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**SPM-1000**  
**SURFACE PROFILE MEASURING MACHINE**  
**OPERATION MANUAL**



## Introduction

The instrument measuring principle for the Cartesian coordinate measurement method, that is, through the X-axis, Z-axis sensor, the measured parts of the surface contours of the measured parts, through the electrical components, the sensor measured coordinate data transmitted to the PC, software The original coordinate data collected by the mathematical operation of processing, marking the required engineering measurement items.

## Installation Requirements

Power supply: AC 220 v + 5% for 50 hz Seperate groud wire  
 Power requirements: about 500w  
 Environmental requirements: the temperature: 15 ~ 25 °C , ideal temperature: 20 + 2 °C  
 Relative humidity: < 85%  
 Around the indoor should have no affect the measurement of dust, vibration, noise, air, corrosive gas and strong magnetic field

## The Machine Structure Diagram



## Operation Procedure

Please read the following instructions carefully to avoid any damage due to improper handling of the instrument. Manufacturer will not be responsible for any damages caused due to improper handling of the Instrument or if the instructions are not followed as mentioned in the manual.

- ◆ Open the software, pay attention to whether the needle is free to float in the range and then the beginning start.
- ◆ When measuring the workpiece, first clean the workpiece, according to the specific parts of the workpiece measurement, select the appropriate fixture and clamping method, the workpiece fixed on the fixture.
- ◆ According to the measurement of the workpiece parts, the column and the horizontal movement, adjust the placement of the workpiece, to measure the site must be needle contact needle.
- ◆ The reference of the workpiece measurement must be consistent with the machining reference. (For the measurement of the axis of the workpiece, for the contour measurement in the direction of the axis, the direction of the axis and the direction of the measurement must be adjusted to find the highest point (outer circle) or the lowest point (Bore).
- ◆ After adjustment, select the appropriate speed, and measurement length, for data collection.
- ◆ According to the measurement requirements, select the rotation pattern or rotate the label coordinates.
- ◆ Fit the elements of the desired project (straight line, arc).

- ◆ Mark the required measurement items.
- ◆ When the workpiece is removed, remove the stylus so that it can be operated safely for the next time.
- ◆ Note: The highest point of the measurement must be below the stylus range, and the lowest point of the measurement must be above the range of the stylus. (This adjustable column movement, and the angle of the workpiece to achieve, such as adjustment can not be satisfied, the workpiece Z height is greater than the instrument range, can not be measured.)

### Software Instructions

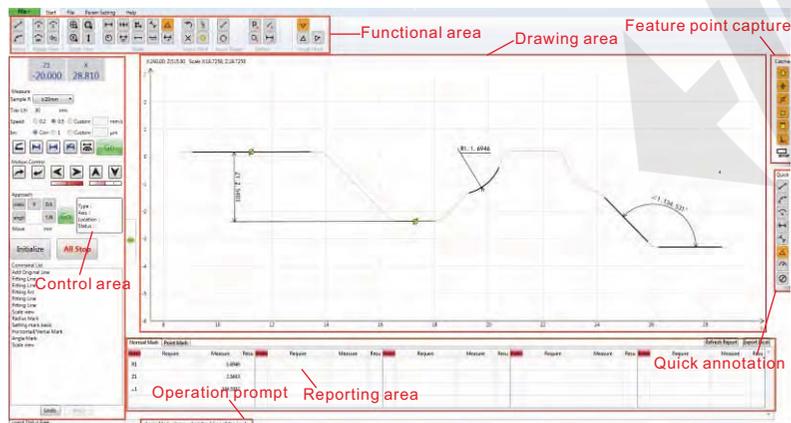
#### 1 Software to start

Click on the desktop icon  to enter the contour measurement system.

#### 2 Needle initialization

In order to find the lowest point of the stylus, each time you turn on the software need to initialize the stylus, each time you initialize the stylus, make sure that the stylus can reach the lowest point.

#### 3 Software interface structure

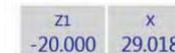


- Function area: the operation of the acquisition of graphics.
- Control area: controls the movement of the hardware.
- Drawing area: displays the graph of the measured artifact.
- Feature point capture: lit the corresponding feature points can be automatically captured.
- Report area: displays the label results.
- Quick tagging: the basic application of the annotation function.
- Operation prompt: tips for current labeling actions.

#### 4 Instructions for the control area



##### a State of the shaft



- Z1 represents the lift of the spindle
- X represents the position of the transverse rail

##### b Measurement



Measurement length: you can manually enter the measurement length, or you can capture the start and end points of the X axis to determine the length of the measurement.

Sampling speed: set the sampling speed in mm / s. Conventional measurement recommended speed selection 0.2mm / s or 0.5mm / s, and also can customize the sampling speed, but can't exceed 1mm/s.

Sampling spacing: set the distance between sampling points in μm.

Automatic contact: the icon is  click the stylus will automatically contact with the workpiece.

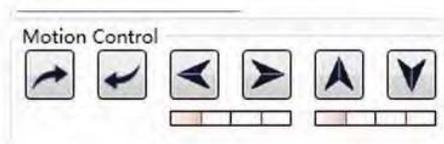
Capture start: the icon is  to capture the current X axis position as the starting point for the measurement.

Capture the end point: the icon is  to capture the current X axis position for the measurement of the end point.

Return to the starting point: the icon is  the sensor returns to the set starting point.

Start the measurement: the icon is  to start the measurement, click will start the measurement, click this button again, will stop the measurement.

Ⓒ Motion control



Needle lift: the icon is  click this button, will lift the stylus lift the amount of input box, as shown below, enter the lift up and click "OK" button, the stylus will automatically lift to the set value.



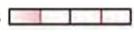
Stylus reset: the icon is  click the stylus down to the lowest position.

Move left and right: the icon is  long press this button will always move to the left, after the release will stop the movement, with the handle "left".

Horizontal right move: the icon is  for long press this button horizontal will always move to the right, after the release will stop the movement, with the operating handle "right direction".

The column moves: the icon is  long press this button column will always move up, release will stop the movement, with the operation handle "on the direction".

Move under the column: the icon is  long press this button column will always move down, release will stop the movement, with the operating handle "under the direction".

Adjust the moving speed: the icon is  divided into four gears, 1 file the lowest speed, 4 files the highest each. See "Motion Settings" for the speed setting of the gear.

**d** Fixed point / fixed distance movement

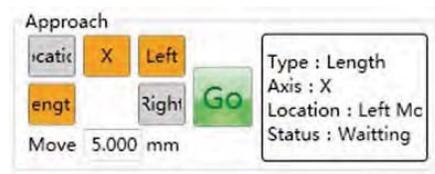
Fixed point movement: refers to the X axis to move to the specified location



Movement axis: X axis

Movement point: Move 5 mm means to move to 5mm position.

Fixed distance movement: refers to the distance relative to the current movement of a certain distance.



Movement axis: X axis

Movement point: Move 5 mm means to move to 5mm position.

Execute the motion command: **Go** Click the button to start moving, the implementation of the state will be displayed on the right side.

**e** Initialization and stopped

Initialize: the icon is **Initialize** that when you click the button, the landscape, column and sensor will be initialized.

The total stop: the icon is **All Stop** that clicking on the button will stop all movement of the device.

**f** The command line



Displays the operation command of the drawing area.

[Cancel] button, click the button, will cancel the last order.

[Cancel Revocation] button, click the button, the recovery will be revoked.

Note: Undo and Undo are valid only for commands generated with new graphics, and for commands such as graphic zoom, rotation, and so on.

**g** Report area



Show drawing area annotation report.

[Refresh Report] button, click the button, the project area will be based on the project type to sort the project.

[Export Excel] button, click the button, you can export the contents of the report to the csv file, you can use Excel to view.

**h** Continuous measurement



Record the intermittent measurement script.  
Click the “Record” button, the recording page will pop up, as shown below:

1. Motion control

Control the movement of the horizontal, column and pole, the specific content of the main area of the control area of the control.

2. Global settings

Consolidate the measurement results: check on, then the results of each measurement will be merged into a file to save, followed by the operation of the template will appear, as shown below



Click the “Browse” button, select the operation template; click “Clear” button, cancel the selected template. If you do not check it, it means that each measurement is saved. At this time, the selection of the operation template will appear in the parameter of adding the “measurement” command, and use the same method as the operation template.

3. Command type

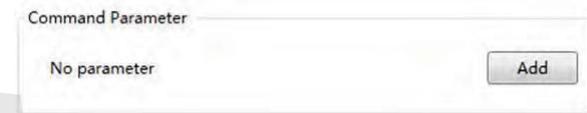
Needle lift: Run this command, the stylus will automatically lift to the set position. The parameters of the command are as follows:



After you enter the lift amount, add the “Add Command” button to add this command to the command set.

Note: The effective range of the lift is 0 to the maximum range of the stylus.

Stylus down: movement of this command, stylus will fall to the lowest position. The command has no parameters, as shown below:



Directly click the “Add Command” button, you can add the command to the command set Automatic contact: Run this command, the stylus will move down to contact with the workpiece to set the location, the command parameters are as follows:



After entering the contact quantity, click the “Add Command” button to add this command to the command set.

Note: The effective range of the contact is 0 to the maximum range of the stylus.

Measure: Run this command to start a measurement, the parameters of this command are as follows:



Note: When switching to this command, the current position is the starting point of the measurement.

Capture end point: After moving horizontally to the end of the measurement, click the “Capture End” button to automatically calculate the measurement length.

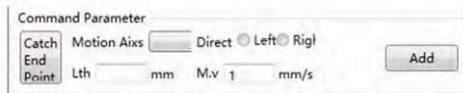
Lth: the length of the measurement, if the use of capture end, it will automatically calculate the fill this value, if manually fill in, after the addition of the command, moved to the measured length of the horizontal position after conversion.

M.v: measuring speed.

S.i: measure the distance, that is, a few microns to collect a point

Operation template, in the global settings, do not check the merger results, this will appear.

Move: Run this command to move the landscape or column, the parameters of this command are as follows:



Note: When switching to this command, the current position is the starting point of the measurement.

Capture end point: After moving the horizontal or column to the end of the measurement, click the "Capture End" button to automatically calculate the measurement length.

Note: Only one axis can be moved at a time.

Movement axis: If you capture the end point, it will automatically get the movement axis, if manually fill in, will add the command after the movement set the axis.

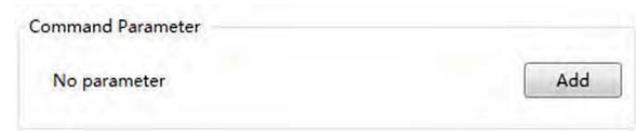
Direction: the direction of movement, if the end of the capture, it will automatically get the direction of movement, if manually fill in, it will add the command, according to set the direction of the axis.

Lth: length of movement, if the use of capture end, it will automatically calculate the value of this fill, if manually fill in, after the addition of the command, moved to the measured length of the axis after conversion.

M.v: movement speed.

Back to Start: Run this command, and each axis moves to the position at the beginning of this break command.

This command has no parameters, as follows:



Add the "Add Command" button to add the command to the command set.

#### 4. Command set

Show the commands that have been added.

Add: When editing state, cancel editing and restore to the status of the add command.

Edit: Select a command and click the "Edit" button to start editing the selection command. Note: The measurement command can only edit the measurement speed and measurement interval, the other can not edit; move the command can only edit the speed, the other can not edit.

Insert: Select a command, click the "Insert" button, in the choice of the command before the insertion of a new command. Note: can only insert the stylus lift, stylus down, automatic contact command, the other command because it will move the axis, it can not be inserted.

Delete: Select a command, click "delete" button, will delete the selected command. Note: When the command is deleted, the selection and subsequent commands are all deleted and the axes are moved to the position where the previous command of the delete item was completed.

Empty: Clear all orders.

#### 5. Schematic

Show this break, stylus running trajectory.

6. "Open" button to open the previously saved multi-station file, you can view and edit.

7. Save button to save the interrupted file, that is, the path of the command set saved to the file.

8. "Exit" button to close the interrupted file recording page.

**Open**  
 Open an intermittent file and add it to the list of interrupted files.

**Return to zero**  
 Select a break file, click the “back to zero” button, the device will move to the location of the interrupted file, that is, to move to the beginning of the break file location.

**Start**  
 Select an intermittent file, click the “Start” button, the device will perform intermittent file recording command, after the completion of the implementation of the results of the preservation of the results of separate preservation or stitching save. The measurement results can be viewed in the File list under the “File” Tab page.

**Menu Function Description**

**1 File menu**

**Open:** Open a saved measurement file.

**Save:** save the original point of the measurement file cloud data, no operation such as fitting, labeling and other information.

**Open the mirror:** it is data and graphics to open, before the label will be presented.

**Save the mirror:** the data for the graphics label, the label data and graphics saved.

**Export:** Export the calibration data and export the measured data to the data for calibration.

**Export DXF files,** export straight lines and arcs to Dxf files that can be opened in CAD.

**Print:** Print the contents of the drawing area and report area.

**Print Preview:** Prints the contents of the drawing area and the report area.

**2 Start**



**a Pretreatment**

**1. Straight line fitting**

The Icon is  for the click or box selected area, the area within the cloud into a straight line.



**Pretreatment selection method**

Click on the fit: the icon is  click on the graphics on the point, according to the type of fit automatically fit line or arc.

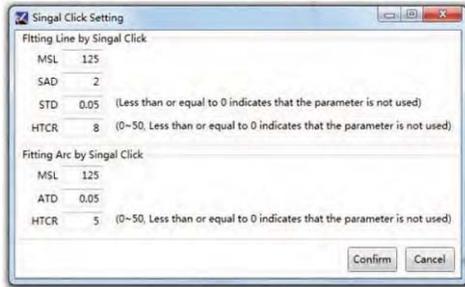
Frame Fit: the icon is  the area in the frame selection pattern, and the selected points are to be merged into segments or arcs according to the type of fit.

2-point fit: the icon is  to select two points, which will fit the line or arc of the selected data between the two points according to the fit type.

Multi-point fitting: the icon is  is to select multiple points to the right end, according to the type of fit will be selected points to be combined into a line or arc.

Multi-segment fit: the icon is  for the line segment fit, select two or more lines to the right end, the selected line of data into a large line segment; for the arc fit, select two or more Arc, to the right end, the selected section of the circular arc data into a large arc.

Click on the settings: the icon is  click on the following pop-up page.

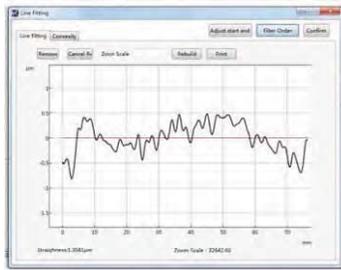


MSL: minimum search scale  
 SAD: slope angle tolerance  
 STD: straightness tolerance  
 HTCR: tail cut off the appropriate range, set to 8, refers to the tail of the cut 8%  
 RND: radius tolerance

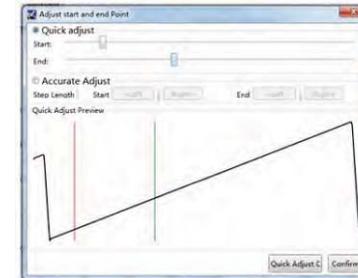
Filter options

Filtering strength: the box within the area of the number of cloud lines/arc fit when the filter, filter strength selection recommendations: sampling interval of 1 micron, the strength of 999, the greater the sampling interval, the smaller the filter strength.

“Automatic filter” option check, each line, arc fit are filtering themselves, otherwise, double-click the line or arc has been fitted in the pop-up dialog box to modify the pop-up dialog box as shown below:



Adjust the end point: click, the following dialog box pops up:



After adjustment, you need to click on the “quick adjustment application” from the end of the adjustment to take effect.

Set the filter order: click on the following pop-up dialog box:



Enter or modify the filter strength value here

Note: Only when the menu is selected “Preprocessing”, double-click the fit line to pop up the window!

2. Arc fitting

The Icon is  for the click or box selected area, the area within the cloud into a straight line.

The preprocessing option is fitted with a straight line.

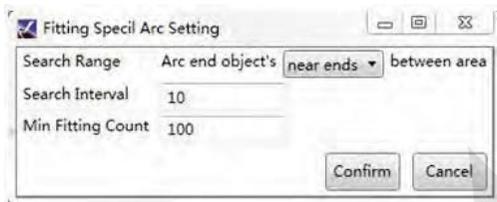
Special fitting of arcs  Used for transitional arc fitting.

To fit the arc between the two segments: the icon is  to select two segments, in the middle of the selection of two segments to find a circular arc, making the pre-generated arc and the selected two sections of the line as much as possible tangent.

The arc between the fitting line and the arc: the icon is  to select a segment and a circle, find a circle between the selected line and arc, making the pre-generated arc and the selected line and arc as far as possible.

Fit the arc between the two arcs: the icon is  to select two arcs, find a circle between the selected two arcs, making the pre-generated arc with the selected two arcs as much as possible tangency.

Special fit settings: the icon is  click will pop up the settings dialog box, as shown below



Find area: set the range of the search arc  
 Find the interval: Find the data interval, the greater the value, find the faster, this value needs to be based on pre-fit arc length and sampling interval to set a more appropriate value.  
 Minimum Fit Points: Fit the minimum number of points of the arc, the greater the value, the faster the fit, this value needs to be based on the pre-fitting arc length and sampling interval to set a more appropriate value.  
 Click the “OK” button to start the fitting; click the “Cancel” button to cancel the fit and close the window.

**b** Graphics rotation

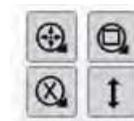


Rotate parallel to the X axis: the icon is  to select a line segment that rotates the entire graph according to the selected line segment and the midpoint of the line segment. Rotate to the selected line parallel to the X axis.

Rotate at any angle: the icon is  to select the rotation direction and rotation angle in the graph rotation options  and then select the line segment and reference point on which to rotate in the secondary menu.

Cancel rotate: the icon is  to cancel the last rotation.

**c** Graphics zoom



Full screen: the icon is  to display all the graphics and data in the drawing area.

Window zoom: the icon is  to select a region, the area full screen zoom.

Scaling: the icon is  the same as the zoom in X and Z directions. You can set the zoom ratio in the graph scaling options, or scroll the mouse ball to adjust the zoom ratio.

Non-scale scaling: the icon is  the X and Z directions have different scaling ratios. You can set the zoom ratio in the graph scaling options. The scroll of the mouse can only adjust the zoom ratio of the Z axis.

Actual translation: Press the middle mouse button (scroll wheel) in the drawing area to move the measurement graph.

d Mark



The naming format for the result is: "label prefix + number: label value".

Annotation prefix: Each annotation has its own prefix.

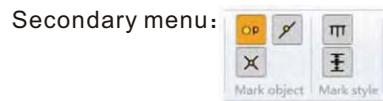
Number: 1 by the beginning of the number, each add a type of annotation, annotation number plus 1.

The value of the actual label.

1. Horizontal / Vertical Marking

The icon is the label object for the two points, marked the two points parallel / vertical baseline direction of the distance. The dimension label is "X", and the vertical label is "Z".

In the process of marking, press the keyboard "H" key, switch to the horizontal label; press the keyboard "V" key, switch to vertical label.



: Mark the object as a generated point.

: The label object is the midpoint of the line segment. After selecting the line segment, the midpoint of the line segment is automatically selected as the label point.

: The label object is the midpoint of the line segment. After selecting the line segment, the midpoint of the line segment is automatically selected as the label point.

: Align, align the selected horizontal / vertical dimension lines.

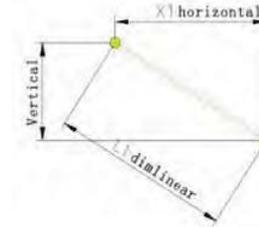
: Equidistant, will be selected on the flat / vertical marked with the marked line isometric display.

2. Linear labeling

The icon is the label object is two points, that is the minimum distance between two points. Mark the prefix "L".

The second level menu is marked with horizontal / vertical, but not marked.

Horizontal / vertical and linear labels are as follows:



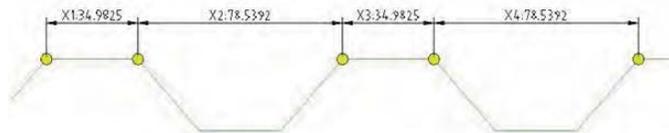
3. Continuous marking

The icon is marked as a point. Quick labeling for certain parts in engineering applications. In essence, for the extension of the horizontal dimension, that is, when the dimension is marked at the second level, the starting point of the second mark automatically recognizes the end of the first punctuation, and the third starting point automatically recognizes the end of the second Point, and so on, right to end continuous marking. Operation method:

First mark a horizontal annotation



And then click on the “continuous label”, the second marked the starting point automatically recognized the end of the standard mark.



The second level menu is marked with the horizontal / vertical.

#### 4. Baseline annotation

The icon is  marked with a parallel / vertical mark, click on the function, will be above a parallel / vertical mark selected in the first point, as the current marked the first point, so just select a point can be To mark.

The second level menu is marked with the horizontal / vertical.

#### 5. Angle annotation

The icon is  the label object is a line, mark the angle between the two lines.

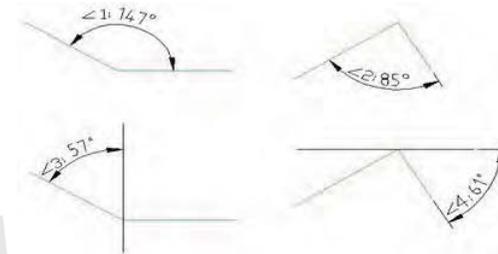
Secondary menu: 

: Conventional annotation, the object is two lines, marked with the selected between the two lines of the angle between.

: Horizontal annotation, the object is a line segment, mark the selected line and horizontal angle.

: Vertical annotation: the object is a line segment, mark the selected selection and vertical direction of the angle.

The label style is as follows:



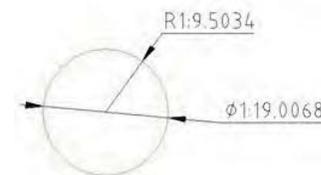
#### 6. Arc labeling

The icon is  marked with the radius or diameter of the arc, and the secondary menu is 

Radius: the icon is  marked with an arc, and the radius of the circle is marked.

Diameter of labeling: the icon is  for the marked object for the arc, marked the diameter of the arc.

Radius and Diameter are marked as follows



#### 7. Other annotations

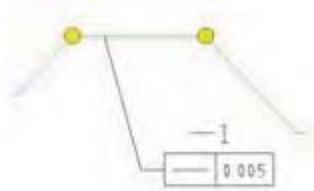
The icon is:  Secondary menu 

Coordinate dots: the icon is  that the label object is a point, and the selection point is based on the coordinate values of X and Z in which the reference point is set in advance.

Straightness annotation: the icon is  for the marked object for the fitting line (auxiliary line can not be marked), marked with the selected line segment straightness value.

Straightness definition: after selecting the region of the straight line, find the least squares midline, the algebraic sum between the highest point P and the lowest point V in the selected region of the original contour line is Straightness values.

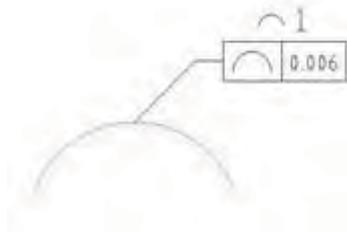
The label style is as follows



Arc contour labeling: the icon is  that the label object is a fitting arc (the auxiliary circle can not be marked), and the arc outline value of the selected arc is marked.

Circular contour definition: select the arc of the fitting area, find the least squares circle, the original contour arc selected area, relative to the least squares of the highest point P and the lowest point V in the selected region of the original contour line is Straightness values.

The label style is as follows



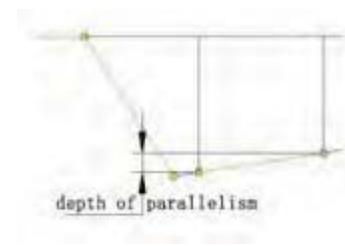
Crown mark: the icon is  the marked object for the fitting line segment, marked with the selected line segment convexity value.

Definition of the cam: In the selected fitting line area, the starting and ending points and the end point of the original contour point are connected in a straight line. The maximum vertical distance from the straight line in the original contour point is the convexity value.

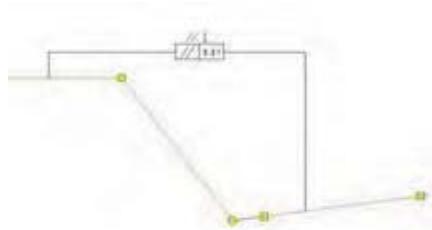
Arc area marked: the icon is  for the marked object for the fitting of the arc, marked with the selected arc to the end of the composition of the closed graphics area.

Parallelism indicate: the icon is  for the marked object for the two fitting line (not the auxiliary line), marked with the selected two lines of parallelism value.

Parallelism definition: pick up two lines have been fitted to the first line of the line as a benchmark, as a vertical line, and the second line to do the vertical distance difference is the parallel value.

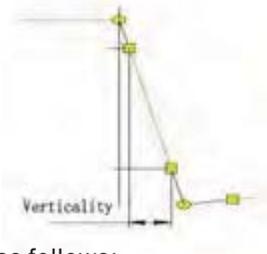


The label style is as follows:

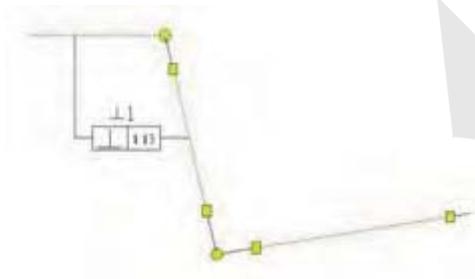


Verticality annotation: the icon is  for the marked object for the two lines, marking the selected two lines of the vertical value.

Vertical definition: the first line of the line to pick up the vertical line, the second line and the vertical distance difference between the vertical is the vertical value.



The label style is as follows:



### 8. Label set of the coordinates and the origin of coordinates

The icon is:  Secondary menu 

: Pick the baseline and the picked baseline will be used for parallel / vertical labeling.

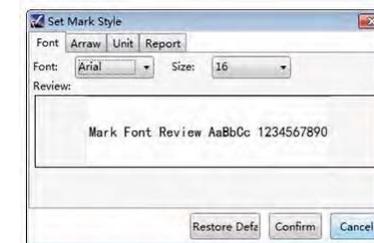
: Restore the coordinates, cancel the selection of the baseline, and use the horizontal direction of the coordinate system as a reference in the parallel / vertical dimension.

: Pick the base point and pick the base point will be used in the coordinate label.

: Pick the base point and pick the base point will be used in the coordinate label.

### 9. Annotation font and arrow sample set

The icon is  click the following page will pop up



- [Font] page: set the font and font size
- [Arrow] page: set the size of the marked arrow
- [Unit] page: set the label value of the accuracy and angle of the marked format
- [Report] page: set the report, the conclusion is correct and the characters displayed when the error
- [Restore Default] button: Restore the default settings
- [OK] button: Click to save the settings
- [Cancel] button, click, cancel the setting, and close the page

10. Update and report

The icon is  for the click will update the contents of the annotation and report area, generally used to mark the settings and marked coordinates set, the drawing area and the report area is not updated.

e Feature points to generation the menu



1. Intersection of line and arc

The icon is  Secondary menu is



: The intersection of the line segment and the arc is connected to the midpoint of the line segment.

: The point at which the line segment intersects the line segment.

: The intersection of the line segment and the arc.

: Line and arc of the right intersection.

Note: The positional relationship between the line segment and the arc is separated, tangent, intersecting, tangent to the ideal position in practical application, does not appear, there will only be phase and intersect. If the line segment is separated, the intersection point is arc The center line of the line between the center line and the intersection of the circle and the line segment, if the line segment intersects, the corresponding point is generated according to the position of the selected point.

2. The intersects point

The icon is  Secondary menu is



: Arc intersection, select two arcs, generate the selected arc intersection.

: Arc intersection of the midpoint, select the two arc, the intersection of these two arcs into the midpoint of the line.

3. Intersection point

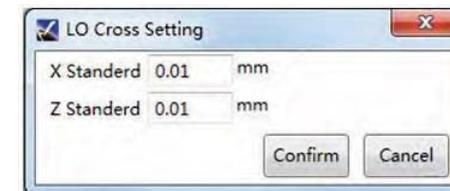
The icon is  Secondary menu is



: Line intersection, select the two segments, generate the selected line of intersection.

: Straight line with the original data line intersection, select a section of the line to generate the line and the original data line intersection.

: The function setting function of the intersection of the straight line and the original data line. Click this function to bring up the following page.



The X-direction judgment criterion is that the X-distance between the two intersections is greater than the set value. The Z-direction criterion is that the distance from the point to the straight line in the original data is less than the point at which the point of the data is found closest to the line segment as the intersection of the straight line and the original data.

4. Change feature points

The icon is  Secondary menu is 

: The highest point in the box selection area, meaning: relative to the X axis, the maximum Z value of the point. The mark in the drawing area is: 

: The lowest point in the box selection area, meaning: relative to the X axis, the smallest Z value of the point. The mark in the drawing area is: 

: The mouse in the drawing area, any left click, and the contour instrument in the X axis or Z axis intersection point. The mark in the drawing area is: 

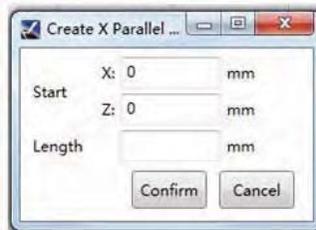
f Generating the menu



1. Auxiliary line object

The icon is  Secondary menu is 

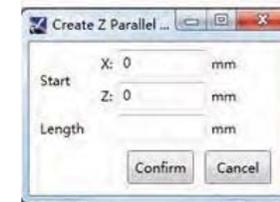
A point of generation X axis parallel lines: the icon is  With the left mouse button click on the drawing area of any feature points, it will pop up the following pagestraightness value.



Starting point: refers to the starting point of the generated line segment relative to the selected feature point of the offset, X, Z support both directions, that is, the input value is greater than 0, the starting point of the positive direction of the axis offset, less than the starting point Negative direction offset of the axis.

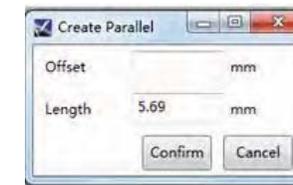
Line length: refers to the length of pre-generated line segment, line length is positive, the auxiliary line from the beginning and end point to the X axis axis positive direction, negative, the auxiliary line from the starting point to the X axis axis negative direction.

Point generation Z axisparallel lines: the icon is  With the left mouse button click on the drawing area of any feature points, it will pop up the following page.



The operation of the page with the [X // generated] page.

The parallel lines generated known line: the icon is  Select the line has been fitted, will pop up the following dialog window:



Deviation from the baseline: refers to the pre-generated line deviation from the selected line of the distance, when the input positive, the deviation from the direction of the axis Z axis of the positive direction; when the input negative, the deviation direction axis Z axis of the negative direction.  
 Line length: refers to the length of pre-generated line segment.

Involves to the vertical line: the icon is  Pick up a fitted line, pick up a generated feature point, and make a vertical line to the line segment.

Generating angel of center line: the icon is  the pick up two fitted line, angle of the two lines to generate the angle of the midline, the direction of the generated line segment by the angle of the line to pick up the decision.

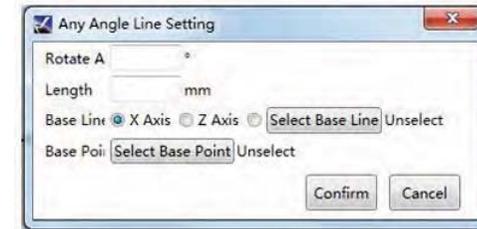
Two points of attachment: the icon is  Left click to pick up the two feature points that have been generated, and the line points are generated by selecting the two feature points as the starting and ending points of the line segment.

Any two points of attachment: the icon is  In the drawing area at any point two points, generate the two points of the connection. Press and hold the shift key on the keyboard while selecting the second point to generate a line parallel to the X or Z axis according to the angle of the two points.

Perpendicular to the line segment and tangent to the circle line: the icon is  Click to pick up a known line segment and circle that will be perpendicular to the selected line segment and tangent to the selected circle.

Extension cord: the icon is  Selecting two fitting segments will generate the selected two segments to their extension line.

Arbitrary angle auxiliary line: the icon is  Click this icon to bring up any angle guides line, as shown below:



Rotation angle: the angle of rotation of the reference line, positive counterclockwise rotation, negative clockwise rotation.

Line length: length of the auxiliary line.

Baseline: Select the baseline to rotate.

Baseline: Rotate, rotate based on the selected point.

After setting, click [OK] button to generate the auxiliary line, click [Cancel] button to cancel the help line generation.

## 2. Auxiliary round object

The icon is  Secondary menu is 

2 points to generate round: the icon is  Pick up two feature points, generate the two points of the circle, that is the diameter of the circle generated.

3 points to generate round: the icon is  Pick up three feature points, generate the three points of the circle.

The point of tangency, cutting radius circle: the icon is  Pick up two matching lines, will pop up the input radius of the dialog box, enter the radius and click [confirm] button, will be generated with the selected two fitting segments tangent, while the radius of the input radius of the circle.

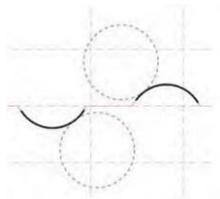
Fitting arc generate the whole circle: the icon is  Select a fitting arc that will draw the full circle of the fit arc.

Radius of the circle line: the icon is  Select a feature point, will pop up the input radius of the dialog box, enter the radius and click [OK] button, will generate a feature point as the center, enter the radius of the radius of the radius of the circle.

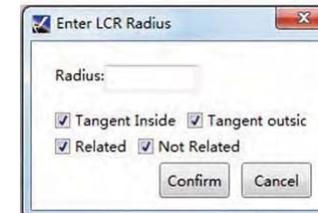
Generate two circles tangent circle: the icon is  Click on the icon, after selecting the two arcs, will pop up to generate tangent circle settings page, as shown below.



Radius: refers to the radius of the generated circle  
 Interference adjustment: If you choose to fit the arc, that is based on the original arc of the fitting arc to adjust the circle.  
 End cut / cut: refers to the generated circle and choose the fit arc of the tangent way.  
 Associated / Unrelated: Refers to the generated circle close to or away from the selected fit arc.  
 After the selection is complete, click the [OK] button to generate a tangent circle according to the conditions. You may generate multiple circles in dashed lines, as shown in the following figure. Please click the desired circle with the left mouse button. The extra circle will be deleted automatically.



Generate two circles tangent circle: the icon is  Click on the icon, select a fitting line and a fitting arc, and then pop up the following settings dialog box.



Radius: refers to the radius of the generated circle.  
 End cut / cut: refers to the generated circle and choose the fit arc of the tangent way.  
 Associated / Unrelated: Refers to the generated circle close to or away from the selected fit arc.

After the selection is complete, click the [OK] button to generate a tangent circle according to the conditions. You may generate multiple circles in dashed lines. Please click the desired circle with the left mouse button. The extra circle will be automatically deleted.

9 Delete the object



1. Delete some object

The icon is  Click on the feature point to delete the selected feature points.

2. Delete the line object

The icon is  Click on a fit line or a line to delete the selected line object.

3. Delete the round object

The icon is  Click on the fitted arc or auxiliary circle to delete the selected circle object.

4. Remove annotation

The icon is  Click on the label to delete the selected label object.

Note: For all generated objects, right-click the generated object and click Delete to delete the object.

**h** Capture and fast

On the right side of the drawing area, there are two toolbars, a capture toolbar and a quick toolbar.

1. Trap setting



The automatic capture of the feature points, lit means that automatically capture the type of point, turn off, no automatic capture.

The icons are from top to bottom: Intersection / Center of mind / Midpoint of line segment / End point / Round cut point / Foot

Feature point display: press Ctrl + A to display all the feature points, Ctrl + 1 shows all the intersection, Ctrl + 2 shows all the center, Ctrl + 3 shows all the midpoints of the line, Ctrl + 4 shows all the endpoints, Ctrl + 5 shows all round tangs, Ctrl + 6 shows all footing.



: Capture the regional settings, click the pop-up settings dialog box, as follows



After setting the capture range, click the [OK] button. The system will use the new capture range to capture the feature points. Click the [Cancel] button to cancel the editing and close the dialog box.

2. Quick operation



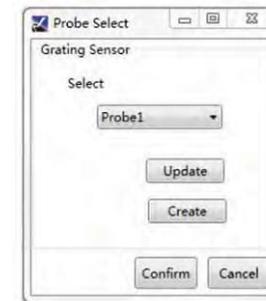
Quick operation: with the beginning of the synchronization, commonly used tools.

The icons are from top to bottom: Fit straight line  
Fit the arc  
Parallel to the X axis  
Parallel / vertical markings  
Parallel to the two-point connection  
Markings of the two segments

**3** Parameter settings



**a** Rod selection



The setting data of the measuring rod is completed by the correction data of the measuring rod. Create a spindle, according to the different measuring rod to create a new spindle data, the new rod data is also corrected to complete. After the determination of the rod to initialize.

**b** Correction

Correction of the required conditions: 2 block, composed of a drop. Different diameter of the standard ball 2.

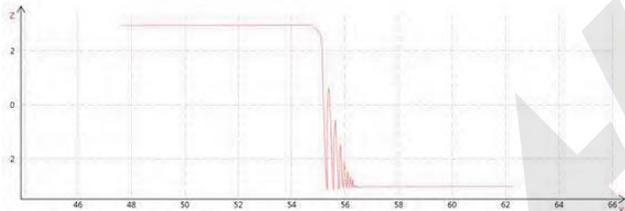
Note: 1. the combination of the amount of block, the length of each block must be more than 5mm.

2.the standard ball measurement, the data must be symmetrical, and the arc angle between 115 degrees to 125 degrees.

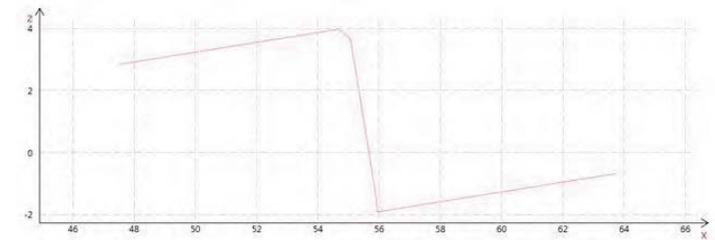
Calibration process:

1. The combination of a good amount of flat on the fixture, set a reasonable length and sampling speed, adjust the height of the location, click to start, for data collection. When the collection can not fall out of the final measurement of the amount of block surface, if the fall out of the re-acquisition, preserve [Export raw data] after collection of the graphics.

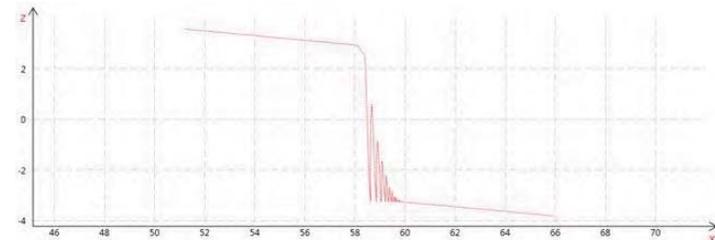
Note that the save path should be clear. That is, the finished graphics:



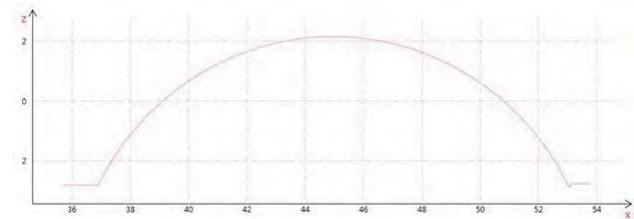
2. The combination of the positive block is tilted 5 to 10 degrees in the fixture, set a reasonable length and sampling speed, adjust the height of the location, click to start, for data collection. When the collection can not fall out of the final measurement of the amount of block surface, if the fall out of the re-acquisition, preserve [Export raw data] after collection of the graphics. Note that the save path should be clear. That is, the finished graphics:



3. The combination of a good amount of negative negative tilt 5 to 10 degrees in the fixture, set a reasonable length and sampling speed, adjust the height of the location, click to start, for data collection. When the collection can not fall out of the final measurement of the amount of block surface, if the fall out of the re-acquisition, preserve [Export raw data] after collection of the graphics. Note that the save path should be clear. That is, the finished graphics:

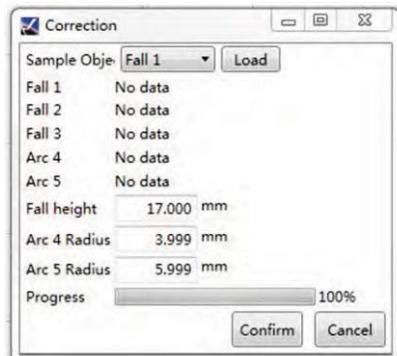


4. The standard ball 1 to measure, adjust the measurement height, click to start. Note: Measuring the arc can be measured on both sides of the plane. preserve [Export raw data] after collection of the graphics. Note that the save path should be clear. That is, the finished graphics:



5. The standard ball 2 to measure. The operation steps are the same as above.

After the need to correct the data saved, click on the correction, as shown in Figure:



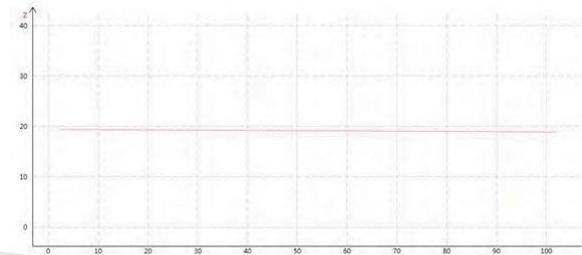
For the data to be loaded, the drop source 1 corresponds to the first file collected, and so on.

After loading, fill in the drop height. Corresponding to fill the arc diameter. Click OK, the calibration is complete.

**c** Straightness correction

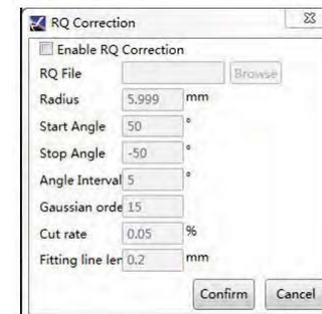


Data required for straightness correction: Measure flat crystal data, the measurement range is the full scale of the X-axis, this file is the raw data of the measurement, not the calibration file.



Correction process: first enable straightness correction, then click to browse, select the correction file, click the [OK] button to complete the straightness correction. If you do not want to correct the straightness, do not select to enable straightness correction, and then click the [OK] button.

**d** RQ Correction



Enable RQ Correction, browse the large arc file in the measured calibration file and click OK.

**e** Print setup



: Print content to edit.

**f** System settings

The icon is:  Click the icon, the following page will pop up





When the Ctrl key is pressed, whether to make straight lines and arcs automatically fit: By default, if you do not fit the line segments and arcs while doing labels and guides, when the left mouse button clicks on the original data line, Will automatically generate lines and arcs as needed, which will lead to some cases will generate the user does not want the graphics, so this option is selected, do not want to automatically generate, press the Ctrl key, this will not automatically generate line and circle The arc.

Whether it is single-step mode: If checked, it is single-step operation mode; if not checked, it is multi-operation mode. In the single-step mode, each step is done, after the completion of the return to no operation, press the Enter key will repeat the last operation state; in non-single-step mode, each step after the operation will continue for The current operating state until the other operating state is switched.

If you are using the virtual keyboard, enter the number, if the use of the virtual keyboard, if the check on the use of the software disk; not checked on, not used; in the menu bar in some places to enter the number, if the use of soft keyboard, Digital box will automatically pop up the soft keyboard, easy to enter, if not checked, it will not pop up the soft keyboard, then the user can use the keyboard input.

When the arc is fitted, whether or not to draw the whole circle: if checked, it means that the circle will be drawn when the circle is rounded; if unchecked, it means to fit the arc without drawing the whole circle.

When a straight line is fitted, whether the full screen is displayed: If it is checked, the fitted line will be displayed on full screen; if it is not checked, the straight line will only show the straight line.

Ask for load the default operate template while the default template exist: If checked, after the measurement is completed, it will ask if the default template is loaded.

Whether to sort the results when exporting the label results: If checked, it means sorting the label results.

Fit to the display style: There are three options

1. show the fit line: after fitting, draw the fitting line
2. Show two points: after fitting, only draw the end of the fitting line
3. does not show: after fitting, do not draw a fitting line

Fitting Color: Sets the color of the fit line display.

Auxiliary object accuracy: Accuracy of the auxiliary object when auxiliary operation is required in the measurement

System Unit: Marks the unit setting of the result, the setting item is in millimeters or inches.

System language: the system language settings, settings for the Chinese or English.

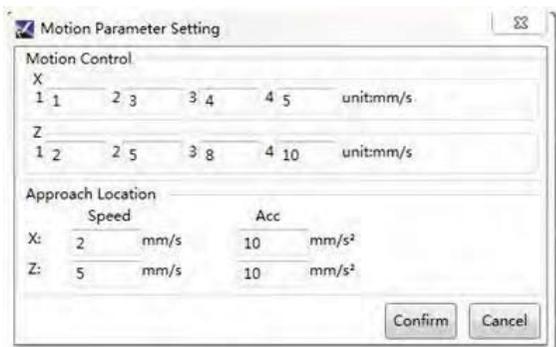
Drawing Area Grid Style: Select the grid pattern for the drawing area.

Collect the result Save path: After the acquisition is complete, the result will be automatically saved to the path set here.

Click the [OK] button to save the settings; click the [Cancel] button to cancel the setting and close the window.

Save file path rule: The format in which the measurement results are saved.

9 Sports set



Motion control, X for the horizontal, Z said column, 1 file to 4 file corresponds to the upper and lower or left and right movement below the speed of the corresponding stall speed. Please do not change the speed here, after the change may lead to movement failure.

Fixed-point movement: Here set the speed of fixed-point movement, acceleration, docking mode and timeout.

Fixed motion: Set the speed, acceleration, docking mode, and time-out for fixed-point motion.

h Help menu

Help: Click to view help to bring up this manual.  
About: View information about this software.

4 Details of the file menu

a Operation template

: Export the template, this time all operations, as a template to export to the file.

: Import the template, the template file into the software, the current open file according to the template in the operation process out, that is automatically fit the label and so on.

Note: Because the template corresponding to the file and open the file to be matched, if the degree of matching is not high, may lead to some lines or arcs are not fitted out, so that with the line and arc are not associated with the label and other operations are can not be generated.

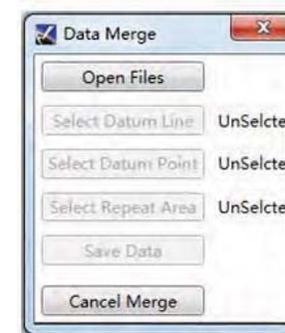
: Set the default template, select a template set to the default template for the system, so that the next measurement after the workpiece will automatically import the template, the graphics fitting, labeling and other operations.

: Clear the default template, clear the selected default template empty, after the next measurement will not automatically call the template.

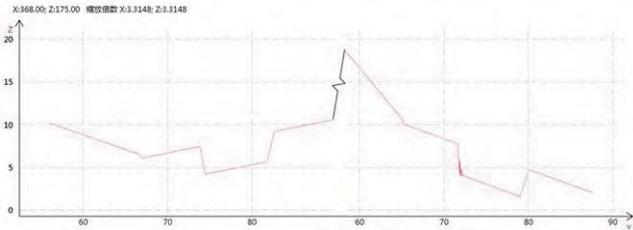
b Data consolidation

Functional Overview: for some workpieces (such as straight slot artifacts), a measurement can not be completely measured to the workpiece surface, so you need to measure the different angle of the workpiece, and then the two measurements are combined to get the actual workpiece surface.

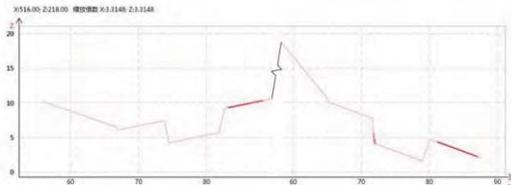
Click the [Data Merge] function, the data merge function page will pop up in the lower right corner of the page, as shown below, and the file browser will be opened automatically. You need to select the data file to be merged. You can select two files at once.



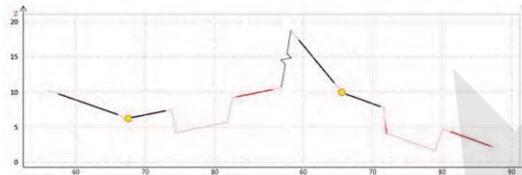
When the file selection is complete, the selected data is displayed in the drawing area



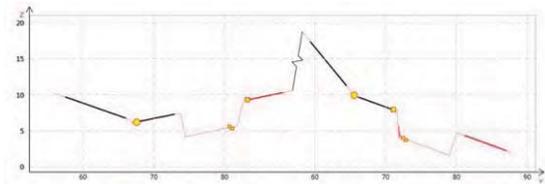
According to the tips below the drawing area, first select the baseline of the two data, that is measured at different angles are measured a straight line



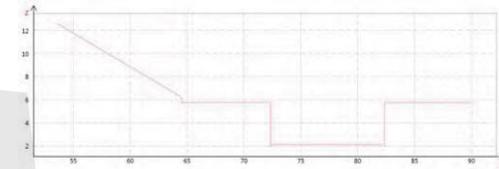
And then select a reference point, the choice of the reference point is very important, try not to merge in the place, and in the two data can be generated out of the point



Select the culling data, select the start and end of the data segment that is not the real artifact surface in the two data



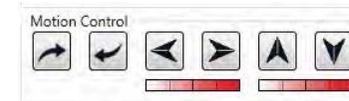
After the selection is complete, the "Save Data" button of the data merge page is available. Click this button to save the merged data. The program will automatically open the combined data, the combined data can be marked. The combined data is shown below



**d Use Catch**

The purpose of the Catch key is to capture the value of the height at which the stylus is lifted and set it up to raise the same height the next time it is lifted.

Step: 1. Click the stylus lift button in the motion control area



2. A pop-up dialog box on the screen displays the current stylus height



3. Manually lift the stylus to the appropriate position and simultaneously press the Catch button



4. The next time you click the stylus lift button, the value you just captured will be displayed.



### Precautions

1. Keep the power supply at 220V plus or minus 5%, please be careful not to shut down and suddenly power off.
2. Make sure the machine is no longer within direct sunlight and do not face the air conditioner.
3. The instrument is used at a temperature of 20 plus or minus 2 degrees Celsius.
4. Before the measurement must ensure that the workpiece clamping stability, to prevent the occurrence of dumping damage to the instrument and stylus.
5. When measuring, be careful of the situation where the stylus and the sensor do not collide with others.
6. Do not rely on the machine or knock on the marble, do not touch the workpiece or stylus.
7. Be careful not to connect a virus with a USB disk or other storage tool to your computer.
8. Do not operate this machine.
9. Lock the two fixing screws on the back when carrying.
10. Separate the pliers from the adjustment table when handling

### Appendix

#### Profiler software error code details

0X000010	The system is not started
0X000020	The system is busy and is handling other tasks
0X000030	The task is running
0X000040	The task is not running
0X000050	Parameter error
0X000060	Task status error
0X0000A0	Undefined tasks
0X0000B0	Hardware does not support
0X0000C0	Axis movement failed
0X0000D0	Get acquisition data failed
0X0000E0	Execute timeout
0X0000F1	The user canceled the operation
0X0000F2	Motion axis limit error
0X0000B1	Does not support this axis movement
0X0000B2	Does not support this axis movement
0X0000B3	Movement failed
0X002000	Script error + OFFSET (few scripts)
0X001100	Access GT card error
0X001200	The return direction is abnormal
0X001101	Board open failed
0X001102	Board configuration failed
0X001103	Axis state clear failed
0X001104	Board download measurement program failed
0X001105	Board shutdown failed
0X001000	Board error offset
0X001106	Switch to JOG mode failed
0X001107	JOG motion setting failed
0X001108	Toggle TRAP mode failed
0X001109	TRAP motion setting failed

0X005000	Illegal hardware
0X005006	Motion control is busy
0X005007	Maintain busy
0X005008	Unrecognized command type
0X005001	The underlying configuration update failed
0X005002	User configuration update failed
0X005003	The spindle parameter failed to update
0X005100	The model calibration failed for the data
0X005010	The collection of results is not present
0X006001	User configuration failed to save
0X006002	User configuration failed to load
0X007001	The underlying configuration failed to save
0X007002	The underlying configuration failed to load
0X007003	Basic configuration is not legal
0X007004	Basic configuration decryption failed
0X008001	Stylus parameter failed to save
0X008002	Stylus parameter loading failed
0X008004	Stylus parameter decryption failed
0X009001	The result is empty
0X009002	The collection of results is not present
0X009003	The result of the decryption failed
0X009004	The result of the collection is incorrect
0X00A001	Click the fit data source to be empty
0X00A002	Click Fit Data Source is incorrect
0X00A003	Click fit parameter error
0X00A004	Click fit to fit the fitting condition
0X00A005	Click fit to be empty
0X00A006	Click fit configuration is not legal
0X00A007	Can not find the appropriate fitting results
0X00A008	Call fit method error
0X00A009	Click to fit the straight line calculation error

0X00A010	Click the arc to calculate the error
0X00A011	Arc fit failed
0X011001	Save the file data empty
0X011002	Save file write failed
0X011003	The file path does not exist
0X011004	File decryption failed
0X011005	The file is malformed
0X011006	File reading failed