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**ISD-A100
VIDEO MEASURING MICROSCOPE
OPERATION MANUAL**



Description

1 ISD-A100 is a precise and excellent effective measuring instrument integrating optic, mechanic and electricity. Used widely in the trade of mechanic, meter, electronics and light industry, as well as the laboratories, metric room and workshop of the academes, research institutions, measurement-inspecting department etc. This instrument can sufficiently inspect various kinds of surface and outline of complicated work-piece. Such as template, cam, tread and gear, perform milling cutter including machine tools and parts.

2 Working principle:

When putting a workpiece on the work-table, it's image is captured and exported to the computer through the camera, user can take measurements like point, line, circle, distance, angle and so on with supplied software.

3 Structure:



4 Specification:

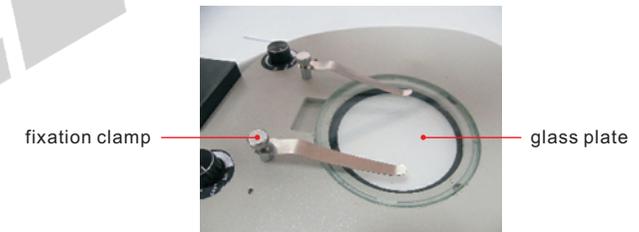
- ◆ Objective: 0.75X - 5X (zoom)
- ◆ Focus distance: 82mm (1X auxiliary objective), 175mm (0.5X auxiliary objective)

- ◆ View field (diagonal length): 1.15mm~7.5mm (1X auxiliary objective), 2.3mm~15mm (0.5X auxiliary objective)
- ◆ Magnification (19" widescreen display): 44X~280mm (1X auxiliary objective), 22X~140X (0.5X auxiliary objective)
- ◆ Accuracy: $\leq 4\mu\text{m}$
- ◆ Repeatability: 2μm

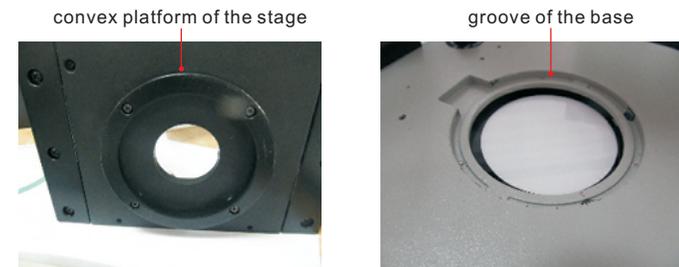
Installation

1 You can select glass plate or black/white plate as the working table. Use X-Y stage can move the workpiece smooth and the installation steps is shown as follow:

- ◆ Cut off the power then disassemble the fixation clamp, glass plate or white/black plate.



- ◆ Make convex platform of the stage bottom align to groove of the base.

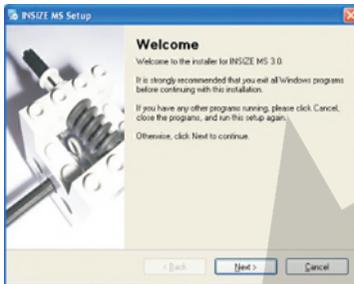


- ◆ Press four corner of the stage to make it stable, turn stage to get the right direction.

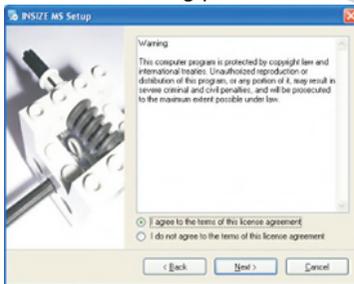


Y axis adjustment
X axis adjustment

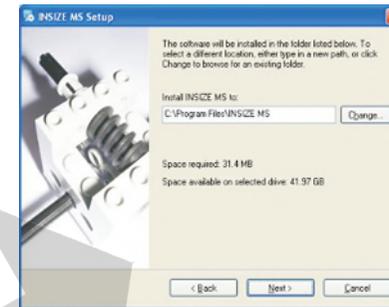
- ◆ Turn X, Y axis adjustment knob the stage.
Note: The scale on the stage just for reference but not for measuring.
- 2 Power connection: Insert the surface illumination plug into the top of stand, then confirm the voltage is same as local voltage.
- 3 Connect to computer: Insert the USB plug into the computer.
- 4 Install the software:
 - ◆ Put the software disc into CD ROM, and then launch “setup”.
As the following picture:



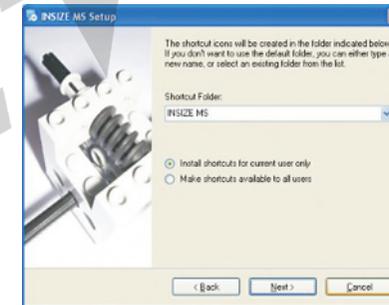
- ◆ Click “Next”. As the following picture:



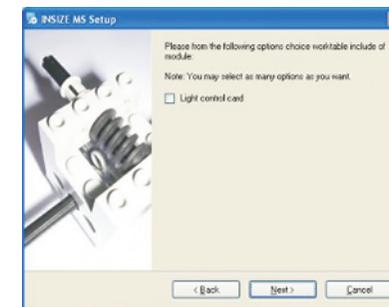
- ◆ Select “I Agree...” then click “Next”. As the following picture:



- ◆ Choose the Install Path then click “Next”:



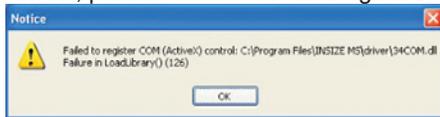
- ◆ Click “Next”. As the following picture:



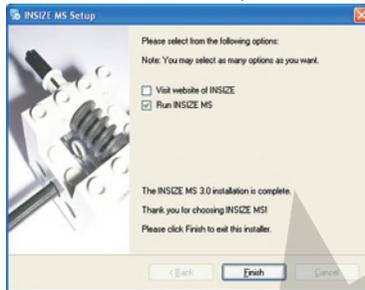
- ◆ Click “Next”. As the following picture:



- ◆ Click “Next” to install the software. If appear the windows as follow, please click “OK” and “Ignore” to continue:



- ◆ When appear window as follow, please click “Finish”.



5 Install the camera drive:

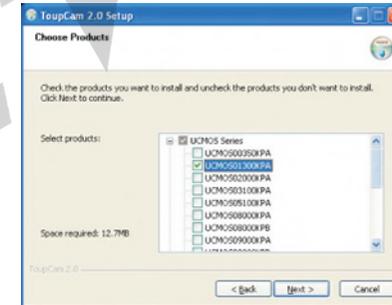
- ◆ Put the software disc into CD ROM, and then launch “ToupTekToupCam Setup”. As the following picture:



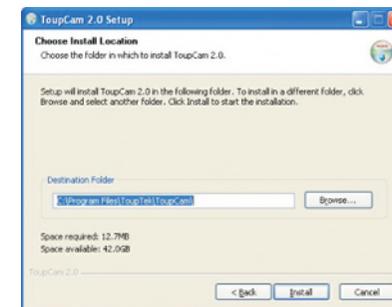
- ◆ Click “Next”. As the following picture:



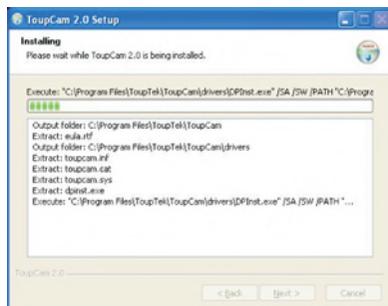
- ◆ Click “I Agree” to continue. As the following picture:



- ◆ Select “UCMOS01300KPA” then click “Next” to continue. As the following picture:



- ◆ Click “Install” to continue. As the following picture:

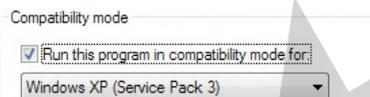


◆ When Installation is Complete, please click “Finish”.

- 6 Run the software:
Insert the softdog then double click desktop icon or click 『Start/Program/INSIZE MS』 to run the software.

Operation attention

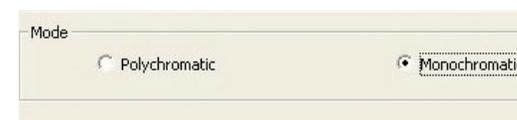
◆ If you computer use Windows 7 OS, please right click “INSIZE MS” icon on the desktop and select properties. Then click “Compatibility” and select the option as follow shown. At last click “OK”.



◆ When run the software first time, click the “image/CCD setup” and set the options as follow shown then click “OK”. After set please close the software and run it again.



◆ In order to get high accuracy, you can make the monochromatic image. The step is: click the “image/CCD setup” then click “Attribute”, click the “Misc” key then click “monochromatic” in the mode option. At last click “OK”.



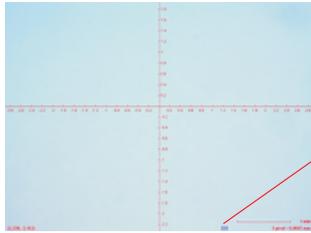
◆ If the image frame speed is slow when you move the workpiece. Click the “image/CCD setup” then click “Attribute”, click the “Exposure” key then cancel “Auto Exposure” and reduce the “Exposure time”. At last click “OK”.



◆ In order to get the measuring accuracy, you must magnify the object as large as possible to make the dimension larger than half diagonal length of the view area. If the view filed is not enough, please use the 0.5X auxiliary objective.

Illumination selection

- 1 Turn on the power switch and select the surface or contour illumination. You can use the illuminations individual or combinational. Turn the adjusting knob to change the brightness of the illumination.
- 2 There is a value displaying in the right and bottom edge of the image zone. When magnification is low, make the cross in the blank area then turn the light controlling knob to see the value, when the value is smaller than 200, It's color will be pink, it means that light is too weak; when the value is larger than 230, It's color will be red, it mean that present light is too strong. When the value is between 200 and 230, and its color is blue, represents light is ideal for measuring.

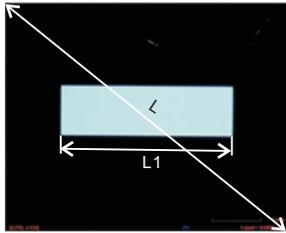


The color is blue

- 3 When magnification is large, just set the max brightness.

View field

In order to get the measuring accuracy, you must magnify the object as large as possible to make the dimension(L1) larger than half diagonal length(L) of the view area.



- 1 Relation between the View field(L is diagonal length of the view area) and magnification:

use 1X auxiliary objective	
magnification of objective	view field(L)
0.75X	7.5mm
1X	5.6mm
1.5X	3.7mm
2X	2.8mm
2.5X	2.3mm
3X	1.8mm
3.5X	1.6mm
4X	1.4mm
4.5X	1.25mm
5X	1.15mm

use 0.5X auxiliary objective	
magnification of objective	view field(L)
0.75X	15mm
1X	11.2mm
1.5X	7.5mm
2X	5.6mm
2.5X	4.6mm
3X	3.7mm
3.5X	3.2mm
4X	2.8mm
4.5X	2.5mm
5X	2.3mm

- 2 Refer to the white line then turn the adjusting knob to select magnification.



- 3 Replace the auxiliary objective:

- ◆ Use the 1.5mm allen wrench(standard delivery) to disassemble the surface illumination.



- ◆ Screw out the original auxiliary objective then fit on the new auxiliary objective.



auxiliary objective

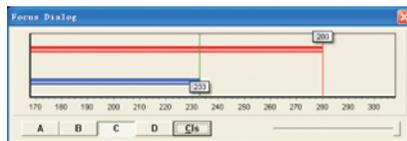
- ◆ To mount the surface illumination again.

Focusing

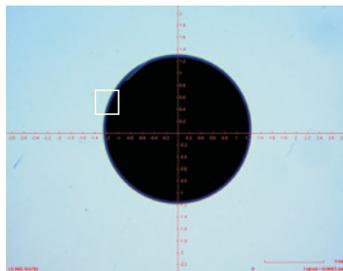
Note: After you change the magnification or replace the auxiliary objective, you need to focusing again.

- 1 When use 1X auxiliary objective, the focus distance is about 82mm. When use 0.5X auxiliary objective, the focus distance is about 175mm.

- Click the  key on the software to open the focus dialog box.



- Turn the focusing knob to make the image clear, then use the mouse to drag the yellow box and make the edge of workpiece in it.



- Click "CIs" key on the dialog box then turn the fine adjusting knob. Get the red indicator at max value, then turn the fine adjusting knob again to make the green indicator value close to red, it means the focus distance at the best state.



- Please close the dialog box after focusing is done.

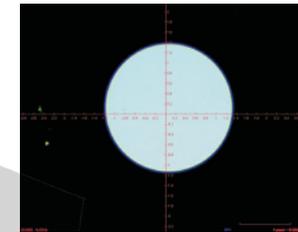
Calibration

Note: After you change the magnification or replace the auxiliary objective, you need to do calibration again.

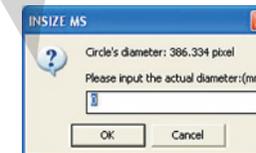
Note: You don't need calibration if focusing again.

- Put the calibration block on the stage and choose contour illumination.

- Select a circle as large as possible (make sure the diameter is larger than half diagonal length of the view area). Adjust the focus distance to make the image clear.



- Click  key on the software or "proof/image correction-circle" then click in the circle. The follow dialog box is shown:



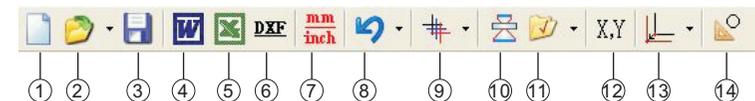
- Input the actual diameter value into the dialog box then click "OK" to finish.

Move away the calibration block then put on the workpiece. Adjust the focus distance and now you can do measurement.

Commands explanation

You can login our website: www.insize.com and click "Support" to watch or download the operation demo.

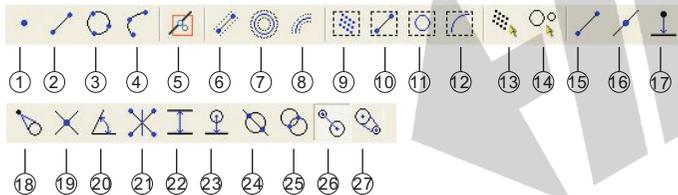
- Function Bar:



- Create new file: Create a new "INSIZE MS" file with the extension "e2d".
- Open file: open "e2d" file.

3. Save file: save present work.
4. Output as "Word": If "Microsoft office" is installed in your computer, program will open "Word" and output selected drawing data(on the data-tree) to form a "Word" file.
5. Output as Excel: If Microsoft office is installed in your computer, program will open Excel and output selected drawing data(on the data-tree) to form a Excel file.
6. Output as DXF: Output present drawing as DXF file.
7. Metric / Inch switch: switch data unit between metric and Inch.
8. Cancel delete: back to recall deleted drawing objects.
9. Reticle line color: Change reticle line color in the image area.
10. Focusing instruction: click the icon to open focusing indication dialogue box.
11. Load proofread parameter: Load proofread parameter file that have been saved before.
12. Input coordinate: Open dialogue box to input coordinate. you can draw point, line and arc/circle,In this box.
13. Coordinate translate: Translate present coordinate system to a new position to set a new coordinate system.
14. Image correction: Use a standard circle to correct the software.

② Drawing and measuring commands:

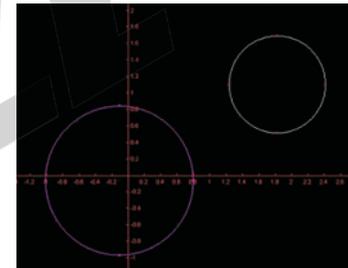


1. Point drawing: Draw a point and record its coordinate.
2. Line drawing: Input two points and click right mouse button to end to get a line. Input at least three points and click right mouse button to end to get a regression line.
3. Circle drawing: Input at least three points and click right mouse key to end to get a circle. parameters like circle center, radius, roundness proportion will be acquired also. (in data-tree).

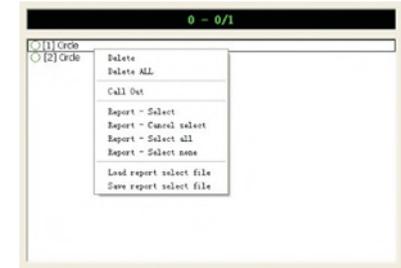
4. Arc drawing: Input at least three points, the first point as the start point, the second point to determine arc direction and the last point as the end point. Click right mouse key to end points input to get the arc, program will calculate parameters like center, radius, length, inclination of the arc.
5. Auto-catch edge point(s): When this button is pressed down, program will find the strongest black-white contrast point in image zone and make it as the input point, otherwise (the button is not pressed down), program will take the mouse key click position as the input point.
6. Auto-line measurement: Input a rectangle by a mean of dragging the mouse, adjust the size and position of rectangle and then right click, the program will regress most suitable line automatically in rectangle box.
7. Auto-circle measurement: create two concentric circles by dragging mouse, and right mouse click after adjusting the two circles size, then the program will automatically regress another concentric circle in the annulus area between the two concentric circles, and the arrow expresses the way of regressing, from inside to outside or from outside to inside.
8. Auto-arc measurement: concentric circle is changed into concentric arc.
9. Box select points group: Use left mouse key to box select a field in the image zone, program will get all the edge points inside the field and display them in points group style automatically.
10. Box select line: Use left mouse key to box select a field in the image zone, program will fit the line inside the field automatically.
11. Box select circle: Use left mouse key to box select a field in the image zone, program will find the circles inside the field automatically.
12. Box select arc: use left mouse key along the same direction (clockwise or counter-clockwise) to select one or some non-overlapping panes, program will fit a arc automatically according to the points within these panes.
13. Point-select point group: Use left key to click in the video zone, the program will regard the point as the center and look for the edge around, then display the edge data acquired in the form of point group.

14. Point-select circle: Use left mouse key to click in the circle, the program will take this point as a center and then look for the edge around, and use the edge data acquired to regress a circle.
15. Two points distance: Use left mouse key to select two points (one by one), program will form a line between the two points, length of this partial line is this two points' distance.
16. Line middle point: Use left mouse key to select a line, program will calculate its middle point.
17. Point-line distance: Use left mouse key to select a point and a line, program will form a new line automatically and its length is the point-line distance.
18. Point-circle tangents: Use left mouse key to select a point and circle, program will get tangents from the point to the circle (If tangents exist).
19. Two lines intersection (inclination): Use left mouse key to select two lines, program will get inclination and intersection of the two lines.
20. Two lines angle: Use left mouse key to select two lines, program will get angle the two lines.
21. Angular bisector: Use left mouse key to select two lines, program will get angular bisector of the two lines. (Click different parts of the lines, results come out may differ).
22. Line-line distance: Press this icon under image windows, use left mouse key to select two lines, program will calculate distance of the two lines.
23. Circle-line distance: Press this icon under image windows, use left mouse key to select a line and a circle, a new line will appear and it's length is the distance between line and the center of the circle. There are three solutions of circle-line distance, opt View/Solution/Setting Circle to line distance, then the below dialogue box will appear.
Notice: If you tick in front of Set as default solution, the dialogue will not appear next time. Remove the tick, then the dialogue will appear next time.
24. Circle-line intersections: Press down Icon under "image" windows, use right mouse key to select a circle and a line, program will calculate intersection coordinates.(If intersections exist).

25. Circle-circle intersections: Press down Icon use right mouse key to select two circles (one by one), program will calculate intersection coordinates.(If intersections exist).
 26. Circle-circle distance: Press this icon under image window, use left mouse key to select two circles (one by one), program will generate automatically a new line and it's the distance between those two circles. Open View/Solution/Circle to circle distance following dialogue.
 27. Circle-circle tangent: Press this icon under image window, use left mouse key to select two circles (one by one), program will get two exterior tangents.
- Note: You can left-click the object in image zone to make a choice. Another way is right-click the object in measuring object zone then select "Call Out" option.**



select in image zone



select in measuring object zone

- 3 Tolerance:
 - ◆ Click the tolerance key on the software and select the option.
- Parallelism

Verticality

Angularity

Position

Concentricity
- ◆ Select two objects then software will calculate the tolerance between them.

4 Optional setting:

Settings to the program, such as Auto-Save function.

5 Result dialog box :

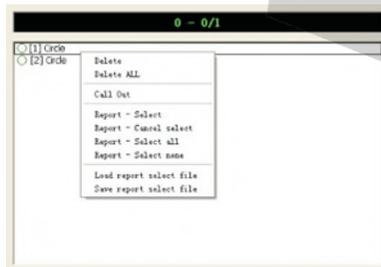
Display the name and measure result of the objects, also you can select and delete the objects.



Output file and input CAD graph

1 Output file:

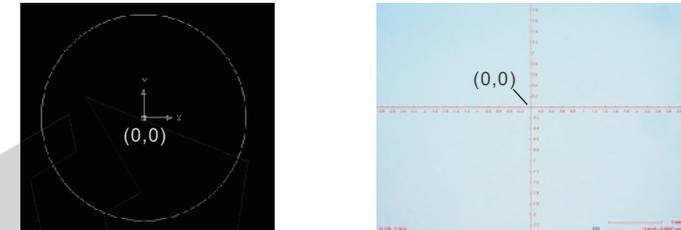
- ◆ Right-click the object in measuring object zone then click "Report-select". If you want select all objects please click "Report-select all".



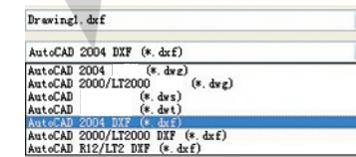
- ◆ Click key to select output the file as Word, Excel or DXF. Save the file after finish the output operation.

2 Input CAD graph to compare with the workpiece:

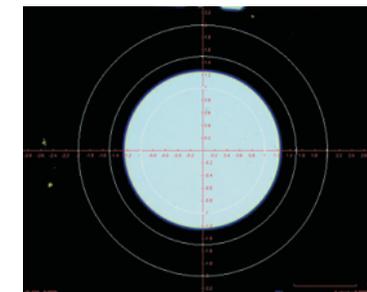
- ◆ First you need use CAD software draw the graph. The absolute coordinate of CAD software and measuring software must be consistent as follow.



- ◆ Save the graph as "DXF" file.



- ◆ Open the software and click the option as follow shown, select the "Input DXF file" then input the graph into the software.



Specification

Objective	0.75X - 5X (zoom)	
Auxiliary objective	1X	0.5X
Focus distance	82mm	175mm
View field (diagonal length)	1.15mm - 7.5mm	2.3mm - 15mm
Magnification (19" widescreen display)	44X - 280X	22X - 140X
Camera	CMOS (color)	
Resolution (pixel)	1280*1024 (1.3M)	
Output	USB2.0	
Accuracy	≤4μm	
Repeatability	2μm	
Illumination	surface/contour: adjustable ring LED/LED	
Demension (W×D×H)	300×350×450mm	
Weight	2.8kg	

Standard delivery

Main unit	1pc
Software disc	1pc
Softdog	1pc
X-Y stage (travel: 74×60mm)	1pc
Calibration block	1pc
0.5X auxiliary objective	1pc
1X auxiliary objective	1pc
Ø95mm glass plate	1pc
Ø95mm white / black plate	1pc
Anti-dust cover	1pc