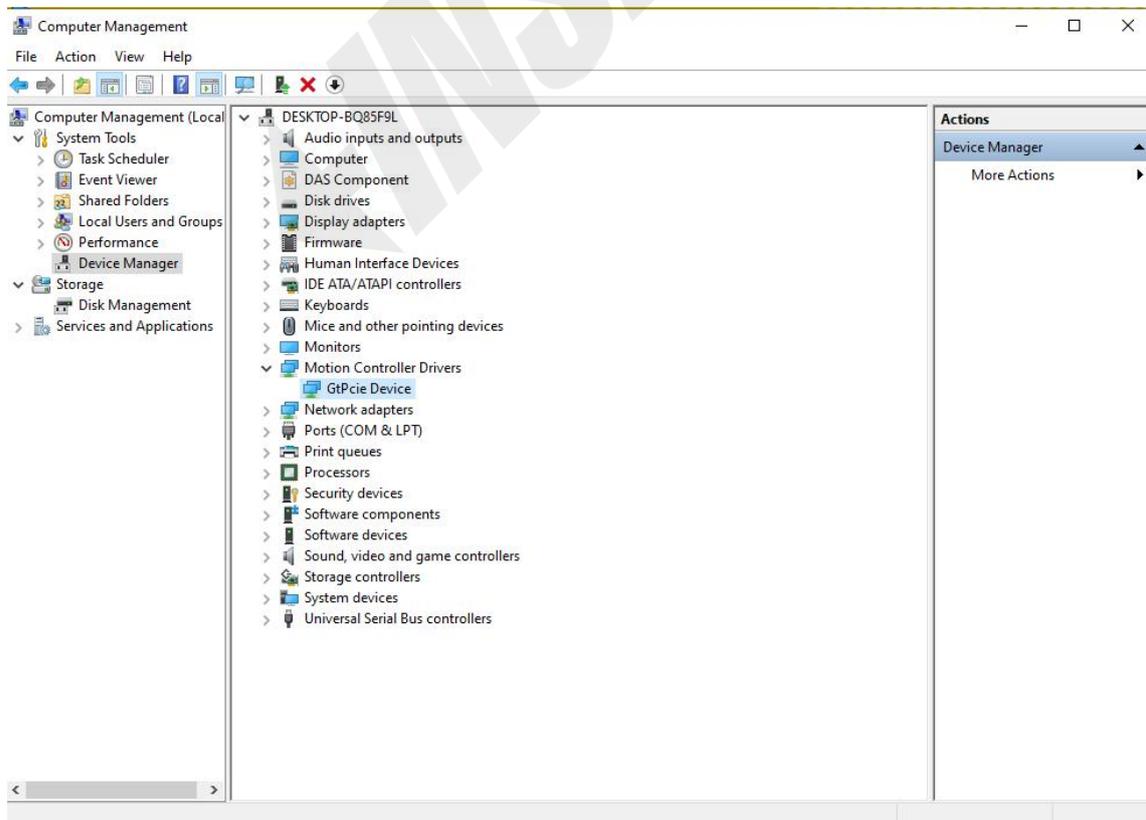
Step 6: Click "Browse My Computer to find the driver (R)" and click "Browse" to find the location of the driver. The interface will be displayed as follows:



Step 7: Click [Next] and the interface will be displayed as follows. Click [Close] to complete the installation of the driver.



Step 8: The【Desktop-D0818F5】 module will display 【Motion Controller Drivers】 , which indicates that the motion control card is completed. As follows:



### 1.6.3. Operation and Use of equipment

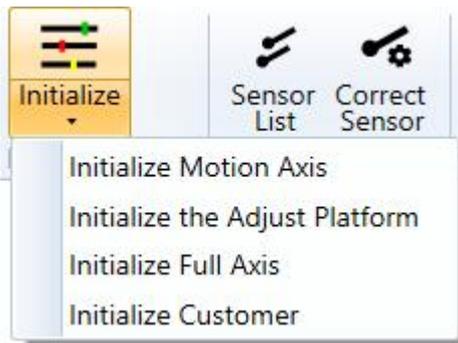
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### 1. 6. 3. 1. Software Initialization



Step 1: Click the software icon

Step 2: Click "Initialize" in "System Settings";



Step 3: Initialize each axis of the device;



### 1. 6. 3. 2. Calibration of sensor

(1) Prepare standard parts

Step 1: Prepare one calibration standard part;

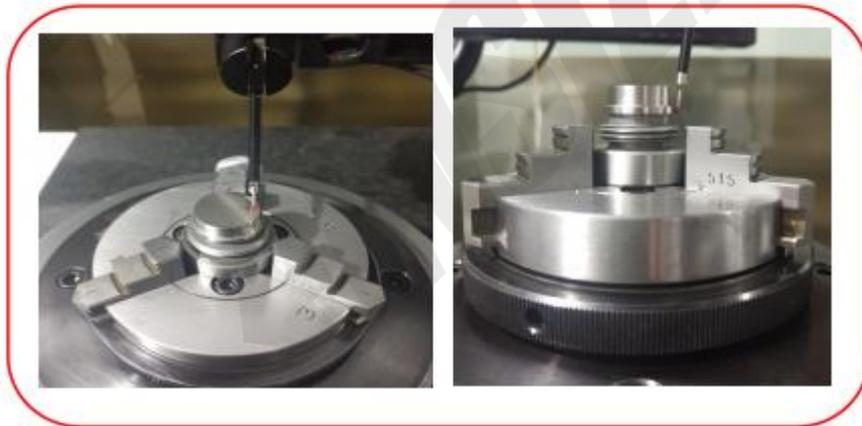
## Effective measure position



## Standard value

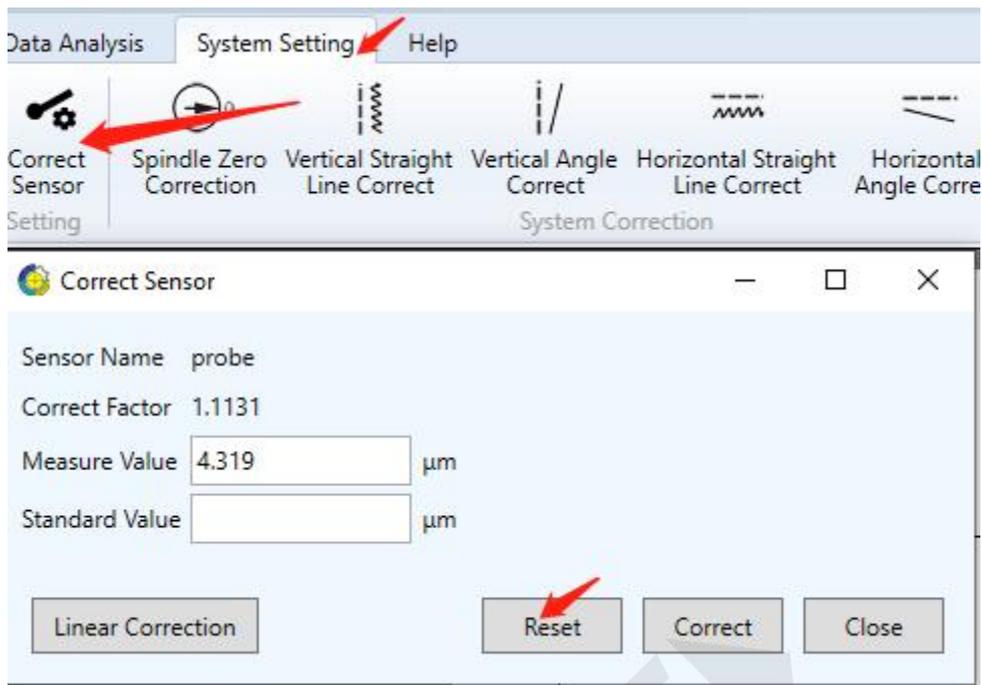
Step 2: Clamp the standard parts in the middle of the chuck;

Step 3: After aligning and leveling, observe whether the gap in the effective part of the standard parts is complete and stable on the graphical display interface.



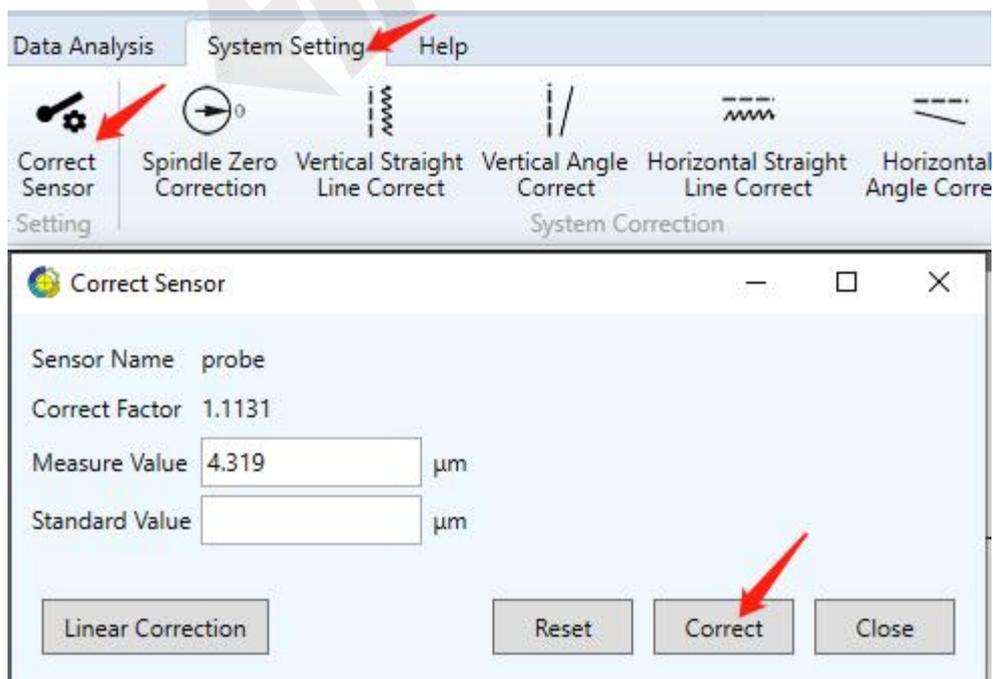
(2) sensor correction

Step 1: Click reset to reset the sensor coefficient;



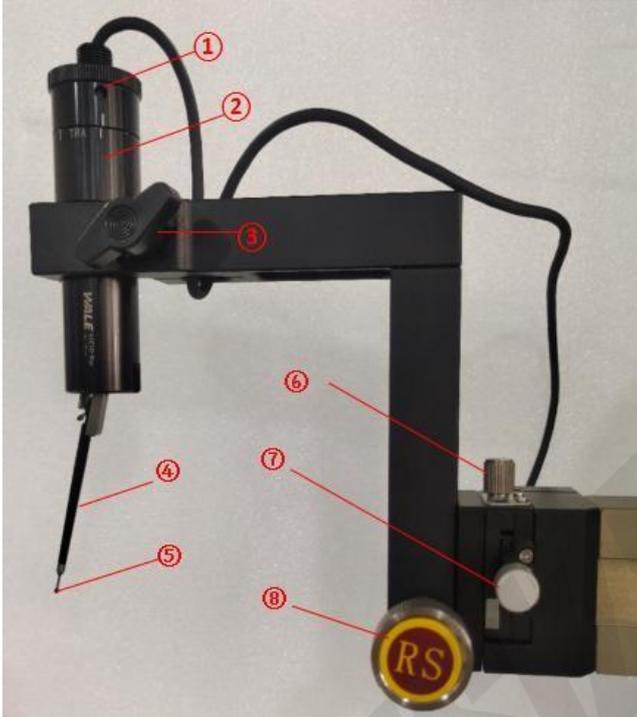
Step 2: Measure the roundness value of the standard parts and make coefficient correction;

The evaluation method was set as LSCI, the band was 1-500 $\mu$ r, the roundness was measured three times, and the average value was taken and recorded. Input the average value and the calibration value of standard parts into the following interface, and the coefficient will be automatically generated. Click OK to complete the correction.



Note: The difference between the retest roundness and the standard should be less than 0.03

### 1. 6. 3. 3. Adjustment of attitude measurement



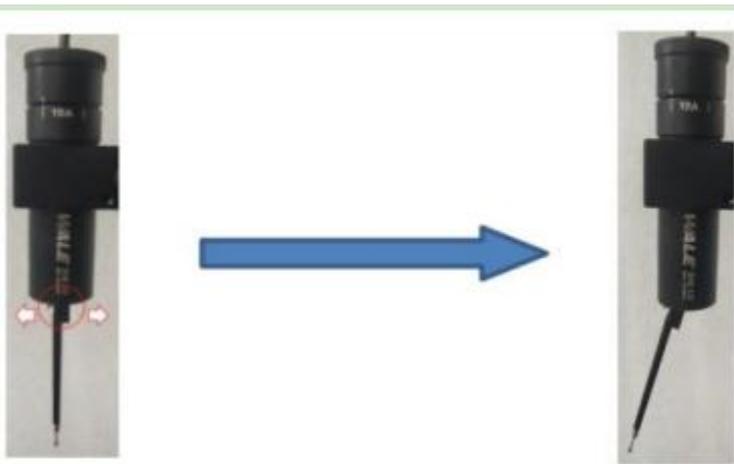
Description:

- ①: sensor range direction adjustment knob;
- ②: sensor;
- ③: Adjust the locking knob in the circumferential direction of the sensor;
- ④: measuring rod;
- ⑤: Measuring needle;
- ⑥: R-shaped component front and back displacement locking button;
- ⑦: R-shaped component front and rear displacement adjustment button;
- ⑧: R-shaped component horizontal and vertical switching locking button;

The figure above shows the mechanical attitude measurement adjustment component. In the actual measurement process, due to the different contact surfaces of the measurement items of the measurement workpiece, the position of the R-type component and the direction of the sensor should be adjusted to fix different attitude measurement.

#### (1) sensor position adjustment

Rotate the direction of the sensor and adjust the posture through the sensor range direction and force adjustment knob, and adjust the locking knob through the sensor circumferential direction to fix the sensor position.



#### (2) R-shaped component position adjustment

The R-shaped member can be adjusted horizontally or vertically by twisting the locking knob of the R-type member and rotating the direction of the connecting rod. The R-type member can be adjusted before and after the position of the R-type member by twisting the position adjustment knob of the R-type member.

### 1. 6. 3. 4. Workpiece measurement

(take measuring crankshaft as an example)

#### (1) Operational matters before measurement

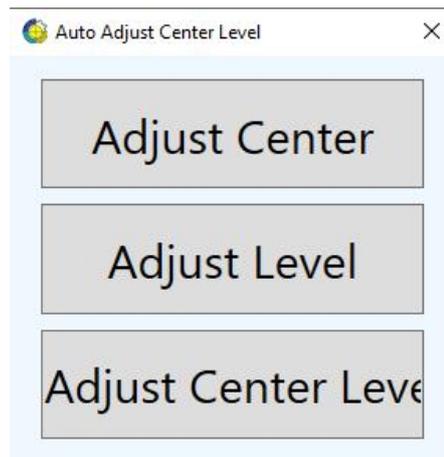
- A. Cleaning parts;
- B. Workpiece positioning and clamping
  - a. Use the three-jaw chuck to grip the outer circle or inner hole of the product, and pay attention to the clamping strength of thin-walled products
  - b. Large diameter cylinder and ring sleeve can be placed smoothly depending on weight and machining surface (after the clamping is completed, you can gently shake the hand to check whether the workpiece is stable)
  - c. Special products can be clamped by custom tooling

#### Note:

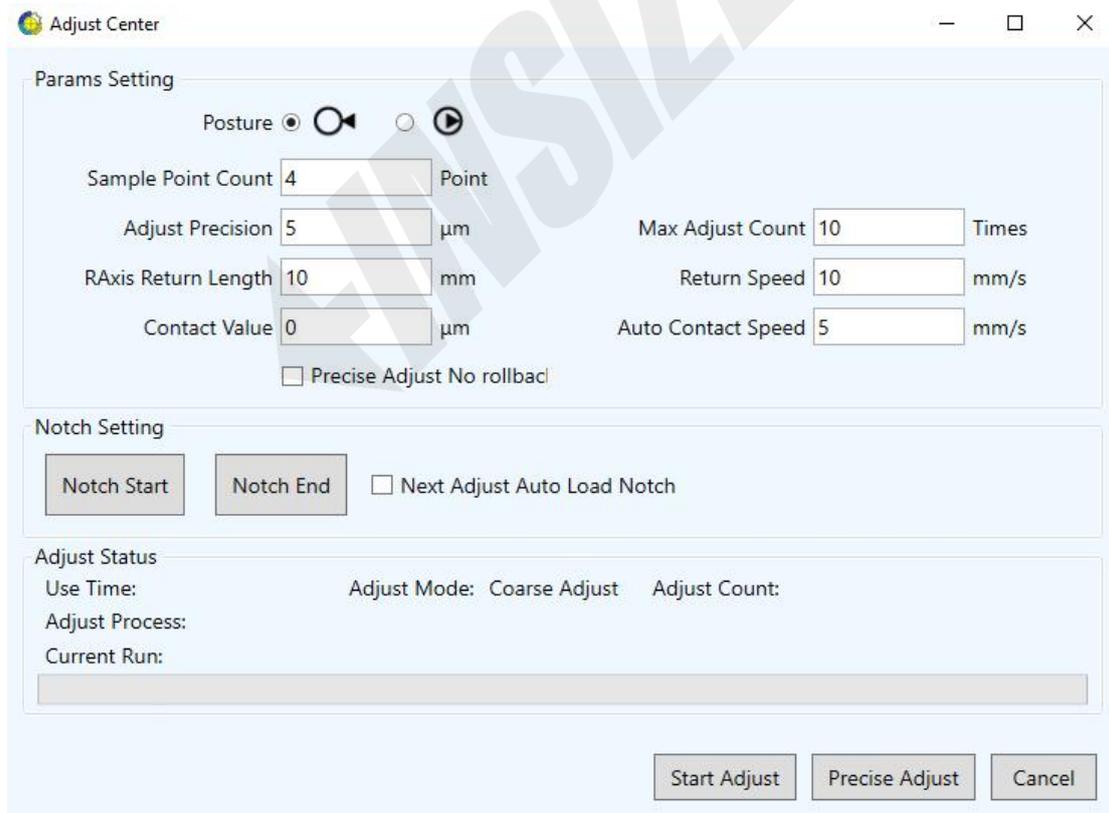
When the product is adjusted to eliminate eccentricity and tilt, the long bushing can be adjusted by automatic aligning and leveling, while the short ring can be adjusted on the workbench and the center can be adjusted in the workpiece.

#### C. Automatically adjust center and level

After the clip is finished, select aligning and leveling, and click "Aligning and leveling" to automatically start aligning and leveling.



Enter the parameter setting, adjust the precision, motion speed and other parameters according to the requirements and dimensions of the workpiece, select the capture height position 1 and height position 2, click "Start rough adjustment", after the rough adjustment is completed, the fine adjustment will automatically start. After the fine adjustment is completed, the page of automatic aligning and leveling will appear, indicating the completion of the aligning and leveling.



**Description:**

When the product processing error is too large, the shape is too long, the adjustment table knob is not detected personnel screw or disassembled three jaw chuck, must be coarse adjustment, direct fine adjustment may exceed the sensor range; Initialize the workbench when it is uneven or offset.





System Param Setting

System Param Setting | Chart Color Setting | Customer Upr

Param Setting

Sensor Unit :   $\mu\text{m}$   mm

Sensor Precision :  MotionAxis Precision :

System Default Font Size :  Print Report FontSize :

Format Date String :

X-Direction Printing Scale Corrector  Z-Direction Printing Scale Corrector

Sample Data Save

Analysis Result Name Rule

Auto Save Save Path

Auto Adjust Center Level Save Log Path

Save Adjust Log Path Save Path

Tolerance Setting

Pop Up Analysis Results After Analysis

Qualified display Text  Font Color

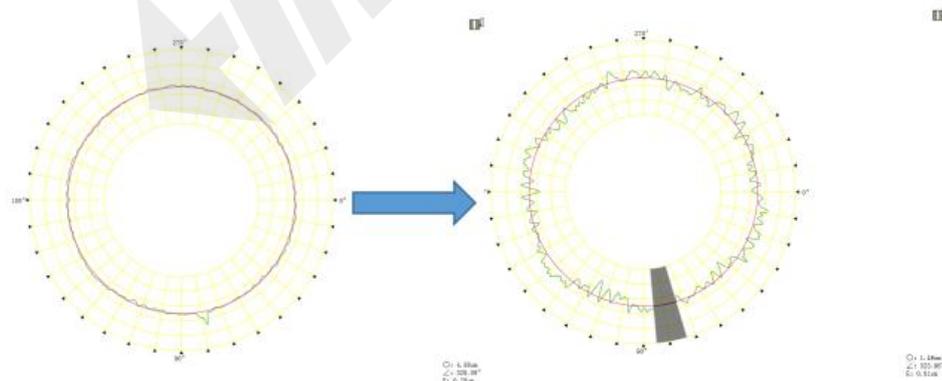
Unqualified display text  Font Color

Other Setting

System Language

#### b. Burr removal

Put the mouse on the edge of the burr -- move the mouse to the other edge of the burr -- click the left button and the roundness of the burr will be automatically refreshed; Put the mouse in the shadow area and click the right button to delete.



#### Description:

(1) Evaluation method: LSCI (least square method) is generally used, and the corresponding evaluation method can be selected for the standard;

(2) Standard report UPR: It can be selected and added according to the industry or processing technology. The filtering band on the printed report is set here, and the roundness value will change synchronously with the graph.

#### C. Save data

Automatic saving, you can set the automatic saving path, if you need to print

---

the report, you can select the printer operation.

## 1. 7. Self test of equipment

Check Items	instructions	cycle
correction	It is recommended to test the equipment accuracy with standard parts every half month. If there is any difference, recalibrate.	Half a month
Standard parts for inspection	It is recommended to send standard parts for inspection once a year.	1 year

## 1. 8. Maintenance of equipment

### 1. 8. 1. Cleaning work

(1) It is recommended to clean the surface of Z-axis guide rail, R-axis guide rail, rail grating ruler and spindle grating ruler with alcohol every 12 months (8-hour working period);

(2) It is recommended to clean the dust inside the main computer every 12 months;

(3) Every day to work on the self-allocating and leveling work table, three jaw chuck oil anti-rust work.

### 1. 8. 2. Power/switch repair work

(1) It is recommended to check the grounding and power supply voltage of the equipment every 3 months (if necessary, please configure a regulated power supply);

(2) It is recommended to check the sensitivity of rocker switch, motor switch and speed control switch on the control panel every 3 months.

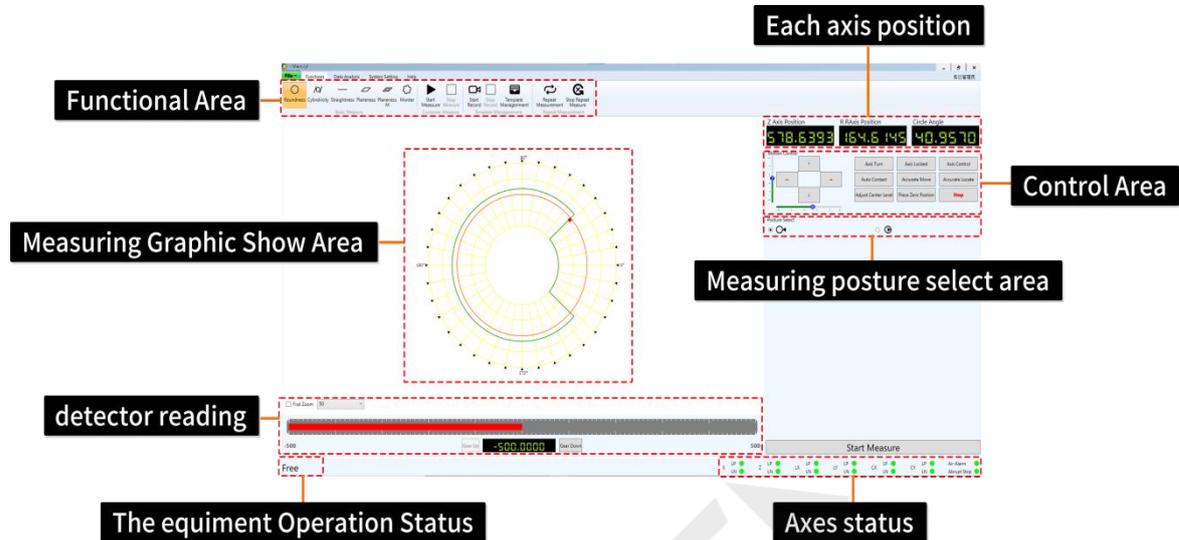
### 1. 8. 3. Environmental inspection work

(1) It is recommended to discharge water from the air compressor and filter every three months, and to test the dew point of the air inlet pressure and the amount of oil mist of the equipment every three months (to detect whether there is water or oil mist on the inner wall of the trachea, please configure cold drying machine and oil mist filter if necessary);

(2) Check the vibration and electromagnetic field near the equipment regularly (away from the processing equipment and large capacitive and inductive load of the equipment that is easy to manufacture such as punch and motor vehicle).

## Chapter II Software Instruction Manual (V. 3.004)

### 2.1. The main interface of the software

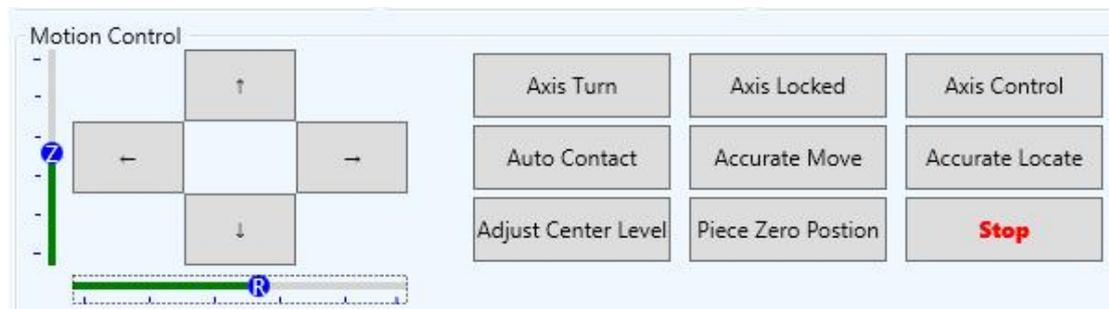


#### 2.1.1. Each axis position



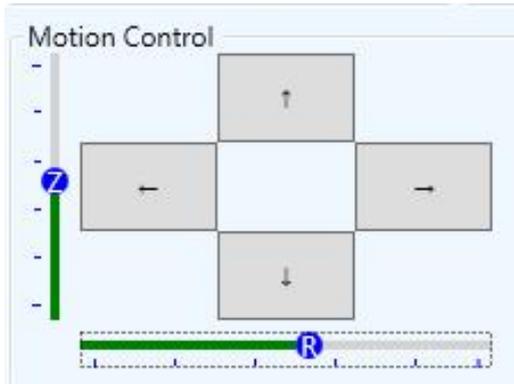
Z-axis position: record the current moving position in the column direction;  
R-axis position: record the current moving position of the transverse drive;  
Circle Angle: record the value of circumferential turning Angle of the current spindle.

#### 2.1.2. Control area



---

### 2. 1. 2. 1. Motion control key



Up and down keys: control column direction up and down movement;

Left and right keys: control the left and right movement of the R axis horizontal;

Green line: Adjust the speed of R axis (transverse drive) and Z axis (longitudinal drive). The Z-axis velocity increases gradually from the bottom to the top; The velocity of the R-axis is increasing from left to right.

### 2. 1. 2. 2. Shaft open key

When measuring, click the open key of the shaft, and the spindle begins to rotate; Click again and the spindle stops rotating.

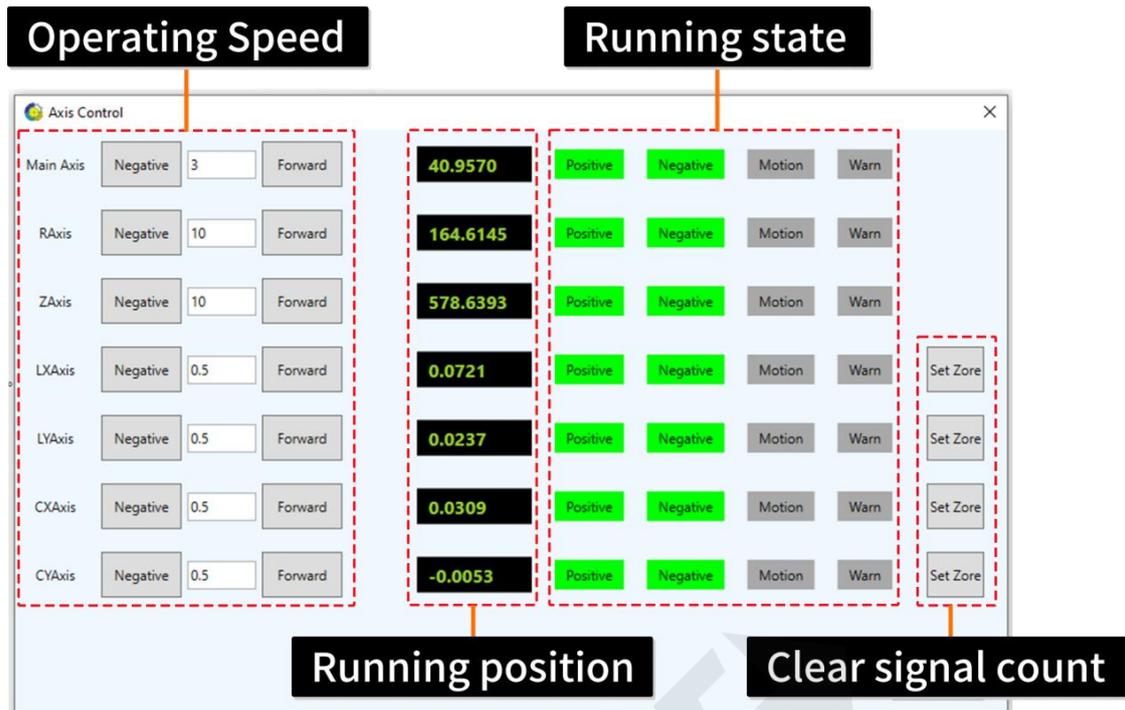
### 2. 1. 2. 3. Shaft lock key

For accurate positioning measurement, use the shaft lock key function, click the shaft lock key, the spindle will quickly stop rotating, click again, the spindle will continue to rotate, before using this function need to open the brake function.

### 2. 1. 2. 4. Control of shaft

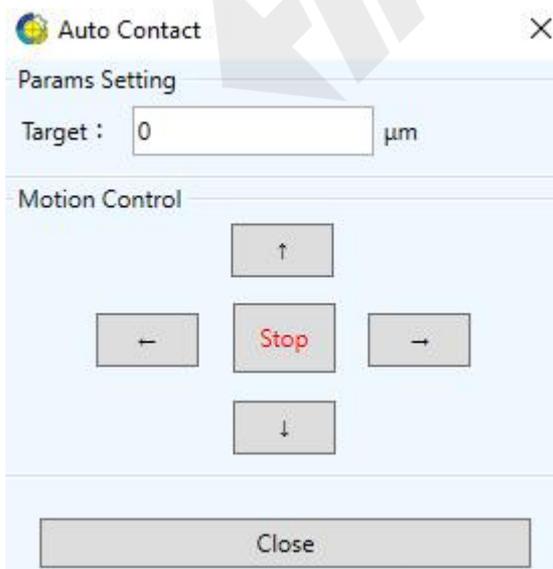
(1) Independently control the movement of each axis; The parameters on the interface are factory default parameters and users do not need to adjust them.

(2) Green means the limit is not triggered, red means the limit is triggered. When the positive and negative limits are red at the same time, the shaft status is abnormal.



### 2. 1. 2. 5. Automatic contact

Set the contact amount, select the self-contact direction, and the sensor will automatically contact the workpiece according to the setting. (In general measurement, it is recommended to set the contact position within  $\pm 20$  microns, and the specific filling is mainly based on the actual measurement)

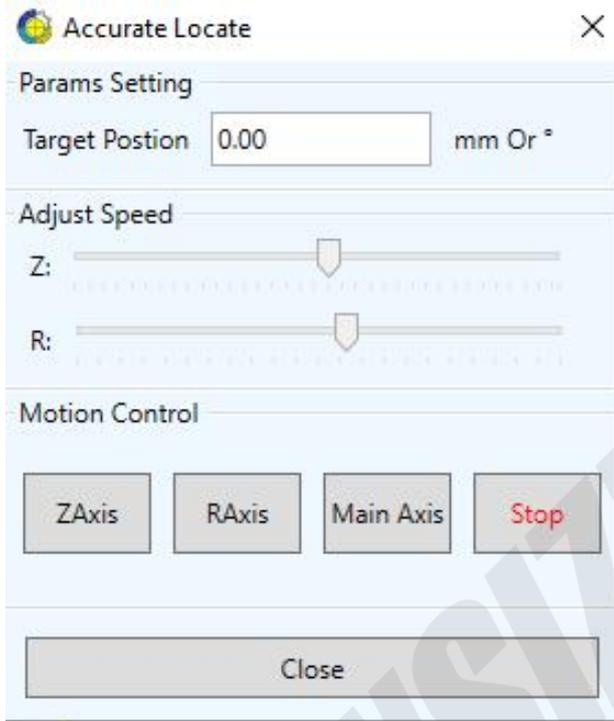


### 2. 1. 2. 6. Fixed distance

Set the moving distance, select the moving speed, select the moving direction, the sensor will automatically move the specified distance.

### 2. 1. 2. 7. Fixed point

Set the target position, select the moving speed, select the moving direction, the sensor will automatically move to the specified position point.



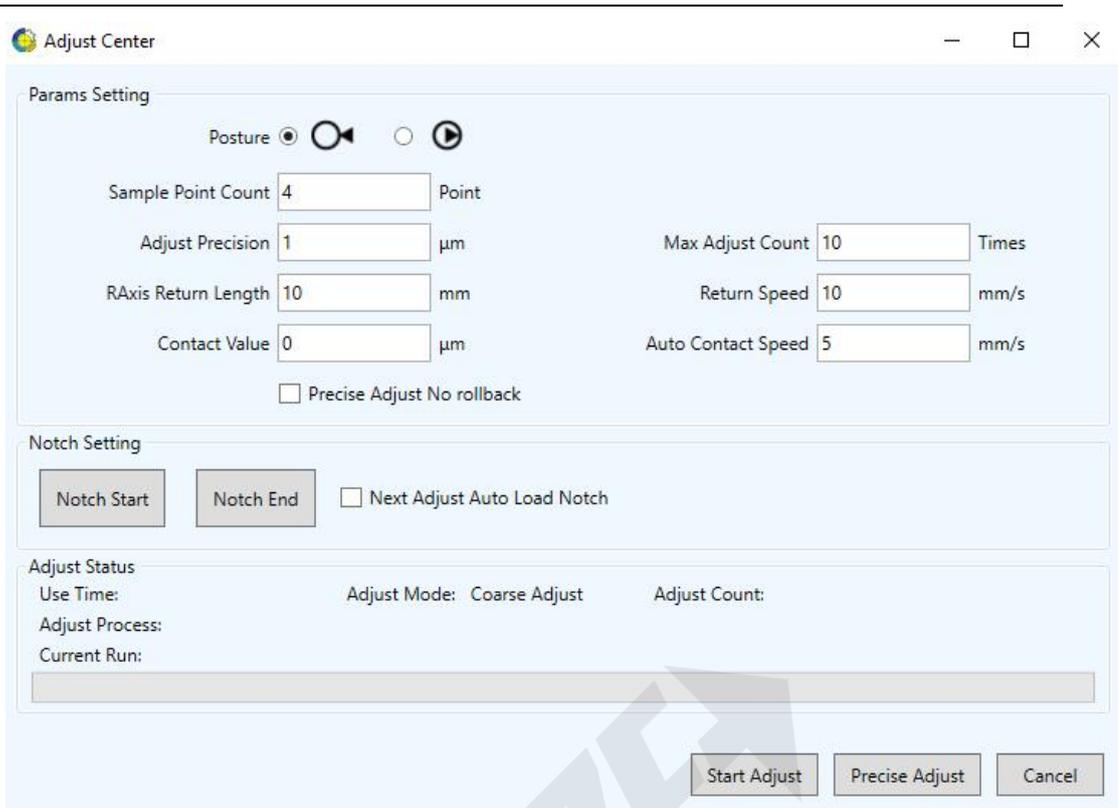
### 2. 1. 2. 8. Automatically Adjust the center and level

According to the actual measurement, select the automatic aligning or leveling or aligning and leveling function.



a. Adjust center:

Click [Adjust center], and the following interface appears:



The operation instructions are as follows:

(1) Attitude measurement: Check the attitude measurement direction according to the measurement contact surface, and adjust the position of R-type components and sensors to adjust the mechanical attitude measurement.

(2) Parameter Settings: The default values of each parameter are adopted

(3) Gap setting: used when rough adjustment. When the outer surface of the workpiece is not a complete circle, rotate the spindle, and click the starting point of the gap to capture the position when the measuring needle touches it; When the measuring needle touches the end of the gap, click the end of the gap on the interface to capture the end position. The system will automatically avoid the gap position when collecting four points.

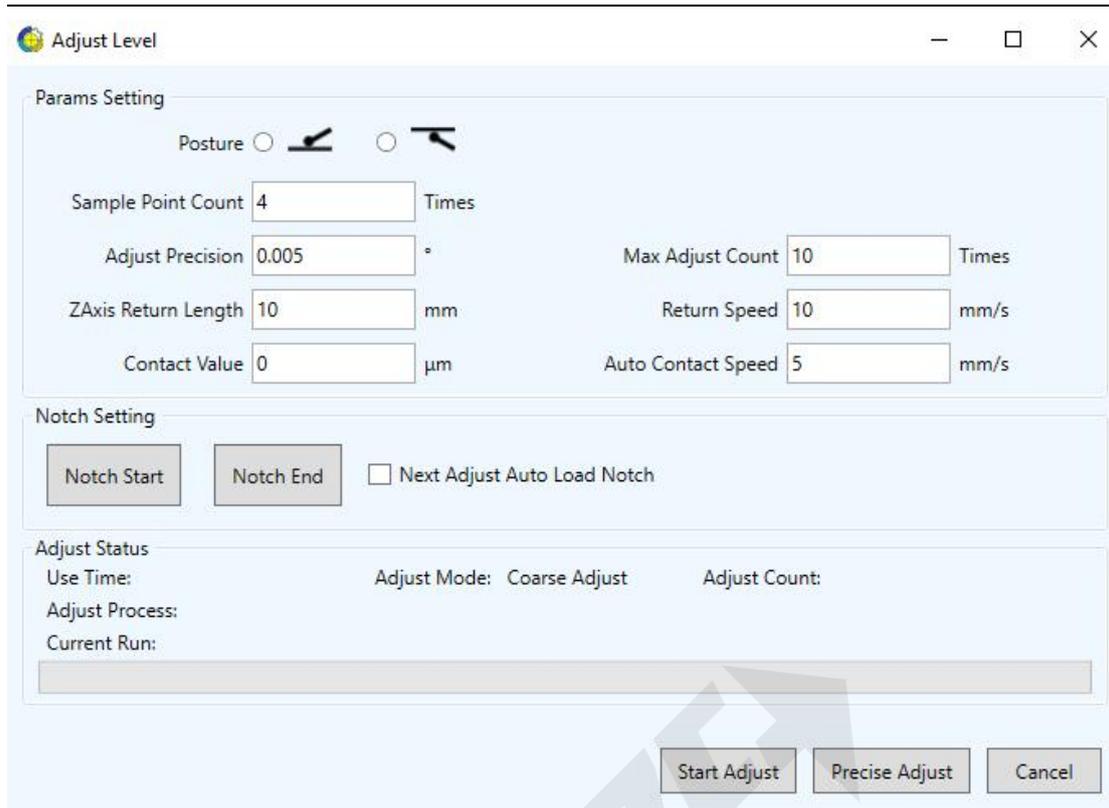
(4) Automatic loading gap for next adjustment: Check this option. When the workpiece is aligning with the same type of workpiece, the workpiece is placed in the same clamping way. The system will automatically load the gap and determine the collection position, without manually capturing the gap position again;

(5) Start adjustment: Click to start adjustment, the system first rough adjustment, then fine adjustment.

(6) Direct fine adjustment: Rotate the spindle. When the measuring needle contacts the outer surface of the workpiece and the offset is displayed within the range of the sensor (the signal bar is yellow or green), you can click on the direct fine adjustment.

#### b. Adjust level

Click [adjust level] to display the following interface:



The operation instructions are as follows:

(1) Attitude measurement: select the corresponding attitude measurement according to the measurement contact surface, and adjust the mechanical attitude measurement;

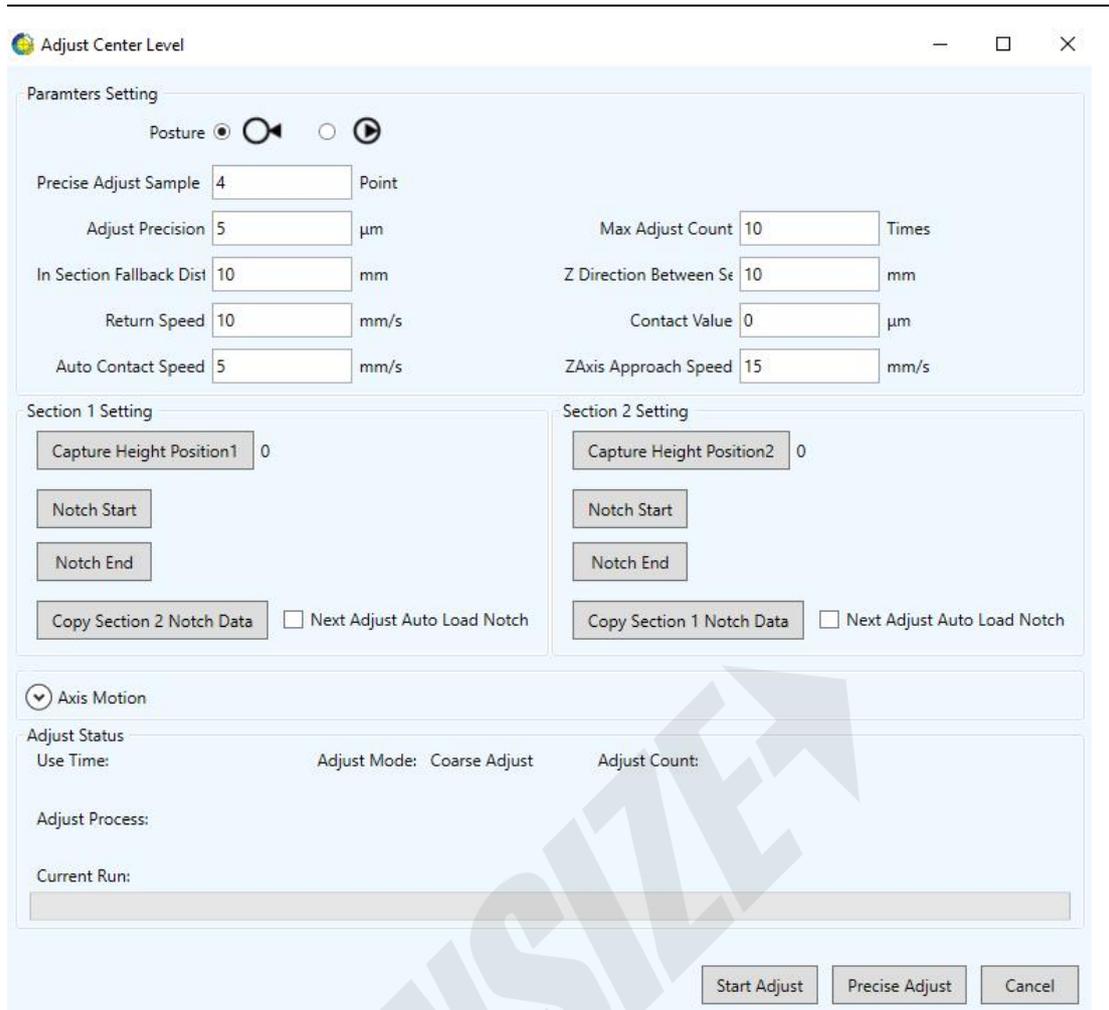
(2) Parameter Settings: The default values of each parameter are adopted;

(3) Start to adjust: refer to the corresponding instructions of "aligning only";

(4) Direct fine tuning: refer to the corresponding instructions of "only aligning".

c. Adjust center level

Click Aligning and leveling to display the following interface:



The operation instructions are as follows:

- (1) Attitude measurement and parameter setting: refer to the corresponding instructions of "aligning only";
- (2) Capture height position 1: Touch the measuring needle to the starting point of measurement position 1 and click capture height position 1;
- (3) Capture height position 2: After capturing height position 1, select measurement position 2 according to the nature of the workpiece, touch the measuring needle to the starting point of measurement position 2, and click capture height position 2;
- (4) The starting point of the gap: Rotate the spindle and click the starting point of the gap to capture the position when the measuring needle touches the starting point of the gap;
- (5) Gap end point: Rotate the spindle and click the gap end point on the interface to capture the end point when the measuring needle touches the gap end point;
- (6) Copy 1/2 gap data of section: Click this option, the system will copy the gap data, and the gap will be automatically avoided when four points are roughly collected;
- (7) Automatic loading gap for next adjustment: Click this option. When similar workpieces are used for aligning and aligning, the workpieces are placed in the same clamping mode and the measuring positions remain the same. The system will automatically load the gap and determine the number of collection points, without

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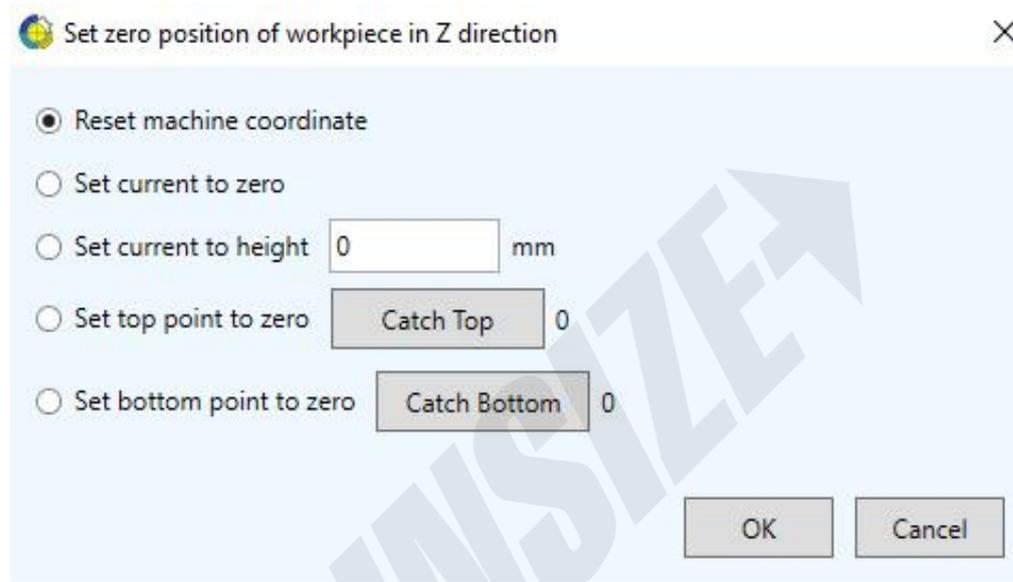
manually capturing the gap position again;

(8) Start to adjust: refer to the corresponding instructions of [aligning only];

(9) Direct fine-tuning: refer to the corresponding instructions of "Only self-tuning".

### 2. 1. 2. 9. The Workpiece zero position

Refers to the coordinate starting point of the longitudinal direction when the workpiece is measured.



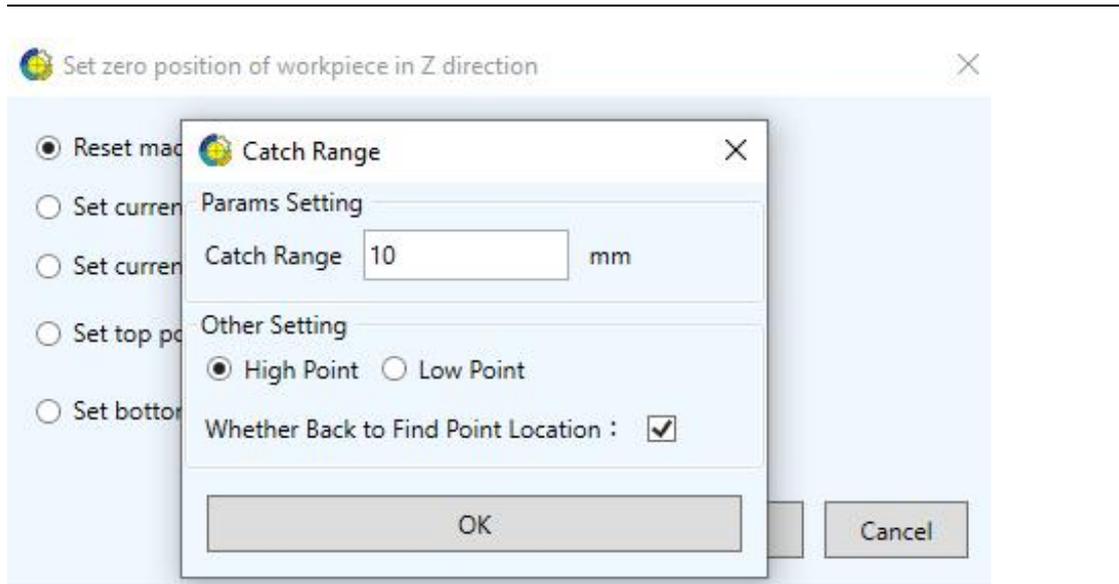
The operation instructions are as follows:

(1) Restore system coordinates: restore equipment coordinate system;

(2) Set the current position as the z-zero position of the workpiece: Set the current position as the Z-0 position of the workpiece coordinate system;

(3) Set the current position to the specified height: set the current position to the specified position in the workpiece coordinate system Z;

(4) Set the high point position as the zero position in the Z-direction of the workpiece: the high point position is the position of the maximum convex point of the deformed workpiece. During measurement, determine its position range according to the drawing and fill in the search range. After the measuring needle touches the high point position of the workpiece, click OK, and the system coordinates are zero.



(5) Set the low position as the zero position in the Z-direction of the workpiece: the low position is the position of the maximum concave point of the deformed workpiece. During the measurement, determine its position range according to the drawing and fill in the search range. After the measuring needle touches the low position of the workpiece, click OK.

### 2.1.2.10. stop

During the measurement, click the button to stop measuring the workpiece .

### 2.1.3. Attitude selection area

The measurement orientation should be perpendicular to the measurement contact surface. Choose left side, right side, up side or down side according to the measurement contact surface.



Outer circle left measurement/inner circle right measurement

is usually used for roundness, cylindricity and Z-direction straightness measurement.



Up/down measurement is usually used for flatness and X -

direction straightness measurement.

### 2.1.4. Limit of each shaft and shaft state

Green means the limit is not triggered, red means the limit is triggered, and when the positive and negative limits are red at the same time, the shaft state is abnormal.

## 2.1.5. Sensor signal display area

The display of sensor acquisition motion contact can be set in "Collection related Parameter Setting" in system Settings

Motion Params Setting

Axis Motion Param Setting | Sample Param Setting | Other Setting

Cyl Sample Motion Param Setting

ZAxis Motion Speed : 4 mm/s

RAxis Return Speed : 2 mm/s

RAxis Auto Contact Speed : 2 mm/s

RAxis Auto Contact Value : 1 μm

First Section Offset : 1 mm

MFlt Sample Motion Param

RAxis Motion Speed : 5 mm/s

ZAxis Return Speed : 1 mm/s

ZAxis Auto Contact Speed : 1 mm/s

ZAxis Auto Contact Value : 1 μm

First Section Offset : 0 mm

Straightness SampleMotionParam

Pre Move Length : 0.3 mm

Max Sampled Point Count : 200000 Point

Min Interval : 1 μm

plunger-V Hope sample Motion Param

Sonser Distance from workpiece Location : 20 mm

Sample Motion Contact Value Param

Warning Area : 60 %

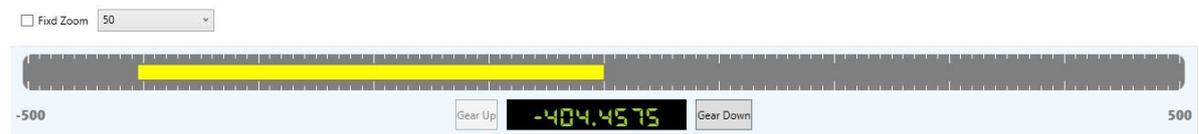
Danger Area : 90 %

OK Cancel

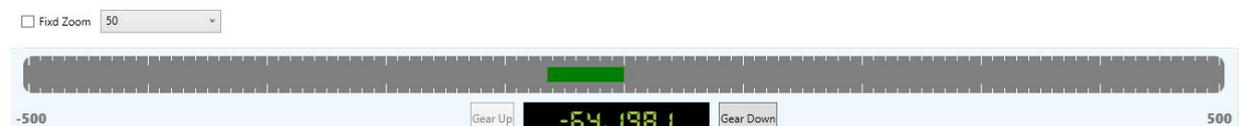
When the contact amount exceeds 90% of the sensor range, the sensor signal bar will be shown in red as follows:



When the contact amount is between 60% and 90% of the sensor range, the signal bar will appear yellow, as shown below:



When the contact amount is within 60% of the sensor range, the signal bar is shown as green:



---

## 2.1.6. Functional area

Select the measurement function of the workpiece, edit the measurement report, set the operating parameters, etc.

## 2.2. Function of measurement



### 2.2.1. Basic measure

Including roundness measurement, cylindricity measurement, straightness measurement, flatness S measurement, flatness M measurement, commutator measurement function.

Note: The corresponding "attitude measurement" must be selected before measurement, and the corresponding mechanical attitude measurement must be adjusted

#### 2.2.1.1. Measuring roundness

Before measurement, select the corresponding pose according to the measurement position. After the measurement is completed, the corresponding measurement report is generated as shown in the following figure.

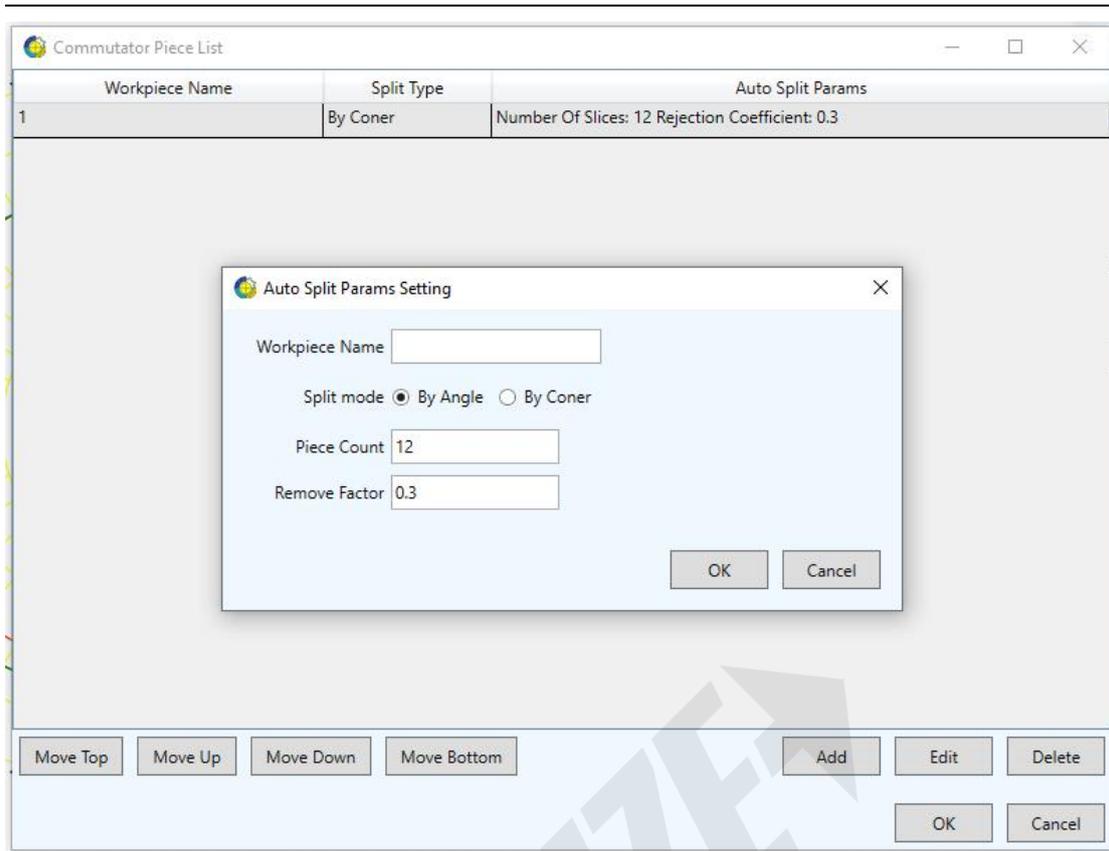




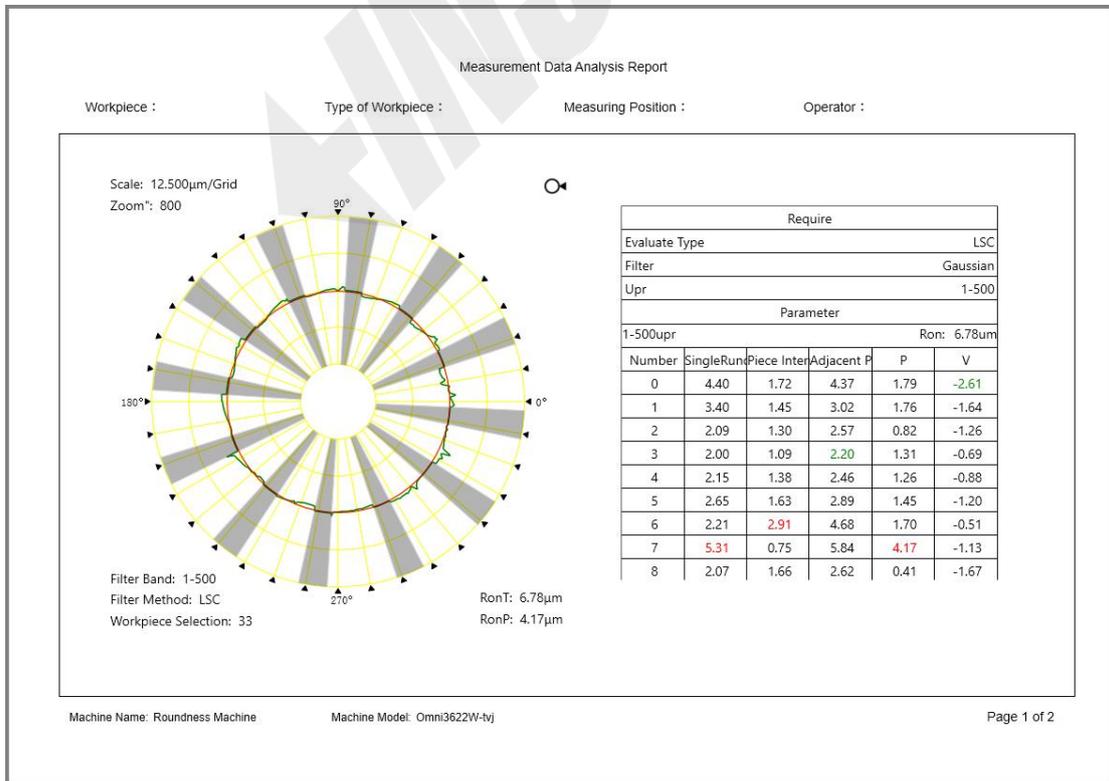








After the measurement is completed, the report is generated as follows:



---

## 2.2.2. Customer measurement

After custom measurement is enabled, multiple measurement functions can be performed to collect measurement elements in batches. After collection, unified evaluation can be performed to generate a report.

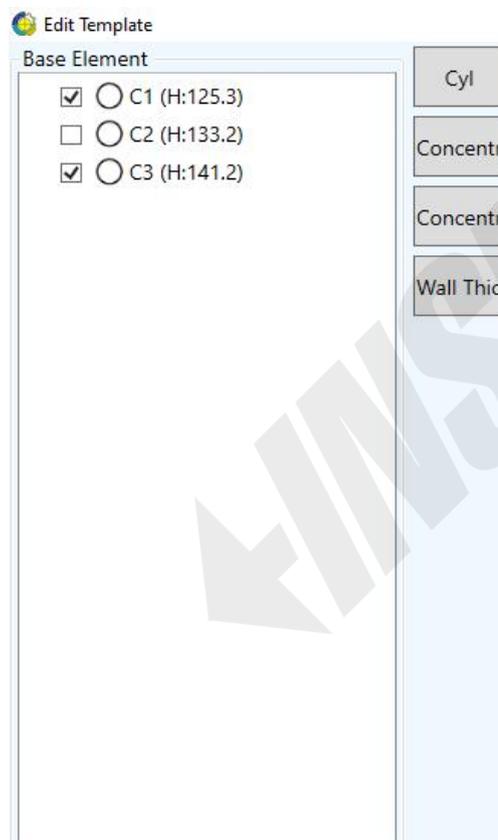
Operation Instructions (coaxiality analysis is used as an example here)

(1) Start measurement: Click to start measurement

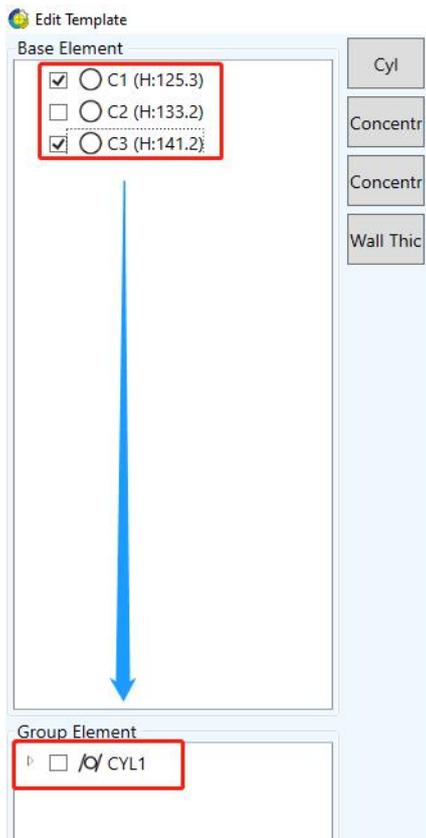
(2) Click the cylindricity to measure the cylindricity of the workpiece. The first group of cylindricity data collection is completed

(3) Refer to steps (1) and (2) to collect the second group of cylindricity data. After the collection is completed, click Stop measurement and the page will automatically jump to the data analysis module.

(4) Click Edit template and the following menu page pops up to analyze the measurement elements:



According to the requirements, select the basic element, and then click [Cyl] to form two combined elements (cylindricity), as shown below:



When the combined elements are selected, the following menu list is displayed:



Click "coaxiality", the parameter setting interface appears, you can set the datum, filter, etc.

Coaxial Param Report Setting

Select Base  
 CYL1  CYL2

Datum Fiter Setting  
 0-500  0-15  0-50  0-150

Measure Fiter Setting  
 0-500  0-15  0-50  0-150

Show Params Setting  
 Datum File  Measure File  Coax ISO  Coax DIN  
 Total Runout

Param Show Mode Setting  
 Use Default Font Size  Precision

Title Setting  
 Show Title

Gird Setting  
 Row Height   Excess Rows Use Blank Line Fill  
 Show Outer Border  Show Inner Border  Show Title Require  
 Show Condition Title  Show Parameter Title

OK Cancel

Click OK to generate parameter report;

CYL1&CYL2-Coaxiality Paramters Report

Require	
Datum File	CYL1 (0-500upr)
Measure File	CYL2 (0-500upr)
Parameter	
Coax ISO	1.15μm
Coax DIN	1.15μm

Click "coaxiality", the parameter setting interface appears, you can set the datum, filter, etc.

Coaxiality Chart Setting

Select Base  
 CYL1       CYL2

Datum Fiter Setting  
 0-500     0-15     0-50     0-150

Measure Fiter Setting  
 0-500     0-15     0-50     0-150

Show Params Setting  
 Datum File     Measure File     Coax ISO     Coax DIN  
 Total Runout

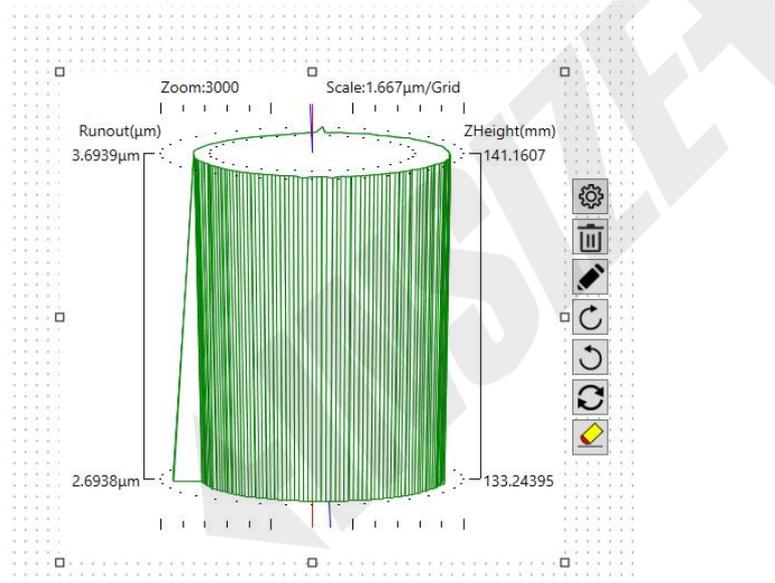
Param Show Mode Setting  
 Use Default Font Size 14    Precision 2

Title Setting  
 Show Title CYL1&CYL2-Coaxiality Chart

Border Setting  
 ShowBorder

OK    Cancel

Click OK to generate the general coaxiality graph;



Save this file, the evaluation analysis of the custom measurement data (coaxiality) is finished.

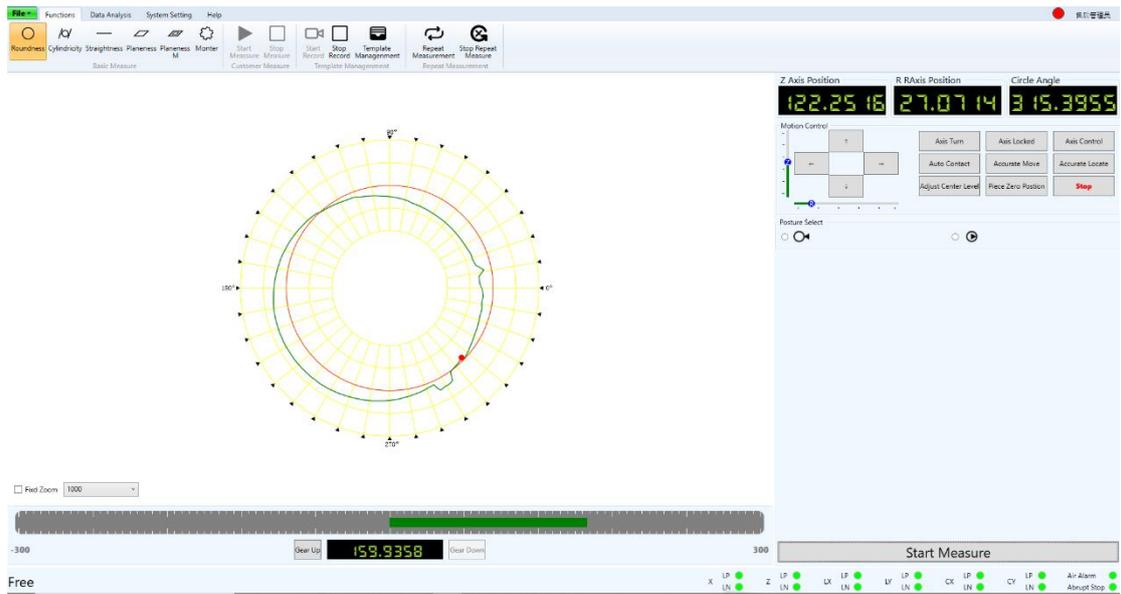
## 2.2.3. Template Management

Through the plate operation, the workpiece program measurement.

For some parts, the process of aligning and leveling the workpiece and the measurement process can be recorded in the same template.

### 2.2.3.1. Recording artifacts

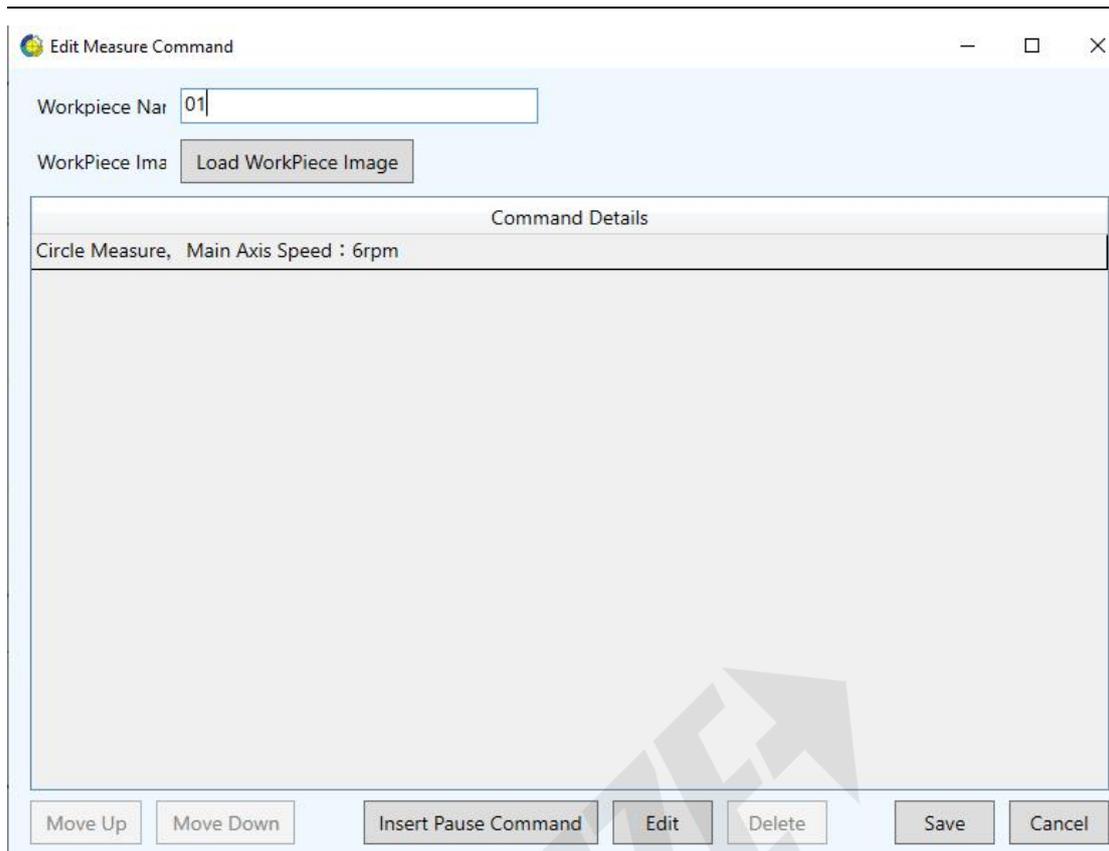
Click Record Artifact to start recording a script file that measures the same type of artifact.



### 2. 2. 3. 2. Stop recording

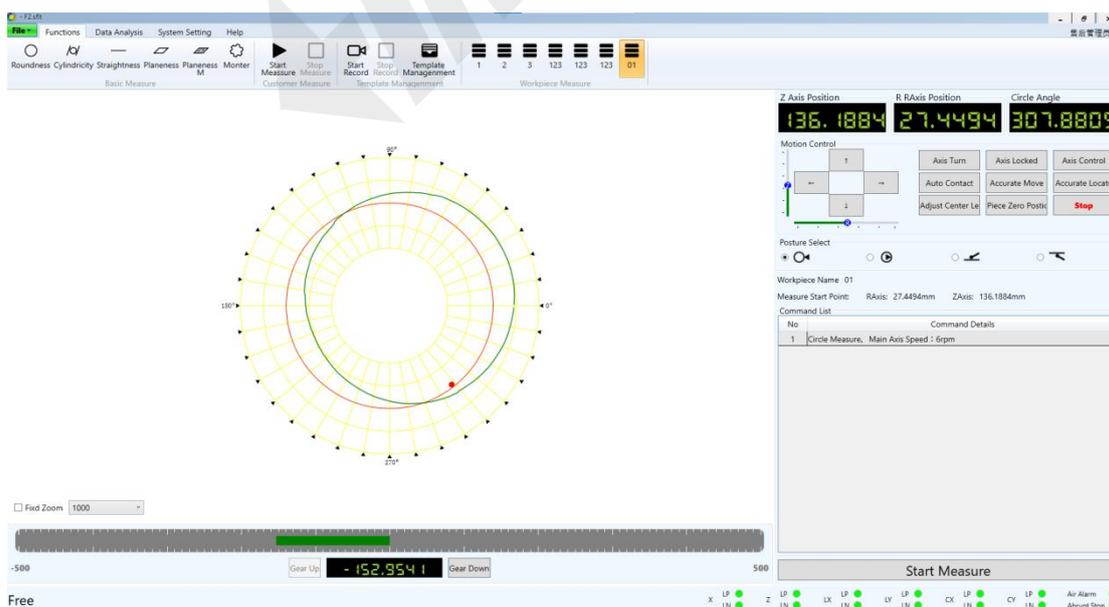


After clicking [Stop recording], the following interface will pop up. In this interface, edit the name of the workpiece, edit the measurement program or insert the pause command according to the actual demand of measurement, and click Save after editing.



### 2. 2. 3. 3. Adding a script file

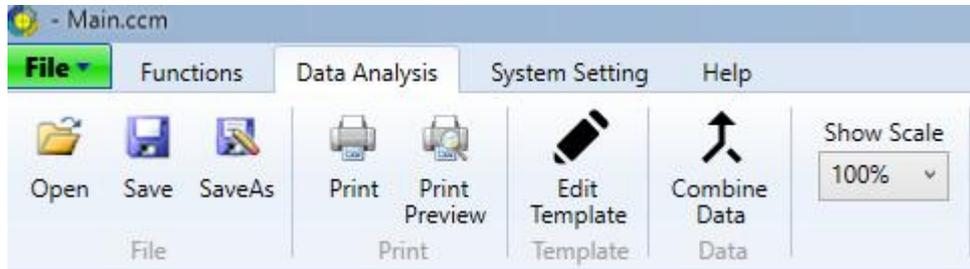
Click Template Management, add the measured recording script file, the file will be displayed in the workpiece measurement module.



When the workpiece starts the program measurement, after the workpiece is clamped, select the corresponding program measurement script in the workpiece measurement module and click Start measurement. The system will measure the workpiece based on the script file program.

---

## 2. 3. Data analysis function



### 2. 3. 1. File

Select or save measurement files as required.

[Open] : Select the corresponding file type and file name and click Open;

[Save] : save the current file;

[Save as] : Save the current file.

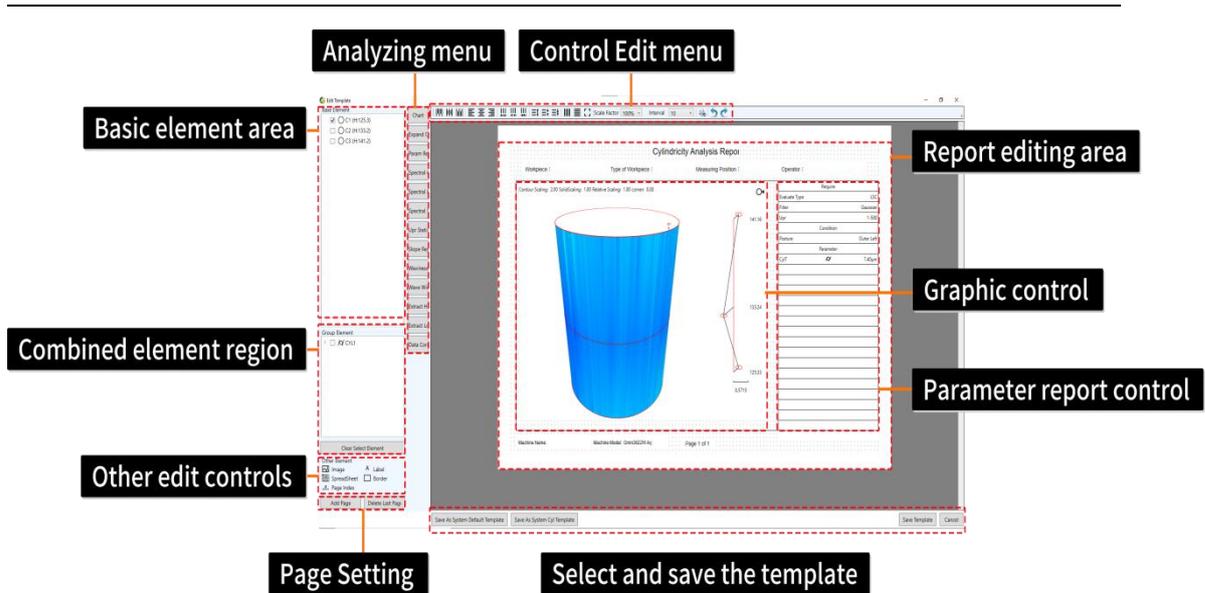
### 2. 3. 2. Print

Print preview, print Settings, or print the current file.

### 2. 3. 3. Editing template

According to the actual demand, the measurement report is analyzed and processed.

#### 2. 3. 3. 1. The template editing page



[Basic element area] : Select and combine basic elements, click the left button to select, and click the right button to delete;

[Combined elements area] : basic elements after checking the combination;The new combination elements will be displayed in this area. Click the left button to check and the right button to delete;

[Other editing controls] : In the [report editing] area, add pictures, frame and other Settings;

[Page setting] : Add edit page, or delete page;

[Analysis menu] : different forms of analysis of the selected menu;

[Control editing area] : Adjust the layout of the controls displayed in the report editing area;

[Report editing area] : Display analysis graphics and parameter reports in this area;

[Graphic control] : Select the analysis form in the [Analysis menu] to edit the generated graphics;

[Parameter Report]: Select Parameter Report from the Analysis menu to edit the parameter report.

[ select and save template] : Select the template type to save, or cancel the report editing

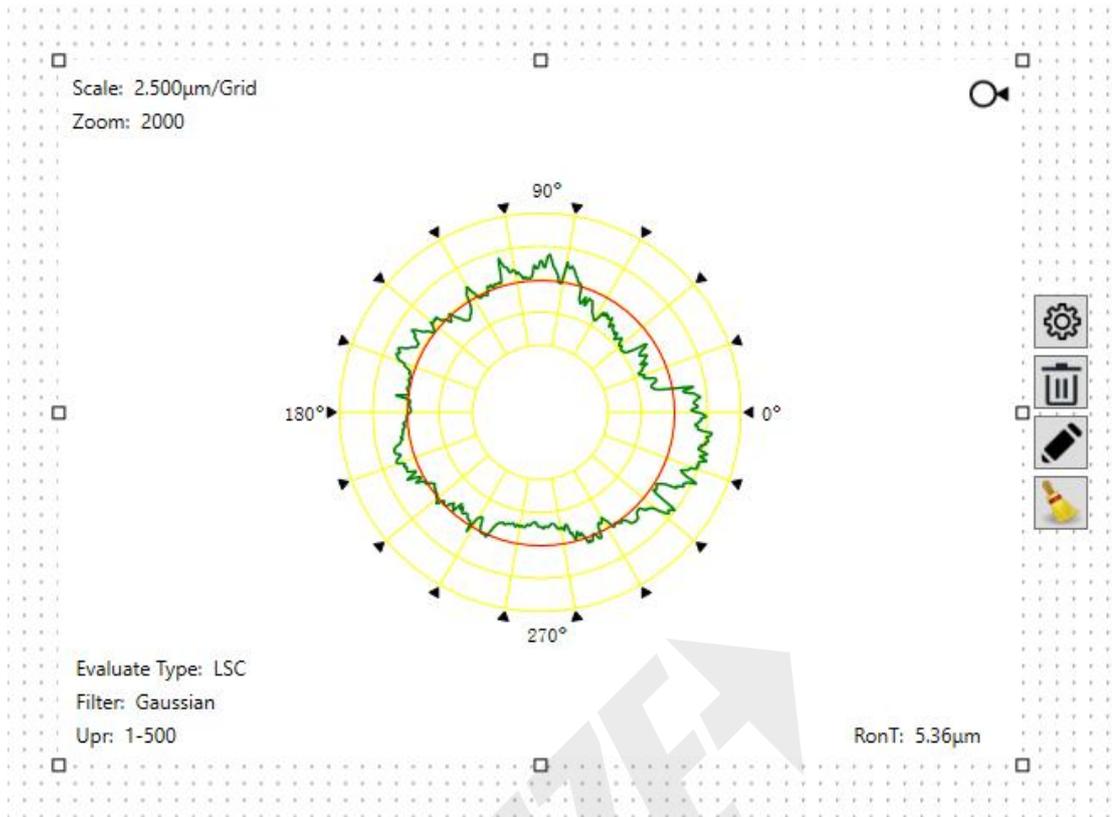
### 2. 3. 3. 2. Analysis of roundness

In the basic element area of the Edit template, click a roundness element and you can see the following menu in the Data analysis area. You can draw your own report in the middle template area through the analysis report of the functional area.



(1) General graph

Click [General Diagram] to display the following graphical controls:



Rename the control.



: Edit and set the assessment method, filtering method, magnification rate, parameters, etc., the page is as follows:

**Roundness parameter Setting** ✕

Filter Mode  
 LSC       MZC       MIC       MCC

Filter Mode  
 None       Gaussian       2RC

Upr  
 1-500       1-15       1-50       1-150  
 2-500       15-150       15-250       15-500

Remove Data Show Model  
 BaseLine Fill       Raw Data Fill       Remove Position Around Connection

Zoom  
 Fixd Zoom      Zoom :

Show Params Setting  
 Evaluate Type       Filter       Upr       RonT  
 RonP       RonPPos       RonV       RonVPos  
 Runout       Ecc       EccPos       Radius  
 Conc

Param Show Mode Setting  
 Use Default Font Size       Precision

Title Setting  
 Show Title

Show Setting  
 Show Remove Area

Border Setting  
 ShowBorder



Delete this control from the template;



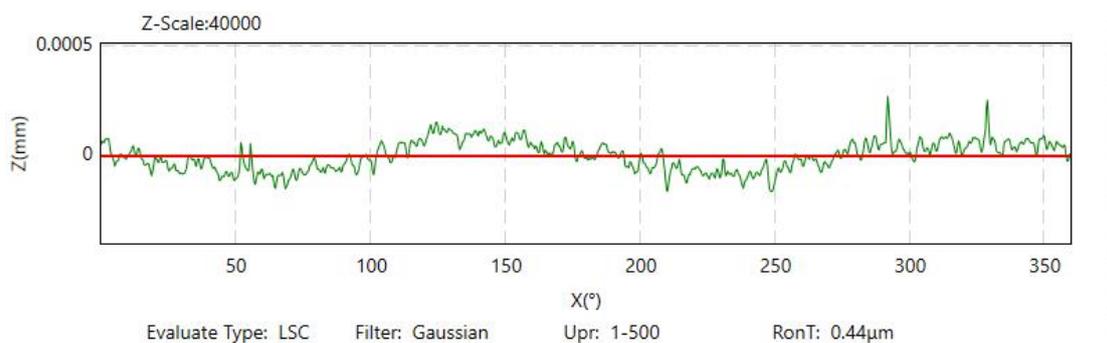
Click edit to delete the control operation;

Delete operation: Put the mouse on the diagram, press the left button, move the mouse, release the left button of the mouse, and then you can see the deleted area;



Clear the culled area.

(2) Expand the diagram



Rename the control.



: For the setting of evaluation method, filtering mode, magnification, parameter display, etc., the page is as follows:

Roundness parameter Setting

Filter Mode

LSC       MZC       MIC       MCC

Filter Mode

None       Gaussian       2RC

Upr

1-500       1-15       1-50       1-150

2-500       15-150       15-250       15-500

Remove Data Show Model

BaseLine Fill       Raw Data Fill       Remove Position Around Connection

Zoom

Fixd Zoom      Zoom : 40000

Show Params Setting

Evaluate Type       Filter       Upr       RonT

RonP       RonPPos       RonV       RonVPos

Runout       Ecc       EccPos       Radius

Conc

Param Show Mode Setting

Use Default Font Size 14      Precision 2

Title Setting

Show Title C1-Roundness Expand Chart

Show Setting

Show Remove Area

Border Setting

ShowBorder

OK Cancel



Delete this control from the template.

## (2) Parameter Report

Require	
Evaluate Type	LSC
Filter	Gaussian
Upr	1-500
Condition	
Z Position	18.0824mm
Measure Speed	6.00rpm
Posture	Outer Left
Parameter	
RonT	5.36 $\mu$ m
RonP	2.96 $\mu$ m
RonV	-2.41 $\mu$ m



: Renames the control.



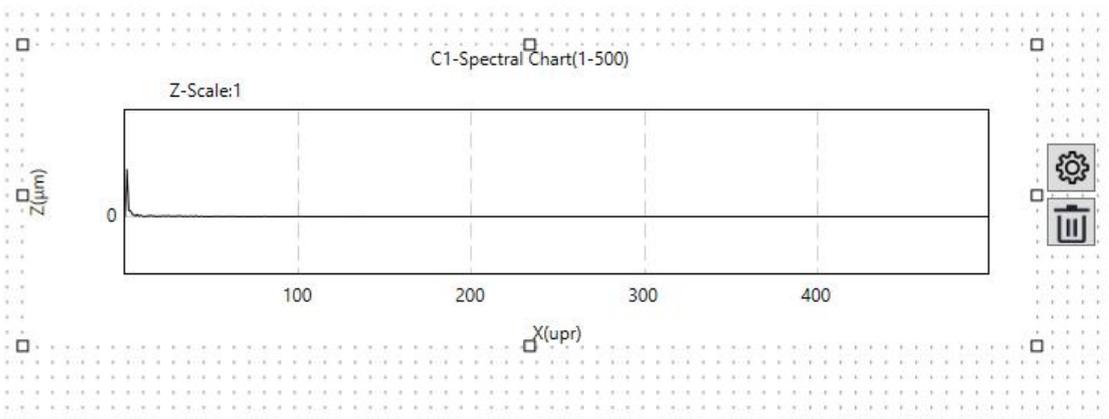
: Set evaluation method, filtering mode, magnification, parameter display, etc.



: Deletes this control from the template.

#### (4) Spectrum diagram

The spectral analysis of contour figure is carried out



Rename the control.



: Set the evaluation method, filtering mode, parameter display, etc., as

shown in the figure below:



Delete this control from the template.

(5) Spectrum report

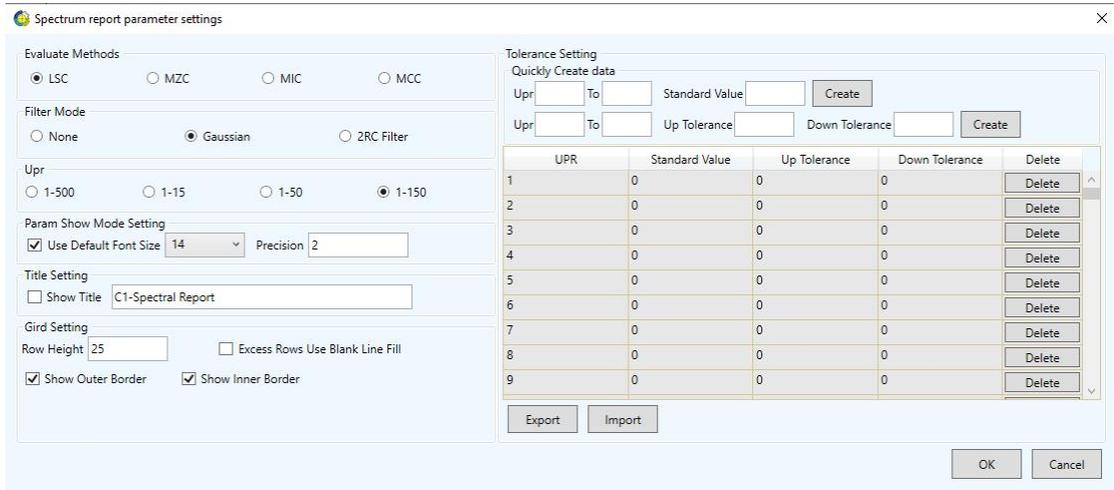
UPR	N+0	N+1	N+2	N+3	N+4	N+5	N+6	N+7	N+8	N+9
0	0.00	1.61	0.03	0.01	0.03	0.01	0.01	0.01	0.03	0.01
10	0.01	0.01	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01
20	0.01	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.02
30	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.01
40	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00
50	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00
60	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00
70	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



Rename the control.



: Setting the assessment method, filtering mode, magnification, tolerance, etc., as shown in the figure below:



[Tolerance setting] : In the current upr tolerance

setting,  , specify the standard value of upr from

small band to large band;  , specify upr from small band to large band, input upper tolerance value and lower tolerance value, generate a tolerance band;

Click on the  Button, will be analyzed with the current measurement data and the set tolerance zone, the out-of-tolerance will be marked with red font.

 Delete this control from the template.

(6) Spectrum statistics

**C1-Spectral Statistics Report(um)1-500**

UPR	Amplitude
1	7.96
2	1.06
3	1.01
4	0.48
7	0.39
5	0.32
9	0.24
15	0.21
25	0.17
14	0.15
41	0.14
31	0.14
32	0.12
22	0.11



Rename the control.



: Set the assessment method, band and parameter display, as shown in the figure below:

**Spectrum Statistics Report Parames Settings**

Upr

1-500       1-15       1-50       1-150

2-500       15-150       15-250       15-500

Param Show Mode Setting

Use Default Font Size  Precision

Display Row Number Setting

Display Row Number

Title Setting

Show Title

Gird Setting

Row Height   Excess Rows Use Blank Line Fill

Show Outer Border       Show Inner Border



Delete this control from the template.

(7) Band statistics

Upr	RonT	RonP	RonV
1-50	5.06	2.68	-2.37



: Renames the control.



: For the setting of evaluation method, filtering mode, parameter display, etc., the page is as follows:

**Roundness Statistics Params Settings** [X]

**Evaluate Methods**

LSC     
  MZC     
  MCC     
  MIC

**Filter Mode**

None     
  Gaussian     
  2RC Filter

**Upr**

1-500     
  1-15     
  1-50     
  1-150  
 2-500     
  15-150     
  15-250     
  15-500

**Param Show Mode Setting**

Use Default Font Size      
 Precision

**Title Setting**

Show Title

**Grid Setting**

Row Height      
 Excess Rows Use Blank Line Fill  
 Show Outer Border     
 Show Inner Border



Delete this control.

(8) Slope table

The peak value (p), trough value (V), P-V (peak minus trough value) from the starting Angle to the end Angle are counted, and the maximum value (max), minimum value (min), and average value (avg) are counted.

	Start Angle	End Angle	P	V	P-V
1	0	30	1.98	-2.17	4.15
2	30	60	-0.56	-2.40	1.84
3	60	90	1.92	-2.01	3.93
4	90	120	2.02	-0.36	2.38
5	120	150	1.43	-1.25	2.68
6	150	180	1.67	-0.34	2.01
7	180	210	1.39	-0.18	1.57
8	210	240	0.50	-0.98	1.48
9	240	270	0.17	-1.79	1.96
10	270	300	0.44	-1.64	2.08
11	300	330	2.42	-0.80	3.22
12	330	360	2.90	0.90	2.00
Max			2.90	0.90	4.15
Min			-0.56	-2.40	1.48
Avg			1.36	-1.08	2.44



: Renames the control.



: For the setting of evaluation method, filtering mode, parameter display, etc., the page is as follows:

**Slope Params Setting**

Evaluate Methods

LSC       MZC       MCC       MIC

滤波方式

None       Gaussian       2RC Filter

Upr

1-500       1-15       1-50       1-150  
 2-500       15-150       15-250       15-500

Param Show Mode Setting

Use Default Font Size  Precision

Interval Angle

Interval Angle

Title Setting

Show Title

Gird Setting

Row Height   Excess Rows Use Blank Line Fill

Show Outer Border       Show Inner Border

OK Cancel



Delete this control.

(9) corrugation degree

C1-Roundness Waviness Report

Require	
Evaluate Type	LSC
Filter	Gaussian
Upr	1-500
Parameter	
Wa	0.31 $\mu$ m

Settings icons:



Rename the control.



: For parameter display, title and other Settings, the page is as follows:

**Waviness Params Settings**

Show Params Setting

Temperature/hu    Evaluate Type    Filter    Upr    Measure Date    Measure Time

Wa    Wc    Wp    Wv    Wz    Wq

Wsm

Param Show Mode Setting

Use Default Font Size   14   Precision   2

Title Setting

Show Title   C1-Roundness Waviness Report

Gird Setting

Row Height   25    Excess Rows Use Blank Line Fill

Show Outer Border    Show Inner Border    Show Title Require

Show Condition Title    Show Parameter Title

OK   Cancel

 Delete this control.

(10) Wave height and wave width

C1-Wave Width And Height Statistics Report (µm) 1-500upr

Number	Angle	Wave Height	Wave Width	Start Angle	End Angle
0	65.79	2.96	3.53	304.63	10.42
1	27.95	2.08	1.50	82.31	110.26
2	21.27	1.69	1.14	143.09	164.36
3	8.31	1.54	0.45	72.47	80.77
4	27.29	1.39	1.46	183.60	210.89
5	3.82	0.94	0.21	118.56	122.39
6	1.67	0.88	0.09	172.35	174.02
7	6.50	0.65	0.35	136.01	142.51
8	0.62	0.50	0.03	237.92	238.54
9	2.20	0.47	0.12	294.13	296.32
10	3.34	0.43	0.18	289.56	292.90
11	2.64	0.30	0.14	219.42	222.06
12	2.64	0.30	0.14	110.61	113.25
13	1.05	0.21	0.06	245.52	246.58
14	2.15	0.18	0.12	301.99	304.15

: Renames the control.

: For the setting of evaluation method, filtering mode, parameter display, etc., the page is as follows:

Wave height and wave width report parameter settings

Evaluate Methods  
 LSC       MZC       MCC       MIC

Filter Mode  
 None       Gaussian       2RC Filter

Upr  
 1-500       1-15       1-50       1-150  
 2-500       15-150       15-250       15-500

Param Show Mode Setting  
 Use Default Font Size    14    Precision    2

Title Setting  
 Show Title    C1-Wave Width And Height Statistics Report

Gird Setting  
 Row Height    25     Excess Rows Use Blank Line Fill  
 Show Outer Border       Show Inner Border

OK    Cancel

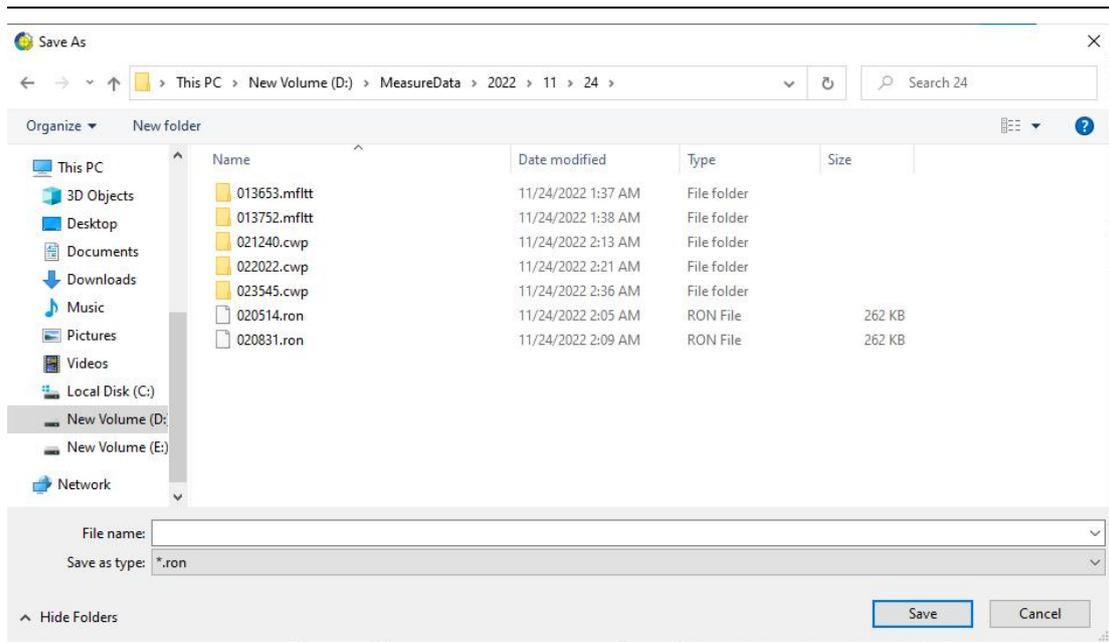


Delete this control;

(11) Data conversion

After data conversion of the files in the new system, the converted files can be edited and analyzed in the old system.

As shown in the picture below, click the "Data conversion" button, and the select file window will pop up. After selecting the file, rename the file and select the storage path.

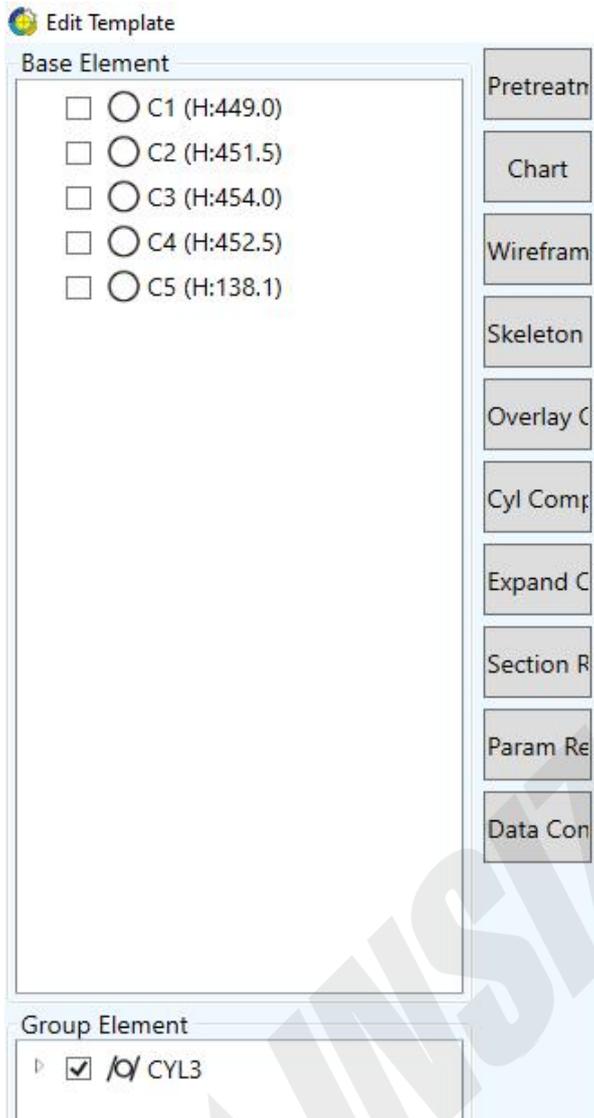


After clicking "Save", the data is exported successfully, and the exported file can be analyzed in the old system.



### 2. 3. 3. 3. Analysis of cylindricity

Check multiple base elements of roundness and click Cyl to form a combination element  **CYL1** Check this element in the combination element of editing template, and the menu will appear, including preprocessing, filling diagram, wireframes, structure diagram, overlay diagram and other functions, to edit the file.



(1) Pretreatment

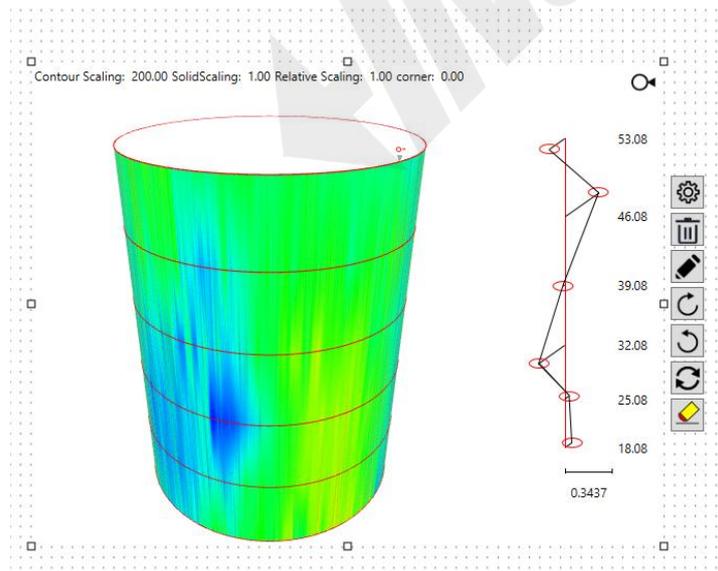
All sections can be displayed, and the section data can be removed, and the evaluation method, filtering method and band can be reset.



When deleting, put the mouse on the graph area, hold down the left button, and move the mouse. The deleted part is filled with the base circle data (you can recover the deleted by clicking the right button). After deleting, click the lower right corner of the interface to save the deleted data. As shown below:

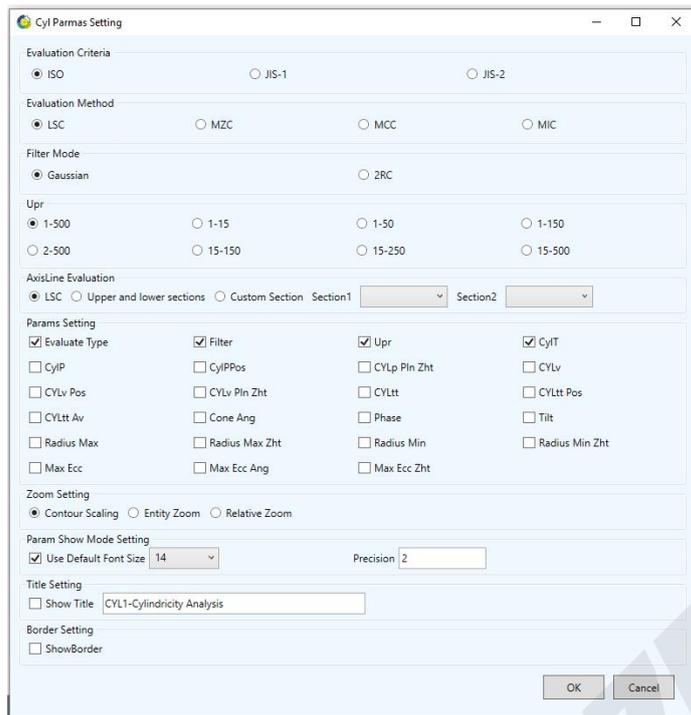


(2) Fill the graph  
Display as a solid when drawing.



: Rename the control.

: Click the Set button, the following interface appears, you can set the evaluation standard, evaluation method, filtering mode, band, axis evaluation mode, display parameters, scale, etc.



: Delete this control.



: After clicking, press the left button of the mouse, place the graph area with the mouse, and scroll the mouse axis to zoom the graph. On the Settings screen, you can select the zoom mode.



: Click once to rotate the solid graph clockwise by 5 degrees with the central axis as the center.



: Click once to rotate the solid graph 5 degrees counterclockwise to the center of the central axis.



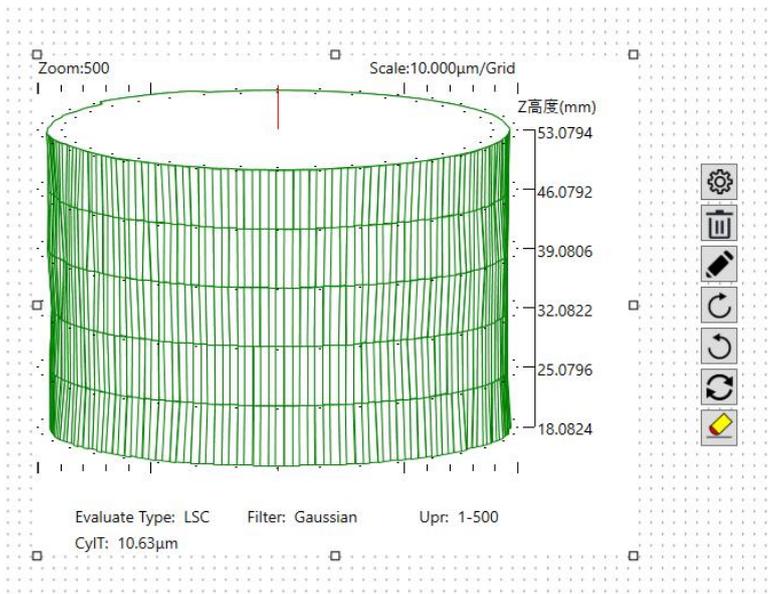
: Rotate back to zero, rotate to zero.



: Preprocess the shortcut icon.

### (3) Wireframes

Draw in the form of a wire frame when drawing.



: Rename the control.



: Set the evaluation method, filtering mode, parameter display, etc.



: Deletes this control.



: Click Edit to scale the graph.



: Click once to rotate the solid graph clockwise by 5 degrees with the central axis as the center.



: Click the solid graph once to rotate 5 degrees counterclockwise with the central axis as the center;.



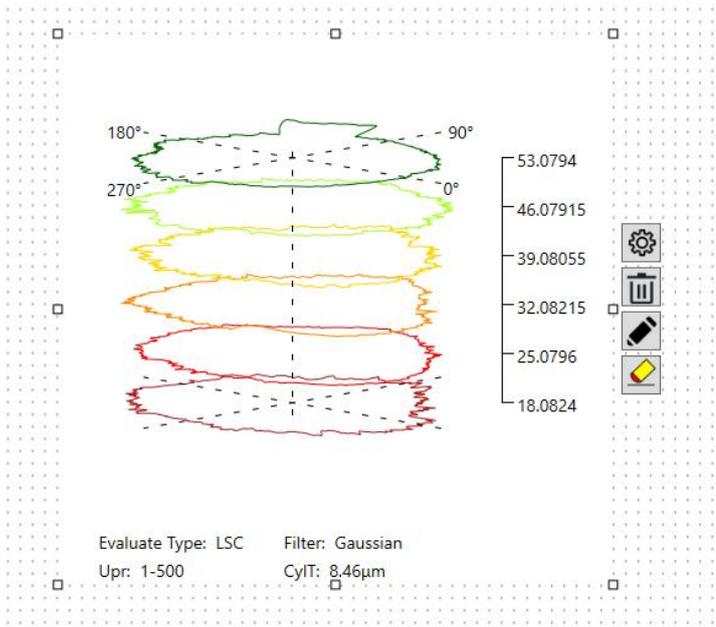
: Rotate back to zero, rotate to zero.



: Preprocess the shortcut icon.

#### (4) Structure drawing

Drawing in the form of solid drawing, the ruler on the right is to represent the height of each section.



: Rename the control.



: Set the evaluation method, filtering mode, parameter display, etc.



: Deletes this control.



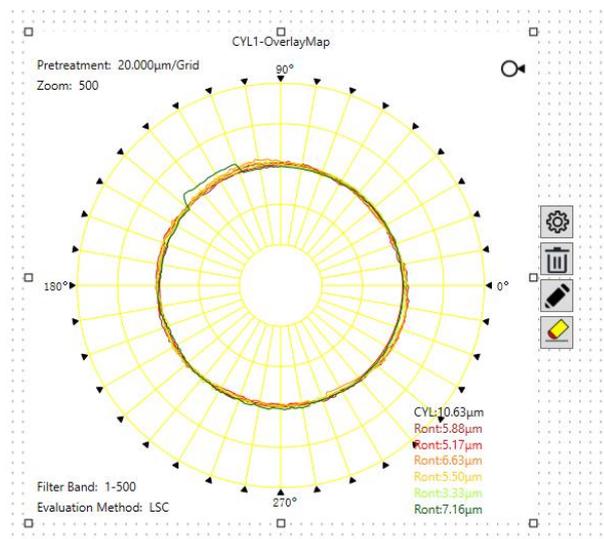
: Click Edit to scale the graph;



: Preprocess the shortcut icon.

### (5) Superposition diagram

Multiple sections are shown on a reference circle, with different sections represented in different colors.



: Rename the control.



: For the setting of evaluation method, filtering mode, parameter display, etc., the page is as follows:

Cyl Overlay parameter settings

Evaluation Criteria  
 ISO  JIS-1  JIS-2

Evaluation Method  
 LSC  MZC  MCC  MIC

Filter Mode  
 Gaussian  2RC

Upr  
 1-500  1-15  1-50  1-150  
 2-500  15-150  15-250  15-500

Param Show Mode Setting  
 Use Default Font Size 14 Precision 2

Title Setting  
 Show Title CYL1-OverlayMap

Border Setting  
 ShowBorder

OK Cancel



: Deletes this control.



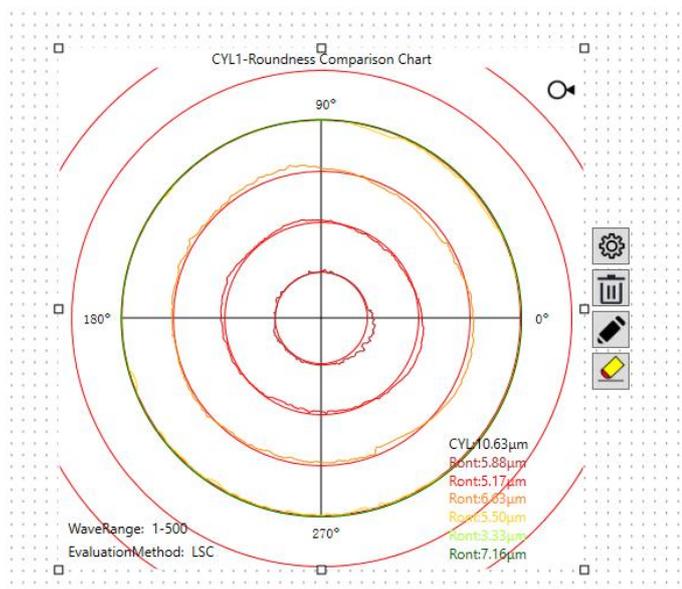
: Click Edit to delete the control.



: Preprocess the shortcut icon.

#### (6) Comparison chart

Multiple sections show the same center on different reference circles.





: Renames the control.



: Set the evaluation method, filtering mode, parameter display, etc.



Delete this control.



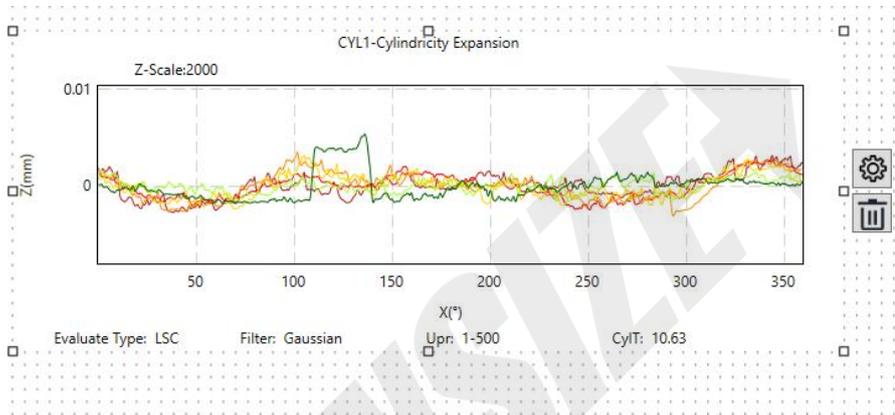
: The graph can be scaled.



: Preprocess the shortcut icon.

### (7) Expand the diagram

The different sections are on the same ordinate.



: Renames the control.



: For the setting of evaluation method, filtering mode, parameter display, etc., the page is as follows:

**Cyl Expand Chart Parmas Setting**

Evaluation Criteria  
 ISO       JIS-1       JIS-2

Evaluation Method  
 LSC       MZC       MCC       MIC

Filter Mode  
 Gaussian       2RC

Upr  
 1-500       1-15       1-50       1-150  
 2-500       15-150       15-250       15-500

Show Params Setting

<input checked="" type="checkbox"/> Evaluate Type	<input checked="" type="checkbox"/> Filter	<input checked="" type="checkbox"/> Upr	<input checked="" type="checkbox"/> CylT
<input type="checkbox"/> CylP	<input type="checkbox"/> CylPPos	<input type="checkbox"/> CylP Pln Zht	<input type="checkbox"/> CylV
<input type="checkbox"/> CylV Pos	<input type="checkbox"/> CylV Pln Zht	<input type="checkbox"/> CylTt	<input type="checkbox"/> CylTt Pos
<input type="checkbox"/> CylTt Av	<input type="checkbox"/> Cone Ang	<input type="checkbox"/> Phase	<input type="checkbox"/> Tilt
<input type="checkbox"/> Radius Max	<input type="checkbox"/> Radius Max Zht	<input type="checkbox"/> Radius Min	<input type="checkbox"/> Radius Min Zht
<input type="checkbox"/> Max Ecc	<input type="checkbox"/> Max Ecc Ang	<input type="checkbox"/> Max Ecc Zht	

Param Show Mode Setting  
 Use Default Font Size  Precision

Title Setting  
 Show Title

Border Setting  
 ShowBorder

OK Cancel

 Delete this control.

(8) Section report  
 Parameter comparison of all sections.

CYL1-Cylindricity Section Report

Section Name	ZPos	RonT	RonP	RonPPos	RonV	RonVPos
C1	18.08mm	5.36 $\mu$ m	2.96 $\mu$ m	353.17°	-2.41 $\mu$ m	38.01°
C2	25.08mm	5.00 $\mu$ m	2.78 $\mu$ m	344.08°	-2.22 $\mu$ m	48.39°
C3	32.08mm	5.90 $\mu$ m	3.12 $\mu$ m	334.65°	-2.79 $\mu$ m	43.15°
C4	39.08mm	5.54 $\mu$ m	2.99 $\mu$ m	331.65°	-2.56 $\mu$ m	69.72°
C5	46.08mm	3.27 $\mu$ m	1.49 $\mu$ m	1.18°	-1.79 $\mu$ m	292.29°
C6	53.08mm	7.28 $\mu$ m	5.48 $\mu$ m	136.09°	-1.80 $\mu$ m	212.76°

: Rename the control.

: For the setting of evaluation method, filtering mode, parameter display, etc., the page is as follows:

**Cyl Section Report Params Setting**

Evaluation Criteria  
 ISO                       JIS-1                       JIS-2

Evaluation Method  
 LSC                       MZC                       MCC                       MIC

Filter Mode  
 Gaussian                       2RC

Upr  
 1-500                       1-15                       1-50                       1-150  
 2-500                       15-150                       15-250                       15-500

Show Params Setting  
 Evaluate Type                       Filter                       Upr                       ZPos  
 Radius                       RonT                       RonP                       RonPPos  
 RonV                       RonVPos                       RonT(Axis)                       RonP(Axis)  
 RonPPos(Axis)                       RonV(Axis)                       RonVPos(Axis)

Param Show Mode Setting  
 Use Default Font Size  Precision

Title Setting  
 Show Title

Show Setting  
 Is Show Result Row

Gird Setting  
 Row Height   Excess Rows Use Blank Line Fill  
 Show Outer Border                       Show Inner Border

OK Cancel

: Deletes this control.

(9) Parameter report

要求	
评定方法	LSC
滤波器	高斯
滤波范围	1-50
条件	
测姿	左测
参数	
峰谷值	2.5127 $\mu\text{m}$
峰值	2.3130 $\mu\text{m}$
谷值	-0.1998 $\mu\text{m}$
最小二乘锥角	NaN $^{\circ}$

52



: Rename the control.



: Set the evaluation method, filtering mode, parameter display, etc.



: Deletes this control.

#### (10) Data conversion

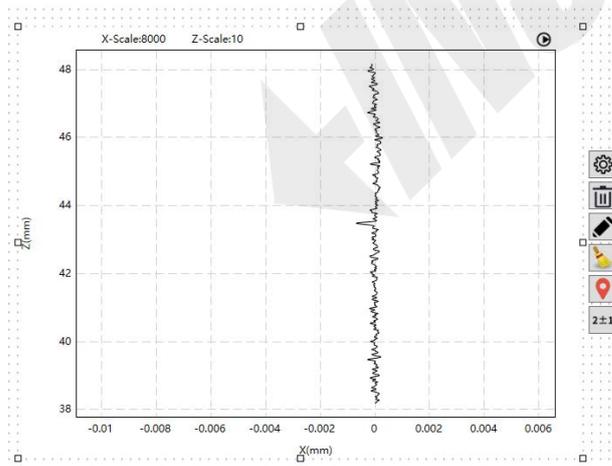
Operation: Click the "Data Conversion" button, the select file window will pop up, select the file, rename the file, select the storage path, click "OK", the data is exported successfully, the exported file can be analyzed in the old system.

### 2. 3. 3. 4. Analysis of straightness

Select a line (vertical or horizontal) in the base element and click it to display the function menu. (Take the vertical line as an example here)



(1) General graph



: Renames the control.



: Click this icon to display the following interface, you can set filtering mode, reference line, display parameters, magnification, etc.



: Remove this control from this report template.



: Edit button, scroll the mouse axis, you can zoom the graph in the graph

area;Or press the left mouse button disk, place the graph area and drag to delete the graph (delete data mode can be selected in the setting interface).



: Press this button to clear the culled area;

## (2) Parameter report

Require	
Evaluate Type	LSC
Filter	Gaussian(0.8mm)
Condition	
Posture	Inner Right
Parameter	
STRt	0.28 $\mu$ m
STRp	0.13 $\mu$ m
STRv	-0.16 $\mu$ m
Trav Length	10.00mm

Icons on the right side of the table: Gear, Trash, 2±1



: Renames the control.



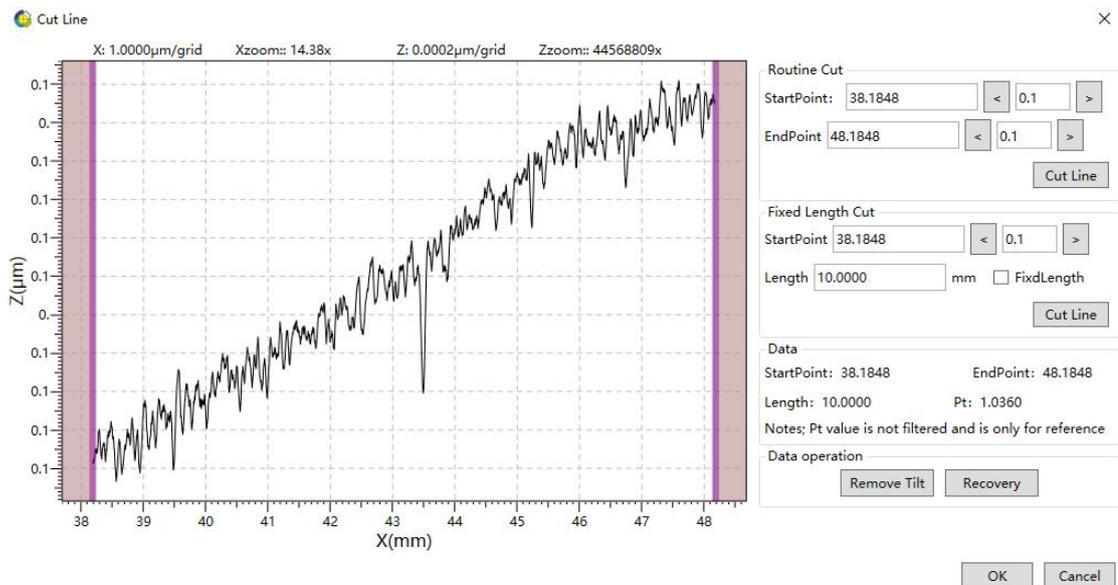
: Click this icon to display the following interface, you can set filtering mode, reference line, display parameters, magnification, etc.



: Remove this control from this report template.

## (3) Straight line screenshot

According to the demand, partial interception of the measurement graph;



[Conventional interception] : fill in the starting point and end point of interception, or drag the left and right keys to determine the starting point and end point;

[Fixed length interception] : Fill in the starting point, determine the interception distance, check fixed length, interception length

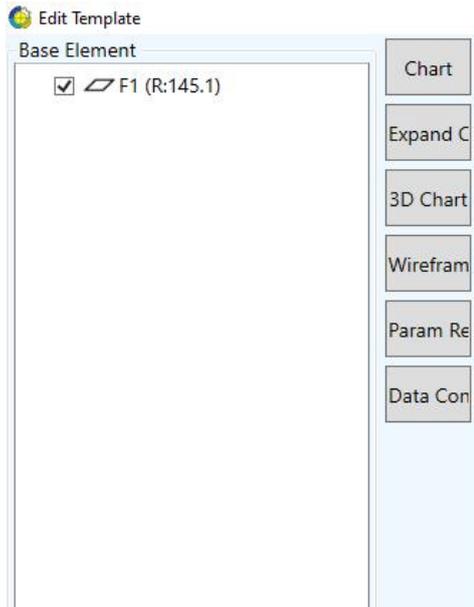
[To tilt] : straighten the graph for easy viewing.

#### (4) Data conversion

Operation: Click the "Data Conversion" button, the select file window will pop up, select the file, rename the file, select the storage path, click "OK", the data is exported successfully, the exported file can be analyzed in the old system.

### 2. 3. 3. 5. Analysis of flatness (S)

In the basic element area of the Edit template, click flatness and you can see the following menu in the Data analysis area. You can draw your own report in the middle template area through the analysis report of the functional area.



(1) General graph

Click on the General Diagram to display the following graphical controls:



: Click this icon to display the following interface. You can set filtering mode, display parameters and band.



Delete: Remove this control from this report template.



Edit: After clicking the edit button, the graph can be deleted;

When culling, the mouse is placed in the graph area, the left button is pressed down, and the mouse is moved, as shown in the figure below. The culling part is filled with the base circle data. You can set whether to display the culled area in the Settings.



;Click this button to delete the recovery.

(2) Expand the diagram



: Renames the control.

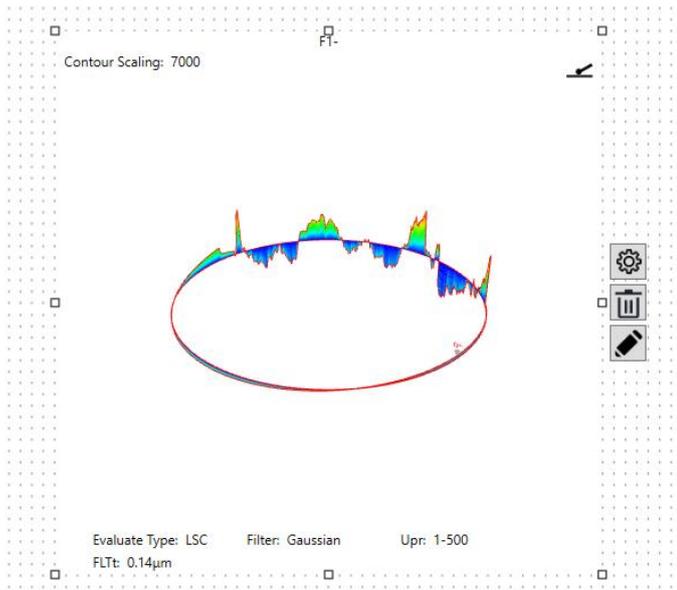


: Click this icon to display the following interface. You can set filtering mode, display parameters and band.



Delete: Delete this control from this report template.

(3) 3D drawing



: Set the evaluation method, filtering mode, parameter display, etc.

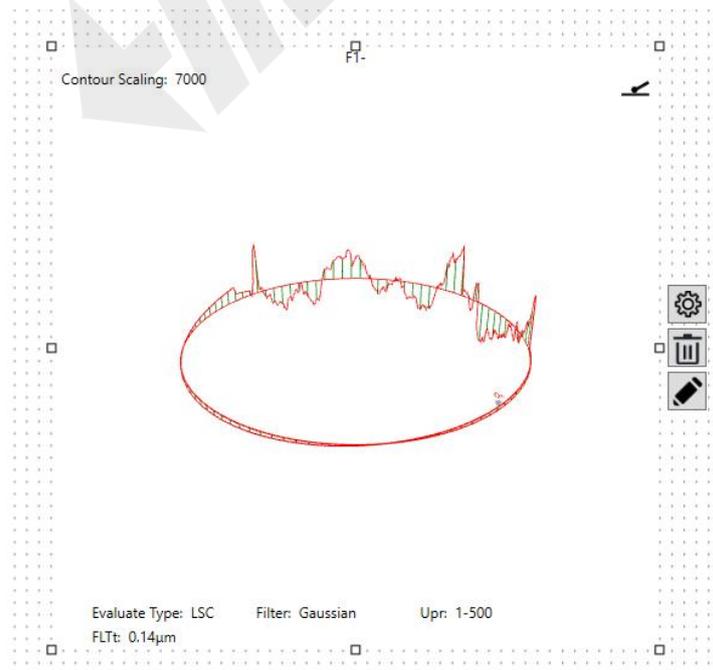


: Delete this control.



: Edit button. After clicking, place the graph area with the mouse and scroll the mouse axis to zoom the graph. For other menu operation instructions, please refer to the above [General Figure] for setting conditions.

#### (4) Wireframes



: Set the evaluation method, filtering mode, parameter display, etc.



: Delete this control.



: Edit button. After clicking, place the graph area with the mouse and scroll the mouse axis to zoom the graph.

For other menu operation instructions, please refer to the above [General Figure] for setting conditions.

(5) Parameter report

Require	
Evaluate Type	LSC
Filter	Gaussian
Upr	1-500
Condition	
Temperature/humidity	20.5°C/75%
R Position	145.1047mm
Z Position	23.249mm
Measure Speed	6.00rpm
Posture	Horizontal Down
Sensor	probe
Sensor Gear	0.5mm/s
Measure Date	2022-11-27
Measure Time	18:56:41
Parameter	
FLTt	0.14μm
FLTp	0.08μm
FLTp Pos	40.74°
FLTv	-0.06μm
FLTv Pos	78.44°
Radius	145.10mm
Zth Average	19.98μm



: Set the evaluation method, filtering mode, parameter display, etc.



: Deletes this control.

(6) Data conversion

Operation: Click the "Data Conversion" button, the select file window will pop up, select the file, rename the file, select the storage path, click "OK", the data is exported successfully, the exported file can be analyzed in the old system.

### 2. 3. 3. 6. Analysis of flatness (M)

Select one of the combined elements  MFit1 Multiple planeness;Preprocessing occurs;Fill chart, Wireframes, Parameter report, Data

conversion menu.

Edit Template

Base Element

- F1 (R:157.6)
- F2 (R:169.0)

Chart

Expand (

3D Char

Wirefran

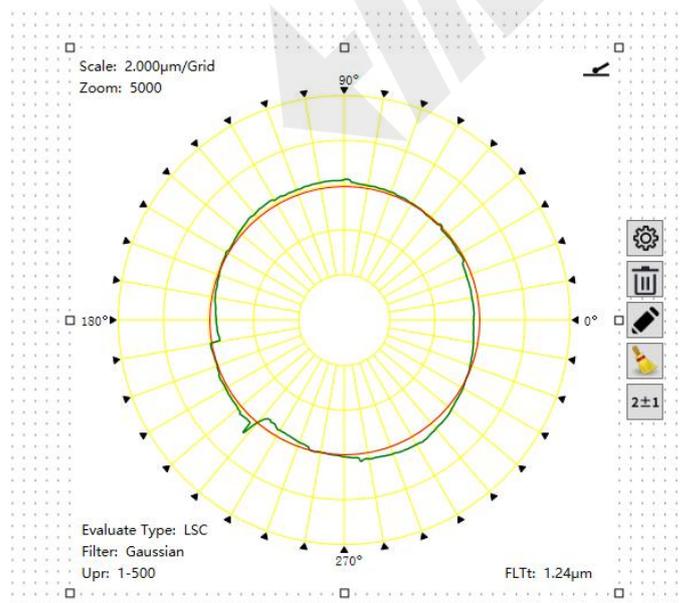
Param R

Data Co

Group Element

- MFit1

(1) Chart





: Set the evaluation method, filtering mode, parameter display, etc.

SinglePlane Params Setting

Filter Mode  
 None       Gaussian       2RC

Upr  
 1-500       1-15       1-50       1-150  
 2-500       15-150       15-250       15-500

Show Params Setting  
 Evaluate Type       Filter       Upr       FLTt  
 FLTp       FLTp Pos       FLTv       FLTv Pos  
 Radius       Zth Average

Param Show Mode Setting  
 Use Default Font Size 12      Precision 2

Title Setting  
 Show Title Report

Show Setting  
 Show Remove Area

Border Setting  
 ShowBorder

OK      Cancel



: Deletes this control.



:To remove burr area

removal operation: Put the mouse on the diagram, press the left button, move the mouse, release the left button of the mouse, and then you can see the deleted area;

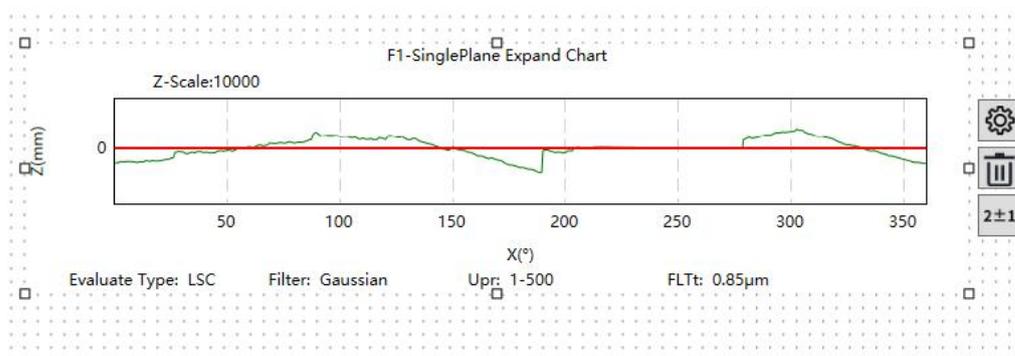


Clear the removed area.



:Set the tolerance values.

## (2) The Expanded Graph

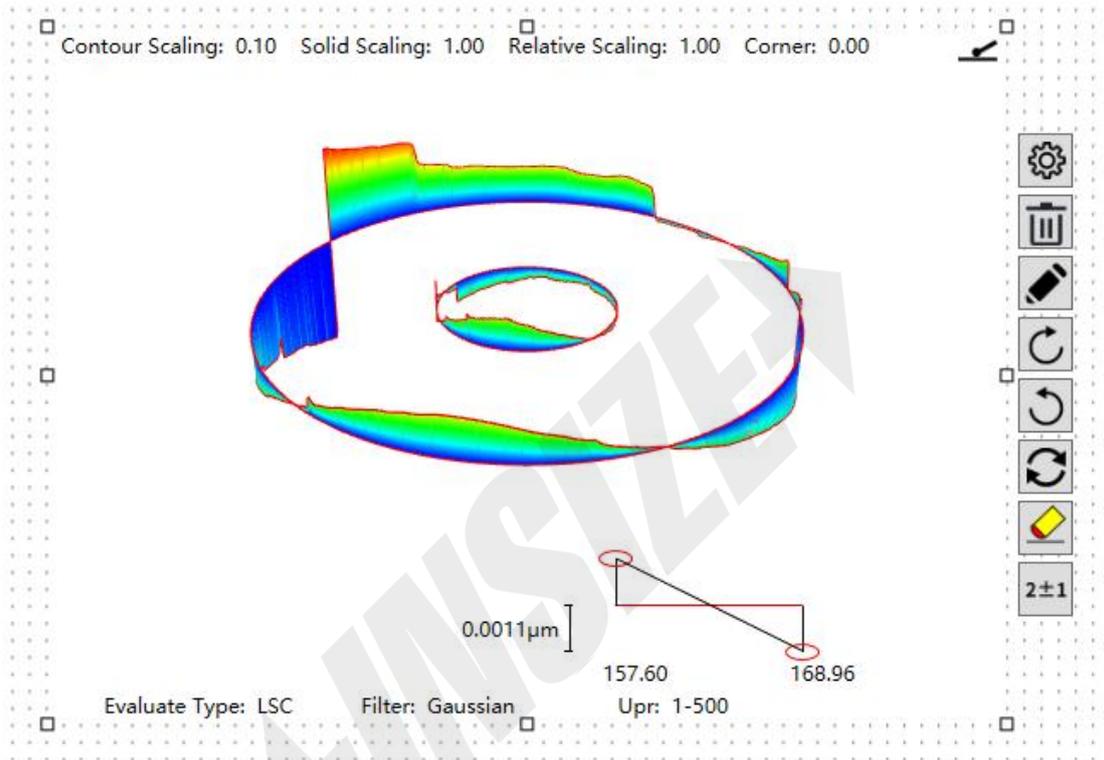


: Set the evaluation method, filtering mode, parameter display, etc.

: Deletes this control.

: Set the tolerance values.

(3) 3D chart



: renames the control.

: Click this icon to set filtering mode, display parameters, band, etc.

: deletes this control.

: After clicking the Edit button, scroll the mouse axis to zoom the graph in the graph area;

: Click on it and rotate it 5 degrees clockwise.

: Click and rotate 5 degrees counterclockwise;

: Rotate back to zero, and rotate the Angle back to zero;

: Preprocessing, the preprocessing page is displayed.



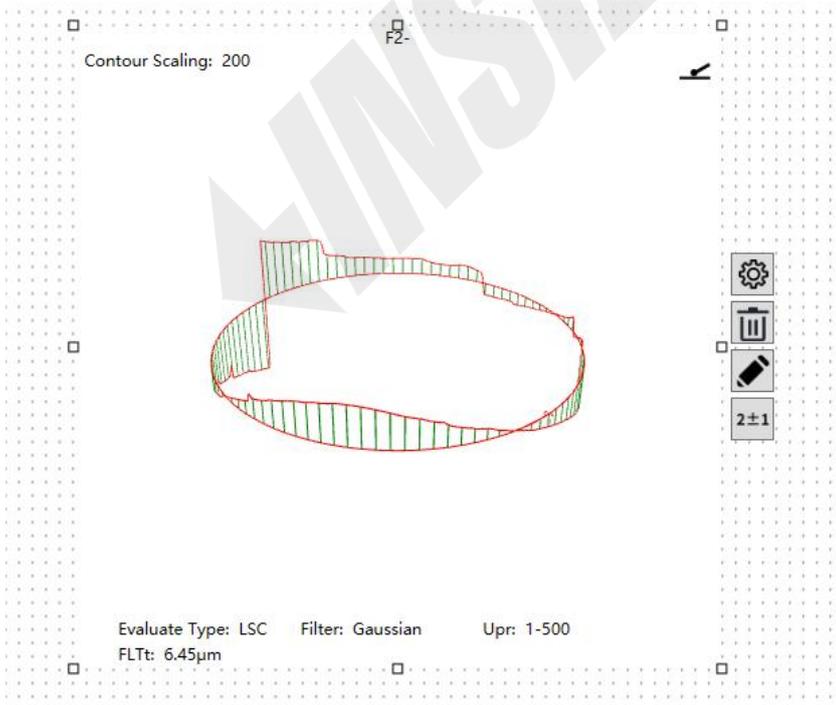
:Set the tolerance values.

Tolerance Setting

Select	Parameter Name	Unit	Stand Value	Up Tolerance	Down Tolerance
<input type="checkbox"/>	FLTt	μm	0	0	0
<input type="checkbox"/>	FLTp	μm	0	0	0
<input type="checkbox"/>	FLTp Pos	°	0	0	0
<input type="checkbox"/>	FLTp Radius	mm	0	0	0
<input type="checkbox"/>	FLTv	μm	0	0	0
<input type="checkbox"/>	FLTv Pos	°	0	0	0
<input type="checkbox"/>	FLTv Radius	mm	0	0	0

OK Cancel

#### (4) Wireframes



: Click this icon to set filtering mode, display parameters, band, etc.



: deletes this control.



: After clicking the Edit button, scroll the mouse axis to zoom the graph

in the graph area;

(4) Parameter report

Require	
Evaluate Type	LSC
Filter	Gaussian
Upr	1-500
Condition	
Posture	Horizontal Down
Measure Date	2022-11-28
Measure Time	11:22:52
Parameter	
FLTt	6.4498 $\mu$ m



: renames the control.



: Click this icon to set filtering mode, display parameters, band, etc.



: Deletes this control.



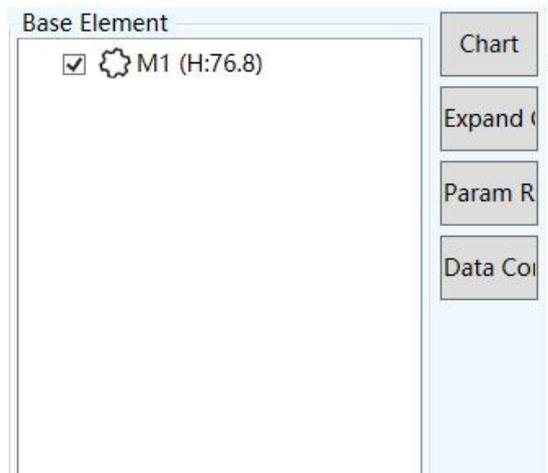
:Set the tolerance values.

(5) Data conversion

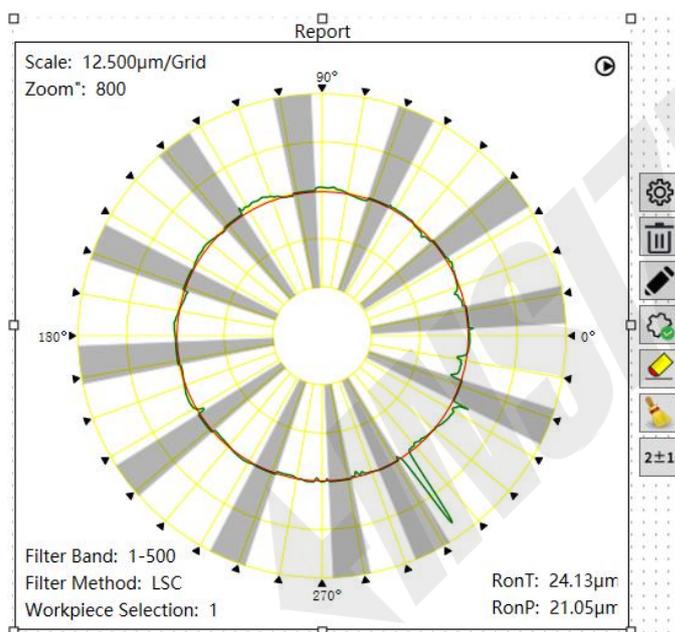
Operation: Click the "Data Conversion" button, the select file window will pop up, select the file, rename the file, select the storage path, click "OK", the data is exported successfully, the exported file can be analyzed in the old system.

### 2. 3. 3. 7. Analysis of commutator

Select one of the base elements   M1 (H:130.2) Commutator roundness, will display including general graph, expansion graph, parameter report, data conversion menu. Here it is:



(1) General graph



: Click this icon to display the following interface, you can set the evaluation method, display parameters and band.

Commutator Chart Setting

Filter Mode  
 LSC       MZC       MCC       MIC

Filter Mode  
 Gaussian       2RC

Upr  
 1-500       1-15       1-50       1-150  
 2-500       15-150       15-250       15-500

Show Params Setting  
 Temperature/hum     Evaluate Type     Filter     Upr     Measure Date  
 Measure Time     RonT     RonP     RonPPos     RonV  
 RonVPos     Runout     Ecc     EccPos

Param Show Mode Setting  
 Use Default Font Size 12    Precision 2

Title Setting  
 Show Title Report

Show Setting  
 Show Remove Area

Border Setting  
 ShowBorder

OK Cancel



: Remove this control from this report template.



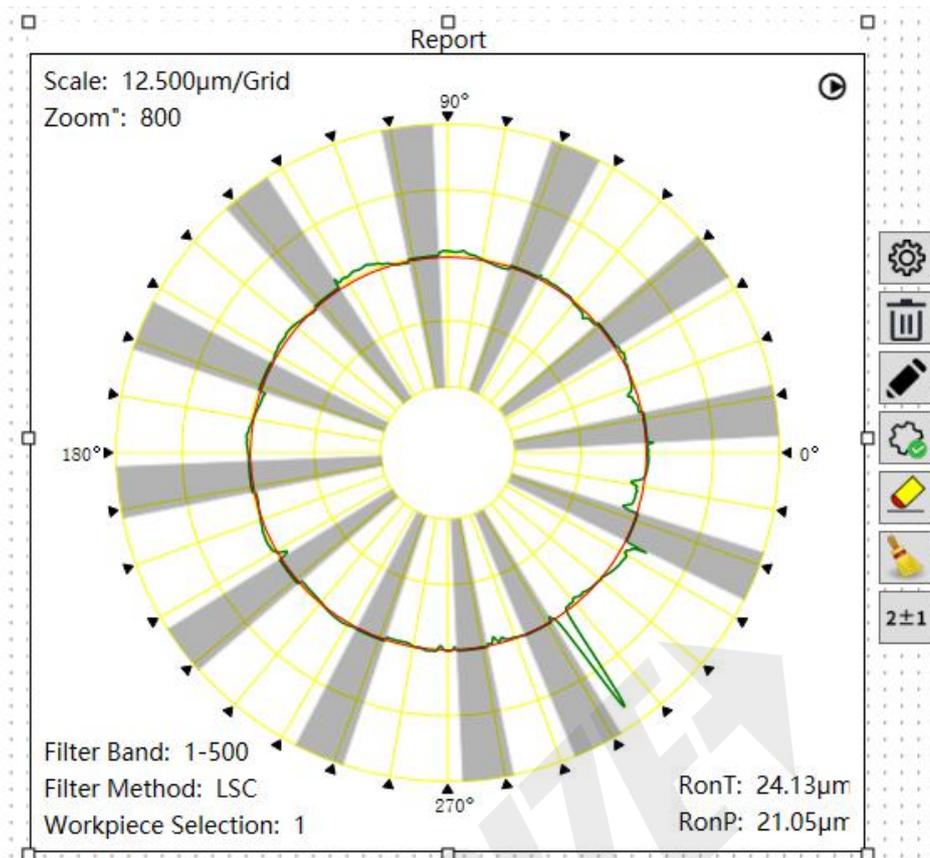
: Edit: After clicking the edit button, the graph can be deleted;



: Set the workpiece of the commutator, add the commutator or modify the sharding parameter Settings.



: Automatic elimination,

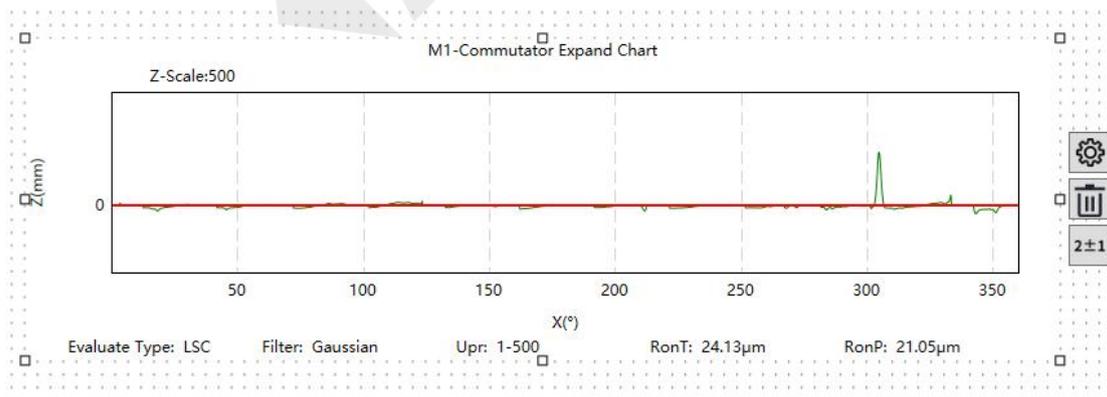


:Clear the removed area.



:Set the tolerance values.

(2) The expanded chart



: Click this icon to display the following interface, you can set the evaluation method, display parameters and band.



: Remove this control from this report template.



:Set the tolerance values.

(3) Parameter report

Require					
Evaluate Type					LSC
Filter					Gaussian
Upr					1-500
Parameter					
1-500upr			Ron: 24.13um		
Number	SingleRuno	Piece Interr	Adjacent Pi	P	V
0	4.25	1.40	3.75	1.17	-3.08
1	2.63	0.72	2.54	0.67	-1.96
2	2.05	0.95	2.47	0.58	-1.48
3	1.91	0.88	2.77	1.00	-0.92
4	2.56	1.74	2.51	1.86	-0.70
5	1.15	0.63	1.79	0.50	-0.65
6	1.85	0.39	2.48	0.57	-1.29
7	2.43	0.07	2.18	0.52	-1.92



: Renames the control.



: Click this icon to display the following interface, you can set the evaluation method, display parameters and band.



: Remove this control from this report template.

(4) Data conversion

Operation: Click the "Data Conversion" button, the select file window will pop up, select the file, rename the file, select the storage path, click "OK", the data is exported successfully, the exported file can be analyzed in the old system.

### 2. 3. 3. 8. Analysis of concentricity

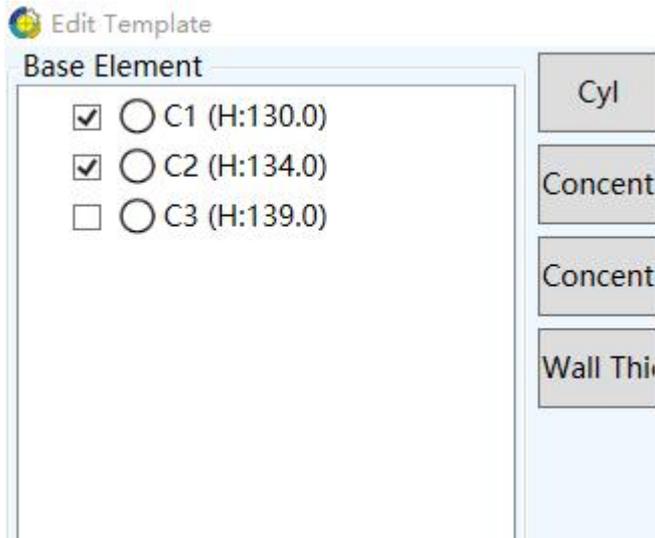
Operation Instructions:

(Here, the combination analysis of roundness and roundness is taken as an example)

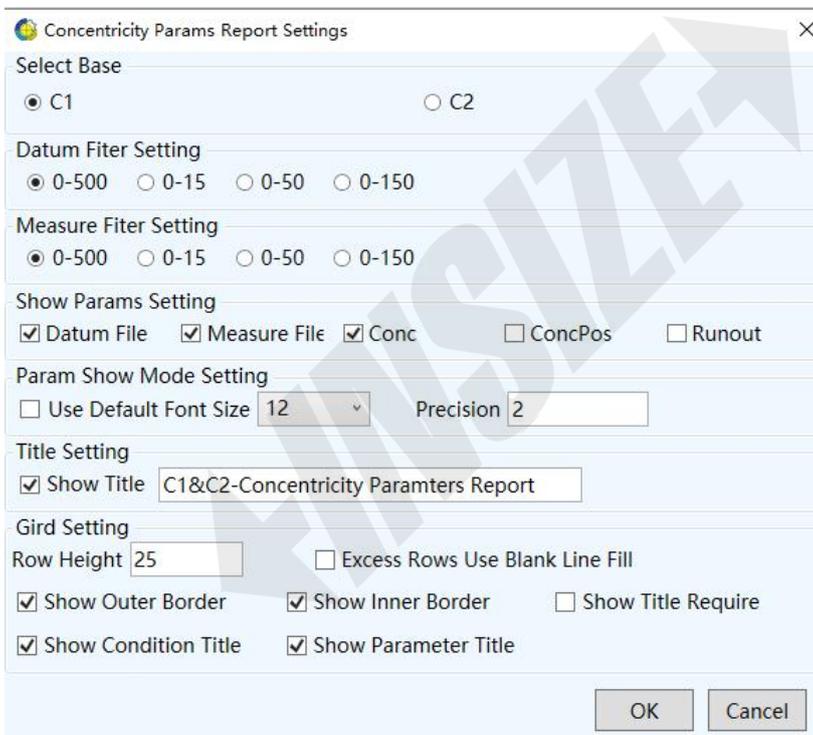
Step 1: Merge the base elements to generate a new merged data file;

The combination of concentricity elements is: cylindricity and roundness elements combination, roundness and roundness elements combination.

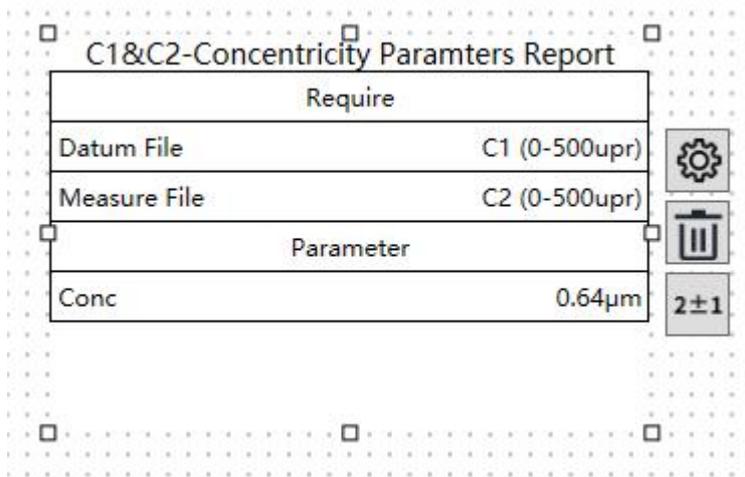
Step 2: Open the merge file and select the roundness of the two basic elements as required. The following menu list will be displayed:



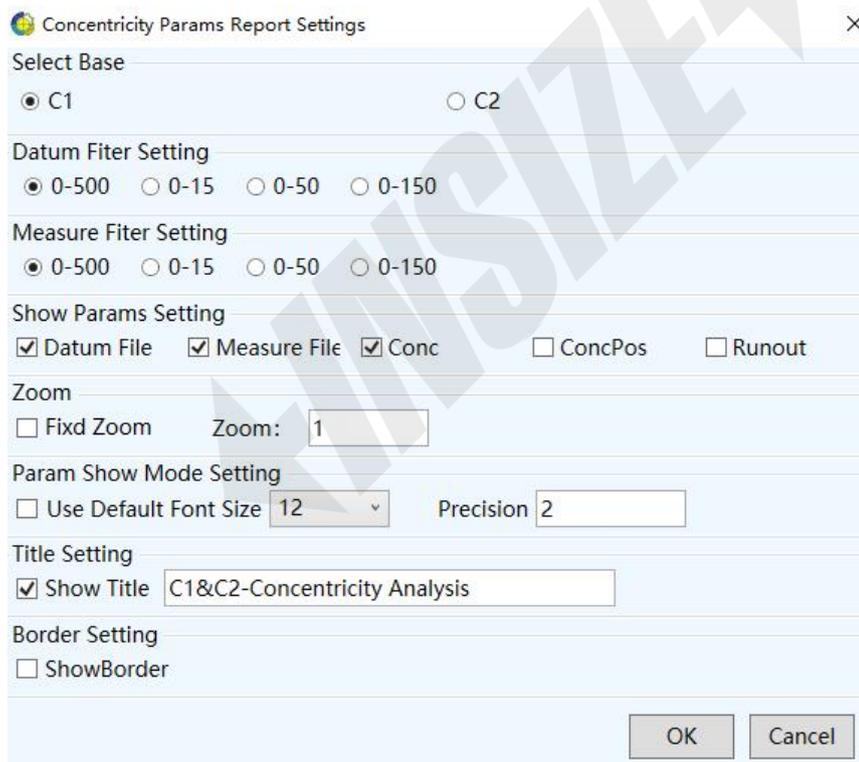
Step 3: Click "concentricity", the parameter setting interface appears, you can set the analysis base, filter, etc.



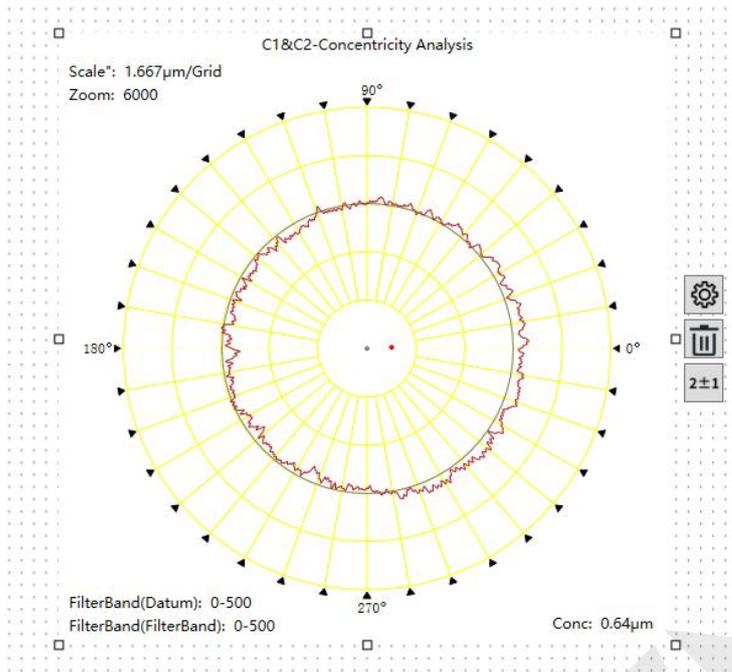
Step 4: Click OK to generate the parameter report. The display interface is as follows:



Step 5: Click [concentricity chart], the parameter setting interface appears, you can set the datum, filter, etc.



Step 6: Click OK to generate the general graph of concentricity, as shown below:



Step 7: After setting the concentricity chart and concentricity parameter report, save the report to complete the concentricity analysis.

### 2. 3. 3. 9. Analysis of coaxiality measurement

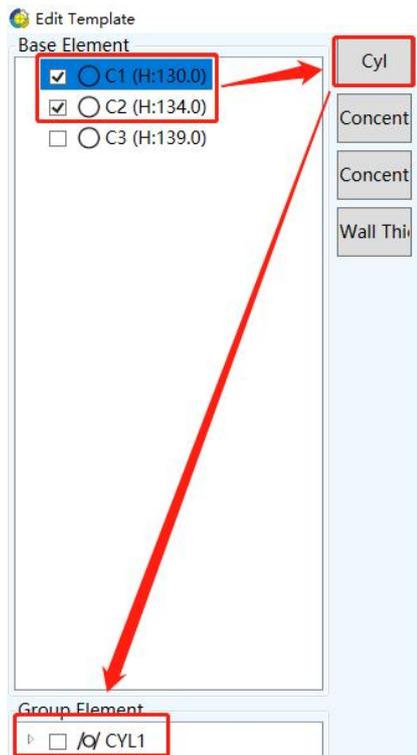
Operation Instructions:

( The combination analysis of cylindricity and cylindricity is taken as an example)

Step 1: Merge the base elements to generate a new merged data file;

There are two types of coaxiality element combination: cylindricity and cylindricity element combination, cylindricity and roundness combination.

Step 2: Open the generated data file, select the basic element according to the requirements, and then click [CYL] to form the combined element (cylindricity), as shown below:



Step 3: After two combination elements are selected, the following menu list is displayed:



Step 4: Click [coaxiality], the parameter setting interface appears, and you can set the analysis datum, filtering, etc.

Coaxial Param Report Setting

Select Base  
 CYL1  CYL2

Datum Fiter Setting  
 0-500  0-15  0-50  0-150

Measure Fiter Setting  
 0-500  0-15  0-50  0-150

Show Params Setting  
 Datum File  Measure File  Coax ISO  Coax DIN  
 Total Runout

Param Show Mode Setting  
 Use Default Font Size 12 Precision 2

Title Setting  
 Show Title CYL1&CYL2-Coaxiality Paramters Report

Gird Setting  
 Row Height 25  Excess Rows Use Blank Line Fill  
 Show Outer Border  Show Inner Border  Show Title Require  
 Show Condition Title  Show Parameter Title

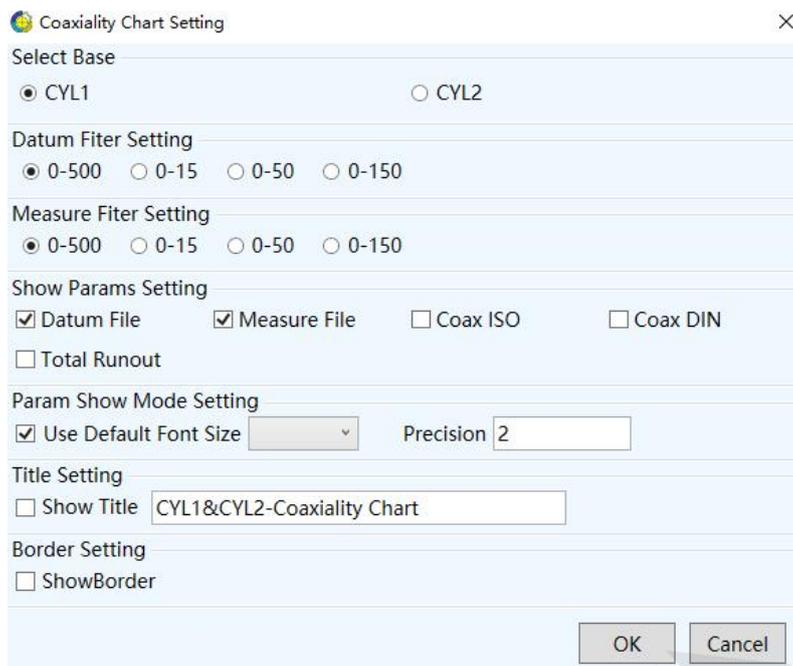
OK Cancel

Step 5: Click OK to generate the parameter report. The display interface is as follows:

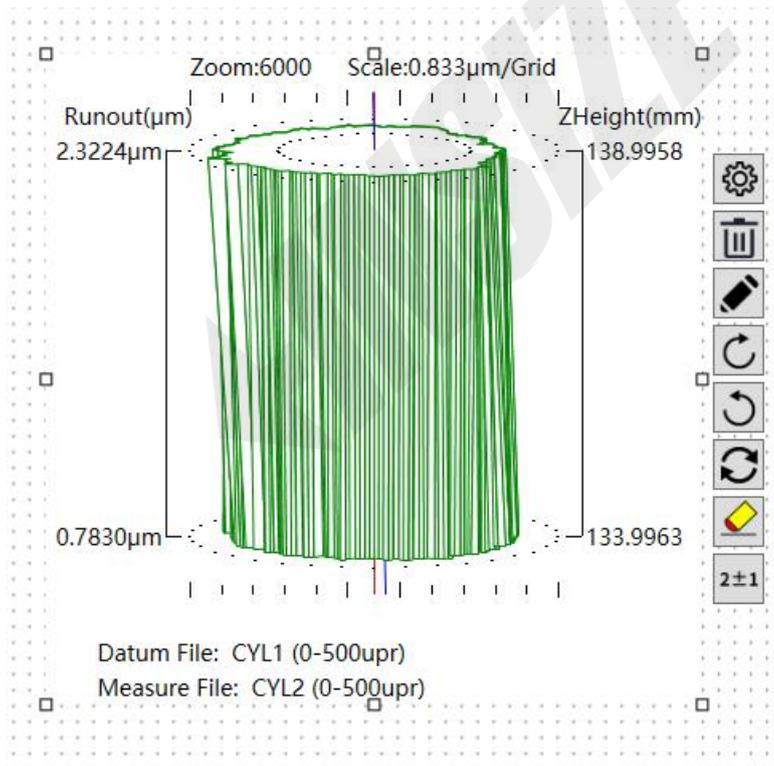
CYL1&CYL2-Coaxiality Paramters Report

Require	
Datum File	CYL1 (0-500 $\mu$ pr)
Measure File	CYL2 (0-500 $\mu$ pr)
Parameter	
Coax ISO	0.34 $\mu$ m
Coax DIN	0.34 $\mu$ m
Total Runout	2.32 $\mu$ m

Step 6: Click [coaxiality chart], the parameter setting interface appears, you can set the datum, filter, etc.



Step 7: Click OK to generate the general coaxiality graph, as shown below:



: Click the Set button, the following interface appears, you can set the evaluation standard, evaluation method, filtering mode, band, axis evaluation mode, display parameters, scale, etc

: Deletes this control

: After clicking, press the left button of the mouse, place the graph area

with the mouse, and scroll the mouse axis to zoom the graph. On the Settings screen, you can select the zoom mode.

: Right rotation Click once and rotate the solid graph right by 5 degrees with the center line as the center;

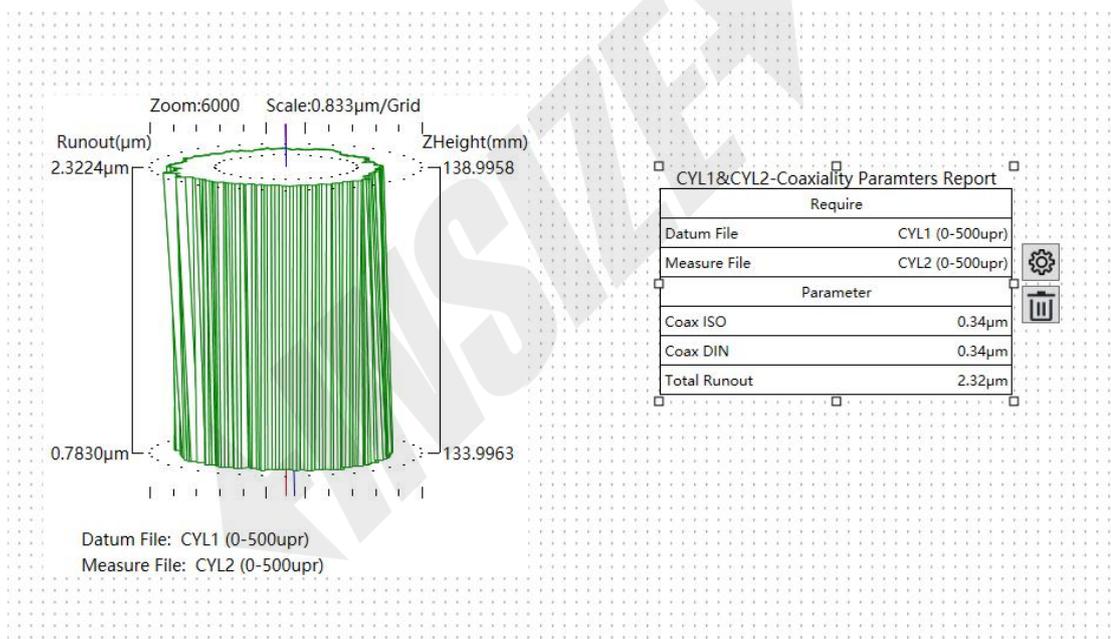
: Left rotation Click once and rotate the solid graph left by 5 degrees with the central axis as the center;

 To rotate back to zero;

 Preprocessing shortcut ICONS;

: Tolerance setting.

Step 7: After setting the coaxiality chart and parameter report, the following information is displayed. Save the report and the coaxiality analysis is complete.



### 2. 3. 3. 10. Analysis of parallelism

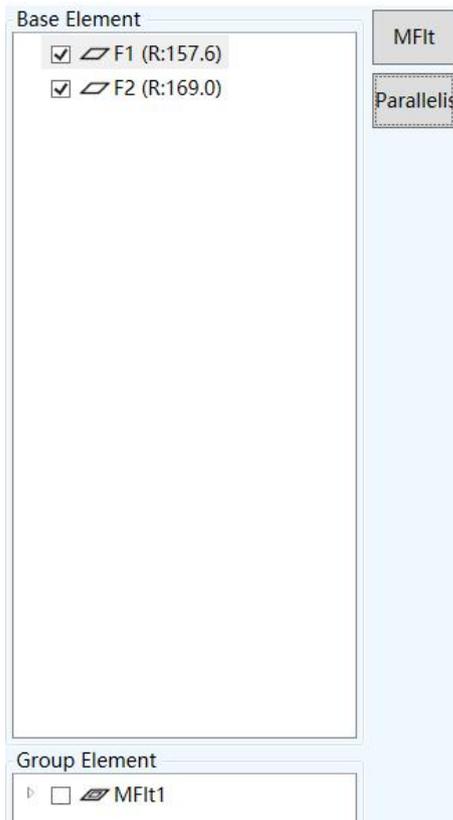
Operation Instructions:

(Here, single plane and single plane combination analysis is taken as an example)

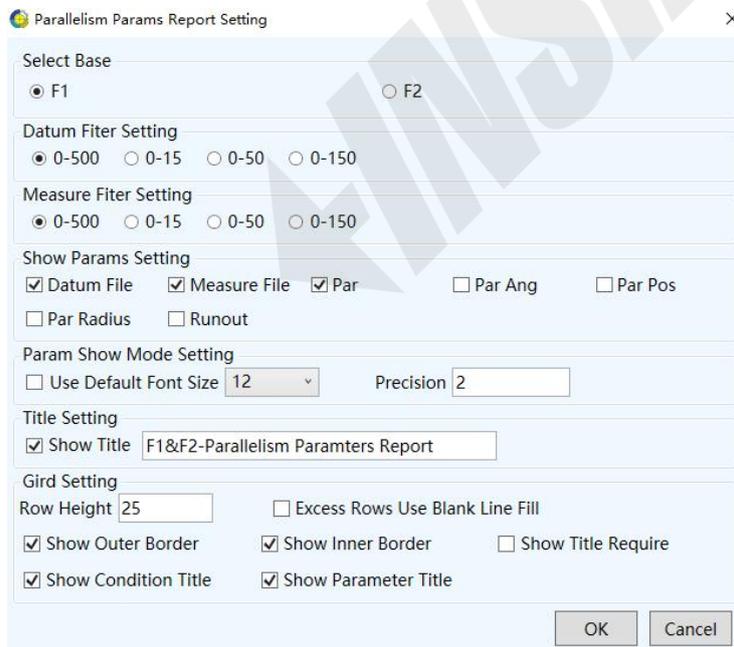
Step 1: Merge the base elements to generate a new merged data file;

There are five combinations of parallelism elements: cylindricality and vertical line elements combination, vertical line and vertical line elements combination, horizontal line and horizontal line elements combination, single plane and single plane elements combination, flat and horizontal line elements combination.

Step 2: Open the merge data file and select two single plane elements to display the following menu list:



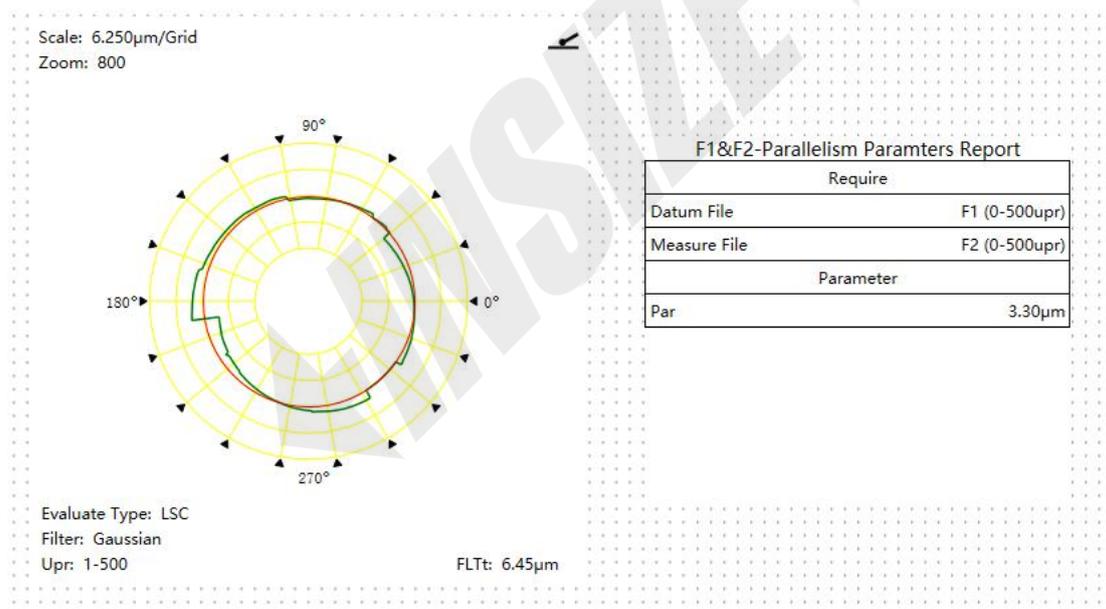
Step 3: Click "Parallelism" and the parameter setting interface appears. You can set the analysis datum and filter.



Step 4: Click OK to generate the parameter report. The display interface is as follows:

F1&F2-Parallelism Paramters Report	
Require	
Datum File	F1 (0-500upr)
Measure File	F2 (0-500upr)
Parameter	
Par	2.84µm

Step 5: Save the analysis report and complete the parallelism analysis.



### 2. 3. 3. 11. Analysis of verticality

Operation Instructions:

(Here, the combination of flatness and vertical line elements is taken as an example)

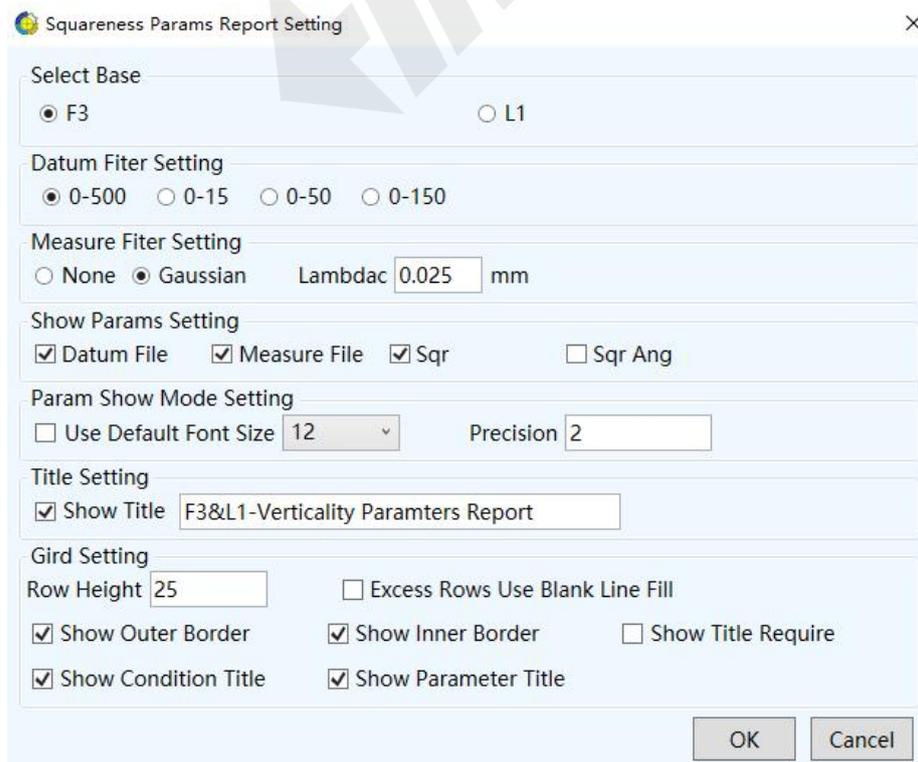
Step 1: Merge the base elements to generate a new merged data file;

There are four combinations of verticality elements: cylindricity and horizontal straight line element combination, cylindricity and flatness (M/S) element combination, flatness and vertical straight line element combination, and vertical straight line element combination.

Step 2: Open the combination element file, select two planarity and vertical line elements, and the following menu list will be displayed:

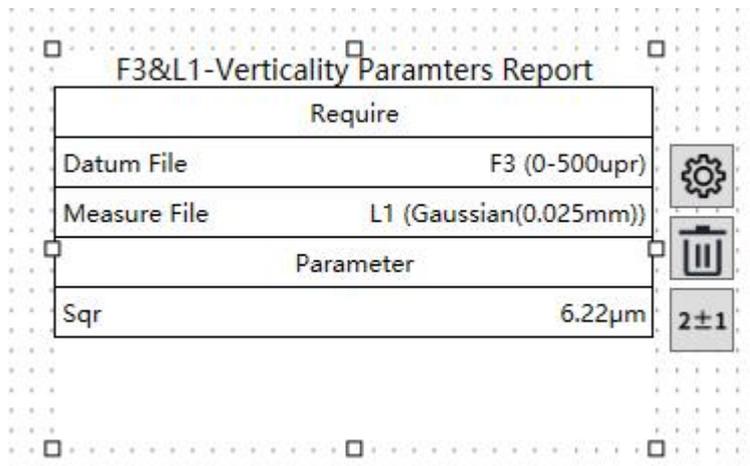


Step 3: Click [verticality], and the parameter setting interface appears. You can set the analysis benchmark and filter.



Step 4: Click OK to generate the parameter report. The display interface is as

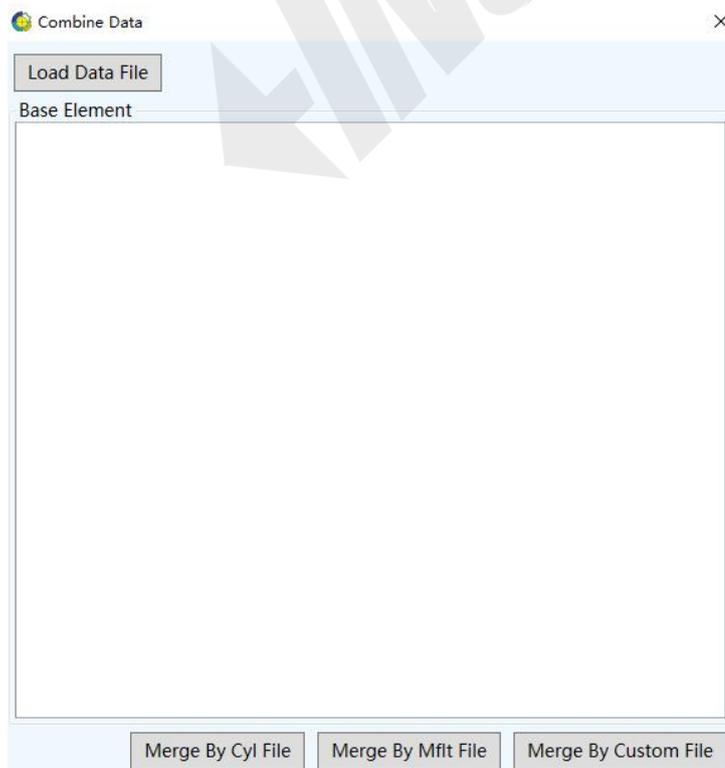
follows:



Step 5: Save the analysis report and complete the verticality analysis.

#### 2.3.4. Combination of data

When the basic elements need to be combined and analyzed, click "Data combination" to display the following interface. Click "Load data file" to add the elements to be analyzed to the basic elements; After adding the data, select the file type of the combined data and save it:



According to measuring requirement,click [load date file] to select the basic element ,and then select the merging type,then all date file you select will be included into a new merging file.

### 2.3.5. Display ratio

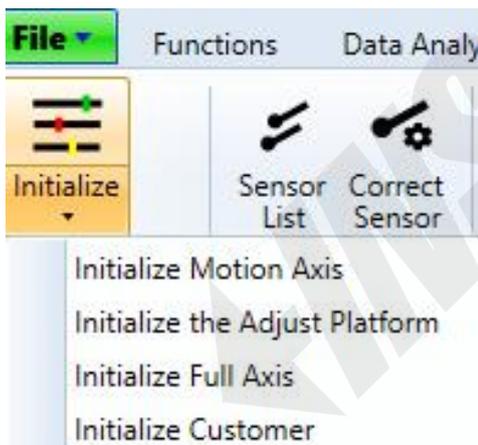
Click [Display ratio] to adjust the ratio of measurement report.

## 2.4. System Settings



### 2.4.1. Initialization of instrument

According to the actual situation of measurement, the equipment axis initialization.

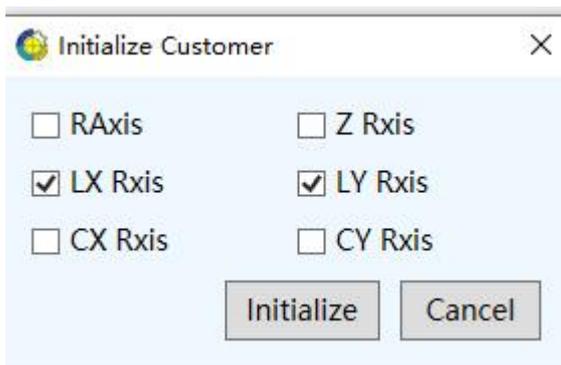


(1) Initialize the axis of motion  
Initialize the R and Z axes.

(2) Initialize the adjustment platform  
Initialize the fine-tuning knobs CX,CY,LX,LY on the adjustment table.

(3) Initialize all axes  
Initialize the transverse and longitudinal motion axes, the adjustment table trimper knobs CX,CY,LX,LY axes.

(4) Custom initialization  
Click Custom Initialization to select the desired axis for initialization.



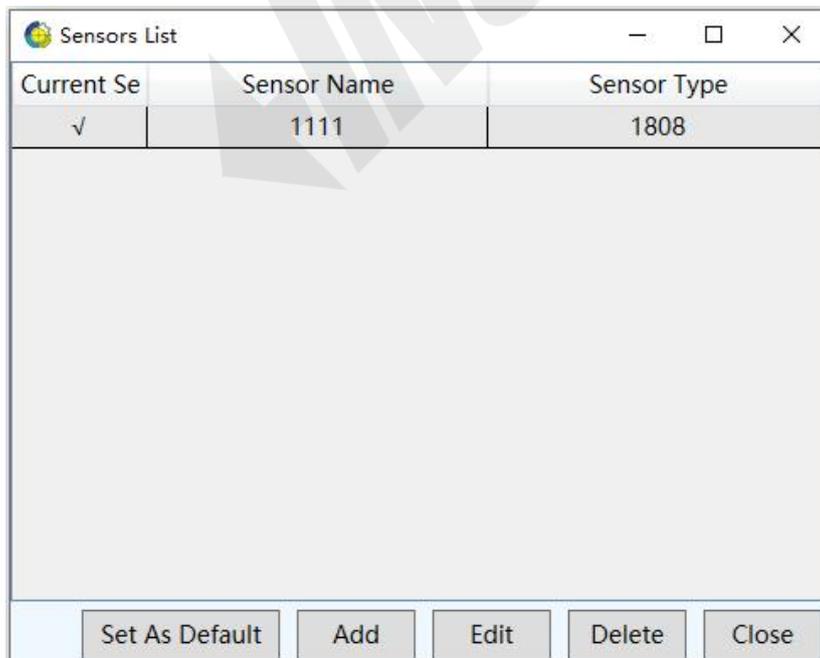
## 2.4.2. Sensor setting

Set and calibrate related parameters of the sensor.



### 2.4.2.1. List of sensors

Click [sensor List] and the following interface is displayed. You can add the measuring needle and modify the measuring needle specification on this interface. When measuring, you must check the corresponding measuring needle specification and click [Set to current].



Click [Add] / [Modify] to fill in the needle specification. The interface will display as follows:

Sensor Setting

Sensor Name

Sensor Type  wale  1808

Probe Length  mm

Sensor Radius  mm

OK Cancel

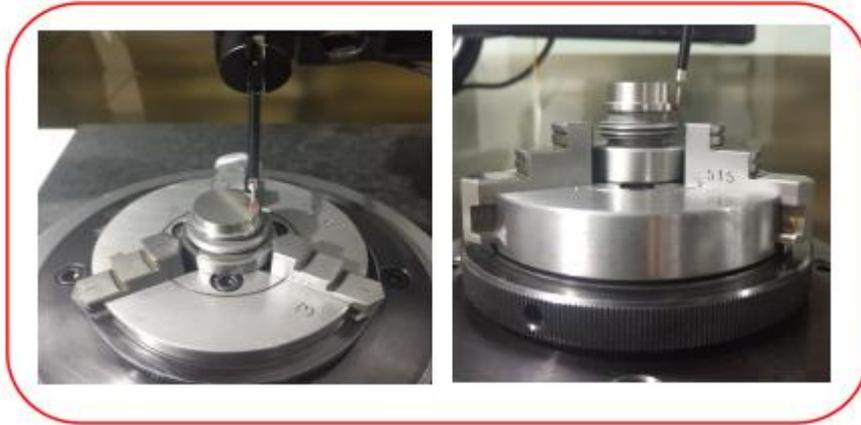
### 2. 4. 2. 2. Calibration of sensor

(1) Prepare standard parts

Step 1: Prepare one calibration standard part;

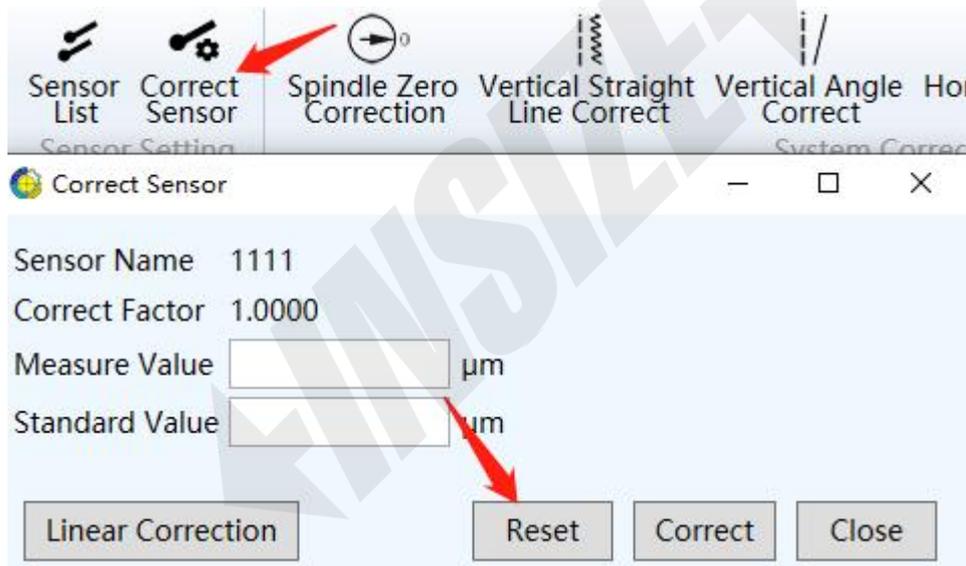


Step 2: Clamp the standard parts in the middle of the chuck;  
 Step 3: After aligning and leveling, observe whether the gap in the effective part of the standard parts is complete and stable on the graphical display interface.



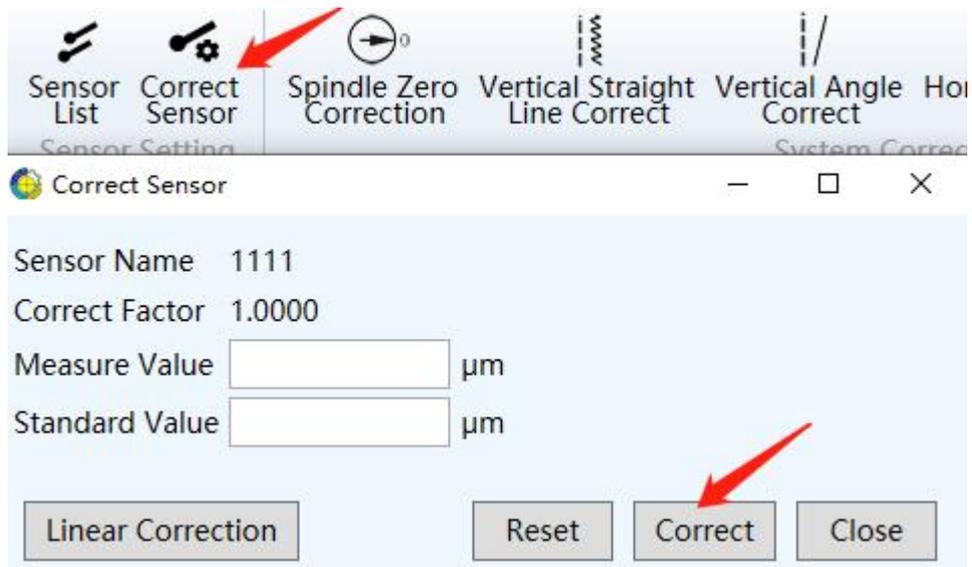
(2) sensor correction

Step 1: Click reset to reset the sensor coefficient;



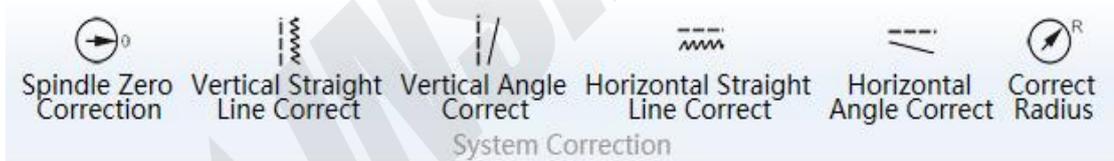
Step 2: Measure the roundness value of the standard parts and make coefficient correction;

The evaluation method was set as LSCI, the band was 1-500 $\mu$ m, the roundness was measured three times, and the average value was taken and recorded. Input the average value and the calibration value of standard parts into the following interface, and the coefficient will be automatically generated. Click OK to complete the correction.



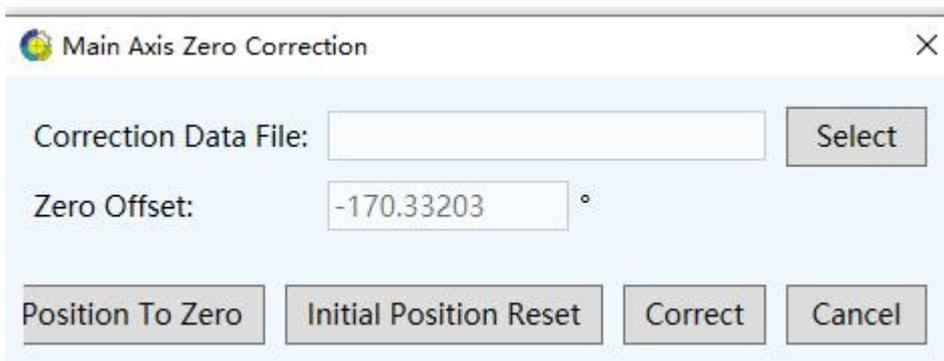
Note: The difference between the retest roundness and the standard should be less than 0.03

### 2.4.3. Correction of system



#### 2.4.3.1. Spindle zero correction

Click "Spindle zero calibration" to display the interface as follows. According to the actual demand, correct the spindle encoder zero.



Correction Mode 1:

Rotate the CX fine-tuning knob to the right below/right of the R-type component and click "Set the current position to zero" to realize correction.

Calibration Mode 2:

---

Align the opening position of the notched standard parts with the CX fine-tuning knob, measure the roundness data of the standard parts, click "Select", add the data file, and click "Correction" to complete the correction.

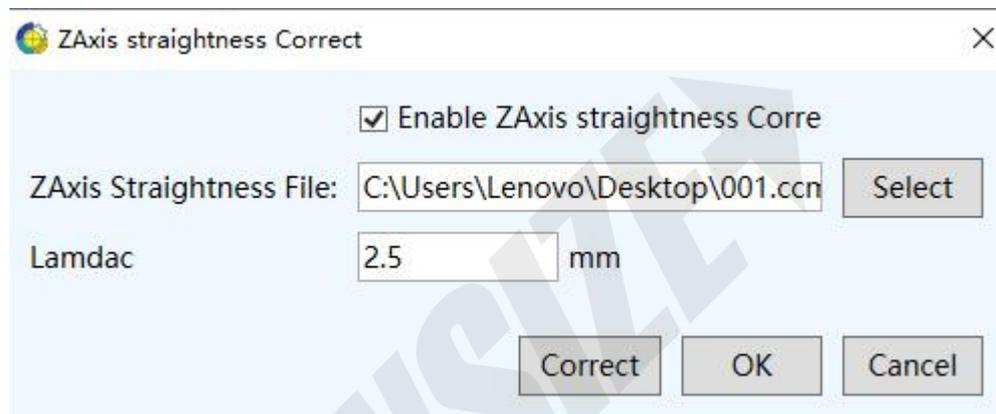
[Zeroing] : Clear the zero position of the current spindle, and perform the operation again when correcting again.

[Correction] : After the measurement data is added, the system will make correction based on it.

[Set current position to zero] : Set the position of the current sensor signal position point to zero.

### 2. 4. 3. 2. Column straightness correction

Correct the straightness of guide rail movement in the column.



Calibration steps:

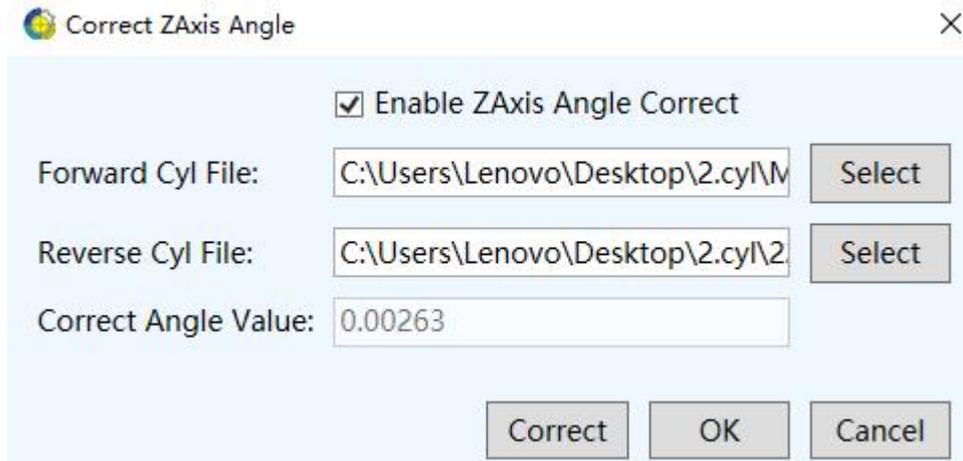
(1) Correct the straightness of the column, fix the flat crystal to the adjusting table, adjust the flat crystal parallel to the column, measure the flat crystal with the longitudinal straightness measurement function within the effective range of the column, and save the measurement file.

(2) Click "Vertical straightness Correction" to display the above page. Select the measurement file and click "Correction" button to complete the straightness correction of the column.

(3) This page can also close and enable straightness correction. If the straightness has been corrected, select Enable longitudinal straightness correction and click the "OK" button to enable the data modified last time.

### 2. 4. 3. 3. Column Angle correction

Correct the parallelism between the column and the main axis.

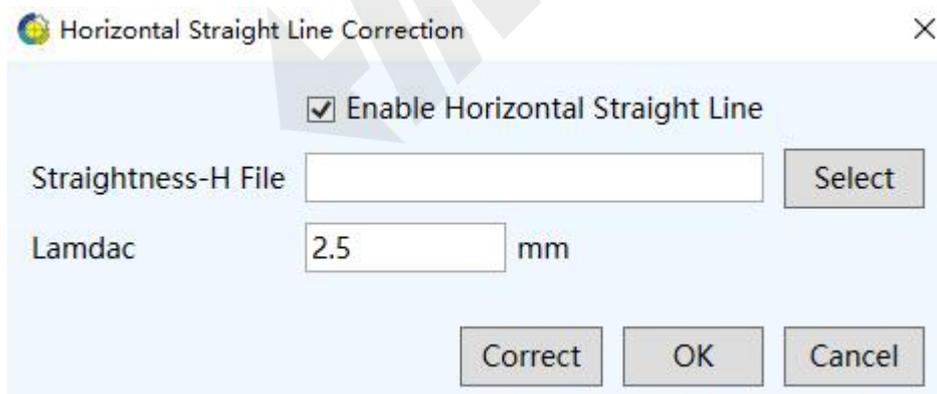


(1) Correction steps: This correction requires the use of taper rod for correction. The positive direction of the cone rod is the lower end of the big end and the negative direction is the lower end of the small end. Place the cone rod in the positive direction to measure a set of cylindricity data, and then place it in the negative direction to measure a set of cylindricity data. Transfer the two sets of cylindricity data into the above page, and click the "Correction" button to complete the column Angle correction.

(2) The column Angle correction can also be turned off and enabled on this page. If the column Angle has been corrected, select enable longitudinal straightness correction and click "OK" button to enable the data modified last time.

#### 2. 4. 3. 4. Horizontal straight line correction

Correct the motion straightness of the lateral driver.



Calibration steps:

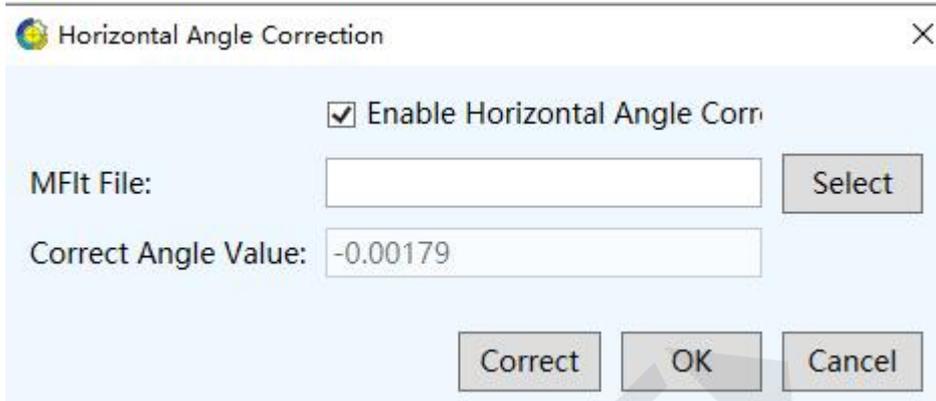
(1) Fix the flat crystal on the adjusting table, adjust the flat crystal to be parallel to the transverse direction, and measure the flat crystal with the transverse straightness measurement function within the transverse effective range.

(2) Click "Horizontal straight line Correction" to display the above page. After selecting the horizontal straight line data file of leveling crystal, click "Correction" button to complete the correction of horizontal straightness.

(3) You can also turn off and enable horizontal straightness correction on this page. If you have corrected the straightness, select Enable horizontal straightness correction and click the "OK" button to enable the data modified last time.

### 2. 4. 3. 5. Horizontal angle correction

Parallelism between the lateral driver and the adjusting table.



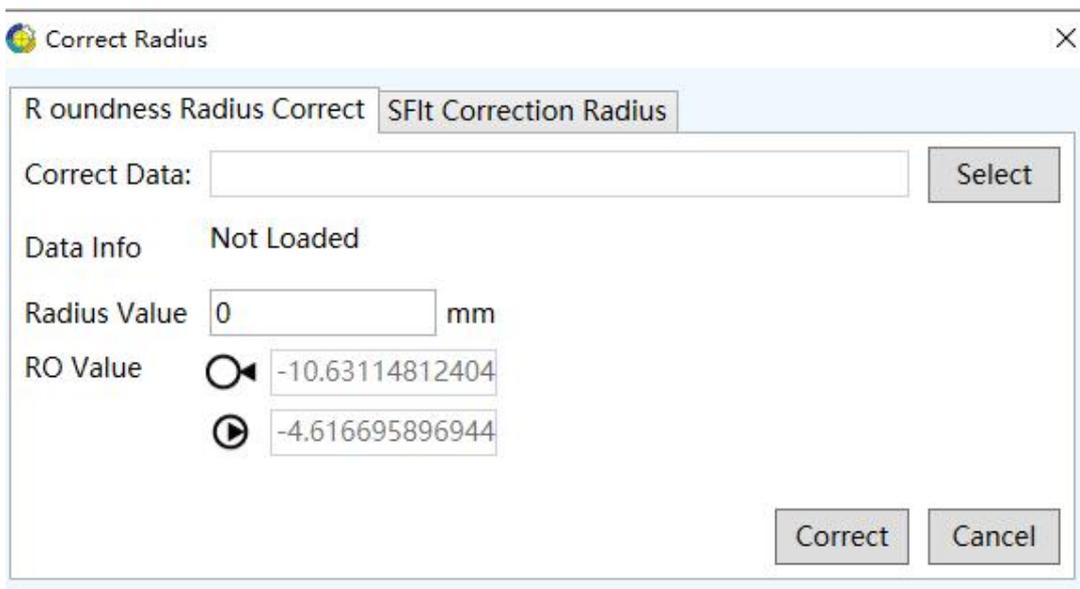
Calibration steps:

(1) Round flat crystal needed for transverse Angle correction, fix the flat crystal to the adjusting table, and level the flat crystal, and measure a set of multi-section flatness files;

(2) Click "Transverse Angle Correction" to display the page above. Select the measurement file and click "Correction" button to complete the transverse Angle correction;

(3) This page can also close and enable horizontal Angle correction. If the horizontal Angle has been corrected, select Enable horizontal Angle correction and click the "OK" button to enable the data modified last time.

### 2. 4. 3. 6. Correct Radius



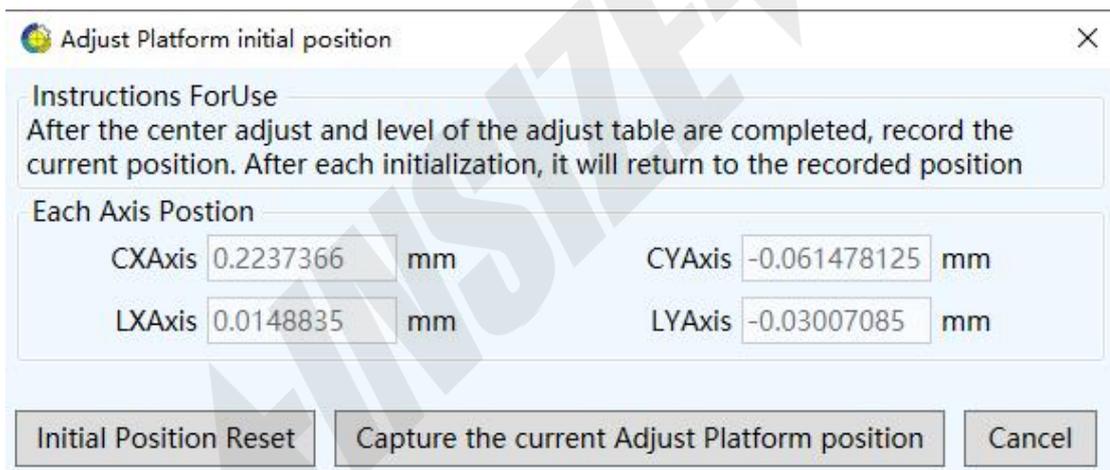
Calibration steps: Radius standard parts are required for workpiece radius calibration. After adjusting the standard parts, measure a set of roundness data and click "radius calibration" to display the above interface. Add the measured data here and click "Calibration" button to complete the calibration.

#### 2.4.4. Auto centering and leveling

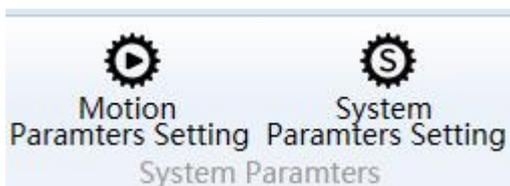


After adjusting centering and leveling, the user can click [capture the current adjust platform position] in the following interface, to ensure that accuracy of measuring.

When the equipment operating abnormally, the user can click[Inital position reset],reset the initial position.



#### 2.4.5. System Parameters



##### 2.4.5.1. Motion parameter setting

Click "Single axis motion Parameter Setting" to set the range of motion speed, self-contact speed and rough adjustment limit of each motion axis.

Motion Params Setting

Axis Motion Param Setting | Sample Param Setting | Other Setting

RAxis Params

Min Speed: 1 mm/s	Max Speed: 20 mm/s
Auto Contact Speed: 5 mm/s	Initialization Speed: 18 mm/s
Precise Adjust Threshold: 0.1 mm	Precise Adjust Speed: 0.1 mm/s
Approach Precision: 0.001 mm	Approach Count: 11 Times
Back Start speed: mm/s	Return safe-Pos Speed: 5 mm/s

ZAxis Params Sitting

Min Speed: 0.5 mm/s	Max Speed: 30 mm/s
Auto Contact Speed: 5 mm/s	Initialization Speed: 30 mm/s
Precise Adjust Threshold: 0.2 mm	Precise Adjust Speed: 0.2 mm/s
Approach Precision: 0.002 mm	Approach Count: 12 Times
Back Start speed: 1 mm/s	Return safe-Pos Speed: 2 mm/s

Main Aaxis Param

Main Axis Speed: 6 rpm	Main-Axis location Speed: 2 rpm
Precise Adjust Threshold: 15 °	Precise Adjust Speed: 1 rpm
Approach Precision: 20 °	Approach Count: 20 Times

OK Cancel

Click "Collection related Parameter Settings" to set Z-axis motion speed and R-axis self-contact speed during various measurement functions.

Motion Params Setting

Axis Motion Param Setting | Sample Param Setting | Other Setting

Cyl Sample Motion Param Setting

ZAxis Motion Speed: 5 mm/s	RAxis Return Speed: 2 mm/s
RAxis Auto Contact Speed: 2 mm/s	RAxis Auto Contact Value: 1 μm
First Section Offset: 1 mm	

MFit Sample Motion Param

RAxis Motion Speed: 5 mm/s	ZAxis Return Speed: 1 mm/s
ZAxis Auto Contact Speed: 1 mm/s	ZAxis Auto Contact Value: 1 μm
First Section Offset: 0 mm	

Straightness SampleMotionParam

Pre Move Length: 0.3 mm	Max Sampled Point Count: 200000 Point
Min Interval: 1 μm	

plunger-V Hope sample Motion Param

Sonser Distance from workpiece 20 mm

Sample Motion Contact Value Param

Warning Area: 60 %	Danger Area: 90 %
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OK Cancel

Click "Other Settings" to set parameters related to automatic contact.

Motion Params Setting

Axis Motion Param Setting | Sample Param Setting | Other Setting

Auto Contact Setting

Contact Precision: 10 μm	Contact After Reverse Distance: 0.2 mm
Speed After Contact: 0.5 mm/s	

OK Cancel

## 2.4.5.2. System Parameters

Click [System Parameter Setting] to display the following interface, you can modify the parameter configuration, save the collection results, and set tolerances.

System Param Setting

System Param Setting | Chart Color Setting | Customer Upr

Param Setting

Sensor Unit:  µm  mm

Sensor Precision: 4 MotionAxis Precision: 4

System Default Font Size: Middle Print Report FontSize: Middle

Format Date String: yyyy-MM-dd

X-Direction Printing Scale Co: 1 Z-Direction Printing Scale Co: 1

Sample Data Save

Analysis Result Name Rule: Data+Time

Auto Save Save Path: D:\MeasureData Select Save Path Open Path

Tolerance Setting

Pop Up Analysis Results After Analysis

Qualified display Text: OK Fount Color: Green

Unqualified display text: NG Fount Color: Red

Other Setting

System Language: English

OK Cancel

Click [Drawing Color Setting] to display the following interface, you can set the color of all sectors, the base color, etc.

System Param Setting

System Param Setting | Chart Color Setting | Customer Upr

Overlay Each section Display Color

Section01	Firebrick	Section02	Red	Section03	DarkOrange
Section04	Gold	Section05	GreenYellow	Section06	DarkGreen
Section07	Cyan	Section08	CornflowerBlue	Section09	Blue
Section10	Purple	Section11	RoyalBlue	Section12	Teal
Section13	DarkOrange	Section14	DarkGray	Section15	Gray

Chart Color Setting

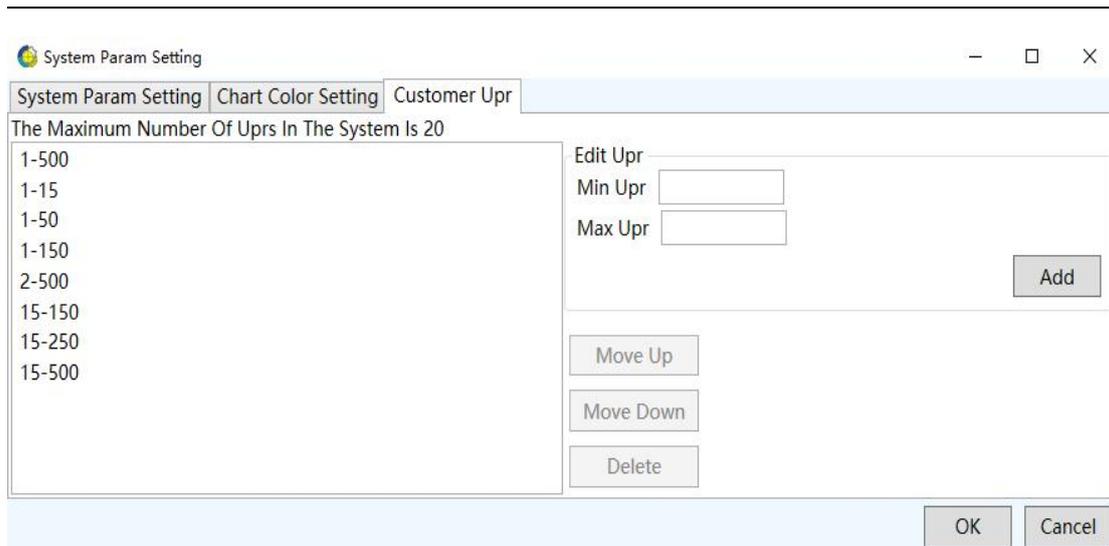
BaseLine Color: Green DataLine Color: Red

Plunger DataLine Color

BaseLine Color: Black Tolerance Line Color: Standard Line Color:

OK Cancel

Click [Customize Upr] to display the following interface. The user can set the band according to the actual requirements.



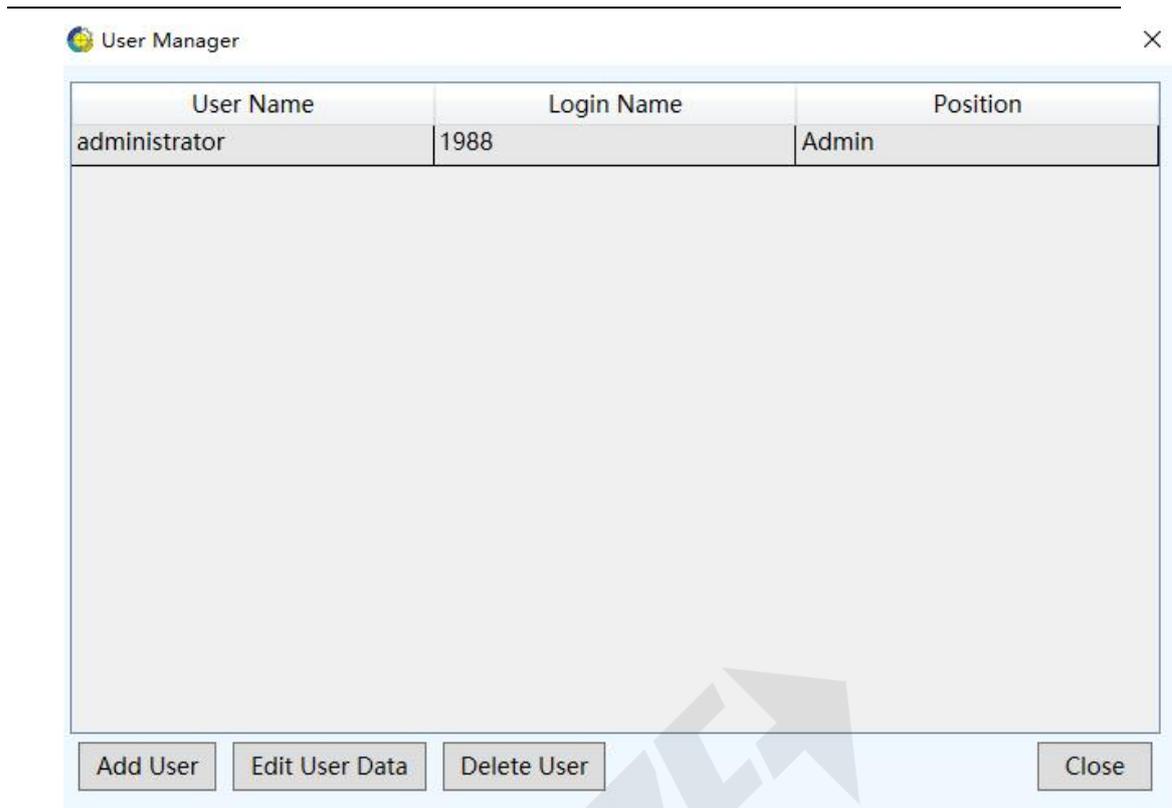
## 2.4.6. User Settings

Click "User Settings" and the following interface will be displayed:

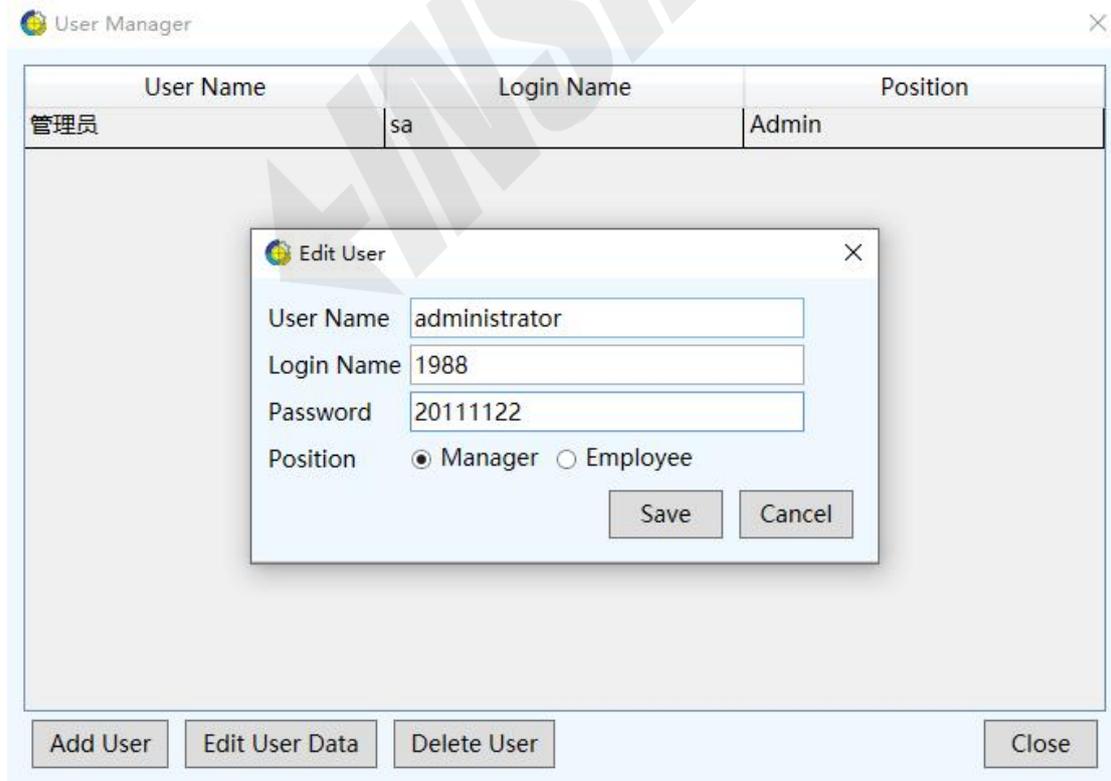


### 2.4.6.1. User Manage

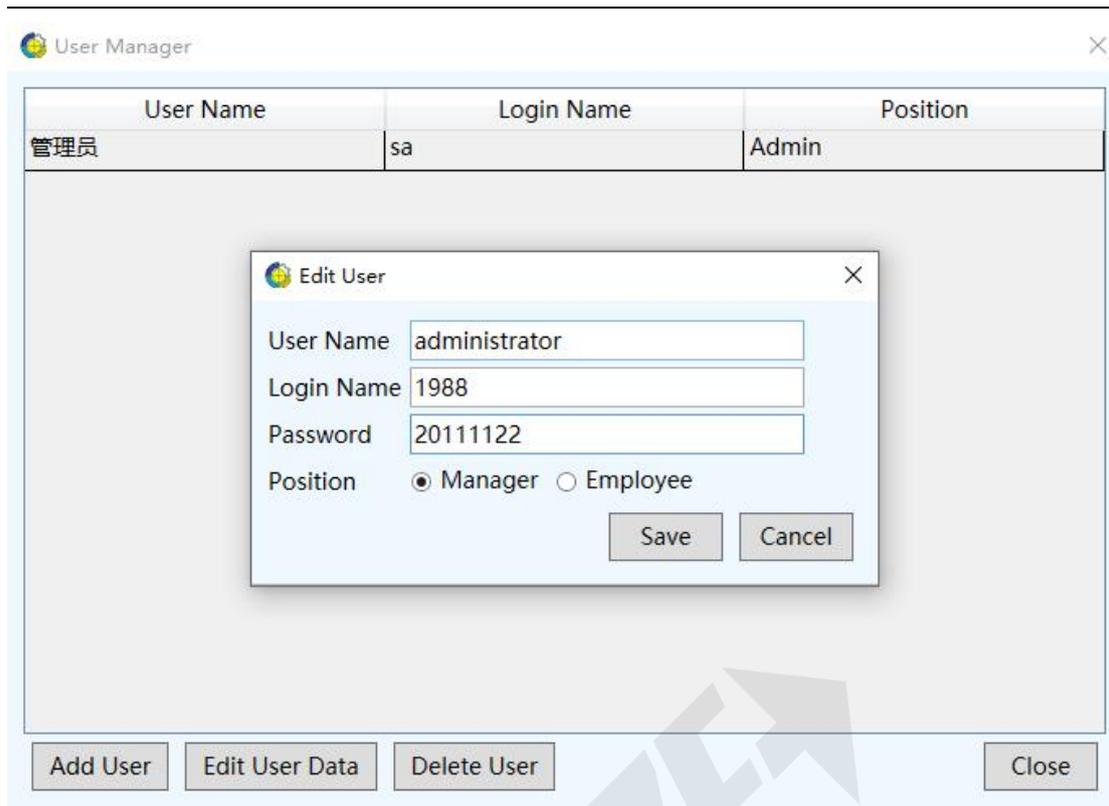
Add, modify, or delete user information. The following interface is displayed:



Click [Add] to add new user information, as shown in the figure below. After adding information, click Save.



Select the user information and click "Modify" to modify the user information, as shown in the figure below. Click "Save" after modification.

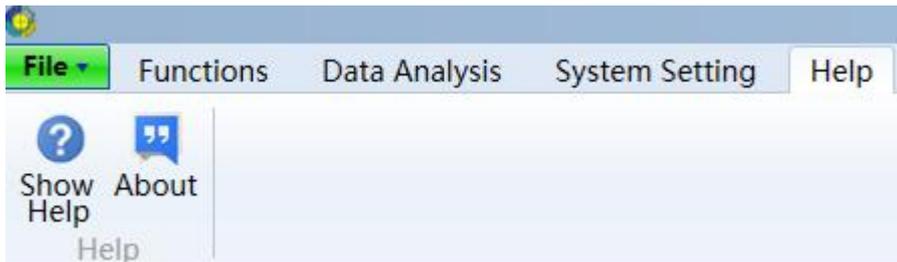


#### 2. 4. 6. 2. Change password

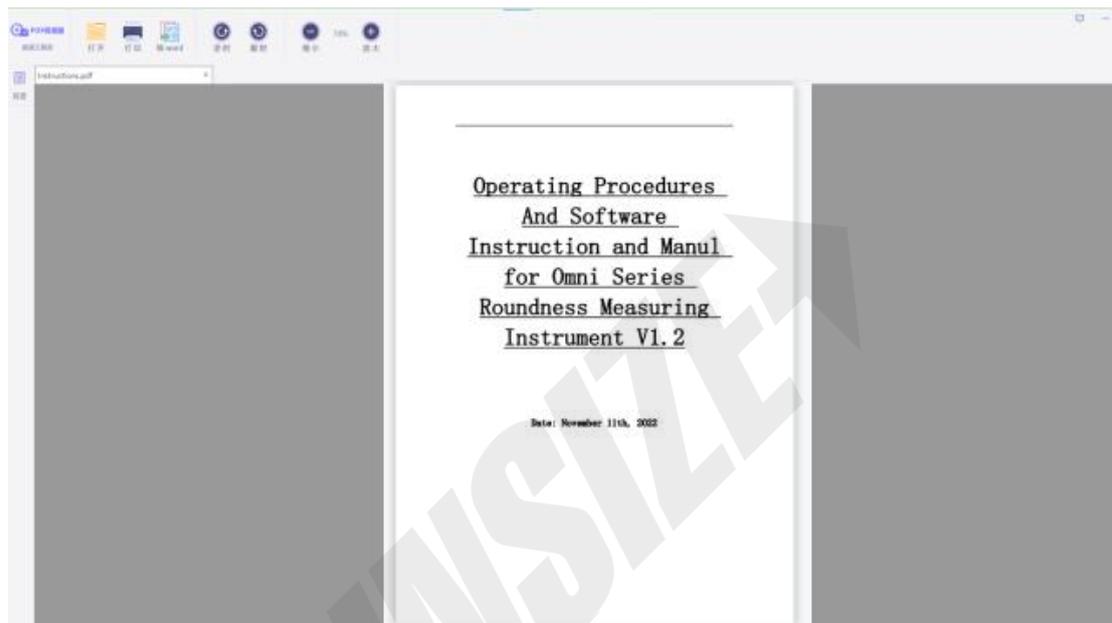
Click[change password], the user can change the current password in the following interface:



#### 2. 5. Help



Click [Show Help] to display the software manual, as shown in the picture below:



Click [About] to display the current software version information, as shown in the picture below:

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## 2.6. Attached Information

### 2.6.1. Parameter description of wave width and wave height

(1) Angle: the Angle of the bulge is the end position (Angle) minus the starting position (Angle);

(2) Wave width: calculate the chord length of the protruding part according to the diameter of the input cylinder;

(3) Wave height: the chord height of the bulge minus the radius;

(4) Starting position: starting Angle of the protruding part;

(5) End position: termination Angle of the protruding part.

### 2.6.2. Parameter description of waviness

(1)  $W_c$ : average height of corrugation contour unevenness;

(2)  $W_p$ : maximum peak height of waviness;

(3)  $W_v$ : maximum valley depth of corrugation degree;

(4)  $W_z$ : the maximum height of the contour of corrugation;

(5)  $W_a$ : arithmetic mean deviation of waviness contour;

(6)  $W_q$ : root mean square deviation of the waviness profile;

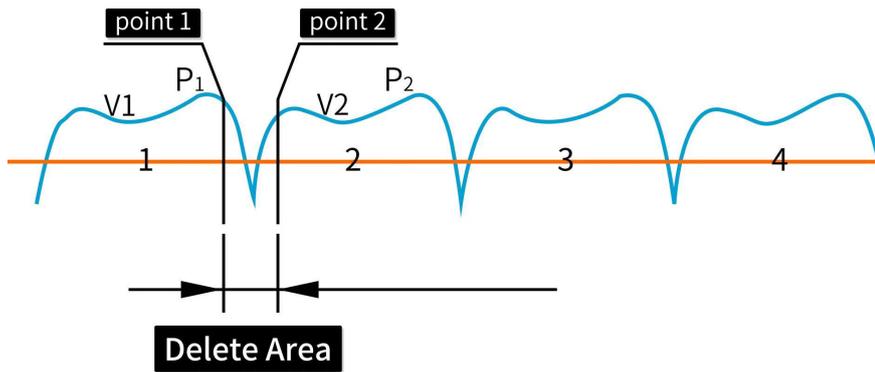
(7)  $W_{sm}$ : Average spacing of waviness profile.

### 2.6.3. Parameter description of commutator

(1) Single piece runout: the maximum (P), minimum (V) difference of each piece;

(2) adjacent piece pulsation: the maximum minus the minimum of the adjacent two pieces;

(3) Film discontinuity: the absolute difference between the inflection points at both ends of the gap.



The adjacent chip runout of the second section.

Calculate the value of  $P_2 - V_1$  and  $P_1 - V_2$ , take the max.

The gap Difference of the second chip.

The absolute value of the value of point 2 minus the value of point 1.

#### 2.6.4. Parameter description of roundness

Parameter of roundness	Show the name	define
Peak valley value	RONt	Is the difference between the maximum and minimum deviations between the data point on the graph and the reference circles LS, MC, MI and MZ.
peak	RONp	The maximum distance between the measured data points and the reference circle. Peak positions are shown by angles. Applies only to LS reference circles.
Position of peak	RONp Pos	
The valley value	RONv	The minimum distance between the measured data points and the reference circle. The valley position is shown by Angle. Applies only to LS reference circles.
Position of valley	RONv Pos	

eccentric	Ecc	The radius difference between the center of the reference circle and the selected reference axis (or point).
Angle of eccentricity	Ecc Pos	The Angle between the eccentricity and the principal axis.
Degree of concentricity	Conc	Is the diameter of a circle generated by the rotation of the selected graph center about the selected reference point. It's twice as eccentric.
beating	Runout	The radial interval between two concentric circles that are concentric with the reference axis (or point) and fully contain the measured data
Maximum slope value	Slope Max	The radius corresponds to the rate of change of the Angle in an Angle window, and the measured data is calculated and stored at each window position. The maximum slope value is the maximum value.
Mean grade of slope	Slope Average	The average slope is the average of the stored slope values.
Angle of window	Slope Window	Slope limiting factor - The operator selects the Angle range within which the slope is calculated.
Maximum slope Angle position	Slope Pos	The angular position of the maximum slope window.
DFTC value	DFTC	Calculate and store the radial deviation relative to the reference center at each window position of the measured data. The DFTC value is the maximum value.
DFTC window Angle	DFTC Window	The Angle range selected by the operator, within which the radial deviation is calculated.
Angular position radius of DFTC	DFTC Pos	The angular position of the maximum DFTC window.
The radius of	Radius	Value of radius

Z height	Zht	The Z height of the measurement plane
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## 2.6.5. Parameter description of Cylindricity

Cylindricity parameter	Show the name	define
Peak-valley value of cylindricity	CYLt	Radial spacing of two cylinders coaxially with the reference axis and fully encompassing the measured data points. There are LS, MC, MI and MZ four reference cylinders.
Cylindrical degree peak position	CYLp	Is the maximum positive value of the deviation between the data point and the least squares reference cylinder (LS only) on the measurement graph. Give the Angle and plane (z-axis height) position of the peak.
The angular position of the peak	CYLp Pos	
The Z height of the peak	CYLp Pln Zht	
Cylindrical degree valley position	CYLv	Is the absolute value of the maximum negative deviation between the data point on the graph and the least squares reference cylinder (LS only). Give the Angle of the valley value and the plane (Z-axis height) position.
The angular position of the valley	CYLv Pos	
The Z height of the valley	CYLv Pln Zht	

Coaxial degree ISO	Coax ISO	Is the diameter of a cylinder coaxial with the reference axis and encompassing the axis of the assessed cylinder. (For selected reference axis)
Coaxial degree DIN	Coax DIN	Is the diameter of a cylinder coaxial with the reference axis and contains the least square center of each section of the cylinder to be evaluated. (For selected reference axis)
Full run out	Total Runout	Similar to roundness runout, there is more than one plane of data to be analyzed.
Taper of cylinder	CLYtt	The maximum cylinder parallelism value. At each angular position, or longitudinal section, two least squares lines are established through the data points intersecting the plane. The cylinder parallelism value is the difference between the two lines in the highest and lowest measurement planes. It used to be called the maximum parallelism value.
Angle position of maximum cylinder taper	CLYtt Pos	The angular position at which the maximum parallelism value of the cylinder occurs relative to the zero position of the spindle. It used to be called the maximum parallelism Angle.
The average of the taper of the cylinder	CLYtt Av	The average parallelism of a cylinder, calculated from all longitudinal sections.
Least square cone Angle	Cone Ang	The top and bottom sections of the plane for analysis are selected by using two least square circle fits. The Angle of the cone is calculated from the radius and spacing of the two planes.
phase	Phase	The Angle between the reference axis established by

		the plane chosen for analysis and the zero degree line of the principal axis.
tilt	Tilt	The Angle between the reference axis established by the plane chosen for analysis and the axis of the main shaft.

←INSIZE→

## 2.6.6. Parameter description of straightness

Parameter of straightness	Show the name	define
Position of peak	STRp Pos	Is the maximum deviation between a data point and a least square line (LS only) on the measurement graph. Give the location of the peak.
Position of valley	STRv Pos	Is the minimum deviation between a data point and a least square line (LS only) on the measurement graph. Give the location of the valley value.
Length of scan	Trav Lth	Length of measurement
Scanning start point	Trav Start	The starting point of the scan
Scan end point	Trav End	The end point of the scan
Position of main shaft	Spindle Ang	Measured angular position
Local peak-valley values	Zoom STRt	Is the PV value of the sub-measurement graph of the existing reference line. This value appears only when the user chooses to zoom in locally on the measurement graph.
Local scan length	Zoom Lth	The length of the selected zoom area
Local scan start point	Zoom Trav Start	The start point of a local scan
Local scan end point	Zoom Trav End	The end point of a local scan
Parallelism of axis	Axis Par	The minimum interval between two lines parallel to the reference axis and completely encompassing the reference line. (Only if the runout datum is selected,

		which used to be called runout to datum)
Axis parallelism Angle	Axis Par Ang	Angle between reference line and reference line. (Used to be called jump Angle)

←INSIZE→

## 2.6.7. Parameter description of single section flatness

Single section flatness parameter	Show the name	define
Peak valley value	FLTt	Is the difference between the maximum and minimum deviations of a data point on a graph from the reference plane (LS or MZ).
The peak of the benchmark	FLTp	Is the maximum deviation between the data point and the reference plane (LS only) on the measurement graph. Shows the angular position of the peak.
Peak Angle position	FLTp Pos	
The valley value against the base	FLTv	Is the minimum deviation of the data point on the graph from the reference plane (LS only). Displays the angular position of the valley value.
Valley value Angle position	FLTv Pos	
Maximum flatness angular position	FLT Pos	The angular position of the spindle at the maximum slope of the reference plane. (Must be associated with the flatness result)
Value of verticality	Sqr	The minimum axial interval between two parallel planes orthogonal to the datum and completely encompassing the reference plane.
Angle of verticality	Sqr Ang	The maximum Angle between the plane orthogonal to the reference axis and the reference plane.
Radius of verticality	Sqr Radius	The radius value when calculating the verticality of the data. Verticality values in different radii can be calculated by the following formula:

		$\text{Sqr} \times \frac{\text{Rc}}{\text{Sqr Radius}}$
Perpendicularity Angle of the main axis	Sqr Pos	Refers to the principal axis Angle at which perpendicularity occurs.
Value of parallelism	Par	The minimum interval between two parallel planes parallel to the datum and completely encompassing the reference plane.
Angle of parallelism	Par Ang	Maximum Angle between the reference plane and the reference plane.
Parallelism main axis Angle	Par Pos	Refers to the principal axis Angle at which the parallelism occurs.
Radius of parallelism	Par Radius	Calculate the radius value of the data parallelism. The values of parallelism in different radii can be calculated by the following formula: $\text{Par} \times \frac{\text{Rc}}{\text{Par Radius}}$
beating	Runout	The minimum axial interval between two parallel planes orthogonal to the datum axis and completely encompassing the measured data.
The radius of	Radius	The radius of the measured plane - relative to the user-selected workpiece coordinates and may not be the actual workpiece radius.
Mean Z height	Zht Average	The average Z-height of the analyzed data points. Only data points with corresponding points spaced 180 degrees apart are analyzed

## 2.6.8. Parameter description of multi-section flatness

Multi-section flatness parameter	Show the name	define
Peak valley value	FLTt	Is the difference between the maximum and minimum deviations of a data point on a graph from the reference plane (LS or MZ).
The peak of the benchmark	FLTp	Is the maximum deviation between the data point and the reference plane (LS only) on the measurement graph. Shows the angular position of the peak.
Peak Angle position	FLTp Pos	
The valley value against the base	FLTv	Is the minimum deviation of the data point on the graph from the reference plane (LS only). Displays the angular position of the valley value.
Valley value Angle position	FLTv Pos	
Maximum flatness angular position	FLT Pos	The angular position of the spindle at the maximum slope of the reference plane. (Must be associated with the flatness result)
Value of verticality	Sqr	The minimum axial interval between two parallel planes orthogonal to the datum and completely encompassing the reference plane.
Angle of verticality	Sqr Ang	The maximum Angle between the plane orthogonal to the reference axis and the reference plane.
Radius of verticality	Sqr Radius	The radius value when calculating the verticality of the data. Verticality values in different radii can be calculated by the following formula: $Sqr \times \frac{Rc}{Sqr \text{ Radius}}$

Perpendicularity Angle of the main axis	Sqr Pos	Refers to the principal axis Angle at which perpendicularity occurs.
Value of parallelism	Par	The minimum interval between two parallel planes parallel to the datum and completely encompassing the reference plane.
Angle of parallelism	Par Ang	Maximum Angle between the reference plane and the reference plane.
Parallelism main axis Angle	Par Pos	Refers to the principal axis Angle at which the parallelism occurs.
Radius of parallelism	Par Radius	Calculate the radius value of the data parallelism. The values of parallelism in different radii can be calculated by the following formula: $\text{Par} \times \frac{R_c}{\text{Par Radius}}$
Full run out	Total Runout	Similar to the runout of a single plane, there is more than one plane of data analyzed.
The radius of	Radius	The radius of the measured plane - relative to the user-selected workpiece coordinates and may not be the actual workpiece radius.
Mean Z height	Zht Average	The average Z-height of the analyzed data points. Only data points with corresponding points spaced 180 degrees apart are analyzed