

QUICK MEASUREMENT SYSTEMS INSTRUCTION MANUAL



Safety Instruction

In order to give full play to the maximum performance of this product, pls read this manual carefully before use.

After reading this manual, you should keep it properly for easy access at any time.

Symbol

The following symbols are important information in this manual.

Please be sure to read it carefully.



Danger

Indicates that the failure to comply with this precaution will result in casualties.



Warning

Indicates that the failure to comply with this precaution may result in casualties.



Cautions

Indicates that the failure to comply with this precaution may result in minor or moderate injury to the person.



Notice

Indicates that the failure to comply with this precaution may result in damage to the product and loss of property.

Cautions

- (1) Without permission shall not be reproduced in part or all of the contents of this manual.
- (2) Any changes to this manual will be made without notice, please note.
- (3) The contents of this manual are made with the aim of being accurate. However, if you find any unclear, ambiguous or wrong contents, please contact our after-sales staff.

For your safe use

General notes



Warning

- ☒ Do not use this product for the purpose of protecting the human body or a part of the human body.
- ☒ Please do not use this product in non-explosion-proof area.



Cautions

- ☒ Be sure to confirm if the functionality and performance of the QMS series are normal during startup or operation.
- ☒ If the device does not work properly, take adequate safety measures to prevent possible personal injury or equipment damage.



Notice

- ☒ Do not modify the device or use it in a way other than the instructions. For such situations, its function and performance are not guaranteed.
- ☒ The functionality and performance of the device may degrade when used in combination with other instruments, depends on operating conditions and the surrounding environments.

Trademark

The company name and product name used in this manual are the registered name or trademark of the company.

Cautions for LED products



Warning

- ☒ Controls and adjustments that follow steps other than those specified herein will result in the scattering of dangerous LED light sources.
- ☒ As it may cause injury to human body (skin, eyes, etc.), please follow the following instructions.
- ☒ Do not disassemble this product for non-professionals.
- ☒ Do not stare at LED light or mirror reflected light.

Important notes

Please observe the following precautions to prevent QMS from malfunction and ensure that it is used correctly.

Cautions for use



Warning

- ☒ Before connecting the IPC to the device wires or repairing it, be sure to cut off the power of QMS, otherwise electric shock may occur.
- ☒ Please do not force bending the AC power wire or place heavy objects on the wire, otherwise the power wire may be damaged, resulting in fire or electric shock. Do not use the damaged power wire.
- ☒ Please do not let foreign objects to fall into QMS, as this may result in fire, electric shock, malfunction or accident.
- ☒ Please do not remove the shell cover. This is very dangerous and may cause electric shock or human injury by touching the inside.
- ☒ If need to change power cord, the cords must comply with QMS standards.
- ☒ Pls do not disassemble and modify the device, otherwise it may cause fire or electric shock.



Cautions

- ☒ Do not put your hand between the platform and the main machine to avoid being pinched.
- ☒ Do not put your hand between the platform and the variable lighting device to avoid being pinched.
- ☒ Do not put your hand between the main machine and the variable lighting device to avoid being pinched.
- ☒ During use, if the surface temperature of the variable lighting device is high, do not touch the variable lighting device, otherwise it may be scalded.
- ☒ When transporting the measuring head components, disconnect the power cable from the main power supply, pull the base and hold the rear handle, otherwise the QMS may fall and injured people. In addition, handling the measuring head by catching other parts may damage the QMS.



Notice

- ☒ Use QMS at the correct power supply voltage, otherwise the product may be damaged.
- ☒ If QMS has any dirt, please wipe it with lens paper or dry cotton cloth, and use lens cleaner as appropriated if necessary. Do not use diluents or organic solvents to wipe the device.
- ☒ Do not place any objects on the QMS, otherwise it may damage the device.
- ☒ Do not tread on the QMS, or it may damage the device.
- ☒ Be sure to cut off the main power supply before connecting or disconnecting the AC power cable, otherwise it may damage the device.
- ☒ QMS using precise optical components, be sure to make them far away from vibration or infusion, otherwise they may damage the device.
- ☒ Do not remove the shell cover or modify the device.
- ☒ Do not place objects over 5KG on the platform of QMS, otherwise it may damage the device.
- ☒ Do not place the measure object outside the glass of the platform of QMS, otherwise it may damage the device.
- ☒ Do not turn off the power during measurement. Some or all of the setting may be lost. Therefore, when the power is turned off. Be sure to turn off the measurement software first.
- ☒ Keep the ambient temperature constant during measurement.

Measures to be taken when an exception occurs



Warning

When the following abnormalities occur, please immediately cut off the main power supply and remove the AC 220V power wire from the main power input connector. Using QMS under abnormal conditions may result in fire, electric shock or malfunction. Please contact our after-sales staff for maintenance.

- ☒ If water or debris gets into QMS.
- ☒ If the QMS falls off or the casing is damaged.
- ☒ If QMS produces unusual smoke or odor.

PS: The data stored on the hard disk cannot be guaranteed intact during maintenance. Please backup the data before QMS is sent for repair.

Safety cautions for installation



Warning

When installing the QMS device, please connect the protective grounding terminal of the power wire to the protective grounding conductor of the installation site, otherwise electric shock or product damage may be caused.



Notice

- ☒ Install QMS on horizontal surface. Do not install the device on the bevel, or it may damage the device.
 - ☒ Do not block the vents and exhaust fans of the QMS. Blocking the vents or fans may cause heat to build up inside the QMS, which may damage the device.
- Avoid installing QMS in the following locations. Otherwise, the product may be damaged.
- ☒ Where directly affected by vibrations or mechanical impact.
 - ☒ Where the temperature changes.
 - ☒ Where ambient temperature beyond the +10 ~ 35°C range
 - ☒ Where ambient humidity beyond 20% ~ 80%RH (no condensation).
 - ☒ Where QMS will receive direct blows from air conditioners, fans, etc.
 - ☒ Where the presence of an active flammable material or corrosive gas.
 - ☒ Where there is a lot of dust, salt, iron or soot.
 - ☒ Where a splash of water, oil or chemicals.
 - ☒ Where a strong magnetic field or electric field is generated.
 - ☒ Where the power supply voltage fluctuates widely.

Cautions for transportation



Notice

- ☒ Be sure to cut off the main power supply.
- ☒ QMS using precise optical components, be sure to make them far away from vibration or infusion, otherwise they may damage the device.
- ☒ During transportation, be sure to use the INSIZE packaging material to keep the packaging in the same condition as when it was shipped, otherwise it may damage the device.

INSIZE

Software license agreement

We will provide "GoldenRoc" when the customer agrees to the following license agreement. Please read the following agreement carefully when using the software

By using this software, the customer agrees to the statement made here and accepts the agreement.

The license agreement

Notes to users: please read this software license agreement (hereinafter referred to as "this agreement") carefully.

By using all or any part of GoldenRoc (hereinafter referred to as the "software"), customer agrees to be bound by all terms and provisions of this agreement. If the customer does not agree to any terms in this agreement, do not use the software.

1. Definition

- 1.1. "Use" or "in use" represents the ability to access, install, download, copy, or profit from the software.
- 1.2. "Software" means the software provided by INSIZE and the related documentation.

2. Permission granted

Subject to customer's compliance with all terms and conditions of this agreement, INSIZE grants customer a non-proprietary and non-transferable license to install the software and use the INSIZE products on all company computers. Customers can only copy one copy of the software for backup and archive.

3. Limitation

- 3.1. Customer shall not modify the software or add any functions to the software, except to install the updated or new functions provided by INSIZE.
- 3.2. The customer shall not perform reverse engineering, reverse compile or reverse assemble the software.
- 3.3. Customers shall not create derivative works based on the software
- 3.4. Unless specifically specified by INSIZE, user may not resell, transfer, lease or redistribute the software to a third party.

4. Intellectual property rights

Unless otherwise specified, all rights, ownership and interest in the software, and all related Copyrights, trademarks and other intellectual property rights are owned by INSIZE.

5. Disclaimer

INSIZE grants this software license to the customer as is without warranty of any kind. INSIZE or its suppliers are not responsible for any damages, compensation, expenses or any loss of profits caused by the use of the software by the customer.

6. Termination of the agreement

- 6.1. If the customer has any copy of the software after destroying the software, or voluntarily returns the software to us, the license of this agreement will automatically terminate.
- 6.2. In the event that the customer fails to comply with any of the terms and conditions of this agreement, this license will automatically terminate without prior notice to INSIZE. Upon termination of the agreement, the customer shall stop using the software and destroy all copies of the software held or controlled by the customer.
- 6.3. The customer shall indemnify for INSIZE expenses or any loss of profits caused by the customer's violation or failure to comply with any of the terms of this agreement.

7. Governing law

- 7.1. This agreement shall be governed by the laws of the People's Republic of China.
- 7.2. If any part of this agreement is found to be invalid or unenforceable, it shall not affect the validity of the remainder of this agreement, which shall remain valid and enforceable in accordance with its terms and provisions.
- 7.3. We reserve the right of final interpretation of this agreement.

Begin

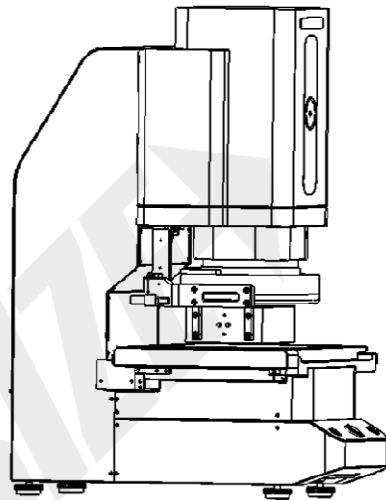
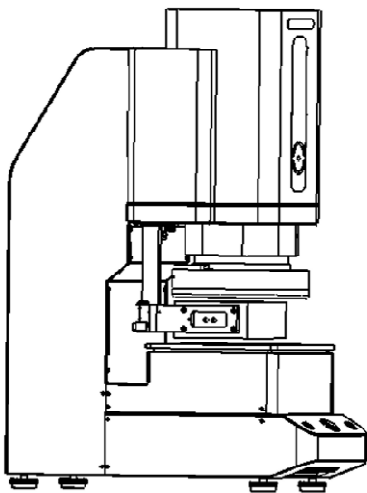
Check packaging

Packing parts list

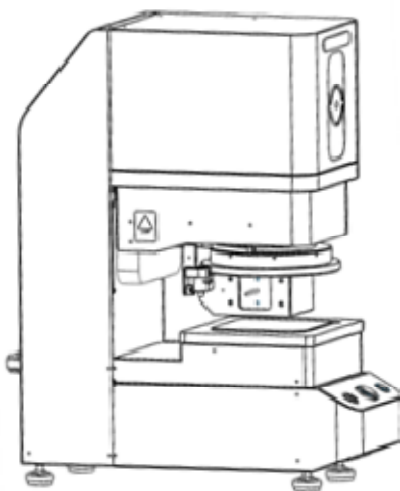
Take QMS from the package and check the package for the following

We had checked every package before ship. But if any parts are missing or damaged, please contact our after-sales staff.

QMS-A315(Measuring machine)



QMS-A110(Measuring machine)

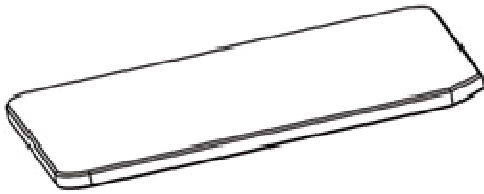


QMS series IPC/ Display



Annex

Platform glass



Wired mouse keyboard ----- 1

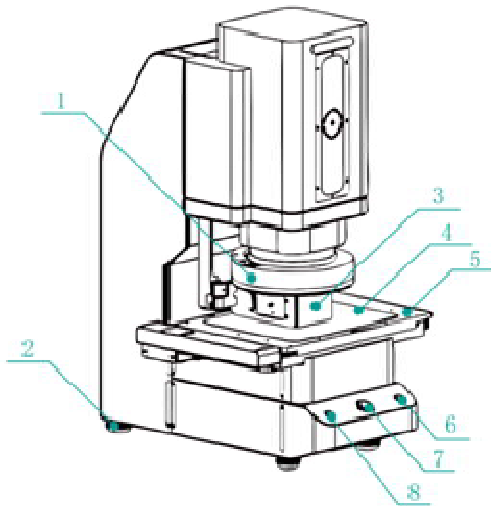


System Configuratio

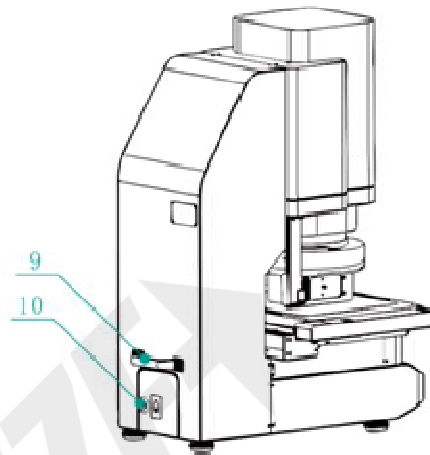
Part name

Measuring machine (QMS-A315)

Front

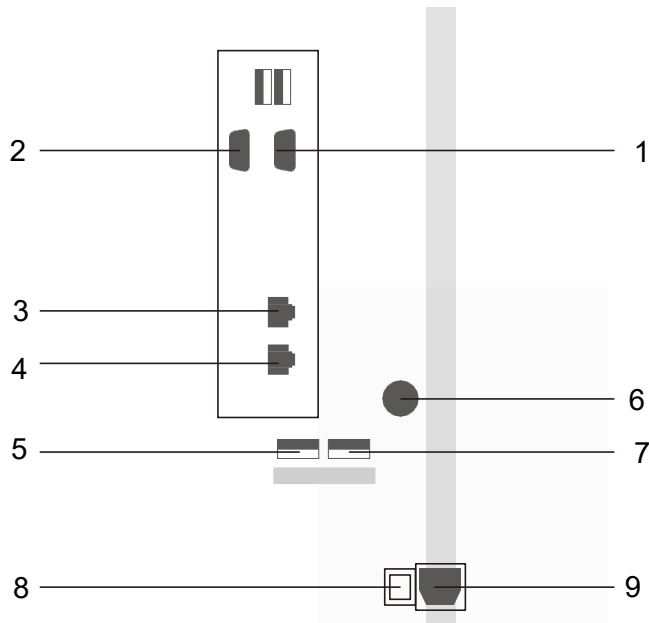


Rear



- 1 Ring lighting--irradiating the illumination of the measuring object from above.
- 2 Regulator--adjust the height of the measuring machine.
- 3 Coaxial optical device (optional)--illumination device for performing depth measurement.
- 4 Platform glass--used to place parts to be measured.
- 5 Carrier platform--used to place platform glass.
- 6 Print button--used to perform printing.
- 7 Measure button--used to start measuring.
- 8 Power button--turn on the power of the controller and measuring machine.
- 9 Handle--used to handling measuring machines.
- 10 Hole outlet--used to lead the device power cable, network cable, etc.

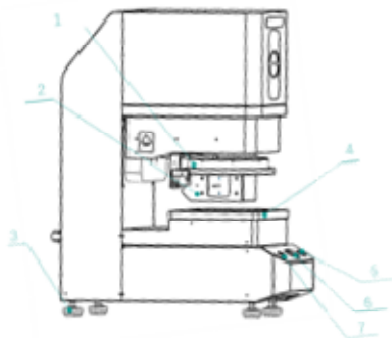
IPC(QMS-A315)



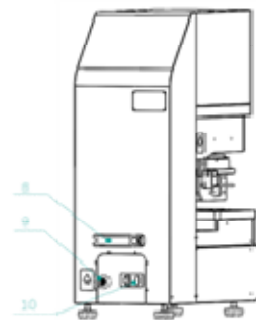
- 1 COM1 Stepperdriveconnector--used to connect stepper drive cables
- 2 Display VGA connector--used to connect the external monitor cable of the measuring machine
- 3 Control board interface-192.168.1.104--used to connect control board cables.
- 4 Extend external network--used to connect an extended external network cable.
- 5 Wide field camera interface--used to connect Wide-field camera of the measuring machine.
- 6 Measuring machine power supply port--used to connect power cord of the measuring machine.
- 7 Small field camera interface--used to connect small filed camera cables of the measuring machine.
- 8 Main power switch--used to switch the main power on and off. The power button of the measuring machine cannot be used when the main power is turned off.
- 9 AC power input connector--used to connect AC power cord.

Measuring machine (QMS-A110)

Front

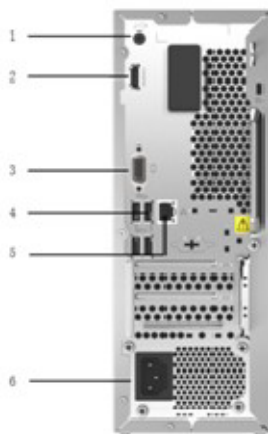


Rear



- 1 Ring lighting--irradiating the illumination of the measuring object from above
- 2 Coaxial optical device (optional)--illumination device for performing depth measurement.
- 3 Regulator--adjust the height of the measuring machine.
- 4 Platform glass--used to place parts to be measured.
- 5 Print button--used to perform printing.
- 6 Measure button--used to start measuring.
- 7 Power button--turn on the power of the controller and measuring machine.
- 8 Handle--used to handling measuring machines
- 9 Hole outlet--used to lead the device power cable, network cable, etc.
- 10 Power plug and switch- used to plug the power cord and power on the device.

IPC(QMS-A110)



- 1 Earphone jack—used to connect audio device.
- 2 HDMI interface – used to connect hanging display.
- 3 VGA interface—used to connect the desktop display.
- 4 USB2.0 interface – used to connect the mouse and keyboard.
- 5 LAN cable interface—used to connect the external network.
- 6 Power interface--used to connect the power supply.

Installation Environment

Before installation

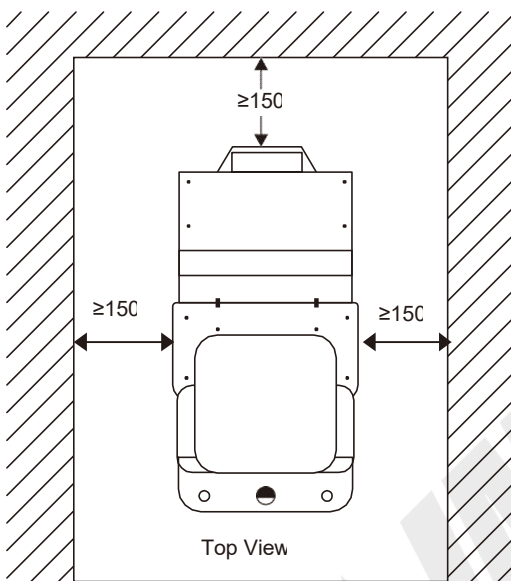
The installation environment should meet the following conditions:

Temperature	10°C~35°C
Humidity	20%~80%RH(No condensation)

Measuring machine installation site

Install the measuring machine in a place that satisfies the following conditions

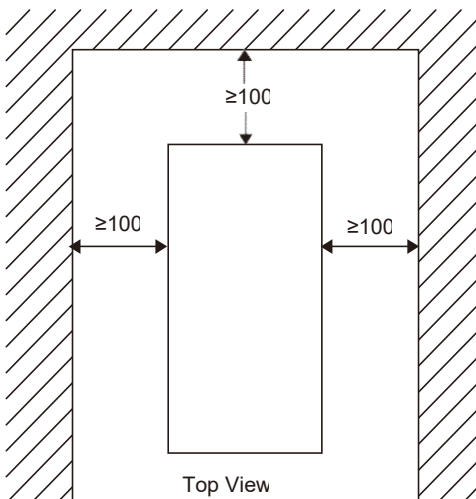
- A horizontal plane without vibration
- At least 150mm from the wall



Controller installation site

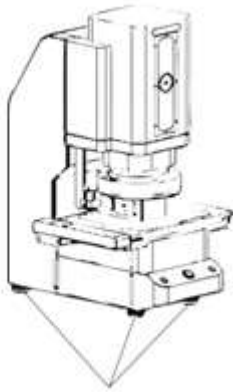
Install controller in a place that satisfies the following conditions

- A horizontal plane without vibration
- At least 100mm from the wall

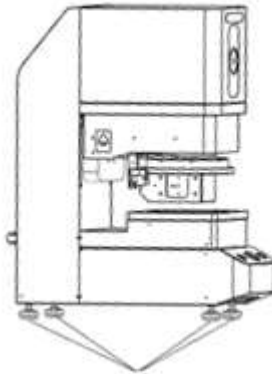


Using the regulator

Please use the 4 regulators under the measuring machine to adjust the height so that the measuring m not shake.



QMS-A315



QMS-A110

← IN SIZE →

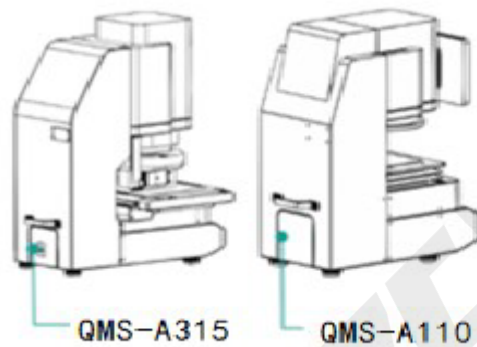
Equipment installation

Preparation and connection of the QMS

Preparation and connection of equipment

Connecting measuring machine and controller

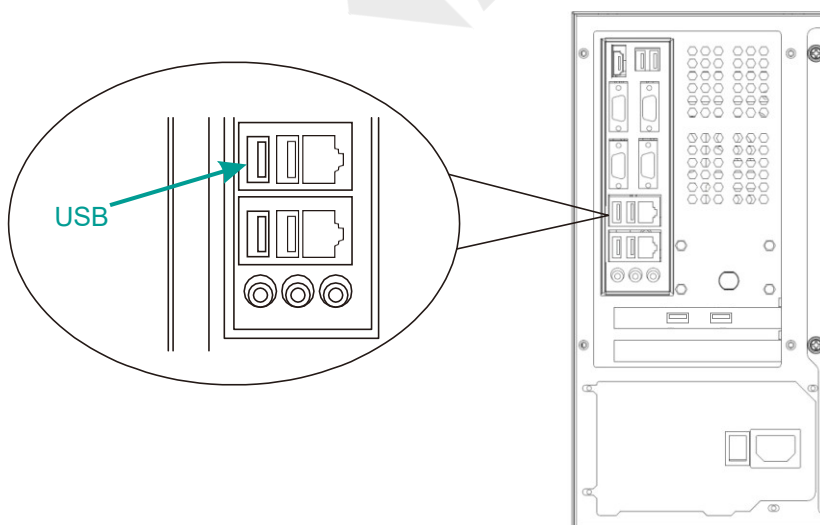
Connecting the measuring machine cable to the controller



1. Connect the display cable to the display VGA connector of the IPC.
2. Connect wide-field camera cable and small field camera cable to the IPC.
3. Connect the power cord to the power supply port of the IPC.

Connect mouse and keyboard

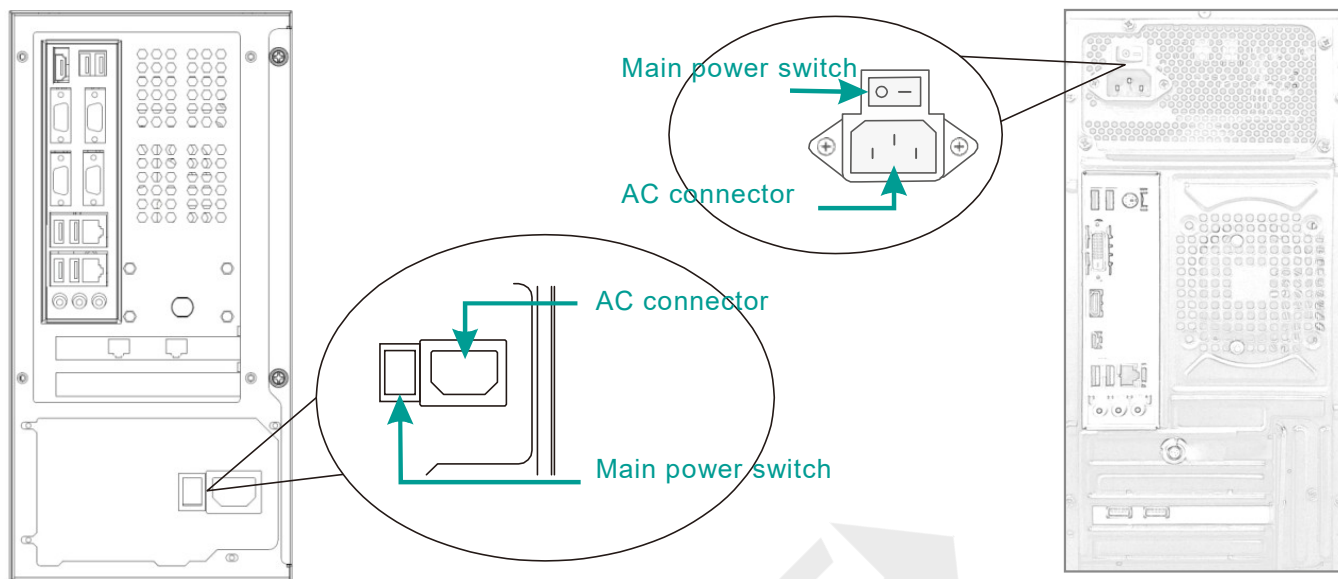
1. Connect the mouse and keyboard to the USB port of the IPC.



Connect the AC power cord

Connect the AC power cord to the IPC

1. Please check if the main power switch on the back of the industrial computer is turned off.



QMS-A315 IPC

QMS-A110 IPC

Cautions



Always turn off the main power switch before connecting or disconnecting the AC power cord.

If the power cord is connected or unplugged while the main power is on, it may cause damage to the device.

2. Connect the AC power cord to the AC power input connector on the back of the IPC.
3. Connect the AC power cord to an AC power source.



When installing this equipment, the voltage used should meet the specifications. Please make sure that the plug and power cord meets the requirements for the location of use. Connect the protective grounding terminal of the power cord to the protective grounding wire of the installation site. Otherwise, it may cause electric shock or damage the device.



Important

If the AC power connector has only two pins, use a three-to-two-plug adapter to connect. In this case, be sure to connect the ground wire

Equipment startup and measurement preparator

Equipment startu

1 Switch on the main power button



2 Turn on the IPC



3 Activate the software

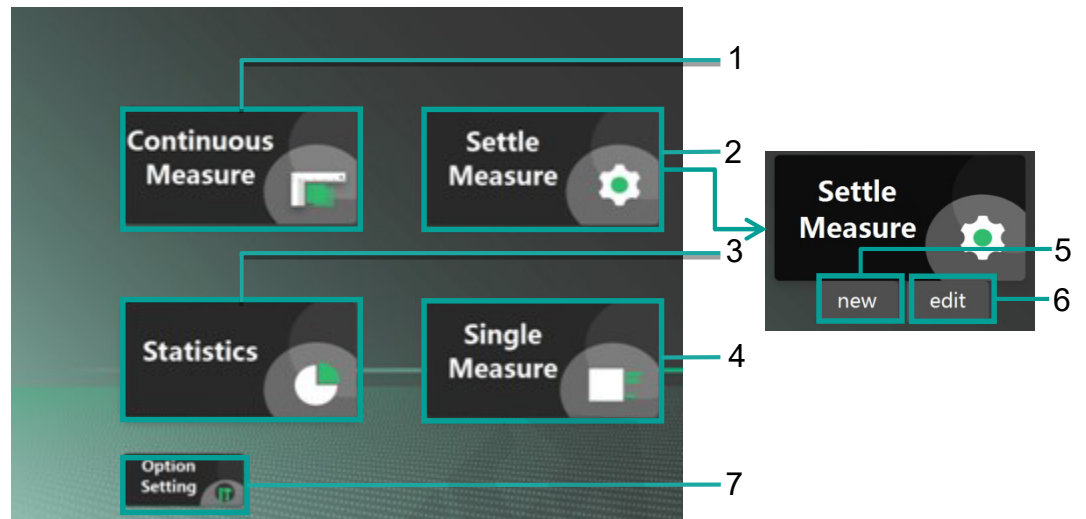
Double click the desktop software icon to activatesoftware.

Placing workpiec

Put the workpiece to be measured in the center of the

Interface Introduction

Main interface introduction



No.	Name	Description
1	Continuous Measure	Click to enter continuous measurement interface
2	Settle Measure	To choose settle measure mode option (New/Edit)
3	Statistics	Click to enter the statistical analysis interface
4	Single Measure	Click to enter the single measurement interface
5	New	Click to enter the new interface in settle measure mode
6	Edit	Click to enter the edit interface in settle measure mode
7	Option Setting	Click to enter the option setting interface

Mode selection

🌿
Mode Selection

1.select camera



Big



Small

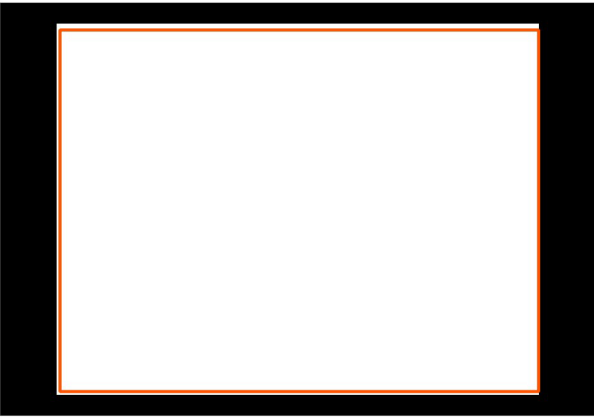
2.set shooting size

Use coaxial light ☐

horizontal 150

vertical 110

Preview of shooting range



Confirm after shoot

cancel

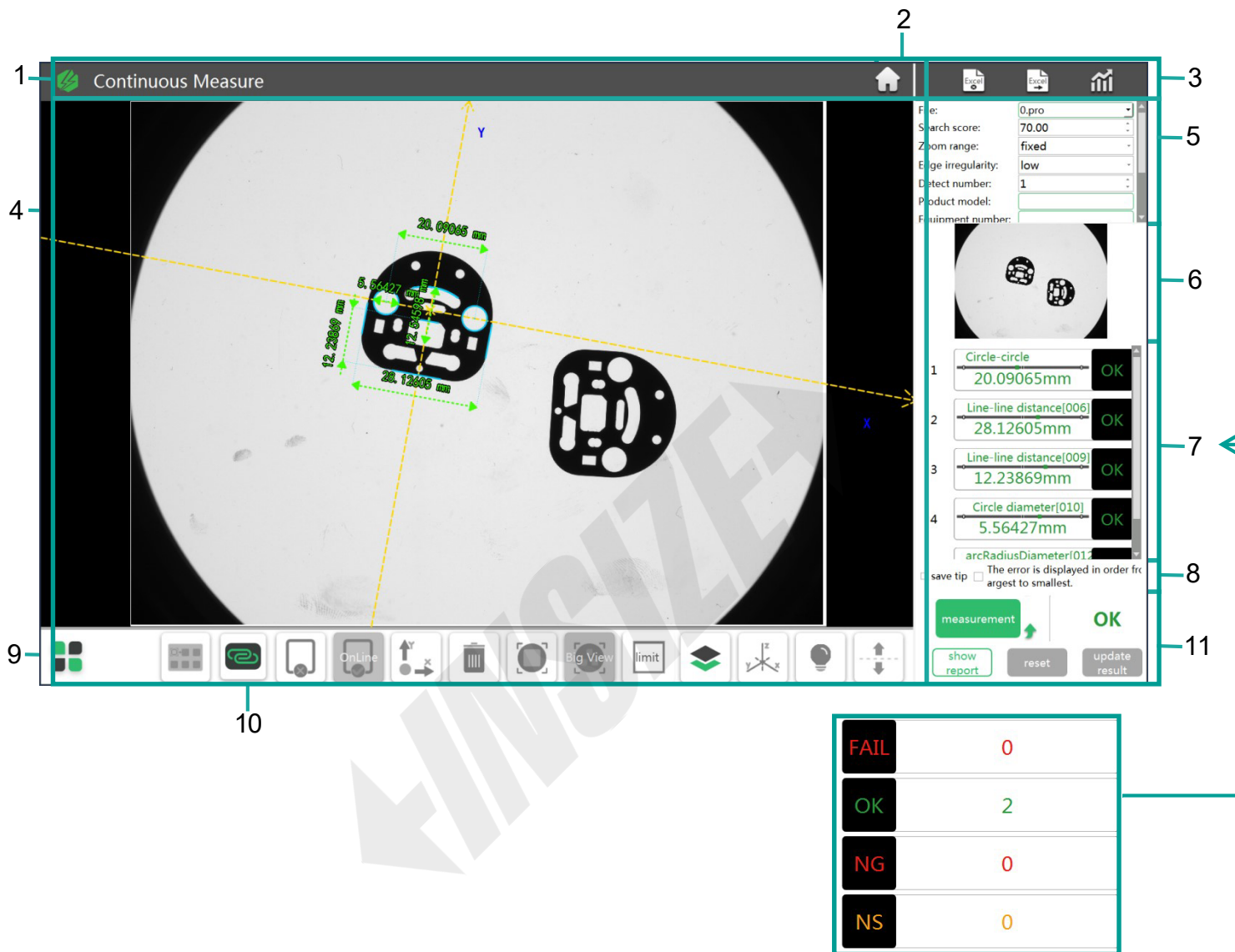
confirm

No.	Name	Description
1	Select camera	There are "big field camera" & "Small field camera" two modes can be chosen.
2	Set shooting size	From Horizontal & Vertical drop-down menu to choose the shooting size.If both choose the minimum data, it will shoot single view. If choose others, it will shoot more views.If choose to use the coaxial light (optional component), the shooting size will change.
3	Preview of Shooting range	If click the preview image, it will splice the maximum measurement range of the shooting machine in this mode, can preview the image in the current selected view, and drag the red frame to adjust the actual measurement position.
4	Cancel	Click Cancel to return back to the main interface.
	Confirm	Click confirm to execute the application for the current settings and proceed to the next step.

PS: QMS-A110only has small field camera.

Name & function of each mode

Continuous measure mode



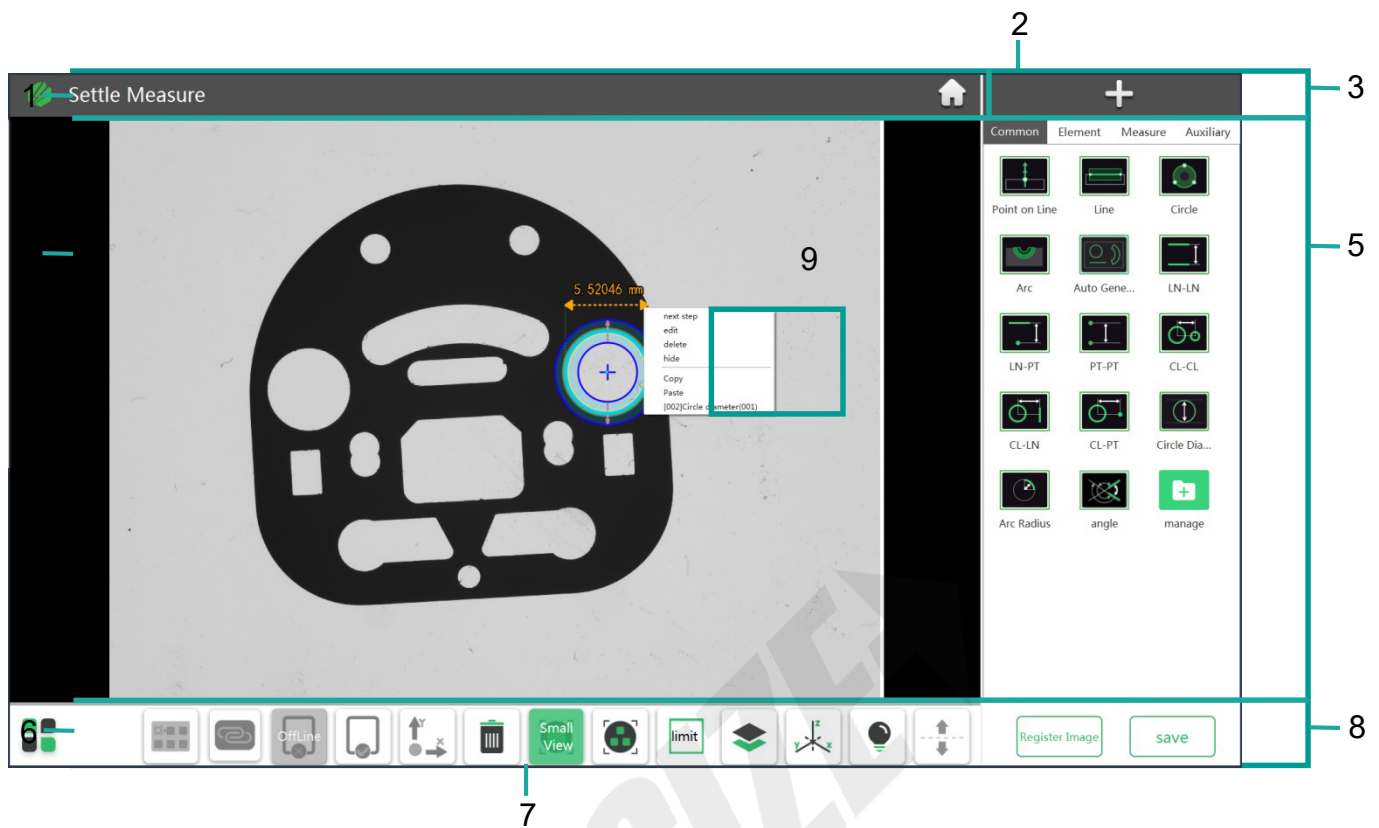
No.	NameDescription	
1	Title	Display software Logo and display current mode name
2	Back to the main interface button	Used to exit continuous measurement mode and back to the main interface
3	Shortcut bar	Cancel export to xls. file
		Clear the measurement information of the current measurement
		Export to xls. file
		Export the measurement information of the current measurement
		Statistical analysis button
		Click to open statistical analysis
4	Measuring camera window	This window displays the image taken by the measurement camera and measurement result
5	Continuous measurement area	File
		You can enter the file name to search the corresponding file and press Enter to open, or click the list box to select to open the project file; the rest shows the name of the opened project file.
		Search score
		Set the image similarity judgment value in template matching
		Zoom range
		Set the scaling degree for the pattern matching setting
		Edge irregularity
		Set the edge irregularity for the pattern matching setting.
		Detect number
		Set the number of workpieces to be tested
		Product model
		Enter the product model No.
		Equipment number
		Enter the equipment number here
		Lot number
		Enter the lot number here
		Counter
		Record the number of detected workpieces, the default is 0. Note: When detecting FAIL, the counter is also incremented by 1
		In charged by
		Record the tester
6	Preview	Display the preview of the current project file
7	Result display	Display the total judgment result after continuous measurement or the measurement result and judgment result of a certain workpiece
8	Save tip	If tick the save tip, it will remind you if need to save the result after measurement.
	The error was displayed from largest to smallest	The result display sequence will follow the error from largest to smallest.
9	Menu button	Click to pull up menu options showing various functions
10	Common toolbar	This bar contains buttons for frequently used functions
11	Public area	Execute measurement Button/Searching button
		Start Execute measurement/ Start Searching and performing measurement (click the Execute measurement right arrow to start measurement)
		Evaluation result display area
		Display the evaluation result after measurement
		Report form
		Show the measurement result as report form
		Reset
		Available while on manual measurement mode, to reset the result back to before manual adjustment
		Updated result
		Available while on manual measurement mode, to updated the result after manual adjustment.

Single measure mode



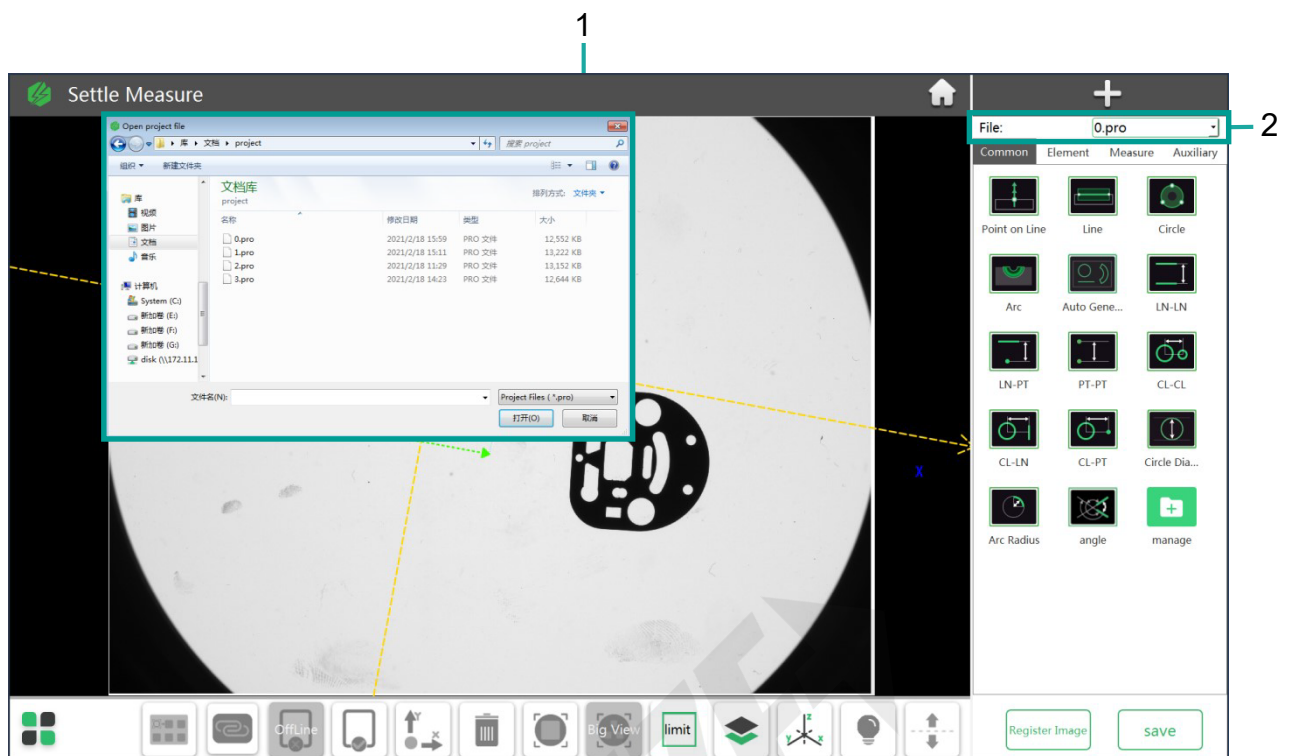
No.	Name		Description
1	Title		Display software Logo and display current mode name
2	Back to the main interface button		Used to exit continuous measurement mode and back to the main interface
3	Shortcut bar	New button	Click to new build a project
		Export to xls. file	Export the measurement information of the current measurement
		Print button	Click to print single part report
4	Measuring camera window		This window displays the image taken by the measurement camera and measurement result
5	Operator panel		Display common operators and all operators icon
6	Menu button		Click to pull up menu options showing various functions
7	Common toolbar		This bar contains buttons for frequently used functions
8	Public area	Execute measurement Button	Start performing measurements
		Evaluation result display area	Display the evaluation result after measurement
9	Right clickmenu	Next step	Copy the last executed operator (retain the attribute set by the last executed operator)
		Edit	Edit the selected test results
		Delete	Delete selected test results
		Name of test result	Display the name of the result detected under the current mouse position (could be multiple), highlight the corresponding result of the selected name

Settle Measure - New



No.	Name		Description
1	Title		Display software Logo and display current mode name
2	Back to the main interface button		Used to exit continuous measurement mode and back to the main interface
3	Shortcut bar	New button	Click to new build a project
4	Measuring camera window		This window displays the image taken by the measurement camera and measurement result
5	Operator panel		Display common operators and all operators icon
6	Menu button		Click to pull up menu options showing various functions
7	Common toolbar		This bar contains buttons for frequently used functions
8	Public area	Register pattern button	Click to select the pattern registration area for template matching in continuous measurement
		Save button	Save current project file
9	Right clickmenu	Next step	Copy the last executed operator (retain the attribute set by the last executed operator)
		Edit	Edit the selected test results
		Delete	Delete selected test results
		Name of test result	Display the name of the result detected under the current mouse position (could be multiple), highlight the corresponding result of the selected name

Settle Measure - Edit

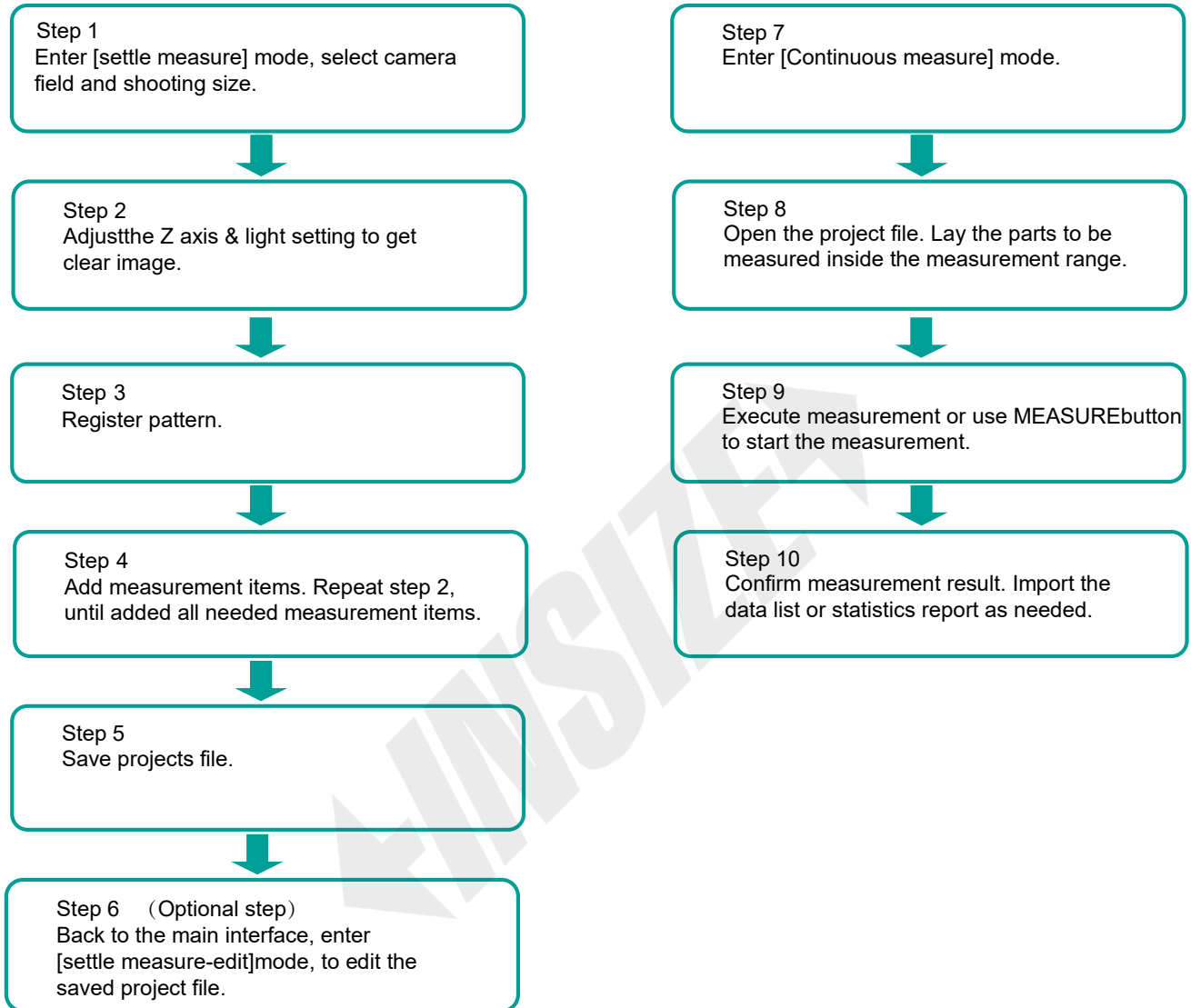


Most of them are the same as the Settle Measure - New interface, only a few modules have changed

No.	Name	Description
1	Open project file popup window	Pop-up automatically when enter edit mode, select the file you want to edit
2	Edit setting	open You can enter the file name to retrieve the corresponding file and press Enter to open, or click the list box to select to open the project file; the rest shows the name of project file that has been opened.

Measurement settings

Measurement setting workflow



Measurement items

List of common measurement elements

This panel is to display the frequently-used operators from detect element, fundamental measurement element & auxiliary elements list.

TAB	Icon	Type	Name	Description
Common operators		/	point on line	detect a point on a selected line
			detect a line	detect a line in a selected area
			detect a circle	detect a circle in a selected area
			detect an arc	detect an arc in a selected area
			automatically generate elements	generate elements in the selected area automatically
			line - line	measure distance between two lines
			line - point	measure distance between a line and a point
			point - point	measure distance between points
			circle - circle	measure distance between circles/arcs
			circle - line	measure distance between a circle/arc and a line
			circle - point	measure distance between a circle and a point
			circle	measure diameter and radius of a selected circle
			Arc	measure radius of a selected arc
			angle	measure angle between two lines
			Management	Pick up the frequently-used operators from all operators on the common operator panel for rapid operation.

List of detection elements

Add operators of points, lines, circles, arcs and other elements

TAB	Icon	Type	Name	Description
Elements		Point	point on line	detect a point on a selected line
			point on the arc	detect a point on the selected arc
			point inside the circle	detect a point in the selected circle
			draw a point	draw a point manually
		maximum point minimum point	inside the rectangle	detect a maximum or minimum point in a rectangle
			inside the ring	detect a maximum or minimum point in a circle
			inside the arc ring	detect a maximum or minimum point in an arc
		Line	detect a line	detect a line in a selected area
			peak line	a line to detect the crest & trough of the selected
			click to detect a line	click once to select a line
			draw a line	draw a line manually
		Circle, arc	detect a circle	detect a circle in a selected area
			detect multiple circles	detect multiple circles in a selected area
			peak circle	a circle to detect the crest & trough of the selected
			draw a circle	draw a circle manually
			click to detect a circle	click once to select a circle
			detect an arc	detect an arc in a selected area
			peak arc	an arc to detect the crest & trough of the selected
			draw an arc	draw an arc manually
			oval	detect an oval in a selected area
		Others	click to detect a rectangle	click once to select a rectangle
			automatically generate elements	generate elements in the selected area automatically
			contour extract	extract contours of a selected element
			curve extract	curve fitting
			register	register an area, can set detection elements based on the

List of fundamental measurement

The operators used for measurement include distance measurement, angle measurement, geometric tolerance measurement, operational measurement and special measurement.

TAB	Icon	Type	Name	Description
Measure		Distance measurement	straight distance	measure the straight distance between two elements
			distance in X direction	measure distance between two elements in X direction
			distance in Y direction	measure distance between two elements in Y direction
			line - line	measure distance between two lines
			line - point	measure distance between a line and a point
			point - point	measure distance between points
			circle - circle	measure distance between circles/ arcs
			circle - line	measure distance between a circle/arc and a line
			circle - point	measure distance between a circle and a point
			circle	measure diameter and radius of a selected circle
			Arc	measure radius of a selected arc
		Angle measurement	angle	measure angle between two lines
		Geometric tolerance	straightness	measure the straightness of a selected line
			roundness	measure the roundness of a selected circle
			perpendicularity	measure the perpendicularity of a selected line relative to the reference line
			parallelism	measurement the parallelism of a selected line relative to the reference line
			position	measure the positional tolerance of a selected point
			concentricity	measure the concentricity of two selected circles
			symmetry	measure the symmetry between two lines
			profile tolerance	measure the profile tolerance of a selected profile

TAB	Icon	Type	Name	Description
Measure		operational measurement	operation	monocular operation on the specified measurement results
			Functional operation	execute functional operations on the specified measurement results
		Special measurement	perimeter	measure perimeter of a closed figure
			automatic measurement	automatic measurement of width, arc radius, circle, diameter, roundness and angle
			screw	measure the basic size of a screw
			Radius	measure the arc to the corner from two straight lines.
			C-plane	Detect the c-plane line between two straight lines
			curve length	specified the curve length
			slot	detect the slot in the selected area
			point position	measure specified point (circle) X direction and Y direction distance
			circular cross	measure several diameters of the specified circle
			oval	Test the oval long and short diameter of axle

List of auxiliary elements

Add auxiliary elements like points, lines and circles.

TAB	Icon	Type	Name	Description
Auxiliary		Point	midpoint	draw the midpoint of two points
			line – line intersection	draw the intersection of two lines
			circle – circle intersection	draw the intersections of two circles
			circle – line intersection	draw the intersections of a circle and a line
			arc – line intersection	draw the intersections of an arc and a line
			arc – circle intersection	draw the intersections of a circle and an arc
			arc – arc intersection	draw the intersections of two arcs
			arc – line tangent point	draw the point of tangent of an arc and a line
			curve – line intersection	draw the intersections of a curve and a line
			curve - circle intersection	draw the intersections of a curve and a circle
		Line	point – point midline	draw the midline of two points
			point – line midline	draw the midline of a point and a line
			line - line midline	draw the midline of two lines
			vertical line	draw the vertical line between a point and a line
			parallel line	draw a line parallel to a selected line through a point or at a specified distance
			circle - point tangent line	draw tangent lines of a circle through a point
			arc - point tangent line	draw tangent lines of a circle through a point
			circle - circle tangent line	draw common tangent line of two circles
			circle - arc tangent line	draw common tangent line of a circle and an arc
			arc - arc tangent line	draw common tangent line of two arcs
			line through a point	draw a line with any angle through a point
			rotate line	draw a line with any length and any angle to a selected line
			approximate line	draw an approximate line through more than two points
			optimal line	Draw the optimal line with best straightness between the selected points

TAB	Icon	Type	Name	Description
Auxiliary		circle	middle circle	draw a middle circle between two circles(a
			approximate circle	drawan approximate circle through more than three p
			auxiliary circle	draw a circle with a selected point as its center and through another s point, or draw a circle with specific radi
			tangent circle	draw a circle tangent to two lines
			optimal circle	d raw the optimal circle with best roundness between the selected
			optimal arc	draw the optimal arc with best roundness between the select
		edge connectic	connection of lines	draw a line connecting two or more lines
			connection of circle	draw a circle connecting two or more arcs

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