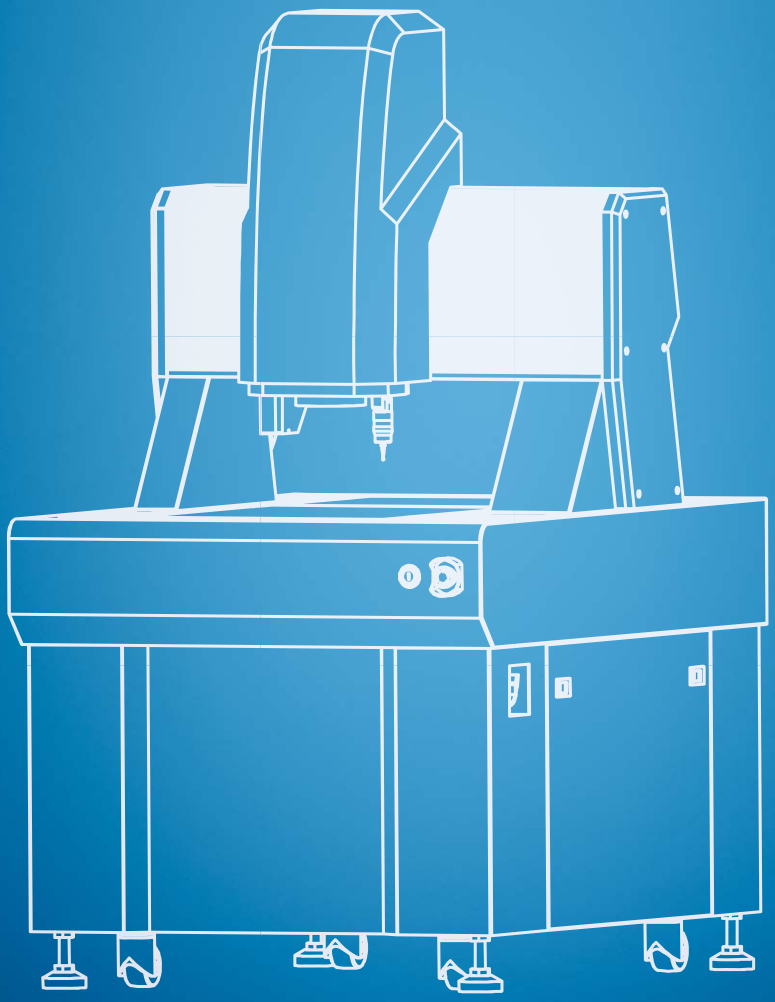
Auto Vision Measuring Instrument
AutoVision/AutoTouch/AutoScan Series
Operation Manual



Sinowon Innovation Metrology Manufacture Limited

www.sinowon.com

Preface

Dear Users,

In order to ensure the safety of your equipment and normal use, please read the following note.

Warning:

- When moving instrument, disconnected all the supply power, against hot plug.
- Handle with care when transportation, all of instruments put in the original package, place according to the iconic instruction, carried the goods in the way of closed type.
- Package material must be put in the place the children out of reach.
- The instrument must ground connection.
- Do not open the case to maintain by yourself. It is very dangerous for high pressure.

This marked warning operator attention to safety, for a variety of power supply, information line collection point and the place where there is a motor.

This marked a strong warning, do not touch.

This label is attached to the moving parts, such as no attention may cause harm to the human body.

This label requires professional personnel to operate, otherwise it is likely to cause damage to the machine or cause damage to personnel.

Grounding Mark.

Contents

1. Introduction of Instrument

1.1 Application

This new product is a non-contact vision measurement instrument CNC, is composed of a high resolution CCD color camera, zoom lens, color display, video cross line generator, precision optical ruler, multifunctional data processor, high precision mechanical structure of the 2D data measurement software with high precision worktable, high efficiency photoelectric measuring instruments; measurement based on 2D and 3D measurement. It can also be widely used in precision in different kinds of industries, such as electronic components, precision molds, precision tool spring, screw machining, plastic, rubber, oil seal valve, camera parts, bicycle parts, auto parts, conductive rubber, PCB processing etc. all kinds of precision processing, machinery, electronics, instrumentation, light industry, plastic industry, universities, research departments and metrology measurement room, one of the measuring and testing laboratory equipment and production workshop indispensable.

1.2 Features

- ✧ Movement gantry structure, work piece more fixed.
- ✧ CNC closed loop control system and auto measurement.
- ✧ Using high precision Ji'nan granite base and column, to ensure that the machine has high stability and precision.
- ✧ A grade high precision optical scale with precision instrument table, ensure the accuracy within ≤1.8+L/200 um (L mean the length of be tested objective).
- ✧ Import linear guide way, ball Screw and Panasonic AC servo motor, high accuracy and stability.
- ✧ High definition industrial camera, observe clearly and stability measurement.
- ✧ 6.5X continuous automatic zoom lens, accurate automatic zoom, just one pixel correction.
- ✧ Program-controlled 5-ring 8-zone LED surface light source, transmission parallel LED contour light source system, intelligent 256-level brightness adjustment.
- ✧ Optional imported contact probes and 3D measurement software, easy to upgrade the machine into a contact with the 3D measuring machine.
- ✧ Powerful iMeasuring image measurement software, to enhance the quality control to a new level.
- ✧ The optional iMeasuring measurement and data analysis and real-time monitoring software, enhance process control and reduce material consumption.
- ✧ Optional touch probe and laser probe, it can also be customized according to customer request.

2. Specification Parameter of Instruments

2.1 AutoVision Series Specification

Product Name		2.5D Fully Auto Vision Measuring Machine			
Model		AutoVision432	AutoVision542	AutoVision652	AutoVision862
Code#		520-121	520-131	520-141	520-151
X/Y-axis Travel		400x300mm	500x400mm	600x500mm	800x600mm
Z-axis Travel		200mm			
X/Y/Z 3-axis Linear Scale		Imported Open Linear Scale, resolution : 0.0001mm			
Guidance Mode		Imported H grade Linear Guide , Double-Track Double Slider Guide			
Operation Mode		Joystick controller, Mouse operation, automatic detection program			
Measurement Accuracy*		XY-axis : ≤1.8+L/200(um)			
		Z-axis : ≤5+L/200(um)			
Repeatability		±2um			
Video System**		1/2" Color CCD Camera			
		6.5X Automatic Zoom Lens; Optical Magnification: 0.7X~4.5X, Video Magnification: 20X~129X(21.5" monitor)			
Field of View(mm) (Diagonal * Horizontal*Vertical)	Lens Magnification	0.7x	1x	2.0x	3.0x	4x	4.5x
	1/2"CCD	11.43x9.14x6.86	8.00x6.40x4.80	4.00x3.20x2.40	2.67x2.13x1.60	2.00x1.60x1.20	1.78x1.42x1.07
Illumination	Contour	LED Parallel Contour Illumination					
	Surface	5-ring 8-division 0~255 grade continue adjustable					
Software System		iMeasuring 4.1 Fully Auto Measuring Software					
Load Capacity		30Kg	30Kg	30Kg	30Kg		
Working Environment		Temperature 20℃±2℃ , Humidity Range<2℃/hr,Humidity 30~80%,Vibration<0.002g, <15Hz					
Power		220V/50Hz/10A					
Dimension		1160x800x1650mm	1450x950x1650mm	1600x1050x1650mm	2000x1200x1650mm		
Packing Dimension		1380x1170x1910mm	1690x1300x2000mm	1800x1400x2000mm	2300x1700x2000mm		
Weight		650Kg	780Kg	1380Kg	2000Kg		

* L is measuring length , unit is mm, the mechanical accuracy of Z-axis and focus accuracy is greatly related to the surface of the workpiece.

**Magnification is approximate value, it is related to the dimension of monitor and resolution.

Customers can choose 0.5X or 2X optional objective, and realize image magnification: 10X~64.5X or 40X~258X.

2.2 AutoTouch Series Specification

<table>
<tr><td colspan="2">Product Name</td><td colspan="6">3D High Accuracy Fully Auto Vision Measuring Machine</td></tr>
<tr><td colspan="2">Model</td><td colspan="2">AutoTouch 432</td><td colspan="2">AutoTouch 542</td><td>AutoTouch 652</td><td>AutoTouch 862</td></tr>
<tr><td colspan="2">Code#</td><td colspan="2">521-121</td><td colspan="2">521-131</td><td>521-141</td><td>521-151</td></tr>
<tr><td colspan="2">X/Y-axis Travel</td><td colspan="2">400x300mm</td><td colspan="2">500x400mm</td><td>600x500mm</td><td>800x600mm</td></tr>
<tr><td colspan="2">Z-axis Travel</td><td colspan="6">200mm</td></tr>
<tr><td colspan="2">X/Y/Z 3-axis Linear Scale</td><td colspan="6">Imported Open Linear Scale, resolution : 0.0001mm</td></tr>
<tr><td colspan="2">Guidance Mode</td><td colspan="6">Imported P grade linear guide , double-track double slider guide</td></tr>
<tr><td colspan="2">Operation Mode</td><td colspan="6">Joystick controller, Mouse operation, automatic detection program</td></tr>
<tr><td colspan="2" rowspan="2">Measurement Accuracy*</td><td colspan="6">XY-axis : ≤1.8+L/200(um)</td></tr>
<tr><td colspan="6">Z-axis : ≤5+L/200(um)</td></tr>
<tr><td colspan="2">Repeatability</td><td colspan="6">±2um</td></tr>
<tr><td colspan="2" rowspan="2">Video System**</td><td colspan="6">High definition 1/2" Color CCD Camera, Image navigation system</td></tr>
<tr><td colspan="6">6.5X Automatic Zoom Lens; Optical Magnification: 0.7X~4.5X,
Video Magnification: 20X~129X(21.5" monitor)</td></tr>
<tr><td rowspan="2">Field of View(mm)
(Diagonal *Horizontal*Vertical)</td><td>Lens Magnification</td><td>0.7x</td><td>1x</td><td>2.0x</td><td>3.0x</td><td>4x</td><td>4.5x</td></tr>
<tr><td>1/2"CCD</td><td>11.43x9.14x6.86</td><td>8.00x6.40x4.80</td><td>4.00x3.20x2.40</td><td>2.67x2.13x1.60</td><td>2.00x1.60x1.20</td><td>1.78x1.42x1.07</td></tr>
<tr><td rowspan="2">Illumination</td><td>Contour</td><td colspan="6">LED Parallel Contour Illumination</td></tr>
<tr><td>Surface</td><td colspan="6">5-ring 8-division 0~255 grade continue adjustable</td></tr>
<tr><td colspan="2">Software System</td><td colspan="6">diMeasuring 4.2 Fully Auto Measuring Software</td></tr>
<tr><td colspan="2">Load Capacity</td><td colspan="2">30Kg</td><td colspan="2">30Kg</td><td>30Kg</td><td>30Kg</td></tr>
<tr><td colspan="2">Working Environment</td><td colspan="6">Temperature 20℃±2℃ , Humidity Range<2℃/hr,Humidity 30~80%,Vibration<0.002g, <15Hz</td></tr>
<tr><td colspan="2">Power</td><td colspan="6">220V/50Hz/10A</td></tr>
<tr><td colspan="2">Dimension</td><td colspan="2">1160x800x1650mm</td><td colspan="2">1450x950x1650mm</td><td>1600x1050x1650mm</td><td>2000x1200x1650mm</td></tr>
<tr><td colspan="2">Packing Dimension</td><td colspan="2">1380x1170x1910mm</td><td colspan="2">1690x1300x2000mm</td><td>1800x1400x2000mm</td><td>2300x1700x2000mm</td></tr>
<tr><td colspan="2">Weight</td><td colspan="2">650Kg</td><td colspan="2">780Kg</td><td>1380Kg</td><td>2000Kg</td></tr>
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* L is measuring length , unit is mm, the mechanical accuracy of Z-axis and focus accuracy is greatly related to the surface of the workpiece.

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Customers can choose 0.5X or 2X optional objective, and realize image magnification: 10X~64.5X or 40X~258X.

2.3 AutoScan Series Specification

<table>
<tr><td colspan="2">Product Name</td><td colspan="6">Auto Laser Scan Vision Measuring Machine</td></tr>
<tr><td colspan="2">Model</td><td colspan="2">AutoScan 432</td><td colspan="2">AutoScan 542</td><td>AutoScan 652</td><td>AutoScan 862</td></tr>
<tr><td colspan="2">Code#</td><td colspan="2">522-121</td><td colspan="2">522-131</td><td>522-141</td><td>522-151</td></tr>
<tr><td colspan="2">X/Y-axis Travel (mm)</td><td colspan="2">400x300mm</td><td colspan="2">500x400mm</td><td>600x500mm</td><td>800x600mm</td></tr>
<tr><td colspan="2">Z-axis Travel (mm)</td><td colspan="6">200mm</td></tr>
<tr><td colspan="2">X/Y/Z 3-axis
Linear Scale (mm)</td><td colspan="6">High precision linear scale , resolution : 0.0001mm</td></tr>
<tr><td colspan="2">Guidance Mode</td><td colspan="6">Precision linear guide , double-track double slider guide</td></tr>
<tr><td colspan="2">Operation Mode</td><td colspan="6">Joystick controller, Mouse operation, automatic detection program</td></tr>
<tr><td colspan="2" rowspan="2">Measurement Accuracy*</td><td colspan="6">XY-axis : ≤1.8+L/200(um)</td></tr>
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<tr><td colspan="2">Repeatability</td><td colspan="6">±2um</td></tr>
<tr><td colspan="2" rowspan="3">Video System**</td><td colspan="6">1/3" Color CCD Camera</td></tr>
<tr><td colspan="6">6.5X auto zoom lens</td></tr>
<tr><td colspan="6">6.5X auto zoom lens; optical magnification: 0.7X-4.5X; video magnification:20X~129X(21.5" monitor)</td></tr>
<tr><td rowspan="2">Field of View(mm)
(Diagonal *Horizontal*Vertical)</td><td>Lens Magnification</td><td>0.7x</td><td>1x</td><td>2.0x</td><td>3.0x</td><td>4x</td><td>4.5x</td></tr>
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<tr><td rowspan="2">Illumination</td><td>Contour</td><td colspan="6">LED Parallel Contour Illumination</td></tr>
<tr><td>Surface</td><td colspan="6">5-ring 8-division 0~255 grade continue adjustable</td></tr>
<tr><td colspan="2">Software System</td><td colspan="6">iMeasuring 5.0 Fully Auto Measuring Software</td></tr>
<tr><td colspan="2">Load Capacity</td><td colspan="2">30Kg</td><td colspan="2">30Kg</td><td>30Kg</td><td>30Kg</td></tr>
<tr><td colspan="2">Working Environment</td><td colspan="6">Temperature 20℃±2℃ , Humidity Range<2℃/hr,Humidity 30~80%,Vibration<0.002g, <15Hz</td></tr>
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Customers can choose 0.5X or 2X optional objective, and realize image magnification: 10X~64.5X or 40X~258X.

3. Structure and Operating Principle

3.1 Structure

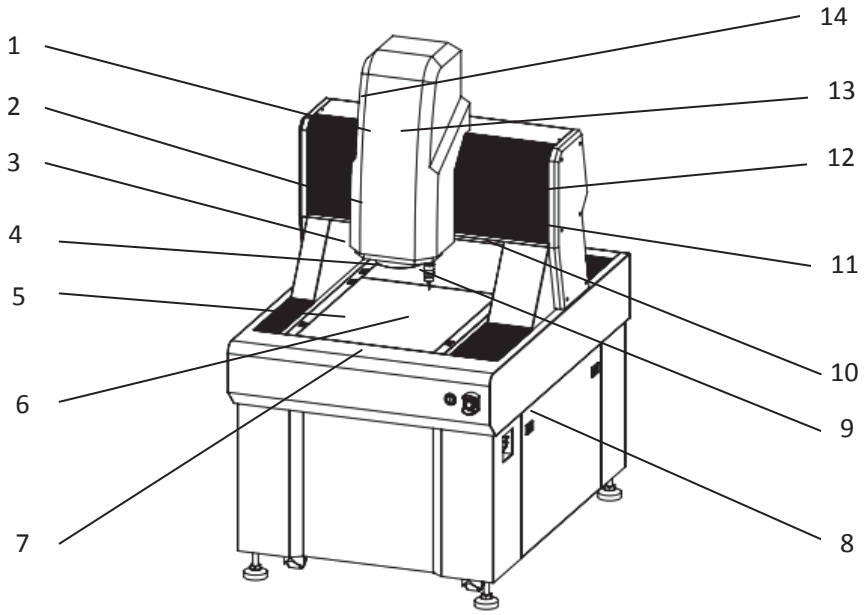

Fig 1 Structure

1. CCD(camera)	2. Zoom lens	3. Laser Probe(Option)	4. Surface Illumination
5. Worktable	6. Y Grating Scale	7. Y Driving Motor	8. Base
9. Probe (Option)	10. X Grating Scale	11. X Driving Motor	12.Shift gantry structure
13. Z axis rotate set	14. Z Grating Scale		

Equipment structure could be divided into three parts (Fig 1)

1) Main Body including :

Base (8) , Shift gantry structure (12) , Worktable (5) , Y X Driving Motor and Z axis rotate set , (7、11、13)。

2) Vision measuring system :

- ✧ Zoom lens (2) : Focusing range 0.7-4.5X , total magnification 20-129X (1/2"CCD,21.5" LCD) .
- ✧ Color CCD camera get the image from Zoom lens, has a image of measured work-piece and change the video to digital signals, then it transfers the signal to computer color monitor via S-port. Color display generates the reticle with edge founder function.
- ✧ Contour light and surface light make use of the LED lamp-house, the LED lightness can be adjusted by switch (Fig 4) and the illumination is better, and LED longevity is 10 times than average bulbs.

3) Digital measuring system, includes as follows :

- ✧ X-axis(10) Y-axis(6) and Z-axis (14) linear scale generates the displacement signals by geometry movement of work-stage, the signal is collected by measuring software via signal capture card, and the measuring software show and process the data on the PC, Z axis is assistant measuring.
- ✧ Functional data: process and display measuring information.

3.2 Operating Principle

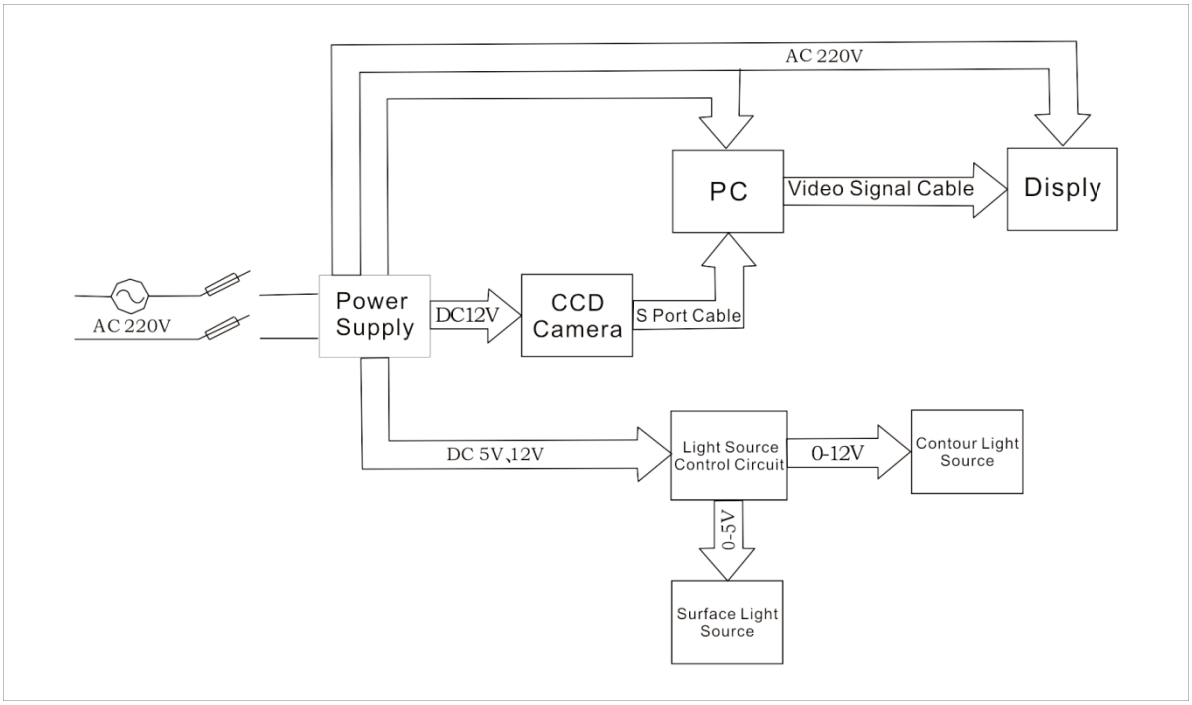

Fig 2 Operating Principle

Optical vision measurement is one of the high precision measuring method is more advanced at present, its working principle is shown in Figure 2, the measured Work piece(placed on the table) by LED surface (4)or contour light (table in lighting), the zoom lens (2), color CCD (1 cover) the uptake of images, even good computer by special measuring software for its target measurement, through Y to X, (longitudinal) to (horizontal movement) drives the grating (6 and 10) in X, mobile Y direction, by measuring software to complete the measurement work.

4. Open Box and Install of Instrument

- ✧ Remove the outside and inside package of instrument, take and read this part for installing instrument firstly.
- ✧ Place the instrument on a horizontal table, install the base screw and adjust it levelly.
- ✧ Take out the fixed ban of X, Y-axis and glide fixed screw of Z-axis (it is on the mantle), then X, Y, Z-axis can be driven.
- ✧ Instrument can work under power supply AC110V-220V, 50-60HZ, after connecting the computer, turn on the instrument power, if the image and data can be displayed on the monitor, the installation is finished.
- ✧ Read the operation manual carefully before using.
- ✧ Normally, the authorized distributors will install and check the instrument before the end customers using it.

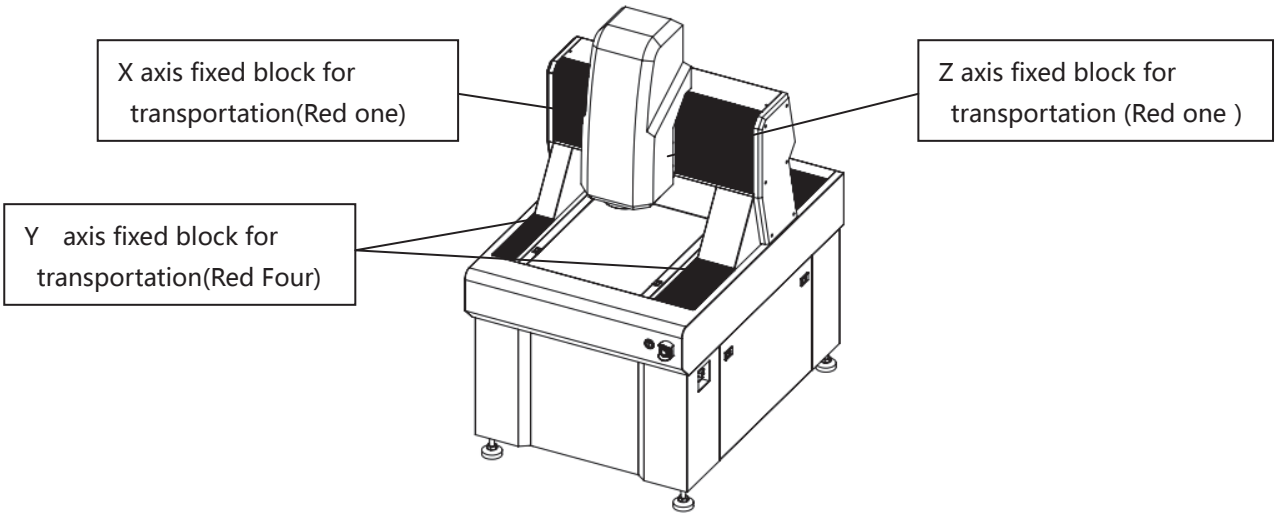

Fig 3 Packing

5. Method of Measurement

Vision measurement can be roughly divided into three ways: profile measurement, surface measurement, Z axis measurement.

5.1 Profile Measurement :

As the name suggests is the measurement of the workpiece contour, generally use the profile light at the bottom, can be applied on the surface of the light auxiliary lighting, let the measured line more clearly, is conducive to the measurement.

5.2 Surface Measurement :

The surface measurement is the main function of vision measurement, that can see the surface on the surface of circular size, light source, vision measuring instrument can measure almost, for example, the line size of copper foil on the circuit board, IC circuit. When the measured object is black plastic, rubber, vision measuring instrument can easily measure its size.

5.3 Z axis Measurement :

When equipped with high magnification objective, there is enough aiming and positioning accuracy, the vision measuring instrument can be used as Z axis measurement such as measuring the height of the steps of the workpiece, dark hole depth, the use of surface light measurement.

5.4 Probe - assisted Measurement :

By the probe we could measurement of touch, such as measuring the height of step, ball, cylinder and circular cone. Meanwhile we could make vision and probe for coordinate measurement. It is could realize automatic measurement.

5.5 Laser Measurement

Equip with import laser displacement sensor, it could make non touch measurement. Such as height, thickness and flatness and scan measurement.

6. Care and Maintenance

Vision measuring system is a precision instrument that integrating the optic, mechanism, electricity and computer technology. In order to keep the excellent performance, it needs regular and upstanding maintenance.

- ✧ The instrument should be installed in a clean room, the temperature of which should be maintained at 20°± 5℃. The relative humidity of the room should not exceed 60％ so as to prevent the molding of optical parts, the rust of metallic parts and the dust drops on the drive guider to keep the high quality.
- ✧ Once the instrument has been finished using, the surface of work-stage should be cleaned with soft brushes and covered by dust cover.
- ✧ The drive and movement system should be regularly appended the lube to make the mechanism movement smooth and keep good using condition.
- ✧ If it is dirty on the glass-stage and paint-surface, it can be cleaned by neutral freshener or clean water, please don’t use organic solvent to brush, or else, the paint-surface will lose the reflet.
- ✧ LED lamp-house has long longevity; please inform the distributor and professional engineers to replace it if it is bad.
- ✧ The precision parts of instrument, such as video system, work-stage, linear scale and Z-axis drive system have been precision adjusted in the factory, adjust screws and fixation screws are riveted in the factory, don’t unbendingly take it out. If there are some problems, please get in touch with the distributor for after sales.
- ✧ The error compensation of measuring software has been enacted; please don’t change it, or else, it will give rise t to inaccurate measuring results.
- ✧ Don’t unbendingly take out the electric connectors, if it has already been took, please plug it into the right port, or else, there is possibility to make the instrument bad.

7. Failure Analysis and Solve the Problem

※ **Failure 1:** Software is not open, no response.

Solution: Confirm the encryption lock has been inserted, canceled or restart the computer, such as multiple times can not open, the encryption lock for a USB interface.

※ **Failure 2:** Software can not count.

Solution: Check the RS232 interface line, see whether it is loose, the device manager in the COM1 whether 1, the computer's COM1 whether damaged.

※ **Failure 3:** Not accurate for drawing, large measuring error.

Solution: check the software calibration whether accurate or not.

The following is the attention of the instrument switch machine!

Boot Notes

First, we turn on the vision instrument and the host power switch, and then start the computer, after the start of the software icon on the desktop, run software, adjust the lights, the focal length to the most clear; can be measured.

In the measurement should pay attention to the following points：

1）Focal length adjustment.

2）Calibration scale.

3）Software window can only open one.

Shutdown Notes

In the shutdown should pay attention to the following points：

1）Turn off the software first.

2）The upper and lower left button to adjust light off.

3）Turn off the computer.

4）Turn off battery main last.

Shutdown Notes

In the shutdown should pay attention to the following points：

1）Turn off the software first.

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8. User’s Instruction

After Service Note

All customers to purchase our vision measuring instrument could enjoy the following services:

- Free operation training
- The same version of the software within a year of free upgrades
- Free warranty one year
- Maintain lifelong

9. Storage Condition, Transportation and Attentions

- Storage should be away from vibration, strong magnetic field, corrosive media, moisture, dust, should be stored at room temperature.
- Avoid rough handling during transport to avoid damage to the instrument.

SINOWON®

ISO 9001:2015 认证企业

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