



VMQ-4030 Fast measurement software

Instruction Manual



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Chapter 1 Installation and Run

This chapter describes the software and hardware resources required for the software to run, and how to install the software.

1.1 Recommended Specification

OS	Windows7 32bit or 64 bit
Processor	i3 or better
Memory	4GB RAM or better
Storage	300MB available hard drive space
Required software	Corresponding camera driver, dongle driver
Recommended software	Microsoft office

1.2 Installation

Step 1: Double Double-click the software installation package to install. It is recommended to install the software in a location other than the C drive drive.

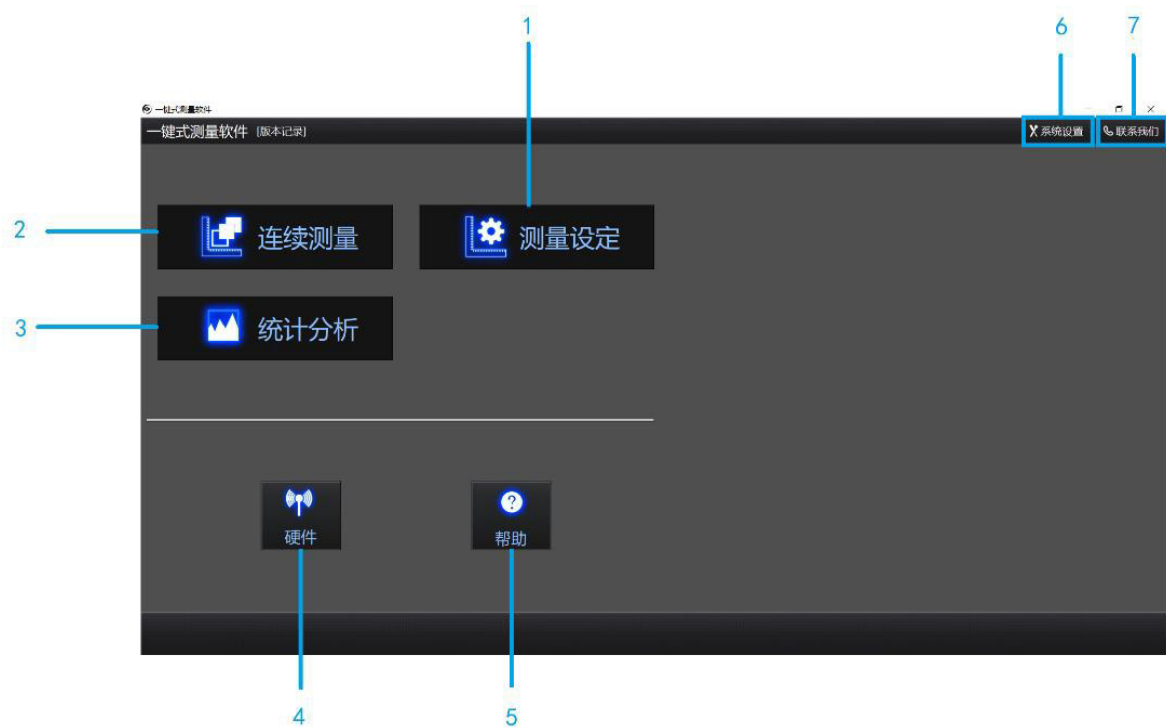
Step 2: Install CodeMeter runtime environment.

1.3 Run

Insert the dongle, double double-click the desktop shortcut.

Chapter 2 Overview

You need to connect and turn on the hardware device before running the software. Open the software and enter the initial interface, as shown in Figure 1-1. The software is divided into three main functions: measurement setting, continuous measurement and statistical analysis.



1.Measurement setting: Enter the measurement setting interface to set the measurement template. The template is used for continuous measurement.

2.Continuous measurement: Enter the continuous measurement interface, use the template to measure and record the data.

3.Statistical Analysis: Data analysis of measured results.

4.Hardware settings: Set the light, motor and IO card.

5.Help: Short description of operation.

6.System settings: System parameter setting.

7.Contact Us

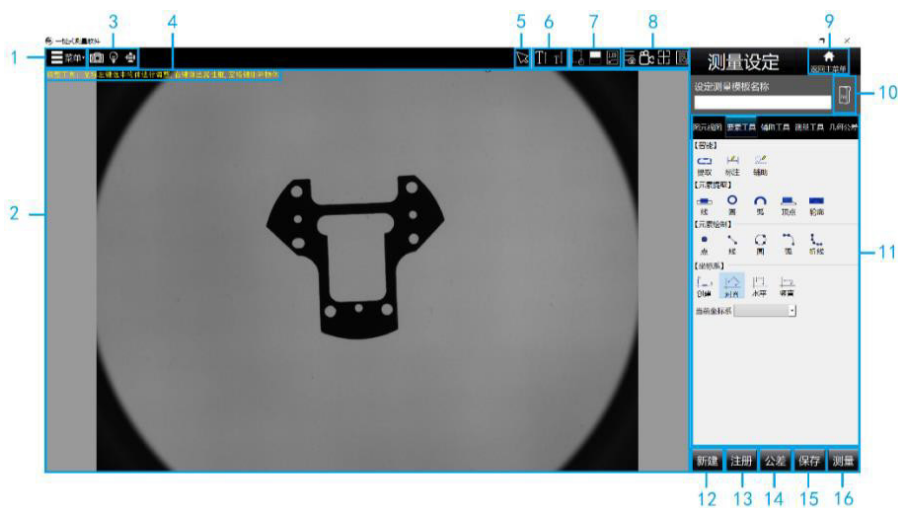
Operating Procedures

Before measurement	Turn on the meter and run software
Measurement settings	Enter the measurement setting, place the object to be measured on the stage and enable the software to display the part of the object to be measured Set environmental parameters such as light intensity and lens height according to the object to be measured Set templates based on inspection purpose
Continuous measurement	Enter continuous measurement and use the template for automatic measurement Record measurement data
Statistical Analysis	Enter statistical analysis, extract data recorded during continuous measurement for analysis

Chapter 3 Measurement Settings

Before measuring the object, the measurement template must be set and saved before entering continuous measurement for automated measurement. After measuring and recording the data, you can use the statistical analysis to analyze and process the data obtained by continuous measurement.

description



Chapter 3 Measurement Settings

1.Menu:Menu: includes screenshots, element display size, color, default tolerance, calibration tool, hardware settings, auxiliary tools, data export.

2.Image display area:Image showing the Object.

3.Hardware settings toolbar:Quickly set camera, light and motor

4.Tooltips:Short step-by-step instructions for using the selected tool

5.Selection tool:Select elements for adjustment

6.Font size tool:Change the display font size

7.Element View Tool

8.View display tool

9.Back to main menu:Return to main menu

10.Open template:Open a saved template

11.Tool panel:template tool

12.New:Create a new template

13.Register:Register template image

14.Tolerance list button:Click to show a list window of all tolerances

15 Save.Save template

16.Measurement:Enter continuous measurement

3.1 Lighting and Focus

3.1.1 Lighting settings

When the meter is powered on, the illumination intensity is a default value set by the software.

After placing the object to be measured on the stage, enter the measurement setting. At this time,the Image display area can hardly show the outline of the wo rkpiece, as shown in Figure 3-1

Chapter 3 Measurement Settings

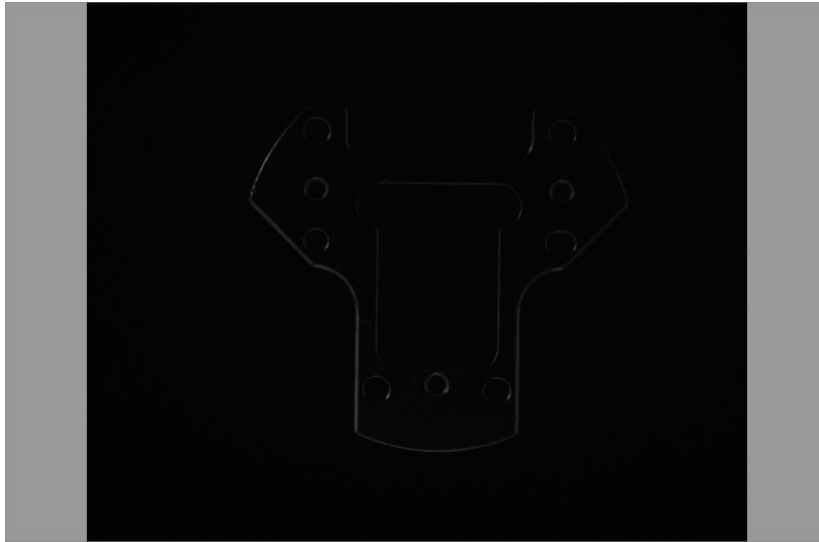
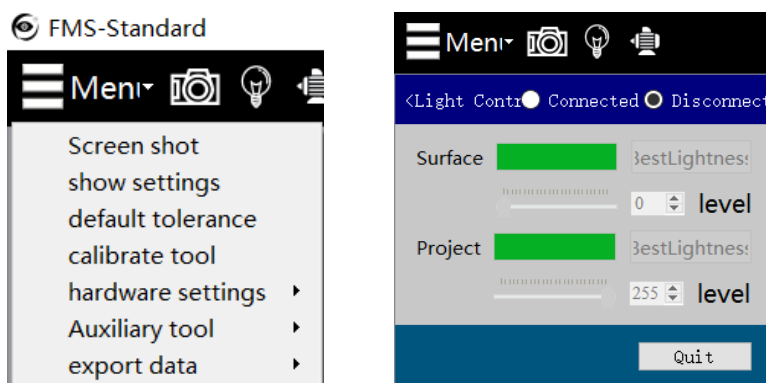


Figure 3-1

Use the light control under the menu to adjust the light intensity until the measurement object can be clearly displayed on the screen.

1. Click the menu to pop up the drop-down box.
2. Click Hardware Settings ➡ light control.
3. Adjust the brightness according to the type of light source, you can drag the slider or click the small arrow to adjust.



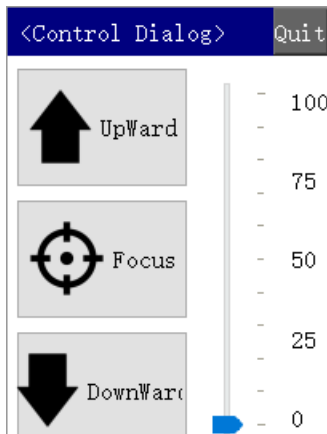
You can also directly click the button on the upper toolbar to directly pop up the above dialog box.



Chapter 3 Measurement Settings

3.1.2 Focus

After setting the brightness of the light, the focus can be adjusted to make the profile of the workpiece clear. Click the motor button , the following window will be displayed in the lower right corner of the screen display area.



Manual focus: Click the up and down buttons or drag the slider.

Auto focus: Click the Focus button.

3 1.3 Enlarge image

You can enlarge the image.

1. Move the mouse to the area to be enlarged.
2. Slide the mouse wheel forward for enlarged display display(Figure 3-2). Slide the mouse wheel backward to zoom out the enlarged image image(Figure 3-3).



Figure 3-2

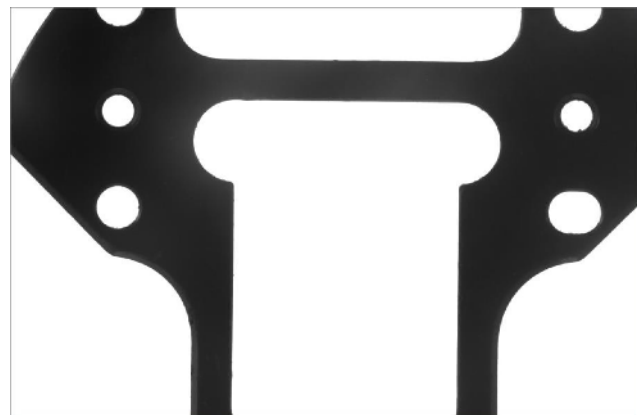


Figure 3-3

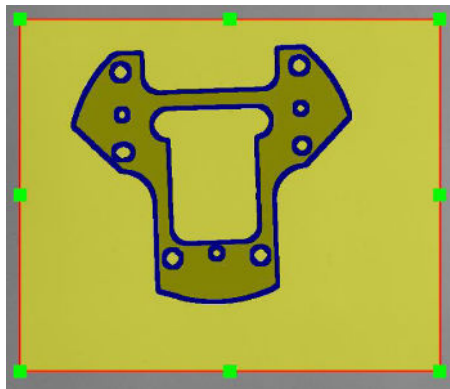
Chapter 3 Measurement Settings

3.2 Positioning

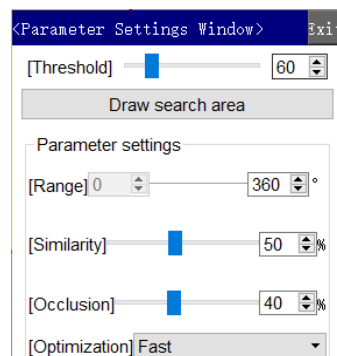
The software locates the workpiece within the field of view of the lens according to the workpiece profile, so the profile of the workpiece to be measured needs to be extracted first. Only after the workpiece to be measured appears completely and clearly in the image display area, profile extraction is performed on the workpiece.

3.2.1 Profile extraction

1. Click the register button, and a red rectangle appears in the image display area. The blue line appearing in the red rectangle is the profile of the workpiece to be measured. Adjust the size of the red rectangle by dragging the green handle on the border to include the area you want to measure within the red rectangle.

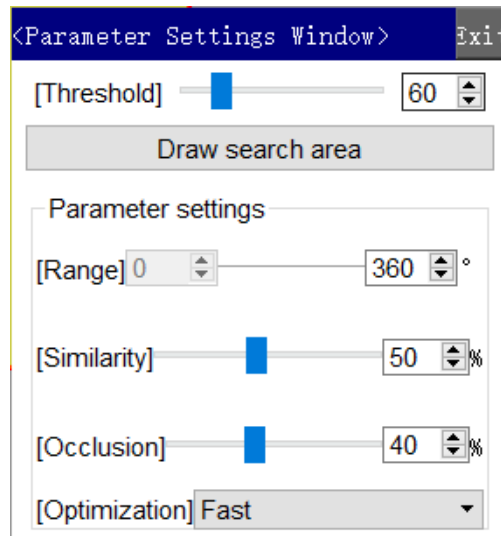


2. If the profile line of the workpiece to be measured is incomplete or not displayed at all, you need to adjust the profile intensity and other parameters to show the profile. Right-click in the image display area and adjust in the pop-up template parameter setting window.



Chapter 3 Measurement Settings

3.2.2 Property description



Threshold: Threshold for segmenting object boundaries and background. A suitable threshold can effectively segment background and noise.

Noise: reduce the noise of isolated points in the registration box. The larger the value, the higher the smoothness and the longer the time.

Searching range: The deflection angle of the object to be searched relative to the template. The larger the range, the greater the deviation of the allowed angle of the object. **Symmetry:** The number of symmetry axes of the object.

Similarity: the similarity between the searched object and the template object **Occlusion:** The maximum overlap allowed by the searched object.

Background texture: The estimated noise intensity at the boundary of the object, which basically does not need to be modified.

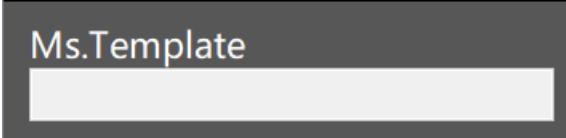
Optimization: It is divided into three modes: fast, medium, and precise. The search speed decreases in order, but the accuracy of the search increases one by one. When the location accuracy of the object to be searched is high, you should choose accurate.

Chapter 3 Measurement Settings

3.3 Save template

After profile extraction, save the template for continuous measurement. Steps:

1. In the blank, enter the name of the template.
2. Click the Save button to save the template.



Ms.Template

Now you can click the measurement button below to enter the continuous measurement interface and test whether the template just positioned the workpiece. Under the continuous measurement interface, click the Measure button.

If a green rectangular frame is displayed in the image display area, it indicates that the positioning is successful, as shown in Figure 3-4



Figure 3-4

Then click the modify button at the bottom right to return to the measurement setting interface and modify the template. Use the tools under the tool panel to set the required measurement values, then save the modified template and enter the continuous measurement interface for continuous measurement.

3.4 Element tool

The software provides a variety of element tools for marking out points, arcs, and circles. After marking, use the measurement tool to measure the value of interest. The following

Chapter 3 Measurement Settings

describes how to use each function of the element tool.

Line

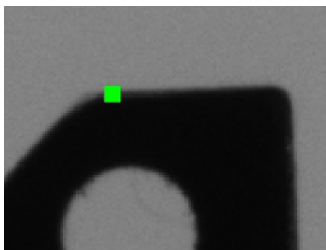


function: Extract a straight line from the image.

直线

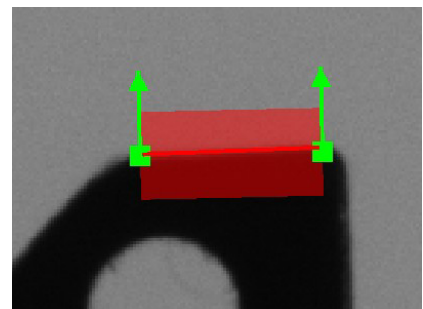
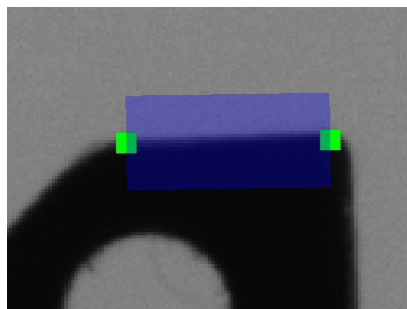
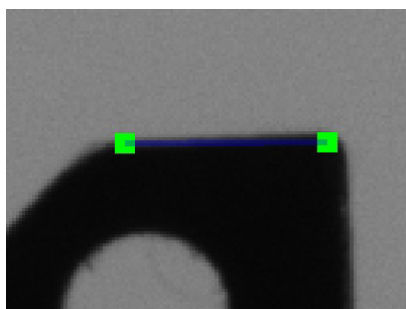
Steps:

Step 1: Click the button and left click on the line you want to extract to select the starting point.



Step 2: Move the mouse to the end of the line and left click.

Step 3: Drag the mouse up or down to adjust the thickness of the extraction tool so that the lines you want to extract are completely included, left click, done.



Note: During the marking process, the workpiece to be measured must not be moved.

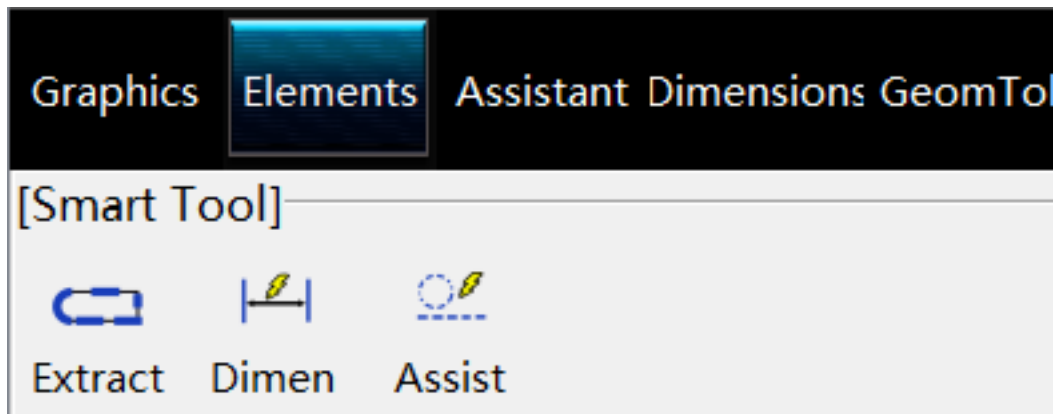
The dark blue rectangle is called a scan box. You can use the menu on the toolbar  to

show or hide the scan box.

Show Edge Points
Hide Edge Points

You can also use the extract tools under Smart Tools for fast element extraction

Chapter 3 Measurement Settings



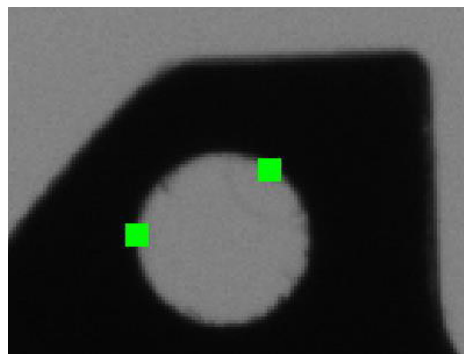
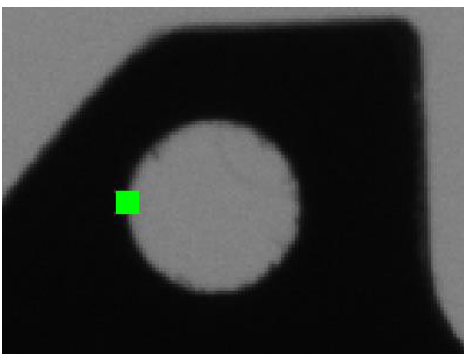
Extraction: Intelligently and quickly extract edges based on images.



function: Extract a circle on the image.

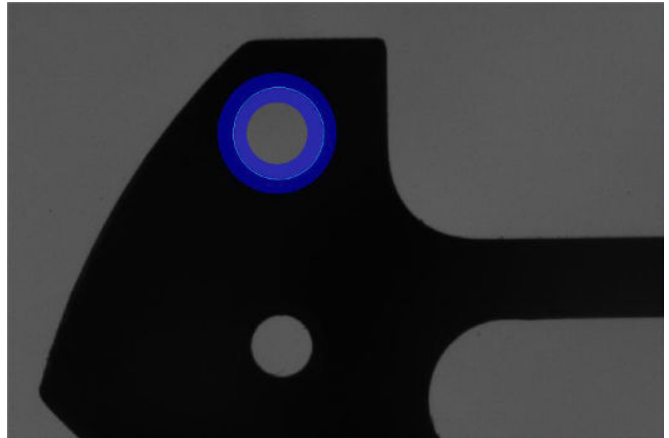
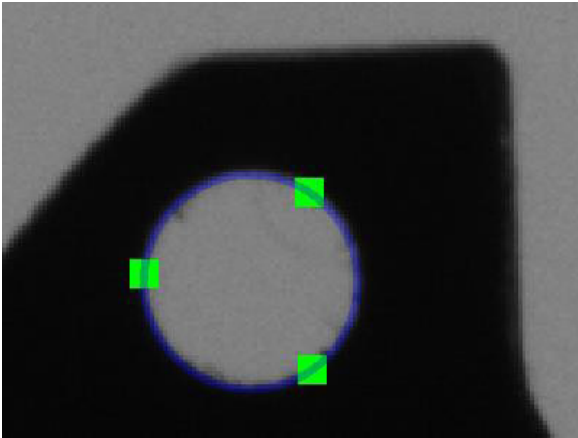
Steps:

1. Click the  button and left-click anywhere on the circle you want to extract in the image displayed on the screen to make the first point.
2. Move the mouse and left-click to make the second point



3. Move the mouse to the third point, which is the last point, and left-click to mark the third point.
4. Drag the mouse to adjust the size of the scan box, left-click.

Chapter 3 Measurement Settings



If the extracted element do not meet the requirements, press the space bar to delete the element just extracted, or use the tool in edit toolbar choose a element to delete.

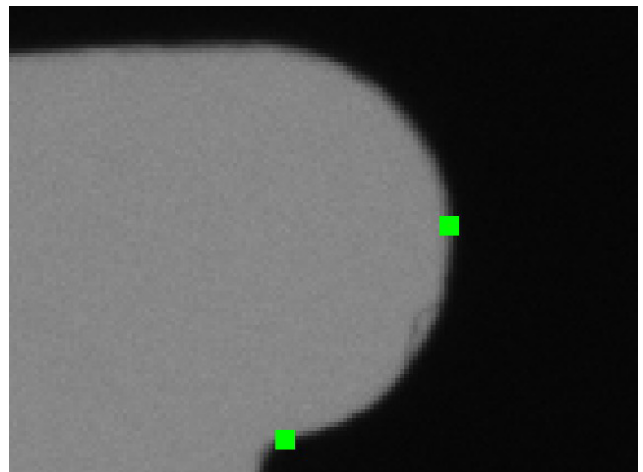
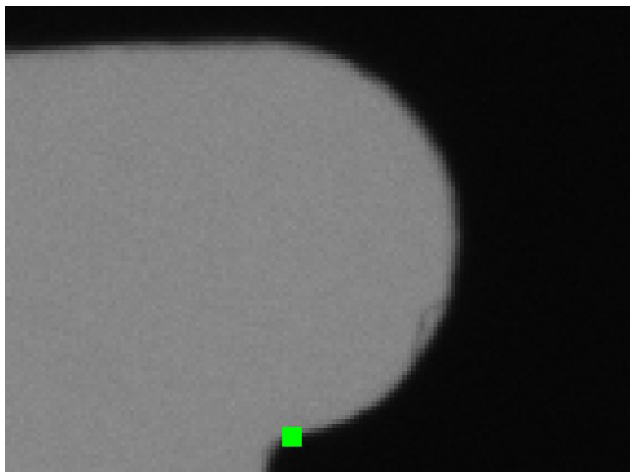


Arc 圆弧

function: Extract an arc on the image.

Steps:

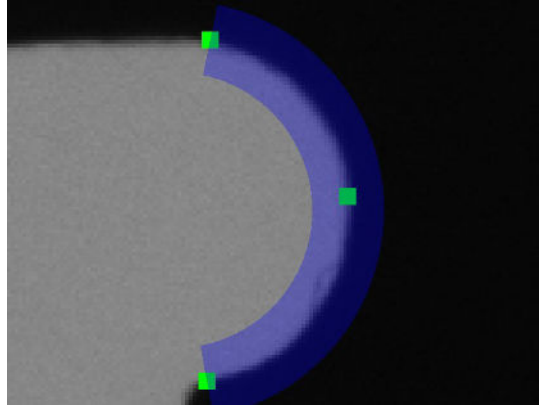
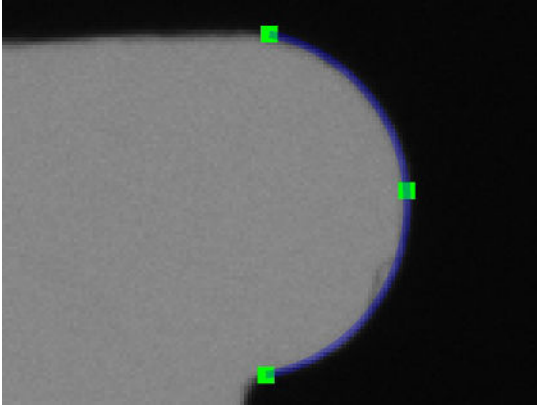
1. Click the  button and left-click the arc you want to extract to mark the first point.
2. Move the mouse and left-click to mark the second point.



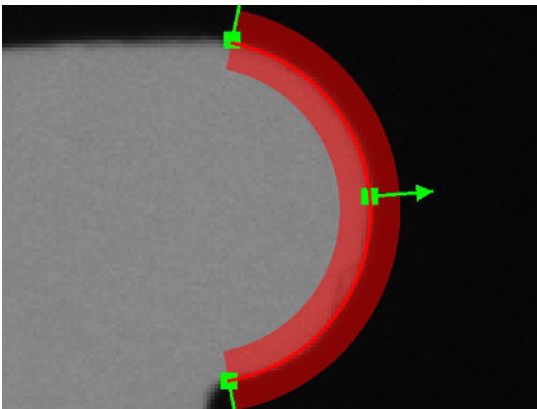
Chapter 3 Measurement Settings

3. Move the mouse to the third point, which is the last point, and left-click.

4. Drag the mouse to change the size of the scan box.



5. Left-click to complete the extraction.



Peak



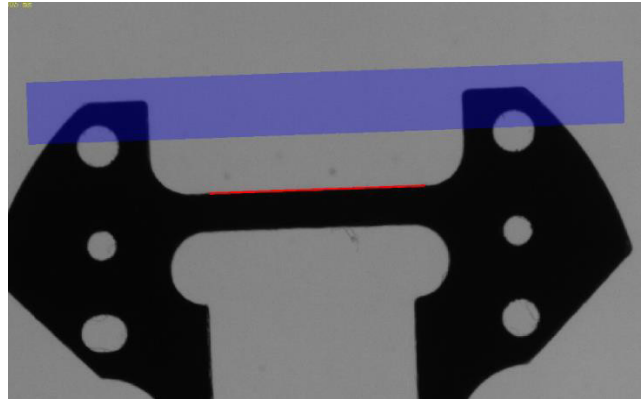
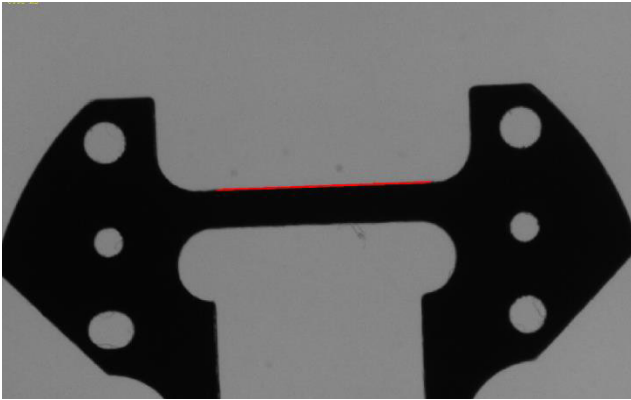
function: Extract the highest point in the image relative to the baseline.

Steps:

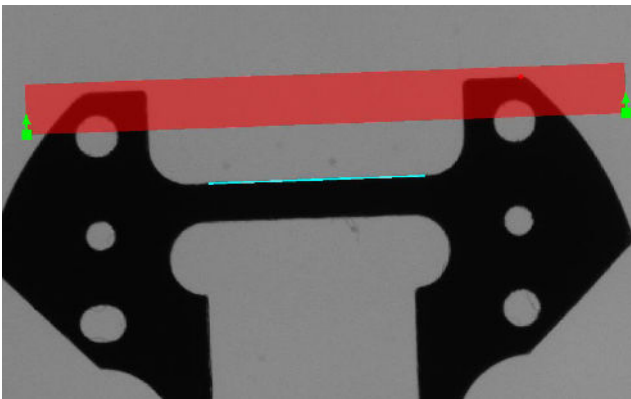
1. Click the  button and select a line as the reference line in the image display area.

2. Make the starting point and ending point, then drag the mouse to adjust the size of the scan box, and left-click.

Chapter 3 Measurement Settings



3.Left-click,done.



function: Extracting profile in a range, providing four ways.

steps:Extract profile by lines, arcs, or circles as before.

3.5Virtual Lines

Software provide 14 types of tools for creating virtual lines. Measurements can be performed with virtual lines created from lines, points, and circles.

3.5.1Virtual Point

Line Center



Chapter 3 Measurement Settings

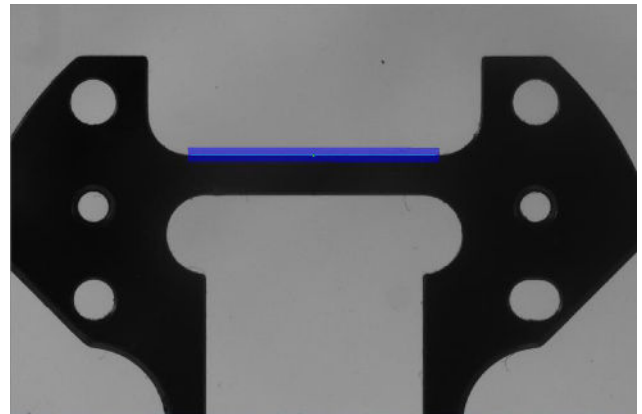
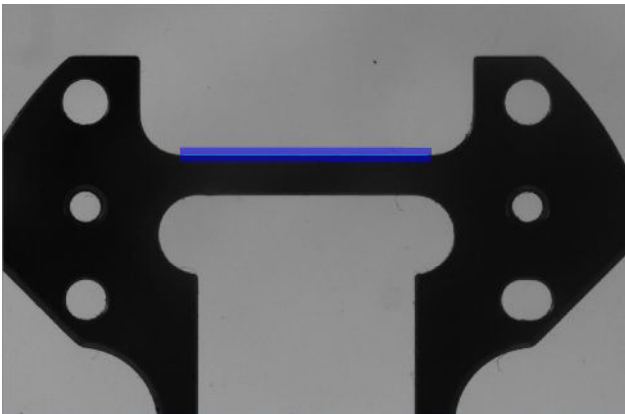
function: Draw a midpoint from selected line.

Steps:

Suppose you mark the line as shown below

1. Press  button.

2. Left-click the line.



Circle center 

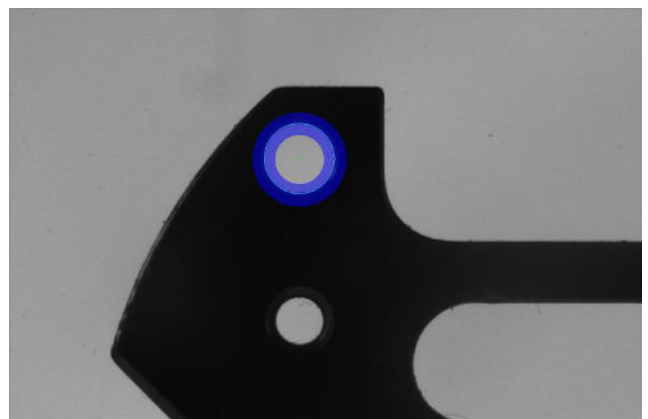
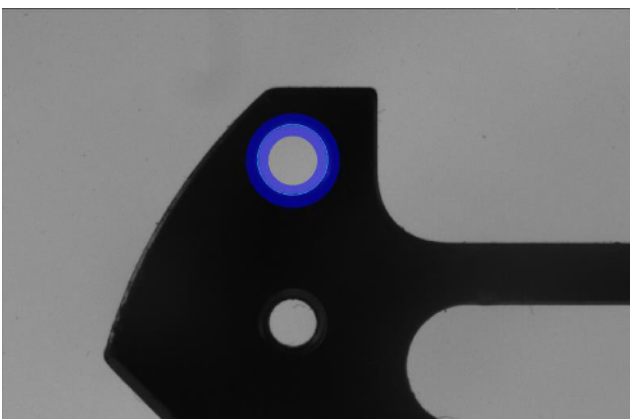
function: Draw a Circle center from selected circle

Steps:

Suppose the circle is extracted as shown below.

Step 1: Click  button

Step 2: left-click the circle



Chapter 3 Measurement Settings

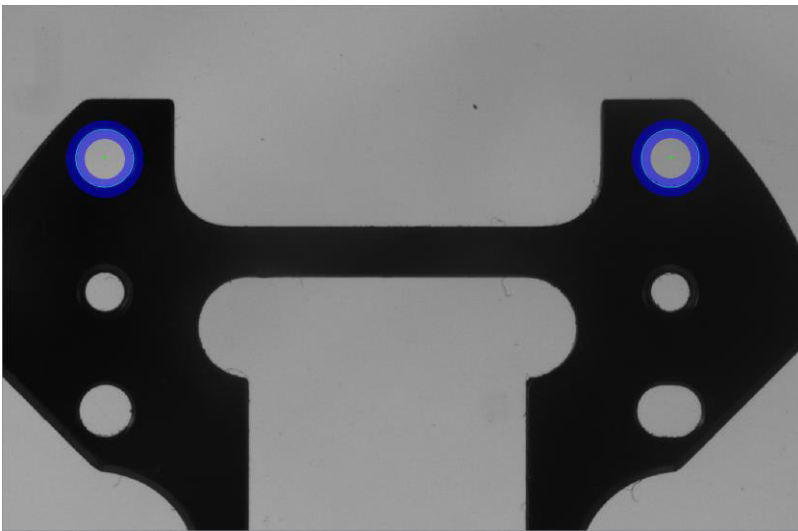
Midpoint



function: Draw a midpoint between two selected points.

Steps:

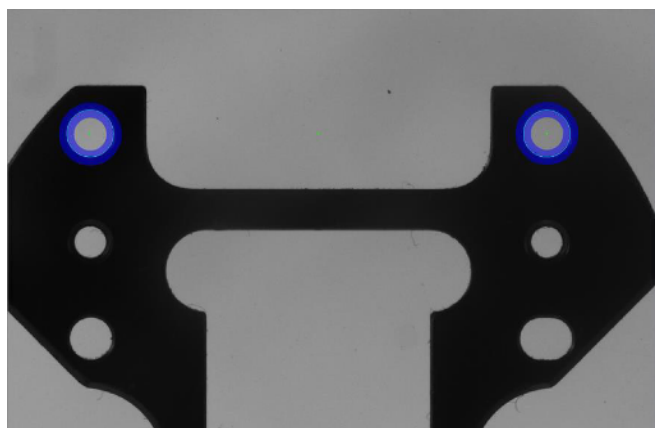
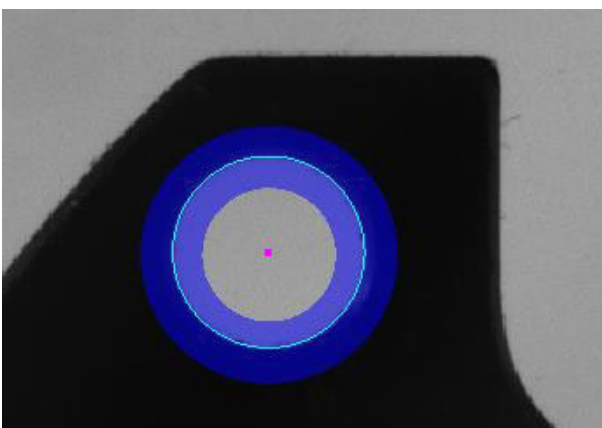
Suppose the two circles are marked as shown in the figure below, and the center points of the two circles are marked using the auxiliary center point.



1. Click button

2. Left-click the center of the circle on the left. The center of the circle changes from green to pink indicate that it is in the selected state.

3. Left-click on the center of the circle on the right, and the midpoint of the two points is marked.



Chapter 3 Measurement Settings

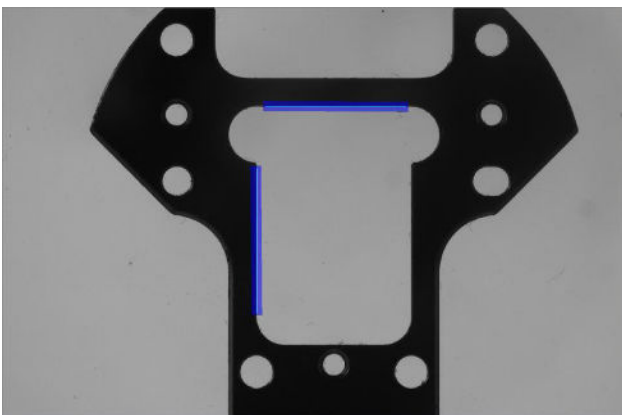
Intersection



function: Draw an intersection of two selected lines (straight line, circle, or arc).

Steps:

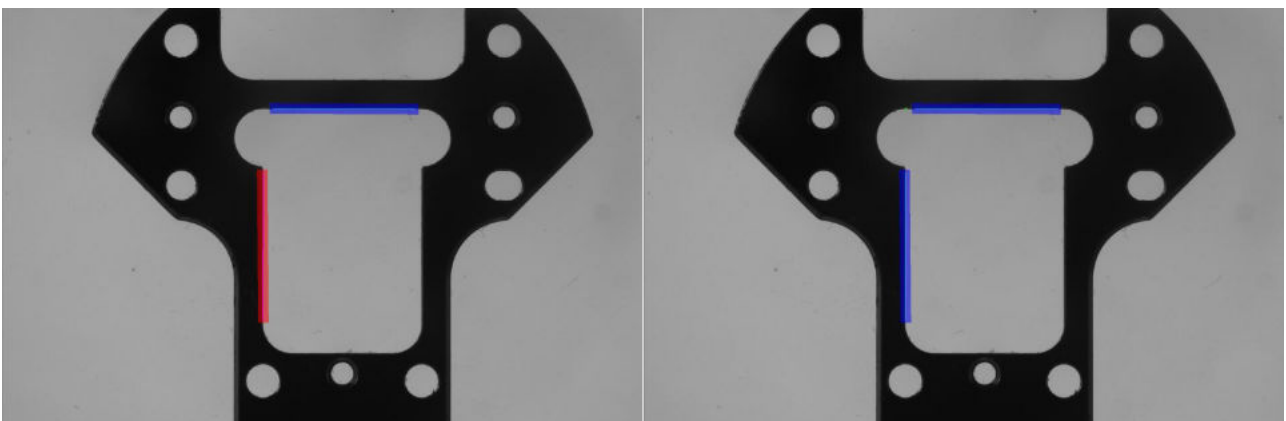
Suppose you mark the two lines as shown in the figure below:



1. Click  button

2. Left-click on the line on the left. The line changes from green to pink to indicate that it is in the selected state.

3. Left click on the line above.



Chapter 3 Measurement Settings

3.5.2 VirtualLine

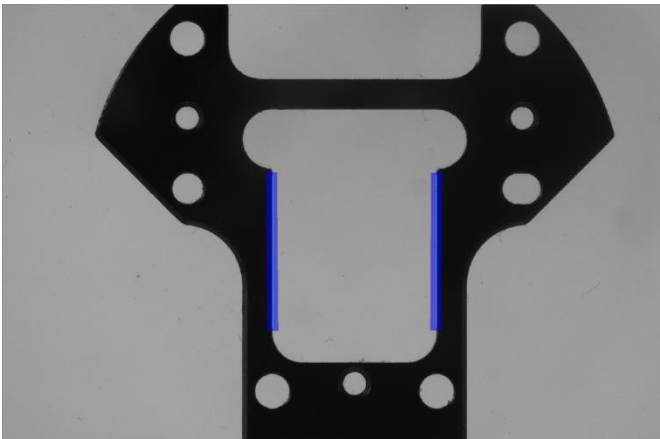
Bisector



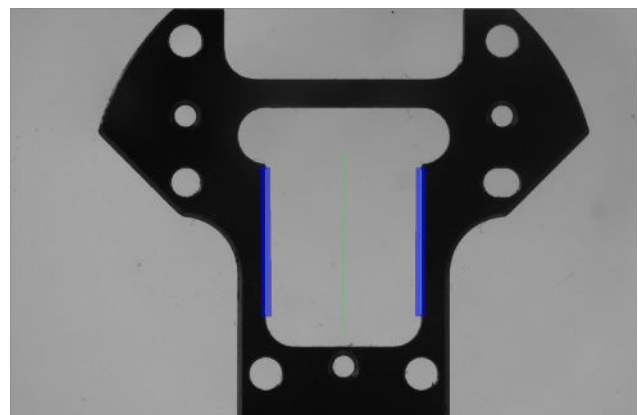
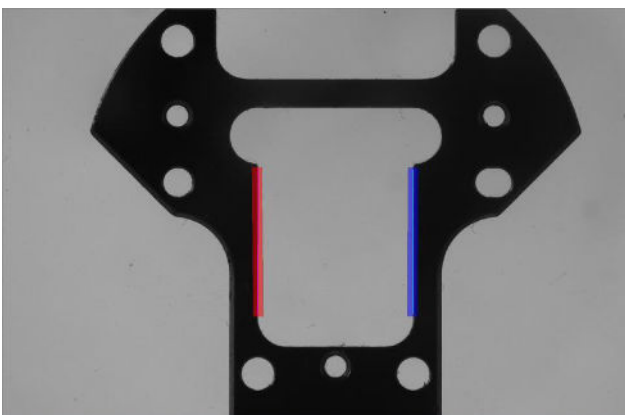
function: Draw a bisector (virtual line) between two selected lines or points.

Steps:

Suppose you mark the two lines as shown in the figure below:



1. Click  button.
2. Left-click the line on the left.
3. Left-click the line on the right.



Chapter 3 Measurement Settings

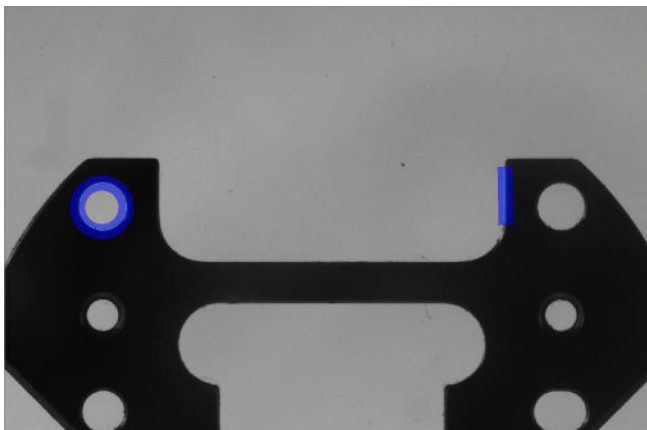
Perpendicular



function: Draw a perpendicular (virtual line), which passes through a selected point to a selected line.

Steps:

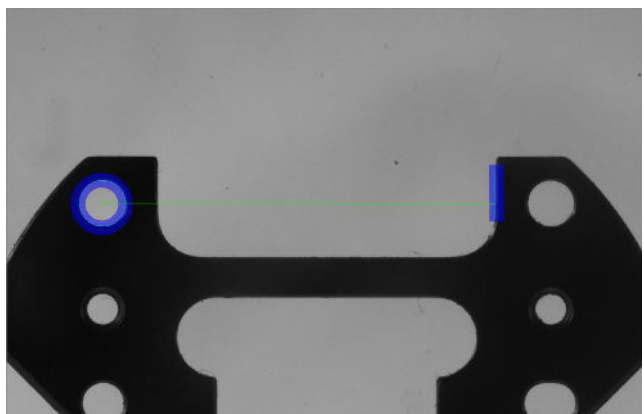
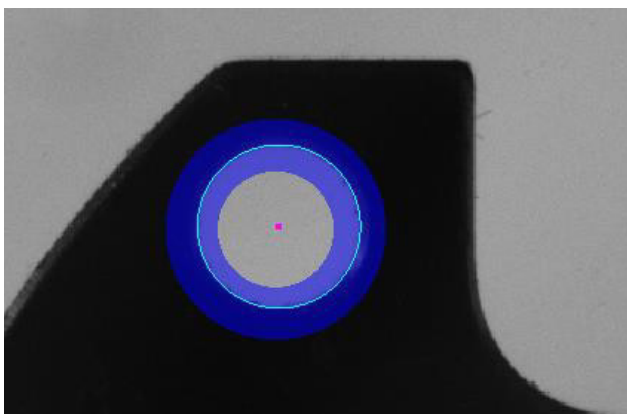
Use the image below:



1. Click  button

2. First pick a point

3. Next select a line



Chapter 3 Measurement Settings

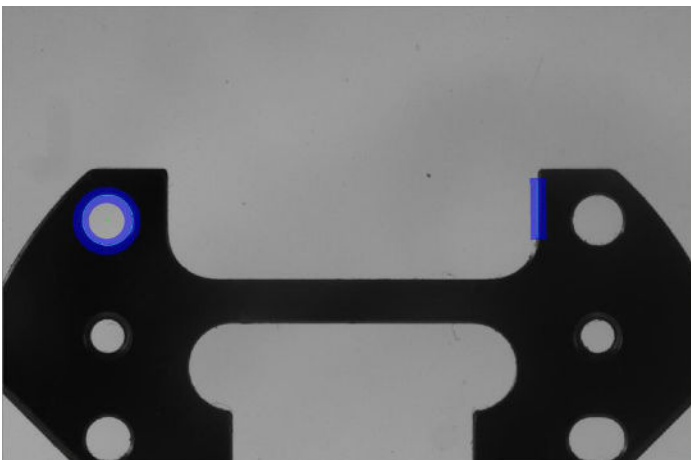
Parallel



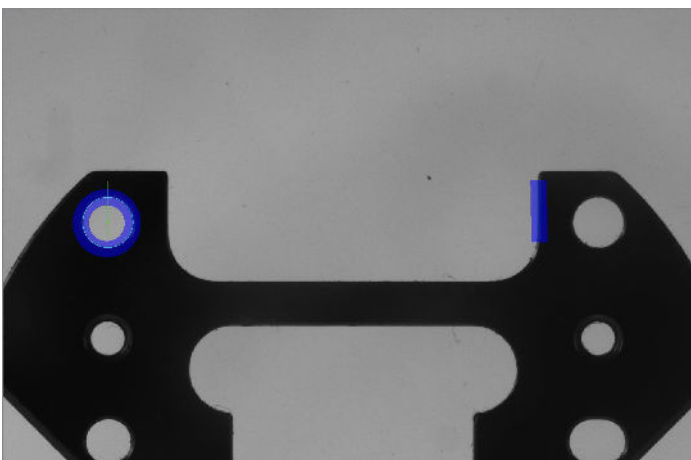
function: Draw a line (virtual line) parallel to a selected line, which passes through a selected point or which is a specified distance away from the selected line.

Steps:

Use the image below:

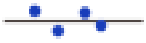


1. Click  button.
2. First, select a line
3. Next, select a point



Chapter 3 Measurement Settings

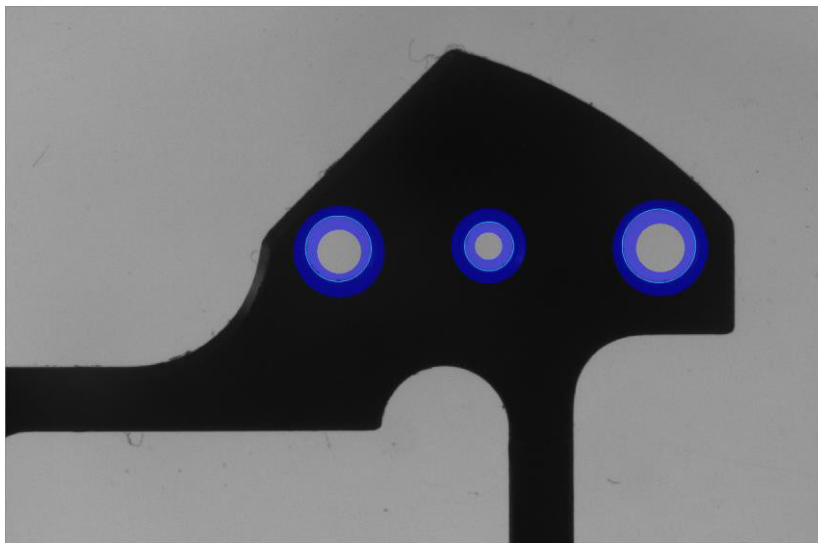
OLS-LN



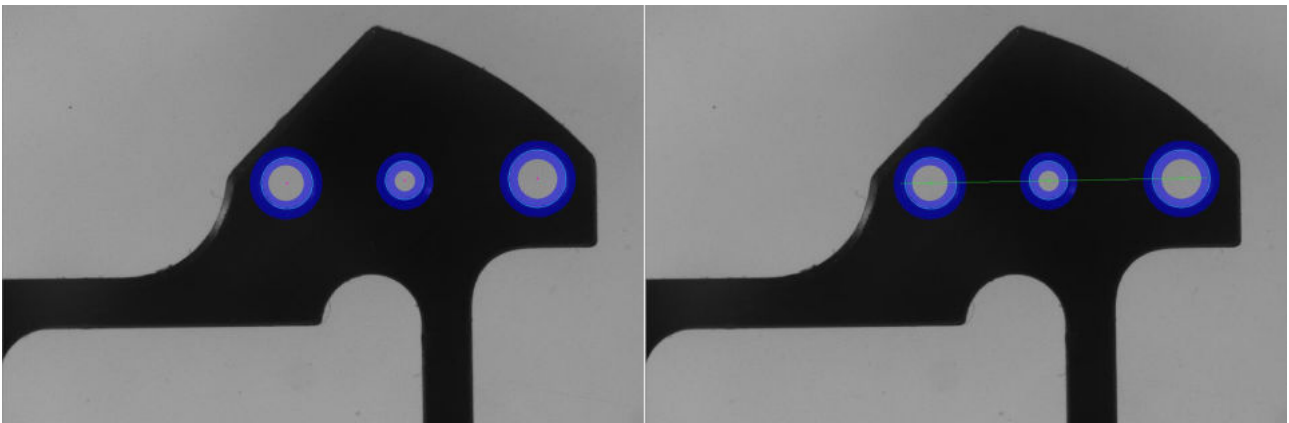
function: Draw an OLS line (virtual line) which approximately passes through two or more selected points.

Steps:

Use the image below:



1. Click  button
2. Left-click these three points.
3. Right-click.



Chapter 3 Measurement Settings

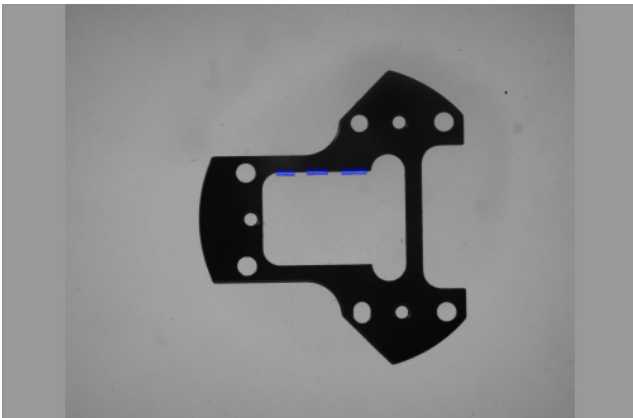
ConnectLN



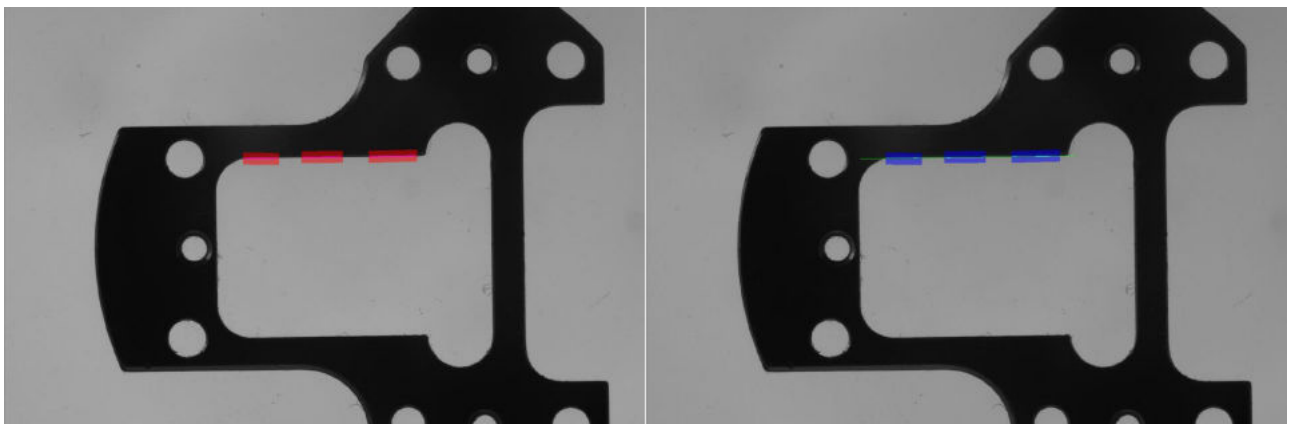
function: Draw a line (virtual line) which connects two or more selected lines.

Steps:

Use the image below



1. Click  button
2. Left-click these lines.
3. Right-click.



3.5.3 Virtual Circle

ConnectArc

Function: Draw a circle (virtual line) which connects two or more selected arcs.

Steps:

Use the image below:

Chapter 3 Measurement Settings



1. Click  button

2. Left-click Arcs

3. Right-click

OLS-CL



Function: Draw an OLS circle (virtual line) which approximately passes through two or more selected points

Steps:

Use the image below:

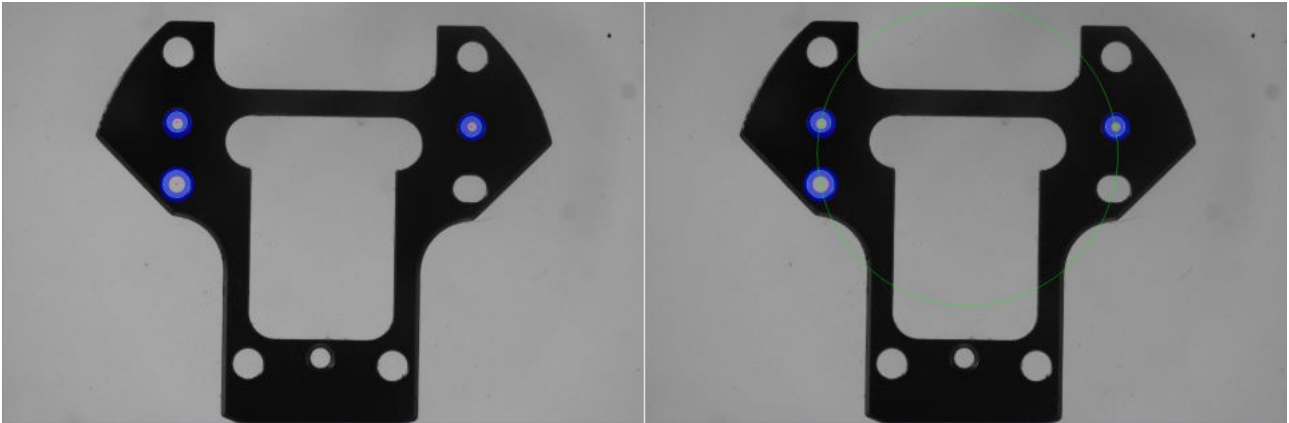


1. Click  button.

2. Left-click these circles.

3. Right-click.

Chapter 3 Measurement Settings



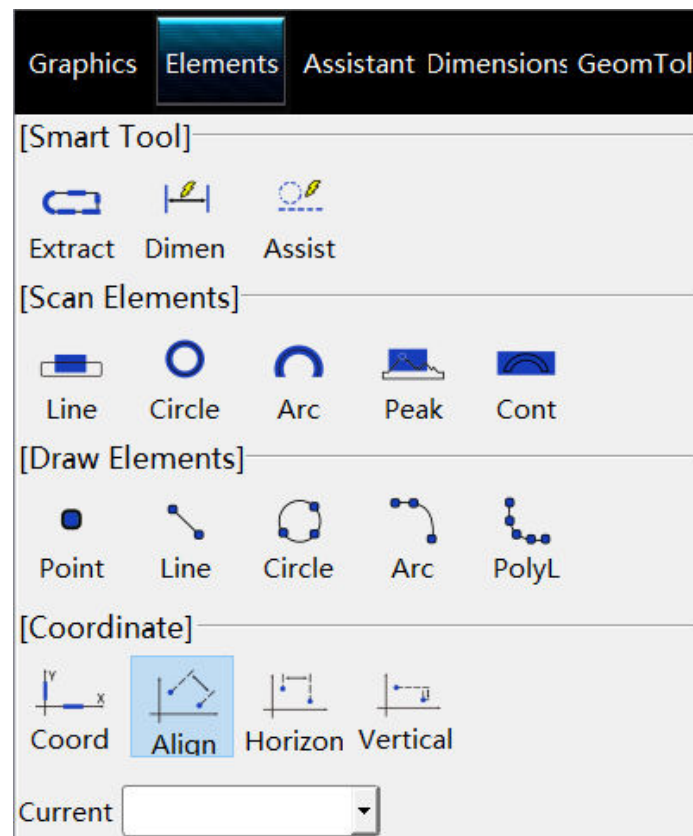
Circle



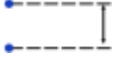
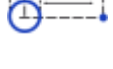
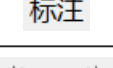
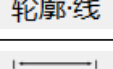
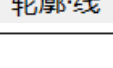
Function: Draw a circle (virtual line) with a selected point at the centre, which passes through another selected point or whose radius is a specified size.

3.6 Measure

After marking the elements of interest, you can measure with the measurement tool.



Chapter 3 Measurement Settings

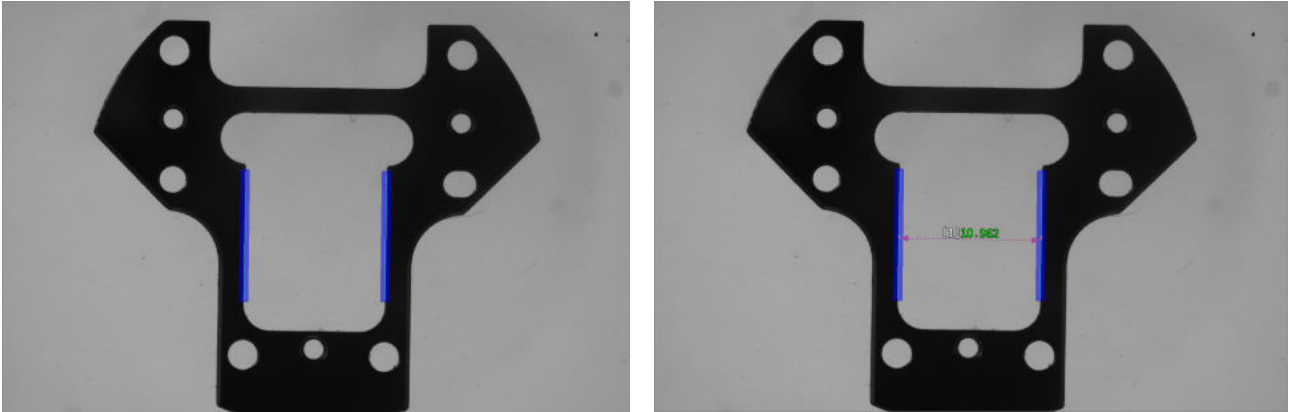
Icon	Name	Elements used in measurement			Description
		Points Line Circle/Arc			
	LN·LN		☐		Measure the distance between two lines.
	LN·PT	☐	☐		Measure the distance between a line and a point.
	PT·PT	☐			Measure the distance between two points.
	CL·CL			☐	Measure the distance between circles / arcs.
	CL·LN		☐	☐	Measure the distance between a circle / arc and a line.
	CL·PT	☐		☐	Measure the distance between a circle /arc and a point.
	radius			☐	Measure the radius of an arc.
	diameter			☐	Measure the diameter of an arc.
	Angle		☐		Measure the angle between two lines.
	Dimen	☐	☐	☐	Automatic calculations based on the type of selected feature
	Profile·PT	☐			Measures the distance between a profile and a point
	PF·PT		☐		Measures the distance between a profile and a line

Chapter 3 Measurement Settings

e.g. Measuring the distance between two lines

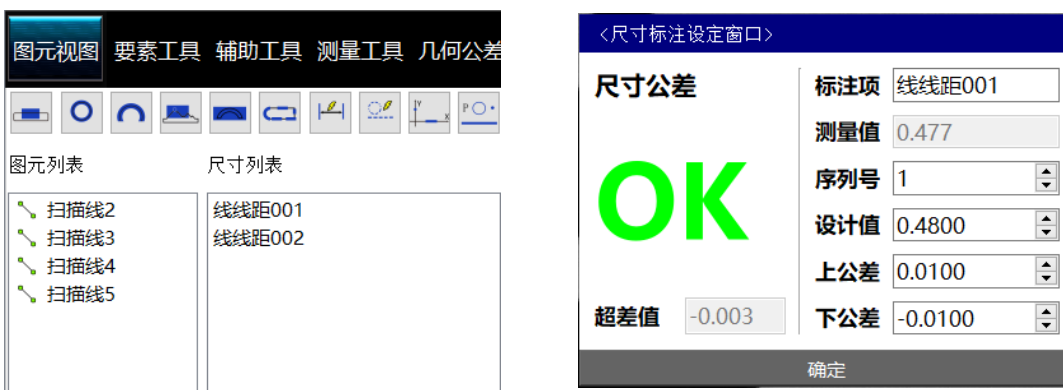
1.First use the element tool to extract the two lines

2.Then use the LN-LN tool or Dimention, select the two lines just marked for measurement.



3.7Tolerance setting

The value displayed in the image display area is the actual measured value of the workpiece. To complete the actual work, you must set the tolerance according to the dimensional value indicated on the design drawing of the workpiece. You can see the dimension list under the graphics panel, here you can set the tolerance of all measured data. Double-click on any item under the dimension list to open the tolerance setting of the corresponding item, and complete the corresponding setting according to the drawing.



After marking, measuring, setting the design value and upper and lower tolerances, save the template and enter continuous measurement for automated measurement.

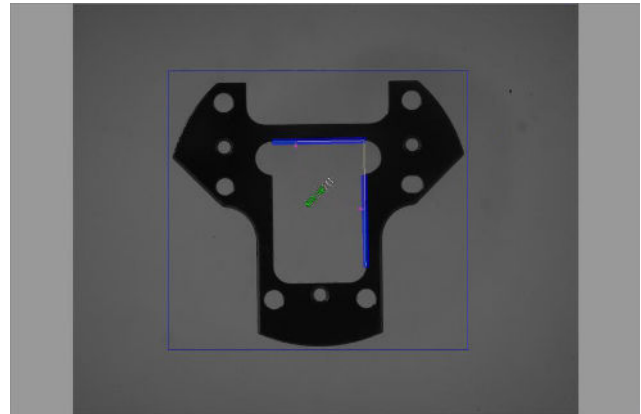
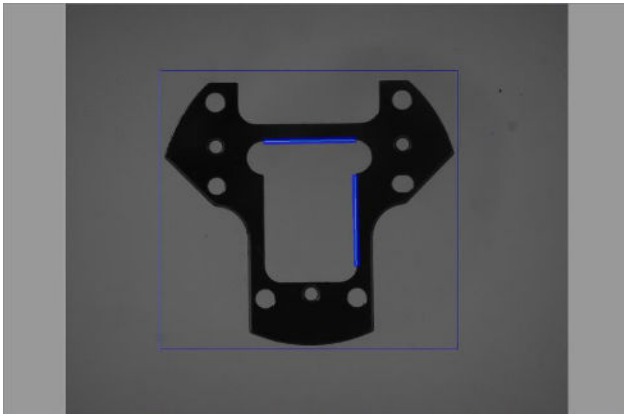
Chapter 3 Measurement Settings

3.8 Example

— . measure whether two lines of a workpiece are perpendicular.

1. First use the element tool mark the two lines.

2. Second, use the angle tool.



From the measured values, you can see that the two lines are perpendicular. Next, set a name for the template and save it. You can then enable continuous measurement and measure other identical parts to see if they are vertical.

3.9 Geometric dimensioning

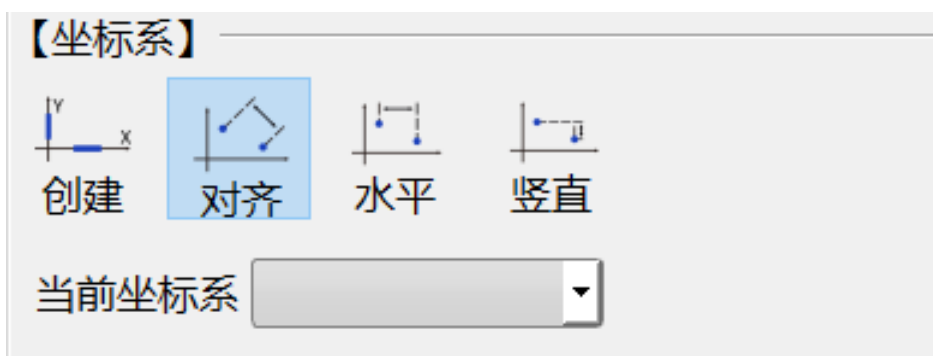
Icon	Name	Description
	Straightness	Measure the straightness of a straight line segment.
	Roundness	Measure the roundness of a circle or an arc.
	Profile	Measure the profile of the specified target range.
	Base	Choose a line as base line.
	Perpendicularity	Measure the perpendicularity of a specified straight line segment to the reference line.
	Parallelism	Measure the parallelism of a specified straight line segment to the reference line.
	Position	Measure the position tolerance of a specified point.
	Concentricity	Measure the concentricity between two circles or arcs.

Chapter 3 Measurement Settings

3.10 Coordinates

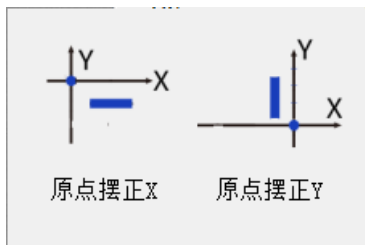
Software is equipped with a function for setting the reference coordinates. Software detects the straight line (or point) that is the reference axis of the target in order to determine the reference coordinates.

Setting the reference coordinates in advance enables the measurement of distance in the X-axis and Y-axis directions.



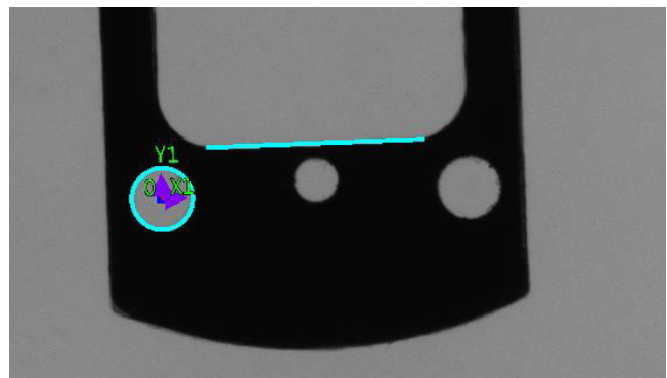
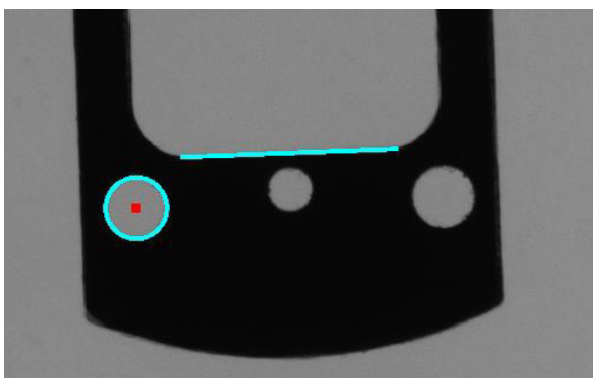
Steps

1: click create button select the origin X or Y



1. choose a origin.

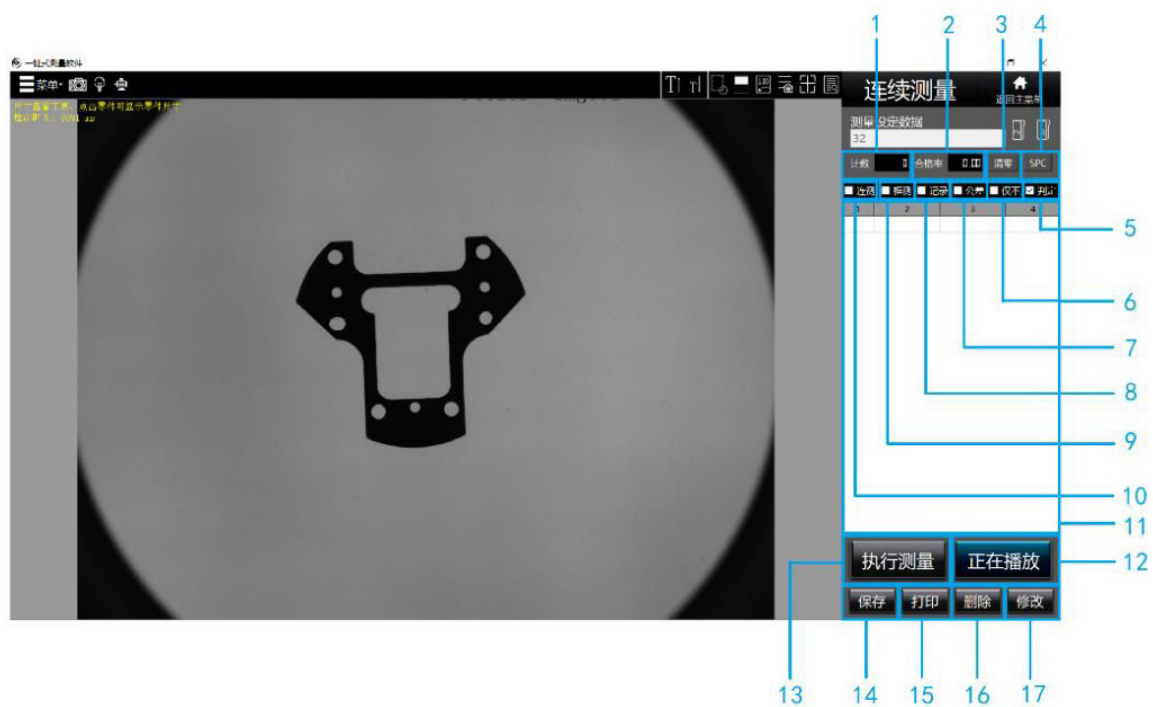
2. select a base line.



Chapter 4 Continuous Measurement

The previous chapter introduced how to set the measurement template. Now you can use the template to perform continuous measurement to achieve automatic measurement or even real-time automatic measurement. Next, the functions included in continuous measurement will be introduced.

overview



1.Count display box:Display the number of recorded data

2.Pass rate display box:Show pass rate

3.Count clear button:Count display box is reset to zero

4.SPC data analysis button:Perform SPC Data Analysis

5.Show switching options:Switch OK / NG display or display specific values

6.List display switching options:List display style changes

7.No option only:Show only failed parts

8.Recording options:When checked, a measurement value will be recorded for report printing

Chapter 4 Continuous Measurement

9.limit area option:Draw a polygon in the image display area. Only the workpiece in the polygon area will be detected.

10.Continuous measurement options:Automatically perform continuous measurement after checked

11.Show list:Display data for each workpiece

12.Status Display

13.Execute measurement button:Perform a measurement

14 Save report button:Export saved data to excel sheet

15.Print button:Print report

16.Delete button:Delete this measurement data

17.Edit button:Return to measurement setting interface

4.1 Introduction



Open templatebutton

function:Open template.

Steps:

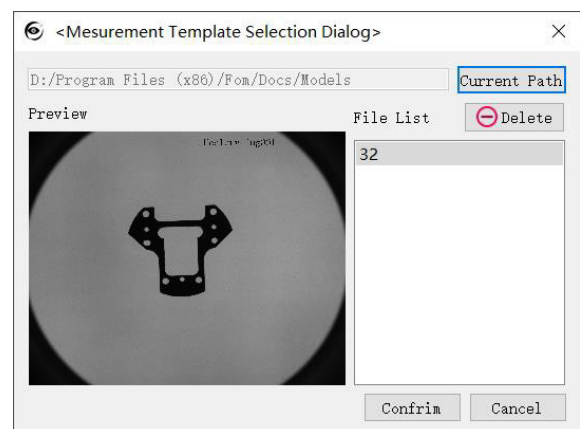
Step 1:click  button,pop up the template selection dialog.

Step 2:Select the template you want to open and click OK

Note

Template path: Specify the path where the template is stored Delete: Delete the selected template

Multi-tasking editing:



Chapter 4 Continuous Measurement



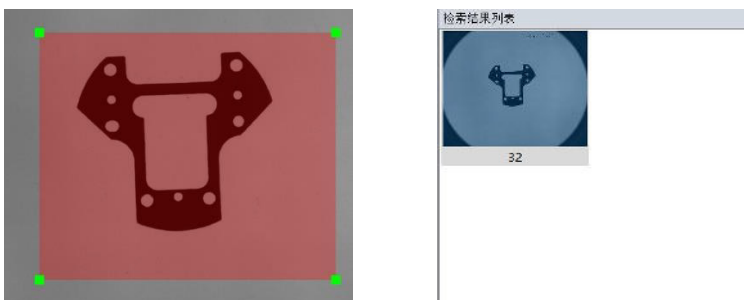
Quick template search button

description: Adjust the search box in the image area to completely surround the workpiece. The search list box lists the most similar results in the template library. Double-click a measurement template to confirm.

Steps:

Step 1: Adjust the search box in the image area by dragging the green handle to completely surround the workpiece

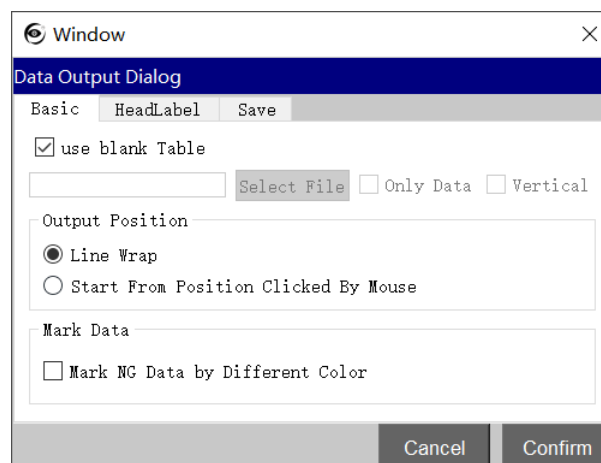
Step 2: Select the appropriate template in the display area on the right.



Save Excel button



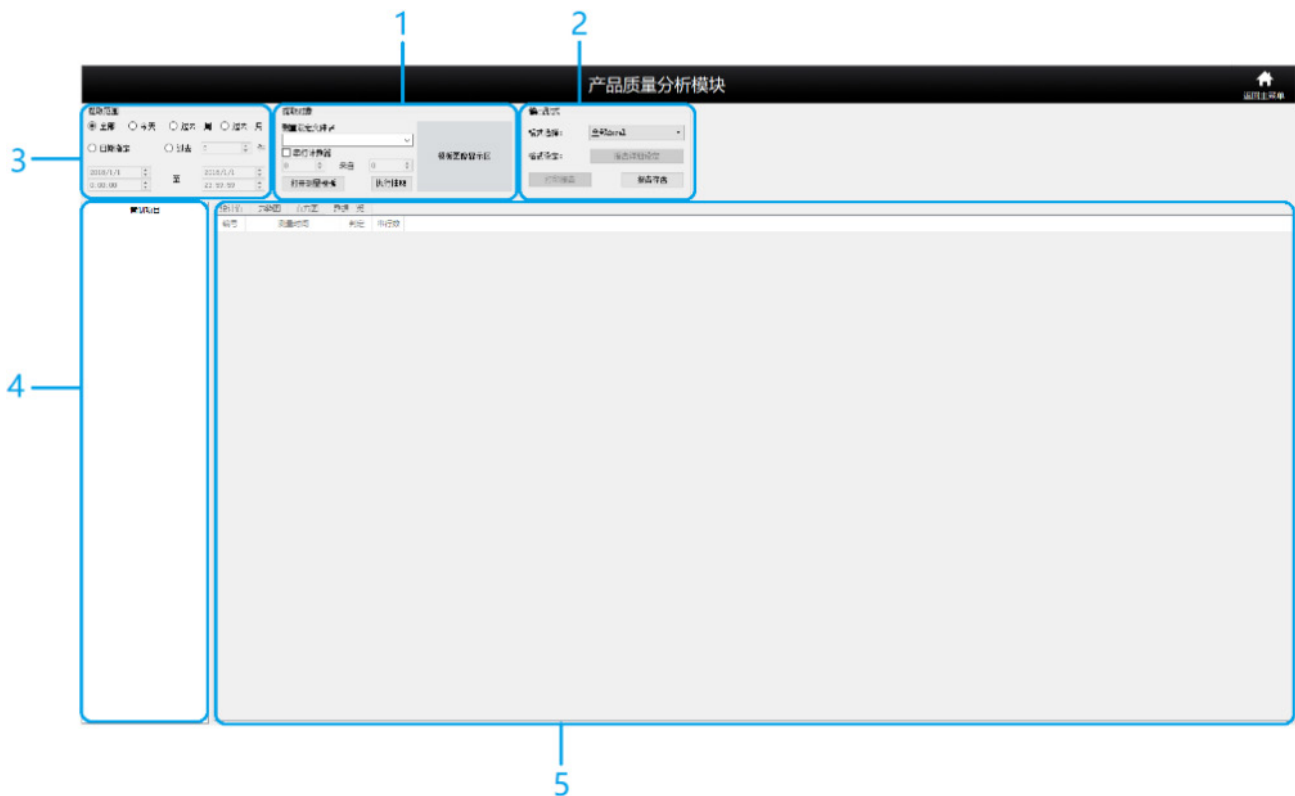
description: save excel in the specified format



Chapter 5 Statistical Analysis

After the measurement is complete, you can view the data using statistical analysis. Provide built-in data analysis tools to help users complete tasks better.

Overview



1.Extract template:select the specific template

2.Report storage format:Choose how the report is stored

3.Extraction range:Specify the extraction range, you can specify the date or quantity

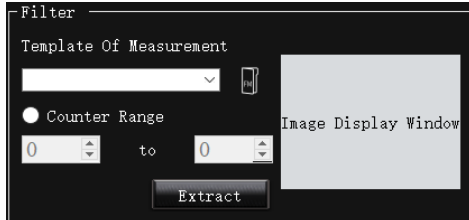
4.Control Item Display Bar:Display items

5Data display panel:Displaying data differently

Chapter 5 Statistical Analysis

5.1 introduction

5.1.1 Extracting data

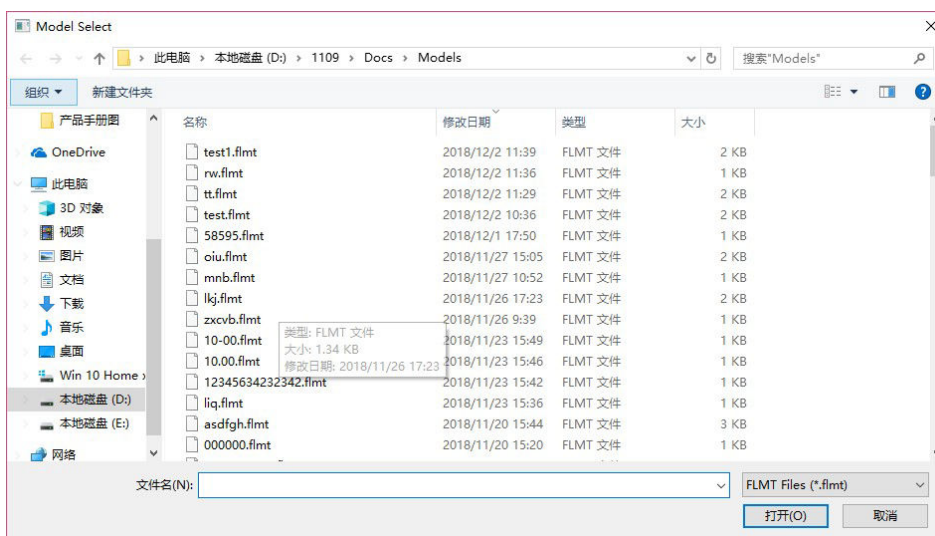


description: Extract the measurement results of the specified template.

Steps:

Step1: Click 打开测量模板 button.

Step2: Select the measurement template in the pop-up dialog.



After the extraction is completed, the template image is displayed in the template image display area of the extraction object.



Chapter 5 Statistical Analysis

1. Click **执行抽取** button, to see the completed measurement results.

管制项目	统计值	趋势图	直方图	数据一览		
	编号	测量时间	判定	串行数	线线距001	
线线距001	1	2018/12/03 15:35:26	OK	1	10.960	
	2	2018/12/03 15:35:31	OK	2	10.960	
	3	2018/12/03 15:35:33	OK	3	10.956	
	4	2018/12/03 15:35:35	OK	4	10.954	
	5	2018/12/03 15:35:37	NG	5	11.066	
	6	2018/12/03 15:35:41	NG	6	11.065	
	7	2018/12/03 15:35:44	OK	7	10.959	

You can check the serial counter option to specify the extraction range.

来自

The previous value specifies the starting value, and the latter value specifies the end.

e.g. extract the measurement data of serial range 3-6.

统计值	趋势图	直方图	数据一览		
编号	测量时间	判定	串行数	线线距001	
1	2018/12/03 15:35:33	OK	3	10.956	
2	2018/12/03 15:35:35	OK	4	10.954	
3	2018/12/03 15:35:37	NG	5	11.066	
4	2018/12/03 15:35:41	NG	6	11.065	

5.1.2 Extraction range setting

提取范围

☒ 全部 ☐ 今天 ☐ 过去一周 ☐ 过去一月

☐ 日期指定 ☐ 过去 件

至

至

Description: Extraction range of the specified date.

Chapter 5 Statistical Analysis

5.1.3 Output form



description: Export report to Excel.

5.2 Data charts and tables

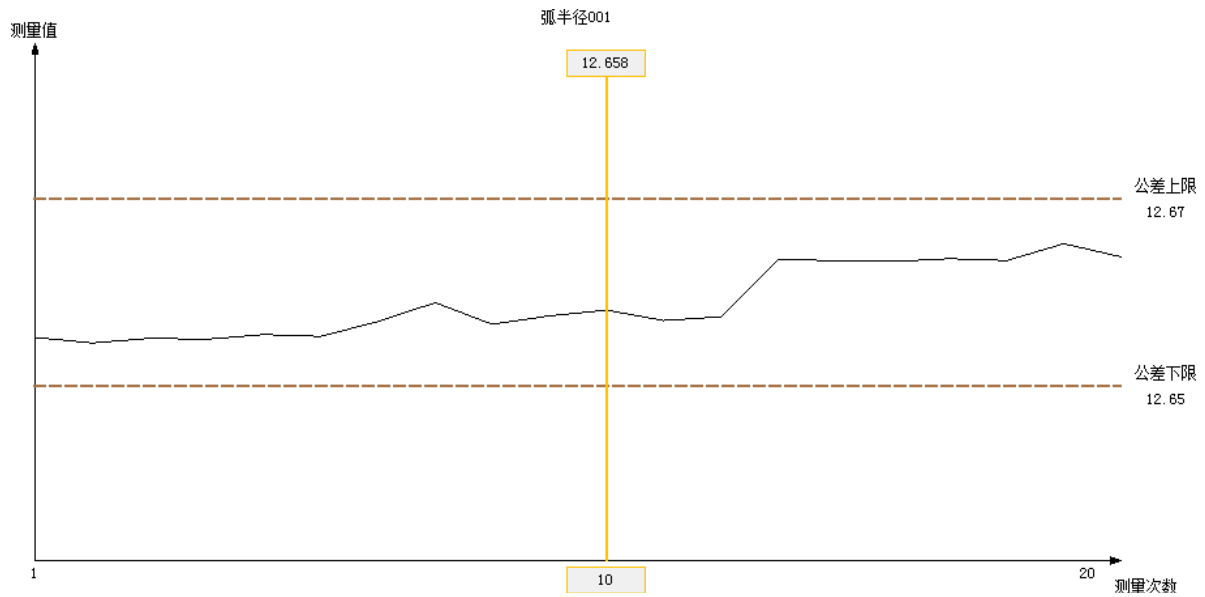
Different ways of displaying data.

5.2.1 Statistics

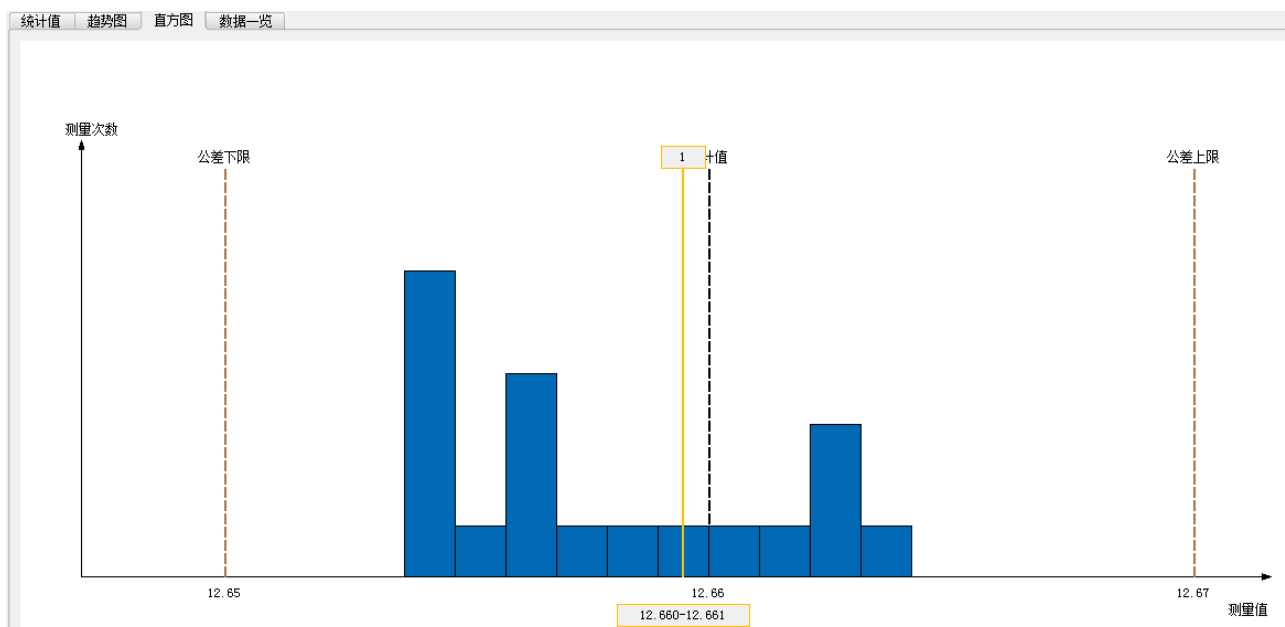
项目名	结果
数据数量	20
有效测量数	20
无效测量数	0
OK数	20
NG数	0
NG率	0.000
设计值	12.66
上限规格值	12.670
下限规格值	12.650
最大值	12.665
最小值	12.655
平均值	12.659
范围	0.011
6 σ	0.022
4 σ	0.015
3 σ	0.011
σ	0.004
CP	0.906
CPK	1.000

Chapter 5 Statistical Analysis

5.2.2 Trend Graph



5.2.3 Histogram



Chapter 5 Statistical Analysis

5.2.4 Data List

编号	测量时间	判定	串行数	线线距003
1	2018/11/27 11:33:56	OK	2	10.960
2	2018/11/27 11:33:56	OK	3	10.959
3	2018/11/27 11:33:56	OK	4	10.959
4	2018/11/27 11:33:56	OK	5	10.959
5	2018/11/27 11:33:57	OK	6	10.959
6	2018/11/27 11:33:57	OK	7	10.959
7	2018/11/27 11:33:57	OK	8	10.960
8	2018/11/27 11:33:57	OK	9	10.960
9	2018/11/27 11:33:58	OK	10	10.962
10	2018/11/27 11:33:58	OK	11	10.962
11	2018/11/27 11:33:58	OK	12	10.962
12	2018/11/27 11:33:58	OK	13	10.962
13	2018/11/27 11:33:58	OK	14	10.962
14	2018/11/27 11:33:58	OK	15	10.962
15	2018/11/27 11:33:58	OK	16	10.962
16	2018/11/27 11:33:58	OK	17	10.962
17	2018/11/27 11:33:59	OK	18	10.962
18	2018/11/27 11:33:59	OK	19	10.962
19	2018/11/27 11:33:59	OK	20	10.962
20	2018/11/27 11:33:59	OK	21	10.962
21	2018/11/27 11:33:59	OK	22	10.962
22	2018/11/27 11:33:59	OK	23	10.962
23	2018/11/27 11:33:59	OK	24	10.962
24	2018/11/27 11:34:00	OK	25	10.962
25	2018/11/27 11:34:00	OK	26	10.962
26	2018/11/27 11:34:00	OK	27	10.962
27	2018/11/27 11:34:00	OK	28	10.961
28	2018/11/27 11:34:00	OK	29	10.961
29	2018/11/27 11:34:00	OK	30	10.961
30	2018/11/27 11:34:00	OK	31	10.961
31	2018/11/27 11:34:00	OK	32	10.962
32	2018/11/27 11:34:00	OK	33	10.962
33	2018/11/27 11:34:01	OK	34	10.962
34	2018/11/27 11:34:01	OK	35	10.962
35	2018/11/27 11:34:01	NG	36	0.000
36	2018/11/27 11:34:01	NG	37	0.000
37	2018/11/27 11:34:01	OK	38	10.962
38	2018/11/27 11:34:01	OK	39	10.962
39	2018/11/27 11:34:01	OK	40	10.962

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